AGENDA
STATE BOARD OF EDUCATION

December 8, 2016
Arkansas Department of Education
ADE Auditorium
10:00 AM

I. Call to Order

II. Recognition

1. Recognition of 2017 Arkansas Teacher of the Year

   Presenter: 2016 ATOY Meghan Ables

2. Presidential Awards for Excellence in Mathematics and Science Teaching 2016 Arkansas State Finalists

   Presidential Awards for Excellence in Mathematics and Science Teaching:

   Justin Leflar, K-6 Science

   Melissa Henry, K-6 Math

   Kimberly Meyer, K-6 Math

   Amy Sandy, K-6 Math

   Presenter: Michele Snyder and Anthony Owen

3. Presidential Awards for Excellence in Mathematics and Science Teaching 2014 & 2015 National Awardees

   Presidential Awards for Excellence in Mathematics and Science Teaching:

   Cassie Kautzer, 2014 K-6 Science

   Diedre Young, 2015 7-12 Science

   Ashley Kasnicka, 2014 K-6 Math

   Daniel Moix, 2015 7-12 Math

   Presenter: Anthony Owen and Michele Snyder

4. National Council for the Social Studies National Recognition

   The National Council for the Social Studies (NCSS) has named Little

Rock School District teacher,
Vicki Stroud Gonterman, the NCSS Teacher of the Year (Elementary Division) for 2016-2017.
Presenter: Stacy Smith and Maggie Herrick

III. Consent Agenda

1. Minutes - November 10, 2016 — 11

   Presenter: Deborah Coffman

2. Review of Loan and Bond Applications — 27

   The members of the Arkansas State Board of Education are requested to review the following:
   Commercial Bond Application – 1 Second Lien
   With the recommendation to approve from the Loan Committee and additional information provided by the school district in its application package:
   • Pursuant to Arkansas Code Annotated § 6-20-805 concerning the Revolving Loan Program, the State Board of Education, in its discretion and after considering the merits of each application with the loan committee recommendation, may approve a school district revolving loan application for the full amount of the proposed loan, approve the application for a loan of a lesser amount than requested, or disapprove the application.
   • Pursuant to Arkansas Code Annotated § 6-20-1205 concerning school district bonds, a school district shall not sell bonds until the issue is approved by the State Board of Education. Therefore, the State Board of Education, in its discretion and after considering the merits of each application with the loan committee recommendation, may approve a school district bond application for the full amount of the proposed bond issue, approve the application for a lesser amount than requested, or disapprove the application.

   Presenter: Cindy Hollowell and Amy Woody

3. Newly Employed, Promotions and Separations — 30

   The applicant data from this information is used to compile the

Applicant Flow Chart forms for the Affirmative Action Report, which demonstrates the composition of applicants through the selecting, hiring, promoting and terminating process. The information is needed to measure the effectiveness of the agency's recruitment, hiring and promotion efforts and is in conformity with federal government guidelines, which require the agency to compile statistical information about applicants for employment.

Presenter: Greg Rogers and Clemetta Hood

4. Community Service Learning Application: Good Shepherd Humane Society 31

   Good Shepherd Humane Society of Berryville is submitting a site application to be a Community Service Learning site provider and work with the Berryville School District per Community Service Learning Act 648 of 1993.

   Presenter: Stacy Smith and Maggie Herrick

5. Approval of High School Science Courses (Survey Results) 33

   The proposed high school science courses were distributed across the State for the purpose of allowing
   educators, parents, and other stakeholders to provide feedback on the proposed course work. A summary of the feedback is provided for consideration by the State Board of Education.

   Presenter: Stacy Smith and Michele Snyder

6. Consideration of Report on Waivers to School Districts for Teachers Teaching Out of Area for Longer than Thirty (30) Days, Ark. Code Ann.§ 6-17-309 56

   Arkansas Code Annotated §6-17-309 requires local school districts to secure a waiver when classrooms are staffed with unlicensed teachers for longer than 30 days. Requests were received from 44 school districts covering a total of 153 waivers. There were also requests for long-term substitutes from 61 school districts requesting a total of 171 waivers for long-term substitutes. These requests have been reviewed, were either approved or denied by Department staff, and are consistent with program guidelines.

Presenter: Ivy Pfeffer

7. Consideration of the Recommendation of the Professional Licensure Standards Board for Case #16-101 – Mallory Dawn Rorie (Second Review requested by SBOE)
Violation of Standard 1. An educator maintains a professional relationship with each student, both in and outside the classroom. The Professional Licensure Standards Board Ethics Subcommittee recommends that the State Board order a one (1) year suspension; assess a $100.00 fine; require that she complete courses HWB14402 – Act 1236 or 2011: Child Maltreatment (January, 2014) and IAD14492 Classroom Management: Building Effective Relationships, 2nd Edition through ArkansasIDEAS; and submit a written reflection on each course addressing how the training will impact her future relationships with students both in and outside the classroom. Both training and written reflections will be completed and submitted to the PLSB office within ninety (90) days of the State Board's final order. All associated costs paid by educator. Ms. Rorie accepted the recommendation on August 16, 2016.
Presenter: Eric James

8. Consideration of the Recommendation of the Professional Licensure Standards Board for Case #16-138 – Gaylon Eugene Freeman
Violation of Standard 1. An educator maintains a professional relationship with each student, both in and outside the classroom. The Professional Licensure Standards Board Ethics Subcommittee recommends that the State Board order a license suspension until June 30, 2017; assess a $100.00 fine; require that he complete course IAD14492 Classroom Management: Building Effective Relationships, 2nd Edition through ArkansasIDEAS; and submit a written reflection addressing how the training will impact his future conduct in the classroom. Both training and written reflection will be completed and submitted to the PLSB office within ninety (90) days of the State Board's final order. All associated costs paid by educator. Mr. Freeman accepted the recommendation on October 26, 2016.
Presenter: Eric James

9. Consideration of the Recommendation of the Professional Licensure Standards Board for Case #16-139 – Toya Marie Graves
Violation of Standard 1. An educator maintains a professional relationship with each student, both in and outside the classroom. The Professional Licensure Standards Board Ethics Subcommittee recommends that the State Board order a one (1) year license suspension; assess a $100.00 fine; require that she complete course IAD14492 Classroom Management: Building Effective Relationships, 2nd Edition, through ArkansasIDEAS; and submit a written reflection addressing how the training will impact her future interactions with students. Both training and written reflection to be completed and submitted to the PLSB by the end of the suspension period. All associated costs paid by educator. Ms. Graves did not respond within the required time period.
Presenter: Eric James

10. Consideration of the Recommendation of the Professional Licensure Standards Board for Case #16-143 – Jeremy Jason Derkovitz
Violation of Standard 1. An educator maintains a professional relationship with each student, both in and outside the classroom. The Professional Licensure Standards Board Ethics Subcommittee recommends that the State Board order a written warning; require that he complete courses TCC14435 Professional Licensure Standards Board (PLSB): Social Media Guidelines and TCC14436 Professional Licensure Standards Board (PLSB): Digital Citizenship Curricula K-12 through ArkansasIDEAS; and submit a written reflection on each course addressing how the training will impact his future interaction with students. Training and written reflections to be completed within sixty (60) days of the State Board's final order. All associated costs paid by educator. Mr. Derkovitz did not respond within the required time period.
Presenter: Eric James

11. Consideration of the Recommendation of the Professional Licensure Standards Board for Case #16-156 – Michael David Shedd
Violation of Standard 1. An educator maintains a professional

relationship with each student, both in and outside the classroom. Violation of Standard 2. An educator maintains competence regarding his or her professional practice inclusive of skills, knowledge, dispositions, and responsibilities relating to his or her organizational position. The Professional Licensure Standards Board Ethics Subcommittee recommends that the State Board order a written warning; require that he complete course IAD14491 Classroom Management: Managing Challenging Behavior through ArkansasIDEAS; and submit a written reflection addressing how the training will impact his future interaction with students and classroom management. Training and written reflection to be completed within sixty (60) days of the State Board's final order. All associated costs paid by educator. Mr. Shedd accepted the recommendation on October 23, 2016.

Presenter: Eric James

12. Consideration of Case #17-083 – Tyler Cameron Pickett

    Violation of Standard 1. An educator maintains a professional relationship with each student, both in and outside the classroom. Mr. Pickett voluntarily consents to the permanent revocation of his license.

    Presenter: Eric James

13. Computer Science Report 74

    Presenter: Anthony Owen

14. Consideration of LRSD Community Advisory Board Training Schedule 99

    The LRSD Community Advisory Board has completed the required training as documented.

    Presenter: Johnny Key

IV. Action Agenda A. 10:00 am

Time: 10:00

1. Consideration of Grade Inflation Report 103

   Pursuant to Ark. Code Ann. § 6-15-421 the ADE shall report to the State Board and the General Assembly the name, address, and superintendent of any high school in which more than twenty percent (20%) of the students received a letter grade of "b" or above but did

not pass the end-of-course assessment on the first attempt.
Presenter: Louis Ferren

2. Consideration of Suspension of Teaching License for Non-Completion of Required Training
PLSB Case No.14-120–Jeri Lyn Odom
Jeri Lyn Odom holds a standard teaching license and has not completed the required training as ordered by the State Board of Education. Ms. Odom has not responded to reminder letters. The PLSB staff respectfully requests the suspension of Ms. Odom's license until the training is completed and confirmation provided to the PLSB.
Presenter: Eric James

3. Consideration of Suspension of Teaching License for Nonpayment of Fines – PLSB Case No. 15-048 – Mary Jill Davis
Mary Jill Davis holds a standard teaching license and has an outstanding fine of $75.00, as ordered by the State Board of Education. Ms. Davis has not responded to collection attempts. The PLSB staff respectfully requests the suspension of Ms. Davis' license until the fine is paid in full.
Presenter: Eric James

4. District Request for Waivers granted to Open-Enrollment Charters: 117
County Line School District
Act 1240 of 2015 allows a school district to petition the State Board of Education for all or some of the waivers granted to Open-Enrollment Public Charter Schools that serve students who reside in the school district. Representatives of the County Line School District are appearing before the Board with a petition of waivers.
Presenter: Kelly McLaughlin

5. Approval of High School English Language Arts Courses 128
When charged with the task of revising the previous English Language Arts standards, a group of qualified individuals from across the State came together to craft standards that were specific for the schools and students of Arkansas. The result of this work is the Arkansas English Language Arts Standards (ELA). As an extension of

this work, high school courses were developed using the newly adopted English Arts Standards. The Arkansas High School English Language Arts courses are respectfully submitted to the State Board of Education for adoption.

Presenter: Stacy Smith and Thomas Coy/Sherri Thorne

6. Approval of High School Math Courses 481

When charged with the task of revising the previous mathematics standards, a group of qualified individuals from across the State came together to craft standards that were specific for the schools and students of Arkansas. The result of this work is the Arkansas Math Standards. As an extension of this work, high school courses were developed using the newly adopted math standards. The Quantitative Literacy course is respectfully submitted to the State Board of Education for adoption.

Presenter: Stacy Smith and Thomas Coy/Veronica Hebard

7. Approval of High School Science Standards 488

When charged with the task of revising the science content standards for high School, a group of qualified individuals from across the State came together to craft standards that were specific for the schools and students of Arkansas. The result of this work is the Arkansas K-12 Science Standards. Reflecting what Arkansas educators know to be best for students, these standards are based on the Next Generation Science Standards and ensure that students are college and career ready and on track for success. The high school courses of the Arkansas K-12 Science Standards are respectfully submitted to the State Board of Education for adoption.

Presenter: Stacy Smith and Michele Snyder

8. Consideration of State Board of Education Approval of Arkansas Professional Pathway to Educator Licensure (APPEL) Program Handbook 763

Prior to October 2015, APPEL was governed by a set of rules from 2012 titled, ADE Rules Governing the Non-Traditional Licensure Program. In October 2015, the State Board approved the Arkansas

Department of Education Rules Governing Educator Licensure and incorporated the previous rules under Chapter 5: Nontraditional Licensure. Section 5-2.0 ARKANSAS PROFESSIONAL PATHWAY TO EDUCATOR LICENSURE (APPEL) states that an applicant for a provisional teaching licensure under APPEL shall adhere to and abide by all the policies and procedures as outlined in the published APPEL Program Handbook for the year of admission. It is our understanding that substantive changes to the APPEL Program Handbook should be approved by the State Board of Education as rules for APPEL had been previously approved.
Presenter: Joan Luneau

V. Arkansas School Boards Association Luncheon - 11:45-1:45 (The luncheon is actually 12:15-1:30 - will need cars for transportation to luncheon)
The State Board will attend the Arkansas School Boards Association Luncheon in the Ballroom at the Marriott.

VI. Action Agenda B 1:45 pm

1. Appeal of PLSB Evidentiary Hearing Determination - Sherry Lynn Young, PLSB Case 16-004
Presenter: Cheryl L. Reinhart
Time: 1:00 p.m.

2. Progress report related to Arkansas Department of Education provided recommendations for schools classified in Academic Distress: Helena-West Helena School District. 814
Helena-West Helena School District has one school classified in Academic Distress. The Arkansas Department of Education appointed review teams to conduct onsite reviews and to provide recommendations. Recommendations were provided to the district in June 2016. School and district leadership will present current status of progress towards Recommendations 1 and 3.
Presenter: Dr. Richard Wilde

3. Progress report related to Arkansas Department of Education provided recommendations for schools classified in Academic Distress: Pulaski 888

County Special School District.

Pulaski County Special School District has one school classified in Academic Distress. The Arkansas Department of Education appointed review teams to conduct onsite reviews and to provide recommendations. Recommendations were provided to the district in June 2016. School and district leadership will present current status of progress towards Recommendations 1 and 3.

4. Adoption of State Board Meeting Calendar for 2017 955

   Presenter: Lori Freno

VII. Reports

1. Chair's Report

   Presenter: Mireya Reith

2. State Board Standing Committees, Special Committees, Liaisons, and Appointments Report 956

   Presenter: State Board Members

3. ForwARd Report 963

   Presenter: Susan Harriman, Executive Director

4. Commissioner's Report

   Presenter: Johnny Key

5. 2016 Arkansas Teacher of the Year Report

   The 2016 Arkansas Teacher of the Year will report on current topics of opportunities for educators.

   Presenter: Meghan Ables

6. ENIAC Announcement

   Presenter: Anthony Owen

VIII. Adjournment

Minutes
State Board of Education Meeting
Thursday, November 10, 2016

The State Board of Education met Thursday, November 10, 2016, in the Arkansas Department of Education Auditorium. Chair Mireya Reith called the meeting to order at 10:02 a.m.

Present: Mireya Reith, Chair; Dr. Jay Barth, Vice-Chair; Dr. Fitz Hill; Joe Black; Diane Zook; Ouida Newton; Susan Chambers; Brett Williamson; Charisse Dean; Meghan Ables, 2016 Teacher of the Year, and Johnny Key, Commissioner.

Absent: None

Consent Agenda

Dr. Barth moved, seconded by Ms. Chambers, to approve the consent agenda. The motion carried unanimously.

Items included in the Consent Agenda:

- Minutes – October 13, 2016
- Minutes – October 14, 2016
- Newly Employed, Promotions and Separations
- Consideration of Report on Waivers to School Districts for Teachers Teaching Out of Area for Longer than Thirty (30) Days, Ark. Code Ann.§ 6-17-309
- My Child/My Student Report
- Consideration of the Recommendation of the Professional Licensure Standards Board for Case #17-008 – Ashley Rene Burns
- Consideration of the Recommendation of the Professional Licensure Standards Board for Case #17-030 – Morgan Kelsey Coble
- Progress Report on the Status of Districts Classified in Fiscal Distress
- Consideration of Legislative Reports

Recognition

Recognition of EAST Program

Mr. Jerry Prince said the EAST Initiative was one of four organizations recognized by Silicon Valley Education Foundation for doing exceptional work to advance STEM education.

Recognition of Veterans Working at the Department

Commissioner Key recognized the following ADE employees:

Employee Name	**Branch of Service**
Brad Montgomery	U.S. Air Force
Chris Abbott	U.S. Army
C.W. Gardenhire	U.S. Army 82nd Airborne- D
David Baca	U.S. Air Force
Derrick Black	U.S. Air Force - retired
Dianna Sheppard	U.S. Air Force
Ed Eason	U.S. Army Reserves
Elbert Harvey	Navy & Arkansas Air National Guard
John Kaminar	U.S. Army
Robert Caringola	U.S. Marine Corps
Terry Granderson	U.S. Army Reserve and the Arkansas Army National Guard
Timothy Barnes	U.S. Army Reserves
William "Bill" Nielsen	U.S. Air Force

Public Comment: Mr. Phillip Bryant recommended more reading teachers in elementary to ensure students are reading on grade level. He also recommended letters regarding sexual orientation.

Action Agenda

A-1 Consideration of Resolution for Arkansas School Board Member Recognition Month

Arkansas School Boards Association Executive Director Dr. Tony Protho requested the State Board recognize January 2017 as Arkansas School Board Member Recognition Month.

Ms. Newton moved, seconded by Ms. Zook, to approve the resolution for the Arkansas School Board Member Recognition Month of January 2017. The motion carried unanimously.

A-2 Consideration of Resolution for American Education Week, November 14-18, 2016

Arkansas Education Association President Ms. Brenda Robinson requested the State Board recognize November 14-18, 2016, as American Education Week.

Ms. Newton moved, seconded by Ms. Dean, to approve the resolution to recognize November 14-18, 2016, as American Education Week. The motion carried unanimously.

A-3 Consideration of Resolution for Computer Science Education Week, December 5-11, 2016

Commissioner Key requested the State Board recognize the week of December 5-11, 2016, as Arkansas Computer Science Education Week.

Dr. Barth moved, seconded by Mr. Black, to approve the resolution to recognize December 5-11, 2016, as Computer Science Education Week.

A-4 Consideration of the Annual Student Discipline Report

Ark. Code Ann. § 6-18-516 requires the ADE to evaluate the impact of school discipline on student achievement and report findings to the State Board of Education and school districts. Office for Education Policy (OEP) Research Assistant Dr. Kaitlin Anderson presented new findings regarding discipline. She addressed disproportionalities, difference across types of schools, and time trends.

Assistant Commissioner Dr. Eric Saunders said additional data collection and differentiation of the "other" category is being implemented in the 2016-2017 school year. He said the data definitions are included in the data manual.

Office for Education Policy Faculty Director Dr. Gary Ritter said future research could identify districts that have positive trend lines and then follow up in the schools with qualitative data.

Dr. Anderson said the OEP has a list of schools implementing Positive Behavioral Intervention Systems (PBIS) and is considering additional qualitative research.

Dr. Ritter said the OEP is interested in working with schools that want try new ideas and conduct research in partnership with OEP. He said the data needed to be considered at the district and school levels. He said OEP could include surveys in their data collection for future reporting.

Commissioner Key said through the State Personnel Development Grant (SPDG) ADE SPDG Director Ms. Jennifer Gonzales is working with Arkansas State University (ASU) to develop Positive Behavior Intervention System (PBIS) modules. He recommended highlighting the best practices being implemented in Arkansas schools.

Public School Accountability Coordinator Mr. Elbert Harvey said schools in academic distress are examining student discipline in the 45-day reports.

Chair Reith requested Dr. Hill serve as liaison on Student Discipline.

The Board discussed communication to schools that included the Annual Student Discipline Report, data from My School Info, and videos that highlight best practices. Additional conversation centered on collaboration with ForwARd Arkansas regarding student discipline and future reporting.

Dr. Barth moved, seconded by Mr. Black, to approve the Annual Student Discipline Report, recommend ADE communication to schools, consider a future innovate video on best practices, and recognize Dr. Fitz Hill as liaison on Student Discipline. The motion carried unanimously.

A-5 Arkansas Teacher Corps

Office for Education Policy Faculty Director Dr. Gary Ritter said the Arkansas Teacher Corps (ATC) program recruits, trains, and supports exceptional, social justice-oriented individuals to serve as teachers for Arkansas students who need them most. He said currently 55 fellows are teaching across the state serving 20 districts, 28 schools, and 5,100 students. He recommended additional licensure routes. He said ATC is planning to increase the number of teachers, increase the number of schools, and expand recruitment of STEM teachers. Dr. Ritter requested the Board help get the word out about Arkansas Teacher Corps.

Ms. Zook moved, seconded by Dr. Hill, to approve the report on Arkansas Teacher Corps. The motion carried unanimously.

A-6 District Request for Waivers Granted to Open-Enrollment Charters: Watson Chapel School District

Division of Learning Services Coordinator Ms. Mary Perry said Act 1240 of 2015 allows a school district to petition the State Board of Education for all or some of the waivers granted to open-enrollment public charter schools that serve students who reside in the school district. The request for waivers is for five (5) years.

Watson Chapel School District Superintendent Dr. Connie Hathorn said he requested a waiver from licensure because of the teacher shortage. He said he had degreed applicants but they were not licensed.

Ms. Dean moved, seconded by Ms. Chambers, to approve the district request for waivers granted to Open-Enrollment Charters for the Watson Chapel School District for five (5) years. The motion carried unanimously.

A-7 Consideration of the Recommendation of the Office of Educator Effectiveness, National Board for Professional Teaching Standards Advisory Subcommittee, for Suspension of License – Evelyn James

Ms. Evelyn James made reimbursement in full and therefore the action item was pulled from the agenda.

A-8 Consideration of the Recommendation of the Office of Educator Effectiveness, National Board for Professional Teaching Standards Advisory Subcommittee, for Suspension of License – Robin Hosier-Whitenton

Assistant Commissioner for Educator Effectiveness and Licensure Ms. Ivy Pfeffer said Ms. Robin Hosier-Whitenton holds an Arkansas Standard Teaching License. The Office of Educator Effectiveness and the National Board Advisory Committee have recommended suspension of Ms. Hosier-Whitenton's teaching license for nonpayment of funds expended by the Arkansas Department of Education for National Board Candidacy. Ms. Pfeffer said efforts have been made to contact Ms. Hosier-Whitenton concerning her nonpayment of funds.

Ms. Zook moved, seconded by Mr. Williamson, to suspend Ms. Robin Hosier-Whitenton's teaching license until payment is made in full. The motion carried unanimously.

A-9 Consideration of the Recommendation of the Office of Educator Effectiveness, National Board for Professional Teaching Standards Advisory Subcommittee, for Suspension of License – Shara Wade

Ms. Shara Wade made reimbursement in full and therefore the action item was pulled from the agenda.

A-10 Consideration of the Recommendation of the Office of Educator Effectiveness, National Board for Professional Teaching Standards Advisory Subcommittee, for Suspension of License – Sita Montgomery

Ms. Sita Montgomery made reimbursement in full and therefore the action item was pulled from the agenda.

A-11 Consideration of the Department of Education Recommendation for the Waiver from Repayment of NBPTS Program Funding is made by the NBPTS Advisory Subcommittee regarding – Brittney Breedlove

Assistant Commissioner for Educator Effectiveness and Licensure Ms. Ivy Pfeffer said Ms. Brittney Breedlove's Arkansas teaching license has been revoked. Ms. Breedlove received funding under the Rules Governing Eligibility and Financial Incentives for National Board for Professional Teaching Standards Candidacy and Certification Program. Because of circumstances explained in accompanying documents, Ms. Breedlove was unable to fulfill the requirement of teaching in an Arkansas Public School for three consecutive years following certification. Therefore, Mr. Breedlove has requested a waiver from her obligation to repay NBPTS Program funding in the amount of $2,652.25. Based on extenuating circumstances as determined by the NBPTS Advisory Subcommittee, Ms. Pfeffer recommended that the State Board waive the requirement for repayment of NBPTS Program funding.

Dr. Barth moved, seconded by Ms. Chambers, to waive the requirement for repayment of NBPTS Program funding for Ms. Brittney Breedlove. The motion carried unanimously.

A-12 Consideration of the Department of Education Recommendation for the Waiver from Repayment of NBPTS Program Funding is made by the NBPTS Advisory Subcommittee regarding – Linda Hughey

Assistant Commissioner for Educator Effectiveness and Licensure Ms. Ivy Pfeffer said Ms. Linda Hughey is a licensed educator who received funding under the Rules Governing Eligibility and Financial Incentives for National Board for Professional Teaching Standards Candidacy and Certification Program, but did not complete certification. Ms. Hughey requested a waiver from her obligation to repay NBPTS Program funding in the amount of $1,445.00. Based on extenuating circumstances as determined by the NBPTS Advisory Subcommittee, Ms. Pfeffer recommended that the State Board waive the requirement for repayment of NBPTS Program funding.

Ms. Newton moved, seconded by Mr. Williamson, to waive the requirement for repayment of NBPTS Program funding for Ms. Linda Hughey. The motion carried unanimously.

A-13 Progress Report related to Arkansas Department of Education provided recommendations for schools classified in Academic Distress: Dollarway School District

Public School Program Manager Dr. Richard Wilde said Dollarway School District has two schools classified in Academic Distress. The Arkansas Department appointed review teams to conduct onsite reviews and to provide recommendation. Recommendations were provided to the district in June 2016. Dr. Wilde interviewed the school leadership regarding the current status of progress towards Recommendation 1.

Dollarway High School Principal Ms. Yolanda Prim said the leadership team has been reviewing data weekly. She said the schedule has been restructured to meet the needs of students. She said an assessment calendar for the year was developed. She said teams were meeting to discuss the needs of teachers and students.

Robert F. Morehead Middle School Principal Ms. Diane Boyd said the school has updated the vision and mission statements. She said the school has implemented an anti-bullying program. She said the team is working on a teacher retention survey. She said the instructional team was engaged in ongoing professional learning. She said the assessment calendar was developed to monitor student progress.

Dr. Wilde said both principals are new to their assignments. He said the high school was moved to the previous middle school facility. He said the district purchased a K-12 curriculum and professional learning support for implementation of the curriculum. He said the 45-day reports were done as compliance instead of ongoing reporting. He said work was being done on processes and procedures. Dr. Wilde said the school improvement unit would continue to support the use of data for decision making purposes, assist the leadership in development of SMART goals and deeper understanding of the data, and will conduct more frequent monitoring.

Ms. Newton moved, seconded by Ms. Chambers, to approve the report of current status of progress towards Recommendation 1 for the Dollarway High School and Robert F. Morehead Middle School in the Dollarway School District. The motion carried unanimously.

A-14 Progress Report related to Arkansas Department of Education provided recommendations for schools classified in Academic Distress: Little Rock School District

Public School Program Manager Dr. Richard Wilde said Little Rock School District has five schools classified in Academic Distress. The Arkansas Department appointed review teams to conduct onsite reviews and to provide recommendation. Recommendations were provided to the district in June 2016. School and district leadership presented current status of progress towards Recommendation 1.

Cloverdale Middle School Principal Ms. Wanda Ruffins said the school has analyzed data and established goals. She said staff were using “Wise Ways” to determine next steps. A survey indicated that teachers needed additional professional learning to meet the needs of English Language students. She said she recently attended a workshop on working with students in poverty. She said the team was working to address a positive behavioral plan. She said parental engagement has increased. She said the student leadership team identified incentives that students wanted and provided insight on issues within the school.

Henderson Middle School Principal Mr. Frank Williams said the team was working to strengthen the instructional program by examining pre- and post-assessments. He said the team was working on a school culture that improved safety and celebration of success. He said a bilingual facilitator had been hired to work with students.

J.A. Fair High School Principal Mr. Michael Anthony said the leadership team examined the data and depth of knowledge. He said students were not performing at the level of the standards. He said individualized on-line learning was made available to students. He said teachers were working on utilizing higher level questioning techniques with students. He said City Year was providing interventions. He said the multiple opportunities to succeed (MOTS) provided additional opportunities for students to complete the learning successfully.

Hall High School Principal Mr. Larry Schleicher said the leadership team was working on rigorous long-term goals that would be accomplished through completion of multiple short-term goals. He said City Year was working with 40-50 students in literacy and math interventions. He said the ninth grade academy has been redesigned. He said educators serve on a vertical alignment team with Cloverdale Middle School for English Language alignment of instruction and intervention services. He said he was in year 2 of the Master Principal's program and five teachers were engaged in the Teacher Academy with the Arkansas Leadership Academy.

McClellan High School Interim Principal Mr. Gabriel Jackson said with 20 new educators, the focus on meeting the needs of students has included analyzing data. He said the leadership team was working to improve culture and climate in the building. He said collaboration, commitment, and consistency were important to success. He said a student team and a community council were established to meet the goals.

All principals said teacher and student attendance was an ongoing issue. The principals reported the district Achieve Team has been supportive of the progress.

Dr. Wilde said that the Achieve Team process was implemented without an integration plan for previous school improvement work. He reported that this was a continuation of a practice that ADE and the State Board of Education had voiced regarding each change in district superintendents. He did note that the Achieve Team was in alignment with practices that school improvement had requested the district to adopt. He also noted that the focus of the Achieve Teams has been on improving learning. He said the school leadership team was asked to work with all staff. He said the ADE requested each school have more voice in the improvement process and that the Achieve Team process helped to accomplish this request. He said the school improvement unit will continue to help the schools develop a deep understanding of the three goals, integrate the plans into the overall school improvement process, and improve SMART goals. He said the district will need to work with the Achieve Team regarding the feeder patterns and that it is highly unlikely that the high schools can exit Academic Distress status without addressing the feeder pattern. He said a district plan should address methods to prevent students from falling below grade level.

Little Rock School District Superintendent Mr. Michael Poore said the Achieve Team was focused on hearing the voices of students, teachers, leaders, and the community to improve continuity of the work. He said the ADE team and the Office of Intensive Support have been vital to the progress.

Assistant Commissioner for Public School Accountability Ms. Annette Barnes said post appeals data was published on November 4 and the agency has 30 days to identify schools that may be removed from academic distress designation.

Ms. Chambers moved, seconded by Dr. Barth, to approve the report of current status of progress towards Recommendation 1 for Cloverdale Middle School, Henderson Middle School, J.A. Fair High School, Hall High School, and McClellan High School in the Little Rock School District. The motion carried unanimously.

A-15 Arkansas Department of Education Site Review Team Recommendations for Mineral Springs High School

Public School Program Manager Dr. Richard Wilde said Mineral Springs High School was classified in Academic Distress on August 11, 2016. The ADE assigned a team of educators to conduct an onsite review and make recommendations to the State Board of Education, the Superintendent of the school district, and principal of the school. Once reviewed by the State Board of Education, the recommendations become binding on the district for implementation.

Mineral Springs School District Superintendent Mr. Curtis Turner Jr. said an external provider would be supporting the current school improvement specialist that is employed half-time. He said the district leadership team meets at least twice a month and information is provided to the local school board. He concurred with the school improvement recommendations. He anticipated seeing gains and acknowledged that this will be accelerated through support from ADE. Mr. Turner selected March 10, 2017, to report to the Standing Committee on Academic Distress.

Ms. Dean moved, seconded by Mr. Black, to approve the recommendations for Mineral Springs High School and the reporting date of March 10, 2017, to the Standing Committee on Academic Distress. The motion carried unanimously.

A-16 Haas Hall Academy Quarterly Report on Partnership and Diversity

Public School Program Coordinator Ms. Alexandra Boyd said on July 14, 2016, the State Board met and approved Haas Hall Academy's request to license a new campus in Springdale with the requirement of a quarterly report on efforts toward diversity and on collaboration efforts with the surrounding school districts. The report was composed by Haas Hall Academy to fulfill that requirement.

Haas Hall Attorney Mr. Mark Henry asked if the report was adequate to the needs of the Board and the timeline for future reports.

Haas Hall Academy Executive Director of Marketing Ms. Heather Holaway said student enrollment data would be available October 2017.
Haas Hall Academy Founder and Superintendent Dr. Martin Schoppmeyer Jr. said he was working on food services for students.

Ms. Chambers moved, seconded by Ms. Zook, to approve the 1st Quarter Partnership and Diversity Report by Haas Hall Academy and to require the next report in November 2017. The motion carried unanimously.

A-17 Consideration of the Charter Authorizing Panel Decision on the Open-Enrollment Charter School Amendment Request: Haas Hall Academy, Fayetteville, Arkansas

Public School Program Coordinator Ms. Alexandra Boyd said on October 19, 2016, representatives of Haas Hall Academy appeared before the Charter Authorizing Panel requesting an amendment to their charter. By a vote of seven-to-one, the Panel approved the request. No request for the State Board of Education to review the decision made by the Panel was submitted.

Haas Hall Attorney Mr. Mark Henry said the Mayor and Chamber of Commerce submitted letters of support. He said the school would work through any issues with parking.

Ms. Zook moved, seconded by Mr. Williamson, to not review the Charter Authorizing Panel's decision on the Open-Enrollment Public Charter School Amendment for Haas Hall Academy, Fayetteville, Arkansas. Dr. Barth voted no. The final vote was 7-1. The motion carried.

A-18 Consideration of the Charter Authorizing Panel Decision on the Open-Enrollment Charter School Amendment Request: KIPP Delta Public Schools, Helena-West Helena, Arkansas

Ms. Zook recused.

Public School Program Advisor Ms. Kelly McLaughlin said on October 19, 2016, representatives of KIPP Delta Public Schools appeared before the Charter Authorizing Panel requesting an amendment to their charter. By a unanimous vote, the Panel approved the request. No request for the State Board of Education to review the decision made by the Panel was submitted.

Ms. Dean moved, seconded by Dr. Barth, to not review the Charter Authorizing Panel's decision on the Open-Enrollment Public Charter School Amendment for KIPP Delta Public Schools, Helena-West Helena, Arkansas. The motion carried unanimously.

A-19 Consideration of the Charter Authorizing Panel Decision on the Open-Enrollment Charter School Amendment Request: Arkansas Arts Academy, Rogers, Arkansas

Public School Program Coordinator Ms. Alexandra Boyd said on October 19, 2016, representatives of Arkansas Arts Academy appeared before the Charter Authorizing Panel requesting an amendment to their charter. By a unanimous vote, the Panel approved the request. No request for the State Board of Education to review the decision made by the Panel was submitted.

Ms. Newton moved, seconded by Ms. Chambers, to not review the Charter Authorizing Panel's decision on the Open-Enrollment Public Charter School Amendment for the Arkansas Arts Academy, Rogers, Arkansas. The motion carried unanimously.

A-20 Consideration of the Charter Authorizing Panel Decision on the District Conversion Charter School Amendment Request: Cross County High School

Public School Program Advisor Ms. Kelly McLaughlin said on October 19, 2016, representatives of Cross County High School appeared before the Charter Authorizing Panel requesting an amendment to their charter. By a unanimous vote, the Panel approved the request. No request for the State Board of Education to review the decision made by the Panel was submitted.

Dr. Barth moved, seconded by Ms. Chambers, to not review the Charter Authorizing Panel's decision on the Open-Enrollment Public Charter School Amendment for Cross County High School. The motion carried unanimously.

A-21 Consideration of the Charter Authorizing Panel Decision on the Open-Enrollment Adult Education Public Charter School Application: The Excel Center, Little Rock, Arkansas

Public School Program Coordinator Ms. Alexandra Boyd said on October 19, 2016, representatives of The Excel Center appeared before the Charter Authorizing Panel requesting a charter. By a unanimous vote, the Panel approved the request. No request for the State Board of Education to review the decision made by the Panel was submitted.

Ms. Zook moved, seconded by Ms. Chambers, to not review the Charter Authorizing Panel's decision on the Open-Enrollment Public Charter School Application for The Excel Center, Little Rock, Arkansas. The motion carried unanimously.

A-22 Consideration of the Charter Authorizing Panel Decision on the District Conversion Public Charter School Application: River Valley Virtual Academy, Van Buren, Arkansas

Public School Program Coordinator Ms. Alexandra Boyd said on October 20, 2016, representatives of River Valley Virtual Academy appeared before the Charter Authorizing Panel requesting a charter. By a unanimous vote, the Panel approved the request. No request for the State Board of Education to review the decision made by the Panel was submitted.

Dr. Barth moved, seconded by Ms. Dean, to not review the Charter Authorizing Panel's decision on the District Conversion Public Charter School Application for the River Valley Virtual Academy, Van Buren, Arkansas. The motion carried unanimously.

A-23 Consideration of the Charter Authorizing Panel Decision on the District Conversion Public Charter School Application: Harrisburg College and Career Preparatory School, Harrisburg, Arkansas

Public School Program Advisor Ms. Kelly McLaughlin said on October 20, 2016, representatives of Harrisburg College and Career Preparatory School appeared before the Charter Authorizing Panel requesting a charter. By a unanimous vote, the Panel approved the request. No request for the State Board of Education to review the decision made by the Panel was submitted.

Ms. Newton moved, seconded by Mr. Williamson, to not review the Charter Authorizing Panel's decision on the District Conversion Public Charter School Application for the Harrisburg College and Career Preparatory School, Harrisburg, Arkansas. The motion carried unanimously.

A-24 Consideration of the Charter Authorizing Panel Decision on the District Conversion Public Charter School Application: Harrison High School, Harrison, Arkansas

Public School Program Coordinator Ms. Alexandra Boyd said on October 20, 2016, representatives of Harrison High School appeared before the Charter Authorizing Panel requesting a charter. By a unanimous vote, the Panel approved the request. No request for the State Board of Education to review the decision made by the Panel was submitted.

Ms. Chambers moved, seconded by Mr. Black, to not review the Charter Authorizing Panel's decision on the District Conversion Public Charter School Application for the Harrison High School, Harrison, Arkansas. The motion carried unanimously.

A-25 Consideration of the Charter Authorizing Panel Decision on the District Conversion Public Charter School Application: Hot Springs Junior Academy, Hot Springs, Arkansas

Public School Program Advisor Ms. Kelly McLaughlin said on October 21, 2016, representatives of Hot Springs Junior Academy appeared before the Charter Authorizing Panel requesting a charter. By a unanimous vote, the Panel approved the request. No request for the State Board of Education to review the decision made by the Panel was submitted.

Dr. Barth moved, seconded by Ms. Chambers, to not review the Charter Authorizing Panel's decision on the District Conversion Public Charter School Application for the Hot Springs Junior Academy, Hot Springs, Arkansas. The motion carried unanimously.

A-26 Consideration of the Charter Authorizing Panel Decision on the District Conversion Public Charter School Application: North Little Rock Center of Excellence, North Little Rock, Arkansas

Public School Program Coordinator Ms. Alexandra Boyd said on October 21, 2016, representatives of North Little Rock Center of Excellence appeared before the Charter Authorizing Panel requesting a charter. By a unanimous vote, the Panel approved the request. No request for the State Board of Education to review the decision made by the Panel was submitted.

Ms. Zook moved, seconded by Ms. Dean, to not review the Charter Authorizing Panel's decision on the District Conversion Public Charter School Application for the North Little Rock Center of Excellence, North Little Rock, Arkansas. The motion carried unanimously.

A-27 Consideration of the Charter Authorizing Panel Decision on the District Conversion Public Charter School Application: Prairie Grove High School, Prairie Grove, Arkansas

Public School Program Advisor Ms. Kelly McLaughlin said on October 21, 2016, representatives of Prairie Grove High School appeared before the Charter Authorizing Panel requesting a charter. By a unanimous vote, the Panel approved the request. No request for the State Board of Education to review the decision made by the Panel was submitted.

Ms. Chambers moved, seconded by Dr. Barth, to not review the Charter Authorizing Panel's decision on the District Conversion Public Charter School Application for the Prairie Grove High School, Prairie Grove, Arkansas. The motion carried unanimously.

A-28 Consideration for Final Approval: Proposed ADE Rules Governing the Arkansas Financial Accounting and Reporting System and Annual Training Requirements (AFARS)

Staff Attorney Ms. Jennifer Davis said Act 345 of 2015 amended Ark. Code Ann. § 6-20-2204 regarding the Educational Financial Accounting and Reporting Act required training. A public comment hearing was held on September 1, 2016, and the public comment period ended on September 19, 2016. She said public comments were received, but no substantive changes were made. Governor's approval was received on September 21, 2016. She requested that the State Board give approval for these rules.

Ms. Newton moved, seconded by Mr. Williamson, to approve the ADE Rules Governing the Arkansas Financial Accounting and Reporting System and Annual Training Requirements (AFARS). The motion carried unanimously.

Reports

Report-1 Chair's Report

Chair Mireya Reith said she had the opportunity to give a keynote address at the Arkansas Teachers of English to Speakers of Other Languages meeting.

Report-2 State Board Standing Committees, Special Committees, Liaisons, and Appointments Report

Science Grant Manager and Appointment Dr. Barth said the Science Courses would be on the December State Board agenda.

ForwARd Arkansas Liaison Dr. Barth said the ADE team was working on the quick wins in the report. The five ForwARd Communities had kick-off events. The implementation working group has identified Pre-K as the legislative topic.

Deeper Learning Grant Manager and Appointment Ms. Reith said the work session today kicked off the follow-up to the NASBE grant. She said the funds would support future work sessions and off-site meetings.

ESSA Steering Committee Liaison Ms. Newton and Special Projects Ms. Tina Smith provided a summary of the October Steering Committee meeting. Ms. Smith said approximately 900 people attended the Community Listening Forums. She identified the top responses to the three questions posed during the forums. She said the Steering Committee was formulating questions and the ADE is working to answer those questions. She encouraged the Board to submit questions. Ms. Newton said the questions are critical to addressing a student focused learning system.

Standing Committee on Academic Distress Ms. Zook said the December meeting would begin at noon.

Little Rock Area Public Education Stakeholder Group Liaison Dr. Barth said the next meeting is scheduled for December 5.

National Association of State Boards of Education (NASBE) Liaison Ms. Reith said during the conference the NASBE Board met. She said Dr. Barth will be Chair of NASBE and she will be the Senior Southern Area Representative. She highlighted topics from the NASBE Conference. She said NASBE is offering support for ESSA. She said Ms. Newton would be attending a meeting next week sponsored by NASBE. She said NASBE will be holding regional meetings regarding sustaining stakeholder engagement. She said the NASBE legislative conference is scheduled for March 19-21, 2017, in Washington, DC. She said the annual conference will be in Atlanta, Georgia on October 31-November 4, 2017.

Report-3 Commissioner's Report

Commissioner Key said Governor Hutchinson submitted his budget that included $100 million dollars for facilities partnership, $5 million dollars for computer science, full funding for adequacy and $3 million dollars ongoing for Pre-K for improved quality and performance.

Commissioner Key said there was a legislative recommendation to increase professional development over the next two years to increase professional learning communities (PLC) and new NLSA dollars, in the form of grants to be distributed by ADE, to match school funding to close the achievement gap.

Report-4 2016 Arkansas Teacher of the Year Report

The 2016 Arkansas Teacher of the Year Ms. Meghan Ables shared the Dare to be Different video about the integration of coding and literacy. The video is available at https://www.youtube.com/watch?v=zbXxyUfv8Fc. Ms. Ables' blog is posted on the ADE website at http://arkansased.edublogs.org.

Adjournment

Mr. Black moved, seconded by Ms. Zook, to adjourn. The motion carried unanimously. The meeting adjourned at 5:38 p.m.

Minutes recorded by Deborah Coffman

Section 1
Second Lien Bonds

Arkansas Code Annotated (A. C. A.) § 6-20-1229 (b) states the following:

(b) All second-lien bonds issued by school districts shall have semi-annual interest payments with the first interest payment due within eight (8) months of the issuance of the second-lien bond. All second lien bonds shall be repaid on payment schedules that are either:

(1) Equalized payments in which the annual payments are substantially equal in amount; or
(2) Decelerated payments in which the annual payments decrease over the life of the schedule.

STATE BOARD OF EDUCATION MEETING

DECEMBER 8, 2016

APPLICATIONS FOR COMMERCIAL BONDS

COMMERCIAL BOND APPLICATIONS:

1	**2nd Lien**	**$**	**3,610,000.00**
1		**$**	**3,610,000.00**

SCHOOL DISTRICT FINANCIAL TRANSACTIONS
COMMERCIAL BONDS
2ND LIEN
RECOMMEND APPROVAL

DISTRICT	COUNTY	ADM	AMOUNT OF APPLICATION	DEBT RATIO	TOTAL DEBT W/THIS APPLICATION	PURPOSE
Farmington	Washington	2,368.47	$3,610,000	20.79%	$33,318,776	Acquiring, constructing and equipping new athletic facilities, renovating and equipping various existing facilities ($3,500,000) and cost of issuance ($110,000).

NEWLY EMPLOYED FOR THE PERIOD OF October 15, 2016 – November 7, 2016

Treva Bradley – Administrative Specialist III, Grade C112, Public School Accountability, Federal Programs, effective 10/17/16.

Sharlee Crowson – Public School Program Advisor, Grade C122, Division of Educator Effectiveness and Licensure, Educator Preparation, effective 10/31/16.

***Jamaal Gaines – ADE State Systems Administrator , Grade C126, Division of Research and Technology, Data Reporting and Systems, effective 10/31/16.**

***Virginia Perry – Public School Program Advisor, Grade C122, Division of Learning Services, Charter Schools, effective 11/07/16.**

***Freddie Scott – Operations Manager, Grade C122, Division of Learning Services, Charter Schools, effective 11/07/16.**

Randi Simmons – APCSN Field Analyst, Grade C121, Division of Research and Technology, APSCN, effective 11/07/16.

Tracy Webb – Public School Program Advisor, Grade C122, Public School Accountability, Federal Programs, effective 11/07/16.

Brent Wood – Attorney Specialist, Grade C126, Central Administration, Legal Services, effective 11/07/16.

PROMOTIONS/DEMOTIONS/LATERALTRANSFERS FOR THE PERIOD OF October 15, 2016 – November 7, 2016

***Oliver Dillingham from a Public School Program Coordinator, Grade C123, Public School Accountability, Equity Assistance, to a Public School Program Manager, Grade C126, Public School Accountability, Equity Assistance, effective 10/24/16. Promotion**

Louis Ferren from an Information Systems Coordinator, Grade C124, Public School Accountability, School Performance, to an ADE State Systems Administrator, Grade C126, Public School Accountability, School Performance, effective 10/24/16. Promotion

***La'Tasha Ursery from a Student Applications Specialist, Grade C116, Division of Research and Technology, APSCN, to an APSCN Field Analyst, Grade C121, Division of Research and Technology, APSCN, effective 10/24/16. Promotion**

SEPARATIONS FOR THE PERIOD OF October 15, 2016 – November 7, 2016

***Chara Rosha Dennis – Administrative Specialist II, Grade C109, Division of Public School Academic Facilities and Transportation (DPSAFT), effective 11/04/16. 0 Years, 4 months, 11 days. 01**

***Jennifer Liwo – Attorney, Grade C124, Division of Educator Effectiveness and Licensure, Professional Licensure Standards Board (PLSB), effective 10/28/16. 2 Years, 0 months, 1 day. 01**

***Minority**

AASIS Codes:
01 – Voluntary

Non-Profit/ Community Organization
Community Service-Learning Site Application

Community Service-Learning
(Act 648 of 1993)

1. Name of the school district and school initiating this application.

(School District) Berryville School District

(School) Berryville High School

2. Name of the Community Service Learning faculty supervisor with whom this non-profit/ community organization will be working: Tiffaney Atkinson, High School Counselor

3. Non-profit/ Community Organization Information:

Name of non-profit/ community organization: Good Shepherd Humane Society

Address: 207 Eureka Ave, Berryville, AR 72616

Phone Number: 870-423-2870 Fax Number: None

Email Address: jchupp@goodshepherd-hs.org

Name of Director/ Contact Person: Janet Chupp, Store Manager

Hours of operation: Tues-Sunday 10-5 Staffing/ number of employees: 1 FT paid employee

Number of volunteers: 20

4. Does your organization have sites at other locations? Yes☒ No☐

If yes, where? Eureka Springs, Arkansas

5. What is the mission of your organization?

To care for the stray, abandoned and unwanted dogs and cats of Carroll County, placing as many as possible into loving homes; to promote responsible pet ownership and humane treatment for all animals; to help reduce pet overpopulation by promoting and providing low-cost spay/neuter programs.

6. What service(s) does your non-profit/ community organization provide?

The Berryville Doggie Thrift Store is a section of the Good Shepherd animal shelter and is designed to raise funds to operate the animal shelter. The shelter is the only “no kill” animal shelter in Carroll County; we do not receive any state, local or federal funding. We take in animals from the 7 cities and towns in Carroll County with a population of just under 30,000 residents. We care for between 70 – 80 cats and dogs at any one time. The shelter takes in and adopts out approximately 400 – 600 animals a year that otherwise most likely would have been euthanized.

7. Does your non-profit/ community organization currently offer volunteer opportunities for youth? Yes☒ No☐

Students will have the opportunity to learn the retail industry while helping their community. They will learn skills such as: customer service, identifying a customer's needs and attempting to satisfy those needs by using listening and communication skills, and proper product display and pricing. Students will provide help that we cannot do on our own or pay an individual to complete as we are a non-profit organization. Through these activities, students will learn rational and creative thinking skills, public health/health regulations, social awareness, citizenship, problem-solving skills, surveying and analyzing, interpersonal relationship skills, appropriate behaviors related to context, and work habits.

8. Identify the non-profit/ community organization personnel who will be supervising student volunteers: Janet Chupp, Store Manager

9. Do staff members or volunteers who would be working directly with students undergo background checks? Yes☐ No☒

Volunteers do not currently go through background checks; however, if required we can fill this need.

10. Does your organization maintain liability insurance for volunteers? Yes☒ No☐

Please return this site application by fax or email:

Arkansas Division of Community Service and Nonprofit Support

Subject Line: Act 648 Site Application

Donaghey Plaza South

P.O. Box 1437, Slot S 230

Little Rock, AR 72203-1437

Phone: 501-682-7540

Fax: 501-682-6752

Arkansas K-12 Science Standards for Grades 9-12 Community Feedback Results and Responses

Arkansas Department of Education Curriculum and Instruction Unit fielded a community feedback survey from September 1-31, 2016. This survey allowed respondents to download and review drafts of the high school science courses of the Arkansas K-12 Science Standards and indicate whether the standards were appropriate as written, or if not, to provide comments specific to each standard.

Demographics of Respondents

Three hundred fifty six (356) respondents logged on to the survey of which 318 Arkansas respondents selected a course to review. Participants were given the option to respond as individuals (330) or as a group (26). Number of respondents and feedback comments specific to each course are summarized below. Additional Arkansans submitted emails with comments about the courses and proposed changes to science graduation credits to State Board members and ADE leadership members after September 30, 2016 (see the comments supplied by this group at the end of this document).

Overall findings from the survey on the Arkansas K-12 Science Standards for each high school course

Proposed courses for Smart Core and Core science graduation credits (3)

- Physical Science (1st Smart Core/Core credit) (59 respondents read the standards and 75% think they are appropriate as written)
- Biology (2nd Smart Core/Core credit) (72 respondents read the standards and 76% think they are appropriate as written)
- Principles of Chemistry and Physics (3rd Smart Core credit) (55 respondents read the standards and 34% think they are appropriate as written)

Proposed courses for 3rd Core graduation credit and science career focus credits

- Astronomy (8 respondents read the standards and 88% think they are appropriate as written)
- Chemistry (37 respondents read the standards and 93 % think they are appropriate as written)
- Human Anatomy and Physiology (16 respondents read the standards and 86% think they are appropriate as written)
- Earth Science (15 respondents read the standards and 85% think they are appropriate as written)

- Environmental Science (13 respondents read the standards and 87% think they are appropriate as written)
- Physics (28 respondents read the standards and 86% think they are appropriate as written)

Additional comments submitted by respondents

Seventy six (76) of the 356 respondents provided overall comments, concerns, and questions about the proposed standards. See detailed comments below the 9-12 sub-committee responses and ADE responses.

9-12 sub-committee responses and ADE responses to comments, concerns, and questions by Arkansans

- Course titles - The titles of the high school courses have been revised to reflect the integration of multiple science domains within each course.
  What was formally called Physical Science is now Physical Science – Integrated. The Arkansas K-12 Science Standards for physical science is an integrated science course that focuses on conceptual understanding of foundational core ideas, science and engineering practices, and crosscutting concepts, and is composed of physical science, Earth and space science, life science, and engineering design standards.
  What was formally called Biology is now Biology – Integrated. The Arkansas K-12 Science Standards for biology is an integrated science course that focuses on conceptual understanding of foundational life and Earth science core ideas, science and engineering practices, and crosscutting concepts, and is an integration of life science, Earth and space science, and engineering design standards.
  What was formally called Principles of Chemistry and Physics is now Chemistry – Integrated. The Arkansas K-12 Science Standards for chemistry is an integrated science course that focuses on conceptual understanding of the foundational chemistry and physics core ideas, science and engineering practices, and crosscutting concepts and is composed of chemistry, physics, Earth and space science, and engineering design standards.

- Physical Science Course – Specific standards have been revised as described below.
  Topic 1 – PS1-4 (added statement to clarification statement "This PE is partially address in this course…..")
  Topic 4– PS-ETS1-4 (added more examples to clarification statement)
  Topic 3 – ESS1-5 was added to this topic and removed from chemistry – integrated

Topic 6 -ETS1-4 (added to clarification statements that spreadsheets could also be used as a computer simulation modeling tool)

- Principles of Chemistry and Physics Course - Specific standards have been revised as described below.
  Topic 2- ETS 1-4 (added another examples other than a computer simulation that fits this topic….)
  Topic 5 – ESS1-5 has been removed and moved to physical science – integrated.
  Topic 6 – this topic has been deleted and 1 standard (ESS2-5) was moved to topic 1 and the remaining three standards were removed.

- Physics Course – Specific standards have been revised as described below.
  Topic 2 – P-PS2-4AR (clarification statement has been revised)

- Chemistry Course – No specific standards/topics have been revised.

- Human Anatomy and Physiology Course - No specific standards/topics have been revised.

- Biology - No specific standards/topics have been revised.

- Astronomy - No specific standards/topics have been revised.

- Environmental Science - No specific standards/topics have been revised.

- Earth Science - No specific standards/topics have been revised.

- Connections to other Arkansas content standards - All courses have been aligned to the new 2016 Arkansas Mathematics Standards, Arkansas English Language Arts Standards and Arkansas Disciplinary Literacy Standards.

Categories and percentage of comments, concerns, and questions

Accelerated Pathway 11.84% (summarized in a separate document)

Affirmation 14.47%

Content Concerns 13.15%

Graduation Requirement 35.52%

Professional Development 15.78%

Licensure 1.31%

Lacks specificity 3.94%

Affirmation Comments (11 Responses)

Affirmation Environmental Science Big take-away: Nice attempt, need to make computer modeling and simulations in line with student's background education. The level of math needs to reflect that most students are likely in Algebra 1 (or Algebra A/B) and limited in their mathematical modeling. Overall this is an improvement and brings the standards up-to-date with current environmental issues. Specifics: pg 3, we generally like to refer to the level of thinking as "critical" not "computational" pg 7, under "Defining the Problem" at the end I would add through engineering EDUCATION AND POLICY, as we don't want students to think we can engineer all environmental solutions, and we want them to understand the role of culture and civics in resolving environmental problems. pg 12 EVS-PS3-2 this will be challenging at this level, perhaps we need to pre-fabricate models with inputs they can vary and see the outputs. pg 12 EVS2 ETS1-2 need to retain a broad scope over the "chunked" problems or we design an improper/impractical solution. There is also a typo as manageable should not be capitalized. pg 15 EVS LS2-1 will be very difficult to accomplish with the mathematical sophistication students have at this level. pg 18 EVS ESS3-3 see above. You need to bring this down to a "doable" level pg 18 EVS4 ETS1-3 addressed in my big take-away about input/output modeling Physical Science Big take-away: This is a vast improvement over current physical science standards. Specifics: pg 12 PS-PS1-2 "Assessment does not include predicting chemical products", I think it should for simple compounds pg 12 PS-PS1-7 okay with this, but I think it should include the concepts of coefficients and ratios in a balanced chemical equation pg 16 PS-2-ETS1-2 excellent! Principles of Chemistry and Physics Big take-away: This is a very doable course and should be relevant and in the educational plan of most students. Chemistry Big take-away: These standards are far better than the current standards. It is more complete and a better prep for college and AP chemistry. Physics Big take-away: These standards are also better than our current standards. It allows depth vs too many standards (in the current framework). Students will have the ability to gain mastery over a number of topics and be prepared to think critically in college or on AP Physics. Thank

you for the opportunity to voice an engineer's perspective over the new frameworks, and again, apologies for the delay. I do have a couple of questions. As we will now require Environmental Science, Physical Science, and Biology for all students do we expect students to double-up in order to fit AP courses in their educational plan? Will this not require more resources in science departments as students will likely be taking more science classes? I look forward to teaching under NGSS, I think it is a considerable improvement over our current standards.
10/25/2016 3:10 PM

Affirmation Thank you for allowing us the opportunity to participate!
9/28/2016 2:47 PM

Affirmation I think these standards are where we as a nation should be. We are getting away from students memorizing information that is not pertinent to most of them (stages of life cycle of a virus) and going back to students having a love of science and learning core ideas that will apply across the curriculum! This will give teachers the freedom to allow students to explore and initiate inquiry without the fear of a test determining how much information can be memorized. We will still teach the same subjects, and they will learn, but they will hopefully apply, analyze, and evaluate, and not just quote information back to me.
9/28/2016 2:38 PM

Affirmation I am impressed that we are going back to actually letting the students use their creativity to enhance their learning experience. I really feel we will see a renewed interest in students wanting to learn.
9/28/2016 2:23 PM

Affirmation **Graduation Requirement** Allow students to replace the PCP course with the full length Arkansas designated Chemistry and Physics or AP Physics 1 course. This will allow students to take upper level courses in their junior and senior year. I'm concerned about current lagging enrollment in AP Physics, AP Chemistry, AP Biology, A & P. Bravo! Great masterpiece in getting all the PE's in. I love the reduction of topics from the current Chem./Physics/Physical Science frameworks. This will require a tremendous amount of Professional Development as we educators unlearn our habit of shoveling mountains of content and focus on deeper level thinking/critical scientific argument and application of science in the everyday phenomena in the world around us.
9/26/2016 6:26 PM

Affirmation I think students will be able to connect their learning of science to the world in which they live; for the first time, in a long time with science courses.

9/26/2016 4:17 PM

Affirmation While the new AR Science Standards will provide more science to more students in the state, it appears that the upper-level science minded student will pay the

price for being a minority in the content. This group will appear to do well in the class - but not have as much opportunity to go deeper into areas of science that is needed for STEM to increase in the workforce. The science achievement gap may be closing by bringing up the lower-level student through a deeper understanding. But, it should not also be closing by bringing down the upper-level student to begin a move closer to the average/norm science student.

9/23/2016 12:52 PM

Affirmation No. I believe that the updates that are suggested will be good for all students in Arkansas.

9/16/2016 12:04 PM

Affirmation I think the new standards are well written. I particularly like the way the accelerated pathway courses are offered. This provides more opportunities for students at a younger age. I think that increase in focus on science in our education system is important, and I am proud of Arkansas for leading the way and supporting this focus.

9/15/2016 11:10 AM

Affirmation I love the standards. They seem to have been written by scientific minds.

9/7/2016 9:06 AM

Affirmation I appreciate the time and effort taken to organize these standards. The push to learning science rather than recalling facts is greatly appreciated. This major goal needs to be remembered when "AR standards" are added. There is a problem with the lead intro to the survey for Principles of Chemistry and Physics. Someone has accidentally copies two intros to the survey. It includes the biology intro as well as the PCP intro

Content Concerns (10 Responses)

Content Concerns I am concerned with what seems like a reduction of life science content. The only cell structure I see occurs at the sixth grade level. If students take the accelerated pathway, they will miss out on the few life science standards in 8th grade. With all of the advances and new information occurring in the field of biology, I feel like we should be increasing the time we spend on biology content . . . instead we using valuable time on Earth science.

9/29/2016 3:26 PM

Content Concerns I am very concerned about the lack of important physical science concepts in these standards. These standards are very shallow and leave out many basic concepts that should be included to achieve a basic understanding of physical science. They have also included concepts that should be taught or will be taught in other courses such as Biology or Environmental Science. Students will not be

appropriately prepared to be successful in Chemistry or Physics if we follow these standards.
9/28/2016 2:32 PM

Content Concerns I believe that many important aspects of biology are left out or glossed over. The concepts here are very shallow and vague and do not focus on all the important aspects of biology. For instance the basis of biology is the study of the cell, which is not really addressed at all. Secondly, the diversity of life section is just a skim over. Comparison of different body systems of different organisms is not addressed either. This curriculum seems more focused on earth science and ecology (which is just one part of biology), rather than biology in its entirety. This biology curriculum is so integrated and ecology heavy, that students will not be successful if they enter any advanced biology class or take college biology. They will not receive all of the essential knowledge of a true biology course.

9/28/2016 2:12 PM

Content Concerns The new courses are called traditional names but they are integrated secondary science. If earth science and space science is going to be taught at the high school, it should be a class instead of mixing it with the others. There are 4 math requirements and 4 English requirements, there could easily be 4 science requirements. Advanced track should at least separate out the chemistry from the physics. Teachers are going to leave the classroom if you force them to teach things in this way.
9/24/2016 8:55 PM

Content Concerns As a biology teacher I see all of the "cool" stuff that really grabs students attention is no longer. Microbiology? Many of my student plan on going the medical route and there are no aspects of that in these PEs. Are they going to be taught these things in other grades?

9/22/2016 1:57 PM

Content Concerns My greatest concern is that at a time when we should be raising our standards of learning for students we are overly simplifying and lowering the standards. This course has changed from a Biology course to a general science course for upper levels. The content for Biology is so weak students entering a college freshman Biology course will not have the foundation necessary to be successful in a content heavy environment. Larger districts can compensate for this issue by dividing the classes by level or by offering upper level high school general science as well as Biology classes. Overall we are doing our students a great disservice by failing to provide the content and understanding necessary for a foundation in Biological Sciences. Engineering is a method of teaching, not a topic. Yet I feel the Earth and Environmental aspects have been added in an attempt to meet the engineering model. In my opinion - back to the drawing board! These are overall weak standards that lower the level of learning for students. By the way - No, students will not remember things taught in the 7th grade when they are in High School. Nor should they be taught at the same depth of understanding in lower grades in comparison to High School and upper grade levels.
9/21/2016 10:47 AM

Content Concerns I think we should add a section about the basics of the solar system, expand gravity to include a discussion about relativity, and at a minimum include all of Maxwell's laws in our discussion of electromagnetism, even if it is just an overview. That is just a personal opinion to try to set them up for success when they see the concepts again in greater detail at the college level. A brief discussion of the quantum world and its eccentricities would not go amiss either.
9/21/2016 9:56 AM

Content Concerns I really like that Biology hasn't changed especially after all the work they've put in over the past few years with the EOC for Biology. I'm concerned that there are specific Biology and Earth Science topics in Physical Science and PCP; these should be left in Biology and in MS Science. Co-evolution and diversity are especially out of place. The names of the courses are misleading: Only Biology is really what it says it is. Both the proposed Physical Science and PCP classes are really integrated science classes. Physical Science should have the name changed to General Science (with these standards) and perhaps PCP could be Applied Science. ? As a Physical Science and Pre-AP PS teacher, I have seen a lot of students struggle with the lower lever Physical Science and the math involved. Many (about 1 in 5) have to take at least one semester over. I can't imagine how they'll do in PCP with harder math rather than taking Environmental Science where there is no math. Many of these same students take 2 years to pass Algebra I and Geometry - both! I just hope we're not ensuring that those weak in math are destined to attend alternative school and or try to get their GED.
9/15/2016 2:55 PM

Content Concerns There are too many plan, design, build, complex-real world applications to add to a full year of teaching the fundamental information students need so that they will be equipped to solve these types of applications.
9/6/2016 4:10 PM

Content Concerns My concern is that this course is taught in Arkansas before Biology and many concepts that are part of these standards require a certain level of life science. Many schools in other states teach Biology first which seems to align better with the order of these standards as it pertains to this course.
9/6/2016 2:43 PM

Graduation Requirements (27 Responses)

Graduation Requirement Several staff members have asked a question in reference to the future chem./phys. course being proposed. It is my understanding from the staff (that the state department mentioned (in a public meeting) that not all students would have to take the course for graduation. That there would be alternatives for some students. I assume the state department is referencing students with IEPs who have portfolios developed for graduation. If that is not correct, do you have an explanation

from the state Department of Education which students would not be required to take the new chem. /phys. course?
10/25/2016 3:11 PM

Graduation Requirement As a mother of two dyslexic children and another child that struggled to be a B and C student, I disagree with the new Science course that is being brought to the table as a "requirement" to graduate high school. I recently had my oldest child graduate from high school in the bottom 1/2 of his class. This was not due to the fact that "we", his parents, teachers, and tutors, did not all put in many hours of work to help him be the best that he could be. Adding yet another difficult required Science course, would have been too much for him to handle. He took the ACT and was not college material, therefore settled on a technical certificate program. Not all students will be college material. In fact, the majority of the population will go into the workforce with just a high school diploma or a technical certificate. I also feel like this is going to hinder the path of our honor students as well, depending on their college path course. Please, consider taking this off of the table as a "requirement"! Thank you for your time.
10/25/2016 3:09 PM

Graduation Requirement I am writing you in connection with the proposal to add the new science course, Principals of Chemistry and Physics, as a requirement for graduation. While I think that this could be an option for students who plan on going to college, but are not sure what they want to do, I disagree with it being a requirement for all students. Some students struggle with physical science and know that they do not plan on doing anything related it. I think that we are adding a hardship on those students that are not college material. We all know that not every child is college material, and would better serve them by preparing them for the work force than requiring upper level classes. I also think that if this is a required course, it will have to be watered down to allow those now college students to be able to pass. We will being a disservice to our advanced students as well, by having to teach to the middle instead of challenging them that would be normally going on to chemistry or physics, which both count toward honors at our school. I do not see the need for this added class, we are actually giving students less options by requiring a specific science course instead of giving them choices for their science classes. This could be discouraging for a student that was planning on going straight biology major. I know that there is always overlap, but I still fill we are limiting their choices with this plan. I have also spoke with a few professors at UCA, who had attended the introduction for this and they also thought it would put the more advanced students to a disadvantage.

10/25/2016 3:08 PM

Graduation Requirement I am sending this email to encourage you as a member of the state school board to rethink making this course mandatory for our high school students. It would hurt the advanced students having to take this class and make it really tough on the students who are not going to college and have enough trouble with Physical Science.
10/25/2016 3:05 PM

Graduation Requirement I am very concerned that every student is going to be required to take the PCP course to graduate. Unfortunately, there are students that will not be successful in that course due to their level of understanding of math and science. I truly believe that we need to look at something else for those students. Also, many of the earth standards do not fit in any of these courses, so maybe need to look at having a 9 week course just for them at the physical science level. I do not think that there is enough emphasis on physics in the PCP course for those students that are planning on taking physics at the college level. Also, our school has quit teaching algebra I at the 8th grade level, so this will take us out of any of our students taking the accelerated classes, and this is a huge concern.
9/30/2016 2:39 PM

Graduation Requirement The standards set for this course are rigorous and thorough. I do have concerns, however, that making every student take this as their third science is setting a good portion of students up for strife and failure. Students on the Smart Core track should take this as their third science, but students on the Core curriculum track should be able to choose an alternative third science. If students are forced to take this course, I feel that a lot of schools will not implement the course with fidelity. Instead, I think there would be a shift towards just making sure students pass and survive. This needs some serious reconsideration.
9/30/2016 1:55 PM

Graduation Requirement I believe at this point that Arkansas should refrain from adopting any new science standards. What has been presented in this review is unacceptable and needs to be reworked to take all students into consideration. The principles of chemistry and physics, that I have been led to believe will be required by all students, is far too extensive to teach in a year, and includes concepts unnecessary for every graduate. I was told that at this point, only about five other states have adopted and are using these standards. Arkansas may be smart to wait for other states to adopt these standards and see how they implement them and the pitfalls they face. I am also concerned about how colleges will perceive these classes, and the rigor at which they will be able to be taught considering that all students are required to take them. It seems ironic to me that many college graduates are able to graduate with less science and math than a high school student is required to take. To achieve a bachelor’s of business in marketing, a student must take two lab sciences. It doesn't specify what they must be. Why must a high school student take chemistry/physics to graduate? Even a nursing student, who is earning a bachelor’s of science only has to take an introductory chemistry class. These standards seem far beyond what is needed for EVERY student.
9/28/2016 4:21 PM

Graduation Requirement I am a high school science teacher and have spoken with several college professors and they are concerned that this is going to do just the opposite of prepare students for college, it is going to not allow them to have time to take the upper level chemistry and physics that is really needed for college. We also need to face the fact that not every student is college material.

9/28/2016 3:37 PM

Graduation Requirement This course is not designed for ALL students. A lot of students would struggle and feel defeated with what is expected throughout this course. Students should be given more than one choice for their third science credit. Students that take environmental science can still learn and utilize science and engineering practices without having to consider more in-depth conceptual material they are less likely to encounter after high school. Students on the Smart Core track could be required to take the Principles course, but students on the Core track should be allowed to choose a different third science. Why is electricity, in terms of circuitry, not included in this course? Circuitry is relevant in our everyday lives; it should have a place within Arkansas standards. Requiring students to choose an accelerated pathway at a young age will lock many out of the upper-level science courses. Students should have the opportunity to pursue upper-level courses after reaching high school (meaning they can enter the accelerated pathway at a later time). This pathway seems to discourage students rather than encourage them to pursue their later developed interest in science. Students coming from elementary school may not know they if they are ready for an accelerated science/ math pathway due to the limited enrichment opportunities and so we may miss some students who would engage and excel in these courses when they get in high school by having this decision made so early in their academic career. Students need--and deserve--optional pathways. Additionally, students should not have to determine at the end of their 5th-grade year if they are to travel down the "accelerated" track. This can lock out students from future interests in science. These pathways can limit non-accelerated students from taking AP Chemistry, for example, simply because there would not be enough room in their schedule to take it prior to graduation.

9/28/2016 2:59 PM

Graduation Requirement This course is not designed for ALL students. A lot of students would struggle and feel defeated with what is expected throughout this course. Students should be given more than one choice for their third science credit. Students that take environmental science can still learn and utilize science and engineering practices without having to consider more in-depth conceptual material they are less likely to encounter after high school. Students on the Smart Core track could be required to take the Principles course, but students on the Core track should be allowed to choose a different third science. Why is electricity, in terms of circuitry, not included in this course? Circuitry is relevant in our everyday lives; it should have a place within Arkansas standards. Requiring students to choose an accelerated pathway at a young age will lock many out of the upper level science courses. Students should have the opportunity to pursue upper level courses after reaching high school (meaning they can enter the accelerated pathway at a later time). This pathway seems to discourage students rather than encourage them to pursue their later developed interest in science. Students coming from elementary school may not know they if they are ready for an accelerated science/ math pathway due to the limited enrichment opportunities and so we may miss some students who would engage and excel in these courses when they get in high school by having this decision made so early in their academic career. Students need--and deserve--optional pathways. Additionally, students should not have

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9/28/2016 2:58 PM

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Graduation Requirement This course is not designed for ALL students. A lot of students would struggle and feel defeated with what is expected throughout this course. Students should be given more than one choice for their third science credit. Students that take environmental science can still learn and utilize science and engineering practices without having to consider more in-depth conceptual material they are less likely to encounter after high school. Students on the Smart Core track could be required to take the Principles course, but students on the Core track should be allowed to choose a different third science. Why is electricity, in terms of circuitry, not included in this course? Circuitry is relevant in our everyday lives; it should have a place within Arkansas standards. Requiring students to choose an accelerated pathway at a young age will lock many out of the upper level science courses. Students should have the opportunity to pursue upper level courses after reaching high school (meaning they can enter the accelerated pathway at a later time). This pathway seems to discourage students rather than encourage them to pursue their later developed interest in science. Students coming from elementary school may not know they if they are ready for an accelerated science/ math pathway due to the limited enrichment opportunities and so we may miss some students who would engage and excel in these courses when they get in high school by having this decision made so early in their academic career.
9/28/2016 2:58 PM

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Graduation Requirement I don't have specific comments about the standards, but I am very concerned about making this course a requirement. I believe one year of chemistry AND one year of physics should replace this course on the advanced track. Arkansas students WILL NOT be prepared for college chemistry if they stop with this course. Students majoring in science typically start with General Chemistry in college, but they will have to drop back to Introductory Chemistry if they have not already had a full year of Pre-AP/Honors Chemistry. This will create a financial burden for our state. Additionally, there is not enough chemistry in this course to prepare students for AP Chemistry, so students will need to take another course between Principles of Chemistry and Physics and AP Chemistry. Making the path to AP more difficult is a disservice to our students. Taking a full year each of biology, chemistry, and physics will prepare students for the ACT, college, and any AP science course of their choosing. Therefore, students should have the option of taking both chemistry and physics instead of this course.
9/26/2016 6:31 PM

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Affirmation **Graduation Requirement** Allow students to replace the PCP course with the full length Arkansas designated Chemistry and Physics or AP Physics 1 course. This will allow students to take upper level courses in their junior and senior year. I'm

12

concerned about current lagging enrollment in AP Physics, AP Chemistry, AP Biology & A & P. Bravo! Great masterpiece in getting all the PE's in. I love the reduction of topics from the current Chem./Physics/Physical Science frameworks. This will require a tremendous amount of Professional Development as we educators unlearn our habit of shoveling mountains of content and focus on deeper level thinking/critical scientific argument and application of science in the everyday phenomena in the world around us.

9/26/2016 6:26 PM

Graduation Requirement Why is Physical Science not required for ALL 8th grade students, which is true for most states that are higher ranking in education? This would allow students to take all core science in high school. If the goal of adopting NGSS is to become more competitive with other states, why are all students not expected to have a full year of ALL core science classes? We are putting students in a position of not being well rounded in the sciences if the only requirement is to take Physical Science, and Biology but not required to take both Chemistry and Physics for a full year.

9/26/2016 6:24 PM

Graduation Requirement 1. There is great concern over having EVERY student, regardless of their Smart Core/Core curriculum track, take Principles of Chemistry and Physics. If a student is on the Core curriculum track that indicates that he/she is not likely to pursue a career in the science field. He/she should be able to choose environmental science or anatomy/physiology as their third required science course. 2. Unless we are piecing it together wrong, electricity (in terms of circuits and flow) do not make an appearance after 8th grade unless a student chooses to take the physics course. We feel that electricity should have a place in the principles course, as it is extremely relevant to the everyday life of students. 3. There is concern over having adequate PD opportunities for teachers to become more comfortable teaching new content that is now incorporated into their course, specifically in regards to strategies and methods.

9/26/2016 4:05 PM

Graduation Requirement My only concern for the new courses is the possible requirement of chemistry/physics for all high school students for graduation. It is my understanding that students will be required to take physical science (9th), biology (10th), and a combination of chemistry/physics (11th) in order to graduate. In my opinion, this will not work for many students. What about those who want to take a full year of chemistry, physics, or environmental science? I would suggest that all students be required to take physical science and biology and be given the option of any of the other science offerings as their third credit. This could include human anatomy, environmental science, chemistry, physics, or chemistry/physics combination. I believe many students and their families would greatly prefer this course of action to better prepare students for future classes and careers.

9/25/2016 11:21 AM

Graduation Requirement We do not agree with the three proposed science courses for graduation because the third course Principles of Chemistry and Physics is not a good fit for our school as a majority of our students lack the math and reading comprehension skills to be successful in this course. We do however, agree that Physical Science and Biology should be required courses for graduation.
9/21/2016 4:05 PM

Graduation Requirement Students need to have an opportunity to get on the accelerated pathway after 5th grade. Students move in, mature, change their interests, etc. What if a senior student moves from out of state with a Physical Science credit, Biology credit, AP Chemistry, and AP Physics class? Will she really be required to take the PCP class? Not only would that be an incredible waste of time for that student, but a management nightmare. This significantly diminishes the integrity of Chemistry and Physics instruction. With only half credit of Chemistry and Physics, it is highly unlikely that students leaving the PCP class will be adequately prepared for Intro to Chem. and/or Physics in college. Just because a teacher is allowed to teach a course doesn't mean they are highly qualified. Many teachers are certified for Chemistry only or Physics only. On paper these teachers would be appropriately licensed for PCP however, they would not be highly qualified.
9/20/2016 7:27 PM

Graduation Requirement My feedback to the proposed high school science courses: • This would be a good time to recommend that biology be offered in the ninth grade, instead of the tenth grade. Life science is the main theme in junior high (middle school) and the biology class would “flow” from the basic life science courses. Logistics might be confusing the first couple of years this is implemented. • A student would take physical science in the tenth grade and therefore the course “flow” would be in the next physical science course. The student would not have a year break between the Physical Science course and the next physical science course. • Principles of Chemistry and Physics should not be a required course. If the course is required, chances are that it will be “watered down” and become “Physical Science II” to accommodate the students who will be taking the course. A student may not have the foundation to take the upper level science courses because of the course did not prepare them to do so and the teacher will have to spend time laying the foundation for the upper level course. • If Principles of Chemistry and Physics becomes a required course, it will effectively sound the death knell for the AP Program in Arkansas. A student has one year to choose between chemistry, physics, AP Chemistry (which requires a chemistry pre-requisite), AP Physics (which may or may not require a pre-requisite), and the other science courses. • Could Principles of Chemistry and Physics replace Physical Science as a course? The courses are almost mirror images of each other according to the course description.
9/20/2016 6:16 PM

Graduation Requirement I do not agree with the Principles of Chemistry and Physics Class - especially for those students who are planning on taking AP Chem., AP Bio or AP Physics. You are doing them a HUGE disservice forcing them to have to take that

class. Those students need to be challenged more and need to focus on the more in depths concepts of these classes. This is going to really hurt the AP scores and programs in a lot of high schools. This Principles class is going to be great for the average college bound student or those entering the workforce. However, you are punishing those gifted students by not letting them choose the more advanced pathway!
9/20/2016 3:55 PM

Graduation Requirement As a high school teacher, I am concerned about the change that was made a few years ago in the 7th and 8th grade science curriculum. When 7th grade was life science and 8th grade was earth science, I noticed students were retaining more information and seeing more connections as they progressed through the 7/8 grade years as well as when they took high school courses that used those same concepts. The current curriculum which has such a wide variety of concepts in 7th and 8th graders is almost a shotgun approach. Since this approach began, I have noticed the students I get on the high school level have not had the same amount of retention and have not been able to make connections as well. I would like to see 7/8 grade science go back to life and earth. This would give the students depth in those courses before they move on to high school. With the current curriculum, they do not get enough of anything to help them. It is nothing more than the distribution of a collection of facts in so many sciences that they do not get a connection to any science as a whole. If we are moving more toward STEM and higher-level inquiry-based thinking, the old curriculum was much better. Students saw connections because concepts were related from chapter to chapter. The accelerated 8th grade physical science is too early for that level course. The math skills needed for the physics semester has not been met by the 8th grade. Pushing things back a grade is NOT making our students smarter, it is making them feel more defeated earlier. 8th grade teachers can add rigor to their classes to challenge those advanced students in earth science (7th grade in life science). This would prepare them for the pre-AP level in the 9th grade and would be more effective than pushing the actual pre-AP course down to the 8th grade. Yes, you have a SMALL percentage who would survive if the change is made, but there would be a greater percentage that would not benefit. I know the plan is to also offer the pre-AP in the 9th grade for those who were not ready in the 8th but that is creating an even greater divide among your students. Some school districts would not be able to do both due to staffing. A pre-AP course taught to 8th grade students is not going to be as rigorous as a pre-AP course taught to 9th graders and that is not a level field if both groups are going to get the same credit on their HS transcript. They will begin to sign up for the 8th grade course because it will be 'easier' than the one at the 9th grader level. This would defeat the purpose all together. I know people would like to think that the 2 courses would be equal, but the only way that would happen is if the same teacher taught it at both levels. This is what I meant when I commented on the staffing issue. Some districts would not be able to do that. My vote...................#1.take the 7th grade back to all life science as a pre-biology course in which the 10th grade biology teacher and the 7th grade biology teacher work together to decrease overlap. This could be done by keeping a notebook of information from the 7th grade to recall and use in the 10th grade. Transfer students would be provided with one if they did not take the course at that school. We spend TOO much time re-teaching. That is why we

don't get depth in the upper grades. 10th should be a continuation. Having reference materials would help students with that. #2 take 8th grade back to earth science to allow those students to see if they have a true interest in environmental science, archeology, geology, or astronomy. #3 - have the pre-AP physical science in the 9th grade only! Thank you
9/16/2016 3:35 PM

Graduation Requirement The name of this course should be changed. Calling it Chemistry and Physics is very misleading.
9/15/2016 2:56 PM

Graduation Requirement I think it would be useful to rename these courses- they are misleading. These are definitely more integrated sciences then the names imply.
9/15/2016 2:51 PM

Graduation Requirement I think the titles for each course should be reflective of the content that is being covered in those courses. For example, the physical science course seems more like a general science course than the traditional physical science course we currently offer. I suggest re-visiting the titles of the courses to make them less confusing.
9/15/2016 2:40 PM

Graduation Requirement I think students should be able to follow different tracks either the three proposed main courses or they should have the opportunity to take physical science, Human Anatomy, and either environmental or earth science.
9/13/2016 2:08 PM

Graduation Requirement I am concerned about the class "Principles of Chemistry and Physics" being both too low level and too high level in a variety of areas. For example, the expectations for the standards are far broader and higher than the strict assessment boundaries provided. I am also concerned that if this was a required course, that it would be very difficult for a student to make any practical use of a half credit of physics and a half credit of chemistry.
9/9/2016 2:10 PM

Graduation Requirement I am concerned about the graduation course requirements and the "accelerated pathway". I don't understand why students would take Physical Science in addition to Principles of Physics and Chemistry. The content seems to be largely the same, and it seems restrictive in that it will not allow more time and freedom for students to take Pre-AP or AP level courses. I hope that you would consider allowing students to replace the Principles course with a Chemistry or Physics course, similar to the way the course requirements are now. I am also concerned that the "accelerated pathway" could be restrictive because it seems difficult or counter-intuitive to introduce students into the pathway at a later grade, such as 9th, etc.
9/6/2016 8:54 AM

Professional Development (12 Responses)

Professional Development I have been teaching science 22 years, and teaching in Arkansas for more than 14 of those years. In addition, I do a lot professional development as a trainer for other Arkansas science teachers. I don't think enough Arkansas teachers have the deep understanding of science necessary to integrate science in the way that the new courses demand. I have met veteran Arkansas science teachers who were confused about Independent and Dependent variables, or the difference between a diatomic gas and a compound. Standards for teachers need to be raised. There is a shortage of qualified physics teachers, and you are making every student take "Principles of . . . Physics". If the teachers don't understand physics, the students are doomed. I don't see how this is going to work in the State we have right now. I support raising standards, but if you raise them without providing a much, much, much more robust system of teacher support than has ever existed in this state before, this will flop.

9/30/2016 5:38 PM

Professional Development My only concern with this curriculum is there is too much leeway in licensing. We may set our students up for failure if we implement courses designed to accelerate their learning and then provide them with inadequate instruction to achieve the goal. With the alternate options written in it is inevitable that someone subpar will eventually be hired. I believe very firmly that if we want to hold our students to a very high standard we should also hold the teachers hired to the same standard. We all know that teachers with alternate licensure are not ideal in every situation and I do not believe they are qualified to teach this curriculum.

9/30/2016 1:35 PM

Professional Development Help would be great in sending out 5E lesson plans for a few of the harder topics.

9/28/2016 2:44 PM

Professional Development My major concern is not being able to have the time to adjust especially when it comes to test scores. The state needs to understand our transition and give us time to overcome the growing pains. However, not only the state, but our administrators at all levels need to understand our classes are going to look different. If we overwhelm our teachers, we are going to find Arkansas as a high needs state for all teachers. There needs to be an adjustment and understanding at the state level and within each district to give all teachers time and help to address all issues.

9/28/2016 2:43 PM

Professional Development It would be helpful to have a collection of distinguished units that teachers could choose from to use in their classroom. Any website resources and Professional Development would be beneficial also.

9/28/2016 8:44 AM

Professional Development What is the rationale for not teaching specific strands of science in each grade level, as opposed to randomized survey classes across the middle school grades? What is the rationale for using language that is intimidating to teachers and students alike? What is the rationale for creating both extremely specific, yet utterly vague standards? Where is the curriculum and resources coming from? How do teachers without science degrees get the content/Professional development? Where is the history of the science theories that have driven our current understanding? What does the timeline look like for each standard? What are the essential standards? Questions?

9/26/2016 9:05 AM

Professional Development Will ADE guarantee that we will not lose our jobs if we are not qualified to teach the physics portion of Principles of Chemistry and Physics? We (older, one certification folks) should somehow be grandfathered in with GUARANTEED co-teaching until new, multi-certified teachers replace us as we retire. This is my life-long career and this new course is going to force me to retire early after 25 years. This is so upsetting. I feel like all the many hours of work, sweat, tutoring, and chemistry teaching training has all been unappreciated. ADE needs to specifically address the veteran teacher instead of focusing on the multi-certified new hires. Also, ADE needs to find out if a half credit in chemistry and a half credit in physics will still allow students to take and succeed in college classes without having to take a remedial course first. Have you shared these courses and surveyed the college chemistry and physics professors across the state?

9/20/2016 7:30 PM

Professional Development Because of the integrated content in these courses, there will be a lot of content based professional training or reinforcement needed for many teachers that have taught the same course for many, many years comfortably.

9/16/2016 2:55 PM

Professional Development For Arkansas teachers to be expected to teach such integrated courses, MUCH content-based PD will be needed. Many of us have only been teaching one or two subjects for many years. Much patience and training and resources will be required for our continued success.

9/16/2016 2:54 PM

Professional Development While I agree with the overall idea of integration of the topics and a focus on a spiral curriculum I have concerns about the support that will be provided to teachers to ensure that they feel comfortable truly including all areas of the proposed course curricula. I hope that there will be considerable resources devoted to helping teachers not only broaden their content but also switch their mindset and that the state realizes that this will be a long term commitment and not just a quick implementation. There should also be conversations with EPP's and the state about new areas of licensure for science teachers such as an integrated science degree with perhaps an emphasis on Chemistry or Physics.

9/15/2016 2:55 PM

Professional Development This class will take a Chemistry teacher (me) that is pretty great and turn me into a below average teacher. Maybe others will do great. I don't believe I will be effective. If you could see me in action, you would not want to change what I do and how I do it.
9/15/2016 12:57 PM

Professional Development Please continue to offer PD opportunities to learn more about the standards

Licensure (1 Response)

Licensure Will these additions/changes to courses affect how we test for/receive our license?
9/8/2016 11:09 AM

Lacks Specificity (3 Responses)

Lacks specificity You are assuming that the student who takes chemistry will be able to "jump" right in and design their own experiments and a graduate researcher would. (Even laboratory technicians are taught to follow the process and DO NOT deviate from the procedure.) For the standards, sometimes I think that you are trying to build the roof first before building the foundation. You are assuming that ALL students who take a science course will automatically become a researcher or an engineer. If this being the case then the student who has taken high school chemistry should automatically start with organic chemistry their freshman year!. Also being the case the student who has taken high school chemistry should automatically be employed in a high tech research lab developing procedures without the watchful eye of a more experienced chemistry researcher.

9/30/2016 6:21 PM

Lacks specificity I have enormous concerns. You're trying to blur the lines and include too much opinion and not enough skill and fact in each of these courses. You're not including math, formulas and other essential tools and background for student's success. This is the worst setback in my 30+ years of teaching and will be a total disaster for the future of the state. You've taken out the rigor and added all these fluffy things that will do nothing and make achievement more difficult. You are NOT listening to teachers input. You're driving students who want to achieve to private schools to go around this nonsense. I cry for the future! You've sold science 'down the river'.
9/28/2016 3:45 PM

Lacks specificity I am a parent of a child who attends Central Elementary school in Van Buren, Arkansas. There are some amazing programs in this school district for most children but what about children who have different needs? My child is in a resource class who does not get the same activities as a "typical" child. I know this to be true because I also have a "typical" child and they get So many more Opportunities than my

child who is consider "special needs". Not fair to these kids! The principle at this school does not like to involve the resource classrooms in the extra fun because she would rather them stay in "their" hallway. Just like these kids have "their" own lunch table... As a mother I am heart broken. My point in writing this is that maybe just maybe whoever reads this can get someone to check into this school and more programs for these amazing kids. For all grades k-12. Thank you Just a mom who wants her child to be given every chance possible to succeed.
9/9/2016 12:03 PM

Additional Comments Submitted by Email following September 30, 2016

From: Melissa Cooper [redacted]
Sent: Wednesday, October 12, 2016 10:06 PM
To: [redacted]
Subject: Concepts of Chemistry and Physics, new required science class

I am sending this email to encourage you as a member of the state school board to rethink making this course mandatory for our high school students. It would hurt the advanced students having to take this class and make it really tough on the students who are not going to college and have enough trouble with Physical Science.

Thank you for your reconsideration.

Melissa Cooper
Library Media Specialist
Calico Rock School District
#1 Pirate Place
Calico Rock, AR 72519

From: Melva Brannon [[redacted]
Sent: Thursday, October 13, 2016 1:22 PM
To: [redacted]
Subject: New science course

I am writing you in connection with the proposal to add the new science course, Principals of Chemistry and Physics, as a requirement for graduation. While I think that this could be an option for students who plan on going to college, but are not sure what they want to do, I disagree with it being a requirement for all students. Some students struggle with physical science and know that they do not plan on doing anything related it. I think that we are adding a hardship on those students that are not college material. We all know that not every child is college material, and would better serve them by preparing them for the work force than requiring upper level classes. I also think that if this is a required course, it will have to be watered down to allow those now college students to be able to pass. We will being a disservice to our advanced students as well, by having to teach to the middle instead of challenging them that would be normally going on to chemistry or physics, which both count toward

honors at our school. I do not see the need for this added class, we are actually giving students less options by requiring a specific science course instead of giving them choices for their science classes. This could be discouraging for a student that was planning on going straight biology major. I know that there is always overlap, but I still fill we are limiting their choices with this plan. I have also spoke with a few professors at UCA, who had attended the introduction for this and they also thought it would put the more advanced students to a disadvantage.

Thank you,

Melva Brannon
8th grade Science
Physical Science
Physics
Chemistry

From: Kish Pool [redacted]]
Sent: Wednesday, October 12, 2016 12:03 PM
To: [redacted]
Subject: new science course

As a mother of two dyslexic children and another child that struggled to be a B and C student, I disagree with the new Science course that is being brought to the table as a "requirement" to graduate high school. I recently had my oldest child graduate from high school in the bottom 1/2 of his class. This was not due to the fact that "we", his parents, teachers, and tutors, did not all put in many hours of work to help him be the best that he could be. Adding yet another difficult required Science course, would have been too much for him to handle. He took the ACT and was not college material, therefore settled on a technical certificate program. Not all students will be college material. In fact, the majority of the population will go into the workforce with just a high school diploma or a technical certificate. I also feel like this is going to hinder the path of our honor students as well, depending on their college path course. Please, consider taking this off of the table as a "requirement"! Thank you for your time.

Kish Pool
Mother of 3 struggling students
Calico Rock School Dyslexia Coordinator
2nd Grade Teacher

Katy Turnbaugh [redacted]

To: [redacted]

I apologize for the long delay in my response. I have been nursing a sinus infection and feeling quite sorry for myself; going to bed right after work. I reviewed the following for the clarification statements

as well as curriculum content, and have commented below. As I am not qualified to teach, and have never taught biology, I did not include it.

Environmental Science:

Big take-away: Nice attempt, need to make computer modeling and simulations in line with student's background education. The level of math needs to reflect that most students are likely in Algebra 1 (or Algebra A/B) and limited in their mathematical modeling. Overall this is an improvement and brings the standards up-to-date with current environmental issues.

Specifics: pg 3, we generally like to refer to the level of thinking as "critical" not "computational"

pg 7, under "Defining the Problem" at the end I would add through engineering EDUCATION AND POLICY, as we don't want students to think we can engineer all environmental solutions, and we want them to understand the role of culture and civics in resolving environmental problems.

pg 12 EVS-PS3-2 this will be challenging at this level, perhaps we need to pre-fabricate models with inputs they can vary and see the outputs.

pg 12 EVS2 ETS1-2 need to retain a broad scope over the "chunked" problems or we design an improper/impractical solution. There is also a typo as manageable should not be capitalized.

pg 15 EVS LS2-1 will be very difficult to accomplish with the mathematical sophistication students have at this level.

pg 18 EVS ESS3-3 see above. You need to bring this down to a "doable" level

pg 18 EVS4 ETS1-3 addressed in my big take-away about input/output modeling

Physical Science:

Big take-away: This is a vast improvement over current physical science standards.

Specifics: pg 12 PS-PS1-2 "Assessment does not include predicting chemical products", I think it should for simple compounds

pg 12 PS-PS1-7 okay with this, but I think it should include the concepts of coefficients and ratios in a balanced chemical equation

pg 16 PS-2-ETS1-2 excellent!

Principles of Chemistry and Physics:

Big take-away: This is a very doable course and should be relevant and in the educational plan of most students.

Chemistry:

Big take-away: These standards are far better than the current standards. It is more complete and a better prep for college and AP chemistry.

Physics:

Big take-away: These standards are also better than our current standards. It allows depth vs too many standards (in the current framework). Students will have the ability to gain mastery over a number of topics and be prepared to think critically in college or on AP Physics.

Thank you for the opportunity to voice an engineer's perspective over the new frameworks, and again, apologies for the delay. I do have a couple of questions. As we will now require Environmental Science, Physical Science, and Biology for all students do we expect students to double-up in order to fit AP courses in their educational plan? Will this not require more resources in science departments as students will likely be taking more science classes?

I look forward to teaching under NGSS, I think it is a considerable improvement over our current standards.

Take care,
Katy Turnbaugh

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Additional Licensure Waiver Requests
2016 - 2017 School Year
December State Board Meeting

Total number of waivers requested this month – 160

Total number of waivers granted – 153

Total number of waivers denied – 7

Total number of School Districts requesting waivers – 46

Waivers granted for schools classified as:
ESEA Needs Improvement Priority* - *Academic Distressed

Blytheville School District

Harmon, Amy	230 - Special Ed Inst Specialist 4 -12(Middle)
Hudson, Christina	103 – Endorsement Math 5-6 (Middle)
Stone, Benjamin	258 - Special Education K-12 (High)
Still, Dara	230 - Special Ed Inst Specialist 4-12 (High)

Little Rock School District

Williams, Krystal	289 - Gift & Talented (Baseline)
Caples, Lenelda	259 - Art K-12 (Cloverdale)
Jasper, Janell	289 - GT
Johnson, Sharon	286 - Library Media Spec K-12 (Henderson)
Pinkard, Tawanna	254 - Middle School Math 4-8 (Henderson)

Little Rock Hall

Barefield, Sherry	258 - Special Education K-12
Choongo, Hamoonga	247 - ESL K-12
Clark, David	167 - Social Studies 7-12
Griffin, Kelli	230 - Special Ed Inst Specialist 4-12
McCabe, Kelly	247 - ESL K-12
Norwood, Marsha	200 - Mathematics 7-12
Smith, Tara	247 – ESL end.

Little Rock Mabelvale Middle School

Davis, Chandra	258 SpEd K-12
Harris, Jasmine	258 SpEd K-12
Banks, Cal	254 Math

Little Rock McClellan

Flood, Paula	710 - Spanish K-12
Pauley, Krista	259 - Art K-12
Sumlin, Hiram	166 - Eng Lang Arts 7-12
O'Neal, Craig	258 – SpEd Resource SS 7-12

Pine Bluff School District

Pine Bluff High School

Withers, Myrtle	289 - Gifted & Talented K-12
Scott II, Timothy	262 - Inst. Music K-12

District	Substitute Name	Substitute Credentials		Teacher of Record	Subject Teaching	G/D	Comment
Ashdown	McFadden, Christopher	BS	Kinesiology	NA	Sec Math	Granted	no teacher of record
Bald Knob	Frisbee, Debbrah	BA	Interdisciplinary Studies	Goacher, Lindsay	Math	Granted	teacher on leave
Bald Knob	Hamrick, Kylie	none	5th grade	Garner, Khali	5th grade	Granted	teacher on leave
Bauxite	James, Kendra	BSE	Education	NA	Soc Stu 4-8	Granted	teacher resigned
Beebe SD	Mendenhall, Lisa	MA	Middle Childhood	Carter, Kayla	MS LA/SS	Granted	teacher on leave
Beebe SD	Channing, Deidre	BA	Elem, SpEd	Thompson, Tina	SpEd	Granted	teacher on leave
Bentonville	Foster, Tyler	BS	SpEd	NA	Elem SpEd	Granted	new position
Bentonville	Jamell, Felicia	MAT	History	Ross, Holly	Soc Stud	Granted	teacher on leave
Bentonville	Sellers, Mary	BSE	Elem Ed, English	Durr, Brittani	Math	Granted	teacher on leave
Bentonville	Maxey, Danney	BSE	Biology / Sociology	Breece, Kerri	Career Orien.	Granted	teacher on leave
Bentonville	Hutchison, Lexy	BSE	Hearing Spec	Bishop, Lissa	SpEd Elem	Granted	teacher on leave
Bentonville	Ross, Rhonda	MA	Elem Ed	Davis, Kristen	3rd Grade	Granted	teacher on leave
Bentonville	Maxey, Danney	BSE	Biology/Sociology	Hudman, Rebecca	Computer App.	Granted	teacher on leave
Bentonville	Zhang, Quain	MA	English	NA	Mandarin Chinese	Granted	new vacancy
Berryville	Randall, David	BA	Social Studies	Mitchell, Bethany	LA/ SS	Granted	teacher on leave
Bradford	Davidson, Billie	Med	Elem, SpEd	Liles, Houston	Art	Granted	teacher on leave
Bryant	Roberts, Terri	BA	Elem Ed	Belin, Mertie	Elem SpEd	Granted	teacher on leave
Buffalo Island SD	Scutero, Michael	BS	Lib Studies / Coaching	Taylor, Bill	PE, Coaching	Granted	teacher resigned
Cabot SD	Kitchings, Robyn	BA	Interdisciplinary Studies	Dyer, Jessica	3rd Grade	Granted	teacher on leave
Cabot SD	Stokes, Megan	BSE	Mid Lev Edu	Jeffers, Maggie	5th gr. Math	Granted	teacher on leave
Cabot SD	Claussen, Natalie	BA	SpEd	NA	SpEd	Granted	no teacher of record
Cabot SD	Ellison, Hailey	BS	Biology	NA	Phy Sci	Granted	no teacher of record
Camden Fairview	Atkins, Amanda	BA	General Studies	NA	Phy Sci	Granted	no teacher of record
Carlisle	McCalman, Whitney	BA	Biology	Brazeal, Melinda	SpEd 7-12	Granted	teacher on leave
Carlisle SD	Bokker, Carly	BS, MS	Agri	Bryant, Ashley	Sci, Biology	Granted	teacher on leave
Cedar Ridge	Vanscoder, Chelsea	Associate Degree	Elem Music	Smith, Amanda	Elem Music	Denied	teacher resigned
Cedar Ridge	Batson, Shirley		Elem Music	Smith, Amanda	Elem Music	Denied	teacher resigned
Cedar Ridge	Wood, Polly	BSE,MSE	ECH, Reading	Smith, Amanda	Elem Music	Granted	teacher resigned
Corning	Moore, Karen	BA	ECAR	NA	ALE	Granted	no teacher of record
Corning	Moore, Karen	BA	Radio TV/Psych	NA	ALE	Granted	no teacher of record

Des Arc	Campbell, Mindy	MAT	Education	Thomason, May	FACS	Granted	teacher on leave
Dollarway	Washington-Lever, Shirley	BA	Business Management	Helton, Sentwali	Algebra I	Granted	teacher resigned
Dollarway	Borkins, Carla	BS	General Studies	McCarty, Kim	5th grade	Granted	teacher reassigned
Dollarway	Thomas, Ivan	BS	Rec/ Phy Edu	Cleveland, Greg	PE	Granted	teacher reassigned
Dollarway	Lowe, Amy	BA	General Studies	Walton, Krystle	Kindergarten	Granted	teacher resigned
Dollarway	Jordan, Montoya	BS	Chemistry/ Crim Just	Wesley, Julie	Chemistry	Granted	teacher resigned
Dollarway	Jackson, Henry	BS	SpEd	Berry, Patricia	SpEd	Granted	teacher resigned
Dollarway	Culclager, Kieona	BS	Chemistry	Irons, Jennifer	Math Sec	Granted	teacher resigned
Dollarway	Baugh, Christina	BS	Visual Arts	Dokes, Kathryn	Art	Granted	teacher resigned
Dollarway	Strickland, Marsha	MA	Ed. Inst. Tech	Hammons, Elizabeth	2nd Grade	Granted	teacher resigned
Dollarway	Smith, Andrea	BS	Human Dev/Family Stud	Walcutt, Ann	9th Grade, English	Granted	teacher resigned
Dollarway	Bell, Jason	BA	Political Sci/ Crim Jus	Kidd, Darrin	PE	Granted	teacher resigned
Dollarway	Cross, Dedrick	BA	Crim Jus/ History	Cortez, Lee	Health/PE	Granted	teacher resigned
Dollarway	Castle, Na'Shalle	BA	Biology	Nalls, Reggie	6th grade, Sci	Granted	teacher resigned
Drew Central	Fleming, Steve	BSE	Physical Ed Science	Greenwood, Rebecca	SpEd	Granted	teacher on leave
Earle SD	Tyler, JeCory	MSE	Mathematics	Tyler, JeCory	Mathematics	Granted	no teacher of record
East Poinsett County	Brown, Stephen	MA	History	Brown, Stephen	Soc Stu 7-12	Granted	teacher not licensed
England	Brazear, Shana	MA	ECH	NA	Math	Granted	no teacher of record
Farmington	Silva, Sandra	MA	Reading Spe, ESL	Spears, Hailey	Life Science	Granted	teacher on leave
Forrest City SD	Wilson, Ashley	BA	ECS	NA	FACS	Granted	no teacher of record
Forrest City SD	Coleman, Angela	BA	EC	NA	Biology	Granted	no teacher of record
Forrest City SD	Means, Vicki	MA	ECIC	NA	Kindergarten	Granted	no teacher of record
Forrest City SD	Wilson, Cynthia	BA	ECY	NA		Granted	no teacher of record
Forrest City SD	Rose, Terra	BA	ECERR	NA	Elem	Granted	no teacher of record
Forrest City SD	Heard, Sandra	MA	ECAN	NA	Soc Stu 7-12	Granted	no teacher of record
Forrest City SD	Mathews, Romano	MA	EC	NA	FACS	Granted	no teacher of record
Forrest City SD	Granger, Natasha	MA	EC	NA	Choral Music	Granted	no teacher of record
Forrest City SD	McCauley, Cassandra	BA	ECASS	NA	English	Granted	no teacher of record
Forrest City SD	Wade, Emmanuel	BA	ECMMA	NA	MS Art	Granted	no teacher of record
Forrest City SD	Kanapala, Geetha	BS	EC	NA	Phy Sci	Granted	no teacher of record
Fort Smith SD	Christly, Dedra	BA	English	Macy, Jessica	English, Journalism	Granted	teacher on leave

Hampton	Smith, Mary	AA	Parks and Recre	Rabb, Andrew	Elem PE	Granted	teacher reassigned
Harrisburg	Garland, Morgan	BSE	Social Science	NA	Social Stud	Granted	no teacher of record
Harrisburg	Benintende, Charles	BA	Religious Studies	NA	Social Stud	Granted	no teacher of record
Harrison SD	Lisko, Jacob	BS	Social Studies	Kennard, C	Social Stud	Granted	teacher resigned
Hillcrest	Durham, Breanna	BSE	Business Education	Tunstall, Benny	Bus Ed	Granted	teacher on leave
Hot Springs	Sierra, Jade	Ed D	Curr & Inst	Beatty, Michelle	Sec Math	Granted	teacher resigned
Hot Springs	Koller, Mikala	BSE	Sped	Koller, Mikala	SpEd K-4	Granted	new pos. teacher not cert.
Kipp Delta Public Schools	Ross, Latasha	MS	SpEd	NA	SpEd	Granted	no teacher of record
Kipp Delta Public Schools	Williams, Roquel	BS	SpEd	NA	SpEd	Granted	no teacher of record
Kipp Delta Public Schools	Knowlton, Lorri	BA	ECH, Elem	NA	SpEd	Granted	no teacher of record
Kipp Delta Public Schools	Guillam, Sara	BA	Phy Earth Sci	NA	SpEd	Granted	no teacher of record
Learning Ctr NE AR	Bell, Laura	BS	SpEd	Tinsley, Sara	ECE SpEd	Granted	teacher left the pos.
LRSD	Guinn, Hubert	BA	Education	NA	2nd grade	Granted	no teacher of record
LRSD	Armstrong, Florene	MA	Science	NA	1st grade	Granted	no teacher of record
LRSD	Griffin, Myrtle	MA	Reading	NA	4th Grade	Granted	no teacher of record
LRSD	Pool, Roger Scott	BA	Bus Admin	NA	Comp. Bus	Granted	no teacher of record
LRSD	Holmes, Shiela	BS	Science	NA	Math	Granted	no teacher of record
LRSD	Ellis, Cleveland	MS	Education	Mann, Stephanie	Communications	Granted	teacher on leave
LRSD	Gatewood, Ada	BA	Elem Ed	Clark, Micah	Music	Granted	teacher on leave
LRSD	Collins, Kimberly	BA	Theatre	Nunn, Berthena	SpEd	Granted	teacher on leave
LRSD	Peters, Amanda	BA	Banking	Holloway, Kathryn	Library	Granted	teacher on leave
LRSD	Snow, Evelyn	BS	Education	NA	Science Lab	Granted	no teacher of record
LRSD	Wells, Rita	BA	Public Admin	NA	Sped	Granted	no teacher of record
LRSD	Cleveland, Kimmie	BS	Health Ed	NA	Broadcast Journ	Granted	no teacher of record
LRSD	Browning, Monica	BA	Health Sci	Huggs, Leslie	5th grade	Granted	teacher on leave
LRSD	Higgins, Vincent	BA	Mathematics	NA	Math	Granted	no teacher of record
LRSD	McFadden, Brittany	BA	Psychology	NA	SpEd	Granted	no teacher of record
LRSD	Williams, Katherine	BA	Science	NA	Spanish	Granted	no teacher of record
LRSD	James, Alexandria	BA	Public Relations	NA	Music	Granted	no teacher of record
LRSD	Grasby, Madasyn	BA	Criminal Justice	Zimmerman, Debra	SpEd	Granted	teacher on leave
LRSD	Boaitey, Kwadjo	BA	BA - Speech Comm	vacant	English	Granted	no teacher of record

LRSD	Jordan,Brooke	BA	BA - General Studies	vacant	Mathematics	Granted	no teacher of record
LRSD	Avant, Caitlin	BA	BA -Theater Arts	vacant	SPED-Math	Granted	no teacher of record
LRSD	Harper, Mary	BA	BA - Family & Consumer	Hart, Judith	SPED	Granted	teacher on leave
LRSD	Johnson, Charlene	BA	BA - Information Systems	Liao, Yanqui	Mathematics	Granted	teacher on leave
LRSD	Earnes, Falloncia	BA	BA - Early Childhood Ed	vacant	SPED-LA/Science	Granted	no teacher of record
LRSD	Mcdonnell, Lesha	BA	BA - Interdisciplinary Stud.	vacant	Mathematics	Granted	no teacher of record
LRSD	Kelly, Ivey	BA	BA - Political Science	vacant	English	Granted	no teacher of record
LRSD	Auduong, Mindy	BA	BA - Early Childhood Ed	vacant	1st grade	Granted	no teacher of record
LRSD	Austin, Dorkendra	BA	BA - Sociology	Johnson, Jennifer	4th grade	Granted	teacher on leave
LRSD	Jones, Andre	BA	BA - Art	vacant	ART	Granted	no teacher of record
LRSD	Howard, Donald	MA	MA - Business Admin	Hardiman, William	Social Studies	Granted	teacher on leave
LRSD	Williams, Kathy	MA	MA - Second Edu	Crayton, Brittany	Mathematics	Granted	teacher on leave
LRSD	Carruth, Jennifer	MA	MA - Computer Sci	vacant	Science	Granted	no teacher of record
LRSD	Threet, Sharronda	BA	BA - Early Childhood Ed	Norwood, Eurydice	3rd grade	Granted	teacher on leave
LRSD	Davenport, Laurel	BA	BA - Journalism	vacant	2nd grade	Granted	no teacher of record
LRSD	Jones, Beverly	BA	BA - Journalism	vacant	2nd grade	Granted	no teacher of record
LRSD	Cleaver, Delilah	BS	BS - Social Studies	vacant	SPED	Granted	no teacher of record
LRSD	Stickley, Tara	MA	MA - ART	vacant	ART	Granted	no teacher of record
LRSD	Thomas, Maryam	BA	BA - Elem Ed	vacant	4th grade	Granted	no teacher of record
LRSD	Daniels, Carla	MS	MS - Public Adm	vacant	5th grade	Granted	no teacher of record
LRSD	Davis, Karon	BA	BA - Business	Gober, Loretta	Kindergarten	Granted	teacher on leave
LRSD	Watson, Chanslor	BA	BA-Speech	vacant	P.E.	Granted	no teacher of record
Mammoth Spring	Burke, Cathy	BSE	Elem Ed	Estes, Rose	Sec English	Granted	teacher on leave
Mammoth Spring	Madden, Monica	BSE	Elem Ed	O'Neill Kylie	Art K-12	Granted	teacher on leave
Manila	Lesley, Kendra	BS	Biology/Chemistry	Bunch, Cindy	Chemistry	Granted	teacher resigned
Manila	Lesley, Kendra	BS	Biology/Chemistry	Bunch, Cindy	Chemistry	Granted	no teacher of record
McCrory SD	Winningham, Sebrina	BS	Elem Ed	Stapleton, Gary	Journalism	Granted	teacher retired
Melbourne SD	Powell, Kimberly	BSE	ECH, Elem, MS Edu	Powell, Kimberly	Library	Granted	expired license
Millcreek Behavioral	Butler, Chris	BBA	SpEd	Neal, Pat	SpEd	Granted	teacher resigned
Millcreek Behavioral	Caldwell, Tammy	BA	General Studies	NA	PRTF	Granted	new position
Mountain Home SD	Massey, Bennie	MSE	Counseling	George, Brittany	Elem Counseling	Granted	teacher on leave
Mountain Pine	Holick, Susan	MS	Reading	Smith, Laquita	Literacy	Granted	teacher resigned

North Little Rock	Martin, Dana	MA	Science	NA	SpEd	Granted	no teacher of record
North Little Rock	Pettus, James	MA	Adult Ed	NA	SpEd	Granted	no teacher of record
North Little Rock	Edwards, Marla	BA		Walton, Ashley	3rd grade	Granted	teacher on leave
North Little Rock	Anderson, Charlotte	BA	Liberal Arts	NA	5th grade	Granted	no teacher of record
North Little Rock	Grasse, Maria	MA	ECH	Bullock, Tiffany	Pre K	Granted	teacher on leave
North Little Rock	Travis, Paige	BA	English	NA	SpEd	Granted	no teacher of record
North Little Rock	Dowers, David	BA	Engineering	NA	Math	Granted	no teacher of record
North Little Rock	Brooks, Staci	MA	Micro Elec & Phot	NA	MS Science	Granted	no teacher of record
North Little Rock	Martin, Matt	BA	Mass Comm	NA	Math	Granted	no teacher of record
North Little Rock	Ellison, Raymona	BA	Psychology	NA	5th grade	Granted	no teacher of record
Ozark Mtn. SD	Gallagher, Anne	BS	ECH	Anderson, Mary Beth	SpEd	Granted	teacher resigned
Palestine-Wheatley	Pascal, Christian	BA	Elem Ed	Knowlton, Terri	Kindergarten	Granted	teacher resigned
Paragould	Speaks, Ashley	BSE	Mid Lev Edu	Weatherford, Ragon	SpEd	Granted	teacher on leave
PCSSD	Polen, Elizabeth	BS	MS Ed	Tokarz, Jamie	MS	Granted	teacher resigned
PCSSD	Head, Tamera	BS	Elem Ed	Pearson, Rosalyn	Secondary	Granted	teacher resigned
PCSSD	Moorehead, LaSonyya	BS	GT	Isgng,Sarah	GT, 5th gr	Granted	no teacher of record
PCSSD	Wells, Shalonda	BA	Elem Ed	Hawkins, Jory	Math	Granted	teacher resigned
PCSSD	Bruce, Christopher	BS	ECHR	NA	SpEd	Granted	no teacher of record
PCSSD	Jones, Gina	BSE	ECIN	NA	Phy Sci	Granted	no teacher of record
PCSSD	Branch, Johnnie	MA	Social Work	Sims, David	GT, Math	Granted	teacher transferred
PCSSD	Thompson, Sheree	BS	Social Work	Madison, Macy	Career Dev	Granted	teacher resigned
Pocahontas	Moffett, Sherrill	BA	Music	NA	Choral Music	Granted	no teacher of record
Prescot	Lee, Cloria	BS	Education	Dendy, Kelsey	3rd gr Math/Sci	Granted	teacher on leave
Quitman	Messenger, Bridget	BA	Elem Ed	Wiedower, Tracy	Kindergarten	Granted	teacher on leave
Rogers	Burleson, April	BA, MA	Social Science	Tucker, Chelsea	4th Grade	Granted	teacher on leave
Russellville	Owens, Derek	BA	History	Phillips, Derek	SS, Civics, AR Hist	Granted	teacher resigned
Russellville	Evants, Tory	BSE	ECH	Cox, Bayley	Kindergarten	Granted	teacher on leave
Russellville	Hendricks, Michael	MA	History	Jones, Cindy	Social Studies	Granted	teacher suspended
Russellville	Evants, Tory	BSE	ECH	Huddleston, Vanessa	2nd Grade	Granted	teacher on leave
Searcy County	Macan, Leslie	BS	Health/PE	Clark, Jill	Sec Eng	Granted	teacher on leave
Searcy County	Busbee, Carol	none	Elem Ed	Harrell, Shelby	Art	Granted	teacher on leave

Sheridan	Bailey, Carl	BS	Crim Jus/ Psyc	Pickett, Tyler	Math, Coaching	Granted	teacher on suspension
Siloam Springs	Ireland, Darcy	BA, MA	Math, Gen Admin	Craig, Phillip	8th gr Science	Granted	teacher resigned
Siloam Springs	Reynolds, Julia	BS	Elem Ed	Melcher, Cassandra	7th gr LA	Granted	teacher on leave
Siloam Springs	Ireland, Darcy	BSE	Math Ed	Stewart, Tamara	Math	Granted	teacher on leave
Spring Hill	Barker, Jamie	NA		Guest, Kathy	Bus Ed	Granted	teacher on leave
Springdale SD	Small, Myra	BS	Office Administration	Pascual, Audrey	Pre K	Granted	teacher on leave
Star City SD	Brandon, April	BSE	Elem Ed	Young, Terry	PE Health	Granted	teacher on leave
Stuttgart	Withers, Sherrick	BS	Education	Youngblood, Susan	3rd Sci/ SS	Granted	teacher reassigned
Stuttgart	Warren, Shirley	BSE	ECH	NA	SpEd	Granted	teacher resigned
Stuttgart	Henderson, Mary	BA	PE/ Soc Stu	DeJarnette, Clifton	SS/PE	Granted	teacher on leave
Stuttgart	Withers, Sherrick	BS	Education	Prislovsky, Stephanie	4th Grade	Granted	teacher on leave
Texarkana	Vickers, Cynthia	BSN	Nursing	Hawkins, Jory	Med Prof 9-12	Granted	teacher on leave
Texarkana	Roberts, Kimberly	BBA	Accounting	Warren, Mary	Math	Granted	teacher retired
Texarkana	Thompson, Sonya	MA		Walker, Scott	ALE	Granted	teacher resigned
Texarkana	Lowery, Kyla	BS		NA	K-6 ALE	Granted	no teacher of record
Trumann	Parker, Martha	MA	ECH	Davidson, Ashleigh	Elem Art	Granted	teacher on leave
Trumann	Tacker, Stephanie	MA	ECH	Barnes, Jordan	K-3 SpEd	Granted	teacher on leave
Valley View	White, Leah	BSE	ECH, ELEM Edu	Thompson, Brandy	3rd grade	Granted	teacher on leave
Vantage Point NWA	Becker, Brittany	BA	Psychology	Geng, Kevin	MS SpEd	Granted	resigned
Warren SD	Hines, William	CTE Permit	Welding Tech	Culp, Raymond	Welding Tech	Granted	teacher terminated
West Memphis	Fortenberry, Charli	BS	Middle School Education	Locke, Elizabeth	Sec Math	Granted	teacher resigned
West Memphis	Wright, Josetta	BA	General ED	Spight, Vickie	Sec Math	Granted	teacher on leave
Westside Johnson Cty	McLeod, Laura	BA	SpEd	Nichols, Taylor	Elem	Granted	teacher on leave
Wynne	Li Li	Teaching	Foreign Language	Li Li	Chinese	Granted	no teacher of record

District Name	# Waive	Teacher Name	License Areas	ALP Code	Out of Area	Years ALP	Granted / Denied
ARKANSAS CONSOLIDATED SCHOOL DISTRICT	3	ADDINGTON, TERESA	166-Eng Lang Arts 7-12, 225-Business Tech 7-12, 230-Special Ed Inst Specialist 4-12, 250-Business Technology 4-12	114	114-Speech 7-12	16-17	Denied
		GRIFFIN, DINAH	002-Middle Childhood Lang Arts/SS 4-8, 082-Secondary Physical Education 7-12, 085-Elementary	167, 500	167-Social Studies 7-12, 500-P. E. & HEALTH K-12	16-17 16-17	Granted Granted
ARKANSAS DIVISION OF YOUTH SERVICES	3	GLOVER, JEFFREY	228-PE/Wellness/Leisure 7-12, 227-PE/Wellness/Leisure PK-8	133, 170, 200	133-Chemistry 7-12, 170-Life/Earth Science 7-12, 200-Mathematics 7-12	16-17 16-17 16-17	Granted Granted Granted
BENTONVILLE SCHOOL DISTRICT	1	HERRINGTON IV, JOSEPH	166-Eng Lang Arts 7-12	258	258-Special Education K-12	16-17	Granted
Black River Technical College	1	MCCORD, MISSY	002-Middle Childhood Lang Arts/SS 4-8, 168-Middle Childhood Science/Math 4-8	412	412-Career Preparation Endorsement 7-12	16-17	Granted
BLYTHEVILLE SCHOOL DISTRICT	13	BULLARD, MELISSA	183-Elementary K-6 K-6, 001-Early Childhood Education PK-4	286	286-Library Media Spec K-12	16-17	Granted
		BURNSIDE, ANGIE	132-Biology 7-12, 293-Coaching 7-12, 271-Coaching K-12	500	500-P. E. & HEALTH K-12	16-17	Granted
		DAVIS, MEGAN	001-Early Childhood Education PK-4	288	288-Guid & Counseling K-12	16-17	Granted
		DUNAVANT, MISTY	001-Early Childhood Education PK-4	253	253-Elementary K-6	16-17	Granted
		GRIGGS, FELICIA	001-Early Childhood Education PK-4	286	286-Library Media Spec K-12	16-17	Granted
		GRIGGS, MAUREEN	183-Elementary K-6 K-6, 001-Early Childhood Education PK-4	258	258-Special Education K-12	15-16 16-17	Granted
		HARMON, AMY	169-Phys/Earth Science 7-12, 170-Life/Earth Science 7-12	230	230-Special Ed Inst Specialist 4-12	14-15 15-16 16-17	Granted
		HUDSON, CHRISTINA	200-Mathematics 7-12	103	103-Grade 5-6 Endorsement Math 5-6	16-17	Granted
		MATTINGLY, DANNA	001-Early Childhood Education PK-4	286	286-Library Media Spec K-12	16-17	Granted
		PATTERSON, DEBORAH	230-Special Ed Inst Specialist 4-12, 231-Special Ed Ech Inst Specialist PK-4	253	253-Elementary K-6	16-17	Granted
		SHEPARD, JESSICA	236-PE/Wellness/Leisure 7-12, 235-PE/Wellness/Leisure PK-8	258	258-Special Education K-12	15-16 16-17	Granted
		STILL, DARA	001-Early Childhood Education PK-4	230	230-Special Ed Inst Specialist 4-12	14-15 15-16 16-17	Granted

		STONE, BENJAMIN	167-Social Studies 7-12	258	258-Special Education K-12	15-16 16-17	Granted
CABOT SCHOOL DISTRICT	2	BURGESS, SAMANTHA	002-Middle Childhood Lang Arts/SS 4-8, 168-Middle Childhood Science/Math 4-8, 250-Business Technology 4-12, 634-Career Automation & Robotic 7-12, 635-Career-Design and Modeling 7-12, 640-Career-Medical Detectives 7-12, 647-Career-Intro to Engineering Design 7-12	632	632-Career-Digital Electronics 7-12	16-17	Granted
		LOVELLETTE, DANIELLE	250-Business Technology 4-12	632	632-Career-Digital Electronics 7-12	16-17	Granted
CALICO ROCK SCHOOL DISTRICT	1	THOMAS, KIMBERLY	300-Guid & Counseling 7-12, 001-Early Childhood Education PK-4, 299-Guid & Counseling PK-8	276	276-Build Level Admin P-12	16-17	Granted
CEDAR RIDGE SCHOOL DISTRICT	1	SMITH, BRITTNEY	001-Early Childhood Education PK-4	258	258-Special Education K-12	15-16 16-17	Granted
DANVILLE SCHOOL DISTRICT	1	BAGULEY, LISA	002-Middle Childhood Lang Arts/SS 4-8, 168-Middle Childhood Science/Math 4-8, 276-Build Level Admin P-12	230	230-Special Ed Inst Specialist 4-12	14-15 15-16 16-17	Granted
DEWITT SCHOOL DISTRICT	2	ISOM, KRYSTAL	001-Early Childhood Education PK-4	258	258-Special Education K-12	15-16 16-17	Granted
		WHITE, DANIEL	159-Middle School Social Studies 5-8, 184-Elementary 1-6, 254-Middle School Math 4-8, 255-Middle School English 4-8, 256-Middle School Social Studies 4-8, 257-Middle School Science 4-8, 276-Build Level Admin P-12	167	167-Social Studies 7-12	16-17	Granted
DIERKS SCHOOL DISTRICT	1	SPRICK, STEPHEN	236-PE/Wellness/Leisure 7-12, 235-PE/Wellness/Leisure PK-8, 271-Coaching K-12	418	418-Career Development 4-8	16-17	Granted
ELKINS SCHOOL DISTRICT	2	BAGWELL, ANNA	166-Eng Lang Arts 7-12	114	114-Speech 7-12	15-16 16-17	Denied
		HALL, TERESA	202-Art 7-12, 201-Art PK-8	230	230-Special Ed Inst Specialist 4-12	14-15 15-16 16-17	Granted
FAYETTEVILLE SCHOOL DISTRICT	2	CORNELIUS, ROBBIE	002-Middle Childhood Lang Arts/SS 4-8, 167-Social Studies 7-12, 168-Middle Childhood Science/Math 4-8, 308-ESL 7-12, 307-ESL PK-8	229	229-Adult Educ PK-PS	16-17	Granted
		DALLAS, COLLIER	200-Mathematics 7-12, 640-Career-Medical Detectives 7-12, 419-Grade 5/6 Business Tech Endors 5-6	254	254-Middle School Math 4-8	16-17	Granted
FRIENDSHIP COMMUNITY CARE	2	FORREST, ANGIE	001-Early Childhood Education PK-4	252	252-ECH/SP. ED. INTEG B-K	16-17	Granted

FRIENDSHIP COMMUNITY CARE	2	WHORTON, MELISSA	001-Early Childhood Education PK-4	252	252-ECH/SP. ED. INTEG B-K	16-17	Granted
GREENLAND SCHOOL DISTRICT	1	HARDIN, ALEXANDER	206-Instrumental Music 7-12, 205-Instrumental Music PK-8	528	528-Computer Science 4-12	16-17	Granted
HARRISBURG SCHOOL DISTRICT	1	TURNER, COLTON	236-PE/Wellness/Leisure 7-12, 235-PE/Wellness/Leisure PK-8, 271-Coaching K-12	166	166-Eng Lang Arts 7-12	16-17	Granted
HECTOR SCHOOL DISTRICT	1	TAYLOR, MARK	228-PE/Wellness/Leisure 7-12, 417-Driver Education Endorsement 7-12, 227-PE/Wellness/Leisure PK-8, 276-Build Level Admin P-12	277	277-District Administrator P-12	16-17	Granted
HILLCREST SCHOOL DISTRICT	1	BLEVINS, SAMANTHA	271-Coaching K-12, 500-P. E. & HEALTH K-12, 419-Grade 5/6 Business Tech Endors 5-6	257	257-Middle School Science 4-8	15-16 16-17	Granted
HOPE SCHOOL DISTRICT	1	CREEL, JOSHUA	236-PE/Wellness/Leisure 7-12, 235-PE/Wellness/Leisure PK-8, 271-Coaching K-12	253	253-Elementary K-6	15-16 16-17	Granted
HORATIO SCHOOL DISTRICT	1	KIRKPATRICK, LAURIE	159-Middle School Social Studies 5-8, 184-Elementary 1-6, 214-Family & Con Sci 4-8, 229-Adult Educ PK-PS	253	253-Elementary K-6	16-17	Granted
JACKSONVILLE NORTH PULASKI SCHOOL DISTRICT	2	JOHNSON, CHRISTOPHER	166-Eng Lang Arts 7-12, 167-Social Studies 7-12	258	258-Special Education K-12	16-17	Granted
		MISSELDINE, CARIN	004-Spanish 7-12, 166-Eng Lang Arts 7-12, 003-Spanish PK-8	248	248-French K-12	16-17	Granted
		BANKS, CAL	159-Middle School Social Studies 5-8, 184-Elementary 1-6, 302-Building Level Administrator 5-12, 312-Build Administrator PK-8	254	254-Middle School Math 4-8	16-17	Granted
		BAREFIELD, SHERRY	170-Life/Earth Science 7-12, 269-Physical Science 7-12	258	258-Special Education K-12	15-16 16-17	Granted
		BATTLES, MICAELA	001-Early Childhood Education PK-4	500	500-P. E. & HEALTH K-12	16-17	Granted
		BOSWELL, MEGAN	001-Early Childhood Education PK-4	289	289-Gifted & Talented K-12	14-15 15-16 16-17	Granted
		BROWN, NOLAN	002-Middle Childhood Lang Arts/SS 4-8, 168-Middle Childhood Science/Math 4-8	289	289-Gifted & Talented K-12	14-15 15-16 16-17	Granted
		CAPLES, LANELDA	139-Middle School Science 5-8, 184-Elementary 1-6	259	259-Art K-12	16-17	Granted
		CHAPIN, AMANDA	418-Career Development 4-8, 250-Business Technology 4-12	253	253-Elementary K-6	15-16 16-17	Granted
		CHOONGO, HAMOONGA	200-Mathematics 7-12	247	247-ESL K-12	16-17	Granted
		CLARK, DAVID	236-PE/Wellness/Leisure 7-12, 235-PE/Wellness/Leisure PK-8	167	167-Social Studies 7-12	15-16 16-17	Granted
		CROSS, TERRI	001-Early Childhood Education PK-4	289	289-Gifted & Talented K-12	15-16 16-17	Granted

DETTMANN, ANDREA	002-Middle Childhood Lang Arts/SS 4-8, 168-Middle Childhood Science/Math 4-8	289	289-Gifted & Talented K-12	15-16 16-17	Denied
DIAMOND, ZSUZSANNA	001-Early Childhood Education PK-4	289	289-Gifted & Talented K-12	15-16 16-17	Granted
FARRAR, JULIE	292-Special Ed Hearing Specialist 4-12, 291-Special Ed Hearing Specialist PK-4	253	253-Elementary K-6	16-17	Granted
FELTY, KAYLIE	002-Middle Childhood Lang Arts/SS 4-8, 168-Middle Childhood Science/Math 4-8, 288-Guid & Counseling K-12, 518-Adult Edu P-S	253	253-Elementary K-6	15-16 16-17	Granted
FLOOD, PAULA	114-Speech 7-12	710	710-Spanish K-12	16-17	Granted
FOSTER, MATTHEW	131-General Science 7-12, 166-Eng Lang Arts 7-12, 170-Life/Earth Science 7-12	428	428-Special Ed. Resource-Math 7-12	16-17	Denied
FREEMAN, ANN	184-Elementary 1-6	276	276-Build Level Admin P-12	15-16 16-17	Granted
GRIFFIN, KELLI	183-Elementary K-6 K-6, 001-Early Childhood Education PK-4	230	230-Special Ed Inst Specialist 4-12	14-15 15-16 16-17	Granted
HARRIS, JASMINE	166-Eng Lang Arts 7-12	258	258-Special Education K-12	15-16 16-17	Granted
HAYES, KEYJAHJNA	001-Early Childhood Education PK-4	289	289-Gifted & Talented K-12	16-17	Granted
HEIPLE, VIRGINIA	081-Health Education 7-12, 082-Secondary Physical Education 7-12	258	258-Special Education K-12	16-17	Granted
JACKSON, JESSICA	001-Early Childhood Education PK-4	253	253-Elementary K-6	15-16 16-17	Granted
JASPER, JANELL	184-Elementary 1-6, 312-Build Administrator PK-8	289	289-Gifted & Talented K-12	16-17	Granted
JOHNSON, SHARON	184-Elementary 1-6, 402-Elementary Principal K-9, 411-Career Orientation Endorsement 7-12, 418-Career Development 4-8, 441-Curriculum Specialist K-12	286	286-Library Media Spec K-12	16-17	Granted
KRIZ, SHELBY	002-Middle Childhood Lang Arts/SS 4-8, 168-Middle Childhood Science/Math 4-8	289	289-Gifted & Talented K-12	15-16 16-17	Granted
MACK, KELLI	002-Middle Childhood Lang Arts/SS 4-8, 168-Middle Childhood Science/Math 4-8	289	289-Gifted & Talented K-12	16-17	Granted
MARTIN, MEGAN	001-Early Childhood Education PK-4	259	259-Art K-12	16-17	Granted
MCCABE, KELLY	114-Speech 7-12, 166-Eng Lang Arts 7-12, 167-Social Studies 7-12, 410-Career Academy Endorsement 7-12	247	247-ESL K-12	16-17	Granted

LITTLE ROCK SCHOOL DISTRICT	59	MILLER, CATHERINE	254-Middle School Math 4-8, 257-Middle School Science 4-8	289	289-Gifted & Talented K-12	16-17	Granted
		MOORE, APRIL	002-Middle Childhood Lang Arts/SS 4-8, 168-Middle Childhood Science/Math 4-8, 308-ESL 7-12, 307-ESL PK-8	289	289-Gifted & Talented K-12	14-15 15-16 16-17	Granted
		MURRY, NICOLAS	250-Business Technology 4-12	418	418-Career Development 4-8	16-17	Granted
		NELSON, DAMIEN	159-Middle School Social Studies 5-8, 184-Elementary 1-6, 302-Building Level Administrator 5-12, 308-ESL 7-12, 313-Build Administrator 7-12, 307-ESL PK-8, 312-Build Administrator PK-8	258	258-Special Education K-12	16-17	Granted
		NESMITH, JEFFREY	254-Middle School Math 4-8, 255-Middle School English 4-8, 257-Middle School Science 4-8	256	256-Middle School Social Studies 4-8	16-17	Granted
		NOBLE, BERGAIL	001-Early Childhood Education PK-4	530	530-Special Education Resource Elementary K-6	16-17	Granted
		NORRIS, RACHEL	132-Biology 7-12, 230-Special Ed Inst Specialist 4-12	133	133-Chemistry 7-12	16-17	Granted
		NORWOOD, MARSHA	002-Middle Childhood Lang Arts/SS 4-8, 168-Middle Childhood Science/Math 4-8, 209-Algebra 1 Endorsement 8-8	200	200-Mathematics 7-12	16-17	Granted
		O'NEAL, CRAIG	167-Social Studies 7-12, 236-PE/Wellness/Leisure 7-12, 293-Coaching 7-12, 413-Career Ser	258, 429	258-Special Education K-12, 429-Special Ed. Resource-Science 7-12	16-17 16-17	Denied Granted
		PAULEY, KRISTA	107-Grade 5-6 Endorsement (P-4) 5-6, 001-Early Childhood Education PK-4, 419-Grade 5/6 Business Tech Endors 5-6	259	259-Art K-12	16-17	Granted
		PENTICOFF, JOSHUA	255-Middle School English 4-8, 256-Middle School Social Studies 4-8, 257-Middle School Science 4-8	289	289-Gifted & Talented K-12	15-16 16-17	Granted
		PINKARD, TAWANNA	002-Middle Childhood Lang Arts/SS 4-8, 168-Middle Childhood Science/Math 4-8	254	254-Middle School Math 4-8	14-15 15-16 16-17	Granted
		PORTER, DONTERIO	002-Middle Childhood Lang Arts/SS 4-8, 168-Middle Childhood Science/Math 4-8	289	289-Gifted & Talented K-12	15-16 16-17	Granted
		REED, KATHERINE	166-Eng Lang Arts 7-12	258	258-Special Education K-12	15-16 16-17	Granted
		ROGERS, JENNIFER	107-Grade 5-6 Endorsement (P-4) 5-6, 001-Early Childhood Education PK-4, 247-ESL K-12	258	258-Special Education K-12	16-17	Granted
		SADDLER, KATHERINE	001-Early Childhood Education PK-4	258	258-Special Education K-12	16-17	Granted
		SIGEL, KELLY	166-Eng Lang Arts 7-12	255	255-Middle School English 4-8	16-17	Granted

		SMITH, TUNZA	001-Early Childhood Education PK-4	289	289-Gifted & Talented K-12	15-16 16-17	Granted
		SMITH, TARA	167-Social Studies 7-12	247	247-ESL K-12	16-17	Granted
		SPENCER, JOEL	001-Early Childhood Education PK-4	253	253-Elementary K-6	16-17	Granted
		SUMLIN, HIRAM	002-Middle Childhood Lang Arts/SS 4-8, 168-Middle Childhood Science/Math 4-8	166	166-Eng Lang Arts 7-12	16-17	Granted
		SUMMONS, CLARICE	002-Middle Childhood Lang Arts/SS 4-8, 168-Middle Childhood Science/Math 4-8, 247-ESL K-12	710	710-Spanish K-12	15-16 16-17	Granted
		TO, TRACY	268-Life Science 7-12	133	133-Chemistry 7-12	16-17	Granted
		TURNER, MALORIE	001-Early Childhood Education PK-4	288	288-Guid & Counseling K-12	16-17	Granted
		WASHINGTON, KIMBERLEY	001-Early Childhood Education PK-4	253	253-Elementary K-6	16-17	Granted
		WHITE, JOHN	002-Middle Childhood Lang Arts/SS 4-8, 168-Middle Childhood Science/Math 4-8	500	500-P. E. & HEALTH K-12	16-17	Granted
		WILKINS, ALYCEA	159-Middle School Social Studies 5-8, 184-Elementary 1-6	289	289-Gifted & Talented K-12	15-16 16-17	Granted
		WILLIAMS, KRYSTAL	001-Early Childhood Education PK-4	289	289-Gifted & Talented K-12	15-16 16-17	Granted
		WILLIAMS, ORVEN	159-Middle School Social Studies 5-8, 184-Elementary 1-6	289	289-Gifted & Talented K-12	16-17	Granted
		WILLIAMS-DAVIS, CHANDRA	002-Middle Childhood Lang Arts/SS 4-8, 168-Middle Childhood Science/Math 4-8, 001-Early Childhood Education PK-4	258	258-Special Education K-12	15-16 16-17	Granted
MAGNET COVE SCHOOL DIST.	1	HARDIN, SADIE	001-Early Childhood Education PK-4	258	258-Special Education K-12	16-17	Granted
MAGNOLIA SCHOOL DISTRICT	1	SUTTON, TRAVIS	236-PE/Wellness/Leisure 7-12, 235-PE/Wellness/Leisure PK-8, 271-Coaching K-12	167	167-Social Studies 7-12	15-16 16-17	Granted
MANILA SCHOOL DISTRICT	1	NIX, BRANDON	236-PE/Wellness/Leisure 7-12, 235-PE/Wellness/Leisure PK-8, 271-Coaching K-12	167	167-Social Studies 7-12	16-17	Granted
MONTICELLO SCHOOL DISTRICT	1	SKINNER, ANITA	183-Elementary K-6 K-6, 001-Early Childhood Education PK-4	289	289-Gifted & Talented K-12	15-16 16-17	Granted
MOUNTAIN HOME SCHOOL DISTRICT	1	VANMATRE, SANDRA	168-Middle Childhood Science/Math 4-8, 255-Middle School English 4-8	258	258-Special Education K-12	16-17	Granted
MOUNTAIN PINE SCHOOL DISTRICT	1	EVANS, GREGORY	082-Secondary Physical Education 7-12, 167-Social Studies 7-12, 302-Building Level Administrator 5-12, 313-Build Administrator 7-12, 417-Driver Education Endorsement 7-12, 312-Build Administrator PK-8	258	258-Special Education K-12	16-17	Granted
		BALLARD, LESLIE	167-Social Studies 7-12, 412-Career Preparation Endorsement 7-12	258	258-Special Education K-12	16-17	Granted

N. LITTLE ROCK SCHOOL DISTRICT	8	KING, HAILEY	001-Early Childhood Education PK-4	258	258-Special Education K-12	15-16 16-17	Granted
		LOFTON, JOYCE	131-General Science 7-12, 139-Middle School Science 5-8, 170-Life/Earth Science 7-12, 306-Gift & Talented 7-12, 6545-Physical Science 7-12, 305-Gift & Talented PK-8	280	280-Curriculum Prog Adm/Curriculum P-12	16-17	Granted
		REYNOLDS, LAUREN	001-Early Childhood Education PK-4	252	252-ECH/SP. ED. INTEG B-K	15-16 16-17	Granted
		ROCHELLE, VALENCIA	002-Middle Childhood Lang Arts/SS 4-8, 168-Middle Childhood Science/Math 4-8, 276-Build Level Admin P-12	280	280-Curriculum Prog Adm/Curriculum P-12	16-17	Granted
		TYLER, SCOT	200-Mathematics 7-12, 302-Building Level Administrator 5-12, 313-Build Administrator 7-12	276	276-Build Level Admin P-12	16-17	Granted
		WHITFIELD, SHEILA	001-Early Childhood Education PK-4	258	258-Special Education K-12	15-16 16-17	Granted
		WILKINS, KATINA	114-Speech 7-12	258	258-Special Education K-12	15-16 16-17	Granted
NEWPORT SCHOOL DISTRICT	3	GOODON, JOSHUA	228-PE/Wellness/Leisure 7-12, 227-PE/Wellness/Leisure PK-8, 271-Coaching K-12	200	200-Mathematics 7-12	16-17	Granted
		LOGGAINS, JESSICA	255-Middle School English 4-8, 256-Middle School Social Studies 4-8	427	427-Special Ed. Resource-Eng. Lang. Arts 7-12	16-17	Granted
		ROHLFING, SHERRI	002-Middle Childhood Lang Arts/SS 4-8, 168-Middle Childhood Science/Math 4-8, 001-Early Childhood Education PK-4	200	200-Mathematics 7-12	16-17	Granted
OZARK GUIDANCE	1	VICE, DEE	184-Elementary 1-6, 230-Special Ed Inst Specialist 4-12, 522-Guidance Elementary K-9, 523-Guidance Secondary 5-12, 001-Early Childhood Education PK-4	258	258-Special Education K-12	16-17	Granted
PINE BLUFF SCHOOL DISTRICT	2	SCOTT II, TIMOTHY	001-Early Childhood Education PK-4	262	262-Instrumental Music K-12	15-16 16-17	Granted
		WITHERS, MYRTLE	159-Middle School Social Studies 5-8, 167-Social Studies 7-12	289	289-Gifted & Talented K-12	16-17	Granted
		BEASLEY-PHILLIPS, DORIS	184-Elementary 1-6, 195-Mentally Retarded (C) K-12, 258-Special Education K-12	256	256-Middle School Social Studies 4-8	16-17	Denied
		CRAIG, ROBERT	2010-Survey Of Fine Arts 7-12, 204-Vocal Music 7-12, 203-Vocal Music PK-8	262	262-Instrumental Music K-12	16-17	Granted

PULASKI COUNTY SPECIAL SCHOOL DISTRICT	22	DIXON, TRISTEN	215-Family & Con Sci 7-12, 411-Career Orientation Endorsement 7-12	253	253-Elementary K-6	16-17	Granted
		FERGUSON, LAURA	001-Early Childhood Education PK-4	289	289-Gifted & Talented K-12	15-16 16-17	Granted
		GRIFFIN, AMANDA	107-Grade 5-6 Endorsement (P-4) 5-6, 001-Early Childhood Education PK-4	231	231-Special Ed Ech Inst Specialist PK-4	14-15 15-16 16-17	Granted
		HALL, JEREMY	236-PE/Wellness/Leisure 7-12, 235-PE/Wellness/Leisure PK-8, 271-Coaching K-12	167	167-Social Studies 7-12	16-17	Granted
		HARRISON, BILLY	236-PE/Wellness/Leisure 7-12, 235-PE/Wellness/Leisure PK-8, 254-Middle School Math 4-8, 271-Coaching K-12	200	200-Mathematics 7-12	16-17	Granted
		HOWARD, SHARON	056-Middle School English 5-8, 183-Elementary K-6 K-6, 230-Special Ed Inst Specialist 4-12, 001-Early Childhood Education PK-4	256	256-Middle School Social Studies 4-8	16-17	Granted
		HURT, DIEDRA	002-Middle Childhood Lang Arts/SS 4-8, 168-Middle Childhood Science/Math 4-8	289	289-Gifted & Talented K-12	15-16 16-17	Granted
		JONES, KATRINA	131-General Science 7-12, 139-Middle School Science 5-8, 170-Life/Earth Science 7-12, 302-Building Level Administrator 5-12, 313-Build Administrator 7-12, 6545-Physical Science 7-12, 6546-Astronomy 7-12, 6547-Geology 7-12, 7010-Arkansas History 5-8, 7015-American History 5-8, 7065-Geography 7-12, 312-Build Administrator PK-8	133	133-Chemistry 7-12	16-17	Granted
		LAMBERTUS, JUDY	159-Middle School Social Studies 5-8, 184-Elementary 1-6	255	255-Middle School English 4-8	16-17	Granted
						16-17	Granted
		LAWRENCE-HALL, DENETHA	001-Early Childhood Education PK-4	253	253-Elementary K-6	16-17	Granted
		LONG, JILL	253-Elementary K-6	258	258-Special Education K-12	15-16 16-17	Granted
		MCCREADY, DAVID	228-PE/Wellness/Leisure 7-12	167	167-Social Studies 7-12	16-17	Granted
		MHOON, BETTIE	230-Special Ed Inst Specialist 4-12, 001-Early Childhood Education PK-4, 231-Special Ed Ech Inst Specialist PK-4	253	253-Elementary K-6	16-17	Granted
		MOSS, KAREN	001-Early Childhood Education PK-4	289	289-Gifted & Talented K-12	15-16 16-17	Granted

		RAY, PHYLLIS	051-Reading 1-12, 184-Elementary 1-6, 298-Reading Specialist 7-12, 297-Reading Specialist PK-8, 247-ESL K-12	286	286-Library Media Spec K-12	15-16 16-17	Granted
		SAUHEAVER, KENDRA	236-PE/Wellness/Leisure 7-12, 293-Coaching 7-12, 235-PE/Wellness/Leisure PK-8, 257-Middle School Science 4-8, 271-Coaching K-12	256	256-Middle School Social Studies 4-8	15-16 16-17	Granted
		SENN, MICHELLE	183-Elementary K-6 K-6, 001-Early Childhood Education PK-4	255	255-Middle School English 4-8	16-17	Granted
		SIMS, DAVID	001-Early Childhood Education PK-4, 312-Build Administrator PK-8	254	254-Middle School Math 4-8	16-17	Granted
		TEAGUE, KRYSTLE	268-Life Science 7-12, 247-ESL K-12	133	133-Chemistry 7-12	16-17	Granted
ROCKBRIDGE MONTESSORI	1	GOBER, SARAH	166-Eng Lang Arts 7-12, 403-Secondary Principal 5-12	258	258-Special Education K-12	16-17	Denied
ROGERS SCHOOL DISTRICT	2	ELGIN, PAULA	139-Middle School Science 5-8, 159-Middle School Social Studies 5-8, 183-Elementary K-6 K-6, 308-ESL 7-12, 001-Early Childhood Education PK-4, 307-ESL PK-8	230	230-Special Ed Inst Specialist 4-12	14-15 15-16 16-17	Granted
		JOHNSON, KELLY	001-Early Childhood Education PK-4	530	530-Special Education Resource Elementary K-6	16-17	Granted
SPRINGDALE SCHOOL DISTRICT	1	WATTS, ELLEN	204-Vocal Music 7-12, 206-Instrumental Music 7-12, 203-Vocal Music PK-8, 205-Instrumental Music PK-8	258	258-Special Education K-12	15-16 16-17	Granted
STEPPING STONE - DDTCS FACILITY	1	DODD, AMBER	001-Early Childhood Education PK-4	252	252-ECH/SP. ED. INTEG B-K	15-16 16-17	Granted
TEXARKANA SCHOOL DISTRICT	1	WEEKS, WILLIAM	051-Reading 1-12, 166-Eng Lang Arts 7-12, 255-Middle School English 4-8	256	256-Middle School Social Studies 4-8	16-17	Granted
VAN BUREN SCHOOL DISTRICT	2	HUMPHREY, ALICE	183-Elementary K-6 K-6, 298-Reading Specialist 7-12, 001-Early Childhood Education PK-4, 297-Reading Specialist PK-8	276	276-Build Level Admin P-12	16-17	Granted
		MCCABE, AIMEE	001-Early Childhood Education PK-4, 288-Guid & Counseling K-12	276	276-Build Level Admin P-12	16-17	Granted
WARREN SCHOOL DISTRICT	1	BLASENGAME, AMBER	236-PE/Wellness/Leisure 7-12	256	256-Middle School Social Studies 4-8	16-17	Granted
WEST SIDE SCHOOL DIST(CLEBURNE)	1	BIRMINGHAM, TERESA	159-Middle School Social Studies 5-8, 183-Elementary K-6 K-6, 001-Early Childhood Education PK-4	289	289-Gifted & Talented K-12	15-16 16-17	Granted
WESTSIDE CONS. SCH DIST(CRAIGH	1	BRATTEN, ANNESSA	204-Vocal Music 7-12, 203-Vocal Music PK-8	262	262-Instrumental Music K-12	16-17	Granted
WHITE CO. CENTRAL SCHOOL DIST	2	O'DEAR, WADE	167-Social Studies 7-12	133,	133-Chemistry 7-12, 135-	16-17	Granted

WHITE CO. CENTRAL SCHOOL DIST.	2	O'DEAR, WADE	167-Social Studies 7-12	135	Physics 7-12	16-17	Granted
WOODBRIDGE BEHAVIORAL CARE CENTER	1	DOLLARD, MICHELLE	167-Social Studies 7-12, 230-Special Ed Inst Specialist 4-12	258	258-Special Education K-12	16-17	Granted
YELLVILLE-SUMMIT SCHOOL DISTRICT.	1	PALMER, JESSICA	107-Grade 5-6 Endorsement (P-4) 5-6, 001-Early Childhood Education PK-4	265	265-Vocal Music K-12	16-17	Granted
YOUTH HOME, INC.	1	LOCK, CECILIA	167-Social Studies 7-12	258	258-Special Education K-12	16-17	Granted
Total # Districts Requesting Waivers	160	Total # Waivers Requested					

Total # of Waivers Granted	153
Total # of Waivers Denied	7
Total # of Waivers this month	160

Program Growth

- Arkansas had an increase of 38.4% in non-duplicative student enrollment in computer science baseline courses this school year (increasing from 1,104 in 2014/15; to 3,973 in 2015/16; to 5,500 in 2016/17). Attached is a presentation that displays high-level look at enrollment numbers and percentages.

- Governor Asa Hutchinson's Announcement on Computer Science Enrollment Growth for 2016-2017: http://governor.arkansas.gov//press-releases/detail/gov.-hutchinson-announces-5500-students-taking-computer-science-courses-nea

Promotion of CS

- Governor Asa Hutchinson's Computer Science Coding Tour
  - http://governor.arkansas.gov/press-releases/detail/governor-hutchinson-announces-2016-computer-science-tour-of-arkansas-school

- Governor's All-Region and All-State Coding Competition
  - Sponsored by a $40,000.00 donation from Verizon; funds are being managed by the Arkansas Chamber of Commerce
  - Information page about competition: http://www.arkansased.gov/divisions/learning-services/curriculum-and-instruction/resource-materials-for-lesson-plans/computer-science/governors-all-region-and-all-state-coding-competition
  - The regional competition took place on Monday, November 7th at various locations around the state.
    - 204 Students Competed
    - 70 Teams Representing 52 Schools in 44 Districts
      - Competing Schools include (one team from each school unless otherwise noted):
        - Alma High School
          Arkadelphia High School
          ASMSA (2 teams)
          Benton High School
          Bentonville High School (3 teams)
          Bentonville J William Fulbright Junior High School
          Bentonville West High School
          Bryant High School (3 teams)
          Clarksville High School
          Clinton High School
          Conway High School (3 teams)
          Dardanelle High School

De Queen High School
Dumas New Tech High School
Eureka Springs High School
Fayetteville High School (3 teams)
Flippin High School
Fort Smith Chaffin Jr. High
Fort Smith Southside High School (3 teams)
Greenbrier High School (2 teams)
Hackett High School
Hamburg High School
Harmony Grove High School
Harrison High School
Lake Hamilton Junior High School
Lakeside High School (2 teams)
Lead Hill
LISA Academy
LISA Academy North High School
LRSD Central High School (2 teams)
LRSD Hall High School
LRSD Parkview Arts/Science Magnet High School
Mammoth Spring High School
Manila High School
Mount Vernon Enola High School
Mountain Home High School
Nevada High School
North Little Rock High School (2 teams)
Paragould High School
Pottsville High School
Prairie Grove High School
Rogers New Technology High School
Russellville Junior High School
Searcy High School
Shiloh Christian School
Spring Hill High School (2 teams)
Springdale Don Tyson School of Innovation
Springdale Har-Ber High School (2 teams)
Springdale High School (2 teams)
Star City High School
Texarkana Arkansas High School
Westside High School

- Special thanks to the following hosting locations:
    - Arch Ford ESC
    - Arkansas River ESC
    - Dawson ESC
    - Hall High School (LRSD)

        - Northeast ESC
        - Northwest ESC
        - Northcentral ESC/Ozarka College
        - Southwest ESC
    - Results will be announced during or after computer science education week (or before the end of the current semester)
  - All-State Coding Competition
    - Top 2 teams from each hosting location will be invited to participate
    - State Competition Awards- Parents/guardians of team members eligible for an award must establish a 529 College Savings Plan for their child. www.arkansas529.org Each team member of the 1st place team will receive a $2000.00 award. Each team member of the 2nd place team will receive a $1000.00 award. Each team member of the 3rd place team will receive a $500.00 award. Awards will on be provided as deposits into established 529 College Savings Plans.
    - Exact date and location of all-state competition TBD

- #ARKidsCanCode Enrollment Contest
  - Announced on 08-10-2016 via Commissioner's Memo (COM-17-009) http://adecm.arkansas.gov/ViewApprovedMemo.aspx?Id=2007
  - Follow up documentation commissioner's memo will have been posted after this report was created, but prior to the December SBE board meeting.

- Additional Large Scale Promotional Events
  - The Computer Science Office is working with the Governor's office to expand and announce additional; promotional events and grow the existing ones through industry support.

- ENIAC Programmers Project Partnership
  - More information on this partnership will be announced at the SBE meeting and the following day at the Girls of Promise Coding Summit
  - http://eniacprogrammers.org/

- Arkansas Computer Science Summit
  - On October 20, 2016, the Arkansas STEM Coalition in partnership with ADE hosted a CS Summit on Arkansas Tech University campus.
  - Estimated 300 educators in attendance
  - Facilitated by a $10,000.00 grant from Research and Technology and a $15,000.00 grant from the Computer Science Unit
- Mr. Owen was honored to present at the National Association of State Boards of Education regarding the #ARKidsCanCode initiative on October 20th. Dr. Barth was the presider of the session.
- Code.org invited Mr. Owen to write a guest blog http://blog.code.org/page/2
- EducatechGuys highlighted the #ARKidsCanCode intiative on their podcast http://www.edutechguys.com/podcast/edutechguys-season-2-episode-14/
- The National K-12 Cybersecurity Conference invited Mr. Owen to discuss the Arkansas initiative which took place on October 6th.

- The MassCAN initiative invited Mr. Owen to serve on their planning committee which took place on October 5th.
- Representatives from Southwest ESC and Mr. Owen attended a two day Professional Learning Partner training provided by Code.org on September 24-25th.
- On September 14th Mr. Owen represented Arkansas and ADE at the White House CSforAll Convening in Washington D.C.

<u>Teacher Development and Licensure</u>

Computer Science Specialists

- ADE has granted FY17 funding for four statewide computer science specialists to the following educational service cooperatives:
    - Arch Ford ESC
    - Northwest ESC
    - Southeast ESC
    - Southwest ESC

- As of 11/18/2016, ADE has received notification that Arch Ford has offered employment, beginning in January 2017, to an individual.

- Commissioner Key has submitted to Mr. Greg Rogers a Reservation of Funding letter of projected FY17 carryover funds to continue these positions in FY18.

PRAXIS 5651 and Computer Science Endorsement #528

As of Friday, 11/18/2016, Arkansas has had:

- 94 (Praxis 5651) tests taken,
- 42 receiving passing scores, and
- 37 licenses processed in #528 Computer Science.

Multi-state Praxis Under Development

- Anthony Owen, Director of Computer Science Education, was selected to serve on the Educational Testing Service (ETS) National Advisory Committee (NAC) for a new multi-state computer science Praxis II content knowledge licensure assessment.

- This new assessment is scheduled to be available beginning in the fall of 2018; the suggestion of the ADE Computer Science Unit is that our state continue using the currently adopted version of and cut score for the Praxis 5651 until this new multi-state Praxis is available.

- A letter sent to ETS regarding the NAC has been attached.

Computer Science Educator Programs of Study

- As of 11/21/2016, the ADE Educator Preparation Unit has finalized approval of one program of study for computer science education at Arkansas Tech University. Two additional programs of study are currently going through the approval process. The additional institutions that are seeking approval are:
    - Henderson State University – dual program of study in Business Tech and Computer Science Education
    - Hendrix College – program of study in Computer Science Education

Arkansas Professional Pathway to Educator Licensure (APPEL)

- The Computer Science Unit funded two candidates (one first year and one second year) in the Arkansas Professional Pathway to Educator Licensure (APPEL). The APPEL will continue to advertise the program as being funded for future computer science candidates for next fiscal year, contingent on appropriation and funding approval by the Arkansas Legislature.

College Board Advanced Placement Computer Science Courses and Requisite Training

- The Computer Science Unit is working with College Board representatives to develop novel ways to engage more Arkansas teachers in the requisite training for AP CS Principles and AP CS - A. This will increase access and affordability for teachers and districts in Arkansas while leveraging existing systems/infrastructure. Additional information will be released as program specifics are finalized.

Curriculum Standards

On Tuesday, December 13th, the Computer Science Unit will be presenting an all day session on implementing the new K-8 embedded standards, the Coding Block for 7th or 8th Grade, and the new high-school courses and standards. Additional information is scheduled to be released via Commissioner's Memo after the creation of this report, but prior to the December Board Meeting.

Expanding Computing Education Pathways (ECEP)

- Arkansas is now a member state of ECEP Alliance, which seeks to increase the number and diversity of students in the pipeline to computing and computing-intensive degrees by supporting state-level computing education reforms.
- "ECEP works closely with the Computer Science Teachers Association (CSTA), the National Center for Women in Information Technology (NCWIT) and the STARS Alliance to support statewide efforts. It also relies on and deploys experts in computing education, promotes state-level computer science education reform, trains educators to provide professional development in computing, supports summer computing camps, and offers advice and tools in higher education transfer and program evaluation."
- "The National Science Foundation (NSF) supports ECEP through its Broadening Participation in Computing (BPC) program. ECEP builds on five years of work by BPC projects in Massachusetts and Georgia—the Commonwealth Alliance for Information Technology Education (CAITE) and GeorgiaComputes! Together, these projects facilitated systemic change that improved the quality of computing education and

broadened participation in computing. ECEP began in partnership with California and South Carolina and has grown to include Alabama, Arkansas, Connecticut, Indiana, Maryland, Nevada, New Hampshire, North Carolina, Puerto Rico, Rhode Island, Texas, Utah, and Virginia to transfer this success to other states and regions." - http://expandingcomputing.cs.umass.edu/

Unit Expansion to a Team of Two

- As of September 12th, the Computer Science Unit has grown to include a second ADE representative. Ms. Melinda Stem, previously an Administrative Assistant of the Federal Programs Unit, graciously accepted the position of Grants Analyst with the Computer Science Unit. Ms. Stem is charged with helping oversee the 100+ grants that the Computer Science Unit currently has in effect. In addition, Ms. Stem helps with the day-to-day requirements of operating a unit within ADE.

Arkansas Department of Education
Transforming Arkansas to lead the nation in student-focused education

November 16, 2016

Pete Yeager
National Director, Teacher Licensure and Certification
Educational Testing Service
Rosedale Road, MS 51-L
Princeton, NJ 08541

Dear Mr. Yeager,

The Arkansas Department of Education (ADE) extends its formal appreciation for Educational Testing Service (ETS) beginning the process of developing a multi-state Praxis II exam for Computer Science.

As a representative on your Praxis Computer Science National Advisory Committee (NAC), I came away with a greater understanding and respect for the process in which ETS engages when developing a Praxis II assessment. ETS should be commended for the selection of the committee members. This diverse group of experts from a variety of backgrounds was extremely knowledgeable and all demonstrated a passion for and commitment to furthering computer science education. The ETS facilitators led the group extremely well. They were able to find and conduct the meeting within that instinctive and undefined balance of letting the committee produce its own work while ensuring progress continues in an efficient and effective manner.

I realize that with the limited number of test takers in computer science over the past year that ETS is taking an economic risk on the development of this assessment. However, I also believe that once multi-state representatives develop an assessment using national computer science community resources (i.e., CSTA 2016 Standards, K-12 Computer Science Framework), additional states will be better positioned to clarify and formalize their computer science education licensure process, as Arkansas did in 2015.

Thank you again for being responsive to this request that ADE and I have personally made multiple times over the past year. It demonstrates ETS's commitment to its clients and more importantly to ensuring that teacher content knowledge is properly and adequately assessed. I look forward to continuing my support of the NAC and remain enthusiastic about the final assessment.

Sincerely,

Anthony A. Owen
Director; Computer Science Education

Four Capitol Mall
Little Rock, AR
72201-1019
(501) 682-4475
ArkansasEd.gov

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Arkansas Department of Education

Computer Science

Enrollment Report for

School Year 2016-2017

Arkansas Department of Education

Arkansas

K-12 Computer Science

#ARKIDSCANCODE - SETTING THE STANDARD

Computer Science Initiative
Student Enrollment for 2016-2017

- The data within this information was compiled using the Arkansas School District Cycle 2 Report submissions.
- Districts are required to submit student enrollment numbers, in addition to other data, for the Cycle 2 Report on or before October 15th of each year (reports provided by SIS on 10/27/2016).
- The numbers contained within this information are enrollment numbers as of October 15th, these numbers are what school funding is based on, and, due to various factors, may change or differ from student completion numbers.

ARKANSAS
K-12 COMPUTER SCIENCE
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Baseline Courses

The following courses are used as the baseline to measure computer science student enrollment numbers for the 2014-2015, 2015-2016, and 2016-2017 school years:

- Computer Science and Mathematics;
- Essentials of Computer Programming;
- Programming I and Programming II;
- Java I and Java II;
- Intro to Object Oriented Programming;
- Computer Science and Software Engineering;
- Computer Game Design and Development;

(continued on next page)

ARKANSAS
K-12 COMPUTER SCIENCE
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Baseline Courses

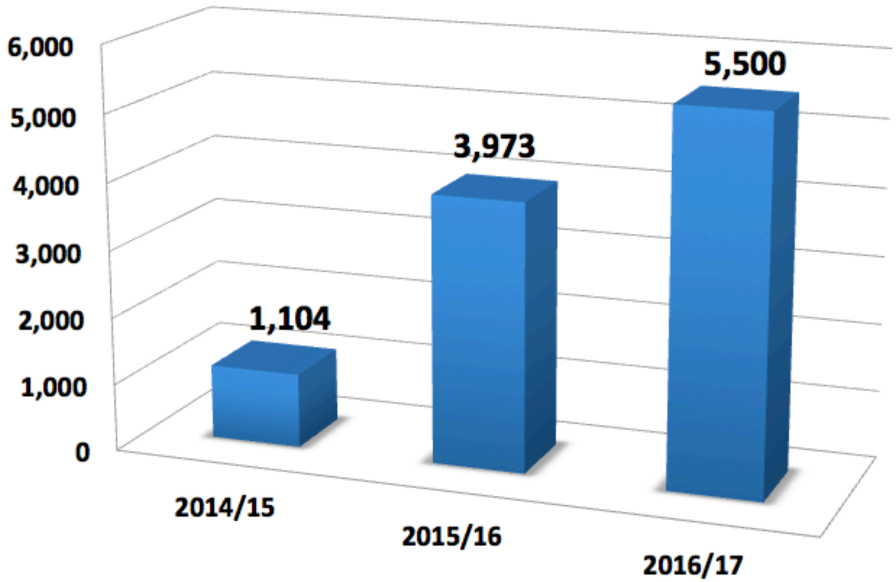
(continued)

- Intro to Mobile Application Development;
- Mobile Application Development (MAD) I and MAD II;
- College Board Advanced Placement (AP) Computer Science Principles;
- College Board AP Computer Science A; and
- International Baccalaureate (IB) Computer Science (HL & SL)
- Computer Science Internship I and II
- Other Concurrent Credit Computer Science
- ADE Approved Computer Science

Baseline Courses

Total Student Enrollment

- 2014/2015 – 1,104
- 2015/2016 – 3,973
  - Increase of
    - 2,869 students
    - 260% increase over 14/15
- 2016/17 – 5,500
  - Increase of
    - 1,527 students
    - 38.4% increase over 2015/16



ARKANSAS
K-12 COMPUTER SCIENCE
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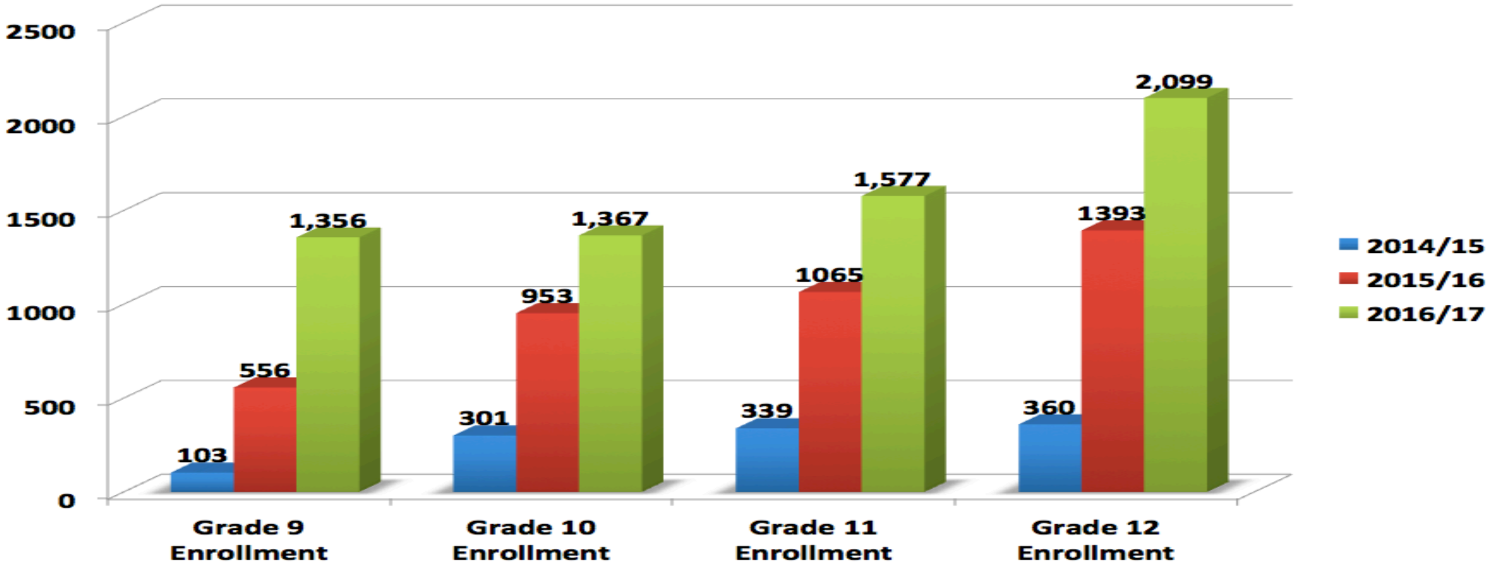
Baseline Courses
Enrollment Numbers by Grade



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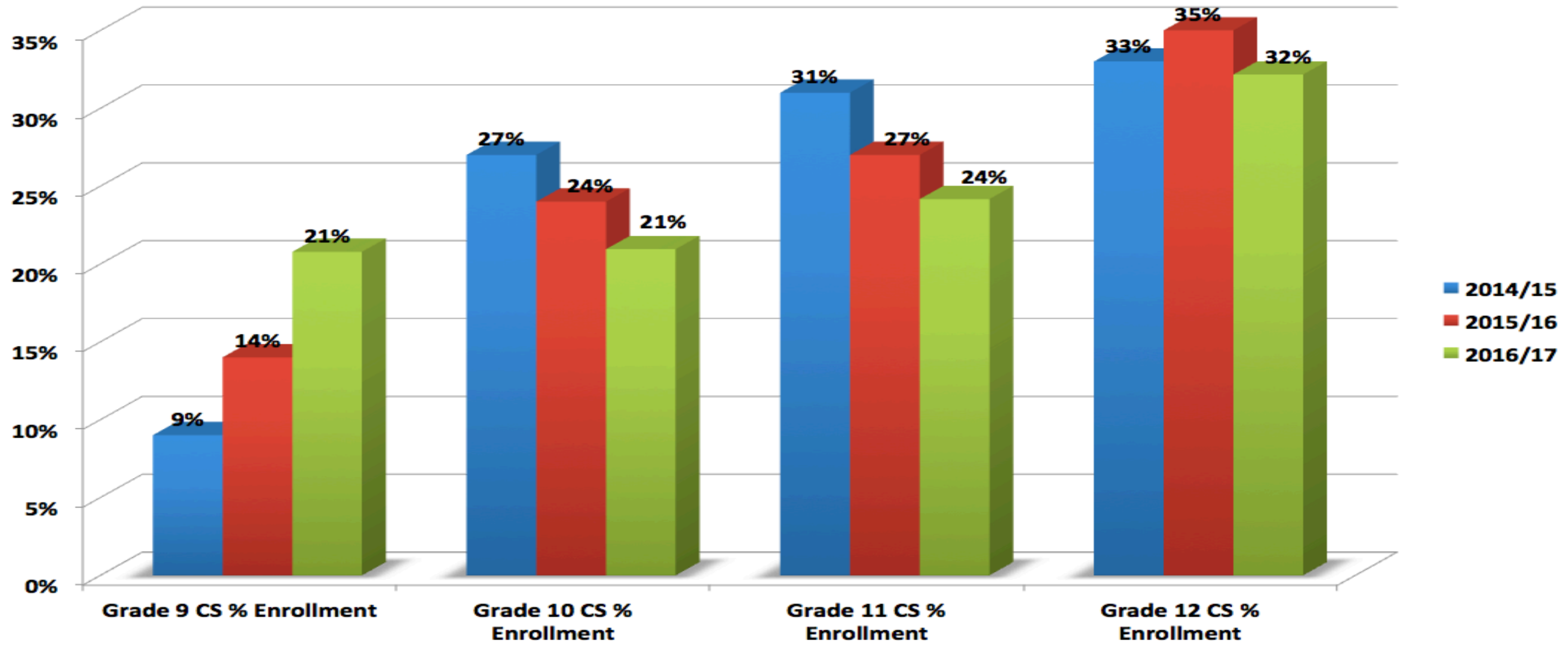
Baseline Courses Enrollment Percentage by Grade



ARKANSAS
K-12 COMPUTER SCIENCE
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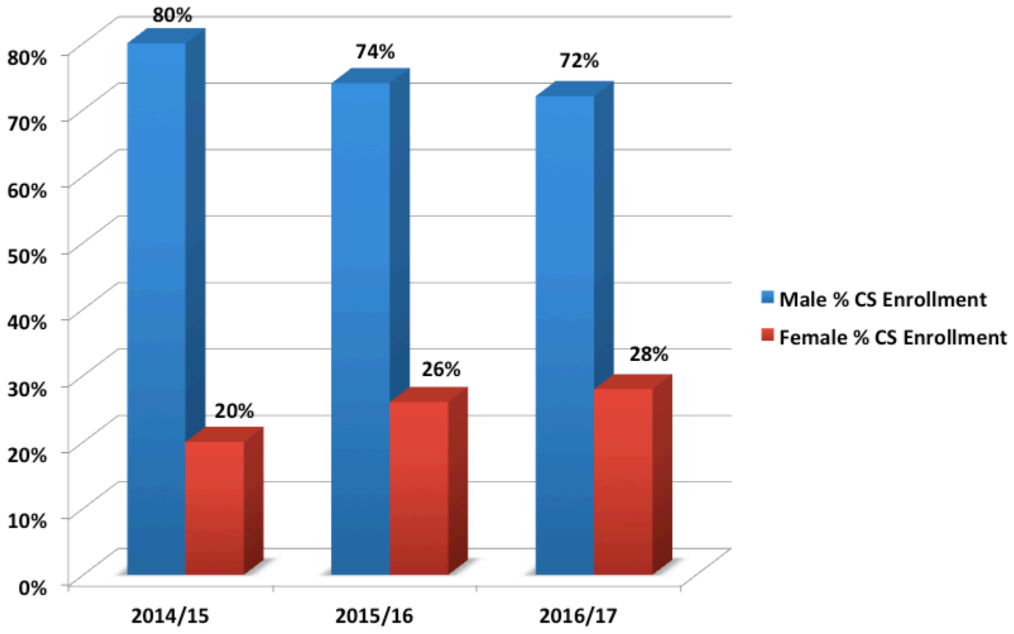
Baseline Courses

Male/Female Student Enrollment
2014/2015
- 880 (80%) Male
- 223 (20%) Female

2015/2016
- 2,942 (74%) Male
- 1,031 (26%) Female

2016/2017
- 4,703 (74%) Male
- 1,824 (26%) Female



ARKANSAS
K-12 COMPUTER SCIENCE
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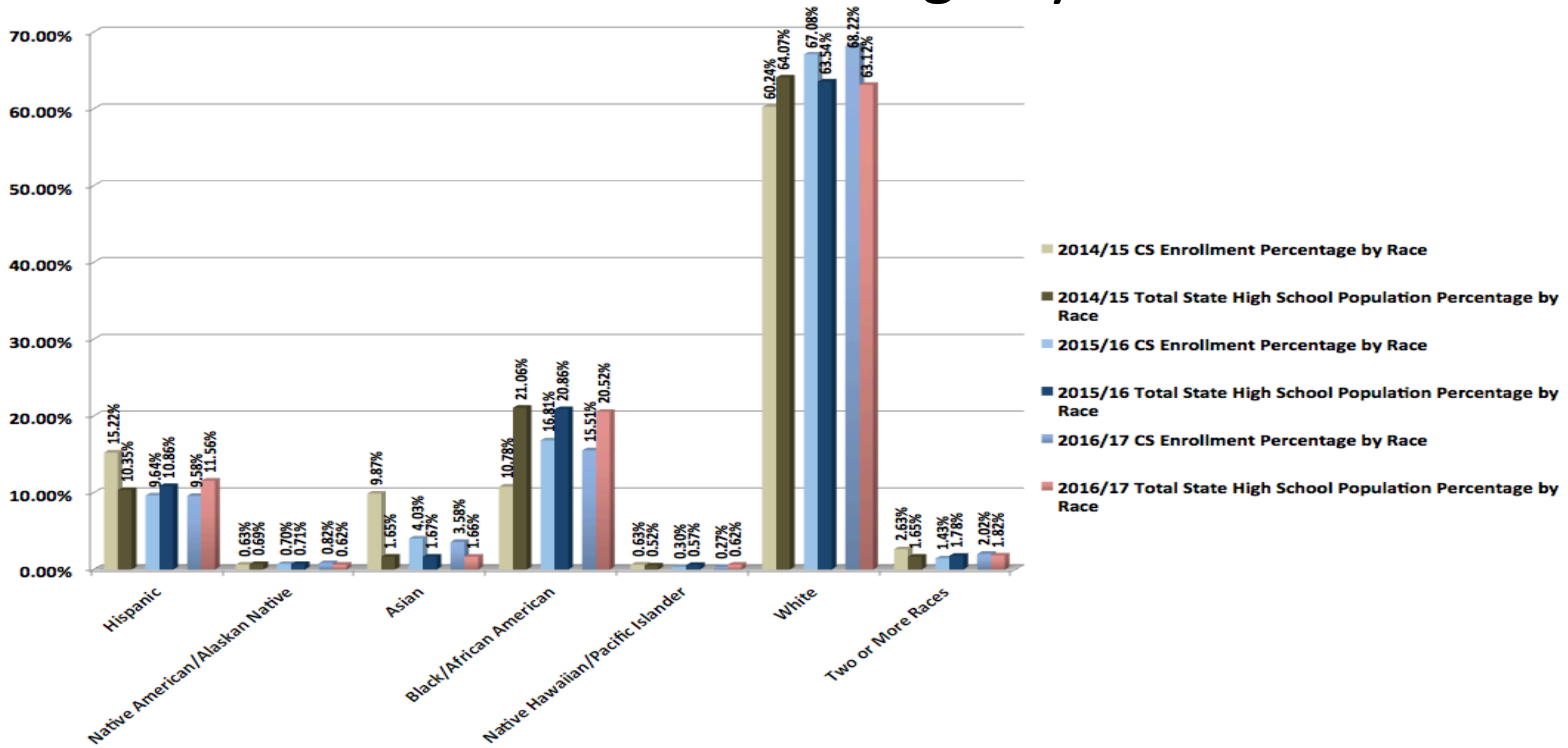
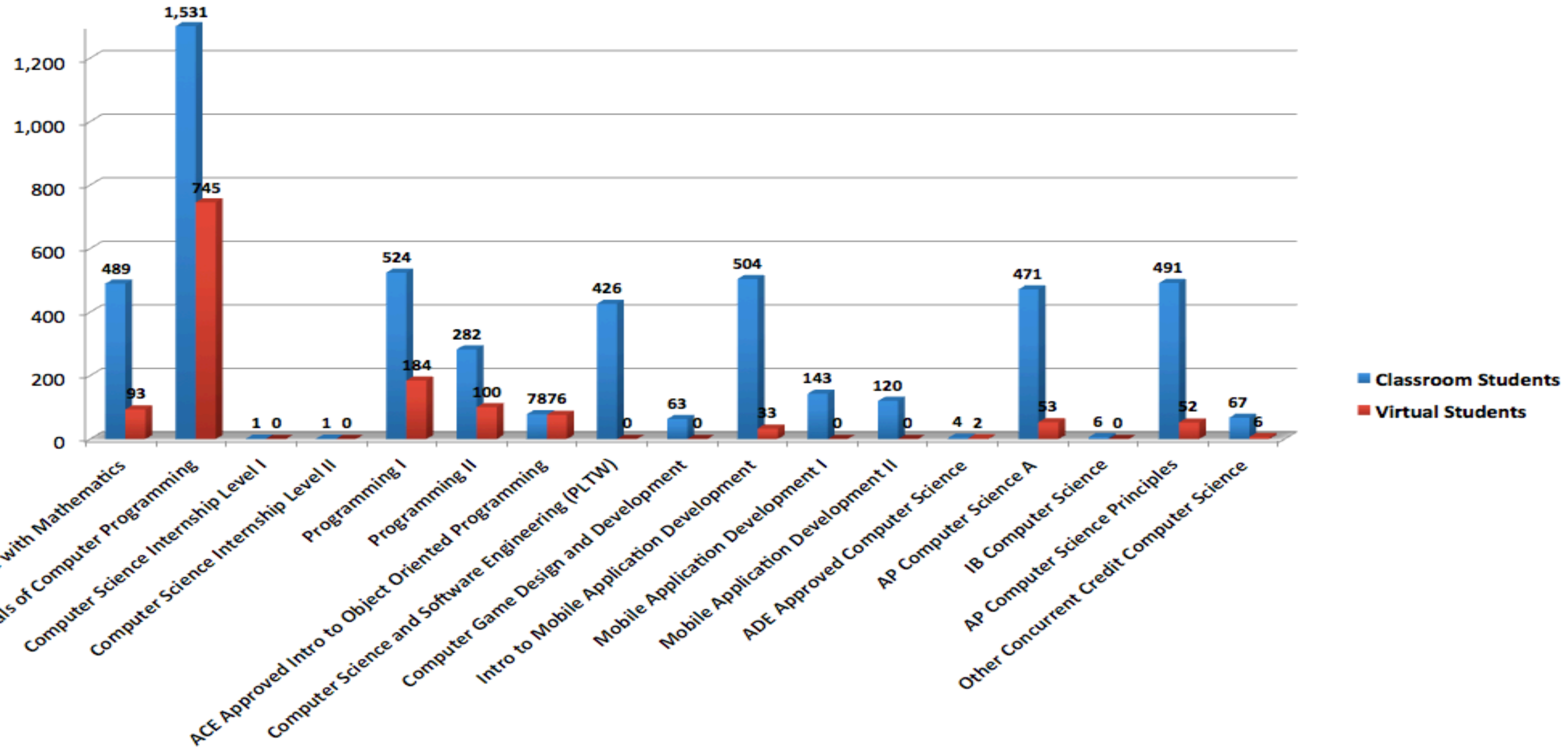
Baseline Courses
Enrollment Percentage by Race



Baseline Course Classroom and Virtual Environment Enrollment for 2016/17



Act 187 Courses

- During the Spring of 2015, Act 187 was passed by the legislature and signed into law by Gov. Hutchinson.
- This act mandated that beginning in the 2015-2016 school year, that all public high schools and public charter high schools offer at least one computer science course at the high school level.

ARKANSAS
K-12 COMPUTER SCIENCE
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Act 187 Courses

- In the Spring of 2015, the Arkansas State Board of Education approved a change to our state graduation requirements, which allows a student to replace a 4th year math requirement and/or a 3rd year science requirement with a CS “flex” credit.
- The rule change is effective beginning with the 2015-2016 school year.

ARKANSAS
K-12 COMPUTER SCIENCE
#ARKIDSCANCODE - SETTING THE STANDARD

Act 187 Courses

The following courses were approved by the Arkansas Department of Education (ADE) as meeting the requirements of Act 187 for the 2016-2017 school year:

- ADE Essentials of Computer Programming
- ADE Computer Science and Mathematics
- AP Computer Science Principles
- AP Computer Science A
- IB Computer Science (SL & HL)

ARKANSAS
K-12 COMPUTER SCIENCE
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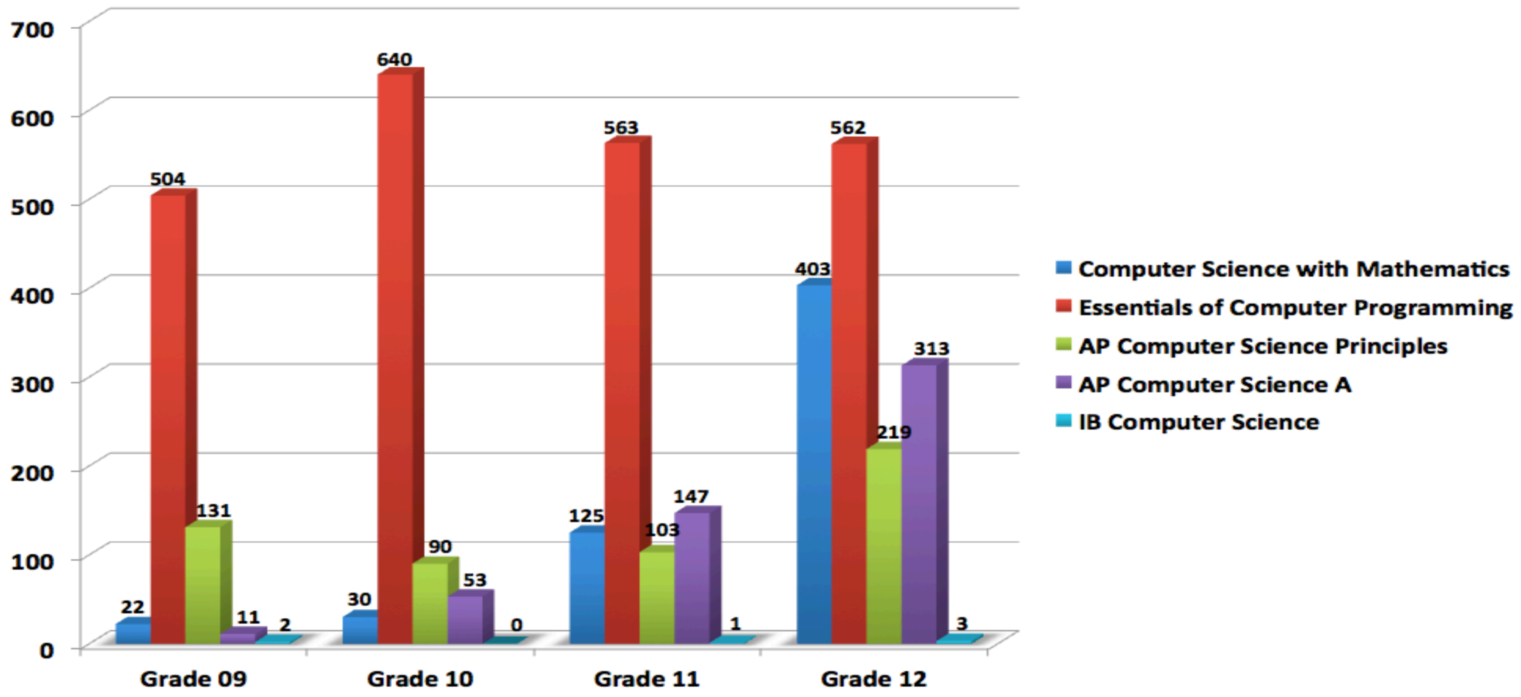
Act 187 Courses 2016/17 Student Enrollment



ARKANSAS
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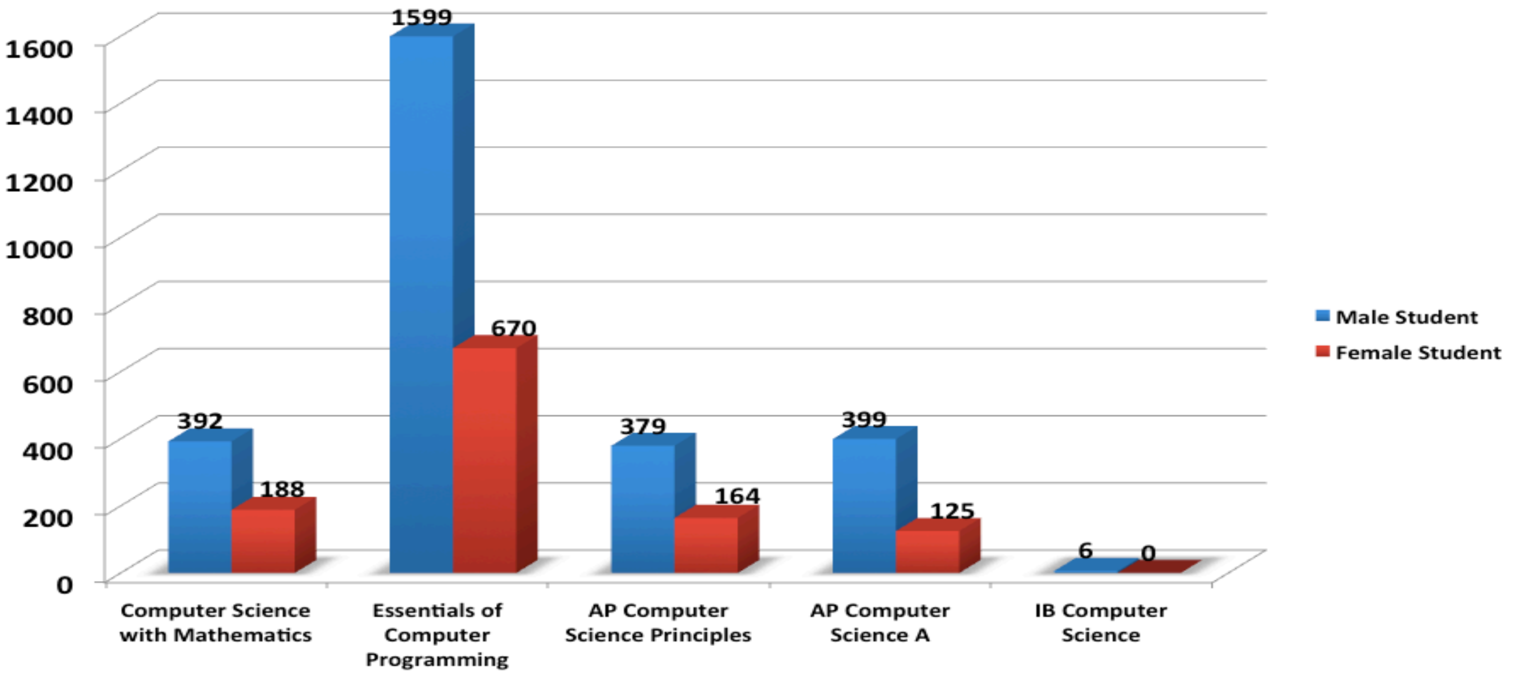
Act 187 Courses - Student Enrollment



ARKANSAS
K-12 COMPUTER SCIENCE
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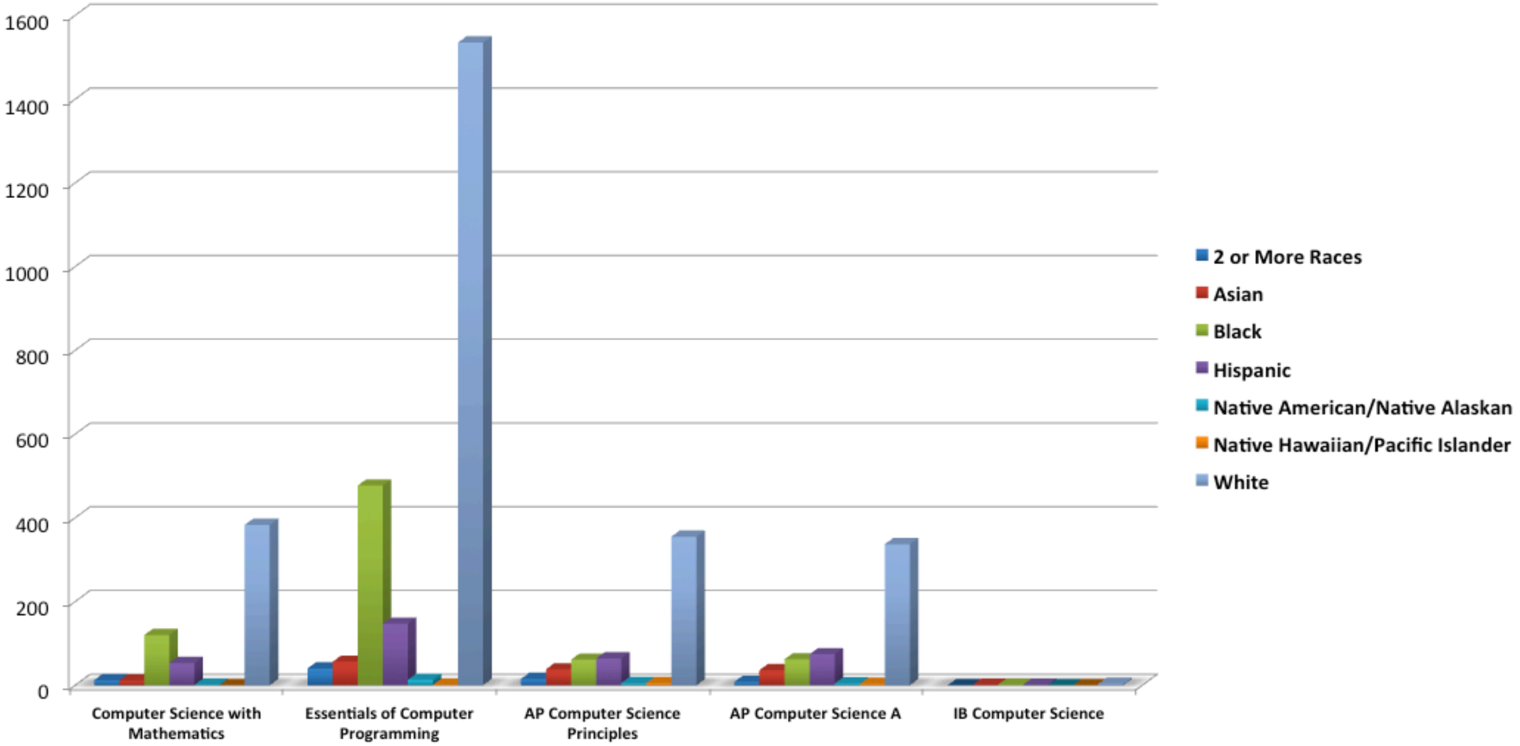
Act 187 2016/17 Enrollment Percentage by Race



K-12 COMPUTER SCIENCE

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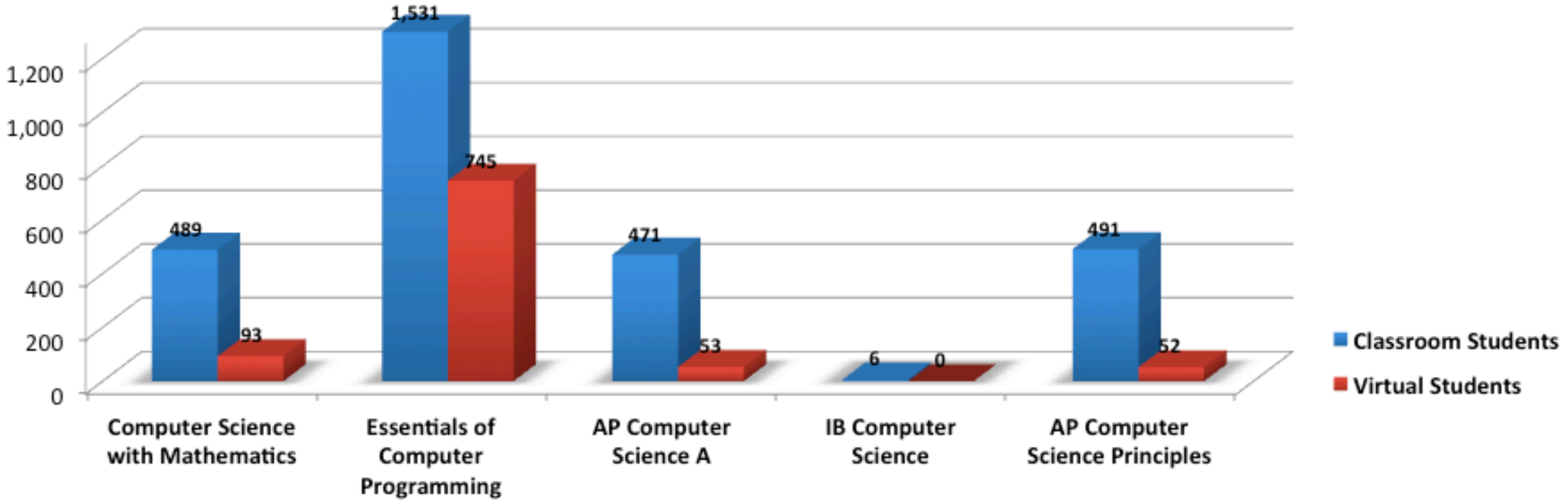
Act 187 Course Classroom and Virtual Environment Enrollment for 2016/17



ARKANSAS
K-12 COMPUTER SCIENCE
#ARKIDSCANCODE - SETTING THE STANDARD

Contact Information

Anthony Owen

Director of Computer Science Education

anthony.owen@arkansas.gov

Office: 501-682-7816

Find More Information Here:

http://www.arkansased.gov/divisions/learning-services/curriculum-and-instruction/computer-science

ARKANSAS DEPARTMENT OF EDUCATION

ARKANSAS K-12 COMPUTER SCIENCE

#ARKIDSCANCODE - SETTING THE STANDARD

Date: The CAB will meet the 2nd Thursday of each month at 5:30 p.m. in the LRSD Administration Building - Student Center - 810 West Markham, Little Rock.	Estimated amount of time needed	Presenter(s)	Topic/Expected Understandings	Code Reference	Notes	Date completed
August 4	3 hours at ASBA	ASBA; Superintendent Michael Poore; Deputy Commissioner Dr. Mark Gotcher	LRSD Community Advisory Board initial training: mission, core values, etc.		Horace Smith, faciliator	8-4-16
August 11	30 minutes	Commissioner Key	Role of the Community Advisory Board. How to respond to issues? What is the role differentiation - commissioner, school board, CAB, superintendent, LRSD employees?	Pursuant to Arkansas Code Annotated § 6-15-430 (2)		8-11-16
August 4 and ongoing	30 minutes	Superintendent Michael Poore	What message/communication do members need from the district administration (to be in the know) so they may communicate with parents, students, community members and business leaders?	Pursuant to Arkansas Code Annotated § 6-15-430 (2) (D) (iv) working to build community capacity for the continued support of the school district;		8-11-16
August 11	30 minutes	Superintendent Michael Poore	Mission of the Community Advisory Board. What is the plan to accomplish district recommendations? How is the district communicating to the public about the role of the Community Advisory Board.	Pursuant to Arkansas Code Annotated § 6-15-430 (2) (D) (i) meeting monthly during a regularly scheduled public meeting with the state-appointed administrator regarding the progress of the public school or school district toward correctly all issues that caused the classification of academic distress;		8-11-16

Date: The CAB will meet the 2nd Thursday of each month at 5:30 p.m. in the LRSD Administration Building - Student Center - 810 West Markham, Little Rock.	Estimated amount of time needed	Presenter(s)	Topic/Expected Understandings	Code Reference	Notes	Date completed
August 11 and September 8	1 hour (ADE) and 30 minutes (Burton)	ADE Legal; Dr. Marvin Burton with LRSD examples	Freedom of Information Act (FOIA)	Pursuant to Arkansas Code Annotated § 25-19-101 et seq.		Dr. Burton completed 8-11-6; ADE had to postpone due to State Board meeting. ADE provided FOIA training September 20.
November 10	2 hours	Dr. Richard Wilde, ADE Director of School Improvement	What is academic distress? Using data to drive decision making. How to read a 45-day report. What is the role of ADE and School Improvement? What is the role of the district? What is the role of the school? Overview of the NSBA Turnaround toolkit.	Pursuant to Arkansas Code Annotated § 6-15-430 (2) (D) (i) meeting monthly during a regularly scheduled public meeting with the state-appointed administrator regarding the progress of the public school or school district toward correctly all issues that caused the classification of academic distress;		8-11-16
September 8	1 hour	Superintendent Michael Poore and LRSD team	How are district resources allocated to meet the needs of students? (personnel, buildings, materials, finance, etc.) How to improve student achievement.	Pursuant to Arkansas Code Annotated § 6-15-430 (2) (D) (i) meeting monthly during a regularly scheduled public meeting with the state-appointed administrator regarding the progress of the public school or school district toward correctly all issues that caused the classification of academic distress;		09/08/16 10/13/16 11/10/16
September 8	1 hour	ASBA	How to read and interpret an audit report and other items listed or required by the Legislative Joint Auditing Committee under § 6-1-101	Pursuant to Arkansas Code Annotated § 6-13-629		10/13/16

Date: The CAB will meet the 2nd Thursday of each month at 5:30 p.m. in the LRSD Administration Building - Student Center - 810 West Markham, Little Rock.	Estimated amount of time needed	Presenter(s)	Topic/Expected Understandings	Code Reference	Notes	Date completed
September 8 and October 13	1 hour	ASBA and Superintendent Michael Poore	What is the Community Advisory Board member (individual) plan to build a broader base for input? Recommend each member develop a 10-15 member advisory team of community members that are called or met with regularly.	Pursuant to Arkansas Code Annotated § 6-15-430 (2) (D)(ii) seeking input from the residents of the school district regarding the progress of the public school or school district toward correcting all issues that caused the classification of academic distress;		09/08/16 9/20/16 10/13/16
September 20	4 hours	ASBA	Procedures for conducting personnel hearings. Understanding policies and grievances. Understanding ADE reporting guidelines.	Pursuant to Arkansas Code Annotated § 6-15-430 (2) (D) (iii) conducting hearing and making recommendations to the commissioner regarding personnel and student discipline matters under the appropriate district policies;		9/20/16
		ASBA	Procedures for conducting student hearings. Understanding student discipline. Understanding ADE reporting guidelines.	Pursuant to Arkansas Code Annotated § 6-15-430 (2) (D) (iii) conducting hearing and making recommendations to the commissioner regarding personnel and student discipline matters under the appropriate district policies;		9/20/16
October 13	1 hour	Superintendent Michael Poore	Quarterly reports should be sent to ADE by October 15, 2016; January 15, 2016; April 15, 2016; and June 15, 2017. Reports will be presented to the State Board: November 10, 2016; February 10, 2017; May 12, 2017; and July 14, 2017. the same reports will be submitted to the Chairs of the Education Committees.	Pursuant to Arkansas Code Annotated § 6-15-430 (2) (D) (v) submitting quarterly reports to the commissioner and the state board regarding the progress of the public school or school district toward correcting all issues that caused the classification of academic distress. Pursuant to Arkansas Code Annotated § 6-13-112 (b) each quarter following the assumption of authority by the state board or commissioner, the commissioner shall provide to the chairs of the House Committee on Education and the Senate Committee on Education a status report indicating the progress of the school district toward removing itself from the authority of the state board or the commissioner.		11/10/16
October 13	1 - 2 hours	Superintendent Michael Poore	review of the district plan of support	as recommended by ADE School Improvement		10/13/16

Date: The CAB will meet the 2nd Thursday of each month at 5:30 p.m. in the LRSD Administration Building - Student Center - 810 West Markham, Little Rock.	**Estimated amount of time needed**	**Presenter(s)**	**Topic/Expected Understandings**	**Code Reference**	**Notes**	**Date completed**
October 17	6 hours	ASBA	New Board Member Training			10/17/16
November 10	1 hour	Dr. Protho and Kelsey Bailey	financial laws or regulations	Pursuant to Arkansas Code Annotated § 6-13-629		10/13/16
November 10			LRSD Community Advisory Board begins conducting student and personnel hearings	https://docs.google.com/spreadsheets/d/1KUvdaqLuRgGKqZgP-E0cGunM_S29vezaSlqXkb_GNpk/edit?usp=sharing		
TBD			LRSD Community Advisory Board begins hearing Personnel Policy recommendations	https://drive.google.com/open?id=0BxBWhMz4f_MTeVljeVJqUnhGd3M		

MEMO

ARKANSAS DEPARTMENT OF EDUCATION

DATE:	December 8, 2016
TO:	Arkansas State Board of Education
FROM:	Johnny Key
SUBJECT:	Grade Inflation Report

As required by A.C.A. § 6-15-421, attached is the 2015-2016 Grade Inflation report. As required by statute, the report, based on the results of the 2015-2016 state mandated tests, includes for each high school, the number of students receiving a grade of "B" or above in the corresponding course who scored less than "19" on the ACT math or reading exams. The highlighted section identifies any high school in which twenty percent (20%) or more of the students received a letter grade of "B" or above and scored less than "19" on the ACT math or reading exams.

As required by statute, a copy of this same report is being submitted to the Legislature.

District Name	School Name	School LEA	Grade Inflation Rate: GPA >= 3 and ACT Math or Reading < 19	Number of Students Having GPA >=3	Number of Students Having GPA >= 3 and ACT Math or Reading < 19	Number of Students Having GPA >= 3 and ACT Math >= 19 and ACT Reading >= 19	Percent of Students Having GPA >= 3 and ACT Math and Reading >= 19	Superintendent
DEER/MT. JUDEA SCHOOL DISTRICT	MOUNT JUDEA HIGH SCHOOL	5106010	RV	RV	RV	RV	RV	RICHARD DENNISTON
DEER/MT. JUDEA SCHOOL DISTRICT	DEER HIGH SCHOOL	5106002	RV	RV	RV	RV	RV	RICHARD DENNISTON
MARVELL-ELAINE SCHOOL DISTRICT	MARVELL-ELAINE HIGH SCHOOL	5404032	RV	RV	RV	RV	RV	JOYCE COTTOMS
COSSATOT RIVER SCHOOL DISTRICT	UMPIRE HIGH SCHOOL	5707017	RV	RV	RV	RV	RV	DONNIE DAVIS
ARK. SCHOOL FOR THE DEAF	ARK. SCHOOL FOR THE DEAF HIGH SCHOOL	6092002	RV	RV	RV	RV	RV	JANET DICKINSON
OZARK MOUNTAIN SCHOOL DISTRICT	ST. JOE HIGH SCHOOL	6505010	RV	RV	RV	RV	RV	JAMES JONES
LITTLE ROCK SCHOOL DISTRICT	MCCLELLAN MAGNET HIGH SCHOOL	6001064	86.5	47	32	5	13.5	BAKER KURRUS
DOLLARWAY SCHOOL DISTRICT	DOLLARWAY HIGH SCHOOL	3502010	86.4	24	19	3	13.6	PATSY HUGHEY
FORREST CITY SCHOOL DISTRICT	FORREST CITY HIGH SCHOOL	6201011	86.3	54	44	7	13.7	TIFFANY HARDRICK
MULBERRY SCHOOL DISTRICT	MULBERRY HIGH SCHOOL	1704017	RV	RV	RV	RV	RV	LONNIE MYERS
LITTLE ROCK SCHOOL DISTRICT	J.A. FAIR HIGH SCHOOL	6001063	82.9	48	29	6	17.1	BAKER KURRUS
HELENA/ WEST HELENA SCHOOL DISTRICT	CENTRAL HIGH SCHOOL	5403019	81.1	41	30	7	18.9	JOHN HOY
DERMOTT SCHOOL DISTRICT	DERMOTT HIGH SCHOOL	0901003	RV	RV	RV	RV	RV	KRISTI RIDGELL
MINERAL SPRINGS SCHOOL DISTRICT	MINERAL SPRINGS HIGH SCHOOL	3104006	78.9	20	15	4	21.1	CURTIS TURNER
LITTLE ROCK SCHOOL DISTRICT	HALL HIGH SCHOOL	6001002	78.6	47	33	9	21.4	BAKER KURRUS
EARLE SCHOOL DISTRICT	EARLE HIGH SCHOOL	1802007	76.5	17	13	4	23.5	RICKEY NICKS
PINE BLUFF SCHOOL DISTRICT	PINE BLUFF HIGH SCHOOL	3505042	75.5	57	40	13	24.5	T WALLACE
BEARDEN SCHOOL DISTRICT	BEARDEN HIGH SCHOOL	5201002	75	25	18	6	25	DENNY ROZENBERG
HARMONY GROVE SCHOOL DISTRICT (OUACHITA COUNTY)	SPARKMAN HIGH SCHOOL	5205012	RV	RV	RV	RV	RV	WALTON PIGOTT
WHITE CO. CENTRAL SCHOOL DISTRICT	WHITE CO. CENTRAL HIGH SCHOOL	7304019	75	19	12	4	25	SHEILA WHITLOW
CLARENDON SCHOOL DISTRICT	CLARENDON HIGH SCHOOL	4802010	73.3	17	11	4	26.7	LEE VENT
HACKETT SCHOOL DISTRICT	HACKETT HIGH SCHOOL	6603048	73.3	18	11	4	26.7	WILLIAM PITTMAN
JASPER SCHOOL DISTRICT	OARK HIGH SCHOOL	5102024	RV	RV	RV	RV	RV	JEFF CANTRELL
AUGUSTA SCHOOL DISTRICT	AUGUSTA HIGH SCHOOL	7401003	RV	RV	RV	RV	RV	NORMAN NASSAR
EAST POINSETT CO.UNTY SCHOOL DISTRICT	EAST POINSETT CO. HIGH SCHOOL	5608037	71	32	22	9	29	MICHAEL PIERCE

District Name	School Name	School LEA	Grade Inflation Rate: GPA >= 3 and ACT Math or Reading < 19	Number of Students Having GPA >=3	Number of Students Having GPA >= 3 and ACT Math or Reading < 19	Number of Students Having GPA >= 3 and ACT Math >= 19 and ACT Reading >= 19	Percent of Students Having GPA >= 3 and ACT Math and Reading >= 19	Superintendent
FOREMAN SCHOOL DISTRICT	FOREMAN HIGH SCHOOL	4102010	69.6	24	16	7	30.4	GEORGE KENNEDY
FORDYCE SCHOOL DISTRICT	FORDYCE HIGH SCHOOL	2002007	69.4	38	25	11	30.6	ALBERT SNOW
LEE COUNTY SCHOOL DISTRICT	LEE HIGH SCHOOL	3904011	69.2	13	9	4	30.8	WILLIE MURDOCK
BARTON-LEXA SCHOOL DISTRICT	BARTON HIGH SCHOOL	5401003	68	26	17	8	32	DAVID TOLLETT
BLYTHEVILLE SCHOOL DISTRICT	SCHOOL	4702706	67.6	73	46	22	32.4	RICHARD ATWILL
LAKESIDE SCHOOL DISTRICT (CHICOT COUNTY)	LAKESIDE HIGH SCHOOL	0903018	66.7	19	12	6	33.3	BILLY ADAMS
CONCORD SCHOOL DISTRICT	CONCORD HIGH SCHOOL	1201002	RV	RV	RV	RV	RV	MICHAEL DAVIDSON
EMERSON-TAYLOR-BRADLEY SCHOOL DISTRICT	BRADLEY HIGH SCHOOL	1408007	RV	RV	RV	RV	RV	JAMES HINES
FOUKE SCHOOL DISTRICT	FOUKE HIGH SCHOOL	4603010	66.7	48	30	15	33.3	FORREST MULKEY
BRINKLEY SCHOOL DISTRICT	BRINKLEY HIGH SCHOOL	4801003	66.7	14	8	4	33.3	ARTHUR TUCKER
COSSATOT RIVER SCHOOL DISTRICT	COSSATOT RIVER HIGH SCHOOL	5707023	66.7	29	18	9	33.3	DONNIE DAVIS
MOUNTAIN VIEW SCHOOL DISTRICT	TIMBO HIGH SCHOOL	6901016	RV	RV	RV	RV	RV	ROWDY ROSS
STRONG-HUTTIG SCHOOL DISTRICT	STRONG HIGH SCHOOL	7009049	RV	RV	RV	RV	RV	SAUL LUSK
PULASKI COUNTY SPECIAL SCHOOL DISTRICT	JACKSONVILLE HIGH SCHOOL	6003123	64.6	54	31	17	35.4	JERRY GUESS
LEAD HILL SCHOOL DISTRICT	LEAD HILL HIGH SCHOOL	0506032	64.3	20	9	5	35.7	DOYLE HULSEY
MAYNARD SCHOOL DISTRICT	MAYNARD HIGH SCHOOL	6102006	64.3	14	9	5	35.7	PATRICIA RAWLINGS
LINCOLN SCHOOL DISTRICT	LINCOLN NEW TECH HIGH SCHOOL	7205706	63.8	63	37	21	36.2	MARY SPEARS
SCRANTON SCHOOL DISTRICT	SCRANTON HIGH SCHOOL	4204019	63.6	11	7	4	36.4	JAMES BRIDGES
PRESCOTT SCHOOL DISTRICT	PRESCOTT HIGH SCHOOL	5006024	63.6	33	21	12	36.4	ROBERT POOLE
HERMITAGE SCHOOL DISTRICT	HERMITAGE HIGH SCHOOL	0601007	62.5	16	10	6	37.5	TRACY TUCKER
NASHVILLE SCHOOL DISTRICT	NASHVILLE HIGH SCHOOL	3105011	62.5	78	45	27	37.5	DOUGLAS GRAHAM
MARKED TREE SCHOOL DISTRICT	MARKED TREE HIGH SCHOOL	5604017	62.5	20	10	6	37.5	ANNESA THOMPSON
WATSON CHAPEL SCHOOL DISTRICT	WATSON CHAPEL HIGH SCHOOL	3509067	62.1	71	41	25	37.9	CONNIE HATHORN
JUNCTION CITY SCHOOL DISTRICT	JUNCTION CITY HIGH SCHOOL	7003028	61.9	26	13	8	38.1	WILLIAM LOWE
OSCEOLA SCHOOL DISTRICT	OSCEOLA HIGH SCHOOL	4713051	61.3	35	19	12	38.7	MICHAEL COX

2015-2016 Grade Inflation Report

District Name	School Name	School LEA	Grade Inflation Rate: GPA >= 3 and ACT Math or Reading < 19	Number of Students Having GPA >=3	Number of Students Having GPA >= 3 and ACT Math or Reading < 19	Number of Students Having GPA >= 3 and ACT Math >= 19 and ACT Reading >= 19	Percent of Students Having GPA >= 3 and ACT Math and Reading >= 19	Superintendent
PIGGOTT SCHOOL DISTRICT	PIGGOTT HIGH SCHOOL	1104018	61.2	51	30	19	38.8	CHARNELSA POWELL
ALPENA SCHOOL DISTRICT	ALPENA HIGH SCHOOL	0501002	60	26	15	10	40	ANDREA MARTIN
EMERSON-TAYLOR-BRADLEY SCHOOL DISTRICT	EMERSON HIGH SCHOOL	1408002	RV	RV	RV	RV	RV	JAMES HINES
BAY SCHOOL DISTRICT	BAY HIGH SCHOOL	1601002	60	23	12	8	40	OLIVER LAYNE
MOUNT IDA SCHOOL DISTRICT	MOUNT IDA HIGH SCHOOL	4902007	60	20	12	8	40	HAL LANDRITH
DECATUR SCHOOL DISTRICT	DECATUR HIGH SCHOOL	0402009	RV	RV	RV	RV	RV	JEFF GRAVETTE
OUACHITA SCHOOL DISTRICT	OUACHITA HIGH SCHOOL	3005030	57.1	23	12	9	42.9	RONNIE KISSIRE
CARLISLE SCHOOL DISTRICT	CARLISLE HIGH SCHOOL	4303013	57.1	24	12	9	42.9	JASON CLARK
EAST END SCHOOL DISTRICT	BIGELOW HIGH SCHOOL	5301002	57.1	24	12	9	42.9	J HARRIS
RIVERCREST SCHOOL DISTRICT 57	RIVERCREST HIGH SCHOOL	4706066	56.5	25	13	10	43.5	MIKE SMITH
HOPE SCHOOL DISTRICT	HOPE HIGH SCHOOL	2903012	56.3	33	18	14	43.7	BOBBY HART
GLEN ROSE SCHOOL DISTRICT	GLEN ROSE HIGH SCHOOL	3002009	56.3	40	18	14	43.7	TIM HOLICER
CAMDEN FAIRVIEW SCHOOL DISTRICT	CAMDEN FAIRVIEW HIGH SCHOOL	5204023	55.4	69	36	29	44.6	MARK KEITH
KIRBY SCHOOL DISTRICT	KIRBY HIGH SCHOOL	5503011	54.5	23	12	10	45.5	JEFF ALEXANDER
HARMONY GROVE SCHOOL DISTRICT (SALINE COUNTY)	HARMONY GROVE HIGH SCHOOL	6304030	54.1	44	20	17	45.9	DANIEL HENLEY
CORNING SCHOOL DISTRICT	CORNING HIGH SCHOOL	1101004	53.8	35	14	12	46.2	KELLEE SMITH
MCGEHEE SCHOOL DISTRICT	MCGEHEE HIGH SCHOOL	2105028	53.6	30	15	13	46.4	THOMAS GATHEN
GURDON SCHOOL DISTRICT	GURDON HIGH SCHOOL	1003018	53.3	32	16	14	46.7	ALLEN BLACKWELL
PARAGOULD SCHOOL DISTRICT	PARAGOULD HIGH SCHOOL	2808043	53.3	93	40	35	46.7	DEBORAH SMITH
CUTTER-MORNING STAR SCHOOL DISTRICT	CUTTER-MORNING STAR HIGH SCH.	2601002	52.6	20	10	9	47.4	NANCY ANDERSON
SMACKOVER-NORPHLET SCHOOL DISTRICT	SMACKOVER HIGH SCHOOL	7008045	52.5	43	21	19	47.5	BRIAN WILCOX
HECTOR SCHOOL DISTRICT	HECTOR HIGH SCHOOL	5803010	52.4	21	11	10	47.6	WALT DAVIS
BLEVINS SCHOOL DISTRICT	BLEVINS HIGH SCHOOL	2901002	52.2	24	12	11	47.8	BILLY LEE
NEWPORT SCHOOL DISTRICT	NEWPORT HIGH SCHOOL	3403013	52.2	26	12	11	47.8	LARRY BENNETT
ROSE BUD SCHOOL DISTRICT	ROSE BUD HIGH SCHOOL	7310043	51.9	34	14	13	48.1	CURTIS SPANN

District Name	School Name	School LEA	Grade Inflation Rate: GPA >= 3 and ACT Math or Reading < 19	Number of Students Having GPA >=3	Number of Students Having GPA >= 3 and ACT Math or Reading < 19	Number of Students Having GPA >= 3 and ACT Math >= 19 and ACT Reading >= 19	Percent of Students Having GPA >= 3 and ACT Math and Reading >= 19	Superintendent
SLOAN-HENDRIX SCHOOL DISTRICT	SLOAN-HENDRIX HIGH SCHOOL	3806019	51.7	30	15	14	48.3	CLIFFORD ROREX
PARIS SCHOOL DISTRICT	PARIS HIGH SCHOOL	4203012	51.2	41	21	20	48.8	ROYCE FAWCETT
HIGHLAND SCHOOL DISTRICT	HIGHLAND HIGH SCHOOL	6804010	51.1	49	23	22	48.9	TRACY WEBB
LITTLE ROCK SCHOOL DISTRICT	PARKVIEW MAGNET HIGH SCHOOL	6001005	51	106	52	50	49	BAKER KURRUS
RIVERVIEW SCHOOL DISTRICT	RIVERVIEW HIGH SCHOOL	7307032	51	52	25	24	49	DAVID RUTLEDGE
CLEVELAND COUNTY SCHOOL DISTRICT	RISON HIGH SCHOOL	1305010	50	20	10	10	50	JOHNNIE JOHNSON
RIVERSIDE SCHOOL DISTRICT	RIVERSIDE HIGH SCHOOL	1613021	50	27	12	12	50	TOMMY KNIGHT
SPRING HILL SCHOOL DISTRICT	SPRING HILL HIGH SCHOOL	2906026	50	29	14	14	50	ANGELA RANEY
SOUTHSIDE SCHOOL DISTRICT (INDEPENDENCE COUNTY)	SOUTHSIDE HIGH SCHOOL	3209039	50	67	33	33	50	ROGER RICH
MIDLAND SCHOOL DISTRICT	MIDLAND HIGH SCHOOL	3211035	RV	RV	RV	RV	RV	DEWAYNE WAMMACK
JACKSON COUNTY SCHOOL DISTRICT	TUCKERMAN HIGH SCHOOL	3405025	50	41	20	20	50	CHESTER SHANNON
NEVADA SCHOOL DISTRICT	NEVADA HIGH SCHOOL	5008014	50	12	6	6	50	RICHARD MCAFEE
PALESTINE-WHEATLEY SCH. DIST.	PALESTINE-WHEATLEY SENIOR HIGH SCHOOL	6205028	50	23	10	10	50	JON ESTES
OZARK MOUNTAIN SCHOOL DISTRICT	BRUNO-PYATT HIGH SCHOOL	6505011	RV	RV	RV	RV	RV	JAMES JONES
HAMBURG SCHOOL DISTRICT	HAMBURG HIGH SCHOOL	0203018	49.1	58	26	27	50.9	MAX DYSON
PULASKI COUNTY SPECIAL SCHOOL DISTRICT	NORTH PULASKI HIGH SCHOOL	6003136	48.9	63	22	23	51.1	JERRY GUESS
TRUMANN SCHOOL DISTRICT	TRUMANN HIGH SCHOOL	5605023	48.6	44	17	18	51.4	MYRA GRAHAM
ASHDOWN SCHOOL DISTRICT	ASHDOWN HIGH SCHOOL	4101004	48.3	65	28	30	51.7	JASON SANDERS
PANGBURN SCHOOL DISTRICT	PANGBURN HIGH SCHOOL	7309039	48.3	32	14	15	51.7	KATHY BERRYHILL
WOODLAWN SCHOOL DISTRICT	WOODLAWN HIGH SCHOOL	1304015	48	26	12	13	52	DUDLEY HUME
MARMADUKE SCHOOL DISTRICT	MARMADUKE HIGH SCHOOL	2803017	47.6	30	10	11	52.4	TIM GARDNER
HORATIO SCHOOL DISTRICT	HORATIO HIGH SCHOOL	6703013	47.5	40	19	21	52.5	LEE SMITH
MANILA SCHOOL DISTRICT	MANILA HIGH SCHOOL	4712044	47.4	42	18	20	52.6	PAMELA CASTOR
CEDARVILLE SCHOOL DISTRICT	CEDARVILLE HIGH SCHOOL	1702009	47.2	37	17	19	52.8	DANNY FOREMAN
DUMAS SCHOOL DISTRICT	DUMAS HIGH SCHOOL	2104021	46.9	33	15	17	53.1	KELVIN GRAGG

2015-2016 Grade Inflation Report

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LAFAYETTE COUNTY SCHOOL DISTRICT	LAFAYETTE COUNTY HIGH SCHOOL	3704013	46.7	15	7	8	53.3	ROBERT EDWARDS
CROSS COUNTY SCHOOL DISTRICT	CROSS CNTY HIGH A NEW TECH SCHOOL	1901703	46.2	13	6	7	53.8	M WILSON
SHIRLEY SCHOOL DISTRICT	SHIRLEY HIGH SCHOOL	7104015	46.2	17	6	7	53.8	BETTY MCGRUDER
BERGMAN SCHOOL DISTRICT	BERGMAN HIGH SCHOOL	0502007	45.5	34	15	18	54.5	JOE COUCH
MOUNTAINBURG SCHOOL DISTRICT	MOUNTAINBURG HIGH SCHOOL	1703013	45.5	28	10	12	54.5	DENNIS COPELAND
BATESVILLE SCHOOL DISTRICT	BATESVILLE HIGH SCHOOL	3201005	45.5	116	45	54	54.5	GARY ANDERSON
TWO RIVERS SCHOOL DISTRICT	TWO RIVERS HIGH SCHOOL	7510019	45.5	25	10	12	54.5	JIMMY LOYD
LAMAR SCHOOL DISTRICT	LAMAR HIGH SCHOOL	3604019	45	45	18	22	55	JAY HOLLAND
CEDAR RIDGE SCHOOL DISTRICT	CEDAR RIDGE HIGH SCHOOL	3212027	44.8	32	13	16	55.2	ANDY ASHLEY
JASPER SCHOOL DISTRICT	KINGSTON HIGH SCHOOL	5102008	RV	RV	RV	RV	RV	JEFF CANTRELL
WEST SIDE SCHOOL DISTRICT (CLEBURNE COUNTY)	WEST SIDE HIGH SCHOOL	1204015	44	26	11	14	56	ANDY CHISUM
RECTOR SCHOOL DISTRICT	RECTOR HIGH SCHOOL	1106023	43.8	18	7	9	56.2	JOHNNY FOWLER
CADDO HILLS SCHOOL DISTRICT	CADDO HILLS HIGH SCHOOL	4901003	43.8	19	7	9	56.2	DERIC OWENS
GENTRY SCHOOL DISTRICT	GENTRY HIGH SCHOOL	0403014	43.4	62	23	30	56.6	RANDY BARRETT
PULASKI COUNTY SPECIAL SCHOOL DISTRICT	SYLVAN HILLS HIGH SCHOOL	6003128	43.2	51	19	25	56.8	JERRY GUESS
CLARKSVILLE SCHOOL DISTRICT	CLARKSVILLE HIGH SCHOOL	3601005	42.9	102	33	44	57.1	DAVID HOPKINS
HUNTSVILLE SCHOOL DISTRICT	ST. PAUL HIGH SCHOOL	4401012	RV	RV	RV	RV	RV	CLINTON JONES
DEWITT SCHOOL DISTRICT	DEWITT HIGH SCHOOL	0101004	42.5	46	17	23	57.5	WANDA DARDENNE
MELBOURNE SCHOOL DISTRICT	MELBOURNE HIGH SCHOOL	3302006	42.3	31	11	15	57.7	DENNIS SUBLETT
BERRYVILLE SCHOOL DISTRICT	BERRYVILLE HIGH SCHOOL	0801002	42.2	47	19	26	57.8	PHIL CLARK
MAYFLOWER SCHOOL DISTRICT	MAYFLOWER HIGH SCHOOL	2305026	42.1	41	16	22	57.9	JOHN GRAY
GREENLAND SCHOOL DISTRICT	GREENLAND HIGH SCHOOL	7204028	42.1	39	16	22	57.9	LARRY BEN
HARRISBURG SCHOOL DISTRICT	HARRISBURG HIGH SCHOOL	5602007	41.9	35	13	18	58.1	DANNY SAMPLE
SOUTH CONWAY COUNTY SCHOOL DISTRICT	MORRILTON SR. HIGH SCHOOL	1507036	41.8	71	23	32	58.2	SHAWN HALBROOK
CALICO ROCK SCHOOL DISTRICT	CALICO ROCK HIGH SCHOOL	3301002	41.7	13	5	7	58.3	JERRY SKIDMORE

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DES ARC SCHOOL DISTRICT	DES ARC HIGH SCHOOL	5901002	41.7	12	5	7	58.3	NICHOLAS HILL
SALEM SCHOOL DISTRICT	SALEM HIGH SCHOOL	2502006	41.4	30	12	17	58.6	KENNETH RICH
WESTSIDE CONSOLIDATED SCHOOL DISTRICT (CRAIGHEAD C	WESTSIDE HIGH SCHOOL	1602055	41.3	50	19	27	58.7	BRYAN DUFFIE
MAMMOTH SPRING SCHOOL DISTRICT	MAMMOTH SPRING HIGH SCHOOL	2501002	41.2	18	7	10	58.8	DAVID TURNBOUGH
ENGLAND SCHOOL DISTRICT	ENGLAND HIGH SCHOOL	4302018	41.2	18	7	10	58.8	BARRY SCOTT
STUTTGART SCHOOL DISTRICT	STUTTGART HIGH SCHOOL	0104025	41.1	61	23	33	58.9	NATHAN GILLS
N. LITTLE ROCK SCHOOL DISTRICT	NORTH LITTLE ROCK HIGH SCHOOL	6002082	40.9	218	81	117	59.1	KELLY RODGERS JR.
CROSSETT SCHOOL DISTRICT	CROSSETT HIGH SCHOOL	0201006	40.7	56	22	32	59.3	GARY WILLIAMS
WYNNE SCHOOL DISTRICT	WYNNE HIGH SCHOOL	1905017	40.7	90	33	48	59.3	CARL EASLEY
TEXARKANA SCHOOL DISTRICT	ARKANSAS HIGH SCHOOL	4605026	40.7	96	33	48	59.3	BECKY KESLER
JASPER SCHOOL DISTRICT	JASPER HIGH SCHOOL	5102006	40.7	29	11	16	59.3	JEFF CANTRELL
DEQUEEN SCHOOL DISTRICT	DEQUEEN HIGH SCHOOL	6701003	40.7	90	35	51	59.3	BRUCE HILL
BROOKLAND SCHOOL DISTRICT	BROOKLAND HIGH SCHOOL	1603007	40.6	71	26	38	59.4	KEITH MC DANIEL
DOVER SCHOOL DISTRICT	DOVER HIGH SCHOOL	5802006	40.6	76	28	41	59.4	JERRY OWENS
BOONEVILLE SCHOOL DISTRICT	BOONEVILLE HIGH SCHOOL	4201002	40.5	47	17	25	59.5	JOHN PARRISH
FORT SMITH SCHOOL DISTRICT	NORTHSIDE HIGH SCHOOL	6601024	40.5	214	77	113	59.5	BENNY GOODEN
GUY-PERKINS SCHOOL DISTRICT	GUY-PERKINS HIGH SCHOOL	2304022	RV	RV	RV	RV	RV	BRIAN COSSEY
MOUNTAIN PINE SCHOOL DISTRICT	MOUNTAIN PINE HIGH SCHOOL	2607047	40	10	4	6	60	ROBERT GRAY
DIERKS SCHOOL DISTRICT	DIERKS HIGH SCHOOL	3102002	40	22	8	12	60	HOLLY COTHREN
SOUTH PIKE COUNTY SCHOOL DISTRICT	MURFREESBORO HIGH SCHOOL	5504015	40	26	10	15	60	ROGER FEATHERSTON
SPRINGDALE SCHOOL DISTRICT	SPRINGDALE HIGH SCHOOL	7207049	39.6	321	99	151	60.4	JIMMY ROLLINS
MAGNOLIA SCHOOL DISTRICT	MAGNOLIA HIGH SCHOOL	1402009	39.5	91	34	52	60.5	JOHN WARD
PULASKI COUNTY SPECIAL SCHOOL DISTRICT	WILBUR D. MILLS HIGH SCHOOL	6003125	39.4	38	13	20	60.6	JERRY GUESS
STAR CITY SCHOOL DISTRICT	STAR CITY HIGH SCHOOL	4003016	39.2	51	20	31	60.8	RICHARD MONTGOMERY
GREEN FOREST SCHOOL DISTRICT	GREEN FOREST HIGH SCHOOL	0803012	38.9	39	14	22	61.1	PHILIP SUMMERS

District Name	School Name	School LEA	Grade Inflation Rate: GPA >= 3 and ACT Math or Reading < 19	Number of Students Having GPA >=3	Number of Students Having GPA >= 3 and ACT Math or Reading < 19	Number of Students Having GPA >= 3 and ACT Math >= 19 and ACT Reading >= 19	Percent of Students Having GPA >= 3 and ACT Math and Reading >= 19	Superintendent
IZARD COUNTY CONSOLIDATED SCHOOL DISTRICT	IZARD CO. CONS. HIGH SCHOOL	3306015	38.5	15	5	8	61.5	FRED WALKER
OUACHITA RIVER SCHOOL DISTRICT	ODEN HIGH SCHOOL	5706011	38.5	13	5	8	61.5	JERRALL STRASNER
VALLEY SPRINGS SCHOOL DISTRICT	VALLEY SPRINGS HIGH SCHOOL	0505027	38.1	45	16	26	61.9	JUDITH GREEN
BALD KNOB SCHOOL DISTRICT	BALD KNOB HIGH SCHOOL	7301003	37.8	52	17	28	62.2	BRADLEY ROBERTS
BRADFORD SCHOOL DISTRICT	BRADFORD HIGH SCHOOL	7303015	37.5	18	6	10	62.5	ARTHUR DUNN
LONOKE SCHOOL DISTRICT	LONOKE HIGH SCHOOL	4301029	36.7	63	22	38	63.3	SUZANNE BAILEY
PERRYVILLE SCHOOL DISTRICT	PERRYVILLE HIGH SCHOOL	5303011	36.7	32	11	19	63.3	RON WILSON
WALDRON SCHOOL DISTRICT	WALDRON HIGH SCHOOL	6401003	36.6	50	15	26	63.4	ROY WAYMAN
DREW CENTRAL SCHOOL DISTRICT	DREW CENTRAL HIGH SCHOOL	2202005	36.4	24	8	14	63.6	BILLY WILLIAMS
PULASKI COUNTY SPECIAL SCHOOL DISTRICT	MAUMELLE HIGH SCHOOL	6003151	36	101	31	55	64	JERRY GUESS
WHITE HALL SCHOOL DISTRICT	WHITE HALL HIGH SCHOOL	3510076	35.8	123	43	77	64.2	LARRY SMITH
MANSFIELD SCHOOL DISTRICT	MANSFIELD HIGH SCHOOL	6606062	35.7	32	10	18	64.3	ROBERT ROSS
VIOLA SCHOOL DISTRICT	VIOLA HIGH SCHOOL	2503010	35.3	23	6	11	64.7	JOHN MAY
ACADEMICS PLUS SCHOOL DISTRICT	MAUMELLE CHARTER HIGH SCHOOL	6040703	35.3	18	6	11	64.7	ROBERT MCGILL
MALVERN SCHOOL DISTRICT	MALVERN HIGH SCHOOL	3004023	35.2	60	19	35	64.8	BRIAN GOLDEN
NEMO VISTA SCHOOL DISTRICT	NEMO VISTA HIGH SCHOOL	1503017	35	22	7	13	65	CODY BEENE
SOUTH SIDE SCHOOL DISTRICT(VAN BUREN COUNTY)	SOUTH SIDE HIGH SCHOOL	7105019	35	20	7	13	65	WILLIAM JACKSON
MARION SCHOOL DISTRICT	MARION HIGH SCHOOL	1804015	34.8	122	39	73	65.2	DON JOHNSTON
NETTLETON SCHOOL DISTRICT	NETTLETON HIGH SCHOOL	1611042	34.7	106	34	64	65.3	JAMES DUNIVAN
MOUNTAIN VIEW SCHOOL DISTRICT	MOUNTAIN VIEW HIGH SCHOOL	6901007	34.7	52	17	32	65.3	ROWDY ROSS
GOSNELL SCHOOL DISTRICT	GOSNELL HIGH SCHOOL	4708031	34.6	28	9	17	65.4	BONARD MACE
ALMA SCHOOL DISTRICT	ALMA HIGH SCHOOL	1701002	34.4	133	42	80	65.6	DAVID WOOLLY
HARMONY GROVE SCHOOL DISTRICT (OUACHITA COUNTY)	HARMONY GROVE HIGH SCHOOL	5205029	34.4	34	11	21	65.6	WALTON PIGOTT

2015-2016 Grade Inflation Report

District Name	School Name	School LEA	Grade Inflation Rate: GPA >= 3 and ACT Math or Reading < 19	Number of Students Having GPA >=3	Number of Students Having GPA >= 3 and ACT Math or Reading < 19	Number of Students Having GPA >= 3 and ACT Math >= 19 and ACT Reading >= 19	Percent of Students Having GPA >= 3 and ACT Math and Reading >= 19	Superintendent
WEST FORK SCHOOL DISTRICT	WEST FORK HIGH SCHOOL	7208062	34.2	44	13	25	65.8	JOHN KARNES
ELKINS SCHOOL DISTRICT	ELKINS HIGH SCHOOL	7201002	34	52	16	31	66	JON JORDAN
OZARK SCHOOL DISTRICT	OZARK HIGH SCHOOL	2404017	33.8	73	22	43	66.2	JAMES FORD
ESTEM PUBLIC CHARTER SCHOOL	ESTEM HIGH CHARTER	6047703	33.8	74	23	45	66.2	JOHN BACON
ROGERS SCHOOL DISTRICT	ROGERS NEW TECHNOLOGY HIGH SCHOOL	0405703	33.3	29	8	16	66.7	MARGARET DARR
ARKANSAS ARTS ACADEMY	ARKANSAS ARTS ACADEMY HIGH SCHOOL	0440703	33.3	38	11	22	66.7	MARY LEY
QUITMAN SCHOOL DISTRICT	QUITMAN HIGH SCHOOL	1203011	33.3	16	4	8	66.7	DENNIS TRUXLER
MT. VERNON/ENOLA SCHOOL DISTRICT	MT. VERNON/ENOLA HIGH SCHOOL	2306030	33.3	14	4	8	66.7	LARRY WALTERS
JESSIEVILLE SCHOOL DISTRICT	JESSIEVILLE HIGH SCHOOL	2604030	33.3	18	6	12	66.7	RALPH CARTER
GREENE COUNTY TECH SCHOOL DISTRICT	GREENE COUNTY TECH HIGH SCHOOL	2807008	33.3	132	39	78	66.7	GENE WEEKS
WESTSIDE SCHOOL DISTRICT (JOHNSON COUNTY)	WESTSIDE HIGH SCHOOL	3606026	33.3	18	6	12	66.7	SHANE GORDON
HOXIE SCHOOL DISTRICT	HOXIE HIGH SCHOOL	3804010	33.3	26	8	16	66.7	RADIUS BAKER
FLIPPIN SCHOOL DISTRICT	FLIPPIN HIGH SCHOOL	4501002	33.3	29	9	18	66.7	DALE QUERY
ATKINS SCHOOL DISTRICT	ATKINS HIGH SCHOOL	5801002	33.3	35	11	22	66.7	JOSEPH FISHER
HAZEN SCHOOL DISTRICT	HAZEN HIGH SCHOOL	5903012	33.3	25	5	10	66.7	NANETTE BELFORD
PULASKI COUNTY SPECIAL SCHOOL DISTRICT	JOE T. ROBINSON HIGH SCHOOL	6003127	33.3	28	7	14	66.7	JERRY GUESS
WESTERN YELL CO. SCHOOL DISTRICT	WESTERN YELL CO. HIGH SCHOOL	7509033	33.3	17	4	8	66.7	JOE STATON
VAN BUREN SCHOOL DISTRICT	VAN BUREN HIGH SCHOOL	1705027	33.2	229	70	141	66.8	HAROLD JEFFCOAT
JONESBORO SCHOOL DISTRICT	SCHOOL	1608703	32.4	133	36	75	67.6	KIM WILBANKS
LAVACA SCHOOL DISTRICT	LAVACA HIGH SCHOOL	6605057	32.3	37	10	21	67.7	STEVEN ROSE
COTTER SCHOOL DISTRICT	COTTER HIGH SCHOOL	0302007	32.1	30	9	19	67.9	DONALD SHARP
BISMARCK SCHOOL DISTRICT	BISMARCK HIGH SCHOOL	3001003	32.1	28	9	19	67.9	SUSAN STEWART
HOT SPRINGS SCHOOL DISTRICT	HOT SPRINGS HIGH SCHOOL	2603021	32	58	16	34	68	MIKE HERNANDEZ
CAVE CITY SCHOOL DISTRICT	CAVE CITY HIGH SCHOOL	6802002	31.6	40	12	26	68.4	STEVEN GREEN
HAMPTON SCHOOL DISTRICT	HAMPTON HIGH SCHOOL	0701002	31.3	17	5	11	68.7	JIMMY CUNNINGHAM

2015-2016 Grade Inflation Report

District Name	School Name	School LEA	Grade Inflation Rate: GPA >= 3 and ACT Math or Reading < 19	Number of Students Having GPA >=3	Number of Students Having GPA >= 3 and ACT Math or Reading < 19	Number of Students Having GPA >= 3 and ACT Math >= 19 and ACT Reading >= 19	Percent of Students Having GPA >= 3 and ACT Math and Reading >= 19	Superintendent
OUACHITA RIVER SCHOOL DISTRICT	ACORN HIGH SCHOOL	5706002	31.3	18	5	11	68.7	JERRALL STRASNER
BRYANT SCHOOL DISTRICT	BRYANT HIGH SCHOOL	6303022	31.2	358	104	229	68.8	TOM KIMBRELL
OMAHA SCHOOL DISTRICT	OMAHA HIGH SCHOOL	0504023	30.8	13	4	9	69.2	JERRY PARRETT
BUFFALO ISLAND CENTRAL SCHOOL DISTRICT	BUFFALO ISLAND CENTRAL HIGH SCHOOL	1605063	30.3	41	10	23	69.7	GAYLON TAYLOR
HEBER SPRINGS SCHOOL DISTRICT	HEBER SPRINGS HIGH SCHOOL	1202006	30	47	12	28	70	ALAN STAUFFACHER
COUNTY LINE SCHOOL DISTRICT	COUNTY LINE HIGH SCHOOL	2403012	30	21	6	14	70	JUSTIN GATTIS
CLINTON SCHOOL DISTRICT	CLINTON HIGH SCHOOL	7102006	30	33	9	21	70	ANDREW VINING
PEA RIDGE SCHOOL DISTRICT	PEA RIDGE HIGH SCHOOL	0407027	29.5	54	13	31	70.5	RICK NEAL
MAGAZINE SCHOOL DISTRICT	J.D. LEFTWICH HIGH SCHOOL	4202008	29.4	19	5	12	70.6	BRETT BUNCH
LAKE HAMILTON SCHOOL DISTRICT	LAKE HAMILTON HIGH SCHOOL	2605034	29.3	162	41	99	70.7	PAUL ANDERSON
SEARCY COUNTY SCHOOL DISTRICT	MARSHALL HIGH SCHOOL	6502006	29.2	25	7	17	70.8	JIMMY YARBROUGH
ARKADELPHIA SCHOOL DISTRICT	ARKADELPHIA HIGH SCHOOL	1002010	29.1	81	23	56	70.9	LARY WHITTEN
MENA SCHOOL DISTRICT	MENA HIGH SCHOOL	5703012	29	71	18	44	71	BENNY WESTON
BEEBE SCHOOL DISTRICT	BEEBE HIGH SCHOOL	7302010	29	96	27	66	71	BELINDA SHOOK
CONWAY SCHOOL DISTRICT	CONWAY HIGH SCHOOL	2301006	28.9	341	94	231	71.1	GREG MURRY
MONTICELLO SCHOOL DISTRICT	MONTICELLO HIGH SCHOOL	2203012	28.8	73	21	52	71.2	SANDRA LANEHART
VILONIA SCHOOL DISTRICT	VILONIA HIGH SCHOOL	2307034	28.8	156	42	104	71.2	DAVID STEPHENS
ROGERS SCHOOL DISTRICT	ROGERS HERITAGE HIGH SCHOOL	0405052	28.7	212	54	134	71.3	MARGARET DARR
LAWRENCE COUNTY SCHOOL DISTRICT	WALNUT RIDGE HIGH SCHOOL	3810027	28.6	28	8	20	71.4	TERRY BELCHER
MOUNTAIN VIEW SCHOOL DISTRICT	RURAL SPECIAL HIGH SCHOOL	6901012	RV	RV	RV	RV	RV	ROWDY ROSS
EL DORADO SCHOOL DISTRICT	EL DORADO HIGH SCHOOL	7001012	28.3	113	28	71	71.7	JIM TUCKER
GENOA CENTRAL SCHOOL DISTRICT	GENOA CENTRAL HIGH SCHOOL	4602006	27.5	41	11	29	72.5	CARL WATERS
GRAVETTE SCHOOL DISTRICT	GRAVETTE HIGH SCHOOL	0404022	27.3	72	18	48	72.7	RICHARD PAGE
EMERSON-TAYLOR-BRADLEY SCHOOL DISTRICT	TAYLOR HIGH SCHOOL	1408019	27.3	14	3	8	72.7	JAMES HINES
MOUNTAIN HOME SCHOOL DISTRICT	MOUNTAIN HOME CAREER ACADEMIES	0303703	27.2	142	34	91	72.8	JAKE LONG

2015-2016 Grade Inflation Report

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PRAIRIE GROVE SCHOOL DISTRICT	PRAIRIE GROVE HIGH SCHOOL	7206036	26.8	91	22	60	73.2	ALLEN WILLIAMS
HARRISON SCHOOL DISTRICT	HARRISON HIGH SCHOOL	0503016	26.7	101	24	66	73.3	MELINDA MOSS
RUSSELLVILLE SCHOOL DISTRICT	RUSSELLVILLE HIGH SCHOOL	5805024	26.2	161	39	110	73.8	RANDALL WILLIAMS
SEARCY SCHOOL DISTRICT	SEARCY HIGH SCHOOL	7311052	25.7	150	36	104	74.3	SARAH DIANE BARRETT
HUNTSVILLE SCHOOL DISTRICT	HUNTSVILLE HIGH SCHOOL	4401003	25.4	65	15	44	74.6	CLINTON JONES
CABOT SCHOOL DISTRICT	CABOT HIGH SCHOOL	4304005	25.2	360	81	241	74.8	WILLIAM THURMAN
WONDERVIEW SCHOOL DISTRICT	WONDERVIEW HIGH SCHOOL	1505026	RV	RV	RV	RV	RV	J. PURTLE
CHARLESTON SCHOOL DISTRICT	CHARLESTON HIGH SCHOOL	2402007	25	48	11	33	75	JEFF STUBBLEFIELD
CENTERPOINT SCHOOL DISTRICT	CENTERPOINT HIGH SCHOOL	5502010	25	41	9	27	75	DANNY BRESHEARS
PARKERS CHAPEL SCHOOL DISTRICT	PARKERS CHAPEL HIGH SCHOOL	7007040	25	27	6	18	75	MICHAEL WHITE
DANVILLE SCHOOL DISTRICT	DANVILLE HIGH SCHOOL	7503006	25	31	7	21	75	GREGG GRANT
SPRINGDALE SCHOOL DISTRICT	HAR-BER HIGH SCHOOL	7207062	24.8	298	61	185	75.2	JIMMY ROLLINS
GREENWOOD SCHOOL DISTRICT	GREENWOOD HIGH SCHOOL	6602043	24.1	199	45	142	75.9	JOHN CIESLA
GREENBRIER SCHOOL DISTRICT	GREENBRIER HIGH SCHOOL	2303017	23.8	141	31	99	76.2	D SPAINHOUR
OZARK MOUNTAIN SCHOOL DISTRICT	WESTERN GROVE HIGH SCHOOL	6505014	23.1	14	3	10	76.9	JAMES JONES
FORT SMITH SCHOOL DISTRICT	SOUTHSIDE HIGH SCHOOL	6601025	22.3	283	56	195	77.7	BENNY GOODEN
VALLEY VIEW SCHOOL DISTRICT	VALLEY VIEW HIGH SCHOOL	1612048	21.4	124	25	92	78.6	BRYAN RUSSELL
ROGERS SCHOOL DISTRICT	ROGERS HIGH SCHOOL	0405048	21.1	257	48	180	78.9	MARGARET DARR
LITTLE ROCK SCHOOL DISTRICT	CENTRAL HIGH SCHOOL	6001001	20.5	253	50	194	79.5	BAKER KURRUS
DARDANELLE SCHOOL DISTRICT	DARDANELLE HIGH SCHOOL	7504011	20.5	49	9	35	79.5	JOHN THOMPSON
POTTSVILLE SCHOOL DISTRICT	POTTSVILLE HIGH SCHOOL	5804014	20.3	68	12	47	79.7	LARRY DUGGER
POCAHONTAS SCHOOL DISTRICT	POCAHONTAS HIGH SCHOOL	6103010	20.3	74	14	55	79.7	DARYL BLAXTON
NORFORK SCHOOL DISTRICT	NORFORK HIGH SCHOOL	0304022	20	12	2	8	80	MICHAEL SEAY
EUREKA SPRINGS SCHOOL DISTRICT	EUREKA SPRINGS HIGH SCHOOL	0802007	18.8	20	3	13	81.2	BRYAN PRUITT
LAKESIDE SCHOOL DISTRICT (GARLAND COUNTY)	LAKESIDE HIGH SCHOOL	2606044	18.8	101	18	78	81.2	SHAWN COOK

2015-2016 Grade Inflation Report

District Name	School Name	School LEA	Grade Inflation Rate: GPA >= 3 and ACT Math or Reading < 19	Number of Students Having GPA >=3	Number of Students Having GPA >= 3 and ACT Math or Reading < 19	Number of Students Having GPA >= 3 and ACT Math >= 19 and ACT Reading >= 19	Percent of Students Having GPA >= 3 and ACT Math and Reading >= 19	Superintendent
SHERIDAN SCHOOL DISTRICT	SHERIDAN HIGH SCHOOL	2705021	18.5	114	20	88	81.5	JERROD WILLIAMS
YELLVILLE-SUMMIT SCHOOL DISTRICT	YELLVILLE-SUMMIT HIGH SCHOOL	4502006	17.6	19	3	14	82.4	WESLEY HENDERSON
BENTONVILLE SCHOOL DISTRICT	BENTONVILLE HIGH SCHOOL	0401003	17.2	547	88	424	82.8	MICHAEL POORE
FAYETTEVILLE SCHOOL DISTRICT	FAYETTEVILLE HIGH SCHOOL	7203020	16	335	47	247	84	PAUL HEWITT
KIPP DELTA PUBLIC SCHOOLS	KIPP:DELTA COLLEGIATE HIGH SCH	5440703	15.4	14	2	11	84.6	SCOTT SHIREY
CABOT SCHOOL DISTRICT	ACADEMIC CENTER FOR EXCELLENCE	4304703	RV	RV	RV	RV	RV	WILLIAM THURMAN
BENTON SCHOOL DISTRICT	BENTON HIGH SCHOOL	6302012	13.6	175	22	140	86.4	JEFF COLLUM
POYEN SCHOOL DISTRICT	POYEN HIGH SCHOOL	2703010	12.5	26	3	21	87.5	JERRY NEWTON
HILLCREST SCHOOL DISTRICT	HILLCREST HIGH SCHOOL	3809023	RV	RV	RV	RV	RV	GREG CRABTREE
MAGNET COVE SCHOOL DISTRICT	MAGNET COVE HIGH SCHOOL	3003014	7.7	27	2	24	92.3	DANNY THOMAS
MCCRORY SCHOOL DISTRICT	MCCRORY HIGH SCHOOL	7403013	5.9	19	1	16	94.1	ROBERT CASTEEL
HAAS HALL ACADEMY	HAAS HALL ACADEMY	7240703	1.8	61	1	55	98.2	MARTIN SCHOPPMEYER
TEXARKANA SCHOOL DISTRICT	WASHINGTON ACADEMY	4605703	RV	RV	RV	RV	RV	BECKY KESLER
ARMOREL SCHOOL DISTRICT	ARMOREL HIGH SCHOOL	4701002	0	13	0	11	100	SALLY BENNETT
SILOAM SPRINGS SCHOOL DISTRICT	CHARTER	0406703	RV	RV	RV	RV	RV	KENDALL RAMEY
PEA RIDGE SCHOOL DISTRICT	ACADEMY	0407703	RV	RV	RV	RV	RV	RICK NEAL
RESPONSIVE ED SOLUTIONS NORTHWEST ARK CLASSICAL AC	NORTHWEST ARKANSAS CLASSICAL ACADEMY HIGH	0442703	RV	RV	RV	RV	RV	ALAN WIMBERLEY
HAAS HALL ACADEMY BENTONVILLE	HAAS HALL ACADEMY BENTONVILLE	0443703	RV	RV	RV	RV	RV	MARTIN SCHOPPMEYER
WARREN SCHOOL DISTRICT	WARREN HIGH SCHOOL DISTRICT CONVERSION CHARTER	0602703	RV	RV	RV	RV	RV	BOBBY ACKLIN
WEST MEMPHIS SCHOOL DISTRICT	SCHOOL	1803703	RV	RV	RV	RV	RV	JONATHAN COLLINS
FOUNTAIN LAKE SCHOOL DISTRICT	FOUNTAIN LAKE CHARTER HIGH SCHOOL	2602703	RV	RV	RV	RV	RV	DARIN BECKWITH
HOT SPRINGS SCHOOL DISTRICT	SUMMIT SCHOOL	2603013	RV	RV	RV	RV	RV	MIKE HERNANDEZ
PINE BLUFF LIGHTHOUSE ACADEMY	PINE BLUFF LIGHTHOUSE COLLEGE PREP ACADEMY HIGH SC	3541703	RV	RV	RV	RV	RV	LENISHA BROADWAY

2015-2016 Grade Inflation Report

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KIPP DELTA PUBLIC SCHOOLS	KIPP BLYTHEVILLE COLLEGIATE HIGH SCHOOL	5440706	RV	RV	RV	RV	RV	SCOTT SHIREY
LITTLE ROCK SCHOOL DISTRICT	ALTERNATIVE AGENCIES	6001067	RV	RV	RV	RV	RV	BAKER KURRUS
LISA ACADEMY	SCHOOL	6041706	RV	RV	RV	RV	RV	ATNAN EKIN
LISA ACADEMY	LISA ACADEMY HIGH	6041703	RV	RV	RV	RV	RV	ATNAN EKIN
ARKANSAS VIRTUAL ACADEMY	ARKANSAS VIRTUAL ACADEMY HIGH SCHOOL	6043703	RV	RV	RV	RV	RV	SCOTT SIDES
JACKSONVILLE LIGHTHOUSE CHARTER	JACKSONVILLE LIGHTHOUSE COLLEGE PREP ACADEMY HIGH	6050703	RV	RV	RV	RV	RV	LENISHA BROADWAY
SIATECH LITTLE ROCK CHARTER	SIATECH HIGH CHARTER	6052703	RV	RV	RV	RV	RV	KATIE TATUM
RESPONSIVE ED SOLUTIONS PREMIER HIGH SCHOOL OF LIT	PREMIER HIGH SCHOOL OF LITTLE ROCK	6053703	RV	RV	RV	RV	RV	ALAN WIMBERLEY
RESPONSIVE EDUCATION SOLUTIONS QUEST MIDDLE SCHOOL	QUEST MIDDLE SCHOOL OF LITTLE ROCK	6054703	RV	RV	RV	RV	RV	ALAN WIMBERLEY
CAPITOL CITY LIGHTHOUSE ACADEMY	CAPITOL CITY LIGHTHOUSE UPPER ACADEMY	6056703	RV	RV	RV	RV	RV	LENISHA BROADWAY
ARK. SCHOOL FOR THE BLIND	ARK. SCHOOL FOR THE BLIND HIGH SCHOOL.	6091002	RV	RV	RV	RV	RV	JIM HILL
SYSTEM	MANSFIELD	6094005	RV	RV	RV	RV	RV	BRETT SMITH
SYSTEM	LEWISVILLE	6094004	RV	RV	RV	RV	RV	BRETT SMITH
SYSTEM	HARRISBURG	6094006	RV	RV	RV	RV	RV	BRETT SMITH
SYSTEM	DERMOTT	6094002	RV	RV	RV	RV	RV	BRETT SMITH
SYSTEM	COLT	6094007	RV	RV	RV	RV	RV	BRETT SMITH
SYSTEM	ALEXANDER	6094001	RV	RV	RV	RV	RV	BRETT SMITH
BAUXITE SCHOOL DISTRICT	MINER ACADEMY	6301703	RV	RV	RV	RV	RV	MATTHEW DONAGHY
BAUXITE SCHOOL DISTRICT	BAUXITE HIGH SCHOOL	6301002	RV	RV	RV	RV	RV	MATTHEW DONAGHY
FORT SMITH SCHOOL DISTRICT	BELLE POINT ALTERNATIVE CENTER	6601005	RV	RV	RV	RV	RV	BENNY GOODEN
HACKETT SCHOOL DISTRICT	HARTFORD HIGH SCHOOL	6603052	RV	RV	RV	RV	RV	WILLIAM PITTMAN
FARMINGTON SCHOOL DISTRICT	FARMINGTON CAREER ACADEMIES	7202703	RV	RV	RV	RV	RV	BRYAN LAW
BEEBE SCHOOL DISTRICT	BADGER ACADEMY	7302703	RV	RV	RV	RV	RV	BELINDA SHOOK

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RV stands for Restricted Value and is used when there are less than 10 students with GPA greater than or equal to 3 having ACT scores.

ARKANSAS DEPARTMENT OF EDUCATION

DISTRICT WAIVER REQUEST FORM

District Name: County Line School District

Superintendent: Taylor Gattis

Email Address: tgattis@county lineindians.org

Phone Number: 479-635-2222 **Submission Date:** 11/07/2016

Name of Charter School(s) Attended by District Students

Arkansas Connections Academy

Waiver Topic: **Class Size and Teaching Load**

Statute/Standard/Rule to be Waived

Standards for Accreditation

- 10.02 Class size and teaching load

Rationale for Waiver

County Line requests a waiver of the requirement that a teacher shall not be assigned more than one hundred and fifty (150) students and that an individual class shall not exceed thirty (30) students. County Line believes that to avoid financial hardships of hiring an additional teacher that may come about in the future, some courses may need more than the maximum allowance of students. We will remedy this by contracting with individual teachers to increase their student load. County Line will ensure that under no circumstance will the teacher be assigned more than one hundred and eighty (180) students and have no more than thirty (35) in any one class. We will ask for this waiver for a period of 5 years and use it on an as needed basis.

Waiver Topic: **Planned Instruction Day**

Statute/Standard/Rule to be Waived

Standards for Accreditation

- 10.01.4 Planned instructional time

Rationale for Waiver

County Line requests a waiver of the requirement that the planned instructional time in each school day shall not average less than six (6) hours per day or thirty (30) hours per week, as well as the unit of credit must meet a minimum of 120 clock hours. The waivers are needed in order to increase scheduling flexibility and offer more exploratory and developmental time in specific college and career pathways. With increased flexibility we can embed coursework and create an environment where a student can learn at their own pace, students will have more time to serve in internships and apprenticeships and gain concurrent credit. These opportunities will position our students to be more successful in their college and career experiences. These waivers would also allow us to offer potential students that do not attend public school another avenue of curriculum that they may not have access to because of not being able to access curriculum on their own time and pace. We will ask for this waiver for a period of 5 years.

Waiver Topic: Clock Hours, School day hours

Statute/Standard/Rule to be Waived

Arkansas Code Annotated

- 6-16-102

Standards for Accreditation

- 14.03

Rationale for Waiver

County Line School requests a waiver of clock hour requirements for graduation credit. This waiver will be used to create more flexibility in student schedules,which will in turn allow more time for substantial participation in relevant and meaningful career pathway opportunities. County Line School assures that the granting of this wavier will not create a dilution of the coursework required to meet all necessary standards and frameworks for affected courses. We will ask for this waiver for a period of 5 years.

Waiver Topic: Required 38 units

Statute/Standard/Rule to be Waived

Standards for Accreditation

- 9.03.4

Rationale for Waiver

County Line requests a waiver of Smart Core curriculum contained within the 38 units and grades 9-12 requiring the 38 units. This waiver will allow County Line to be more efficient in utilizing teaching staff to offer the credits required for graduation. This will allow County the flexibility to offer classes that normally do not have a large number of students in them each year on an every other year rotation. An example would be if the Principals of Physics/Chemistry class comes about, we would not have to offer physics each year with a class size of around 5. We will ask for this waiver for a period of 5 years and use on an as needed basis.

Waiver Topic: Mandatory attendance

Statute/Standard/Rule to be Waived

Arkansas Code Annotated

- 6-18-211

Standards for Accreditation

- ADE Rules Governing Mandatory Attendance for grades 9-12.

Rationale for Waiver

County Line requests a waiver for mandatory attendance for students in grades 9-12. The waivers are needed in order to increase scheduling flexibility and offer more exploratory and developmental time for apprenticeships and participation in relevant and meaningful career pathway opportunities. This waiver request is for a period of 5 years.

When the form is complete, email it with the waiver lists for the charter school(s) that serve district students to Mary Perry at mary.perry@arkansas.gov. Waiver lists can be accessed from the Arkansas Department of Education website at http://www.arkansased.gov/divisions/learning-services/charterschools/open-enrollment-charter-school-waivers.

Questions should be directed to Mary Perry by email at mary.perry@arkansas.gov or by phone at (501) 683-4800.

OPTIONAL CONSIDERATIONS TO ADDRESS

The State Board of Education requests, but cannot require, written responses to the following considerations as part of the petition for district waivers. All written responses should be emailed to the Arkansas Department of Education with the waiver request and list(s) of open-enrollment charter waivers.

Discuss the ways in which the proposed waivers will impact the district.

- Ways in which the waivers would support or complement the district's **vision, mission, and/or strategic plan**
- District **policies**, if any, that would have to be developed or revised to implement the waiver
- The **fiscal impact** of the waivers, if any
    - Additional costs associated and sources of funding
    - Planned uses for savings
- Effects of the waivers, if any, on current academic, fiscal, or facilities **distress status**
    - Ways the waivers will help alleviate distress issues
    - Potential for implementation of the waivers to cause distress issues
- Effects of the waivers, if any, on compliance with the **Standards for Accreditation**
    - Ways the waivers will help alleviate accreditation issues
    - Potential for implementation of the waivers to cause accreditation issues

Discuss the planning that has taken place to ensure successful implementation of the waivers.

- **Options considered** by the district to request the waivers
    - School of innovation
    - District conversion charter
    - Reasons district waivers are being requested rather than seeking a school of innovation or a charter
- **Student gains** for students if these waivers are granted
    - Academic gains
    - Other benefits
- **Implementation** of the waivers
    - **Charter** school(s) use of the waivers
        - Application of the waivers
        - Evaluation of ongoing need for the waivers
    - **District** use of the waivers
        - **Specific plans** to implement the waivers
            - Certain schools, grade levels, and/or programs to be affected
            - Description of the changes to take place
            - Length of time for which the waivers are requested
- **Evaluation** of the usefulness of the waivers
    - **Method(s)** to be used to determine benefits of and/or problems with using the waivers
    - **Timeframe** for assessing the use of the waivers
    - **Outcome(s)** that will demonstrate successful use of the waivers
    - **Plan of action** if use of waivers is not achieving the desired results

Discuss the transparency of the process and methods used for garnering support for the waivers.

- Efforts, including **methods, times, dates, places**, for notifying and including all stakeholders
    - Students
    - Teachers and other staff
    - Parents
    - Community members
    - School board (board resolution)
- **Feedback** received from stakeholders and how it was and will be used in district planning

ARKANSAS CONNECTIONS ACADEMY
APPROVED WAIVERS

District LEA:	0444700	**Elementary School LEA:**	0444701
City:	Bentonville	**Middle School LEA:**	
Opening Date:	2016	**High School LEA:**	
Grades Approved:	K-12	**Expiration Date:**	06/30/2021
CAP:	3,000	**Grades Served 2016-2017:**	K-9

Waivers from Title 6 of the Arkansas Code Annotated (Education Code)

6-10-106	School year dates
6-10-115	Period of silence
6-10-122	Automated external defibrillators required
6-13-109	School superintendent
6-13-608	Length of directors' terms
6-13-611(b) and (c)	Vacancies generally
6-13-612(c)	Vacancies generally
6-13-613	Temporary vacancies - vacancies created by failure to participate
6-13-619(c)(1)(A) and (d)(2)	Requiring a board member to be physically present at a meeting to be counted for purposes of a quorum or to vote
6-13-620(5)(A)	Powers and duties
6-13-630	Election by zone and at large
6-13-631	Effect of minority population on election
6-13-1301 et. seq	Site-based decision making
6-14-101 et seq.	School Elections
6-15-1005(b)(5)(A)	Pertaining to alternative learning environments
6-15-1302	Emergency plan for war or terrorist attack
6-15-2006(b)	Annual progress report
6-15-2302	General business manager-—Responsibilities—Minimum qualifications
6-16-102	School day hours
6-16-105	United States flag
6-16-108	Daily recitation of the Pledge of Allegiance
6-16-143	Cardiopulmonary resuscitation instruction
6-17-102	Emergency first aid personnel
6-17-119	Alternative pay programs
6-17-201 et seq.	Requirements—Written personnel policies—Teacher salary schedule
6-17-302	Principals—Responsibilities
6-17-427	Superintendent license—Superintendent mentoring program required
6-17-913	Audit of accounts
6-17-1111	Life and disability insurance - Employee eligibility - Allocation of costs
6-17-1117	Health insurance
6-17-1201 et seq.	Teachers' Minimum Sick Leave Law
6-17-1301 et seq.	School Employees' Minimum Sick Leave Law
6-17-1501 et seq.	Teacher Fair Dismissal Act
6-17-1701 et seq.	Public School Employee Fair Hearing Act
6-17-2201 et seq.	Classified School Employee Minimum Salary Act
6-17-2301 et seq.	Classified School Employee Personnel Policy Law
6-17-2401 et seq.	Teacher Compensation Program of 2003
6-18-211	Students in grades nine through twelve—Mandatory Attendance
6-18-213(a)(2)	Attendance records and reports generally

6-18-503(a)(1)(C)(i)	Pertaining to alternative learning environments
6-18-705	School breakfast program
6-18-706	School nurses—Nurse-to-student ratio
6-18-1001 et seq.	Public School Student Services Act
6-18-1501 et. seq.	Mandated eye and vision screening procedures and tests for children
6-20-701 et. seq.	School lunch program
6-20-2208(c)(1)	Monitoring of expenditures (gifted and talented)
6-21-106	Fire hazards inspection prior to closing for breaks
6-21-303(b)(1)(A)	Rules (Acquisition of commodities generally)
6-21-406	Adoption, sale, or exchange of instructional materials
6-25-103	Library media services program defined
6-25-104	Library media specialist—Qualifications
6-42-109	Reports by school districts
6-48-101 et seq.	Alternative Learning Environments

Waivers from ADE Rules Governing Standards for Accreditation of Arkansas Public Schools and Districts

7.02.2	Publication of a report in a newspaper of general circulation in the district before November 15 a report detailing the progress toward accomplishing program goals, accreditation standards, and proposals to correct deficiencies
9.03.1.2	The Smart Core curriculum contained within 38 units that must be taught each year
9.03.4	Grades 9-12 (courses to be taught, requiring the 38 units of credit)
10.01.3	At least 10 days or 60 hours shall be used for professional development and in-service training and at least two (2) days shall be used for parent/teacher conferences
10.01.4	Planned instructional time
10.02	Class Size and Teaching Load
14.03	Unit of credit and clock hours for a unit of credit
15.01	School District Superintendent
15.02	Principals
15.03	Licensure and Renewal
15.04	Professional development and in-service training
16.01.3	Requiring a certified counselor at each school at a ratio of 1 to 450
16.02	Media Services
16.03	Health and Safety Services
18	Gifted and Talented Education
19.03	Pertaining to alternative learning environments
19.04	Requirement to provide summer school and adult education programs

Waivers from Other Rules:

ADE Rules - Automated External Defibrillator (AED) Devices and Cardiopulmonary Resuscitation (CPR)
ADE Rules - Automated External Defibrillators, Requirement of Schools to Have
ADE Rules - Business Manager Qualifications
ADE Rules - Eye and Vision Screening Report in Arkansas Public Schools
ADE Rules - Gifted And Talented Program Approval Standards
ADE Rules - Licensure - Educator Licensure, Chapter 3, Chapter 4 as it applies to administrators
ADE Rules - Mandatory Attendance Requirements for Students in Grades Nine through 12
ADE Rules - Personnel Policies and Salary Schedules, Sections 4-8
ADE Rules - School Fire Marshal
ADE Rules – Student Discipline and School Safety Policies 4.10
ADE Rules Governing Instructional Materials 6.02

ADE Rules Governing Public School Student Services 3.01.1
ADE Rules Governing Public School Student Services 3.01.6
ADE Rules Governing the Distribution of Student Special Needs Funding 4.00

Certain provisions of state law shall not be waived. The public charter school is subject to any prohibition, restriction, or requirement imposed by Title 6 of the Arkansas Code Annotated and any rule and regulation approved by the State Board of Education under this title relating to:

- Monitoring compliance with Arkansas Code Annotated § 6-23-101 et seq. as determined by the Commissioner of the Department of Education;
- Conducting criminal background checks for employees;
- High school graduation requirements as established by the State Board of Education;
- Special education programs as provided by this title;
- Public school accountability under this title;
- Ethical guidelines and prohibitions as established by Arkansas Code Annotated § 6-24-101 et seq., and any other controlling state or federal law regarding ethics or conflicts of interest; and
- Health and safety codes as established by the State Board of Education and local governmental entities.

Also, any teacher, whether licensed or unlicensed, who teaches a core academic subject area must meet the requirements of the ADE Rules Governing Arkansas Qualified Teacher Requirements. Core academic subjects include English Language Arts, Mathematics, Science, Social Studies, Early Childhood (Elementary), Music, Art and Foreign Language.

Waiver request for the County Line School District

County Line has an enrollment of around 450 students; we are in the middle of 4 larger school districts that range in size from 900 students to 1,900 students. The farthest distance to any of the 4 schools is fifteen miles.

County Line is an Achieving School and the elementary and high school both received a grade of B on the last school report card.

The waivers would allow County Line the ability to offer students in the district that are receiving an education from an alternative means a more flexible way of receiving their education. It would also give traditional students the opportunity to explore careers through an internship or an apprenticeship program.

The fiscal impact for the district would be positive. There would be the possibility that we would not have to hire additional staff for just a few kids and we will have the opportunity to educate kids that may not be receiving as adequate an education through another means.

County Line has never had an issue with accreditation and we continue to stay in compliance but these waivers could help us stay more financially sound and allow us to offer better salaries to compete with our neighboring districts.

We are seeking waivers instead of a charter because there were just a few of the waivers we believe are needed to make a positive difference in our school district.

We believe these waivers will allow our district to keep our enrollment up and benefit students in our district that may be receiving their education from a different avenue. We consistently have a graduation rate of around 95%.

COUNTY LINE SCHOOL DISTRICT

Date of Waiver Request Submission	**November 8, 2016**
90-Day Deadline for State Board of Education Action	**January 30, 2017**

2015-2016 Enrollment	
2 or More Races	**1**
Asian	**32**
Black	**3**
Hispanic	**1**
Native American/Native Alaskan	**5**
Native Hawaiian/Pacific Islander	**0**
White	**410**
Total	**452**

2016 ESEA DISTRICT REPORT

COUNTY LINE SCHOOL DISTRICT

Superintendent: JUSTIN GATTIS
LEA: 2403000
Enrollment: 461

Attendance: 95.63
Poverty Rate: 70.50

Address: 12092 W STATE HWY 22
BRANCH, AR 72928
Phone: (479) 635-2222

OVERALL DISTRICT STATUS:	2014 NEEDS IMPROVEMENT

PERCENT TESTED

PERCENT TESTED STATUS:	ACHIEVING

	ELA			MATHEMATICS		
ESEA Flexibility Indicators	**# Attempted**	**# Expected**	**Percentage**	**# Attempted**	**# Expected**	**Percentage**
All Students	275	276	99.64	275	276	99.64
Targeted Achievement Gap Group	197	198	99.49	197	198	99.49
ESEA Subgroups	**# Attempted**	**# Expected**	**Percentage**	**# Attempted**	**# Expected**	**Percentage**
African American	n < 10	n < 10	n < 10	n < 10	n < 10	n < 10
Hispanic	n < 10	n < 10	n < 10	n < 10	n < 10	n < 10
White	250	251	99.60	250	251	99.60
Economically Disadvantaged	189	190	99.47	189	190	99.47
English Language Learners	n < 10	n < 10	n < 10	n < 10	n < 10	n < 10
Students with Disabilities	32	32	100.00	32	32	100.00

2016 STUDENT PERFORMANCE -- ENGLISH LANGUAGE ARTS

ESEA Flexibility Indicators	# Achieved	# Tested	Percentage	State Average % Achieved
All Students	141	250	56.40	47.87
Targeted Achievement Gap Group	88	180	48.89	36.87
ESEA Subgroups	**# Achieved**	**# Tested**	**Percentage**	**State Average % Achieved**
African American	n < 10	n < 10	n < 10	27.81
Hispanic	n < 10	n < 10	n < 10	41.05
White	124	225	55.11	55.31
Economically Disadvantaged	88	173	50.87	37.65
English Language Learners	n < 10	n < 10	n < 10	30.15
Students with Disabilities	3	31	9.68	12.35

2016 STUDENT PERFORMANCE -- MATHEMATICS

ESEA Flexibility Indicators	# Achieved	# Tested	Percentage	State Average % Achieved
All Students	134	250	53.60	43.35
Targeted Achievement Gap Group	84	180	46.67	34.25
ESEA Subgroups	**# Achieved**	**# Tested**	**Percentage**	**State Average % Achieved**
African American	n < 10	n < 10	n < 10	23.53
Hispanic	n < 10	n < 10	n < 10	38.01
White	120	225	53.33	50.35
Economically Disadvantaged	82	173	47.40	34.76
English Language Learners	n < 10	n < 10	n < 10	31.69
Students with Disabilities	3	31	9.68	12.35

2015 SCHOOL GRADUATION RATE

ESEA Flexibility Indicators	# Actual Graduates	# Expected Graduates	Percentage	2015 State Average Percentage
All Students	38	40	95.00	85.71
Targeted Achievement Gap Group	19	21	90.48	82.59
Three Year Average Performance	**# Actual Graduates**	**# Expected Graduates**	**Percentage**	**2015 State Average Percentage**
All Students	99	107	92.52	85.87
Targeted Achievement Gap Group	51	58	87.93	82.01
ESEA Subgroups	**# Actual Graduates**	**# Expected Graduates**	**Percentage**	**2015 State Average Percentage**
African American	n < 10	n < 10	n < 10	78.66
Hispanic	n < 10	n < 10	n < 10	85.43
White	35	37	94.59	88.13
Economically Disadvantaged	18	20	90.00	82.42
English Language Learners	n < 10	n < 10	n < 10	86.45
Students with Disabilities	n < 10	n < 10	n < 10	82.56

2016 ESEA DISTRICT REPORT

COUNTY LINE SCHOOL DISTRICT

Superintendent:	JUSTIN GATTIS			**Address:**	12092 W STATE HWY 22
LEA:	2403000	**Attendance:**	95.63		BRANCH, AR 72928
Enrollment:	461	**Poverty Rate:**	70.50	**Phone:**	(479) 635-2222

Percent Tested: Source and Use of Enrollment

For percent tested and school/district performance calculations, student enrollment files were downloaded from eSchool via TRIAND to establish the students expected to test. These files were downloaded April 29, 2016.

When students' test and enrollment records were matched by school and student state identifier, the demographic values from the enrollment files were used in ESEA calculations.

When a student had a test record, but a matching enrollment record was not found, the demographic values from the student's test record were used in ESEA calculations.

When a student had an enrollment record that did not match a test record, the demographic values from the student's enrollment record were used in ESEA percent tested calculations.

District Performance

The district performance results in this report include students who completed a full academic year (not highly mobile) and completed a regular or alternate assessment. Students who were considered highly mobile were excluded from the calculations. All grades are included in the district performance for each subject.

Average State Performance

The average state performance statistics listed in this report include students who completed a full academic year (not highly mobile) and completed a regular or alternate assessment. Students who were considered highly mobile were excluded from the calculations. All grades are included in the state averages for each subject.

The school performance results in this report include students who completed a full academic year (not highly mobile) and completed a regular or an alternate assessment.

Report created on: 11/14/2016

Creative Writing

One Semester (.5 Credit)

Arkansas
English Language Arts Standards

2016

129

Course Title:	Creative Writing
Course/Unit Credit:	0.5
Course Number:	417010
Teacher Licensure:	Please refer to the Course Code Management System (https://adedata.arkansas.gov/ccms/) for the most current licensure codes.
Grades:	9-12

Creative Writing – One Semester

Creative Writing is a one-semester English elective course designed to engage students in the writing of poetry, short fiction, personal narratives, and other genres with an emphasis on developing and exercising imagination. Students will read closely for multiple purposes to analyze and evaluate exemplary texts to develop creative writing skills. Students will critique and refine writing through guided discussions, collaborative revisions, and individual reflections. Students will produce a portfolio of creative work that reflects student growth and understanding of the techniques of published authors. Students will share writing in a variety of ways and research methods for publishing original work. Creative Writing does not require Arkansas Department of Education approval.

Strand	Content Standard
Reading	
	1. Students will read a variety of texts for the purpose of analyzing styles, techniques, devices, and language in order to develop their own voice and style of writing.
Writing	
	2. Students will use a range of writing techniques to produce original compositions in a variety of genres for multiple purposes and audiences.

Notes:

1. Student Learning Expectations (SLEs) may be taught in any sequence.
2. Italicized words in this document appear in the glossary.
3. All items in a bulleted list are required to be taught.
4. The examples given (e.g.,) are suggestions to guide the instructor.

How the Anchor Standards are Labeled

R . CCR . 1

R

The letter in the first position of the anchor standard numbering system represents the strand:

Reading (R)

Writing (W)

Speaking and Listening (SL)

Language (L)

CCR

The symbol in the second position of the anchor standard numbering system represents college and career readiness.

1

The number in the third position of the anchor standard numbering system represents the standard.

How the SLEs are Labeled

D . 10 . DIII . 2

D	10	DIII	2
Letters in the first position represent the Strand name (e.g., Delivery).	Numbers in the second position represent the Standard number (e.g., Standard 10).	Symbols in the third position represent the Course name and level (e.g., Debate III).	Numbers in the fourth position represent the SLE number (e.g., SLE 2).

Strand: Reading

Content Standard 1: Students will read a variety of texts for the purpose of analyzing styles, techniques, devices, and language in order to develop their own voice and style of writing.

		AR ELA Alignment
R.1.CW.1	Analyze the function and effect of *literary devices, poetic devices*, *narrative techniques,* and structure in a variety of texts from a writer's perspective	R.CCR.1, R.CCR.4, R.CCR.5, R.CCR.6
R.1.CW.2	Analyze a variety of genres, including but not limited to poetry, personal narratives, and short fiction, for authorial choices (e.g., word choices, syntax, cadence, character development, dialogue, plot development), author's purpose, and effects on the reader	R.CCR.3, R.CCR.4, R.CCR.5, R.CCR.6
R.1.CW.3	Read a variety of excerpts and texts from authors representing multiple cultures and perspectives (e.g., world regions, ethnicities, beliefs and philosophies, socio-economic and sociological viewpoints) to enhance and inspire student writing	R.CCR.6, R.CCR.7, R.CCR.9
R.1.CW.4	Analyze focused excerpts about the craft of creative writing in a variety of sources (e.g., blogs, websites, literary magazines, essays, books)	R.CCR.4, R.CCR.5, R.CCR.6

Strand: Writing

Content Standard 2: Students will use a range of writing techniques to produce original compositions in a variety of genres for multiple purposes and audiences.

		AR ELA Alignment
W.2.CW.1	Write poetry using a range of *poetic devices* that demonstrates understanding of the genre and is appropriate to audience and purpose	W.CCR.4, W.CCR.5, W.CCR.10
W.2.CW.2	Write personal narratives that arise from problems, situations, observations, or experiences, using a range of *literary devices* and *narrative techniques*	W.CCR.3, W.CCR.4, W.CCR.5, W.CCR.10
W.2.CW.3	Write short fiction using *literary elements* and a range of *literary devices* and *narrative techniques*	W.CCR.3, W.CCR.4, W.CCR.5, W.CCR.10
W.2.CW.4	Produce creative writing (e.g., blog, article, essay, graphic novel, comic strip, screen play, script, drama) that demonstrates an understanding of multiple genres appropriate to audience and purpose	W.CCR.3, W.CCR.4, W.CCR.5, W.CCR.6, W.CCR.9, W.CCR.10
W.2.CW.5	Apply *literary devices*, *narrative techniques,* and a variety of stylistic devices (e.g., vivid word choice, abstract versus concrete language, descriptive language, sensory details, tone, voice, persona) in student writing	W.CCR.3, W.CCR.4, W.CCR.5, W.CCR.10
W.2.CW.6	Revise student writing during the writing process using self and peer review (e.g., rubrics, writing conferences, writing groups, feedback)	W.CCR.5, W.CCR.6
W.2.CW.7	Edit during the writing process for standard conventions (e.g., mechanics, usage, grammar, agreement, spelling, punctuation) as appropriate for the genre	W.CCR.5, W.CCR.6
W.2.CW.8	Maintain a portfolio of student work that reflects growth in creative writing	W.CCR.6, W.CCR.10
W.2.CW.9	Research a variety of methods and criteria for publishing original student works (e.g., school newspaper, literary magazine, online journal, school/class anthology, writing contests)	W.CCR.6

Literary elements	Universal components that writers purposefully use to develop a literary piece and can be found in any written or oral story (e.g., antagonist, conflict, narrator, plot, protagonist, setting, theme)
Literary devices	Components of literature that can be found in written text but are not universal (e.g., characterization, diction, figurative language, flashback, foreshadowing, imagery, irony, satire, suspense, symbolism)
Narrative techniques	Methods authors use to develop the narrative, making it more complete, complicated, or interesting (e.g., back story, cliff hanger, flashback, flash forward, foreshadowing) for the audience
Poetic devices	Devices and methods that affect the sound (e.g., alliteration, assonance, onomatopoeia, repetition, rhyme, rhythm), meaning (e.g., allusion, ambiguity, apostrophe, hyperbole, imagery, irony, metaphor, oxymoron, paradox, personification, simile, symbolism), arrangement (e.g., line, point of view, rhyme scheme, stanza, verse), and form (e.g., ballad, blank verse, free verse, haiku) in poetry

Contributors

The following people contributed to the development of this document:

Jennifer Akers - Cabot	Amy Matthews - Fayetteville
Tammy Alexander - Nashville	Gerri McCann - Manila
Rebecca Allen - Valley View	Amanda McMahan - Magnolia
Jane Balgavy - Jacksonville-North Pulaski	Lynn Meade - University of Arkansas
Brandon Box-Higdem - Bentonville	Alisa Melton - Blytheville
Samantha Carpenter - Virtual Arkansas	Jennifer Murphy - El Dorado
Lisa Carver - Texarkana	Traci Myers - Foreman
Kimberly Chavez - Camden Fairview	Tim Peerbolte - Greenwood
Susan Colyer - Fort Smith	Erin Radke - Jessieville
Joan Crowder - Arkadelphia	Jacki Reiff - Gravette
April Erickson - South Conway County	Tracie Richard - Hermitage
Jessica Foster - Siloam Springs	Chad Simpson - Clarendon
Sommer Frazer - McGehee	Dallas Sims - Lakeside (Lake Village)
Natalie Free - Pangburn	Vivian Sisk – KIPP: Delta Collegiate
Eric Gamble - Dardanelle	Andrea Speer - Bentonville
Jennifer Garner - Lakeside (Hot Springs)	Steven Trulock - Huntsville
Roger Guevara - Southern Arkansas University	Rosie Valdez - Little Rock
Shelly Hardin - West Memphis	

Creative Writing

One Year (1 Credit)

Arkansas
English Language Arts Standards

2016

Course Title: Creative Writing
Course/Unit Credit: 1.0
Course Number: XXXXXX
Teacher Licensure: Please refer to the Course Code Management System (https://adedata.arkansas.gov/ccms/) for the most current licensure codes.
Grades: 9-12

Creative Writing – One Year

Creative Writing is a two-semester English elective course designed to engage students in the writing of poetry, short fiction, personal narratives, and other genres with an emphasis on developing and exercising imagination. Students will read closely for multiple purposes to analyze and evaluate exemplary texts to develop creative writing skills. Students will critique and refine writing through guided discussions, collaborative revisions, and individual reflections. Students will produce an expansive portfolio of creative work in a variety of genres that reflects student growth and understanding of the techniques of published authors. Students will share writing in a variety of ways and submit original works for publication. Creative Writing does not require Arkansas Department of Education approval.

Strand	Content Standard
Reading	
	1. Students will read a variety of texts for the purpose of analyzing styles, techniques, devices, and language in order to develop their own voice and style of writing.
Writing	
	2. Students will use a range of writing techniques to produce original compositions in a variety of genres for multiple purposes and audiences.
Speaking & Listening	
	3. Students will participate in collaborative conversations about writing.

Notes:
1. Student Learning Expectations (SLEs) may be taught in any sequence.
2. Italicized words in this document appear in the glossary.
3. All items in a bulleted list are required to be taught.
4. The examples given (e.g.,) are suggestions to guide the instructor.

How the Anchor Standards are Labeled

R . CCR . 1

The letter in the first position of the anchor standard numbering system represents the strand:

Reading (R)

Writing (W)

Speaking and Listening (SL)

Language (L)

The symbol in the second position of the anchor standard numbering system represents college and career readiness.

The number in the third position of the anchor standard numbering system represents the standard.

How the SLEs are Labeled

D . 10 . DIII . 2

- **D**: Letters in the first position represent the Strand name (e.g., Delivery).
- **10**: Numbers in the second position represent the Standard number (e.g., Standard 10).
- **DIII**: Symbols in the third position represent the Course name and level (e.g., Debate III).
- **2**: Numbers in the fourth position represent the SLE number (e.g., SLE 2).

Strand: Reading

Content Standard 1: Students will read a variety of texts for the purpose of analyzing styles, techniques, devices, and language in order to develop their own voice and style of writing.

		AR ELA Alignment
R.1.CW.1	Analyze from a writer's perspective the function and effect of *literary devices, poetic devices*, *narrative techniques,* and structure in a variety of texts	R.CCR.1, R.CCR.4, R.CCR.5, R.CCR.6
R.1.CW.2	Analyze a variety of poetry, personal narratives, and short fiction, for authorial choices (e.g., word choices, syntax, cadence, character development, dialogue, plot development), author's purpose, and effects on the reader	R.CCR.3, R.CCR.4, R.CCR.5, R.CCR.6
R.1.CW.3	Analyze a variety of *creative non-fiction* for authorial purpose, choices, and effects on the reader	R.CCR.6, R.CCR.10
R.1.CW.4	Analyze excerpts from a variety of fiction genres (e.g., romance, science fiction, mystery, steampunk, historical) that illustrate characteristics particular to the respective genre	R.CCR.5, R.CCR.6, R.CCR.10
R.1.CW.5	Read a variety of excerpts and texts from authors representing multiple cultures and perspectives (e.g., world regions, ethnicities, beliefs and philosophies, socio-economic and sociological viewpoints) to enhance and inspire student writing	R.CCR.6, R.CCR.7, R.CCR.9
R.1.CW.6	Analyze focused excerpts about the craft of creative writing from a variety of sources (e.g., blogs, websites, literary magazines, essays, books)	R.CCR.4, R.CCR.5, R.CCR.6

Strand: Writing

Content Standard 2: Students will use a range of writing techniques to produce original compositions in a variety of genres for multiple purposes and audiences.

		AR ELA Alignment
W.2.CW.1	Write poetry using a range of *poetic devices* that demonstrates understanding of the genre and is appropriate to audience and purpose	W.CCR.4, W.CCR.5, W.CCR.10
W.2.CW.2	Write personal narratives that arise from problems, situations, observations, or experiences, using a range of *literary devices* and *narrative techniques*	W.CCR.3, W.CCR.4, W.CCR.5, W.CCR.10
W.2.CW.3	Write short fiction using *literary elements* and a range of *literary devices* and *narrative techniques*	W.CCR.3, W.CCR.4, W.CCR.5, W.CCR.10
W.2.CW.4	Produce creative writing (e.g., blog, article, essay, graphic novel, comic strip, screen play, script, drama) that demonstrates an understanding of multiple genres appropriate to audience and purpose	W.CCR.3, W.CCR.4, W.CCR.5, W.CCR.6, W.CCR.9, W.CCR.10
W.2.CW.5	Write a variety of fiction genres (e.g., fantasy, science fiction, mystery, steampunk, historical) illustrating characteristics particular to the respective genre	W.CCR.3, W.CCR.4, W.CCR.5, W.CCR.6, W.CCR.10
W.2.CW.6	Apply *literary devices*, *narrative techniques,* and a variety of stylistic devices (e.g., vivid word choice, abstract versus concrete language, descriptive language, sensory details, tone, voice, persona) in student writing	W.CCR.3, W.CCR.4, W.CCR.5, W.CCR.10
W.2.CW.7	Revise student writing during the writing process using self and peer review (e.g., rubrics, writing conferences, writing groups, feedback)	W.CCR.5, W.CCR.6
W.2.CW.8	Edit during the writing process for standard conventions (e.g., mechanics, usage, grammar, agreement, spelling, punctuation) as appropriate for the genre	W.CCR.5, W.CCR.6
W.2.CW.9	Maintain an expansive portfolio of student work that reflects growth in a variety of creative formats	W.CCR.6, W.CCR.10
W.2.CW.10	Research a variety of methods and criteria for publishing original student works, and submit a work for publication (e.g., school newspaper, literary magazine, online journal, school/class anthology, writing contests)	W.CCR.6

Strand: Speaking & Listening

Content Standard 3: Students will participate in collaborative conversations about writing.

		AR ELA Alignment
SL.3.CW.1	Respond with constructive criticism to the works of others	SL.CCR.1, SL.CCR.2, SL.CCR.3
SL.3.CW.2	Facilitate writing activities, student-created mini-lessons, discussions, or feedback sessions	SL.CCR.1
SL.3.CW.3	Participate in discussions within a greater writing community (e.g., writing conferences, author visits, online communication, Skyping with an author, literary festivals)	SL.CCR.1, SL.CCR.4, SL.CCR.6
SL.3.CW.4	Students will present their creative writing products to an appropriate audience (e.g., poetry slams, poetry and prose cafes, authors' night, readers theater, digital sharing)	SL.CCR.4, SL.CCR.5, SL.CCR.6

Creative non-fiction	Writing that uses literary styles and techniques to create factually accurate narratives written to entertain as well as inform. Non-fiction that reads like fiction. (e.g., essay, journal article, memoir, poem, research paper, satire, parody)
Literary elements	Universal components that writers purposefully use to develop a literary piece and can be found in any written or oral story (e.g., antagonist, conflict, narrator, plot, protagonist, setting, theme)
Literary devices	Components of literature that can be found in written text but are not universal (e.g., characterization, diction, figurative language, flashback, foreshadowing, imagery, irony, satire, suspense, symbolism)
Narrative techniques	Methods authors use to develop the narrative, making it more complete, complicated, or interesting (e.g., back story, cliff hanger, flashback, flash forward, foreshadowing) for the audience
Poetic devices	Devices and methods that affect the sound (e.g., alliteration, assonance, onomatopoeia, repetition, rhyme, rhythm), meaning (e.g., allusion, ambiguity, apostrophe, hyperbole, imagery, irony, metaphor, oxymoron, paradox, personification, simile, symbolism), arrangement (e.g., line, point of view, rhyme scheme, stanza, verse), and form (e.g., ballad, blank verse, free verse, haiku) in poetry

Contributors

The following people contributed to the development of this document:

Jennifer Akers - Cabot	Amy Matthews - Fayetteville
Tammy Alexander - Nashville	Gerri McCann - Manila
Rebecca Allen - Valley View	Amanda McMahan - Magnolia
Jane Balgavy - Jacksonville-North Pulaski	Lynn Meade - University of Arkansas
Brandon Box-Higdem - Bentonville	Alisa Melton - Blytheville
Samantha Carpenter - Virtual Arkansas	Jennifer Murphy - El Dorado
Lisa Carver - Texarkana	Traci Myers - Foreman
Kimberly Chavez - Camden Fairview	Tim Peerbolte - Greenwood
Susan Colyer - Fort Smith	Erin Radke - Jessieville
Joan Crowder - Arkadelphia	Jacki Reiff - Gravette
April Erickson - South Conway County	Tracie Richard - Hermitage
Jessica Foster - Siloam Springs	Chad Simpson - Clarendon
Sommer Frazer - McGehee	Dallas Sims - Lakeside (Lake Village)
Natalie Free - Pangburn	Vivian Sisk – KIPP: Delta Collegiate
Eric Gamble - Dardanelle	Andrea Speer - Bentonville
Jennifer Garner - Lakeside (Hot Springs)	Steven Trulock - Huntsville
Roger Guevara - Southern Arkansas University	Rosie Valdez - Little Rock
Shelly Hardin - West Memphis	

Critical Reading I

Arkansas
English Language Arts Standards

2016

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Course Title: Critical Reading I
Course/Unit Credit: 1
Course Number: 419110
Teacher Licensure: Please refer to the Course Code Management System (https://adedata.arkansas.gov/ccms/) for the most current licensure codes.
Grades: 9-12

Critical Reading I

Critical Reading is a two-semester course designed to accelerate reading growth by strengthening comprehension outcomes in high school grades. In a context of meaningful content, on-going assessment, and focused explicit instruction, students will evaluate fiction and nonfiction texts and multicultural literature of diverse formats (e.g., print media, Web-based texts, fiction and nonfiction books and articles) and genres. In addition students will engage in differentiated learning activities tied to a variety of fiction and nonfiction texts with increasing complexity. Students will also demonstrate literacy *competence* through purposeful application of knowledge and skills from this course, based on individual and collective literacy goals. Critical Reading does not require Arkansas Department of Education approval.

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Strand	Content Standard
Engaging the Reader	
	1. Students will become self-directed readers by engaging in literacy experiences relevant to personal interests, goals, everyday life, or world events.
Comprehension Strategies	
	2. Students will use a variety of strategies to comprehend fiction and nonfiction texts.
Response to Text	
	3. Students will respond to a variety of texts through writing and extended discussion.
Vocabulary Development	
	4. Students will increase vocabulary knowledge through multiple word study strategies to gain meaning of new words in a variety of contexts.

Notes:

1. Student Learning Expectations (SLEs) may be taught in any sequence.
2. Italicized words in this document appear in the glossary.
3. All items in a bulleted list are required to be taught.
4. The examples given (e.g.,) are suggestions to guide the instructor.
5. Publishing can include, but is not limited to, school publications (e.g., yearbook, newspaper, literary magazine, online media) and community media.

How the Anchor Standards are Labeled

R . CCR . 1

The letter in the first position of the anchor standard numbering system represents the strand:

- Reading (R)
- Writing (W)
- Speaking and Listening (SL)
- Language (L)

The symbol in the second position of the anchor standard numbering system represents college and career readiness.

The number in the third position of the anchor standard numbering system represents the standard.

How the SLEs are Labeled

D . 10 . DIII . 2

D — Letters in the first position represent the Strand name (e.g., Delivery).

10 — Numbers in the second position represent the Standard number (e.g., Standard 10).

DIII — Symbols in the third position represent the Course name and level (e.g., Debate III).

2 — Numbers in the fourth position represent the SLE number (e.g., SLE 2).

Strand: Engaging the Reader

Content Standard 1: Students will become self-directed readers by engaging in literacy experiences relevant to personal interests, goals, everyday life, or world events.

		AR ELA Alignment
ER.1.CRI.1	Analyze personal literary interests by exploring and tracking reading preferences (e.g., peer and teacher reading conferences, reading logs/learning logs, surveys, self-assessments, personal interest inventories)	W.CCR.2, W.CCR.4, W.CCR.6, W.CCR.7, W.CCR.10, SL.CCR.1, SL.CCR.2, SL.CCR.4, SL.CCR.5, SL.CCR.6, L.CCR.1, L.CCR.2, L.CCR.3, L.CCR.6
ER.1.CRI.2	Set personal learning goals to develop silent and oral reading fluency, *reading stamina*, and active participation in group work	SL.CCR.1, SL.CCR.6, L.CCR.1, L.CCR.2, L.CCR.3, L.CCR.6
ER.1.CRI.3	Prepare for meaningful discussions, individually or collaboratively, through inquiry and analysis	R.CCR.1, R.CCR.2, R.CCR.3, R.CCR.4, R.CCR.5, R.CCR.6, R.CCR.7, R.CCR.8, R.CCR.9, R.CCR.10, W.CCR.4, W.CCR.6, W.CCR.7, W.CCR.8, W.CCR.9, W.CCR.10, SL.CCR.1, SL.CCR.2, SL.CCR.3, L.CCR.1, L.CCR.2, L.CCR.3, L.CCR.5, L.CCR.6

ER.1.CRI.4	Participate in collaborative learning routines (e.g., *reciprocal teaching*, Socratic Seminars, *Questioning the Autho*r, extended discussion, blogging) using culturally diverse texts that offer multiple perspectives of real-world experiences	R.CCR.1, R.CCR.2, R.CCR.3, R.CCR.4, R.CCR.5, R.CCR.6, R.CCR.7, R.CCR.8, R.CCR.9, R.CCR.10, W.CCR.4, W.CCR.6, W.CCR.7, W.CCR.8, W.CCR.9, W.CCR.10, SL.CCR.1, SL.CCR.2, SL.CCR.3, SL.CCR.4, SL.CCR.5, SL.CCR.6, L.CCR.1, L.CCR.2, L.CCR.3, L.CCR.4, L.CCR.5, L.CCR.6
ER.1.CRI.5	Generate relevant questions and thoughtful solutions through collaborative inquiry-based and real-world experiences	W.CCR.6, W.CCR.7, W.CCR.8, W.CCR.9, W.CCR.9, SL.CCR.1, SL.CCR.2, SL.CCR.3, SL.CCR.4, SL.CCR.6, L.CCR.1, L.CCR.2, L.CCR.3, L.CCR.6
ER.1.CRI.6	Engage in real-world literacy applications (e.g., Web page design, simulations of court and corporate environments, comparisons of opinion editorials, creation of public service announcements, construction of *multimedia* presentations)	R.CCR.7, W.CCR.4, W.CCR.6, W.CCR.7, W.CCR.8, W.CCR.9, W.CCR.10, SL.CCR.4, SL.CCR.5, SL.CCR.6

Strand: Comprehension Strategies

Content Standard 2: Students will use a variety of strategies to comprehend fiction and nonfiction texts.

		AR ELA Alignment
CS.2.CRI.1	Integrate effective comprehension strategies when reading to improve understanding of increasingly complex texts: ● analyze ● determine central ideas ● evaluate ● infer ● question ● summarize and/or paraphrase ● *synthesize* ● visualize	R.CCR.1, R.CCR.2, R.CCR.3, R.CCR.4, R.CCR.5, R.CCR.6, R.CCR.7, R.CCR.8, R.CCR.9, R.CCR.10
CS.2.CRI.2	Engage in oral and silent reading fluency strategies (e.g., read-aloud, choral reading, paired reading, timed readings) to improve understanding of increasingly complex text	R.CCR.1, R.CCR.2, R.CCR.3, R.CCR.4, R.CCR.5, R.CCR.6, R.CCR.10
CS.2.CRI.3	Analyze literary elements (e.g., plot, theme, mood, tone, foreshadowing, imagery) to develop deeper comprehension of texts and determine author's purpose	R.CCR.2, R.CCR.3, R.CCR.4, R.CCR.5, R.CCR.6, R.CCR.9
CS.2.CRI.4	Analyze *rhetorical strategies* (e.g., parallel structure, anaphora, language and word choice) to develop deeper comprehension of texts and determine author's purpose	R.CCR.4, R.CCR.5, R.CCR.6, L.CCR.5, L.CCR.6
CS.2.CRI.5	Summarize fiction and nonfiction texts *succinctly*, individually and with peers	R.CCR.2, W.CCR.4, W.CCR.10, SL.CCR.4, SL.CCR.6, L.CCR.1, L.CCR.2, L.CCR.3, L.CCR.6
CS.2.CRI.6	Self-monitor comprehension by using fix-up strategies to repair or maintain understanding of text (e.g., rereading, slowing down for complex texts, hypothesizing and/or predicting, visualizing, writing questions or notes, asking for help, reading further to clarify, chunking text, stopping and thinking, identifying the central idea of a paragraph, page, or passage)	R.CCR.10, W.CCR.10, L.CCR.3, L.CCR.4, L.CCR.6

CS.2.CRI.7	Create meaning by *synthesizing* information and ideas from multiple sources	R.CCR.7, R.CCR.9, W.CCR.8, W.CCR.9, W.CCR.10, SL.CCR.2, L.CCR.1, L.CCR.2, L.CCR.3, L.CCR.6
CS.2.CRI.8	Make relevant connections by activating background knowledge before and during reading	R.CCR.1, R.CCR.9
CS.2.CRI.9	Analyze multiple text structures (e.g., description, compare and contrast, chronological, question/answer, problem/solution, definition) within a single text to clarify meaning	R.CCR.5, R.CCR.10
CS.2.CRI.10	Apply knowledge of text features (e.g., bold headings, sidebars, italicized words, tables, charts, graphs, pictures, hyperlinks, interactive diagrams) to determine key ideas and details	R.CCR.1, R.CCR.2, R.CCR.3, R.CCR.10
CS.2.CRI.11	Use graphic organizers (e.g. discussion webs, two-column notes, concept maps) to organize, analyze, and evaluate important ideas in various formats	W.CCR.4, W.CCR.5, W.CCR.6, W.CCR.8, W.CCR.9, W.CCR.10

Strand: Response to Text

Content Standard 3: Students will respond to a variety of texts through writing and extended discussion.

		AR ELA Alignment
RT.3.CRI.1	Participate in collaborative small and whole group settings, building on ideas of others (e.g., think-pair-share, Socratic seminar, give-one-get-one) ● apply *protocols* for discussion ● listen actively ● structure meaningful responses	SL.CCR.1, SL.CCR.2, SL.CCR.3, SL.CCR.4, SL.CCR.6, L.CCR.1, L.CCR.3, L.CCR.6
RT.3.CRI.2	Develop and support claims with relevant evidence from multiple sources (e.g., interviews, graphs, charts, fiction and nonfiction texts, opinion editorials)	W.CCR.1, W.CCR.4, W.CCR.5, W.CCR.6, W.CCR.7, W.CCR.8, W.CCR.9, W.CCR.10, SL.CCR.2, SL.CCR.4, SL.CCR.5, SL.CCR.6 L.CCR.1, L.CCR.2, L.CCR.3, L.CCR.6
RT.3.CRI.3	Compare and contrast multiple viewpoints from fiction, nonfiction, and multimedia texts	R.CCR.7, R.CCR.9, W.CCR.8, W.CCR.9, W.CCR.10, SL.CCR.2, L.CCR.1, L.CCR.2, L.CCR.3, L.CCR.6
RT.3.CRI.4	Generate, pose, and respond to questions in discussion and written formats	W.CCR.4, W.CCR.6, W.CCR.7, W.CCR.10, SL.CCR.1, SL.CCR.6, L.CCR.1, L.CCR.2, L.CCR.3, L.CCR.6
RT.3.CRI.5	Use a variety of products and performances (e.g., quick write, visuals, dramatizations, tableau, digital storytelling, book trailers) to respond to fiction and nonfiction texts	W.CCR.4, W.CCR.6, W.CCR.10, SL.CCR.5, SL.CCR.6, L.CCR.1, L.CCR.2, L.CCR.3, L.CCR.6
RT.3.CRI.6	Write as a tool for learning (e.g., personal reactions, note-taking, concept mapping, summarizing, reflecting monitoring understanding, electronic journaling, blogging, wiki)	W.CCR.4, W.CCR.6, W.CCR.10, L.CCR.1, L.CCR.2, L.CCR.3

RT.3.CRI.7	Use textual evidence to present and defend individual interpretations of text in written and discussion formats	R.CCR.1, W.CCR.4, W.CCR.8, W.CCR.9, W.CCR.10, SL.CCR.2, SL.CCR.3, SL.CCR.4
RT.3.CRI.8	Evaluate information from a variety of sources, including primary and secondary sources and multimedia, for bias, accuracy, and credibility	R.CCR.7, R.CCR.8, W.CCR.8, W.CCR.9, SL.CCR.2, SL.CCR.3, L.CCR.1, L.CCR.2, L.CCR.3, L.CCR.4, L.CCR.5, L.CCR.6
RT.3.CRI.9	Examine a text for social and cultural implications in a global society	R.CCR.2, R.CCR.6, R.CCR.9, R.CCR.10, L.CCR.4, L.CCR.6
RT.3.CRI.10	Evaluate visual media (e.g., ads, political cartoons, candidate platforms, television and film messages, literary allusions in cartoons) to determine the effect on an intended audience	R.CCR.7, W.CCR.9, SL.CCR.2

Strand: Vocabulary Development

Content Standard 4: Students will increase vocabulary knowledge through multiple word study strategies to gain meaning of new words in a variety of contexts.

		AR ELA Alignment
VD.4.CRI.1	Infer the meaning of a word through context clues	R.CCR.4, L.CCR.4, L.CCR.6
VD.4.CRI.2	Apply knowledge from one text to determine word meaning in multiple texts	R.CCR.9, W.CCR.8, W.CCR.9, L.CCR.4
VD.4.CRI.3	Develop vocabulary (e.g., academic, specialized and/or technical, *high utility*) through reading a variety of texts and extended classroom discussions	R.CCR.4, L.CCR.4
VD.4.CRI.4	Analyze *etymology*, word relationships (e.g., synonyms, antonyms, analogies, *homographs*), and interdisciplinary connections	R.CCR.4, L.CCR.4, L.CCR.5, L.CCR.6
VD.4.CRI.5	Apply a range of word learning strategies (e.g., *personal word walls*, vocabulary notebooks, semantic mapping, concept definition maps, *Frayer Model*) in order to internalize new vocabulary	R.CCR.4, L.CCR.3, L.CCR.4, L.CCR.5, L.CCR.6
VD.4.CRI.6	Utilize a variety of print (e.g., dictionary, glossary, thesaurus) and digital resources (e.g., online dictionary, visual dictionary) to determine and clarify meaning	L.CCR.4, L.CCR.6
VD.4.CRI.7	Develop *word consciousness* to gain a deep appreciation of words and value them	R.CCR.4, L.CCR.3, L.CCR.4, L.CCR.5, L.CCR.6
VD.4.CRI.8	Apply knowledge of *affixes* and roots (e.g., Greek, Latin) to determine meaning of new words	L.CCR.4, L.CCR.6
VD.4.CRI.9	Interpret figures of speech (e.g., metaphors, *euphemisms*, *hyperbole*, personification, *paradox*) to generate meaning	R.CCR.4, L.CCR.5

Glossary for Critical Reading

Affix	Word element, such as a prefix or suffix, that can only occur attached to a base, stem, or root
Competence	The capability to apply and use a set of related knowledge, skills, and abilities successfully
Connotation	The idea or feeling that a word invokes in addition to its literal meaning; the implied meaning
Denotation	The most specific or direct meaning of a word, in contrast to its figurative or associated meanings; dictionary meaning of a word.
Etymology	The history of a word shown by tracing its development from its origin, transmission from one language to another, the analysis of its components, and the identification of its cognates
Euphemism	Pleasant or indirect substitution for more offensive expressions (e.g., “passed away” instead of “died”)
Extended metaphor	A comparison between two unlike things that continues throughout a series of sentences in a paragraph or lines in a poem
Fluency	The ability to read with appropriate speed, expression, and accuracy
Frayer Model	An adaptation of the concept map, includes the concept word, the definition, characteristics of the concept word, examples and non-examples of the concept word.
High Utility	Words that are commonly used in formal, academic, and professional contexts (e.g., Beck’s Tier Two words)
Homograph	Two or more words that have the same spelling but differ in origin, meaning, and sometimes pronunciation
Hyperbole	An intentional, extreme exaggeration used for rhetorical purposes
Multimedia	Using, involving, or encompassing several formats such as photographs, films, art, music, and digital productions
Paradox	A statement that is apparently contradictory or opposed to common sense and yet is true
Protocol	A structure for examining student learning in a democratic and orderly manner that allows students to voice their opinions, ideas, and concerns with one another, typically in pairs or small groups
Questioning the Author	A strategy designed to encourage students to think beyond the words on the page and to question the author’s intent for the selection and his or her success at communicating that intent

Glossary for Critical Reading
(continued)

Reading Stamina	The ability to sustain a prolonged period of independent reading
Reciprocal Teaching	A strategy in which students become the teacher in small-group reading and discussion sessions
Rhetorical Strategy	A strategy used in writing and discussions to effectively enhance the art of discourse
Succinctly	Precisely concise
Synthesize	Combining two or more components, findings from sources that are gathered, to form a new whole, a conclusion drawn from those findings
Tableau	A description of a scene presented on a stage by silent and motionless costumed participants
Word Consciousness	Knowledge and disposition necessary for students to learn, appreciate, and effectively use words

Contributors

The following people contributed to the development of this document:

Jennifer Akers - Cabot	Amy Matthews - Fayetteville
Tammy Alexander - Nashville	Gerri McCann - Manila
Rebecca Allen - Valley View	Amanda McMahan - Magnolia
Jane Balgavy - Jacksonville-North Pulaski	Lynn Meade - University of Arkansas
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April Erickson - South Conway County	Tracie Richard - Hermitage
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Natalie Free - Pangburn	Vivian Sisk – KIPP: Delta Collegiate
Eric Gamble - Dardanelle	Andrea Speer - Bentonville
Jennifer Garner - Lakeside (Hot Springs)	Steven Trulock - Huntsville
Roger Guevara - Southern Arkansas University	Rosie Valdez - Little Rock
Shelly Hardin - West Memphis	

Critical Reading II

Arkansas
English Language Arts Standards

2016

Course Title:	Critical Reading II
Course/Unit Credit:	1
Course Number:	XXXXXX
Teacher Licensure:	Please refer to the Course Code Management System (https://adedata.arkansas.gov/ccms/) for the most current licensure codes.
Grades:	9-12
Prerequisite:	Critical Reading I

Critical Reading II

Critical Reading I is a prerequisite for Critical Reading II. Students entering Critical Reading II must have successfully completed the preceding year of study. Critical Reading II is a two-semester course designed to accelerate reading growth by strengthening comprehension outcomes in high school grades. In a context of meaningful content, ongoing assessment, and focused explicit instruction, students will evaluate fiction and nonfiction texts and multicultural literature of diverse formats (e.g., print media, Web-based texts, fiction and nonfiction books and articles) and genres. In addition students will engage in differentiated learning activities tied to a variety of fiction and nonfiction texts with increasing complexity. Students will also demonstrate literacy *competence* through purposeful application of knowledge and skills from this course, based on individual and collective literacy goals. Critical Reading II does not require Arkansas Department of Education approval.

Strand	Content Standard
Engaging the Reader	
	1. Students shall become self-directed readers by engaging in literacy experiences relevant to personal interests, goals, everyday life, or world events.
Comprehension Strategies	
	2. Students shall use a variety of strategies to comprehend fiction and nonfiction texts.
Response to Text	
	3. Students shall respond to a variety of texts through writing and extended discussion.
Vocabulary	
	4. Students shall increase vocabulary knowledge through multiple word study strategies to gain meaning of new words in a variety of contexts.
Critical Literacy	
	5. Students shall engage in thinking critically about contemporary and historical texts and the corresponding social and cultural implications in a global society.

Notes:

1. Critical thinking is the intellectually disciplined process of actively and skillfully conceptualizing, applying, analyzing, synthesizing, and/or evaluating information gathered from, or generated by, observation, experience, reflection, reasoning, or communication, as a guide to belief and action.
2. Each level continues to address earlier Student Learning Expectations (SLEs) as needed.
3. Student Learning Expectations (SLEs) may be taught in any sequence.
4. Italicized words in this document appear in the glossary.
5. All items in a bulleted list are required to be taught.
6. The examples given (e.g.,) are suggestions to guide the instructor.

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How the Anchor Standards are Labeled

R . CCR . 1

The letter in the first position of the anchor standard numbering system represents the strand:

Reading (R)

Writing (W)

Speaking and Listening (SL)

Language (L)

The symbol in the second position of the anchor standard numbering system represents college and career readiness.

The number in the third position of the anchor standard numbering system represents the standard.

How the SLEs are Labeled

D	.	10	.	DIII	.	2

Letters in the first position represent the Strand name (e.g., Delivery).

Numbers in the second position represent the Standard number (e.g., Standard 10).

Symbols in the third position represent the Course name and level (e.g., Debate III).

Numbers in the fourth position represent the SLE number (e.g., SLE 2).

Strand: Engaging the Reader

Content Standard 1: Students shall become self-directed readers by engaging in literacy experiences relevant to personal interests, goals, everyday life, or world events.

		AR ELA Alignment
ER.1.CRII.1	Expand personal learning goals to develop silent and oral reading fluency, *reading stamina*, and active participation in group work	W.CCR.2, W.CCR.4, W.CCR.6, W.CCR.7, W.CCR.10, SL.CCR.1, SL.CCR.2, SL.CCR.4, SL.CCR.5, SL.CCR.6, L.CCR.1, L.CCR.2, L.CCR.3, L.CCR.6
ER.1.CRII.2	Prepare, participate in, and facilitate collaborative learning routines (e.g., *reciprocal teaching*, Socratic Seminar, *Questioning the Autho*r, extended discussion, blogging) using culturally diverse texts that offer multiple perspectives of real-world experiences	R.CCR.1, R.CCR.2, R.CCR.3, R.CCR.4, R.CCR.5, R.CCR.6, R.CCR.7, R.CCR.8, R.CCR.9, R.CCR.10, W.CCR.4, W.CCR.6, W.CCR.7, W.CCR.8, W.CCR.9, W.CCR.10, SL.CCR.1, SL.CCR.2, SL.CCR.3, SL.CCR.4, SL.CCR.5, SL.CCR.6, L.CCR.1, L.CCR.2, L.CCR.3, L.CCR.4, L.CCR.5, L.CCR.6
ER.1.CRII.3	Generate questions that stimulate thoughtful discourse and promote deeper inquiry	W.CCR.6, W.CCR.7, W.CCR.8, W.CCR.9, SL.CCR.1, SL.CCR.2, SL.CCR.3, SL.CCR.4, SL.CCR.6, L.CCR.1, L.CCR.2, L.CCR.3, L.CCR.6

ER.1.CRII.4	Engage in real-world literacy applications (e.g., Web page design, simulations of court and corporate environments, comparisons of opinion editorials, creation of public service announcements, construction of *multimedia* presentations)	R.CCR.7, W.CCR.4, W.CCR.6, W.CCR.7, W.CCR.8, W.CCR.9, W.CCR.10, SL.CCR.4, SL.CCR.5, SL.CCR.6

Strand: Comprehension Strategies

Content Standard 2: Students shall use a variety of strategies to comprehend fiction and nonfiction texts.

		AR ELA Alignment
CS.2.CRII.1	Integrate effective comprehension strategies during oral and silent reading to improve understanding of increasingly complex texts: • analyze • determine central ideas • evaluate • infer • question • summarize and/or paraphrase • *synthesize* • visualize	R.CCR.1, R.CCR.2, R.CCR.3, R.CCR.4, R.CCR.5, R.CCR.6, R.CCR.7, R.CCR.8, R.CCR.9, R.CCR.10
CS.2.CRII.2	Analyze literary elements (e.g., plot, theme, mood, tone, foreshadowing, imagery) and *rhetorical strategies* (e.g., parallel structure, anaphora, language and word choice) to develop deeper comprehension of increasingly complex texts and determine author's purpose	R.CCR.4, R.CCR.5, R.CCR.6, L.CCR.5, L.CCR.6
CS.2.CRII.3	Self-monitor comprehension to repair or maintain understanding of text (e.g., rereading; slowing down for complex texts; hypothesizing and/or predicting; visualizing a picture; writing questions or notes; asking for help; reading further to clarify; chunking text; stopping and thinking; identifying the central idea of a paragraph, page, or passage)	R.CCR.10, W.CCR.10, L.CCR.3, L.CCR.4, L.CCR.6
CS.2.CRII.4	Synthesize information and ideas from multiple sources	R.CCR.7, R.CCR.9, W.CCR.8, W.CCR.9, W.CCR.10, SL.CCR.2, L.CCR.1, L.CCR.2, L.CCR.3, L.CCR.6
CS.2.CRII.5	Analyze Multiple text structures within a variety of genres (e.g., poetry, drama, informational text, fictional story)	R.CCR.5, R.CCR.10
CS.2.CRII.6	Apply knowledge of text features (e.g., bold headings, sidebars, italicized words, tables, charts, graphs, pictures, hyperlinks, interactive diagrams) to determine key ideas and details	R.CCR.1, R.CCR.2, R.CCR.3, R.CCR.10

CS.2.CRII.7	Create graphic organizers to synthesize, analyze, and evaluate important ideas in various formats	W.CCR.4, W.CCR.5, W.CCR.6, W.CCR.8, W.CCR.9, W.CCR.10

Strand: Response to Text

Content Standard 3: Students shall respond to a variety of texts through writing and extended discussion.

		AR ELA Alignment
RT.3.CRII.1	Facilitate and participate in collaborative small (e.g., think-pair-share, Socratic Seminar, give-one-get-one) and whole group settings, building on ideas of others: ● apply *protocols* for discussion ● listen actively ● structure meaningful responses	SL.CCR.1, SL.CCR.2, SL.CCR.3, SL.CCR.4, SL.CCR.6, L.CCR.1, L.CCR.3, L.CCR.6
RT.3.CRII.2	Develop and support claims and counterclaims with convincing evidence from multiple sources (e.g., interviews, graphs, charts, fiction and nonfiction texts, opinion editorials)	W.CCR.1, W.CCR.4, W.CCR.5, W.CCR.6, W.CCR.7, W.CCR.8, W.CCR.9, W.CCR.10, SL.CCR.2, SL.CCR.4, SL.CCR.5, SL.CCR.6, L.CCR.1, L.CCR.2, L.CCR.3, L.CCR.6
RT.3.CRII.3	Analyze or interpret author's craft (e.g., literary devices, viewpoints, literary devices) to critique a text	R.CCR.7, R.CCR.9, W.CCR.8, W.CCR.9, W.CCR.10, SL.CCR.2, L.CCR.1, L.CCR.2, L.CCR.3, L.CCR.6
RT.3.CRII.4	Evaluate the author's word choice, syntax, and sentence structure for its impact on a text	R.CCR.4, R.CCR.5, R.CCR.6, W.CCR.9 SL.CCR.3, L.CCR.4
RT.3.CRII.5	Generate, pose, and respond to stimulating questions in discussion and written formats	W.CCR.4, W.CCR.6, W.CCR.7, W.CCR.10, SL.CCR.1, SL.CCR.6, L.CCR.1, L.CCR.2, L.CCR.3, L.CCR.6

RT.3.CRII.6	Use a variety of products and performances (e.g., quick write, visuals, dramatizations, *tableau*, digital storytelling, book trailers) to respond to fiction and nonfiction texts	W.CCR.4, W.CCR.6, W.CCR.10, SL.CCR.5, SL.CCR.6, L.CCR.1, L.CCR.2, L.CCR.3, L.CCR.6
RT.3.CRII.7	Write to analyze, evaluate, and critique text	W.CCR.4, W.CCR.6, W.CCR.7, W.CCR.8, W.CCR.9, W.CCR.10
RT.3.CRII.8	Evaluate information from a variety of sources for bias, accuracy, credibility, and missing perspectives, including primary and secondary sources and *multimedia*	R.CCR.7, R.CCR.8, W.CCR.8, W.CCR.9, SL.CCR.2, SL.CCR.3, L.CCR.1, L.CCR.2, L.CCR.3, L.CCR.4, L.CCR.5, L.CCR.6
RT.3.CRII.9	Scrutinize a text for social and cultural implications in a global society	R.CCR.2, R.CCR.6, R.CCR.9, R.CCR.10, L.CCR.4, L.CCR.6
RT.3.CRII.10	Evaluate visual media (e.g., ads, political cartoons, candidate platforms, television and film messages, literary allusions in cartoons) to determine effect on intended audience	R.CCR.7, W.CCR.9, SL.CCR.2

Strand: Vocabulary Development

Content Standard 4: Students shall increase vocabulary knowledge through multiple word study strategies to gain meaning of new words in a variety of contexts.

		AR ELA Alignment
VD.4.CRII.1	Infer the meaning of a word through contextual evidence	R.CCR.4, L.CCR.4, L.CCR.6
VD.4.CRII.2	Apply knowledge from one text to determine word meaning in multiple texts	R.CCR.9, W.CCR.8, W.CCR.9, L.CCR.4
VD.4.CRII.3	Develop vocabulary (e.g., academic, specialized and/or technical, *high utility*) through reading a variety of texts, extended classroom discussions, and inquiry	R.CCR.9, W.CCR.8, W.CCR.9, L.CCR.4
VD.4.CRII.4	Analyze *etymology*, word relationships (e.g., synonyms, antonyms, analogies, *homographs*), and interdisciplinary connections	R.CCR.4, L.CCR.4, L.CCR.5, L.CCR.6
VD.4.CRII.5	Apply a range of word learning strategies (e.g., classroom word walls, *personal word walls*, vocabulary notebooks, semantic mapping, concept definition maps, *Frayer Model*) in order to internalize new vocabulary	R.CCR.4, L.CCR.3, L.CCR.4, L.CCR.5, L.CCR.6
VD.4.CRII.6	Utilize a variety of print (e.g., dictionary, glossary, thesaurus) and digital resources (e.g., online dictionary, visual dictionary) to determine and clarify meaning	L.CCR.4, L.CCR.6
VD.4.CRII.7	Develop *word consciousness* to gain an awareness of words and the significance they have in both text and real world application	R.CCR.4, L.CCR.3, L.CCR.4, L.CCR.5, L.CCR.6
VD.4.CRII.8	Apply knowledge of *affixes* and roots (e.g., Greek, Latin) to determine meaning of new words	L.CCR.4, L.CCR.6
VD.4.CRII.9	Interpret figures of speech (e.g., metaphors, *euphemisms*, *hyperbole*, personification, *paradox*) to construct meaning within a text	R.CCR.4, L.CCR.5

Strand: Critical Literacy

Content Standard 5: Students shall engage in thinking critically about contemporary and historical texts and the corresponding social and cultural implications in a global society.

		AR ELA Alignment
CL.5.CRII.1	Evaluate *multimedia* information for accuracy, quality, and credibility of sources (e.g., analyzing rigor, identifying bias, determining sponsorship, evaluating timeliness)	R.CCR.7, R.CCR.8, W.CCR.8, SL.CCR.2, L.CCR.1, L.CCR.2, L.CCR.3
CL.5.CRII.2	Evaluate primary and secondary sources for bias, propaganda, and authenticity	R.CCR.4, R.CCR.5, R.CCR.6, R.CCR.8, R.CCR.9, R.CCR.10, W.CCR.7, W.CCR.8, W.CCR.9, SL.CCR.2, L.CCR.1, L.CCR.2, L.CCR.3
CL.5.CRII.3	Analyze the effects of *stereotypical language* in historical and contemporary documents on reader perception of and response to global events and culture	R.CCR.1, R.CCR.2, R.CCR.3, R.CCR.4, R.CCR.6, R.CCR.9, R.CCR.10, W.CCR.8, W.CCR.9, SL.CCR.2, SL.CCR.3, L.CCR.1, L.CCR.2, L.CCR.3, L.CCR.4, L.CCR.5, L.CCR.6
CL.5.CRII.4	Compare and contrast multiple media on the same topic (e.g., Web sites, letters to the editor, position papers, documentaries)	R.CCR.7, R.CCR.9, W.CCR.8, SL.CCR.2, L.CCR.1, L.CCR.2, L.CCR.3

CL.5.CRII.5	Identify missing perspectives and information in texts to determine author bias	R.CCR.1, R.CCR.2, R.CCR.3, R.CCR.4, R.CCR.5, R.CCR.6, R.CCR.7, R.CCR.8, R.CCR.9, R.CCR.10, W.CCR.7, W.CCR.8, W.CCR.9, SL.CCR.3, L.CCR.1, L.CCR.2, L.CCR.3, L.CCR.5
CL.5.CRII.6	Critique historical and contemporary visual media to determine effect on intended audience (e.g., ads, political cartoons, candidate platforms, television and film messages, literary allusions in cartoons)	R.CCR.7, W.CCR.9, SL.CCR.2

Glossary for Critical Reading

Affix	Word element, such as a prefix or suffix, that can only occur attached to a base, stem, or root
Competence	The capability to apply and use a set of related knowledge, skills, and abilities successfully
Etymology	The history of a word shown by tracing its development from its origin, transmission from one language to another, the analysis of its components, and the identification of its cognates
Euphemism	Pleasant or indirect substitutions for more offensive expressions (e.g., “passed away” instead of “died”)
Frayer Model	An adaptation of the concept map, includes the concept word, the definition, characteristics of the concept word, examples and non-examples of the concept word
High utility	Words that are commonly used in formal, academic, and professional contexts (e.g., Beck’s Tier Two words)
Homograph	One or two words that have the same spelling but differ in origin, meaning, and sometimes pronunciation
Hyperbole	An intentional extreme exaggeration used for rhetorical purposes
Multimedia	Using, involving, or encompassing several media such as photographs, films, art, music, and digital productions
Paradox	A statement that is apparently contradictory or opposed to common sense and yet is true
Protocol	A structures for examining student learning in a democratic and orderly manner that allows students to voice their opinions, ideas, and concerns with one another, typically in pairs or small groups
Questioning the Author	A strategy designed to encourage students to think beyond the words on the page and to question the author’s intent for the selection and his or her success at communicating that intent
Reading stamina	The ability to sustain a long period of independent reading
Reciprocal Teaching	A strategy in which students become the teacher in small-group reading and discussion sessions
Rhetorical strategy	A strategy used in writing and discussions to effectively enhance the art of discourse
Stereotypical language	Any language that assumes a stereotype about a group of people
Synthesize	Combining two or more components, findings from sources that are gathered, to form a new whole, a conclusion drawn from those findings
Tableau	A description of a scene presented on a stage by silent and motionless costumed participants
Word consciousness	Knowledge and disposition necessary for students to learn, appreciate, and effectively use words

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Contributors

The following people contributed to the development of this document:

Jennifer Akers - Cabot	Amy Matthews - Fayetteville
Tammy Alexander - Nashville	Gerri McCann - Manila
Rebecca Allen - Valley View	Amanda McMahan - Magnolia
Jane Balgavy - Jacksonville-North Pulaski	Lynn Meade - University of Arkansas
Brandon Box-Higdem - Bentonville	Alisa Melton - Blytheville
Samantha Carpenter - Virtual Arkansas	Jennifer Murphy - El Dorado
Lisa Carver - Texarkana	Traci Myers - Foreman
Kimberly Chavez - Camden Fairview	Tim Peerbolte - Greenwood
Susan Colyer - Fort Smith	Erin Radke - Jessieville
Joan Crowder - Arkadelphia	Jacki Reiff - Gravette
April Erickson - South Conway County	Tracie Richard - Hermitage
Jessica Foster - Siloam Springs	Chad Simpson - Clarendon
Sommer Frazer - McGehee	Dallas Sims - Lakeside (Lake Village)
Natalie Free - Pangburn	Vivian Sisk – KIPP: Delta Collegiate
Eric Gamble - Dardanelle	Andrea Speer - Bentonville
Jennifer Garner - Lakeside (Hot Springs)	Steven Trulock - Huntsville
Roger Guevara - Southern Arkansas University	Rosie Valdez - Little Rock
Shelly Hardin - West Memphis	

Debate I

Arkansas
English Language Arts Standards

2016

Course Title: Debate I
Course/Unit Credit: 1
Course Number: 414050
Teacher Licensure: Please refer to the Course Code Management System (https://adedata.arkansas.gov/ccms/) for the most current licensure codes.
Grades: 9-12

Debate I

Debate I is a prerequisite for Debate II. Students entering Debate II, III, or IV must have successfully completed the preceding year of study. Debate I is a two-semester foundational course and cannot be combined with other courses. Debate II-IV may be taught within the same class period; however, the student learning expectations for each level are different and must be addressed.

Students in Debate I will gain an understanding of the fundamentals of argumentation and will express ideas and present information in a variety of oral advocacy situations from small group discussions to formal debates. Special emphasis will be given to research proficiencies and analytical thinking and listening skills. The skills listed in Strand 1: Communication Skills will be embedded throughout the course, providing students with an understanding of the dynamics of effective oral communication when speaking, listening, and responding. Debate I fulfills the .5 unit of Oral Communication required for graduation, and does not require Arkansas Department of Education approval.

Debate II, III, and IV lead students to a mastery of advanced argumentation skills. Students will construct and present argumentative positions using scholarly research on complex, controversial issues. Content includes oral advocacy in relation to the legal system and the democratic process. Peer adjudication will be an important part of the advanced Debate courses.

Debate I

Strand	Content Standard
Communication Skills (Taught in Level 1 and reinforced in Levels II, III, & IV)	
	1. Students will demonstrate fundamental oral communication competencies.
	2. Students will demonstrate understanding of the variety of debate styles.
	3. Students will identify and apply the necessary tools for debate.
	4. Students will develop persuasive speaking skills.
Argumentation	
	5. Students will identify and present the three parts of an argument (claim, warrant, impact).
	6. Students will utilize research skills and collect well-sourced evidence.
	7. Students will apply appropriate speech organization.
Refutation	
	8. Students will analyze and rebut opposing arguments.
	9. Students will utilize effective questioning strategies.
Delivery	
	10. Students will participate in debates within or outside of the classroom.
	11. Students will evaluate debates and provide feedback.
Advocacy	
	12. Students will synthesize socioeconomic, ethical, and/or philosophical reasoning that influences current issues.
	13. Students will develop individual and group perspectives on the importance of debate to both local and global communities.
	14. Students will participate in community outreach, culminating in competitive debate in or outside of the classroom.

Notes:

1. Throughout this document, the terms competition and competitive event occur frequently. These terms refer to events that may occur within or outside of the school. The purpose of these courses is to provide students with debate fundamentals and tools of mastery and provide guidance for how to practice these in a competitive atmosphere.
2. The Communication Skills strand appears only in Debate I. This provision allows Debate I to meet the state Oral Communication requirement.
3. Student Learning Expectations (SLEs) may be taught in any sequence.
4. Italicized words in this document appear in the glossary.
5. All items in a bulleted list are required to be taught.
6. The examples given (e.g.,) are suggestions to guide the instructor.

How the Anchor Standards are Labeled

R . CCR . 1

R — **The letter in the first position of the anchor standard numbering system represents the strand:**

Reading (R)

Writing (W)

Speaking and Listening (SL)

Language (L)

CCR — **The symbol in the second position of the anchor standard numbering system represents college and career readiness.**

1 — **The number in the third position of the anchor standard numbering system represents the standard.**

How the SLEs are Labeled

D . 10 . DIII . 2

D	10	DIII	2
Letters in the first position represent the Strand name (e.g., Delivery).	Numbers in the second position represent the Standard number (e.g., Standard 10).	Symbols in the third position represent the Course name and level (e.g., Debate III).	Numbers in the fourth position represent the SLE number (e.g., SLE 2).

Strand: Communication Skills

Content Standard 1: Students will demonstrate fundamental oral communication competencies.

		AR ELA Alignment
CS.1.DI.1	Demonstrate effective verbal communication: ● clarity ● diction and *word economy* ● elimination of verbal fillers ● inflection ● speed of delivery	SL.CCR.4, SL.CCR.6
CS.1.DI.2	Implement effective nonverbal communication: ● control of facial expressions ● eye contact ● gesturing and posture ● pauses ● proximity	
CS.1.DI.3	Utilize effective listening practices (e.g., note-taking, active listening feedback)	W.CCR.10, SL.CCR.1, SL.CCR.3
CS.1.DI.4	Discuss ethical practices: ● academic honesty ● appropriate *cutting* of evidence ● courtesy ● proper citation ● respect for diversity	SL.CCR.1, SL.CCR.4, SL.CCR.6

Strand: Communication Skills

Content Standard 2: Students will demonstrate understanding of the variety of debate styles.

		AR ELA Alignment
CS.2.DI.1	Identify the different types of debate (e.g., policy, Lincoln-Douglas, public forum, International Public Debate Association [IPDA], student congress/parliamentary, mock trial, world school, big question, extemporaneous)	
CS.2.DI.2	Compare and contrast the various styles of debate	R.CCR.9
CS.2.DI.3	Practice skills associated with various styles of debate	SL.CCR.6

Strand: Communication Skills

Content Standard 3: Students will identify and apply the necessary tools for debate.

		AR ELA Alignment
CS.3.DI.1	Speak within time parameters for various styles of debate	SL.CCR.6
CS.3.DI.2	Complete specialized debate *flows*	W.CCR.4, W.CCR.10
CS.3.DI.3	Access evidence databases and online resources (e.g., www.debatecoaches.org, www.speechanddebate.org, www.actaa.net)	W.CCR.8
CS.3.DI.4	Utilize electronic file organization (e.g., Dropbox, Google Drive, Verbatim)	R.CCR.7, W.CCR.6

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Strand: Communication Skills

Content Standard 4: Students will develop persuasive speaking skills.

		AR ELA Alignment
CS.4.DI.1	Identify tools of persuasion: ● ethos ● pathos ● logos	R.CCR.8
CS.4.DI.2	Establish *impact* framing: ● *impact* comparison ● time frame, magnitude, probability ● risk assessment ● speech *overviews*	SL.CCR.4, SL.CCR.6
CS.4.DI.3	Adapt to opponents, audience, and judge: ● content warnings ● microaggressions ● paradigms (e.g., tabula rasa, policy maker, hypotesting, comparative advantage) ● sensitivity ● *spreading*	SL.CCR.6

Strand: Argumentation

Content Standard 5: Students will identify and present the three parts of an argument (claim, warrant, impact)

		AR ELA Alignment
ARG.5.DI.1	Assert a *claim* (e.g., War is bad.)	SL.CCR.1, SL.CCR.2, SL.CCR.4, SL.CCR.6, L.CCR.1, L.CCR.3, LCCR.6
ARG.5.DI.2	Produce a *warrant* to support the *claim* (e.g., War is bad because it destroys economies and devalues life.)	W.CCR.7, W.CCR.8, W.CCR.9, W.CCR.10, SL.CCR.6, L.CCR.1, L.CCR.3, L.CCR.4, L.CCR.5, L.CCR.6
ARG.5.DI.3	Demonstrate an *impact* (e.g., War causes nuclear escalation, environmental degradation, structural violence, and dehumanization.)	SL.CCR.1, SL.CCR.2, SL.CCR.3, SL.CCR.4, SL.CCR.5, SL.CCR.6, L.CCR.1, L.CCR.3, L.CCR.6

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Strand: Argumentation

Content Standard 6: Students will utilize research skills and collect well-sourced evidence.

		AR ELA Alignment
ARG.6.DI.1	Identify and utilize credible sources (e.g., LexisNexis, EBSCO Host, ERIC, Project Muse, professional journals, .edu, .gov)	R.CCR.7, R.CCR.9, R.CCR.10, W.CCR.7, W.CCR.8, W.CCR.9, W.CCR.10
ARG.6.DI.2	Evaluate text for validity: ● author qualifications ● recency ● relevancy	W.CCR.8
ARG.6.DI.3	Identify bias, methodology conclusions	R.CCR.6, SL.CCR.3, L.CCR.3
ARG.6.DI.4	Apply appropriate citation to support argumentation: ● *power tag* ● *tagline* (e.g., author, date, qualification, publication, location)	W.CCR.8, SL.CCR.4

Strand: Argumentation

Content Standard 7: Students will apply appropriate speech organization.

		AR ELA Alignment
ARG.7.DI.1	Utilize effective note-taking (*flowing*)	W.CCR.2, W.CCR.4, W.CCR.10, SL.CCR.3, L.CCR.1, L.CCR.2, L.CCR.6
ARG.7.DI.2	Identify the parts of a *roadmap*	SL.CCR.4, SL.CCR.6, L.CCR.1, L.CCR.3, L.CCR.6
ARG.7.DI.3	Define priority of arguments: • case • procedurals (e.g., evidence challenges, topicality, framework, value criterion, weighing mechanism) • counter-advocacies (e.g., kritiks, counterplans) • comparative advantage (e.g., *impact* turns, disadvantages, *impact* calculus)	R.CCR.7, R.CCR.8, W.CCR.1, W.CCR.4, W.CCR.5, W.CCR.6, W.CCR.7, W.CCR.8, W.CCR.9, W.CCR.10, SL.CCR.2, SL.CCR.4, SL.CCR.5, SL.CCR.6, L.CCR.1, L.CCR.2, L.CCR.3, L.CCR.6
ARG.7.DI.4	Identify the utility of *line-by-line*	SL.CCR.3

Strand: Refutation

Content Standard 8: Students will analyze and rebut opposing arguments.

		AR ELA Alignment
R.8.DI.1	Detect inconsistencies in arguments and formulate rebuttals: ● *clash* ● counter-advocacies ● defensive arguments ● offensive arguments	SL.CCR.3
R.8.DI.2	Apply critical thinking skills when researching, preparing, and presenting arguments: ● false assumptions ● loaded terms ● logical fallacies	R.CCR.5, R.CCR.6, R.CCR.7, R.CCR.8, R.CCR.9, W.CCR.4, W.CCR.5, W.CCR.6, W.CCR.7, W.CCR.8, W.CCR.9, W.CCR.10, SL.CCR.1, SL.CCR.2, SL.CCR.3, SL.CCR.4, SL.CCR.5, SL.CCR.6, L.CCR.1, L.CCR.2, L.CCR.3, L.CCR.5, L.CCR.6

Strand: Refutation

Content Standard 9: Students will utilize effective questioning strategies.

		AR ELA Alignment
R.9.DI.1	Identify skills associated with cross-examination	SL.CCR.6
R.9.DI.2	Conduct cross-examination/crossfire: • speaker duties and time limits based on debate style	SL.CCR.4, SL.CCR.5, SL.CCR.6, L.CCR.1, L.CCR.3, L.CCR.6

Strand: Delivery

Content Standard 10: Students will participate in debates within or outside of the classroom.

		AR ELA Alignment
D.10.DI.1	Demonstrate ability to present before a variety of audiences (e.g., civic events, scrimmages, exhibitions, modeling for underclassmen, participation in tournaments)	SL.CCR.6
D.10.DI.2	Broaden complex arguments: ● accessibility ● concise rhetoric ● relatability	W.CCR.5, SL.CCR.1, SL.CCR.2, SL.CCR.3, SL.CCR.4, SL.CCR.5, SL.CCR.6, L.CCR.1, L.CCR.3, L.CCR.6

Strand: Delivery

Content Standard 11: Students will evaluate debates and provide feedback.

		AR ELA Alignment
D.11.DI.1	Identify and adhere to evaluation criteria: ● comments ● Reason for Decision (RfD) ● sides (e.g., aff/neg, pro/con, proposition/opposition) ● speaker points ● speaker positions ● speaker ranks	SL.CCR.6
D.11.DI.2	Generate evaluation criteria and offer feedback: ● ballots ● oral critiques ● peer reviews	SL.CCR.3, SL.CCR.4, SL.CCR.6

Strand: Advocacy

Content Standard 12: Students will synthesize socioeconomic, ethical, and/or philosophical reasoning that influences current issues.

		AR ELA Alignment
ADV.12.DI.1	Identify the historical and contemporary role that debate and oral advocacy play in democratic society (e.g., diplomacy, government policy, justice system, politics, gender, race, religion, socioeconomics)	R.CCR.9, R.CCR.10, W.CCR.7, W.CCR.9, SL.CCR.1, SL.CCR.3
ADV.12.DI.2	Compare and contrast classical and contemporary philosophers and their contributions to debate (e.g., value criterion, kritik)	R.CCR.1, R.CCR.2, R.CCR.3, R.CCR.4, R.CCR.5, R.CCR.6, R.CCR.7, R.CCR.8, R.CCR.9, R.CCR.10, W.CCR.2, W.CCR.4, W.CCR.7, W.CCR.9, W.CCR.10, SL.CCR.1, SL.CCR.2, SL.CCR.3, SL.CCR.4, SL.CCR.5, SL.CCR.6, L.CCR.1, L.CCR.2, L.CCR.3, L.CCR.6
ADV.12.DI.3	Identify ideological motivations within the status quo	R.CCR.6, R.CCR.9, R.CCR.10, W.CCR.7, W.CCR.9, SL.CCR.1, SL.CCR.2, SL.CCR.3, L.CCR.3, L.CCR.6

Strand: Advocacy

Content Standard 13: Students will develop individual and group perspectives on the importance of debate to both local and global communities.

		AR ELA Alignment
ADV.13.DI.1	Create networks (e.g., alumni, local attorneys, local theaters, human advocacy groups, school and district personnel, print and digital media)	SL.CCR.6, L.CCR.1
ADV.13.DI.2	Identify roles and responsibilities as an advocate (e.g., voting, liberties, rights, restrictions)	SL.CCR.6

Strand: Advocacy

Content Standard 14: Students will participate in community outreach, culminating in competitive debate in or outside of the classroom.

		AR ELA Alignment
ADV.14.DI.1	Identify the components of hosting a competitive event: • Arkansas Activities Association guidelines • budgetary needs • community resources • events offered • judges and timekeepers • venue • volunteer coordination	SL.CCR.1, SL.CCR.4, SL.CCR.5, SL.CCR.6
ADV.14.DI.2	Participate in a competition (e.g., local, state, and national tournaments; formal scrimmages; intraschool mock tournament; Student Congress; Mock Trial)	SL.CCR.1, SL.CCR.2, SL.CCR.3, SL.CCR.4, SL.CCR.5, SL.CCR.6
ADV.14.DI.3	Identify the elements of proper reflection and assessment	SL.CCR.1, SL.CCR.3, SL.CCR.6

Glossary for Debate I

Blocks	A set of prepared arguments to include analysis/reasoning and evidence on a specific point, prepared in advance of a debate or during a debate
Claim	A statement that a debater supports or refutes with evidence and reasoning (e.g., “Schools should run year round” is a claim; “Wednesday comes after Tuesday” is not.)
Clash	Fundamental to debate; opposing arguments, Affirmative and Negative stances, on the key issues
Clipping	Failure of a debater to read all marked portions of the card while claiming to have done so
Cutting	Exact passages taken directly from articles, reports, books, speeches, and transcripts used as evidence in debate
Flow	Detailed, shorthand notes taken during a debate round to keep track of all of the arguments made by both debaters/teams
Impact	Why the judge/someone in the round should care about an argument, and how winning the argument affects the rest of the debate
Kicking	Strategically choosing to eliminate an argument(s) that has become irrelevant, dangerous, or incoherent
Line-by-line	Debate strategy in which a speaker directly answers each and every one of the opponents’ arguments one right after another in the order that they were given
Overviews	Distinct from line-by-line; appears at the beginning of a speech to highlight key offensive points for a debater or team, occurs within the time limits of a speech
Power tagging	The unethical practice of labeling a tagline in a way that grossly misrepresents the evidence used as support
Roadmap	Explanation of the order in which the debater’s next speech will address the issues surrounding the debate, directed to the judge, not added to the timed remarks
Spreading	The practice of increasing a debater’s speaking speed (150-300 words per minute) to allow for more argumentation within given time limits; also known as speed reading, not encouraged for every type of debate

Contributors

The following people contributed to the development of this document:

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Samantha Carpenter - Virtual Arkansas	Jennifer Murphy - El Dorado
Lisa Carver - Texarkana	Traci Myers - Foreman
Kimberly Chavez - Camden Fairview	Tim Peerbolte - Greenwood
Susan Colyer - Fort Smith	Erin Radke - Jessieville
Joan Crowder - Arkadelphia	Jacki Reiff - Gravette
April Erickson - South Conway County	Tracie Richard - Hermitage
Jessica Foster - Siloam Springs	Chad Simpson - Clarendon
Sommer Frazer - McGehee	Dallas Sims - Lakeside (Lake Village)
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Eric Gamble - Dardanelle	Andrea Speer - Bentonville
Jennifer Garner - Lakeside (Hot Springs)	Steven Trulock - Huntsville
Roger Guevara - Southern Arkansas University	Rosie Valdez - Little Rock
Shelly Hardin - West Memphis	

Debate II

Arkansas
English Language Arts Standards

2016

Course Title: Debate II
Course/Unit Credit: 1
Course Number: 414060
Teacher Licensure: Please refer to the Course Code Management System (https://adedata.arkansas.gov/ccms/) for the most current licensure codes.
Grades: 9-12
Prerequisite: Debate I

Debate II

Debate I is a prerequisite for Debate II. Students entering Debate II, III, or IV must have successfully completed the preceding year of study. Debate I is a two-semester foundational course and cannot be combined with other courses. Debate II-IV may be taught within the same class period; however, the student learning expectations for each level are different and must be addressed.

Debate II, III, and IV lead students to a mastery of advanced argumentation skills. Students will construct and present argumentative positions using scholarly research on complex, controversial issues. Content will include oral advocacy in relation to the legal system and the democratic process. Peer adjudication will be an important part of the advanced Debate courses. The two-semester courses of Debate II, III, and IV do not require Arkansas Department of Education approval.

Strand	Content Standard
Communication Skills (Taught in Level 1 and reinforced in Levels II, III, & IV)	
	1. Students will demonstrate fundamental oral communication competencies.
	2. Students will demonstrate understanding of the variety of debate styles.
	3. Students will identify and apply the necessary tools for debate.
	4. Students will develop persuasive speaking skills.
Argumentation	
	5. Students will identify and present the three parts of an argument (claim, warrant, impact).
	6. Students will utilize research skills and collect well-sourced evidence.
	7. Students will apply appropriate speech organization.
Refutation	
	8. Students will analyze and rebut opposing arguments.
	9. Students will utilize effective questioning strategies.
Delivery	
	10. Students will participate in debates within or outside of the classroom.
	11. Students will evaluate debates and provide feedback.
Advocacy	
	12. Students will synthesize socioeconomic, ethical, and/or philosophical reasoning that influences current issues.
	13. Students will develop individual and group perspectives on the importance of debate to both local and global communities.
	14. Students will participate in community outreach, culminating in competitive debate in or outside of the classroom.

Notes:

1. Throughout this document, the terms competition and competitive event occur frequently. These terms refer to events that may occur within or outside of the school. The purpose of these courses is to provide students with debate fundamentals and tools of mastery and provide guidance for how to practice these in a competitive atmosphere.
2. The Communication Skills strand appears only in Debate I. This provision allows Debate I to meet the state Oral Communication requirement.
3. Each level continues to address earlier Student Learning Expectations (SLEs) as needed.
4. Student Learning Expectations (SLEs) may be taught in any sequence.
5. Italicized words in this document appear in the glossary.
6. All items in a bulleted list are required to be taught.
7. The examples given (e.g.,) are suggestions to guide the instructor.

How the Anchor Standards are Labeled

R . CCR . 1

The letter in the first position of the anchor standard numbering system represents the strand:

Reading (R)

Writing (W)

Speaking and Listening (SL)

Language (L)

The symbol in the second position of the anchor standard numbering system represents college and career readiness.

The number in the third position of the anchor standard numbering system represents the standard.

How the SLEs are Labeled

D . 10 . DIII . 2

D	10	DIII	2
Letters in the first position represent the Strand name (e.g., Delivery).	Numbers in the second position represent the Standard number (e.g., Standard 10).	Symbols in the third position represent the Course name and level (e.g., Debate III).	Numbers in the fourth position represent the SLE number (e.g., SLE 2).

Strand: Communication Skills

Content Standard 1: Students will demonstrate fundamental oral communication competencies.

		AR ELA Alignment
CS.1.DII.1	This SLE is taught in Debate I and should be reinforced as needed. Demonstrate effective verbal communication: ● clarity ● diction and *word economy* ● elimination of verbal fillers ● inflection ● speed of delivery	SL.CCR.4, SL.CCR.6
CS.1.DII.2	This SLE is taught in Debate I and should be reinforced as needed. Implement effective nonverbal communication: ● control of facial expressions ● eye contact ● gesturing and posture ● pauses ● proximity	
CS.1.DII.3	This SLE is taught in Debate I and should be reinforced as needed. Utilize effective listening practices (e.g., note-taking, active listening feedback)	W.CCR.10, SL.CCR.1, SL.CCR.3
CS.1.DII.4	This SLE is taught in Debate I and should be reinforced as needed. Discuss ethical practices: ● academic honesty ● appropriate *cutting* of evidence ● courtesy ● proper citation ● respect for diversity	SL.CCR.1, SL.CCR.4, SL.CCR.6

Strand: Communication Skills

Content Standard 2: Students will demonstrate understanding of the variety of debate styles.

		AR ELA Alignment
CS.2.DII.1	This SLE is taught in Debate I and should be reinforced as needed. Identify the different types of debate (e.g., policy, Lincoln-Douglas, public forum, International Public Debate Association [IPDA], student congress/parliamentary, mock trial, world school, big question, extemporaneous)	
CS.2.DII.2	This SLE is taught in Debate I and should be reinforced as needed. Compare and contrast the various styles of debate	R.CCR.9
CS.2.DII.3	This SLE is taught in Debate I and should be reinforced as needed. Practice skills associated with various styles of debate	SL.CCR.6

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Strand: Communication Skills

Content Standard 3: Students will identify and apply the necessary tools for debate.

		AR ELA Alignment
CS.3.DII.1	This SLE is taught in Debate I and should be reinforced as needed. Speak within time parameters for various styles of debate	SL.CCR.6
CS.3.DII.2	This SLE is taught in Debate I and should be reinforced as needed. Complete specialized debate *flows*	W.CCR.4, W.CCR.10
CS.3.DII.3	This SLE is taught in Debate I and should be reinforced as needed. Access evidence databases and online resources (e.g., www.debatecoaches.org, www.speechanddebate.org, www.actaa.net)	W.CCR.8
CS.3.DII.4	This SLE is taught in Debate I and should be reinforced as needed. Utilize electronic file organization (e.g., Dropbox, Google Drive, Verbatim)	R.CCR.7, W.CCR.6

Strand: Communication Skills

Content Standard 4: Students will develop persuasive speaking skills.

		AR ELA Alignment
CS.4.DII.1	This SLE is taught in Debate I and should be reinforced as needed. Identify tools of persuasion: ● ethos ● pathos ● logos	R.CCR.8
CS.4.DII.2	This SLE is taught in Debate I and should be reinforced as needed. Establish *impact* framing: ● *impact* comparison ● time frame, magnitude, probability ● risk assessment ● speech *overviews*	SL.CCR.4, SL.CCR.6
CS.4.DII.3	This SLE is taught in Debate I and should be reinforced as needed. Adapt to opponents, audience, and judge ● content warnings ● microaggressions ● paradigms (e.g., tabula rasa, policy maker, hypotesting, comparative advantage) ● sensitivity ● *spreading*	SL.CCR.6

Strand: Argumentation

Content Standard 5: Students will identify and present the three parts of an argument (claim, warrant, impact)

		AR ELA Alignment
ARG.5.DII.1	Develop advanced *claims*	W.CCR.1, W.CCR.4, W.CCR.5, W.CCR.6, W.CCR.7, W.CCR.8, W.CCR.9, W.CCR.10, SL.CCR.1, SL.CCR.2, SL.CCR.4, SL.CCR.5, SL.CCR.6, L.CCR.1, L.CCR.3, LCCR.6
ARG.5.DII.2	Investigate *warrant*s and evidence	W.CCR.7, W.CCR.8, W.CCR.9, W.CCR.10, SL.CCR.3, L.CCR.1, L.CCR.3, L.CCR.4, L.CCR.5, L.CCR.6
ARG.5.DII.3	Conduct *impact* framing: ● *Impact* comparison ● time frame, magnitude, probability ● risk assessment	SL.CCR.1, SL.CCR.2, SL.CCR.3, SL.CCR.4, SL.CCR.5, SL.CCR.6, L.CCR.1, L.CCR.3, L.CCR.6

Strand: Argumentation

Content Standard 6: Students will utilize research skills and collect well-sourced evidence.

		AR ELA Alignment
ARG.6.DII.1	Produce evidence: • rules for evidence *cutting* and citation • *clipping* • organization of evidence • electronic filing	W.CCR.6, W.CCR.8, W.CCR.9, W.CCR.10
ARG.6.DII.2	Evaluate quality of evidence: • analytics • empirics	R.CCR.7, R.CCR.8, W.CCR.8, SL.CCR.3, SL.CCR.5, L.CCR.3, L.CCR.5
ARG.6.DII.3	Analyze and compare evidence and *warrant*s	R.CCR.8, SL.CCR.3, L.CCR.3, L.CCR.5, L.CCR.6
ARG.6.DII.4	Discriminate between winning and losing arguments (e.g., *power tagging* results in un*warrant*ed arguments)	R.CCR.8, SL.CCR.3, L.CCR.1, L.CCR.3, L.CCR.5, L.CCR.6

Strand: Argumentation

Content Standard 7: Students will apply appropriate speech organization.

		AR ELA Alignment
ARG.7.DII.1	Master *flowing* for the purpose of preparation for future debates	W.CCR.2, W.CCR.4, W.CCR.10, SL.CCR.3, L.CCR.1, L.CCR.2, L.CCR.6
ARG.7.DII.2	Communicate a *roadmap*	SL.CCR.4, SL.CCR.6, L.CCR.1, L.CCR.3, L.CCR.6
ARG.7.DII.3	Establish priority of arguments: ● case ● procedurals (e.g., evidence challenges, topicality, framework, value criterion, weighing mechanism) ● counter-advocacies (e.g., kritiks, counterplans) ● comparative advantage (e.g., *impact* turns, disadvantages, *impact* calculus)	R.CCR.7, R.CCR.8, W.CCR.1, W.CCR.4, W.CCR.5, W.CCR.6, W.CCR.7, W.CCR.8, W.CCR.9, W.CCR.10, SL.CCR.2, SL.CCR.4, SL.CCR.5, SL.CCR.6, L.CCR.1, L.CCR.2, L.CCR.3, L.CCR.6
ARG.7.DII.4	Follow *line-by-line* analysis	SL.CCR.3

Strand: Refutation

Content Standard 8: Students will analyze and rebut opposing arguments.

		AR ELA Alignment
R.8.DII.1	Generate offensive arguments	W.CCR.1, W.CCR.4, W.CCR.5, W.CCR.6, W.CCR.7, W.CCR.8, W.CCR.9, W.CCR.10, L.CCR.1, L.CCR.2, L.CCR.3, L.CCR.6
R.8.DII.2	Brainstorm responses to fallacious arguments (e.g., framework value criterion, rules of evidence, motions, objections)	SL.CCR.1, SL.CCR.2, SL.CCR.3, SL.CCR.4, SL.CCR.5, SL.CCR.6, L.CCR.1, L.CCR.3, L.CCR.6

Strand: Refutation

Content Standard 9: Students will utilize effective questioning strategies.

		AR ELA Alignment
R.9.DII.1	Deploy strategies at the intermediate level (e.g., novice, junior varsity): • entrapment • leading questions • preemptions • setting up the argument	SL.CCR.4, SL.CCR.6, L.CCR.1, L.CCR.3, L.CCR.6
R.9.DII.2	Specialize in a speaker position: • speaker points (ballot) • speaker strategies	SL.CCR.6

Strand: Delivery

Content Standard 10: Students will participate in debates within or outside of the classroom.

		AR ELA Alignment
D.10.DII.1	Determine personal strengths and weaknesses across debate styles	SL.CCR.6
D.10.DII.2	Specialize in a debate style	SL.CCR.6
D.10.DII.3	Compete at the intermediate level (e.g., novice, junior varsity)	SL.CCR.1, SL.CCR.2, SL.CCR.3, SL.CCR.4, SL.CCR.5, SL.CCR.6, L.CCR.1, L.CCR.3, L.CCR.6

Strand: Delivery

Content Standard 11: Students will evaluate debates and provide feedback.

		AR ELA Alignment
D.11.DII.1	Reflect on evaluation feedback: • comments • Reason for Decision (RfD) • sides (e.g., aff/neg, pro/con, proposition/opposition) • speaker points • speaker positions • speaker ranks	SL.CCR.6
D.11.DII.2	Reflect and modify based on evaluation criteria (e.g., ballot, peer review, oral critique)	SL.CCR.6

Strand: Advocacy

Content Standard 12: Students will synthesize socioeconomic, ethical, and/or philosophical reasoning that influences current issues.

		AR ELA Alignment
ADV.12.DII.1	Explain the historical and contemporary role that debate and oral advocacy play in democratic society (e.g., diplomacy, government policy, justice system, politics, gender, race, religion, socioeconomics)	SL.CCR.1, SL.CCR.2, SL.CCR.4, SL.CCR.5, SL.CCR.6, L.CCR.1, L.CCR.3, L.CCR.6
ADV.12.DII.2	Analyze how philosophy *impact*s policy	R.CCR.6, R.CCR.9, R.CCR.10, W.CCR.7, W.CCR.9, SL.CCR.1, SL.CCR.2, SL.CCR.3, L.CCR.3, L.CCR.6
ADV.12.DII.3	Interrogate ideological motivations within the status quo	R.CCR.6, R.CCR.9, R.CCR.10, W.CCR.7, W.CCR.9, SL.CCR.1, SL.CCR.2, SL.CCR.3, L.CCR.3, L.CCR.6

Strand: Advocacy

Content Standard 13: Students will develop individual and group perspectives on the importance of debate to both local and global communities.

		AR ELA Alignment
ADV.13.DII.1	Engage network resources	SL.CCR.6, LCCR.1
ADV.13.DII.2	Assemble advocacy allies and identify opposing ideology	W.CCR.6, SL.CCR.1, SL.CCR.2, SL.CCR.4, SL.CCR.5, SL.CCR.6, L.CCR.1, L.CCR.2, L.CCR.3, L.CCR.6

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Strand: Advocacy

Content Standard 14: Students will participate in community outreach, culminating in competitive debate in or outside of the classroom.

		AR ELA Alignment
ADV.14.DII.1	Organize a competition in or outside of the classroom: ● Arkansas Activities Association guidelines ● budgetary needs ● community resources ● events offered ● judges and timekeepers ● venue ● volunteer coordination	SL.CCR.1, SL.CCR.4, SL.CCR.5, SL.CCR.6
ADV.14.DII.2	Participate in a competition at the intermediate level (e.g., novice, junior varsity)	SL.CCR.1, SL.CCR.2, SL.CCR.3, SL.CCR.4, SL.CCR.5, SL.CCR.6
ADV.14.DII.3	Perform assessment and reflection (e.g., respond to judges' feedback, debrief tournament results, rebuttal re-dos)	SL.CCR.3, SL.CCR.6

Glossary for Debate I

Blocks	A set of prepared arguments to include analysis/reasoning and evidence on a specific point, prepared in advance of a debate or during a debate
Claim	A statement that a debater supports or refutes with evidence and reasoning (e.g., "Schools should run year round" is a claim; "Wednesday comes after Tuesday" is not.)
Clash	Fundamental to debate; opposing arguments, Affirmative and Negative stances, on the key issues
Clipping	Failure of a debater to read all marked portions of the card while claiming to have done so
Cutting	Exact passages taken directly from articles, reports, books, speeches, and transcripts used as evidence in debate
Flow	Detailed, shorthand notes taken during a debate round to keep track of all of the arguments made by both debaters/teams
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Kicking	Strategically choosing to eliminate an argument(s) that has become irrelevant, dangerous, or incoherent
Line-by-line	Debate strategy in which a speaker directly answers each and every one of the opponents' arguments one right after another in the order that they were given
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Shelly Hardin - West Memphis	

Debate III

Arkansas
English Language Arts Standards

2016

Course Title:	Debate III
Course/Unit Credit:	1
Course Number:	414070
Teacher Licensure:	Please refer to the Course Code Management System (https://adedata.arkansas.gov/ccms/) for the most current licensure codes.
Grades:	9-12
Prerequisite:	Debate II

Debate III

Debate II is a prerequisite for Debate III. Students entering Debate II, III, or IV must have successfully completed the preceding year of study. Debate I is a two-semester foundational course and cannot be combined with other courses. Debate II-IV may be taught within the same class period; however, the student learning expectations for each level are different and must be addressed.

Debate II, III, and IV lead students to a mastery of advanced argumentation skills. Students will construct and present argumentative positions using scholarly research on complex, controversial issues. Content will include oral advocacy in relation to the legal system and the democratic process. Peer adjudication will be an important part of the advanced Debate courses. The two-semester courses of Debate II, III, and IV do not require Arkansas Department of Education approval.

Strand	Content Standard
Communication Skills (Taught in Level 1 and reinforced in Levels II, III, & IV)	
	1. Students will demonstrate fundamental oral communication competencies.
	2. Students will demonstrate understanding of the variety of debate styles.
	3. Students will identify and apply the necessary tools for debate.
	4. Students will develop persuasive speaking skills.
Argumentation	
	5. Students will identify and present the three parts of an argument (claim, warrant, impact).
	6. Students will utilize research skills and collect well-sourced evidence.
	7. Students will apply appropriate speech organization.
Refutation	
	8. Students will analyze and rebut opposing arguments.
	9. Students will utilize effective questioning strategies.
Delivery	
	10. Students will participate in debates within or outside of the classroom.
	11. Students will evaluate debates and provide feedback.
Advocacy	
	12. Students will synthesize socioeconomic, ethical, and/or philosophical reasoning that influences current issues.
	13. Students will develop individual and group perspectives on the importance of debate to both local and global communities.
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2. The Communication Skills strand appears only in Debate I. This provision allows Debate I to meet the state Oral Communication requirement.
3. Each level continues to address earlier student learning Expectations (SLEs) as needed.
4. Student Learning Expectations (SLEs) may be taught in any sequence.
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6. All items in a bulleted list are required to be taught.
7. The examples given (e.g.,) are suggestions to guide the instructor.

How the Anchor Standards are Labeled

R . CCR . 1

The letter in the first position of the anchor standard numbering system represents the strand:

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Speaking and Listening (SL)

Language (L)

The symbol in the second position of the anchor standard numbering system represents college and career readiness.

The number in the third position of the anchor standard numbering system represents the standard.

How the SLEs are Labeled

D . 10 . DIII . 2

D	10	DIII	2
Letters in the first position represent the Strand name (e.g., Delivery).	Numbers in the second position represent the Standard number (e.g., Standard 10).	Symbols in the third position represent the Course name and level (e.g., Debate III).	Numbers in the fourth position represent the SLE number (e.g., SLE 2).

Strand: Communication Skills

Content Standard 1: Students will demonstrate fundamental oral communication competencies.

		AR ELA Alignment
CS.1.DIII.1	This SLE is taught in Debate I and should be reinforced as needed. Demonstrate effective verbal communication: ● clarity ● diction and *word economy* ● elimination of verbal fillers ● inflection ● speed of delivery	SL.CCR.4, SL.CCR.6
CS.1.DIII.2	This SLE is taught in Debate I and should be reinforced as needed. Implement effective nonverbal communication: ● control of facial expressions ● eye contact ● gesturing and posture ● pauses ● proximity	
CS.1.DIII.3	This SLE is taught in Debate I and should be reinforced as needed. Utilize effective listening practices (e.g., note-taking, active listening feedback)	W.CCR.10, SL.CCR.1, SL.CCR.3
CS.1.DIII.4	This SLE is taught in Debate I and should be reinforced as needed. Discuss ethical practices: ● academic honesty ● appropriate *cutting* of evidence ● courtesy ● proper citation ● respect for diversity	SL.CCR.1, SL.CCR.4, SL.CCR.6

Strand: Communication Skills

Content Standard 2: Students will demonstrate understanding of the variety of debate styles.

		AR ELA Alignment
CS.2.DIII.1	This SLE is taught in Debate I and should be reinforced as needed. Identify the different types of debate (e.g., policy, Lincoln-Douglas, public forum, International Public Debate Association [IPDA], student congress/parliamentary, mock trial, world school, big question, extemporaneous)	
CS.2.DIII.2	This SLE is taught in Debate I and should be reinforced as needed. Compare and contrast the various styles of debate	R.CCR.9
CS.2.DIII.3	This SLE is taught in Debate I and should be reinforced as needed. Practice skills associated with various styles of debate	SL.CCR.6

Strand: Communication Skills

Content Standard 3: Students will identify and apply the necessary tools for debate.

		AR ELA Alignment
CS.3.DIII.1	This SLE is taught in Debate I and should be reinforced as needed. Speak within time parameters for various styles of debate	SL.CCR.6
CS.3.DIII.2	This SLE is taught in Debate I and should be reinforced as needed. Complete specialized debate *flows*	W.CCR.4, W.CCR.10
CS.3.DIII.3	This SLE is taught in Debate I and should be reinforced as needed. Access evidence databases and online resources (e.g., www.debatecoaches.org, www.speechanddebate.org, www.actaa.net)	W.CCR.8
CS.3.DIII.4	This SLE is taught in Debate I and should be reinforced as needed. Utilize electronic file organization (e.g., Dropbox, Google Drive, Verbatim)	R.CCR.7, W.CCR.6

Strand: Communication Skills

Content Standard 4: Students will develop persuasive speaking skills.

		AR ELA Alignment
CS.4.DIII.1	This SLE is taught in Debate I and should be reinforced as needed. Identify tools of persuasion: ● ethos ● pathos ● logos	R.CCR.8
CS.4.DIII.2	This SLE is taught in Debate I and should be reinforced as needed. Establish *impact* framing: ● *impact* comparison ● time frame, magnitude, probability ● risk assessment ● speech *overviews*	SL.CCR.4, SL.CCR.6
CS.4.DIII.3	This SLE is taught in Debate I and should be reinforced as needed. Adapt to opponents, audience, and judge ● content warnings ● microaggressions ● paradigms (e.g., tabula rasa, policy maker, hypotesting, comparative advantage) ● sensitivity ● *spreading*	SL.CCR.6

Strand: Argumentation

Content Standard 5: Students will identify and present the three parts of an argument (claim, warrant, impact)

		AR ELA Alignment
ARG.5.DIII.1	Compose advanced argumentation adapted to opponents, audience, and judge ● content warnings ● microaggressions ● paradigms (e.g., tabula rasa, policy maker, hypotesting, comparative advantage) ● sensitivity ● *spreading*	SL.CCR.3, SL.CCR.4, SL.CCR.5, SL.CCR.6
ARG.5.DIII.2	Explore nuances within *warrants*	SL.CCR.3, SL.CCR.4, SL.CCR.6
ARG.5.DIII.3	Employ *impact* calculus using framing criteria	W.CCR.6, SL.CCR.3

Strand: Argumentation

Content Standard 6: Students will utilize research skills and collect well-sourced evidence.

		AR ELA Alignment
ARG.6.DIII.1	Disseminate evidence (e.g., file sharing, email chains, Dropbox, Google Drive, Verbatim)	W.CCR.6, W.CCR.8, W.CCR.9, W.CCR.10
ARG.6.DIII.2	Categorize evidence (e.g., *flow* grouping, cross-application)	R.CCR.7, W.CCR.8, W.CCR.9, W.CCR.10
ARG.6.DIII.3	Develop arguments based on evidence	W.CCR.1, W.CCR.4, W.CCR.7, W.CCR.8, W.CCR.9, W.CCR.10, W.CCR.4, W.CCR.5, W.CCR.6, L.CCR.1, L.CCR.3, L.CCR.6
ARG.6.DIII.4	Strategize within winning arguments (e.g., *kicking*, offense vs. defense, strategic concessions)	W.CCR.1, W.CCR.4, W.CCR.5, W.CCR.6, W.CCR.7, W.CCR.8, W.CCR.9, W.CCR.10, SL.CCR.1, SL.CCR.2, SL.CCR.3, SL.CCR.4, SL.CCR.5, CL.CCR.6, L.CCR.1, L.CCR.3, L.CCR.5, L.CCR.6

Strand: Argumentation

Content Standard 7: Students will apply appropriate speech organization.

		AR ELA Alignment
ARG.7.DIII.1	Produce *flows* for the purpose of scouting	W.CCR.4, W.CCR.6, W.CCR.10
ARG.7.DIII.2	Compose *overviews*	W.CCR.4, W.CCR.5, W.CCR.6, W.CCR.7, W.CCR.8, W.CCR.9, W.CCR.10, SL.CCR.1, SL.CCR.4, SL.CCR.5, SL.CCR.6
ARG.7.DIII.3	Embed *clash* (e.g., collapsing down arguments, cross-application)	W.CCR.1, W.CCR.4, SL.CCR.4, SL.CCR.6
ARG.7.DIII.4	Follow *line-by-line* analysis using offensive and defensive arguments	W.CCR.4, W.CCR.8, W.CCR.9, W.CCR.10, SL.CCR.3, SL.CCR.4, SL.CCR.6, L.CCR.1, L.CCR.3

Strand: Refutation

Content Standard 8: Students will analyze and rebut opposing arguments.

		AR ELA Alignment
R.8.DIII.1	Strategize on offensive arguments (e.g., link turns, solvency turns, *impact* turns, alternate causality)	W.CCR.1, W.CCR.4, W.CCR.5, W.CCR.6, W.CCR.7, W.CCR.8, W.CCR.9, W.CCR.10, L.CCR.1, L.CCR.2, L.CCR.3, L.CCR.6
R.8.DIII.2	Incorporate framing arguments into offense	SL.CCR.4, SL.CCR.5, SL.CCR.6, L.CCR.1, L.CCR.1, L.CCR.3, L.CCR.6

Strand: Refutation

Content Standard 9: Students will utilize effective questioning strategies.

		AR ELA Alignment
R.9.DIII.1	Deploy strategies at the intermediate level (e.g., junior varsity, varsity)	SL.CCR.4, SL.CCR.5, SL.CCR.6, L.CCR.1, L.CCR.3, L.CCR.6
R.9.DIII.2	Engage in debates within own speaker position and conduct ballot review	SL.CCR.1, SL.CCR.2, SL.CCR.3, SL.CCR.4, SL.CCR.5, SL.CCR.6, L.CCR.1, L.CCR.3, L.CCR.6

Strand: Delivery

Content Standard 10: Students will participate in debates within or outside of the classroom.

		AR ELA Alignment
D.10.DIII.1	This SLE is taught in Debate II and should be reinforced as needed. Determine personal strengths and weaknesses across debate styles	SL.CCR.6
D.10.DIII.2	Identify and apply debate theory (e.g., conditionality, dispositionality, role of the ballot, role of the judge, parliamentary procedure, legal terminology)	SL.CCR.1, SL.CCR.2, SL.CCR.3, SL.CCR.4, SL.CCR.5, SL.CCR.6
D.10.DIII.3	Compete at the intermediate level (e.g., junior varsity, varsity)	SL.CCR.1, SL.CCR.2, SL.CCR.3, SL.CCR.4, SL.CCR.5, SL.CCR.6, L.CCR.1, L.CCR.3, L.CCR.6

Strand: Delivery

Content Standard 11: Students will evaluate debates and provide feedback.

		AR ELA Alignment
D.11.DIII.1	Incorporate feedback into performance	SL.CCR.6
D.11.DIII.2	Judge and complete balloting for practice debates	SL.CCR.3, L.CCR.1, L.CCR.2, L.CCR.6

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Strand: Advocacy

Content Standard 12: Students will synthesize socioeconomic, ethical, and/or philosophical reasoning that influences current issues.

		AR ELA Alignment
ADV.12.DIII.1	Synthesize the historical and contemporary role that debate and oral advocacy play with one's subject position	R.CCR.7, R.CCR.9, R.CCR.10, W.CCR.7, W.CCR.9, W.CCR.10, SL.CCR.1, SL.CCR.2, SL.CCR.4, SL.CCR.6, L.CCR.1, L.CCR.2, L.CCR.3
ADV.12.DIII.2	Incorporate philosophy into argument	W.CCR.1, SL.CCR.1, SL.CCR.2, SL.CCR.3, SL.CCR.4, SL.CCR.5, SL.CCR.6
ADV.12.DIII.3	Challenge ideological motivations within the status quo ● parts of a kritik (link, *impact*, alternative) ● value criterion (e.g., logic, ethics, morality, justice, life)	SL.CCR.4, SL.CCR.5, SL.CCR.6

Strand: Advocacy

Content Standard 13: Students will develop individual and group perspectives on the importance of debate to both local and global communities.

		AR ELA Alignment
ADV.13.DIII.1	Collaborate with network and resources to create community goals and plan of action	W.CCR.6, SL.CCR.1, SL.CCR.2, SL.CCR.4, SL.CCR.5, SL.CCR.6, L.CCR.1, L.CCR.2, L.CCR.3, L.CCR.6
ADV.13.DIII.2	Strategize methods to combat opposing ideology	W.CCR.6, SL.CCR.1, SL.CCR.2, SL.CCR.4, SL.CCR.5, SL.CCR.6, L.CCR.1, L.CCR.2, L.CCR.3, L.CCR.6

Strand: Advocacy

Content Standard 14: Students will participate in community outreach, culminating in competitive debate in or outside of the classroom.

		AR ELA Alignment
ADV.14.DIII.1	Chair a competition committee (e.g., ballot table, judge recruitment, concessions, hospitality, timekeepers)	SL.CCR.1, SL.CCR.4, SL.CCR.5, SL.CCR.6
ADV.14.DIII.2	Participate in a competition at the intermediate level (e.g., junior varsity, varsity)	SL.CCR.1, SL.CCR.2, SL.CCR.3, SL.CCR.4, SL.CCR.5, SL.CCR.6
ADV.14.DIII.3	Formulate response to feedback	SL.CCR.3, SL.CCR.6

Glossary for Debate III

Blocks	A set of prepared arguments to include analysis/reasoning and evidence on a specific point, prepared in advance of a debate or during a debate
Claim	A statement that a debater supports or refutes with evidence and reasoning (e.g., “Schools should run year round” is a claim; “Wednesday comes after Tuesday” is not.)
Clash	Fundamental to debate; opposing arguments, Affirmative and Negative stances, on the key issues
Clipping	Failure of a debater to read all marked portions of the card while claiming to have done so
Cutting	Exact passages taken directly from articles, reports, books, speeches, and transcripts used as evidence in debate
Flow	Detailed, shorthand notes taken during a debate round to keep track of all of the arguments made by both debaters/teams
Impact	Why the judge/someone in the round should care about an argument, and how winning the argument affects the rest of the debate
Kicking	Strategically choosing to eliminate an argument(s) that has become irrelevant, dangerous, or incoherent
Line-by-line	Debate strategy in which a speaker directly answers each and every one of the opponents’ arguments one right after another in the order that they were given
Overviews	Distinct from line-by-line; appears at the beginning of a speech to highlight key offensive points for a debater or team, occurs within the time limits of a speech
Power tagging	The unethical practice of labeling a tagline in a way that grossly misrepresents the evidence used as support
Roadmap	Explanation of the order in which the debater’s next speech will address the issues surrounding the debate, directed to the judge, not added to the timed remarks
Spreading	The practice of increasing a debater’s speaking speed (150-300 words per minute) to allow for more argumentation within given time limits; also known as speed reading, not encouraged for every type of debate

Contributors

The following people contributed to the development of this document:

Jennifer Akers - Cabot	Amy Matthews - Fayetteville
Tammy Alexander - Nashville	Gerri McCann - Manila
Rebecca Allen - Valley View	Amanda McMahan - Magnolia
Jane Balgavy - Jacksonville-North Pulaski	Lynn Meade - University of Arkansas
Brandon Box-Higdem - Bentonville	Alisa Melton - Blytheville
Samantha Carpenter - Virtual Arkansas	Jennifer Murphy - El Dorado
Lisa Carver - Texarkana	Traci Myers - Foreman
Kimberly Chavez - Camden Fairview	Tim Peerbolte - Greenwood
Susan Colyer - Fort Smith	Erin Radke - Jessieville
Joan Crowder - Arkadelphia	Jacki Reiff - Gravette
April Erickson - South Conway County	Tracie Richard - Hermitage
Jessica Foster - Siloam Springs	Chad Simpson - Clarendon
Sommer Frazer - McGehee	Dallas Sims - Lakeside (Lake Village)
Natalie Free - Pangburn	Vivian Sisk – KIPP: Delta Collegiate
Eric Gamble - Dardanelle	Andrea Speer - Bentonville
Jennifer Garner - Lakeside (Hot Springs)	Steven Trulock - Huntsville
Roger Guevara - Southern Arkansas University	Rosie Valdez - Little Rock
Shelly Hardin - West Memphis	

Debate IV

Arkansas
English Language Arts Standards

2016

Course Title:	Debate IV
Course/Unit Credit:	1
Course Number:	XXXXXX
Teacher Licensure:	Please refer to the Course Code Management System (https://adedata.arkansas.gov/ccms/) for the most current licensure codes.
Grades:	9-12
Prerequisite:	Debate III

Debate IV

Debate III is a prerequisite for Debate IV. Students entering Debate II, III, or IV must have successfully completed the preceding year of study. Debate I is a two-semester foundational course and cannot be combined with other courses. Debate II-IV may be taught within the same class period; however, the student learning expectations for each level are different and must be addressed.

Debate II, III, and IV lead students to a mastery of advanced argumentation skills. Students will construct and present argumentative positions using scholarly research on complex, controversial issues. Content will include oral advocacy in relation to the legal system and the democratic process. Peer adjudication will be an important part of the advanced Debate courses. The two-semester courses of Debate II, III, and IV do not require Arkansas Department of Education approval.

Strand	Content Standard
Communication Skills (Taught in Level 1 and reinforced in Levels II, III, & IV)	
	1. Students will demonstrate fundamental oral communication competencies.
	2. Students will demonstrate understanding of the variety of debate styles.
	3. Students will identify and apply the necessary tools for debate.
	4. Students will develop persuasive speaking skills.
Argumentation	
	5. Students will identify and present the three parts of an argument (claim, warrant, impact).
	6. Students will utilize research skills and collect well-sourced evidence.
	7. Students will apply appropriate speech organization.
Refutation	
	8. Students will analyze and rebut opposing arguments.
	9. Students will utilize effective questioning strategies.
Delivery	
	10. Students will participate in debates within or outside of the classroom.
	11. Students will evaluate debates and provide feedback.
Advocacy	
	12. Students will synthesize socioeconomic, ethical, and/or philosophical reasoning that influences current issues.
	13. Students will develop individual and group perspectives on the importance of debate to both local and global communities.
	14. Students will participate in community outreach, culminating in competitive debate in or outside of the classroom.

Notes:

1. Throughout this document, the terms competition and competitive event occur frequently. These terms refer to events that may occur within or outside of the school. The purpose of these courses is to provide students with debate fundamentals and tools of mastery and provide guidance for how to practice these in a competitive atmosphere.
2. The Communication Skills strand appears only in Debate I. This provision allows Debate I to meet the state Oral Communication requirement.
3. Each level continues to address earlier student learning Expectations (SLEs) as needed.
4. Student Learning Expectations (SLEs) may be taught in any sequence.
5. Italicized words in this document appear in the glossary.
6. All items in a bulleted list are required to be taught.
7. The examples given (e.g.,) are suggestions to guide the instructor.

How the Anchor Standards are Labeled

R . CCR . 1

The letter in the first position of the anchor standard numbering system represents the strand:

Reading (R)

Writing (W)

Speaking and Listening (SL)

Language (L)

The symbol in the second position of the anchor standard numbering system represents college and career readiness.

The number in the third position of the anchor standard numbering system represents the standard.

How the SLEs are Labeled

D . 10 . DIII . 2

D	10	DIII	2
Letters in the first position represent the Strand name (e.g., Delivery).	Numbers in the second position represent the Standard number (e.g., Standard 10).	Symbols in the third position represent the Course name and level (e.g., Debate III).	Numbers in the fourth position represent the SLE number (e.g., SLE 2).

Strand: Communication Skills

Content Standard 1: Students will demonstrate fundamental oral communication competencies.

		AR ELA Alignment
CS.1.DIV.1	This SLE is taught in Debate I and should be reinforced as needed. Demonstrate effective verbal communication: ● clarity ● diction and *word economy* ● elimination of verbal fillers ● inflection ● speed of delivery	SL.CCR.4, SL.CCR.6
CS.1.DIV.2	This SLE is taught in Debate I and should be reinforced as needed. Implement effective nonverbal communication: ● control of facial expressions ● eye contact ● gesturing and posture ● pauses ● proximity	
CS.1.DIV.3	This SLE is taught in Debate I and should be reinforced as needed. Utilize effective listening practices (e.g., note-taking, active listening feedback)	W.CCR.10, SL.CCR.1, SL.CCR.3
CS.1.DIV.4	This SLE is taught in Debate I and should be reinforced as needed. Discuss ethical practices: ● academic honesty ● appropriate *cutting* of evidence ● courtesy ● proper citation ● respect for diversity	SL.CCR.1, SL.CCR.4, SL.CCR.6

Strand: Communication Skills

Content Standard 2: Students will demonstrate understanding of the variety of debate styles.

		AR ELA Alignment
CS.2.DIV.1	This SLE is taught in Debate I and should be reinforced as needed. Identify the different types of debate (e.g., policy, Lincoln-Douglas, public forum, International Public Debate Association [IPDA], student congress/parliamentary, mock trial, world school, big question, extemporaneous)	
CS.2.DIV.2	This SLE is taught in Debate I and should be reinforced as needed. Compare and contrast the various styles of debate	R.CCR.9
CS.2.DIV.3	This SLE is taught in Debate I and should be reinforced as needed. Practice skills associated with various styles of debate	SL.CCR.6

Strand: Communication Skills

Content Standard 3: Students will identify and apply the necessary tools for debate.

		AR ELA Alignment
CS.3.DIV.1	This SLE is taught in Debate I and should be reinforced as needed. Speak within time parameters for various styles of debate	SL.CCR.6
CS.3.DIV.2	This SLE is taught in Debate I and should be reinforced as needed. Complete specialized debate *flows*	W.CCR.4, W.CCR.10
CS.3.DIV.3	This SLE is taught in Debate I and should be reinforced as needed. Access evidence databases and online resources (e.g., www.debatecoaches.org, www.speechanddebate.org, www.actaa.net)	W.CCR.8
CS.3.DIV.4	This SLE is taught in Debate I and should be reinforced as needed. Utilize electronic file organization (e.g., Dropbox, Google Drive, Verbatim)	R.CCR.7, W.CCR.6

Strand: Communication Skills

Content Standard 4: Students will develop persuasive speaking skills.

		AR ELA Alignment
CS.4.DIV.1	This SLE is taught in Debate I and should be reinforced as needed. Identify tools of persuasion: ● ethos ● pathos ● logos	R.CCR.8
CS.4.DIV.2	This SLE is taught in Debate I and should be reinforced as needed. Establish *impact* framing: ● *impact* comparison ● time frame, magnitude, probability ● risk assessment ● speech *overviews*	SL.CCR.4, SL.CCR.6
CS.4.DIV.3	This SLE is taught in Debate I and should be reinforced as needed. Adapt to opponents, audience, and judge ● content warnings ● microaggressions ● paradigms (e.g., tabula rasa, policy maker, hypotesting, comparative advantage) ● sensitivity ● *spreading*	SL.CCR.6

Strand: Argumentation

Content Standard 5: Students will identify and present the three parts of an argument (claim, warrant, impact)

		AR ELA Alignment
ARG.5.DIV.1	Apply advanced argumentation across a broad spectrum	SL.CCR.3, SL.CCR.4, SL.CCR.5, SL.CCR.6
ARG.5.DIV.2	Apply philosophical context to arguments (e.g., utilitarianism, value to life, dehumanization)	SL.CCR.4, SL.CCR.6
ARG.5.DIV.3	Weigh *impacts* within philosophical context	W.CCR.6, SL.CCR.3

Strand: Argumentation

Content Standard 6: Students will utilize research skills and collect well-sourced evidence.

		AR ELA Alignment
ARG.6.DIV.1	Instruct use of evidence to novice debaters	R.CCR.1, W.CCR.1, W.CCR.8, W.CCR.9, SL.CCR.1, SL.CCR.3, SL.CCR.4, SL.CCR.5
ARG.6.DIV.2	This SLE is taught in Debate III and should be reinforced as needed. Categorize evidence (e.g., *flow* grouping, cross-application)	R.CCR.7, W.CCR.8, W.CCR.9, W.CCR.10
ARG.6.DIV.3	This SLE is taught in Debate III and should be reinforced as needed. Develop arguments based on evidence	W.CCR.1, W.CCR.4, W.CCR.7, W.CCR.8, W.CCR.9, W.CCR.10, W.CCR.4, W.CCR.5, W.CCR.6, L.CCR.1, L.CCR.3, L.CCR.6
ARG.6.DIV.4	Generate strategy guides using feedback (e.g., ballots, Reasons for Decisions (RFDs), peer reviews, oral critiques)	W.CCR.2, W.CCR.4, W.CCR.10, SL.CCR.1, SL.CCR.2, SL.CCR.3, SL.CCR.4, SL.CCR.5, SL.CCR.6, L.CCR.1

Strand: Argumentation

Content Standard 7: Students will apply appropriate speech organization.

		AR ELA Alignment
ARG.7.DIV.1	Produce *flows* for the purpose of novice education	W.CCR.4, W.CCR.6, W.CCR.10
ARG.7.DIV.2	Create *blocks*	W.CCR.1, W.CCR.4, W.CCR.6, W.CCR.7, W.CCR.8, W.CCR.9, W.CCR.10
ARG.7.DIV.3	Affect *clash* using the priority of arguments	W.CCR.1, W.CCR.4, SL.CCR.4, SL.CCR.6
ARG.7.DIV.4	Combine evidence and *line-by-line* analysis seamlessly	W.CCR.4, W.CCR.8, W.CCR.9, W.CCR.10, SL.CCR.3, SL.CCR.4, SL.CCR.6, L.CCR.1, L.CCR.3

Strand: Refutation

Content Standard 8: Students will analyze and rebut opposing arguments.

		AR ELA Alignment
R.8.DIV.1	Design multiple offensive positions (e.g., briefs, shells, pre-written rebuttals)	W.CCR.1, W.CCR.4, W.CCR.5, W.CCR.6, W.CCR.7, W.CCR.8, W.CCR.9, W.CCR.10, L.CCR.1, L.CCR.2, L.CCR.3, L.CCR.6
R.8.DIV.2	Demonstrate and evaluate effectiveness of offensive strategies in competition	SL.CCR.3, SL.CCR.4, SL.CCR.6, L.CCR.1, L.CCR.3

Strand: Refutation

Content Standard 9: Students will utilize effective questioning strategies.

		AR ELA Alignment
R.9.DIV.1	Deploy strategies at the master level (e.g., varsity)	SL.CCR.4, SL.CCR.5, SL.CCR.6, L.CCR.1, L.CCR.3, L.CCR.6
R.9.DIV.2	Model speaker positions for novice debaters (e.g., student lectures, demonstration debates, observation of competition)	SL.CCR.1, SL.CCR.3, SL.CCR.4, SL.CCR.5, SL.CCR.6

Strand: Delivery

Content Standard 10: Students will participate in debates within or outside of the classroom.

		AR ELA Alignment
D.10.DIV.1	This SLE is taught in Debate II and should be reinforced as needed. Determine personal strengths and weaknesses across debate styles	SL.CCR.6
D.10.DIV.2	Synthesize theoretical implications of debate arguments	SL.CCR.3, SL.CCR.6
D.10.DIV.3	Compete at the master level (e.g., varsity)	SL.CCR.1, SL.CCR.2, SL.CCR.3, SL.CCR.4, SL.CCR.5, SL.CCR.6, L.CCR.1, L.CCR.3, L.CCR.6

Strand: Delivery

Content Standard 11: Students will evaluate debates and provide feedback.

		AR ELA Alignment
D.11.DIV.1	Evaluate peers using criteria (e.g., volunteer judging at junior high tournaments)	SL.CCR.3
D.11.DIV.2	Refine oral critiques and written feedback	W.CCR.5, SL.CCR.3, SL.CCR.6, L.CCR.1

Strand: Advocacy

Content Standard 12: Students will synthesize socioeconomic, ethical, and/or philosophical reasoning that influences current issues.

		AR ELA Alignment
ADV.12.DIV.1	Participate in dialogue and service that promotes social advocacy (e.g., analyze televised debate events, debate tournaments, in-class critiques)	SL.CCR.1, SL.CCR.2, SL.CCR.3, SL.CCR.4, SL.CCR.5, SL.CCR.6
ADV.12.DIV.2	Defend policy change through a philosophical lens	W.CCR.1, SL.CCR.1, SL.CCR.2, SL.CCR.3, SL.CCR.4, SL.CCR.5, SL.CCR.6
ADV.12.DIV.3	Articulate alternatives to the status quo	SL.CCR.4, SL.CCR.5, SL.CCR.6

Strand: Advocacy

Content Standard 13: Students will develop individual and group perspectives on the importance of debate to both local and global communities.

		AR ELA Alignment
ADV.13.DIV.1	Implement plans with the community	W.CCR.6, SL.CCR.1, SL.CCR.2, SL.CCR.4, SL.CCR.5, SL.CCR.6, L.CCR.1, L.CCR.2, L.CCR.3, L.CCR.6
ADV.13.DIV.2	Apply methods to promote advocacy	W.CCR.6, SL.CCR.1, SL.CCR.2, SL.CCR.4, SL.CCR.5, SL.CCR.6, L.CCR.1, L.CCR.2, L.CCR.3, L.CCR.6

Strand: Advocacy

Content Standard 14: Students will participate in community outreach, culminating in competitive debate in or outside of the classroom.

		AR ELA Alignment
ADV.14.DIV.1	Direct a competitive event in or outside of the classroom: ● collaboration among teacher, student, and administration ● student leadership	SL.CCR.1, SL.CCR.4, SL.CCR.5, SL.CCR.6
ADV.14.DIV.2	Participate in a competition at the master level (e.g., varsity)	SL.CCR.1, SL.CCR.2, SL.CCR.3, SL.CCR.4, SL.CCR.5, SL.CCR.6
ADV.14.DIV.3	Model assessment and response to feedback to novice debaters	SL.CCR.3, SL.CCR.6

Glossary for Debate IV

Blocks	A set of prepared arguments to include analysis/reasoning and evidence on a specific point, prepared in advance of a debate or during a debate
Claim	A statement that a debater supports or refutes with evidence and reasoning (e.g., "Schools should run year round" is a claim; "Wednesday comes after Tuesday" is not.)
Clash	Fundamental to debate; opposing arguments, Affirmative and Negative stances, on the key issues
Clipping	Failure of a debater to read all marked portions of the card while claiming to have done so
Cutting	Exact passages taken directly from articles, reports, books, speeches, and transcripts used as evidence in debate
Flow	Detailed, shorthand notes taken during a debate round to keep track of all of the arguments made by both debaters/teams
Impact	Why the judge/someone in the round should care about an argument, and how winning the argument affects the rest of the debate
Kicking	Strategically choosing to eliminate an argument(s) that has become irrelevant, dangerous, or incoherent
Line-by-line	Debate strategy in which a speaker directly answers each and every one of the opponents' arguments one right after another in the order that they were given
Overviews	Distinct from line-by-line; appears at the beginning of a speech to highlight key offensive points for a debater or team, occurs within the time limits of a speech
Power tagging	The unethical practice of labeling a tagline in a way that grossly misrepresents the evidence used as support
Roadmap	Explanation of the order in which the debater's next speech will address the issues surrounding the debate, directed to the judge, not added to the timed remarks
Spreading	The practice of increasing a debater's speaking speed (150-300 words per minute) to allow for more argumentation within given time limits; also known as speed reading, not encouraged for every type of debate

Contributors

The following people contributed to the development of this document:

Jennifer Akers - Cabot	Amy Matthews - Fayetteville
Tammy Alexander - Nashville	Gerri McCann - Manila
Rebecca Allen - Valley View	Amanda McMahan - Magnolia
Jane Balgavy - Jacksonville-North Pulaski	Lynn Meade - University of Arkansas
Brandon Box-Higdem - Bentonville	Alisa Melton - Blytheville
Samantha Carpenter - Virtual Arkansas	Jennifer Murphy - El Dorado
Lisa Carver - Texarkana	Traci Myers - Foreman
Kimberly Chavez - Camden Fairview	Tim Peerbolte - Greenwood
Susan Colyer - Fort Smith	Erin Radke - Jessieville
Joan Crowder - Arkadelphia	Jacki Reiff - Gravette
April Erickson - South Conway County	Tracie Richard - Hermitage
Jessica Foster - Siloam Springs	Chad Simpson - Clarendon
Sommer Frazer - McGehee	Dallas Sims - Lakeside (Lake Village)
Natalie Free - Pangburn	Vivian Sisk – KIPP: Delta Collegiate
Eric Gamble - Dardanelle	Andrea Speer - Bentonville
Jennifer Garner - Lakeside (Hot Springs)	Steven Trulock - Huntsville
Roger Guevara - Southern Arkansas University	Rosie Valdez - Little Rock
Shelly Hardin - West Memphis	

Dramatic Literature

Arkansas
English Language Arts Standards

2016

Course Title: Dramatic Literature
Course/Unit Credit: 1
Course Number: 416010
Teacher Licensure: Please refer to the Course Code Management System (https://adedata.arkansas.gov/ccms/) for the most current licensure codes.
Grades: 9-12

Dramatic Literature

Dramatic Literature is a two-semester English elective course designed to engage students in an in-depth study of dramatic literature. Through an examination of written plays, students will become informed, perceptive, and appreciative audience members. To accomplish this goal, students will analyze and evaluate dramatic elements by studying classical to contemporary plays. Students will examine and compare historical influences and contexts, universal themes, and authorial treatment of tragic heroes from various literary periods in dramatic literature. Students will demonstrate understanding of dramatic literature by creating written adaptations and original works. Dramatic Literature does not require Arkansas Department of Education approval.

Dramatic Literature does not fulfill the ½ unit of Fine Arts required for graduation.

Strand	Content Standard
Dramatic Elements	
	1. Students will analyze dramatic elements in a variety of plays from diverse time periods.
Creative Expression	
	2. Students will develop adaptations using dramatic elements.
	3. Students will create original works using dramatic elements.

Notes:
1. Student Learning Expectations (SLEs) may be taught in any sequence.
2. Italicized words in this document appear in the glossary.
3. All items in a bulleted list are required to be taught.
4. The examples given (e.g.,) are suggestions to guide the instructor.

How the Anchor Standards are Labeled

R . CCR . 1

The letter in the first position of the anchor standard numbering system represents the strand:

Reading (R)

Writing (W)

Speaking and Listening (SL)

Language (L)

The symbol in the second position of the anchor standard numbering system represents college and career readiness.

The number in the third position of the anchor standard numbering system represents the standard.

How the SLEs are Labeled

D . 10 . DIII . 2

D	10	DIII	2
Letters in the first position represent the Strand name (e.g., Delivery).	Numbers in the second position represent the Standard number (e.g., Standard 10).	Symbols in the third position represent the Course name and level (e.g., Debate III).	Numbers in the fourth position represent the SLE number (e.g., SLE 2).

Strand: Dramatic Elements

Content Standard 1: Students will analyze dramatic elements in a variety of plays from diverse time periods.

Teacher Note: Students should provide textual evidence when evaluating and analyzing plays. Students should show understanding through a variety of assessment methods (e.g., Socratic circle, essay, script, newspaper column, classroom discussion, debate, non-linguistic representation, advertisement).

		AR ELA Alignment
DE.1.DL.1	Examine the historical influences and contexts of various time periods on plays and playwrights (e.g., Greek, Roman, medieval, Renaissance, modern, contemporary): • audience • format • genre (e.g., tragedy, comedy, melodrama) • purpose	R.CCR.3, R.CCR.4, R.CCR.10, W.CCR.2, W.CCR.4, W.CCR.5, W.CCR.6, W.CCR.7, W.CCR.8, W.CCR.9, W.CCR.10, SL.CCR.1, SL.CCR.2, L.CCR.1, L.CCR.2, L.CCR.3, L.CCR.6
DE.1.DL.2	Evaluate playwright choices as influenced by historical and cultural context: • character analysis • dialogue • conflict • foil • plot • setting • theme	R.CCR.5, R.CCR.10, R.CCR.5, R.CCR.10, W.CCR.1, W.CCR.2, W.CCR.4, W.CCR.5, W.CCR.6, W.CCR.7, W.CCR.8, W.CCR.9, W.CCR.10, L.CCR.1, L.CCR.2, L.CCR.3, L.CCR.6
DE.1.DL.3	Analyze the influence of Aristotle's theory of *tragedy* on a subsequent drama by citing evidence from the script: • chorus • language (e.g., dialogue, poetry) • rhythm • spectacle (e.g., scenery, costumes, lighting) • *tragic hero*	R.CCR.3, R.CCR.4, R.CCR.5, R.CCR.6, R.CCR.7, W.CCR.1, W.CCR.4, W.CCR.5, W.CCR.6, W.CCR.7, W.CCR.8, W.CCR.9, W.CCR.10, L.CCR.1, L.CCR.2, L.CCR.3, L.CCR.6

DE.1.DL.4	Compare and contrast *authorial treatments* of *tragic heroes* from various literary periods: • character development • downfall • impact on other characters • tragic flaw	R.CCR.4, R.CCR.9, W.CCR.4, W.CCR.5, W.CCR.9, W.CCR.10, L.CCR.1, L.CCR.2, L.CCR.3, L.CCR.6
DE.1.DL.5	Analyze a playwright's use of *dramatic elements* to develop *universal themes*	R.CCR.1, R.CCR.2, R.CCR.3, R.CCR.4, R.CCR.5, R.CCR.7, R.CCR.10, W.CCR.2, W.CCR.4, W.CCR.5, W.CCR.9, W.CCR.10, SL.CCR.1, SL.CCR.2, L.CCR.1, L.CCR.2, L.CCR.3, L.CCR.6
DE.1.DL.6	Analyze two or more classical Greek *tragedies* (e.g., Eumenides by Aeschylus; Medea by Euripides; Oedipus the King by Sophocles): • character (e.g., *inner world*, *outer world*) • given circumstances (e.g., setting, society, economics, cultural, spirituality or religion, previous action) • literary devices (e.g., allusions, imagery, symbolism, theme) • plot (e.g., structure, major moments)	R.CCR.1, R.CCR.2, R.CCR.7, R.CCR.10, W.CCR.1, W.CCR.2, W.CCR.4, W.CCR.5, W.CCR.6, W.CCR.7, W.CCR.8, W.CCR.9, W.CCR.10, SL.CCR.1, SL.CCR.2, L.CCR.1, L.CCR.2, L.CCR.3, L.CCR.6
DE.1.DL.7	Analyze one Medieval *morality*, *mystery*, or *miracle* play (e.g., Castle of Perseverance; Disobedient Child translated by Thomas Ingelend; Everyman translated by Peter Van Diest; Raising of Lazarus; The Second Shepherd's Play): • character (e.g., *inner world, outer world*) • given circumstances (e.g., setting, society, economics, cultural, spirituality or religion, previous action) • literary devices (e.g., allusions, imagery, symbolism, theme) • plot (e.g., structure, major moments)	R.CCR.1, R.CCR.2, R.CCR.7, R.CCR.10, W.CCR.1, W.CCR.2, W.CCR.4, W.CCR.5, W.CCR.6, W.CCR.7, W.CCR.8, W.CCR.9, W.CCR.10, SL.CCR.1, SL.CCR.2, L.CCR.1, L.CCR.2, L.CCR.3, L.CCR.6

DE.1.DL.8	Analyze two or more Renaissance *comedies* or *tragedies* (e.g., Much Ado About Nothing, Othello, The Tempest by William Shakespeare; The Tragical History of Dr. Faustus by Christopher Marlowe; Tartuffe and Misanthrope by Moliere; The Spanish Tragedy by Thomas Kyd): • character (e.g., *inner world, outer world*) • given circumstances (e.g., setting, society, economics, cultural, spirituality or religion, previous action) • literary devices (e.g., allusions, imagery, symbolism, theme) • plot (e.g., structure, major moments)	R.CCR.1, R.CCR.2, R.CCR.7, R.CCR.10, W.CCR.1, W.CCR.2, W.CCR.4, W.CCR.5, W.CCR.6, W.CCR.7, W.CCR.8, W.CCR.9, W.CCR.10, SL.CCR.1, SL.CCR.2, L.CCR.1, L.CCR.2, L.CCR.3, L.CCR.6
DE.1.DL.9	Analyze two or more dramatic works from the eighteenth century or the nineteenth century (e.g., British *comedy of manners*: The Importance of Being Earnest by Oscar Wilde; French satire: Norwegian *realism*: A Doll's House and Ghosts by Henrik Ibsen; Russian *realism*: The Sea Gull and Cherry Orchard by Anton Chekhov): • character (e.g., *inner world, outer world*) • given circumstances (e.g., setting, society, economics, cultural, spirituality or religion, previous action) • literary devices (e.g., allusions, imagery, symbolism, theme) • plot (e.g., structure, major moments)	R.CCR.1, R.CCR.2, R.CCR.7, R.CCR.10, W.CCR.1, W.CCR.2, W.CCR.4, W.CCR.5, W.CCR.6, W.CCR.7, W.CCR.8, W.CCR.9, W.CCR.10, SL.CCR.1, SL.CCR.2, L.CCR.1, L.CCR.2, L.CCR.3, L.CCR.6
DE.1.DL.10	Analyze two or more dramatic works (e.g., television scripts, movie scripts, musicals) from the twentieth century to the contemporary period (e.g., A Raisin in the Sun by Lorraine Hansberry; A Street Car Named Desire by Tennessee Williams; Barefoot in the Park by Neil Simon; Death and the King's Horseman by Wole Soyinka; Death of a Salesman by Arthur Miller; Fences and The Piano Lesson by August Wilson; Little Sister by Joan McCloud; Novio Boy by Gary Soto; Our Town by Thornton Wilder; Sizwe Banzi is Dead by Athol Fugard; Waiting for Godot by Samuel Beckett; M. Butterfly by David Henry Hwang; Angels in America: Part 1 and 2 by Tony Kushner; Oklahoma by Rogers and Hammenstein): • character (e.g., *inner world, outer world*) • given circumstances (e.g., setting, society, economics, cultural, spirituality or religion, previous action) • literary devices (e.g., allusions, imagery, symbolism, theme) • plot (e.g., structure, major moments)	R.CCR.1, R.CCR.2, R.CCR.7, R.CCR.10, W.CCR.1, W.CCR.2, W.CCR.4, W.CCR.5, W.CCR.6, W.CCR.7, W.CCR.8, W.CCR.9, W.CCR.10, SL.CCR.1, SL.CCR.2, L.CCR.1, L.CCR.2, L.CCR.3, L.CCR.6
DE.1.DL.11	Present a scene or monologue from a dramatic work using vocal variety and facial expressions	R.CCR.1, R.CCR.2, R.CCR.7, R.CCR.10, SL.CCR.1, SL.CCR.2, SL.CCR.3, SL.CCR.4, SL.CCR.5, SL.CCR.6

Strand: Creative Expression

Content Standard 2: Students will develop adaptations using dramatic elements.

		AR ELA Alignment
CE.2.DL.1	Adapt a scene, using *dramatic elements*, to a different time period	R.CCR.3, R.CCR.4, R.CCR.5, R.CCR.6, W.CCR.3, W.CCR.4, W.CCR.5, W.CCR.6, W.CCR.10, SL.CCR.1, SL.CCR.2, SL.CCR.3, SL.CCR.6
CE.2.DL.2	Adapt a monologue to a different medium (e.g., song, poem, art work, multimedia piece)	RCCR.1, R.CCR.4 R.CCR.5, R.CCR.6, R.CCR.10, W.CCR.2, W.CCR.4, W.CCR.6, W.CCR.10, SL.CCR.1, SL.CCR.4, SL.CCR.5, SL.CCR.6
CE.2.DL.3	Present an adaptation of a scene or monologue from a dramatic work using vocal variety and facial expressions	R.CCR.1, R.CCR.4, R.CCR.5, R.CCR.6, R.CCR.10, W.CCR.2, W.CCR.4, W.CCR.6, W.CCR.10, SL.CCR.1, SL.CCR.3, SL.CCR.4, SL.CCR.5, SL.CCR.6

Strand: Creative Expression

Content Standard 3: Students will create original works using dramatic elements.

		AR ELA Alignment
CE.3.DL.1	Write an alternative ending to a classic play, considering all *dramatic elements*	R.CCR.3, R.CCR.4, R.CCR.5, R.CCR.6, W.CCR.3, W.CCR.4, W.CCR.5, W.CCR.6, W.CCR.10, L.CCR.1, L.CCR.2, L.CCR.3, L.CCR.6
CE.3.DL.2	Compose an original script using *dramatic elements*: • development of a complete plot • development of two or more characters • play formatting (e.g., stage directions, dialogue, production notes)	R.CCR.5, R.CCR.6, W.CCR.3, W.CCR.4, W.CCR.5, W.CCR.6, W.CCR.10, L.CCR.1, L.CCR.2
CE.3.DL.3	Present a scene or monologue from an original dramatic work using vocal variety and facial expressions	R.CCR.5, R.CCR.6, W.CCR.3, W.CCR.4, W.CCR.5, W.CCR.6, W.CCR.10, SL.CCR.1, SL.CCR.2, SL.CCR.3, SL.CCR.4, SL.CCR.5, SL.CCR.6, L.CCR.1, L.CCR.2, L.CCR.3, L.CCR.6

Glossary for Dramatic Literature

Authorial treatment	Playwright's style as it relates to the use of dramatic elements in developing the overall meaning of the play
Blocking	Positions and movements of the actors on the stage
Comedy	A play that ends happily, presents the lighter side of life, and represents ordinary people
Comedy of manners	A form of comedy that satirizes characters, usually from the upper class, who fail or refuse to conform to polite society
Dramatic device	A technique employed by the playwright to create a desired effect (e.g., acts, scenes, lines, prologue, epilogue, asides, soliloquies)
Dramatic elements	Plot (e.g., exposition, rising action, climax, falling action, resolution, conflict) characters (e.g., protagonist, antagonist, foil), dialogue, theme, and spectacle (e.g., costumes, set)
Inner world	A character's psychological and emotional state (e.g., desire, will, decorum, morals)
Outer world	A character's environmental and physical traits (e.g., social status, education, physical description, unusual physical characteristics)
Miracle play	A play about the lives of saints and the wonders they performed
Morality play	A play about virtues and vices such as fellowship, good deeds, and death, which uses allegory to make a point
Mystery play	A play that is a representation of a Bible story from Creation to Judgment
Realism	Accurate depiction of the everyday life of a place or period
Satire	Bitter irony to point out shortcomings or injustices in society
Tragedy	A play that typically ends in disaster
Tragic hero	A protagonist who has a downfall, suffers, or experiences defeat
Universal theme	A central idea (e.g., love, death, marriage, human suffering, justice) about the human condition applicable to all humans regardless of cultural differences or geographical location even though the plays are written decades or centuries apart

Contributors

The following people contributed to the development of this document:

Jennifer Akers - Cabot	Amy Matthews - Fayetteville
Tammy Alexander - Nashville	Gerri McCann - Manila
Rebecca Allen - Valley View	Amanda McMahan - Magnolia
Jane Balgavy - Jacksonville-North Pulaski	Lynn Meade - University of Arkansas
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Lisa Carver - Texarkana	Traci Myers - Foreman
Kimberly Chavez - Camden Fairview	Tim Peerbolte - Greenwood
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Sommer Frazer - McGehee	Dallas Sims - Lakeside (Lake Village)
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Eric Gamble - Dardanelle	Andrea Speer - Bentonville
Jennifer Garner - Lakeside (Hot Springs)	Steven Trulock - Huntsville
Roger Guevara - Southern Arkansas University	Rosie Valdez - Little Rock
Shelly Hardin - West Memphis	

English Language Arts (ELA) Drama

Arkansas
English Language Arts Standards

2016

Course Title: English Language Arts (ELA) Drama
Course/Unit Credit: 0.5
Course Number: 416000
Teacher Licensure: Please refer to the Course Code Management System (https://adedata.arkansas.gov/ccms/) for the most current licensure codes.
Grades: 9-12

English Language Arts (ELA) Drama

ELA Drama is a one-semester English elective course designed to engage students in an in-depth study of dramatic literature. Through an examination of written plays, students will become informed, perceptive, and appreciative audience members. To accomplish this goal, students will analyze and evaluate dramatic elements by studying classical to contemporary plays. Students will examine and compare historical influences and contexts, universal themes, and authorial treatment of tragic heroes from various literary periods in dramatic literature. Students will demonstrate understanding of dramatic literature by creating written adaptations and original works. ELA Drama does not require Arkansas Department of Education approval.

ELA Drama does not fulfill the 0.5 unit of Fine Arts required for graduation.

Strand	Content Standard
Dramatic Elements	
	1. Students will analyze dramatic elements in a variety of plays from diverse time periods.
Creative Expression	
	2. Students will develop adaptations using dramatic elements.
	3. Students will create original works using dramatic elements.

Notes:
1. Student Learning Expectations (SLEs) may be taught in any sequence.
2. Italicized words in this document appear in the glossary.
3. All items in a bulleted list are required to be taught.
4. The examples given (e.g.,) are suggestions to guide the instructor.

How the Anchor Standards are Labeled

R . CCR . 1

The letter in the first position of the anchor standard numbering system represents the strand:

Reading (R)

Writing (W)

Speaking and Listening (SL)

Language (L)

The symbol in the second position of the anchor standard numbering system represents college and career readiness.

The number in the third position of the anchor standard numbering system represents the standard.

How the SLEs are Labeled

D . 10 . DIII . 2

D	10	DIII	2
Letters in the first position represent the Strand name (e.g., Delivery).	Numbers in the second position represent the Standard number (e.g., Standard 10).	Symbols in the third position represent the Course name and level (e.g., Debate III).	Numbers in the fourth position represent the SLE number (e.g., SLE 2).

Strand: Dramatic Elements

Content Standard 1: Students will analyze dramatic elements in a variety of plays from diverse time periods.

Teacher Note: Students should provide textual evidence when evaluating and analyzing plays. Students should show understanding through a variety of assessment methods (e.g., Socratic circle, essay, script, newspaper column, classroom discussion, debate, non-linguistic representation, advertisement).

		AR ELA Alignment
DE.1.ELAD.1	Examine the historical influences and contexts of various time periods on plays and playwrights (e.g., Greek, Roman, medieval, Renaissance, modern, contemporary): • purpose • audience • genre (e.g., tragedy, comedy, melodrama) • format	R.CCR.3, R.CCR.4, R.CCR.10, W.CCR,2, W.CCR.4, W.CCR.5, W.CCR.6, W.CCR.7, W.CCR.8, W.CCR.9, W.CCR.10, SL.CCR.1, SL.CCR.2, L.CCR.1, L.CCR.2, L.CCR.3, L.CCR.6
DE.1.ELAD.2	Evaluate playwright choices as influenced by historical and cultural context: • character analysis • conflict • dialogue • foil • plot • setting • theme	R.CCR.5, R.CCR.10, R.CCR.5, R.CCR.10, W.CCR.1, W.CCR.2, W.CCR.4, W.CCR.5, W.CCR.6, W.CCR.7, W.CCR.8, W.CCR.9, W.CCR.10, L.CCR.1, L.CCR.2, L.CCR.3, L.CCR.6
DE.1.ELAD.3	Analyze the influence of Aristotle's theory of *tragedy* on a subsequent drama by citing evidence from the script: • chorus • language (e.g., dialogue, poetry) • rhythm • spectacle (e.g., scenery, costumes, set design, lighting) • *tragic hero*	R.CCR.3, R.CCR.4, R.CCR.5, R.CCR.6, R.CCR.7, W.CCR.1, W.CCR.4, W.CCR.5, W.CCR.6, W.CCR.7, W.CCR.8, W.CCR.9, W.CCR.10, L.CCR.1, L.CCR.2, L.CCR.3, L.CCR.6

DE.1.ELAD.4	Compare and contrast *authorial treatments* of *tragic heroes* from two literary periods (e.g., Elizabethan tragic hero vs. contemporary tragic hero): • character development • downfall • impact on other characters • tragic flaw	R.CCR.4, R.CCR.9, W.CCR.4, W.CCR.5, W.CCR.9, W.CCR.10, L.CCR.1, L.CCR.2, L.CCR.3, L.CCR.6
DE.1.ELAD.5	Analyze a playwright's use of *dramatic elements* to develop *universal themes*	R.CCR.1, R.CCR.2, R.CCR.3, R.CCR.4, R.CCR.5, R.CCR.7, R.CCR.10, W.CCR.2, W.CCR.4, W.CCR.5, W.CCR.9, W.CCR.10, SL.CCR.1, SL.CCR.2, L.CCR.1, L.CCR.2, L.CCR.3, L.CCR.6
DE.1.ELAD.6	Analyze one classical Greek tragedy (e.g., Eumenides by Aeschylus; Medea by Euripides; Oedipus the King by Sophocles): • character (e.g., *inner world*, *outer world*) • given circumstances (e.g., setting, society, economics, cultural, spirituality or religion, previous action) • literary devices (e.g., allusions, imagery, symbolism, theme) • plot (e.g., structure, major moments)	R.CCR.1, R.CCR.2, R.CCR.7, R.CCR.10, W.CCR.1, W.CCR.2, W.CCR.4, W.CCR.5, W.CCR.6, W.CCR.7, W.CCR.8, W.CCR.9, W.CCR.10, SL.CCR.1, SL.CCR.2, L.CCR.1, L.CCR.2, L.CCR.3, L.CCR.6
DE.1.ELAD.7	Analyze one Medieval *morality*, *mystery*, or m*iracle* play (e.g., Castle of Perseverance; Disobedient Child translated by Thomas Ingelend; Everyman translated by Peter Van Diest; Raising of Lazarus; The Second Shepherd's Play): • character (e.g., *inner world, outer world*) • given circumstances (e.g., setting, society, economics, cultural, spirituality or religion, previous action) • literary devices (e.g., allusions, imagery, symbolism, theme) • plot (e.g., structure, major moments)	R.CCR.1, R.CCR.2, R.CCR.7, R.CCR.10, W.CCR.1, W.CCR.2, W.CCR.4, W.CCR.5, W.CCR.6, W.CCR.7, W.CCR.8, W.CCR.9, W.CCR.10, SL.CCR.1, SL.CCR.2, L.CCR.1, L.CCR.2, L.CCR.3, L.CCR.6
DE.1.ELAD.8	Analyze one or more Renaissance *comedies* or *tragedies*	R.CCR.1, R.CCR.2, R.CCR.7, R.CCR.10, W.CCR.1, W.CCR.2,

	(e.g., Much Ado About Nothing, Othello, The Tempest by William Shakespeare; The Tragical History of Dr. Faustus by Christopher Marlowe; Tartuffe and Misanthrope by Moliere; The Spanish Tragedy by Thomas Kyd): • character (e.g., *inner world, outer world*) • given circumstances (e.g., setting, society, economics, cultural, spirituality or religion, previous action) • literary devices (e.g., allusions, imagery, symbolism, theme) • plot (e.g., structure, major moments)	W.CCR.4, W.CCR.5, W.CCR.6, W.CCR.7, W.CCR.8, W.CCR.9, W.CCR.10, SL.CCR.1, SL.CCR.2, L.CCR.1, L.CCR.2, L.CCR.3, L.CCR.6
DE.1.ELAD.9	Analyze one or more dramatic works from the eighteenth century or the nineteenth century (e.g., British *comedy of manners*: The Importance of Being Earnest by Oscar Wilde; French satire: Norwegian *realism*: A Doll's House and Ghosts by Henrik Ibsen; Russian *realism*: The Sea Gull and Cherry Orchard by Anton Chekhov): • character (e.g., *inner world, outer world*) • given circumstances (e.g., setting, society, economics, cultural, spirituality or religion, previous action) • literary devices (e.g., allusions, imagery, symbolism, theme) • plot (e.g., structure, major moments)	R.CCR.1, R.CCR.2, R.CCR.7, R.CCR.10, W.CCR.1, W.CCR.2, W.CCR.4, W.CCR.5, W.CCR.6, W.CCR.7, W.CCR.8, W.CCR.9, W.CCR.10, SL.CCR.1, SL.CCR.2, L.CCR.1, L.CCR.2, L.CCR.3, L.CCR.6
DE.1.ELAD.10	Analyze two or more dramatic works (e.g., television scripts, movie scripts, musicals) from the twentieth century to the contemporary period (e.g., A Raisin in the Sun by Lorraine Hansberry; A Street Car Named Desire by Tennessee Williams; Barefoot in the Park by Neil Simon; Death and the King's Horseman by Wole Soyinka; Death of a Salesman by Arthur Miller; Fences and The Piano Lesson by August Wilson; Little Sister by Joan McCloud; Novio Boy by Gary Soto; Our Town by Thornton Wilder; Sizwe Banzi is Dead by Athol Fugard; Waiting for Godot by Samuel Beckett; M. Butterfly by David Henry Hwang; Angels in America: Part 1 and 2 by Tony Kushner; Oklahoma by Rogers and Hammenstein): • character (e.g., *inner world, outer world*) • given circumstances (e.g., setting, society, economics, cultural, spirituality or religion, previous action) • literary devices (e.g., allusions, imagery, symbolism, theme) • plot (e.g., structure, major moments)	R.CCR.1, R.CCR.2, R.CCR.7, R.CCR.10, W.CCR.1, W.CCR.2, W.CCR.4, W.CCR.5, W.CCR.6, W.CCR.7, W.CCR.8, W.CCR.9, W.CCR.10, SL.CCR.1, SL.CCR.2, L.CCR.1, L.CCR.2, L.CCR.3, L.CCR.6
DE.1.ELAD.11	Present a scene or monologue from a dramatic work using vocal variety and facial expressions	R.CCR.1, R.CCR.2, R.CCR.7, R.CCR.10, SL.CCR.1, SL.CCR.2, SL.CCR.3, SL.CCR.4, SL.CCR.5, SL.CCR.6

Strand: Creative Expression

Content Standard 2: Students will develop adaptations using dramatic elements.

		AR ELA Alignment
CE.2.ELAD.1	Adapt a scene, using *dramatic elements*, to a different time period	R.CCR.3, R.CCR.4, R.CCR.5, R.CCR.6, W.CCR.3, W.CCR.4, W.CCR.5, W.CCR.6, W.CCR.10, SL.CCR.1, SL.CCR.2, SL.CCR.3, SL.CCR.6
CE.2.ELAD.2	Adapt a monologue to a different medium (e.g., song, poem, art work, multimedia piece)	R.CCR.1, R.CCR.4, R.CCR.5, R.CCR.6, R.CCR.10, W.CCR.2, W.CCR.4, W.CCR.6, W.CCR.10, SL.CCR.1, SL.CCR.4, SL.CCR.5, SL.CCR.6

Strand: Creative Expression

Content Standard 3: Students will create original works using dramatic elements.

		AR ELA Alignment
CE.3.D.1	Write an alternative ending to a classic play, considering all *dramatic elements*	R.CCR.3, R.CCR.4, R.CCR.5, R.CCR.6, W.CCR.3, W.CCR.4, W.CCR.5, W.CCR.6, W.CCR.10, L.CCR1, L.CCR.2, L.CCR.3, L.CCR.6
CE.3.D.2	Compose an original script using *dramatic elements*: • development of a complete plot • development of two or more characters • play formatting (e.g., stage directions, dialogue, production notes)	R.CCR.5, R.CCR.6, W.CCR.3, W.CCR.4, W.CCR.5, W.CCR.6, W.CCR.10, L.CCR.1, L.CCR.2

Aristotle's theory of tragedy	Aristotle's theory in the Poetics that tragedy should • evoke the emotions of pity and fear in the audience • focus on a hero of high estate who falls from his rightful place through some tragic flaw (hamartia) • result in the purging (catharsis) of those emotions
Authorial treatment	Playwright's style as it relates to the use of dramatic elements in developing the overall meaning of the play
Blocking	Positions and movements of the actors on the stage
Comedy	A play that ends happily, presents the lighter side of life, and represents ordinary people
Comedy of manners	A form of comedy that satirizes characters, usually from the upper class, who fail or refuse to conform to polite society
Dramatic device	A technique employed by the playwright to create a desired effect (e.g., acts, scenes, lines, prologue, epilogue, asides, soliloquies)
Dramatic elements	Plot (e.g., exposition, rising action, climax, falling action, resolution, conflict) characters (e.g., protagonist, antagonist, foil), dialogue, theme, and spectacle (e.g., costumes, set)
Inner world	A character's psychological and emotional state (e.g., desire, will, decorum, morals)
Outer world	A character's environmental and physical traits (e.g., social status, education, physical description, unusual physical characteristics)
Miracle play	A play about the lives of saints and the wonders they performed
Morality play	A play about virtues and vices such as fellowship, good deeds, and death, which uses allegory to make a point
Mystery play	A play that is a representation of a Bible story from Creation to Judgment
Realism	Accurate depiction of the everyday life of a place or period
Satire	Bitter irony to point out shortcomings or injustices in society
Tragedy	A play that typically ends in disaster
Tragic hero	A protagonist who has a downfall, suffers, or experiences defeat
Universal theme	A central idea (e.g., love, death, marriage, human suffering, justice) about the human condition applicable to all humans regardless of cultural differences or geographical location even though the plays are written decades or centuries apart

Contributors

The following people contributed to the development of this document:

Jennifer Akers - Cabot	Amy Matthews - Fayetteville
Tammy Alexander - Nashville	Gerri McCann - Manila
Rebecca Allen - Valley View	Amanda McMahan - Magnolia
Jane Balgavy - Jacksonville-North Pulaski	Lynn Meade - University of Arkansas
Brandon Box-Higdem - Bentonville	Alisa Melton - Blytheville
Samantha Carpenter - Virtual Arkansas	Jennifer Murphy - El Dorado
Lisa Carver - Texarkana	Traci Myers - Foreman
Kimberly Chavez - Camden Fairview	Tim Peerbolte - Greenwood
Susan Colyer - Fort Smith	Erin Radke - Jessieville
Joan Crowder - Arkadelphia	Jacki Reiff - Gravette
April Erickson - South Conway County	Tracie Richard - Hermitage
Jessica Foster - Siloam Springs	Chad Simpson - Clarendon
Sommer Frazer - McGehee	Dallas Sims - Lakeside (Lake Village)
Natalie Free - Pangburn	Vivian Sisk – KIPP: Delta Collegiate
Eric Gamble - Dardanelle	Andrea Speer - Bentonville
Jennifer Garner - Lakeside (Hot Springs)	Steven Trulock - Huntsville
Roger Guevara - Southern Arkansas University	Rosie Valdez - Little Rock
Shelly Hardin - West Memphis	

Forensics I

Arkansas
English Language Arts Standards

2016

Course Title: Forensics I
Course/Unit Credit: 1
Course Number: 414020
Teacher Licensure: Please refer to the Course Code Management System (https://adedata.arkansas.gov/ccms/) for the most current licensure codes.
Grades: 9-12

Forensics I

Forensics I is a prerequisite for Forensics II. Students entering Forensics II, III, or IV must have successfully completed the preceding year of study. Forensics I is a foundational course and cannot be combined with other courses. Forensics II-IV may be taught within the same class period; however, the student learning expectations for each level are different and must be addressed.

Forensics I is a two-semester course which will provide students with an understanding of the dynamics of effective oral communication when speaking, listening, and responding. Students will develop basic communication competencies including ethical practices in communication, recognition of communication barriers, effective use of interpersonal communication through verbal and nonverbal messages, and use of digital media. Listed in this document as Strand 4, Communication Competencies, life skills are embedded throughout the course. In Forensics I, students will develop research skills to prepare for a variety of public speaking formats, including debate, public address, and oral interpretation of literature. Furthermore, students will organize research and analysis of topics into presentations and performances delivered in a variety of formats and for a variety of audiences. Students will engage in oral advocacy to promote community partnerships, enhance community engagement, and cultivate a positive school culture. Forensics I fulfills the ½ unit of Oral Communication required for graduation and does not require Arkansas Department of Education approval.

Strand	Content Standard
Research	
	1. Students will engage in inquiry and research to prepare a foundation for communicating to various audiences.
Organization	
	2. Students will organize literary selections and informational text into effective oral presentations and performances.
Presentation	
	3. Students will perform interpretations of literature and deliver presentations and performances conveying concepts and ideas to a variety of audiences.
Communication Competencies	
	4. Students will demonstrate fundamental oral communication competencies.
Oral Advocacy	
	5. Students will participate at the fundamental level in community outreach, culminating in events.

Notes:

1. Each level continues to address earlier Student Learning Expectations (SLEs) as needed.
2. Student Learning Expectations (SLEs) may be taught in any sequence.
3. Italicized words in this document appear in the glossary.
4. All items in a bulleted list are required to be taught.
5. The examples given (e.g.,) are suggestions to guide the instructor.

How the Anchor Standards are Labeled

R . CCR . 1

The letter in the first position of the anchor standard numbering system represents the strand:

Reading (R)

Writing (W)

Speaking and Listening (SL)

Language (L)

The symbol in the second position of the anchor standard numbering system represents college and career readiness.

The number in the third position of the anchor standard numbering system represents the standard.

How the SLEs are Labeled

D . 10 . DIII . 2

D	10	DIII	2
Letters in the first position represent the Strand name (e.g., Delivery).	Numbers in the second position represent the Standard number (e.g., Standard 10).	Symbols in the third position represent the Course name and level (e.g., Debate III).	Numbers in the fourth position represent the SLE number (e.g., SLE 2).

Strand: Research

Content Standard 1: Students will engage in inquiry and research to prepare a foundation for communicating to various audiences.

		AR ELA Alignment
R.1.FI.1	Identify the elements of a story	R.CCR.5
R.1.FI.2	Determine the meaning of literature	R.CCR.1, R.CCR.2, R.CCR.3, R.CCR.4, R.CCR.5, R.CCR.6, R.CCR.10
R.1.FI.3	Discover author's intent	R.CCR.1, R.CCR.2, R.CCR.3, R.CCR.6, R.CCR.10
R.1.FI.4	Investigate characterization	R.CCR.3
R.1.FI.5	Select materials with *literary merit*	R.CCR.10
R.1.FI.6	Investigate sources affiliated with forensics to analyze literature for performance	R.CCR.10
R.1.FI.7	Identify the tone of a selection	R.CCR.1, R.CCR.4
R.1.FI.8	Identify the elements of a performance: • character • diction • music • plot • spectacle • theme	
R.1.FI.9	Research historical context and cultural influences	R.CCR.1, R.CCR.2, W.CCR.7, W.CCR.8, W.CCR.9
R.1.FI.10	Identify sources of current and political events for discussion	R.CCR.7, R.CCR.8, R.CCR.9
R.1.FI.11	Gather relevant information from multiple credible print and digital sources, using advanced searches effectively	W.CCR.8
R.1.FI.12	Establish small groups to collect and analyze researched material	

R.1.FI.13	Identify imagery in a selection	R.CCR.1, R.CCR.4, L.CCR.5
R.1.FI.14	Examine the credibility of an author’s argument	W.CCR.8
R.1.FI.15	Examine models of audience-centered speeches/performances	R.CCR.7, R.CCR.10

Strand: Organization

Content Standard 2: Students will organize literary selections and informational text into effective oral presentations and performances.

		AR ELA Alignment
O.2.FI.1	Conduct audience-centered analysis for each presentation	SL.CCR.4, SL.CCR.6
O.2.FI.2	Create effective introductions: • attention device • preview • transition	SL.CCR.6, L.CCR.3
O.2.FI.3	Identify the process involved in cutting a selection	
O.2.FI.4	Use evidence to support ideas	SL.CCR.4, SL.CCR.5
O.2.FI.5	Identify effective transitions between • main points • material to material • selection to selection	SL.CCR.4
O.2.FI.6	Cite sources accurately and appropriately	R.CCR.1, W.CCR.8, SL.CCR.4
O.2.FI.7	Identify criteria for speech topics	
O.2.FI.8	Recognize organizational patterns	R.CCR.5, SL.CCR.4
O.2.FI.9	Identify research sources for extemporaneous speaking	R.CCR.10, W.CCR.7, W.CCR.8, W.CCR.9
O.2.FI.10	Determine point of view and perspective	R.CCR.6, SL.CCR.3
O.2.FI.11	Utilize specialized vocabulary	L.CCR.6
O.2.FI.12	Create storyboards	W.CCR.5
O.2.FI.13	Create effective conclusions: • transitions • reiteration • ending statement	SL.CCR.6, L.CCR.3

O.2.FI.14	Work collaboratively to write and revise original work	W.CCR.5, W.CCR.6
O.2.FI.15	Collaborate to collect and analyze researched materials	W.CCR.6, W.CCR.7, W.CCR.8, W.CCR.9
O.2.FI.16	Build effective teams and work groups	
O.2.FI.17	Create a portfolio of selections, topics, and research	

Strand: Presentation

Content Standard 3: Students will perform interpretations of literature and deliver presentations and performances conveying concepts and ideas to a variety of audiences.

		AR ELA Alignment
P.3.FI.1	Develop a fundamental understanding of basic competitive events adhering to a national set performance criteria: • dramatic interpretation • duo interpretation • extemporaneous speaking • humorous interpretation • improvised duet acting • informative speaking • original oratory • poetry • program oral interpretation • prose • storytelling	
P.3.FI.2	Present oral readings from literary and informational text	R.CCR.10, SL.CCR.6
P.3.FI.3	Perform a variety of literary selections	SL.CCR.6
P.3.FI.4	Observe multiple selections of similar genres that are connected with a central theme	R.CCR.9, R.CCR.10
P.3.FI.5	Create believable characters using nonverbal language	
P.3.FI.6	Score a script	
P.3.FI.7	Create intensity with varied vocal inflection	SL.CCR.6
P.3.FI.8	Utilize clear articulation	SL.CCR.6
P.3.FI.9	Defend a perspective	SL.CCR.4, SL.CCR.5, SL.CCR.6
P.3.FI.10	Present information with evidence	SL.CCR.4, SL.CCR.5, SL.CCR.6

P.3.FI.11	Adapt presentation to context and audience	SL.CCR.4, SL.CCR.5, SL.CCR.6
P.3.FI.12	Develop arguments to support a claim	SL.CCR.4, SL.CCR.5, SL.CCR.6
P.3.FI.13	Determine appropriate movement for presentation: • platform movement • *proxemics*/special communication	
P.3.FI.14	Integrate multiple sources	SL.CCR.2
P.3.FI.15	Conduct peer reviews: • clarity • effectiveness of delivery • faulty reasoning and logical fallacies (e.g., *ad hominem, ad populum, post hoc ergo propter hoc,* appeal to authority, appeal to tradition, band wagon, begging the question, fallacy of unimpeachable source, mistaken cause, name calling, red herring, straw man) • organization of evidence • relevance	SL.CCR.3
P.3.FI.16	Incorporate chosen feedback into future presentations or performances: • peer ballots and rubrics • teacher/evaluator ballots and rubrics	SL.CCR.6
P.3.FI.17	Accept and analyze appropriate feedback from critiques	SL.CCR.6

P.3.FI.18	Demonstrate direction terminology to personal and group performances: • above • backstage • below • counter cross • downstage • full back • full front • offstage • onstage • profile • stage left • stage right • three-quarter • upstage • wings	L.CCR.6

Strand: Communication Competencies

Content Standard 4: Students will demonstrate fundamental oral communication competencies.

		AR ELA Alignment
CC.4.FI.1	Apply principles of ethical communication appropriate to context: • *academic honesty* • bias • communication responsibility • plagiarism • respect for *diversity*	SL.CCR.6
CC.4.FI.2	Analyze the reduction of communication barriers (e.g., intrapersonal, adversarial mindset, bias, communication, apprehension, environment, noise, nonverbal communication, perception, *proxemics*/spatial, *reticence*, *semantics*)	SL.CCR.6
CC.4.FI.3	Demonstrate mutual respect when addressing behaviors that affect interpersonal communication: • aggressive • assertive • conflict • passive • passive/aggressive	SL.CCR.1, SL.CCR.6
CC.4.FI.4	Demonstrate appropriate critical, empathetic, appreciative, and reflective listening skills in formal and informal situations: • active listening behaviors • false assumptions • loaded terms • notetaking • sarcasm	SL.CCR.1, SL.CCR.6
CC.4.FI.5	Discuss effective nonverbal communication skills: • attire • facial expressions • gestures • body language	

CC.4.FI.6	Use context-appropriate oral messages: • concrete expressions of thought • connotation vs. denotation • dialects • International Phonetic Alphabet • jargon • slang • standard English • words and symbols	SL.CCR.1, SL.CCR.6

Strand: Oral Advocacy

Content Standard 5: Students will participate at the fundamental level in community outreach, culminating in events.

		AR ELA Alignment
OA.5.FI.1	Understand fundamental terminology and execution of a competitive event	L.CCR.6
OA.5.FI.2	Help execute the duties and needs assigned to upper-level leadership, documenting the process to secure event resources (e.g., judges, concessions, security, hospitality, time keepers, public relations, volunteers as needed)	
OA.5.FI.3	Solicit the community for needed resources and materials to hold events	W.CCR.2

Teacher Note
OA.5.FI.3 Students document their process to find needed resources and materials.

Glossary for Forensics I

Academic honesty	Performing all academic work in a responsible and ethical manner, which includes acknowledging any source of information that is not common knowledge and completing academic work without cheating, lying, stealing, or sharing information without authorization
Ad hominem	A Latin term meaning “to the man”; attacking an opponent’s character rather than answering his argument
Ad populum	A Latin term meaning “to the popular opinion”; a fallacious argument that concludes it must be true because many or most people believe it
Arkansas Communication and Theater Arts Association (ACTAA)	State professional organization that encompasses theater, drama, theater dance, oral communication, forensics, and debate
Diversity	Differences in individuals (e.g., ability, culture, federally protected categories, gender, race, religion, socio-economic status)
Literary merit	The quality shared by all works of fiction that are considered to have aesthetic value
National Speech and Debate Association (NSDA)	National professional organization for debate, speech, and forensics
Paralanguage	Nonverbal means of communication (e.g., tone of voice, laughter, gestures, facial expressions) that accompany speech and convey further meaning
Post hoc ergo propter hoc	A Latin term meaning “after the fact, therefore before the fact”; this is a conclusion that assumes if “A” occurred after “B”, then “B” must have caused “A”
Proxemics	Communicating with others by virtue of the relative positioning of the body
Reticence	The trait of being uncommunicative; not volunteering anything more than necessary
Semantics	The study of the meanings of words

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Roger Guevara - Southern Arkansas University	Rosie Valdez - Little Rock
Shelly Hardin - West Memphis	

Forensics II

Arkansas
English Language Arts Standards

2016

Course Title:	Forensics II
Course/Unit Credit:	1
Course Number:	414030
Teacher Licensure:	Please refer to the Course Code Management System (https://adedata.arkansas.gov/ccms/) for the most current licensure codes.
Grades:	9-12
Prerequisite:	Forensics I

Forensics II

Forensics I is a prerequisite for Forensics II. Students entering Forensics II, III, or IV must have successfully completed the preceding year of study. Forensics I is a foundational course and cannot be combined with other courses. Forensics II-IV may be taught within the same class period; however, the student learning expectations for each level are different and must be addressed.

Forensics II is a two-semester course which will provide students with an opportunity to demonstrate communication and performance skills at an intermediate level. Students will cultivate effective vocal delivery, emphasizing articulation, projection, and inflection. They will cultivate appropriate movement and gesture to accentuate meaning. These communication and performance skills, which will serve students well throughout their lives, are embedded throughout the course. Students will acquire skills necessary to make aesthetic choices in the selection, preparation, and presentation of literature from a wide variety of genres. Students will practice all genres of public speaking. Students will engage in oral advocacy to promote community partnerships, enhance community engagement, and cultivate a positive school culture. Forensics II does not require Arkansas Department of Education approval.

Strand	Content Standard
Oral Interpretation	
	1. Students will demonstrate intermediate competency through a variety of literary performances.
Performance Literature	
	2. Students will demonstrate competency in a variety of genres.
Public Speaking	
	3. Students will synthesize information to create a variety of speaking genres.
Intermediate Communication Skills	
	4. Students will demonstrate communication skills at an intermediate level.
Oral Advocacy	
	5. Students will participate at the intermediate level in community outreach, culminating in events.

Notes:

1. Each level continues to address earlier Student Learning Expectations (SLEs) as needed.
2. Student Learning Expectations (SLEs) may be taught in any sequence.
3. Italicized words in this document appear in the glossary.
4. All items in a bulleted list are required to be taught.
5. The examples given (e.g.,) are suggestions to guide the instructor.

How the Anchor Standards are Labeled

R . CCR . 1

The letter in the first position of the anchor standard numbering system represents the strand:

Reading (R)

Writing (W)

Speaking and Listening (SL)

Language (L)

The symbol in the second position of the anchor standard numbering system represents college and career readiness.

The number in the third position of the anchor standard numbering system represents the standard.

How the SLEs are Labeled

D . 10 . DIII . 2

D	10	DIII	2
Letters in the first position represent the Strand name (e.g., Delivery).	Numbers in the second position represent the Standard number (e.g., Standard 10).	Symbols in the third position represent the Course name and level (e.g., Debate III).	Numbers in the fourth position represent the SLE number (e.g., SLE 2).

Strand: Oral Interpretation

Content Standard 1: Students will demonstrate intermediate competency through a variety of literary performances.

		AR ELA Alignment
OI.1.FII.1	Select and analyze varied genres of literature to find appropriate stories (e.g., adventure, biographical story, children's stories, fairy tale, fantasy, historical accounts, modern short story, mythology)	R.CCR.1, R.CCR.2, R.CCR.3, R.CCR.4, R.CCR.5, R.CCR.6, R.CCR.7, R.CCR.8, R.CCR.9, R.CCR.10
OI.1.FII.2	Demonstrate how vocal variety alters characterization	SL.CCR.6
OI.1.FII.3	Identify the important elements of a story or poem.	R.CCR.1, R.CCR.2, R.CCR.3, R.CCR.5
OI.1.FII.4	Analyze the role of movement and gesture in performing oral readings	
OI.1.FII.5	Determine appropriate movement for performances: • heightened movement • movement to delineate character, time, place and/or mood • simplified movement •	
OI.1.FII.6	Practice the use of paralanguage in performances to match emotion: • dramatic pause • inflection • oral punctuation • pitch variation • stress • tempo • volume	SL.CCR.6, L.CCR.1, L.CCR.3
OI.1.FII.7	Investigate criteria for determining correct pronunciation and inflection (e.g., acceptance, education, limitations, locale, regional similarity)	W.CCR.7, W.CCR.8
OI.1.FII.8	Coordinate oral interpretation with content and intent	SL.CCR.3, SL.CCR.4, SL.CCR.6

OI.1.FII.9	Compile a portfolio for oral interpretation: • culturally diverse literature • dramatic literature • humorous literature • poetry • prose • social issues	R.CCR.10
OI.1.FII.10	Select literature to be performed based on teacher-selected criteria	R.CCR.10
OI.1.FII.11	Conduct an audience analysis	SL.CCR.4, SL.CCR.6
OI.1.FII.12	Complete an analysis of characters in a selection	R.CCR.3
OI.1.FII.13	Examine the historical impact of literature selected for oral interpretation	R.CCR.3, R.CCR.6, R.CCR.10
OI.1.FII.14	Determine appropriate volume for diverse audiences or venues	SL.CCR.6
OI.1.FII.15	Experiment with various introductory methods (e.g., author biography, excerpt/exposition, humor, narrative, related anecdote, startling statement, teasers)	SL.CCR.4, SLCCR.6
OI.1.FII.16	Perform in a group presentation (e.g., Choral Reading, Readers Theater)	SL.CCR.6
OI.1.FII.17	Participate in group evaluations	SL.CCR.1, SL.CCR.2, SL.CCR.3, L.CCR.1, L.CCR.3
OI.1.FII.18	Examine the social impact of a literary selection	R.CCR.1, R.CCR.2, R.CCR.3, R.CCR.4, R.CCR.5, R.CCR.6, R.CCR.7, R.CCR.8, R.CCR.9, R.CCR.10
OI.1.FII.19	Score a script	

OI.1.FII.20	Compare multiple interpretations of a selection	R.CCR.6, R.CCR.9, R.CCR.10
OI.1.FII.21	Compare first- and third-person point-of-view	R.CCR.6
OI.1.FII.22	Contrast performances of fiction and nonfiction	R.CCR.7, R.CCR.9, SL.CCR.3
OI.1.FII.23	Incorporate chosen feedback into future presentations or performances: • peer ballots and rubrics • teacher/evaluator ballots and rubrics •	SL.CCR.4, SL.CCR.5, SL.CCR.6
OI.1.FII.24	Accept and analyze appropriate feedback from critiques	SL.CCR.3, SL.CCR.6
OI.1.FII.25	Identify specialized vocabulary: • black notebook (BNB) • body language • character voice • facial expressions • focal point • gestures • narrative voice • off state focus	R.CCR.4, L.CCR.4, L.CCR.6

Strand: Performance Literature

Content Standard 2: Students will demonstrate competency in a variety of genres.

		AR ELA Alignment
PL.2.FII.1	Compare and analyze performance literature for specific settings	SL.CCR.3
PL.2.FII.2	Identify the theme of selected literature	R.CCR.2
PL.2.FII.3	Analyze the imagery within selected literature	R.CCR.4
PSL.2.FII.4	Prepare performance cuttings (e.g., monologue, duet, words and music, humorous interpretation, dramatic interpretation, program oral interpretation)	SL.CCR.4, SL.CCR.6
PL.2.FII.5	Cut a piece of literature down to a specified time limit	SL.CCR.6
PL.2.FII.6	Apply stage direction terminology to personal and group performances: • above • backstage • below • counter cross • downstage • full back • full front • offstage • onstage • profile • stage left • stage right • three-quarter • upstage • wings	L.CCR.6
PL.2.FII.7	Block a personal performance	
PL.2.FII.8	Analyze pivotal moments in performance literature	R.CCR.5

PL.2.FII.9	Develop an intermediate understanding of basic competitive events adhering to national set performance criteria provided through the National Speech and Debate Association: • dramatic interpretation • duo interpretation • extemporaneous speaking • humorous interpretation • improvised duet acting • informative speaking • original oratory • poetry • program oral interpretation • prose • story telling •	
PL.2.FII.10	Perform selections for audiences outside the classroom (e.g., civic organizations, classroom showcases of performance work, community events, elementary school classroom performances, parent nights, school assemblies)	SL.CCR.6
PL.2.FII.11	Research the historical context of performance literature	W.CCR.7
PL.2.FII.12	Investigate a playwright's intended meaning	R.CCR.1, R.CCR.2, R.CCR.3, R.CCR.4, R.CCR.5, R.CRR.6, R.CCR.8
PL.2.FII.13	Examine the social impact of the play or scene	R.CCR.5, W.CCR.7, W.CCR.9
PL.2.FII.14	Research culturally diverse performance literature	W.CCR.7, W.CCR.8, W.CCR.9, W.CCR.10
PL.2.FII.15	Delineate characters using various techniques (e.g., body posture, consistent mannerisms, large gestures, nonverbal facial expressions, vocal delivery)	SL.CCR.6
PL.2.FII.16	Evaluate a cutting from literature to determine its ability to stand alone as a performance piece (e.g., beginning and end, complications that build, self-contained events)	R.CCR.1, R.CCR.2, R.CCR.5
PL.2.FII.17	Incorporate chosen feedback into future presentations or performances: • peer ballots and rubrics • teacher/evaluator ballots and rubrics	SL.CCR.6

PL.2.FII.18	Accept and analyze appropriate feedback from critiques	SL.CCR.6
PL.2.FII.19	Analyze how characters evolve throughout a performance	R.CCR.3
PL.2.FII.20	Create introductions that capture the audience (e.g., dramatic, intriguing, shocking, tantalizing, unique)	SL.CCR.6, L.CCR.1, L.CCR.3
PL.2.FII.21	Discuss motivation as it relates to dialogue	SL.CCR.1, L.CCR.1, L.CCR.3

Strand: Public Speaking

Content Standard 3: Students will synthesize information to create a variety of speaking genres.

		AR ELA Alignment
PS.3.FII.1	Develop a fundamental understanding of public speaking rules: • competition events • extemporaneous speaking • informative speaking • original oratory (persuasive speaking)	W.CCR.9
PS.3.FII.2	Define and explain specialized vocabulary: • definition by authority • definition by examples • definition by operations • inherency arguments (attitudinal, existential, gap, structural) • non sequitur • originality • *prima facie argument* • relatability • relevance • “think clearly on one’s feet” (e.g., extemporaneous speaking, varied argumentation formats) • *Toulmin Model* of argumentation	L.CCR.6, L.CCR.1, L.CCR.3
PS.3.FII.3	Discuss public speaking as a strategic activity	SL.CCR.1, SL.CCR.6, L.CCR.1, L.CCR.3
PS.3.FII.4	Discuss the educational values of argumentation and debate	SL.CCR.1, SL.CCR.6, L.CCR.1, L.CCR.3
PS.3.FII.5	Examine how source credibility plays a role in public speaking	W.CCR.7, W.CCR.8, W.CCR.9
PS.3.FII.6	Examine criteria for speech topics (e.g., age appropriateness, creative angle, interesting to both genders, personal connection, sound documentation, speech type, uniqueness, universal appeal)	R.CCR.10
PS.3.FII.7	Measure effectiveness of speaker’s delivery	SL.CCR.3
PS.3.FII.8	Create levels of varied intensity	SL.CCR.6, L.CCR.3
PS.3.FII.9	Develop appropriate tone in delivery	SL.CCR.6, L.CCR.3

PS.3.FII.10	Assess the pace of delivery	SL.CCR.6
PS.3.FII.11	Utilize transitions as strategic connections	SL.CCR.4, L.CCR.3
PS.3.FII.12	Defend selected methods of reasoning	R.CCR.8
PS.3.FII.13	Question author biases or prejudices in informational texts	R.CCR.6, L.CCR.1, L.CCR.3
PS.3.FII.14	Identify the role of ethics in debate and/or argumentation	R.CCR.6
PS.3.FII.15	Analyze the effectiveness of presentations conducted by oneself and peers	SL.CCR.3
PS.3.FII.16	Formulate a properly worded proposition of fact, value, and policy	SL.CCR.4, SL.CCR.6, L.CCR.1, L.CCR.3
PS.3.FII.17	Explain different kinds of argumentation (e.g., argument by generalization, argument from analogy, argument from authority, argument from expertise, argument from precedent, argument from sign, causal argument, causal chain of reasoning)	R.CCR.8, W.CCR.9, SL.CCR.4, SL.CCR.5, SL.CCR.6, L.CCR.1, L.CCR.3
PS.3.FII.18	Create arguments to support a claim	W.CCR.1, SL.CCR.4, SL.CCR.5, SL.CCR.6, L.CCR.1, L.CCR.3
PS.3.FII.19	Explain the guidelines for ethics in research	SL.CCR.1, SL.CCR.4, SL.CCR.6, L.CCR.1, L.CCR.3
PS.3.FII.20	Contrast *empirical evidence* and opinion evidence	R.CCR.8, W.CCR.7, W.CCR.8, W.CCR.9, SL.CCR.3, SL.CCR.6, L.CCR.1, L.CCR.3
PS.3.FII.21	Discuss various persuasive formats	SL.CCR.1, SL.CCR.4, SL.CCR.6, L.CCR.1, L.CCR.3
PS.3.FII.22	Discuss how to detect fallacies in value arguments	SL.CCR.1, SL.CCR.3, L.CCR.1, L.CCR.3

PS.3.FII.23	Draft an affirmation position using a specific format	W.CCR.4, W.CCR.8, W.CCR.9, W.CCR.10, L.CCR.1, L.CCR.3
PS.3.FII.24	Use evidence to develop basic arguments	W.CCR.1, W.CCR.4, W.CCR.5, W.CCR.6, W.CCR.7, W.CCR.8, W.CCR.9, W.CCR.10, L.CCR.1, L.CCR.3
PS.3.FII.25	Draw conclusions that are defensible	R.CCR.1, R.CCR.2, R.CCR.3, R.CCR.4, R.CCR.5, R.CCR.8, R.CCR.9, SL.CCR.2, SL.CCR.3
PS.3.FII.26	Practice the process of inquiry in the following order: • examine data • ask questions based on data • re-examine data • try to answer the questions • provide data, evidence, that supports the answer	R.CCR.1, R.CCR.2, R.CCR.7, R.CCR.8, R.CCR.9, W.CCR.7, W.CCR.8, W.CCR.9, L.CCR.1, L.CCR.3
PS.3.FII.27	Select organizational structure based on terms of proposition	SL.CCR.4, SL.CCR.5, SL.CCR.6, L.CCR.3
PS.3.FII.28	Argue a defense of the status quo	SL.CCR.4, SL.CCR.5, SL.CCR.6, L.CCR.1, L.CCR.3
PS.3.FII.29	Develop indictments of an affirmative position	W.CCR.1, W.CCR.4, W.CCR.5, W.CCR.6, W.CCR.7, W.CCR.8, W.CCR.9, W.CCR.10, SL.CCR.4, L.CCR.1, L.CCR.3
PS.3.FII.30	Explain why alternate causality is a key issue	SL.CCR.4, SL.CCR.5, SL.CCR.6, L.CCR.1, L.CCR.3

PS.3.FII.31	Construct an alternate causality objection	W.CCR.1, W.CCR.4, W.CCR.5, W.CCR.6, W.CCR.7, W.CCR.8, W.CCR.9, W.CCR.10, SL.CCR.4, L.CCR.1, L.CCR.3
PS.3.FII.32	Construct a counterplan or counter warrant	W.CCR.1, W.CCR.4, W.CCR.5, W.CCR.6, W.CCR.7, W.CCR.8, W.CCR.9, W.CCR.10, SL.CCR.4, L.CCR.1, L.CCR.3
PS.3.FII.33	Discuss the differences between statements of fact, value, and policy	SL.CCR.1, SL.CCR.2, SL.CCR.4, SL.CCR.5, SL.CCR.6, L.CCR.1, L.CCR.3
PS.3.FII.34	Contrast the types of reasoning: • analogy • causal • deductive • inductive	W.CCR.4, W.CCR.7, W.CCR.8, W.CCR.9, W.CCR.10, SL.CCR.1, SL.CCR.2, SL.CCR.3, SL.CCR.4, SL.CCR.6, L.CCR.1, L.CCR.3
PS.3.FII.35	Investigate current issues of controversy	R.CCR.1, R.CCR.2, R.CCR.3, R.CCR.4, R.CCR.5, R.CCR.6, R.CCR.8, R.CCR.9, R.CCR.10, W.CCR.7, W.CCR.8, W.CCR.9, W.CCR.10
PS.3.FII.36	Develop a fundamental understanding of the structure and format of each public speech to create an effective presentation: • extemporaneous speaking • informative speaking (e.g., visual aids) • original oratory	R.CCR.5

PS.3.FII.37	Formulate questions and analyze current, domestic, and foreign events to create an effective presentation	W.CCR.7, W.CCR.8, W.CCR.9, W.CCR.10, L.CCR.1, L.CCR.3
PS.3.FII.38	Determine the magnitude of a current event topic to create an effective presentation	W.CCR.7, W.CCR.8, W.CCR.9, W.CCR.10

Strand: Intermediate Communication Skills

Content Standard 4: Students will demonstrate communication skills at an intermediate level.

		AR ELA Alignment
ICS.4.FII.1	Demonstrate the use of varied sentence structure to create emphasis	W.CCR.4, W.CCR.5, SL.CCR.4, SL.CCR.6, L.CCR.3
ICS.4.FII.2	Work collaboratively to generate ideas and solve complex problems	W.CCR.6, SL.CCR.1, SL.CCR.6, L.CCR.1, L.CCR.3
ICS.4.FII.3	Participate in discussions for varied purposes	SL.CCR.1, SL.CCR.6
ICS.4.FII.4	Use vocal variety to establish mood, feelings, and attitude	SL.CCR.6
ICS.4.FII.5	Identify components of the speech process: • articulators • diaphragm • larynx • lungs • pharynx • resonators • trachea	L.CCR.6
ICS.4.FII.6	Control breathing to increase volume and resonance: • diaphragmatic breathing • timing of inhalation and exhalation	SL.CCR.6
ICS.4.FII.7	Demonstrate appropriate articulation: • dialect • enunciation • pronunciation	SL.CCR.6
ICS.4.FII.8	Demonstrate audible speech/vocal flexibility	SL.CCR.6
ICS.4.FII.9	Demonstrate fluency at the intermediate level	SL.CCR.4, SL.CCR.6
ICS.4.FII.10	Display appropriate social etiquette	SL.CCR.4, SL.CCR.6

ICS.4.FII.11	Demonstrate vocal projection to a specific target	SL.CCR.6
ICS.4.FII.12	Adjust vocal projection based on the following: • level of noise in environment • size of audience • size of room	SL.CCR.6
ICS.4.FII.13	Evaluate information from a variety of sources	R.CCR.7, R.CCR.8, R.CCR.9, R.CCR.10, W.CCR.7, W.CCR.8, W.CCR.9, SL.CCR.2

Strand: Oral Advocacy

Content Standard 5: Students will participate at the intermediate level in community outreach, culminating in events.

		AR ELA Alignment
OA.5.FII.1	Understand intermediate terminology and execution of a competitive event	L.CCR.6
OA.5.FII.2	Shadow and help execute the duties and needs assigned to upper-level leadership documenting the process to secure event resources (e.g., judges, concessions, security, hospitality, time keepers, public relations, volunteers as needed)	
OA.5.FII.3	Solicit the community for needed resources and materials to hold events	W.CCR.2

Teacher Note
OA.5.FII.3 Students document their process to find needed resources and materials.

Glossary for Forensics II

Academic honesty	Performing all academic work in a responsible and ethical manner, which includes acknowledging any source of information that is not common knowledge and completing academic work without cheating, lying, stealing, or sharing information without authorization
Ad hominem	A Latin term meaning “to the man”; attacking an opponent’s character rather than answering his argument
Ad populum	A Latin term meaning “to the popular opinion”; a fallacious argument that concludes it must be true because many or most people believe it
Arkansas Communication and Theater Arts Association (ACTAA)	State professional organization that encompasses theater, drama, theater dance, oral communication, forensics, and debate
Diversity	Differences in individuals (e.g., ability, culture, federally protected categories, gender, race, religion, socio-economic status)
Literary merit	The quality shared by all works of fiction that are considered to have aesthetic value
National Speech and Debate Association (NSDA)	National professional organization for debate, speech, and forensics
Paralanguage	Nonverbal means of communication (e.g., tone of voice, laughter, gestures, facial expressions) that accompany speech and convey further meaning
Post hoc ergo propter hoc	A Latin term meaning “after the fact, therefore before the fact”; this is a conclusion that assumes if “A” occurred after “B”, then “B” must have caused “A”
Proxemics	Communicating with others by virtue of the relative positioning of the body
Reticence	The trait of being uncommunicative; not volunteering anything more than necessary
Semantics	The study of the meanings of words

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Contributors

The following people contributed to the development of this document:

Jennifer Akers - Cabot	Amy Matthews - Fayetteville
Tammy Alexander - Nashville	Gerri McCann - Manila
Rebecca Allen - Valley View	Amanda McMahan - Magnolia
Jane Balgavy - Jacksonville-North Pulaski	Lynn Meade - University of Arkansas
Brandon Box-Higdem - Bentonville	Alisa Melton - Blytheville
Samantha Carpenter - Virtual Arkansas	Jennifer Murphy - El Dorado
Lisa Carver - Texarkana	Traci Myers - Foreman
Kimberly Chavez - Camden Fairview	Tim Peerbolte - Greenwood
Susan Colyer - Fort Smith	Erin Radke - Jessieville
Joan Crowder - Arkadelphia	Jacki Reiff - Gravette
April Erickson - South Conway County	Tracie Richard - Hermitage
Jessica Foster - Siloam Springs	Chad Simpson - Clarendon
Sommer Frazer - McGehee	Dallas Sims - Lakeside (Lake Village)
Natalie Free - Pangburn	Vivian Sisk – KIPP: Delta Collegiate
Eric Gamble - Dardanelle	Andrea Speer - Bentonville
Jennifer Garner - Lakeside (Hot Springs)	Steven Trulock - Huntsville
Roger Guevara - Southern Arkansas University	Rosie Valdez - Little Rock
Shelly Hardin - West Memphis	

Forensics III

Arkansas
English Language Arts Standards

2016

Course Title: Forensics III
Course/Unit Credit: 1
Course Number: 414040
Teacher Licensure: Please refer to the Course Code Management System (https://adedata.arkansas.gov/ccms/) for the most current licensure codes.
Grades: 9-12
Prerequisite: Forensics II

Forensics III

Forensics II is a prerequisite for Forensics III. Students entering Forensics II, III, or IV must have successfully completed the preceding year of study. Forensics I is a foundational course and cannot be combined with other courses. Forensics II-IV may be taught within the same class period; however, the student learning expectations for each level are different and must be addressed.

Forensics III is a two-semester course. In this course students will demonstrate proficiency in research, organization, presentation, performance, and directing. Research activities will include analyzing literary elements and current events, framing a selection or topic around historical context or cultural influences, and maintaining a portfolio of selections and topics. Organization skills will be enhanced by cutting and introducing selections and synthesizing information from complex texts. Students will demonstrate proficiency of the fundamentals of directing. Teacher-guided peer critique will be utilized to enhance presentation and performance skills. Students will engage in oral advocacy to promote community partnerships, enhance community engagement, and cultivate a positive school culture. Forensics III does not require Arkansas Department of Education approval.

Strand	Content Standard
Oral Interpretation	
	1. Students will demonstrate proficient competency through a variety of literary performances.
Performance Literature	
	2. Students will demonstrate competency in a variety of genres.
Public Speaking	
	3. Students will synthesize information to create a variety of speaking genres.
Proficient Communication Skills	
	4. Students will demonstrate communication skills at a proficient level.
Oral Advocacy	
	5. Students will participate at the proficiency level in community outreach, culminating in competitive events.
Peer Directing and Critiquing	
	6. Students will demonstrate proficiency in the fundamentals of directing and peer evaluation skills with teacher guidance.

Notes:

1. Each level continues to address earlier Student Learning Expectations (SLEs) as needed.
2. Student Learning Expectations (SLEs) may be taught in any sequence.
3. Italicized words in this document appear in the glossary.
4. All items in a bulleted list are required to be taught.
5. The examples given (e.g.,) are suggestions to guide the instructor.

How the Anchor Standards are Labeled

R . CCR . 1

The letter in the first position of the anchor standard numbering system represents the strand:

Reading (R)

Writing (W)

Speaking and Listening (SL)

Language (L)

The symbol in the second position of the anchor standard numbering system represents college and career readiness.

The number in the third position of the anchor standard numbering system represents the standard.

How the SLEs are Labeled

D . 10 . DIII . 2

D	10	DIII	2
Letters in the first position represent the Strand name (e.g., Delivery).	Numbers in the second position represent the Standard number (e.g., Standard 10).	Symbols in the third position represent the Course name and level (e.g., Debate III).	Numbers in the fourth position represent the SLE number (e.g., SLE 2).

Strand: Oral Interpretation

Content Standard 1: Students will demonstrate proficient competency through a variety of literary performances.

		AR ELA Alignment
OI.1.FIII.1	Select and analyze specific genres of literature to find appropriate stories (e.g., adventure, biographical story, children's stories, fairy tale, fantasy, historical accounts, modern short story, mythology)	R.CCR.1, R.CCR.2, R.CCR.3, R.CCR.4, R.CCR.5, R.CCR.6, R.CCR.7, R.CCR.8, R.CCR.9, R.CCR.10
OI.1.FIII.2	Demonstrate at a proficient level how vocal variety alters characterization	SL.CCR.6
OI.1.FIII.3	Analyze and incorporate, into a performance, the important elements of a story or poem	R.CCR.1, R.CCR.2, R.CCR.3, R.CCR.5
OI.1.FIII.4	Analyze and incorporate the role of movement and gesture in performing oral readings	
OI.1.FIII.5	Generate appropriate movement for performances: • heightened movement • movement to delineate character, time, place and/or mood • simplified movement	
OI.1.FIII.6	Implement the use of *paralanguage* in performances to match emotion: • dramatic pause • inflection • oral punctuation • pitch variation • stress • tempo • volume	SL.CCR.6, L.CCR.1, L.CCR.3
OI.1.FIII.7	Implement correct pronunciation and inflection (e.g., acceptance, education, limitations, locale, regional similarity)	SL.CCR.6
OI.1.FIII.8	Coordinate oral interpretation with content and intent	SL.CCR.3, SL.CCR.4, SL.CCR.6

OI.1.FIII.9	Compile and maintain a portfolio for oral interpretation: • culturally diverse literature • dramatic literature • humorous literature • poetry • prose • social issues	R.CCR.10
OI.1.FIII.10	Select literature to be performed based on selected criteria	R.CCR.10
OI.1.FIII.11	Conduct an audience analysis	SL.CCR.4, SL.CCR.6
OI.1.FIII.12	Analyze a character's complexity to develop a fully actualized performance	R.CCR.3
OI.1.FIII.13	Examine the historical impact of literature selected for oral interpretation to develop a fully actualized performance	R.CCR.3, R.CCR.6, R.CCR.10
OI.1.FIII.14	Determine appropriate volume for diverse audiences or venues	SL.CCR.6
OI.1.FIII.15	Experiment and perfect various introductory methods (e.g., author biography, excerpt/exposition, humor, narrative, related anecdote, startling statement, teasers)	SL.CCR.4, SLCCR.6
OI.1.FIII.16	Shadow a mentor in preparation to perform in a group presentation (e.g., Choral Reading, Readers Theater)	SL.CCR.6
OI.1.FIII.17	Participate in group evaluations	SL.CCR.1, SL.CCR.2, SL.CCR.3, L.CCR.1, L.CCR.3
OI.1.FIII.18	Examine and develop the social impact of a literary selection for a fully actualized performance	R.CCR.1, R.CCR.2, R.CCR.3, R.CCR.4, R.CCR.5, R.CCR.6, R.CCR.7, R.CCR.8, R.CCR.9, R.CCR.10, SL.CCR.6
OI.1.FIII.19	Score a script	
OI.1.FIII.20	Compare multiple interpretations of a selection to develop a fully actualized performance	R.CCR.6, R.CCR.9, R.CCR.10, SL.CCR.6

OI.1.FIII.21	Compare first- and third-person point-of-view	R.CCR.6
OI.1.FIII.22	Contrast performances of fiction and nonfiction to develop a fully actualized performance	R.CCR.7, R.CCR.9, SL.CCR.3
OI.1.FIII.23	Incorporate chosen feedback into future presentations or performances: • peer ballots and rubrics • teacher/evaluator ballots and rubrics	SL.CCR.4, SL.CCR.5, SL.CCR.6
OI.1.FIII.29	Accept and analyze appropriate feedback from critiques	SL.CCR.3, SL.CCR.6
OI.1.FIII.30	Apply specialized vocabulary for performances at a proficient level: • black notebook (BNB) • body language • character voice • facial expressions • focal point • gestures • narrative voice • off state focus	R.CCR.4, L.CCR.4, L.CCR.6

Strand: Performance Literature

Content Standard 2: Students will demonstrate competency in a variety of genres.

		AR ELA Alignment
PL.2.FIII.1	Compare and analyze performance literature for specific settings to develop a fully actualized performance	SL.CCR.3
PL.2.FIII.2	Examine the theme of selected literature	R.CCR.2
PL.2.FIII.3	Analyze the imagery within the literature to develop a fully actualized performance	R.CCR.4
PL.2.FIII.4	Prepare performance cuttings (e.g., monologue, duet, words and music, humorous interpretation, dramatic interpretation, program oral interpretation)	SL.CCR.4, SL.CCR.6
PL.2.FIII.5	Cut a piece of literature down to a specified time limit	SL.CCR.6

PL.2.FIII.6	Apply stage direction terminology to personal and group performances at a proficient level: • above • backstage • below • blocking • breaking Character • counter cross • downstage • fluidity • full back • full front • give a scene • in the Moment • levels • motivation • offstage • onstage • profile • share a scene • stage left • stage right • tagging lines • take a scene • three-quarter • timing • topping lines • upstage • wings	L.CCR.6
PL.2.FIII.7	Block a personal performance and defend choices	
PL.2.FIII.8	Analyze pivotal moments in performance literature	R.CCR.5

PL.2.FIII.9	Develop a proficient understanding of basic competitive events adhering to national set performance criteria provided through the National Speech and Debate Association: • dramatic interpretation • duo interpretation • extemporaneous speaking • humorous interpretation • improvised duet acting • informative speaking • original oratory • poetry • program oral interpretation • prose • storytelling	
PL.2.FIII.10	Perform selections for audiences outside the classroom (e.g., civic organizations, classroom showcases of performance work, community events, elementary school classroom performances, parent nights, school assemblies)	SL.CCR.6
PL.2.FIII.11	Research the historical context of performance literature to develop a fully actualized performance	W.CCR.7
PL.2.FIII.12	Investigate the playwright's intended meaning to develop a fully actualized performance	R.CCR.1, R.CCR.2, R.CCR.3, R.CCR.4, R.CCR.5, R.CRR.6, R.CCR.8
PL.2.FIII.13	Examine the social impact of the play or scene to develop a fully actualized performance	R.CCR.5, W.CCR.7, W.CCR.9
PL.2.FIII.14	Research culturally diverse performance literature to develop a fully actualized performance	W.CCR.7, W.CCR.8, W.CCR.9, W.CCR.10
PL.2.FIII.15	Delineate characters using various techniques to develop a fully actualized performance (e.g., body posture, consistent mannerisms, large gestures, nonverbal facial expressions, vocal delivery)	SL.CCR.6
PL.2.FIII.16	Evaluate cutting from literature to determine its ability to stand alone as a performance piece to develop a fully actualized performance (e.g., beginning and end, complications that build, self-contained events)	R.CCR.1, R.CCR.2, R.CCR.5

PL.2.FIII.17	Incorporate chosen feedback into future presentations or performances: • peer ballots and rubrics • teacher/evaluator ballots and rubrics	SL.CCR.6
PL.2.FIII.18	Accept and analyze appropriate feedback from critiques	SL.CCR.6
PL.2.FIII.19	Analyze how characters evolve throughout a performance to develop a fully actualized performance	R.CCR.3
PL.2.FIII.20	Create introductions that capture the audience (e.g., dramatic, intriguing, shocking, tantalizing, unique)	SL.CCR.6, L.CCR.1, L.CCR.3
PL.2.FIII.21	Discuss motivation as it relates to dialogue	SL.CCR.1, L.CCR.1, L.CCR.3

Strand: Public Speaking

Content Standard 3: Students will synthesize information to create a variety of speaking genres.

		AR ELA Alignment
PS.3.FIII.1	Develop a proficient understanding of public speaking rules to create an effective presentation: • competition events • extemporaneous speaking • informative speaking • original oratory (persuasive speaking) •	W.CCR.9
PS.3.FIII.2	Examine and defend source credibility in personal presentations	W.CCR.7, W.CCR.8, W.CCR.9, SL.CCR.1, SL.CCR.3, SL.CCR.6
PS.3.FIII.3	Summarize complex ideas by accurately paraphrasing	R.CCR.2, L.CCR.1, L.CCR.3, L.CCR.6
PS.3.FIII.4	Examine criteria for speech topics (e.g., age appropriateness, creative angle, interesting to both genders, personal connection, sound documentation, speech type, uniqueness, universal appeal)	R.CCR.10
PS.3.FIII.5	Integrate feedback received after speeches to increase effectiveness of the speaker's delivery	SL.CCR.6
PS.3.FIII.6	Integrate feedback received after speeches to refine use of various levels of intensity as appropriate for task, purpose, and audience	SL.CCR.6
PS.3.FIII.7	Integrate feedback received after speeches to use appropriate tone in delivery	SL.CCR.6
PS.3.FIII.8	Integrate feedback received after speeches to adjust the pace of delivery	SL.CCR.6
PS.3.FIII.9	Utilize transitions as strategic connections	L.CCR.3
PS.3.FIII.10	Defend selected methods of reasoning	R.CCR.10
PS.3.FIII.11	Question author biases or prejudices in informational texts	R.CCR.6, L.CCR.1, L.CCR.3
PS.3.FIII.12	Identify the role of ethics in debate and/or argumentation	R.CCR.6
PS.3.FIII.13	Analyze the effectiveness of presentations conducted by oneself and peers and synthesize the feedback to create a more polished presentation	SL.CCR.3

PS.3.FIII.14	Formulate and design a properly worded proposition of fact, value, and policy	SL.CCR.4, SL.CCR.6, L.CCR.1, L.CCR.3
PS.3.FIII.15	Demonstrate the different kinds of argumentation (e.g., argument by generalization, argument from analogy, argument from authority, argument from expertise, argument from precedent, argument from sign, causal argument, causal chain of reasoning)	R.CCR.8, W.CCR.9, SL.CCR.4, SL.CCR.5, SL.CCR.6, L.CCR.1, L.CCR.3
PS.3.FIII.16	Construct arguments to support a claim	W.CCR.1, SL.CCR.4, SL.CCR.5, SL.CCR.6, L.CCR.1, L.CCR.3
PS.3.FIII.17	Demonstrate knowledge of the guidelines for ethics in research	W.CCR.8
PS.3.FIII.18	Implement various persuasive, informative, and extemporaneous formats	R.CCR.8, W.CCR.7, W.CCR.8, W.CCR.9, SL.CCR.3, SL.CCR.6, L.CCR.1, L.CCR.3
PS.3.FIII.19	Use evidence to develop basic arguments	W.CCR.1, W.CCR.4, W.CCR.5, W.CCR.6, W.CCR.7, W.CCR.8, W.CCR.9, W.CCR.10, L.CCR.1, L.CCR.3
PS.3.FIII.20	Draw conclusions that are defensible	R.CCR.1, R.CCR.2, R.CCR.3, R.CCR.4, R.CCR.5, R.CCR.8, R.CCR.9, SL.CCR.2, SL.CCR.3
PS.3.FIII.21	Practice the process of inquiry in the following order**:** • examine data • ask questions based on data • re-examine data • try to answer the questions • data that supports our answer = evidence	R.CCR.1, R.CCR.2, R.CCR.7, R.CCR.8, R.CCR.9, W.CCR.7, W.CCR.8, W.CCR.9, L.CCR.1, L.CCR.3

PS.3.FIII.22	Develop a fundamental understanding of the structure and format of each public speech to create an effective presentation: • extemporaneous speaking • informative speaking (visual aids) • original oratory	R.CCR.5
PS.3.FIII.23	Formulate questions and analyze current, domestic, and foreign events to create an effective presentation	W.CCR.7, W.CCR.8, W.CCR.9, W.CCR.10, L.CCR.1, L.CCR.3
PS.3.FIII.24	Determine the magnitude of a current event topic to create an effective presentation	W.CCR.7, W.CCR.8, W.CCR.9, W.CCR.10
PS.3.FIII.25	Discuss the differences between statements of fact, value, and policy to create an effective presentation	SL.CCR.1, SL.CCR.3, SL.CCR.6
PS.3.FIII.26	Contrast the types of reasoning to create an effective presentation: • analogy • causal • deductive • inductive	R.CCR.8
PS.3.FIII.27	Investigate current issues of controversy to create an effective presentation	W.CCR.7, W.CCR.8, W.CCR.9
PS.3.FIII.28	Synthesize information from research using scientific and technical texts, scholarly journals, and different media formats	R.CCR.7, W.CCR.8, W.CCR.9, SL.CCR.2, SL.CCR.5
PS.3.FIII.29	Evaluate credibility of sources	W.CCR.8
PS.3.FIII.30	Cite sources accurately and appropriately	W.CCR.8

Strand: Proficient Communication Skills

Content Standard 4: Students will demonstrate communication skills at a proficient level.

		AR ELA Alignment
PCS.4.FIII.1	Demonstrate the use of varied sentence structure to create emphasis	W.CCR.4, W.CCR.5, SL.CCR.4, SL.CCR.6, L.CCR.3
PCS.4.FIII.2	Work collaboratively to generate ideas and solve complex problems	W.CCR.6, SL.CCR.1, SL.CCR.6, L.CCR.1, L.CCR.3
PCS.4.FIII.3	Participate in discussions for varied purposes	SL.CCR.1, SL.CCR.6
PCS.4.FIII.4	Use vocal variety to establish mood, feelings, and attitude	SL.CCR.6
PCS.4.FIII.5	Control breathing to increase volume and resonance: • diaphragmatic breathing • timing of inhalation and exhalation	SL.CCR.6
PCS.4.FIII.6	Demonstrate appropriate articulation: • dialect • enunciation • pronunciation	SL.CCR.6
PCS.4.FIII.7	Demonstrate audible speech/vocal flexibility	SL.CCR.6
PCS.4.FIII.8	Demonstrate fluency at the proficient level	SL.CCR.4, SL.CCR.6
PCS.4.FIII.9	Display appropriate social etiquette	SL.CCR.4, SL.CCR.6
PCS.4.FIII.10	Demonstrate vocal projection to a specific target	SL.CCR.6
PCS.4.FIII.11	Adjust vocal projection based on the following: • level of noise in environment • size of audience • size of room	SL.CCR.6

PCS.4.FIII.12	Evaluate information from a variety of sources	R.CCR.7, R.CCR.8, R.CCR.9, R.CCR.10, W.CCR.7, W.CCR.8, W.CCR.9, SL.CCR.2

Strand: Oral Advocacy

Content Standard 5: Students will participate at the proficient level in community outreach, culminating in events.

		AR ELA Alignment
OA.5.FIII.1	Demonstrate a proficiency of terminology and execution of a competitive event	L.CCR.6
OA.5.FIII.2	Shadow and help execute the duties and needs assigned to students in Forensics III leadership roles, documenting the process to secure event resources (e.g., judges, concessions, security, hospitality, time keepers, public relations, volunteers as needed)	
OA.5.FIII.3	Solicit the community for needed resources and materials to support events	W.CCR.2

Teacher Note
OA.5.FIII.3 Students document their process to find needed resources and materials.

Strand: Peer Directing and Critiquing

Content Standard 6: Students will demonstrate proficiency in the fundamentals of directing and peer evaluation skills with teacher guidance.

		AR ELA Alignment
PDC.6.FIII.1	Explore the duties of a director	R.CCR.1, R.CCR.10, W.CCR.7, SL.CCR.1
PDC.6.FIII.2	Devise a directorial philosophy	W.CCR.2, W.CCR.4, W.CCR.6, W.CCR.9, W.CCR.10, L.CCR.1, L.CCR.2, L.CCR.3, R.CCR.6
PDC.6.FIII.3	Shadow a student director to observe and analyze directorial processes	SL.CCR.1, SL.CCR.3
PDC.6.FIII.4	Define and incorporate technical language as it applies to directing a performance	L.CCR.6
PDC.6.FIII.5	Determine the meaning of literature for direction purpose	R.CCR.1, R.CCR.2, R.CCR.3, R.CCR.4, R.CCR.5, R.CCR.6, R.CCR.10
PDC.6.FIII.6	Create a working Readers Theater script utilizing various articles, ideas, literary works, play scripts, journals or concepts	R.CCR.1, R.CCR.2, R.CCR.4, R.CCR.5, R.CCR.6, R.CCR.7, R.CCR.8, R.CCR.9, R.CCR.10, L.CCR.1, L.CCR.2, L.CCR.3, R.CCR.6
PDC.6.FIII.7	Create a working words and music script in the role of either a director, choreographer or costumer, focusing on activities appropriate for the selected role (e.g., acting, character development, blocking choices, costuming and prop usage, casting, cutting and creating of a script, locating music tracks, pursuing royalty rights, and choreography)	R.CCR.3, R.CCR.4, R.CCR.5, R.CCR.6, R.CCR.7, R.CCR.9, R.CCR.10, L.CCR.1, L.CCR.2, L.CCR.3, R.CCR.6

Academic honesty	Performing all academic work in a responsible and ethical manner, which includes acknowledging any source of information that is not common knowledge and completing academic work without cheating, lying, stealing, or sharing information without authorization
Ad hominem	A Latin term meaning “to the man”; attacking an opponent’s character rather than answering his argument
Ad populum	A Latin term meaning “to the popular opinion”; a fallacious argument that concludes it must be true because many or most people believe it
Arkansas Communication and Theater Arts Association (ACTAA)	State professional organization that encompasses theater, drama, theater dance, oral communication, forensics, and debate
Diversity	Differences in individuals (e.g., ability, culture, federally protected categories, gender, race, religion, socio-economic status)
Literary merit	The quality shared by all works of fiction that are considered to have aesthetic value
National Speech and Debate Association (NSDA)	National professional organization for debate, speech, and forensics
Paralanguage	Nonverbal means of communication (e.g., tone of voice, laughter, gestures, facial expressions) that accompany speech and convey further meaning
Post hoc ergo propter hoc	A Latin term meaning “after the fact, therefore before the fact”; this is a conclusion that assumes if “A” occurred after “B”, then “B” must have caused “A”
Proxemics	Communicating with others by virtue of the relative positioning of the body
Reticence	The trait of being uncommunicative; not volunteering anything more than necessary
Semantics	The study of the meanings of words

Contributors

The following people contributed to the development of this document:

Jennifer Akers - Cabot	Amy Matthews - Fayetteville
Tammy Alexander - Nashville	Gerri McCann - Manila
Rebecca Allen - Valley View	Amanda McMahan - Magnolia
Jane Balgavy - Jacksonville-North Pulaski	Lynn Meade - University of Arkansas
Brandon Box-Higdem - Bentonville	Alisa Melton - Blytheville
Samantha Carpenter - Virtual Arkansas	Jennifer Murphy - El Dorado
Lisa Carver - Texarkana	Traci Myers - Foreman
Kimberly Chavez - Camden Fairview	Tim Peerbolte - Greenwood
Susan Colyer - Fort Smith	Erin Radke - Jessieville
Joan Crowder - Arkadelphia	Jacki Reiff - Gravette
April Erickson - South Conway County	Tracie Richard - Hermitage
Jessica Foster - Siloam Springs	Chad Simpson - Clarendon
Sommer Frazer - McGehee	Dallas Sims - Lakeside (Lake Village)
Natalie Free - Pangburn	Vivian Sisk – KIPP: Delta Collegiate
Eric Gamble - Dardanelle	Andrea Speer - Bentonville
Jennifer Garner - Lakeside (Hot Springs)	Steven Trulock - Huntsville
Roger Guevara - Southern Arkansas University	Rosie Valdez - Little Rock
Shelly Hardin - West Memphis	

Forensics IV

Arkansas
English Language Arts Standards

2016

Course Title:	Forensics IV
Course/Unit Credit:	1
Course Number:	XXXXXX
Teacher Licensure:	Please refer to the Course Code Management System (https://adedata.arkansas.gov/ccms/) for the most current licensure codes.
Grades:	9-12
Prerequisite:	Forensics III

Forensics IV

Forensics III is a prerequisite for Forensics IV. Students entering Forensics II, III, or IV must have successfully completed the preceding year of study. Forensics I is a foundational course and cannot be combined with other courses. Forensics II-IV may be taught within the same class period; however, the student learning expectations for each level are different and must be addressed.

Forensics IV is a two-semester course. In this course students will demonstrate mastery in research, organization, presentation, performance, and directing. Research activities will include analyzing literary elements and current events, framing a selection or topic around historical context or cultural influences, and maintaining a portfolio of selections and topics. Organization skills will be enhanced by cutting and introducing selections and synthesizing information from complex texts. Students will demonstrate mastery of the fundamentals of directing. Peer critique will be utilized to enhance presentation and performance skills. Students will engage in oral advocacy to promote community partnerships, enhance community engagement, and cultivate a positive school culture. Forensics IV does not require Arkansas Department of Education approval.

Strand	Content Standard
Oral Interpretation	
	1. Students will demonstrate mastery competency through a variety of literary performances.
Performance Literature	
	2. Students will demonstrate competency in a variety of genres.
Public Speaking	
	3. Students will synthesize information to create a variety of speaking genres.
Mastery Communication Skills	
	4. Students will demonstrate communication skills at a mastery level.
Oral Advocacy	
	5. Students will participate at the mastery level in community outreach, culminating in competitive events.
Peer Directing and Critiquing	
	6. Students will demonstrate mastery of independent peer directing and peer evaluation skills.

Notes:

1. Each level continues to address earlier Student Learning Expectations (SLEs) as needed.
2. Student Learning Expectations (SLEs) may be taught in any sequence.
3. Italicized words in this document appear in the glossary.
4. All items in a bulleted list are required to be taught.
5. The examples given (e.g.,) are suggestions to guide the instructor.

How the Anchor Standards are Labeled

R . **CCR** . **1**

The letter in the first position of the anchor standard numbering system represents the strand:

Reading (R)

Writing (W)

Speaking and Listening (SL)

Language (L)

The symbol in the second position of the anchor standard numbering system represents college and career readiness.

The number in the third position of the anchor standard numbering system represents the standard.

How the SLEs are Labeled

D . 10 . DIII . 2

D	10	DIII	2
Letters in the first position represent the Strand name (e.g., Delivery).	Numbers in the second position represent the Standard number (e.g., Standard 10).	Symbols in the third position represent the Course name and level (e.g., Debate III).	Numbers in the fourth position represent the SLE number (e.g., SLE 2).

Strand: Oral Interpretation

Content Standard 1: Students will demonstrate mastery competency through a variety of literary performances.

		AR ELA Alignment
OI.1.FIV.1	Select and analyze specific genres of literature to find appropriate stories (e.g., adventure, biographical story, children's stories, fairy tale, fantasy, historical accounts, modern short story, mythology)	R.CCR.1, R.CCR.2, R.CCR.3, R.CCR.4, R.CCR.5, R.CCR.6, R.CCR.7, R.CCR.8, R.CCR.9, R.CCR.10
OI.1.FIV.2	Demonstrate at a mastery level how vocal variety alters characterization	SL.CCR.6
OI.1.FIV.3	Analyze and incorporate, into a performance, the important elements of a story or poem	R.CCR.1, R.CCR.2, R.CCR.3, R.CCR.5
OI.1.FIV.4	Analyze and incorporate the role of movement and gesture in performing oral readings	
OI.1.FIV.5	Generate appropriate movement for performances at a mastery level: • heightened movement • movement to delineate character, time, place, and/or mood • simplified movement	
OI.1.FIV.6	Master the use of *paralanguage* in performances to match emotion: • dramatic pause • inflection • oral punctuation • pitch variation • stress • tempo • volume	SL.CCR.6, L.CCR.1, L.CCR.3
OI.1.FIV.7	Master correct pronunciation and inflection (e.g., acceptance, education, limitations, locale, regional similarity)	SL.CCR.6
OI.1.FIV.8	Synthesize oral interpretation with content and intent	SL.CCR.3, SL.CCR.4, SL.CCR.6

OI.1.FIV.9	Compile and maintain a portfolio for oral interpretation: • culturally diverse literature • dramatic literature • humorous literature • poetry • prose • social issues	R.CCR.10
OI.1.FIV.10	Select literature to be performed based on selected criteria	R.CCR.10
OI.1.FIV.11	Conduct an audience analysis	SL.CCR.4, SL.CCR.6
OI.1.FIV.12	Analyze character complexity to develop a fully actualized performance	R.CCR.3
OI.1.FIV.13	Examine the historical impact of literature selected for oral interpretation to develop a fully actualized performance	R.CCR.3, R.CCR.6, R.CCR.10
OI.1.FIV.14	Determine appropriate volume for diverse audiences or venues	SL.CCR.6
OI.1.FIV.15	Experiment and perfect various introductory methods (e.g., author biography, excerpt/exposition, humor, narrative, related anecdote, startling statement, teasers)	SL.CCR.4, SLCCR.6
OI.1.FIV.16	Direct a group presentation (e.g., Choral Reading, Readers Theater)	SL.CCR.6
OI.1.FIV.17	Serve as a mentor for students in Forensics I-III	SL.CCR.6
OI.1.FIV.18	Lead group evaluations	SL.CCR.1, SL.CCR.2, SL.CCR.3, L.CCR.1, L.CCR.3
OI.1.FIV.19	Examine and develop the social impact of a literary selection for a fully actualized performance at a mastery level	R.CCR.1, R.CCR.2, R.CCR.3, R.CCR.4, R.CCR.5, R.CCR.6, R.CCR.7, R.CCR.8, R.CCR.9, R.CCR.10, SL.CCR.6
OI.1.FIV.20	Score a script	
OI.1.FIV.21	Compare multiple interpretations of a selection to develop a fully actualized performance at a mastery level	R.CCR.6, R.CCR.9, R.CCR.10, SL.CCR.6

OI.1.FIV.22	Compare first- and third- person point-of-view	R.CCR.6
OI.1.FIV.23	Contrast performances of fiction and nonfiction to develop a fully actualized performance at a mastery level	R.CCR.7, R.CCR.9, SL.CCR.3
OI.1.FIV.24	Incorporate chosen feedback into future presentations or performances: • peer ballots and rubric • teacher/evaluator ballots and rubrics	SL.CCR.4, SL.CCR.5, SL.CCR.6
OI.1.FIV.25	Accept and analyze appropriate feedback from critiques	SL.CCR.3, SL.CCR.6

Strand: Performance Literature

Content Standard 2: Students will demonstrate competency in a variety of genres.

		AR ELA Alignment
PL.2.FIV.1	Compare and analyze performance literature for specific settings to develop a fully actualized performance at a mastery level	SL.CCR.3
PL.2.FIV.2	Examine the theme of the literature	R.CCR.2
PL.2.FIV.3	Analyze the imagery within the literature to develop a fully actualized performance at a mastery level	R.CCR.4
PL.2.FIV.4	Prepare performance cuttings at a mastery level (e.g., monologue, duet, words and music, humorous interpretation, dramatic interpretation, program oral interpretation)	SL.CCR.4, SL.CCR.6
PL.2.FIV.5	Cut a piece of literature down to a specified time limit	SL.CCR.6

L.2.FIV.6	Apply stage direction terminology to personal and group performances at a mastery level: • above • backstage • below • blocking • breaking character • counter cross • downstage • fluidity • full back • full front • give a scene • in the moment • levels • motivation • offstage • onstage • profile • share a scene • stage left • stage right • tagging lines • take a scene • three-quarter • timing • topping lines • upstage • wings	L.CCR.6
PL.2.FIV.7	Block a personal performance and defend choices at a mastery level	
PL.2.FIV.8	Analyze pivotal moments in performance literature	R.CCR.5

PL.2.FIV.9	Develop a mastery understanding of basic competitive events adhering to national set performance criteria provided through the National Speech and Debate Association: • dramatic interpretation • duo interpretation • extemporaneous speaking • humorous interpretation • improvised duet acting • informative speaking • original oratory • poetry • program oral interpretation • prose • storytelling	
PL.2.FIV.10	Perform selections for audiences outside the classroom (e.g., civic organizations, classroom showcases of performance work, community events, elementary school classroom performances, parent nights, school assemblies)	SL.CCR.6
PL.2.FIV.11	Research the historical context of performance literature to develop a fully actualized performance at a mastery level	W.CCR.7
PL.2.FIV.12	Investigate the playwright's intended meaning to develop a fully actualized performance at a mastery level	R.CCR.1, R.CCR.2, R.CCR.3, R.CCR.4, R.CCR.5, R.CRR.6, R.CCR.8
PL.2.FIV.13	Examine the social impact of the play or scene to develop a fully actualized performance at a mastery level	R.CCR.5, W.CCR.7, W.CCR.9
PL.2.FIV.14	Research culturally diverse performance literature to develop a fully actualized performance at a mastery level	W.CCR.7, W.CCR.8, W.CCR.9, W.CCR.10
PL.2.FIV.15	Delineate characters using various techniques to develop a fully actualized performance at a mastery level (e.g., body posture, consistent mannerisms, large gestures, nonverbal facial expressions, vocal delivery)	SL.CCR.6
PL.2.FIV.16	Evaluate cutting from literature to determine its ability to stand alone as a performance piece to develop a fully actualized performance at a mastery level (e.g., beginning and end, complications that build, self-contained events)	R.CCR.1, R.CCR.2, R.CCR.5

PL.2.FIV.17	Incorporate chosen feedback into future presentations or performances at a mastery level: • peer ballots and rubrics • teacher/evaluator ballots and rubrics	SL.CCR.6
PL.2.FIV.18	Accept and analyze appropriate feedback from critiques	SL.CCR.6
PL.2.FIV.19	Analyze how characters evolve throughout a performance to develop a fully actualized performance at a mastery level	R.CCR.3
PL.2.FIV.20	Create introductions that capture the audience (e.g., dramatic, intriguing, shocking, tantalizing, unique)	SL.CCR.6, L.CCR.1, L.CCR.3
PL.2.FIV.21	Discuss motivation as it relates to dialogue	SL.CCR.1, L.CCR.1, L.CCR.3

Strand: Public Speaking

Content Standard 3: Students will synthesize information to create a variety of speaking genres.

		AR ELA Alignment
PS.3.FIV.1	Develop a mastery understanding of public speaking rules to create an effective presentation: • competition events • extemporaneous speaking • informative speaking • original oratory (persuasive speaking)	W.CCR.9
PS.3.FIV.2	Examine and defend source credibility in personal presentations at a mastery level	W.CCR.7, W.CCR.8, W.CCR.9, SL.CCR.1, SL.CCR.3, SL.CCR.6
PS.3.FIV.3	Summarize complex ideas by accurately paraphrasing	R.CCR.2, L.CCR.1, L.CCR.3, L.CCR.6
PS.3.FIV.4	Examine criteria for speech topics at a mastery level (e.g., age appropriateness, creative angle, interesting to both genders, personal connection, sound documentation, speech type, uniqueness, universal appeal)	R.CCR.10
PS.3.FIV.5	Integrate feedback received after speeches to increase effectiveness of the speaker's delivery	SL.CCR.6
PS.3.FIV.6	Integrate feedback received after speeches to refine use of various levels of intensity as appropriate for task, purpose, and audience	SL.CCR.6
PS.3.FIV.7	Integrate feedback received after speeches to use appropriate tone in delivery	SL.CCR.6
PS.3.FIV.8	Integrate feedback received after speeches to adjust the pace of delivery	SL.CCR.6
PS.3.FIV.9	Utilize transitions as strategic connections	L.CCR.3
PS.3.FIV.10	Defend selected methods of reasoning	R.CCR.10
PS.3.FIV.11	Question author biases or prejudices in informational texts	R.CCR.6, L.CCR.1, L.CCR.3
PS.3.FIV.12	Identify the role of ethics in debate and/or argumentation	R.CCR.6
PS.3.FIV.13	Analyze the effectiveness of presentations conducted by oneself and peers and synthesize the feedback to create a more polished presentation	SL.CCR.3

PS.3.FIV.14	Formulate and design a properly worded proposition of fact, value, and policy	SL.CCR.4, SL.CCR.6, L.CCR.1, L.CCR.3
PS.3.FIV.15	Demonstrate the different kinds of argumentation at a mastery level (e.g., argument by generalization, argument from analogy, argument from authority, argument from expertise, argument from precedent, argument from sign, causal argument, causal chain of reasoning)	R.CCR.8, W.CCR.9, SL.CCR.4, SL.CCR.5, SL.CCR.6, L.CCR.1, L.CCR.3
PS.3.FIV.16	Construct arguments to support a claim	W.CCR.1, SL.CCR.4, SL.CCR.5, SL.CCR.6, L.CCR.1, L.CCR.3
PS.3.FIV.17	Demonstrate knowledge of the guidelines for ethics in research	W.CCR.8
PS.3.FIV.18	Implement various persuasive, informative, and extemporaneous formats at a mastery level	R.CCR.8, W.CCR.7, W.CCR.8, W.CCR.9, SL.CCR.3, SL.CCR.6, L.CCR.1, L.CCR.3
PS.3.FIV.19	Use evidence to develop stronger arguments at a mastery level	W.CCR.1, W.CCR.4, W.CCR.5, W.CCR.6, W.CCR.7, W.CCR.8, W.CCR.9, W.CCR.10, L.CCR.1, L.CCR.3
PS.3.FIV.20	Draw conclusions that are defensible	R.CCR.1, R.CCR.2, R.CCR.3, R.CCR.4, R.CCR.5, R.CCR.8, R.CCR.9, SL.CCR.2, SL.CCR.3
PS.3.FIV.21	Practice the process of inquiry in the following order: • examine data • ask questions based on data • re-examine data • try to answer the questions • data that supports our answer = evidence	R.CCR.1, R.CCR.2, R.CCR.7, R.CCR.8, R.CCR.9, W.CCR.7, W.CCR.8, W.CCR.9, L.CCR.1, L.CCR.3

PS.3.FIV.22	Strengthen an understanding of the structure and format of each public speech to create an effective presentation at a mastery level: • extemporaneous speaking • informative speaking (visual aids) • original oratory	R.CCR.5
PS.3.FIV.23	Formulate questions and analyze current, domestic, and foreign events to create an effective presentation at a mastery level	W.CCR.7, W.CCR.8, W.CCR.9, W.CCR.10, L.CCR.1, L.CCR.3
PS.3.FIV.24	Determine the magnitude of a current event topic to create an effective presentation at a mastery level	W.CCR.7, W.CCR.8, W.CCR.9, W.CCR.10
PS.3.FIV.25	Discuss the differences among statements of fact, value, and policy and use each to create effective presentations at mastery level	SL.CCR.1, SL.CCR.3, SL.CCR.6
PS.3.FIV.26	Contrast the types of reasoning to create an effective presentation at a mastery level: • analogy • causal • deductive • inductive	R.CCR.8
PS.3.FIV.27	Investigate current issues of controversy to create an effective presentation at a mastery level	W.CCR.7, W.CCR.8, W.CCR.9
PS.3.FIV.28	Synthesize information from research using scientific and technical texts, scholarly journals, and different media formats	R.CCR.7, W.CCR.8, W.CCR.9, SL.CCR.2, SL.CCR.5
PS.3.FIV.29	Evaluate credibility of sources	W.CCR.8
PS.3.FIV.30	Cite sources accurately and appropriately	W.CCR.8

Strand: Mastery Communication Skills

Content Standard 4: Students will demonstrate communication skills at a mastery level.

		AR ELA Alignment
MCS.4.FIV.1	Demonstrate the use of varied sentence structure to create emphasis	W.CCR.4, W.CCR.5, SL.CCR.4, SL.CCR.6, L.CCR.3
MCS.4.FIV.2	Work collaboratively to generate ideas and solve complex problems	W.CCR.6, SL.CCR.1, SL.CCR.6, L.CCR.1, L.CCR.3
MCS.4.FIV.3	Participate in discussions for varied purposes	SL.CCR.1, SL.CCR.6
MCS.4.FIV.4	Use vocal variety to establish mood, feelings, and attitude	SL.CCR.6
MCS.4.FIV.5	Control breathing to increase volume and resonance: • diaphragmatic breathing • timing of inhalation and exhalation	SL.CCR.6
MCS.4.FIV.6	Demonstrate appropriate articulation: • dialect • enunciation • pronunciation	SL.CCR.6
MCS.4.FIV.7	Demonstrate audible speech/vocal flexibility	SL.CCR.6
MCS.4.FIV.8	Demonstrate fluency at the mastery level	SL.CCR.4, SL.CCR.6
MCS.4.FIV.9	Display appropriate social etiquette	SL.CCR.4, SL.CCR.6
MCS.4.FIV.10	Demonstrate vocal projection to a specific target	SL.CCR.6
MCS.4.FIV.11	Adjust vocal projection based on the following: • level of noise in environment • size of audience • size of room	SL.CCR.6

MCS.4.FIV.12	Evaluate information from a variety of sources	R.CCR.7, R.CCR.8, R.CCR.9, R.CCR.10, W.CCR.7, W.CCR.8, W.CCR.9, SL.CCR.2

Strand: Oral Advocacy

Content Standard 5: Students will participate at the mastery level in community outreach, culminating in events.

		AR ELA Alignment
OA.5.FIV.1	Demonstrate mastery of terminology and execution of a competitive event	L.CCR.6
OA.5.FIV.2	Execute the duties and needs assigned by event directors and document the process to secure event resources (e.g., judges, concessions, security, hospitality, time keepers, public relations, volunteers as needed)	
OA.5.FIV.3	Solicit the community for needed resources and materials to support events	W.CCR.2
Teacher Note		
OA.5.FIV.3 Students document their process to find needed resources and materials.		
OA.5.FIV.4	Apply effective leadership skills when collaborating with peers	SL.CCR.6
OA.5.FIV.5	Research the qualities of a strong leader	W.CCR.7
OA.5.FIV.6	Apply conflict resolution strategies when collaborating with peers	SL.CCR.6
OA.5.FIV.7	Explore how to separate valuable feedback from differing opinions and incorporate into interactions	SL.CCR.6
OA.5.FIV.8	Discuss and document successes and challenges when reflecting on a completed event to inform future planning and implementation	W.CCR.6, SL.CCR.1

Strand: Peer Directing and Critiquing

Content Standard 6: Students will demonstrate mastery of independent peer directing and peer evaluation skills.

		AR ELA Alignment
PDC.6.FIV.1	Explore the duties of a director	W.CCR.7, SL.CCR.1
PDC.6.FIV.2	Incorporate instructor feedback into an original script prior to production	W.CCR.5
PDC.6.FIV.3	Develop an understanding of how to work with actors to elicit stellar performances	
PDC.6.FIV.4	Create an effective scene with a strong beginning, middle and end	W.CCR.3, W.CCR.4, W.CCR.5, W.CCR.6, W.CCR.10, L.CCR.3
PDC.6.FIV.5	Communicate intention, physicality, and motivation of a character within the scene	W.CCR.4, SL.CCR.4, SL.CCR.6
PDC.6.FIV.6	Determine the meaning of literature for direction purposes	R.CCR.1, R.CCR.3, R.CCR.4, R.CCR.5, R.CCR.6
PDC.6.FIV.7	Determine author's intent as it applies to blocking, movement and aesthetics for directing a performance	R.CCR.6
PDC.6.FIV.8	Analyze characters to apply blocking, movement, and aesthetics as the director of a performance	R.CCR.3
PDC.6.FIV.9	Define and incorporate technical language as it applies to directing a performance	L.CCR.6
PDC.6.FIV.10	Select plays and musicals with *literary merit* for directing purposes	R.CCR.10
PDC.6.FIV.11	Compile and compose Readers Theater scripts with *literary merit* for direction purposes	R.CCR.10
PDC.6.FIV.12	Analyze the mood of a selection from beginning to end for directing purposes	R.CCR.1, R.CCR.4, R.CCR.5, R.CCR.6
PDC.6.FIV.13	Devise a directorial philosophy based on historical context and cultural influences	W.CCR.2, W.CCR.4, W.CCR.6, W.CCR.9, W.CCR.10, L.CCR.1, L.CCR.2, L.CCR.3, R.CCR.6

PDC.6.FIV.14	Maintain a director's portfolio	W.CCR.6, W.CCR.10
PDC.6.FIV.15	Devise a directorial philosophy based on current and political events	W.CCR.2, W.CCR.4, W.CCR.6, W.CCR.9, W.CCR.10, L.CCR.1, L.CCR.2, L.CCR.3, R.CCR.6
PDC.6.FIV.16	Synthesize information from research using scientific and technical texts, scholarly journals and different media formats as it applies to directing choices	W.CCR.7, W.CCR.8, W.CCR.9
PDC.6.FIV.17	Research various sources of licensing agents for directing scripts, plays, and musicals	W.CCR.7
PDC.6.FIV.18	Create a production staff that will collect and analyze researched materials for the purpose of authenticity of plays and musicals	
PDC.6.FIV.19	Conduct audience-centered analysis for production purposes	R.CCR.10
PDC.6.FIV.20	Cut a literary selection effectively for directing plays, musicals, and Readers Theaters	R.CCR.10
PDC.6.FIV.21	Direct performances that have been thoroughly analyzed	SL.CCR.6
PDC.6.FIV.22	Paraphrase directorial objectives to actors and technical crew	SL.CCR.6
PDC.6.FIV.23	Create effective transitions from scene to scene or from musical number to scene	W.CCR.4
PDC.6.FIV.24	Execute proper citation of licensing agents	W.CCR.8
PDC.6.FIV.25	Modify direction based on critical feedback from instructor	SL.CCR.6
PDC.6.FIV.26	Defend character motivation as it applies to directing	SL.CCR.4, SL.CCR.6
PDC.6.FIV.27	Write a director's rationale for one play, one musical, and one Readers Theater	W.CCR.1, W.CCR.4, W.CCR.8, W.CCR.9, W.CCR.10
PDC.6.FIV.28	Interpret point of view to find meaning of a selection as it applies to a play, musical or Readers Theater script	R.CCR.6
PDC.6.FIV.29	Interpret imagery through direction using author's context clues	R.CCR.1, R.CCR.4

PDC.6.FIV.30	Evaluate author's intents and how it relates to director's vision	R.CCR.6
PDC.6.FIV.31	Critique peer performances using the *Arkansas Communication and Theater Arts Association* performance rubrics	SL.CCR.6
PDC.6.FIV.32	Master directorial methods: • defend a point of view by writing a director's rationale • direct actors on how to master appropriate movement for performance • direct actors on proper usage of verbal emphasis • direct actors on the effective use of pauses to vary tempo and match emotion • direct actors to create intensity with varied vocal inflection • direct actors to master clear articulation	SL.CCR.6
PDC.6.FIV.33	Organize a director's post-performance assessment discussion	SL.CCR.1, SL.CCR.4, SL.CCR.6

Academic honesty	Performing all academic work in a responsible and ethical manner, which includes acknowledging any source of information that is not common knowledge and completing academic work without cheating, lying, stealing, or sharing information without authorization
Ad hominem	A Latin term meaning “to the man”
Ad populum	A Latin term meaning “to the popular opinion”
Arkansas Communication and Theater Arts Association (ACTAA)	State professional organization that encompasses theater, drama, theater dance, oral communication, forensics, and debate
Diversity	Understanding that each individual is unique and recognizing individual differences (e.g., ability, culture, federally protected categories, gender, race, religion, socio-economic status)
Literary merit	The quality shared by all works of fiction that are considered to have aesthetic value
National Speech and Debate Association (NSDA)	National professional organization for debate, speech, and forensics
Paralanguage	Nonverbal means of communication (e.g., tone of voice, laughter, gestures, facial expressions) that accompany speech and convey further meaning
Post hoc ergo propter hoc	A Latin term meaning “after the fact, therefore before the fact”; this is a conclusion that assumes if “A” occurred after “B”, then “B” must have caused “A”
Proxemics	Communicating with others by virtue of the relative positioning of the body
Reticence	The trait of being uncommunicative; not volunteering anything more than necessary
Semantics	The study of the meanings of words

Contributors

The following people contributed to the development of this document:

Jennifer Akers - Cabot	Amy Matthews - Fayetteville
Tammy Alexander - Nashville	Gerri McCann - Manila
Rebecca Allen - Valley View	Amanda McMahan - Magnolia
Jane Balgavy - Jacksonville-North Pulaski	Lynn Meade - University of Arkansas
Brandon Box-Higdem - Bentonville	Alisa Melton - Blytheville
Samantha Carpenter - Virtual Arkansas	Jennifer Murphy - El Dorado
Lisa Carver - Texarkana	Traci Myers - Foreman
Kimberly Chavez - Camden Fairview	Tim Peerbolte - Greenwood
Susan Colyer - Fort Smith	Erin Radke - Jessieville
Joan Crowder - Arkadelphia	Jacki Reiff - Gravette
April Erickson - South Conway County	Tracie Richard - Hermitage
Jessica Foster - Siloam Springs	Chad Simpson - Clarendon
Sommer Frazer - McGehee	Dallas Sims - Lakeside (Lake Village)
Natalie Free - Pangburn	Vivian Sisk – KIPP: Delta Collegiate
Eric Gamble - Dardanelle	Andrea Speer - Bentonville
Jennifer Garner - Lakeside (Hot Springs)	Steven Trulock - Huntsville
Roger Guevara - Southern Arkansas University	Rosie Valdez - Little Rock
Shelly Hardin - West Memphis	

Journalism I

Arkansas
English Language Arts Standards

2016

Course Title: Journalism I
Course/Unit Credit: 1
Course Number: 415000
Teacher Licensure: Please refer to the Course Code Management System (https://adedata.arkansas.gov/ccms/) for the most current licensure codes.
Grades: 9-12

Journalism I

Journalism I is a prerequisite for Journalism II. Students entering Journalism II, III, or IV must have successfully completed the preceding year of study. Journalism I is a foundational course and cannot be combined with other courses. Journalism II-IV may be taught within the same class period; however, the student learning expectations for each level are different and must be addressed.

Journalism I is a two-semester courses designed to introduce students to the world of media. Students in Journalism I will become analytical consumers of media and technology to enhance their communication skills. Writing, technology, and visual and electronic media are used as tools for learning as students create, clarify, critique, and produce effective communication. Students will learn and apply journalistic guidelines for writing, design, and photography, which include objectivity, responsibility, and credibility.

Journalism I does not require Arkansas Department of Education approval.

Strand	Content Standard
Law and Ethics	
	1. Students will evaluate legal and ethical issues.
History	
	2. Students will demonstrate a working knowledge of the history and role of journalism in society.
Management and Organization	
	3. Students will demonstrate a working knowledge of staff management and organization.
Design	
	4. Students will create designs for media.
Writing	
	5. Students will create various pieces of journalistically sound writing.
Photography	
	6. Students will demonstrate a working knowledge of photographic principles.
Publishing	
	7. Students will publish journalistically sound media.

Notes:

1. Student Learning Expectations (SLEs) may be taught in any sequence.
2. Italicized words in this document appear in the glossary.
3. All items in a bulleted list are required to be taught.
4. The examples given (e.g.,) are suggestions to guide the instructor.
5. Publishing can include, but is not limited to, school publications (e.g., yearbook, newspaper, literary magazine, online media) and community media.

How the Anchor Standards are Labeled

R . CCR . 1

R	CCR	1
The letter in the first position of the anchor standard numbering system represents the strand: Reading (R) Writing (W) Speaking and Listening (SL) Language (L)	**The symbol in the second position of the anchor standard numbering system represents college and career readiness.**	**The number in the third position of the anchor standard numbering system represents the standard.**

How the SLEs are Labeled

D . 10 . DIII . 2

D	10	DIII	2
Letters in the first position represent the Strand name (e.g., Delivery).	Numbers in the second position represent the Standard number (e.g., Standard 10).	Symbols in the third position represent the Course name and level (e.g., Debate III).	Numbers in the fourth position represent the SLE number (e.g., SLE 2).

Strand: Law and Ethics

Content Standard 1: Students will evaluate legal and ethical issues.

		AR ELA Alignment
LE.1.JI.1	Describe the meaning and limitations of freedom of the press: • First Amendment • Fourteenth Amendment • legal precedents: Tinker v. Des Moines Independent School District, Bethel School District v. Fraser, Hazelwood School District v. Kuhlmeier, Dean v.Utica, Muller v. CA, Draudt v. Wooster, W.I.A.A. v. Gannett • pending issues	R.CCR.1, R.CCR.2, R.CCR.4, R.CCR.8, SL.CCR.4, L.CCR.6
LE.1.JI.2	Identify the various legal restrictions placed on the press and electronic media: • *Arkansas Student Publications Act* A.C.A. § 6-18-1201-1204 (2016) • *censorship* • copyright/fair use • *defamation* • district publication policy • invasion of privacy • obscenity • plagiarism	R.CCR.1, R.CCR.2, R.CCR.4, R.CCR.8, L.CCR.6
LE.1.JI.3	Identify responsibilities that accompany the right of a free press by examining a journalism *Code of Ethics*	R.CCR.1, R.CCR.2, R.CCR.4, R.CCR.8, L.CCR.6
LE.1.JI.4	Identify responsibilities regarding current technological aspects of media (e.g., photo manipulation via software, social network and Internet sites for sourcing)	R.CCR.1, R.CCR.2, W.CCR.6, W.CCR.8

Strand: History

Content Standard 2: Students will demonstrate a working knowledge of the history and role of journalism in society.

		AR ELA Alignment
H.2.JI.1	Describe the role media has played and now plays in a democratic society (e.g., citizen journalists, *convergent media,* embedded journalism, mobile journalists, White House Press Corps)	SL.CCR.1, SL.CCR.2, SL.CCR.4, SL.CCR.5, SL.CCR.6
H.2.JI.2	Identify individuals and major events in the development of journalism (e.g., invention of Gutenberg Press, telegraph, minority media, Robert S. Abbott, yellow journalism, Horace Greeley, Joseph Pulitzer, Nellie Bly, William Randolph Hearst, muckraking, radio, television, shock jocks, Internet, blog, social media)	R.CCR.1, R.CCR.2, R.CCR.3, R.CCR.4, R.CCR.7, R.CCR.10
H.2.JI.3	Identify individuals and major developments in the history of photography (e.g., Joseph Niepce, Louis Daguerre, Matthew Brady, George Eastman, technological developments of cameras, digital vs. print)	R.CCR.1, R.CCR.2, R.CCR.3, R.CCR.4, R.CCR.7, R.CCR.10

Strand: Management and Organization

Content Standard 3: Students will demonstrate a working knowledge of staff management and organization.

		AR ELA Alignment
MO.3.JI.1	Explain organizational and time management skills necessary to meet production schedules	W.CCR.2, W.CCR.4, W.CCR.5, W.CCR.6, W.CCR.8, W.CCR.9, W.CCR.10, SL.CCR.1, SL.CCR.2, SL.CCR.4, SL.CCR.5, SL.CCR.6
MO.3.JI.2	Describe plans for financing media	W.CCR.2, W.CCR.4, W.CCR.5, W.CCR.6, W.CCR.8, W.CCR.9, W.CCR.10, SL.CCR.1, SL.CCR.2, SL.CCR.4, SL.CCR.5, SL.CCR.6
MO.3.JI.3	Describe plans to maximize the circulation of media	W.CCR.2, W.CCR.4, W.CCR.5, W.CCR.6, W.CCR.8, W.CCR.9, W.CCR.10, SL.CCR.1, SL.CCR.2, SL.CCR.4, SL.CCR.5, SL.CCR.6
MO.3.JI.4	Investigate careers in journalism	R.CCR.1, R.CCR.2, R.CCR.4, R.CCR.7, R.CCR.8, R.CCR.9, R.CCR.10, W.CCR.7, W.CCR.8, W.CCR.9, SL.CCR.2, L.CCR.4, L.CCR.6

Strand: Design

Content Standard 4: Students will create designs for media.

		AR ELA Alignment
D.4.JI.1	Use principles of design, applying available technologies through guided practice (e.g., desktop publishing, photo editing, Web-based media, word processing)	W.CCR.6, SL.CCR.5
D.4.JI.2	Apply basic design principles and elements through guided practice (e.g., balance, white-space, center of interest, modules, dominance)	W.CCR.4, SL.CCR.5
D.4.JI.3	Identify design trends in media (e.g., Pantone color of the year, *typography*)	R.CCR.7

Strand: Writing

Content Standard 5: Students will create various pieces of journalistically sound writing.

W.5.JI.1	Write relevant questions for an interview or research through guided practice	W.CCR.7
W.5.JI.2	Demonstrate effective interviewing skills through guided practice	SL.CCR.1
W.5.JI.3	Evaluate the validity of background information from a variety of sources (e.g., books, Internet sources, qualified persons, reports, social media)	R.CCR.7, W.CCR.8, SL.CCR.3
W.5.JI.4	Write *journalistically sound* leads through guided practice	W.CCR.5
W.5.JI.5	Incorporate the fundamental questions of journalism in a news story through guided practice • who • what • when • where • why • how	W.CCR.4, W.CCR.5, SL.CCR.4
W.5.JI.6	Identify news elements (e.g., conflict, consequence, human interest, prominence, proximity, timeliness)	R.CCR.5, W.CCR.2, W.CCR.4, W.CCR.7, W.CCR.8
W.5.JI.7	Apply direct and indirect quotes in copy through guided practice with appropriate *attribution* (e.g., punctuation, identification, verb choice)	W.CCR.8, W.CCR.9, W.CCR.10

Strand: Writing

Content Standard 5: Students will create various pieces of journalistically sound writing.

		AR ELA Alignment
W.5.JI.8	Write different *journalistically sound* pieces through guided practice (e.g., reviews, columns, news, features, advertising copy, editorials, blogs, essays, narratives)	W.CCR.1, W.CCR.2, W.CCR.4, W.CCR.5, W.CCR.6, W.CCR.10
W.5.JI.9	Edit assigned pieces (e.g., basic features, basic news, captions, headlines, poetry, *secondary coverage*) for content, grammar, spelling, and style through guided practice	W.CCR.5, L.CCR.1, L.CCR.2, L.CCR.3
W.5.JI.10	Revise assigned pieces for content and style through guided practice	W.CCR.4, W.CCR.5 L.CCR.3
W.5.JI.11	Select the most appropriate media format to present content (e.g., feature story, news story, *secondary coverage,* blog, social media)	W.CCR.4, W.CCR.6, W.CCR.10
W.5.JI.12	Write captions in *journalistic style* through guided practice (e.g., verb tense, identification, validity of information, style)	W.CCR.4
W.5.JI.13	Write headlines in *journalistic style* through guided practice (e.g., verb tense, validity of information, style)	W.CCR.4

Strand: Photography

Content Standard 6: Students will demonstrate a working knowledge of photographic principles.

		AR ELA Alignment
PH.6.JI.1	Describe types of photography used in media (e.g., photograph, *photo essay*, video)	
PH.6.JI.2	Define terms related to photographic equipment and processing (e.g., Digital Single Lens Reflex, memory cards, card readers, flash, tripod, JPEG)	L.CCR.6
PH.6.JI.3	Identify composition skills of photography (e.g., angle, dominant element, leading lines, rule of thirds, selective focus)	R.CCR.7
PH.6.JI.4	Apply composition skills through guided practice	
PH.6.JI.5	Describe roles of photojournalism	SL.CCR.4

Strand: Publishing

Content Standard 7: Students will publish journalistically sound media.

P.7.JI.1	Describe forms of publishing (e.g., newspaper, yearbook, literary magazine, web, social media)	
P.7.JI.2	Identify content for media (e.g., newspaper, yearbook, literary magazine, Web, social media) when reporting, writing, editing, designing, and photography)	R.CCR.7, W.CCR.8, W.CCR.9
P.7.JI.3	Publish media through guided practice	W.CCR.6, SL.CCR.4, SL.CCR.5

Glossary for Journalism I

Arkansas Student Publications Act	An Arkansas law that provides student journalists additional safeguards against censorship
Attribution	Using a source’s full name and title when quoting; see style guide for publication (e.g., Associated Press [AP], National Press, Columbia Scholastic Press Association [CSPA])
Censorship	Suppression of speech or written material by an authoritative body
Code of ethics	Moral code and standards to which journalists adhere
Convergent media	Multiple media that combines to form one product
Defamation	Act of damaging the good reputation of another (e.g., libel, slander)
Journalistically sound	Adheres to the journalistic guidelines for writing and design based on objectivity, responsibility, and credibility
Journalistic style	Style that is determined by journalism organizations in order to maintain consistency in media (e.g., Associated Press [AP], student press organizations)
Photo essay	A story told primarily with images
Secondary coverage	Additional coverage of material not provided in the main/primary coverage of the story (e.g., diagrams, informational graphics, maps, quote collections, sidebars, timelines)
Typography	The use of text as a graphic element in design

Contributors

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Rebecca Allen - Valley View	Amanda McMahan - Magnolia
Jane Balgavy - Jacksonville-North Pulaski	Lynn Meade - University of Arkansas
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Lisa Carver - Texarkana	Traci Myers - Foreman
Kimberly Chavez - Camden Fairview	Tim Peerbolte - Greenwood
Susan Colyer - Fort Smith	Erin Radke - Jessieville
Joan Crowder - Arkadelphia	Jacki Reiff - Gravette
April Erickson - South Conway County	Tracie Richard - Hermitage
Jessica Foster - Siloam Springs	Chad Simpson - Clarendon
Sommer Frazer - McGehee	Dallas Sims - Lakeside (Lake Village)
Natalie Free - Pangburn	Vivian Sisk – KIPP: Delta Collegiate
Eric Gamble - Dardanelle	Andrea Speer - Bentonville
Jennifer Garner - Lakeside (Hot Springs)	Steven Trulock - Huntsville
Roger Guevara - Southern Arkansas University	Rosie Valdez - Little Rock
Shelly Hardin - West Memphis	

Journalism II

Arkansas
English Language Arts Standards

2016

Course Title:	Journalism II
Course/Unit Credit:	1
Course Number:	415010
Teacher Licensure:	Please refer to the Course Code Management System (https://adedata.arkansas.gov/ccms/) for the most current licensure codes.
Grades:	9-12
Prerequisite:	Journalism I

Journalism II

Journalism I is a prerequisite for Journalism II. Students entering Journalism II, III, or IV must have successfully completed the preceding year of study. Journalism I is a foundational course and cannot be combined with other courses. Journalism II-IV may be taught within the same class period; however, the student learning expectations for each level are different and must be addressed.

Journalism II is a two-semester course designed to provide students with an intermediate study of media applications above Journalism I. This course can serve as further preparation for advanced media applications. Students in Journalism II will become active participants in the world of media to enhance their communication skills. Students will progress in their academic knowledge through the roles of reporters, photographers, ad sales, and marketing team members. Writing, technology, and visual and electronic media are used as tools for learning as students create, assess, and produce.

Journalism II does not require Arkansas Department of Education approval.

Strand	Content Standard
Law and Ethics	
	1. Students will evaluate legal and ethical issues.
History	
	2. Students will demonstrate a working knowledge of the history and role of journalism in society.
Management and Organization	
	3. Students will demonstrate a working knowledge of staff management and organization.
Design	
	4. Students will create designs for media.
Writing	
	5. Students will create various pieces of journalistically sound writing.
Photography	
	6. Students will demonstrate a working knowledge of photographic principles.
Publishing	
	7. Students will publish journalistically sound media.

Notes:

1. Each level continues to address earlier Student Learning Expectations (SLEs) as needed.
2. Student Learning Expectations (SLEs) may be taught in any sequence.
3. Italicized words in this document appear in the glossary.
4. All items in a bulleted list are required to be taught.
5. The examples given (e.g.,) are suggestions to guide the instructor.
6. Publishing can include, but is not limited to, school publications (e.g., yearbook, newspaper, literary magazine, online media) and community media.

How the Anchor Standards are Labeled

R . CCR . 1

The letter in the first position of the anchor standard numbering system represents the strand:

Reading (R)

Writing (W)

Speaking and Listening (SL)

Language (L)

The symbol in the second position of the anchor standard numbering system represents college and career readiness.

The number in the third position of the anchor standard numbering system represents the standard.

How the SLEs are Labeled

D . 10 . DIII . 2

D	10	DIII	2
Letters in the first position represent the Strand name (e.g., Delivery).	Numbers in the second position represent the Standard number (e.g., Standard 10).	Symbols in the third position represent the Course name and level (e.g., Debate III).	Numbers in the fourth position represent the SLE number (e.g., SLE 2).

Strand: Law and Ethics

Content Standard 1: Students will evaluate legal and ethical issues.

		AR ELA Alignment
LE.1.JII.1	Analyze current legal and ethical issues pertaining to freedom of the press	R.CCR.1, R.CCR.2, R.CCR.4, R.CCR.8, SL.CCR.1, SL.CCR.2 L.CCR.6
LE.1.JII.2	Explain various legal restrictions placed on the press and electronic media	R.CCR.1, R.CCR.2, R.CCR.4, R.CCR.8, W.CCR.2, W.CCR.4, W.CCR.7, SL.CCR.1, SL.CCR.2, SL.CCR.4, SL.CCR.6, L.CCR.6
LE.1.JII.3	Explain ethical responsibilities regarding sourcing (e.g., c*ode of ethics*, student media policies)	R.CCR.1, R.CCR.2, R.CCR.4, W.CCR.2, W.CCR.4, W.CCR.9, SL.CCR.1, SL.CCR.4, SL.CCR.6, L.CCR.6
LE.1.JII.4	Explain ethical responsibilities regarding technological aspects of media (e.g., *code of ethics*, student media policies)	R.CCR.1, R.CCR.2, R.CCR.4, W.CCR.2, W.CCR.4, W.CCR.9, SL.CCR.1, SL.CCR.4, SL.CCR.6, L.CCR.6

Strand: History

Content Standard 2: Students will demonstrate a working knowledge of the history and role of journalism in society.

		AR ELA Alignment
H.2.JII.1	Explain the role of journalism in a democratic society	R.CCR.1, R.CCR.2, R.CCR.4, W.CCR.2, W.CCR.4, W.CCR.9, SL.CCR.1, SL.CCR.4, SL.CCR.6, L.CCR.6
H.2.JII.2	Explain the impact of journalism on contemporary events (e.g., call to action; credibility of media; how media shapes events, policy, public opinion)	R.CCR.1, R.CCR.2, R.CCR.4, W.CCR.2, W.CCR.4, W.CCR.9, SL.CCR.1, SL.CCR.4, SL.CCR.6, L.CCR.6
H.2.JII.3	Describe the impact of photography on contemporary journalism (e.g., emotional connection, how photos enhance text, reader response)	R.CCR.1, R.CCR.2, R.CCR.4, W.CCR.2, W.CCR.4, W.CCR.9, SL.CCR.1, SL.CCR.4, SL.CCR.6, L.CCR.6

Strand: Management and Organization

Content Standard 3: Students will demonstrate a working knowledge of staff management and organization.

MO.3.JII.1	Apply organizational and time management skills necessary to meet student media production schedules	W.CCR.10
MO.3.JII.2	Apply existing staff plan for financing student media	
MO.3.JII.3	Apply existing staff plan to maximize the circulation of student media	W.CCR.6
MO.3.JII.4	This skill is taught in Journalism I and should be reinforced as needed. Investigate careers in journalism	

Strand: Design

Content Standard 4: Students will create designs for media.

		AR ELA Alignment
D.4.JII.1	Apply available technologies used in publishing to create designs appropriate for media (e.g., desktop publishing, photo editing, Web-based media, word processing)	W.CCR.6, SL.CCR.5
D.4.JII.2	Apply design principles and elements for media (e.g., *color harmony*, *column layout*, graphic effects, *typography*, Web design)	W.CCR.6, SL.CCR.5
D.4.JII.3	Apply design trends in media (e.g., Pantone color of the year, *typography*)	W.CCR.6, SL.CCR.5

Strand: Writing

Content Standard 5: Students will create various pieces of journalistically sound writing.

		AR ELA Alignment
W.5.JII.1	Write original interview questions, using advanced research skills for various forms of writing	W.CCR.4, W.CCR.5, W.CCR.7, SL.CCR.1, SL.CCR.6, L.CCR.1, L.CCR.6
W.5.JII.2	Conduct interviews for use in media	L.CCR.1, L.CCR.2, L.CCR.3, L.CCR.6
W.5.JII.3	Gather information from valid sources	R.CCR.6, R.CCR.7, R.CCR.8, R.CCR.9, R.CCR.10, W.CCR.8, SL.CCR.2
W.5.JII.4	Write *journalistically sound* leads	W.CCR.4, W.CCR.5, W.CCR.6, W.CCR.10, L.CCR.1, L.CCR.2
W.5.JII.5	Write a news story using the fundamental questions of journalism • who • what • when • where • why • how	W.CCR.2, W.CCR.4, W.CCR.5, W.CCR.6, W.CCR.7, W.CCR.8, W.CCR.10, L.CCR.1, L.CCR.2, L.CCR.3, L.CCR.6
W.5.JII.6	Apply news elements (e.g., conflict, consequence, human interest, prominence, proximity, timeliness) to original pieces	W.CCR.1, W.CCR.2, W.CCR.4, W.CCR.5, W.CCR.6, W.CCR.7, W.CCR.8, W.CCR.9, W.CCR.10, L.CCR.1, L.CCR.2, L.CCR.3, L.CCR.6
W.5.JII.7	Use direct and indirect quotes in copy with appropriate *attribution* (e.g., punctuation, identification, verb choice)	W.CCR.8, W.CCR.9, W.CCR.10

Strand: Writing

Content Standard 5: Students will create various pieces of journalistically sound writing.

		AR ELA Alignment
W.5.JII.8	Write *journalistically sound* pieces (e.g., reviews, columns, news, features, advertising copy, editorials, blogs, essays, narratives)	W.CCR.1, W.CCR.2, W.CCR.4, W.CCR.5, W.CCR.6, W.CCR.10, L.CCR.1, L.CCR.2, L.CCR.3
W.5.JII.9	Self-edit a variety of original pieces (e.g., basic features, basic news, captions, headlines, poetry, *secondary coverage*) suitable for publishing using a style guide	W.CCR.5, L.CCR.1, L.CCR.2, L.CCR.3
W.5.JII.10	Revise original pieces for content and style	W.CCR.4, W.CCR.5, L.CCR.1, L.CCR.2, L.CCR.3
W.5.JII.11	Create content for media (e.g., feature story, news story, *secondary coverage,* blog, social media)	W.CCR.1, W.CCR.2, W.CCR.4, W.CCR.6, W.CCR.10, L.CCR.1, L.CCR.2, L.CCR.3
W.5.JII.12	Write captions in *journalistic style* (e.g., verb tense, identification, validity of information, style)	W.CCR.4, W.CCR.5, W.CCR.6, L.CCR.1, L.CCR.2, L.CCR.3
W.5.JII.13	Write headlines in *journalistic style* (e.g., verb tense, validity of information, style)	W.CCR.4, W.CCR.5, W.CCR.6, L.CCR.1, L.CCR.2, L.CCR.3

Strand: Photography

Content Standard 6: Students will demonstrate a working knowledge of photographic principles.

		AR ELA Standards
PH.6.JII.1	Produce visual content for media (e.g., photos, video, *vlogs*)	SL.CCR.4, SL.CCR.5
PH.6.JII.2	Describe different types of cameras and lenses	SL.CCR.4, SLCCR.4, SL.CCR.6
PH.6.JII.3	Analyze the use of composition skills of photography (e.g., angle, dominant element, leading lines, rule of thirds, selective focus)	R.CCR.7
PH.6.JII.4	Apply composition skills of photography (e.g., angle, dominant element, leading lines, rule of thirds, selective focus)	
PH.6.JII.5	Analyze roles of photojournalism	R.CCR.1, R.CCR.2, R.CCR.4, R.CCR.6, R.CCR.9, L.CCR.6

Strand: Publishing

Content Standard 7: Students will publish journalistically sound media.

		AR ELA Alignment
P.7.JII.1	This skill is taught in Journalism I and should be reinforced as needed. Describe forms of publishing (e.g., newspaper, yearbook, literary magazine, Web, social media)	
P.7.JII.2	Create content for media through reporting, writing, editing, photography, layout, and design	W.CCR.1, W.CCR.2, W.CCR.3, W.CCR.4, W.CCR.5, W.CCR.6, W.CCR.7, W.CCR.8, W.CCR.9, W.CCR.10, SL.CCR.4, SL.CCR.5, SL.CCR.6, L.CCR.1, L.CCR.2, L.CCR.3, L.CCR.5, L.CCR.6
P.7.JII.3	Publish a variety of original *journalistically sound* pieces	W.CCR.1, W.CCR.2, W.CCR.3, W.CCR.4, W.CCR.5, W.CCR.6, W.CCR.7, W.CCR.8, W.CCR.9, W.CCR.10, SL.CCR.4, SL.CCR.5, SL.CCR.6, L.CCR.1, L.CCR.2, L.CCR.3, L.CCR.5, L.CCR.6

Glossary for Journalism II

Attribution	Using a source's full name and title when quoting; see style guide for publication (e.g., Associated Press [AP], National Press, Columbia Scholastic Press Association [CSPA])
Code of Ethics	Moral code and standards to which journalists adhere
Color harmony	A pleasing arrangement of color
Column layout	Vertical lines that provide a framework for a page
Journalistically sound	Adheres to the journalistic guidelines for writing and design based on objectivity, responsibility, and credibility
Journalistic style	Style that is determined by journalism organizations in order to maintain consistency in media (e.g., Associated Press, student press organizations)
Photo essay	A story told primarily with images
Secondary coverage	Additional coverage of material not provided in the main/primary coverage of the story (e.g., diagrams, informational graphics, maps, quote collections, sidebars, timelines)
Typography	The use of text as a graphic element in design
Vlogs	Video log embedded in online media

Contributors

The following people contributed to the development of this document:

Jennifer Akers - Cabot	Amy Matthews - Fayetteville
Tammy Alexander - Nashville	Gerri McCann - Manila
Rebecca Allen - Valley View	Amanda McMahan - Magnolia
Jane Balgavy - Jacksonville-North Pulaski	Lynn Meade - University of Arkansas
Brandon Box-Higdem - Bentonville	Alisa Melton - Blytheville
Samantha Carpenter - Virtual Arkansas	Jennifer Murphy - El Dorado
Lisa Carver - Texarkana	Traci Myers - Foreman
Kimberly Chavez - Camden Fairview	Tim Peerbolte - Greenwood
Susan Colyer - Fort Smith	Erin Radke - Jessieville
Joan Crowder - Arkadelphia	Jacki Reiff - Gravette
April Erickson - South Conway County	Tracie Richard - Hermitage
Jessica Foster - Siloam Springs	Chad Simpson - Clarendon
Sommer Frazer - McGehee	Dallas Sims - Lakeside (Lake Village)
Natalie Free - Pangburn	Vivian Sisk – KIPP: Delta Collegiate
Eric Gamble - Dardanelle	Andrea Speer - Bentonville
Jennifer Garner - Lakeside (Hot Springs)	Steven Trulock - Huntsville
Roger Guevara - Southern Arkansas University	Rosie Valdez - Little Rock
Shelly Hardin - West Memphis	

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Journalism III

Arkansas
English Language Arts Standards

2016

Course Title:	Journalism III
Course/Unit Credit:	1
Course Number:	415020
Teacher Licensure:	Please refer to the Course Code Management System (https://adedata.arkansas.gov/ccms/) for the most current licensure codes.
Grades:	9-12
Prerequisites:	Journalism I, Journalism II

Journalism III

Journalism II is a prerequisite for Journalism III. Students entering Journalism II, III, or IV must have successfully completed the preceding year of study. Journalism I is a foundational course and cannot be combined with other courses. Journalism II-IV may be taught within the same class period; however, the student learning expectations for each level are different and must be addressed.

Journalism III is a two-semester course designed to immerse students in the production process through an advanced study of media production. Students will employ journalistic skills in media. Students will use academic knowledge gained in Journalism I and II to assume leadership roles and/or become advanced writers, designers, and photographers. Writing, technology, and visual and electronic media are used as tools for learning as students create, critique, and produce.

Journalism I, II, III, and IV do not require Arkansas Department of Education approval.

Strand	Content Standard
Law and Ethics	
	1. Students will evaluate legal and ethical issues.
History	
	2. Students will demonstrate a working knowledge of the history and role of journalism in society.
Management and Organization	
	3. Students will demonstrate a working knowledge of staff management and organization.
Design	
	4. Students will create designs for media.
Writing	
	5. Students will create various pieces of journalistically sound writing.
Photography	
	6. Students will demonstrate a working knowledge of photographic principles.
Publishing	
	7. Students will publish journalistically sound media.

Notes:

1. Each level continues to address earlier Student Learning Expectations (SLEs) as needed.
2. Student Learning Expectations (SLEs) may be taught in any sequence.
3. Italicized words in this document appear in the glossary.
4. All items in a bulleted list are required to be taught.
5. The examples given (e.g.,) are suggestions to guide the instructor.
6. Publishing can include, but is not limited to, school publications (e.g., yearbook, newspaper, literary magazine, online media) and community media.

How the Anchor Standards are Labeled

R . CCR . 1

The letter in the first position of the anchor standard numbering system represents the strand:

Reading (R)

Writing (W)

Speaking and Listening (SL)

Language (L)

The symbol in the second position of the anchor standard numbering system represents college and career readiness.

The number in the third position of the anchor standard numbering system represents the standard.

How the SLEs are Labeled

D . 10 . DIII . 2

D	10	DIII	2
Letters in the first position represent the Strand name (e.g., Delivery).	Numbers in the second position represent the Standard number (e.g., Standard 10).	Symbols in the third position represent the Course name and level (e.g., Debate III).	Numbers in the fourth position represent the SLE number (e.g., SLE 2).

Strand: Law and Ethics

Content Standard 1: Students will evaluate legal and ethical issues.

		AR ELA Alignment
LE.1.JIII.1	Evaluate legal and ethical concepts in journalistic works	R.CCR.1, R.CCR.2, R.CCR.4, R.CCR.8, SL.CCR.1, SL.CCR.2 L.CCR.6
LE.1.JIII.2	Evaluate various legal restrictions placed on the press and electronic media	R.CCR.1, R.CCR.2, R.CCR.4, R.CCR.8, W.CCR.2, W.CCR.4, W.CCR.7, SL.CCR.1, SL.CCR.2, SL.CCR.4, SL.CCR.6, L.CCR.6
LE.1.JIII.3	Apply ethical responsibilities to journalistic work (e.g., *Code of Ethics*, student media policies)	W.CCR.8
LE.1.JIII.4	Apply ethical responsibilities regarding technological aspects of media (e.g., *Code of Ethics*, student media policies)	W.CCR.4, W.CCR.6, W.CCR.8, SL.CCR.2, SL.CCR.5, SL.CCR.6

Strand: History

Content Standard 2: Students will demonstrate a working knowledge of the history and role of journalism in society.

		AR ELA Alignment
H.2.JIII.1	Analyze the role of journalism in a democratic society	R.CCR.1, R.CCR.2, R.CCR.4, W.CCR.2, W.CCR.4, W.CCR,8, W.CCR.9, SL.CCR.1, SL.CCR.4, L.CCR.6
H.2.JIII.2	Analyze the effectiveness of journalism in contemporary society	R.CCR.1, R.CCR.2, R.CCR.4, W.CCR.2, W.CCR.4, W.CCR,8, W.CCR.9, SL.CCR.1, SL.CCR.4, L.CCR.6
H.2.JIII.3	Analyze photography in contemporary journalism (e.g., emotional connection, how photos enhance text, reader response, storytelling quality of the photo)	R.CCR.1, R.CCR.2, R.CCR.4, W.CCR.2, W.CCR.4, W.CCR,8, W.CCR.9, SL.CCR.1, SL.CCR.4, L.CCR.6

Strand: Management and Organization

Content Standard 3: Students will demonstrate a working knowledge of staff management and organization.

		AR ELA Alignment
MO.3.JIII.1	Evaluate staff organizational and time management strategies necessary to meet student media production schedules	W.CCR.6
MO.3.JIII.2	Evaluate existing staff plan for financing student media	
MO.3.JIII.3	Evaluate existing staff plan to maximize the circulation of student media	
MO.3.JIII.4	This skill is taught in Journalism I and should be reinforced as needed. Investigate careers in journalism	

Strand: Design

Content Standard 4: Students will create designs for media.

		AR ELA Alignment
D.4.JIII.1	Create designs using available technology for media	W.CCR.6, SL.CCR.5
D.4.JIII.2	Apply appropriate advanced design principles and elements for media (e.g., grid layout, special graphic effects, advanced *typography*, advanced Web design)	W.CCR.6, SL.CCR.5
D.4.JIII.3	Apply advanced design trends in media	W.CCR.6, SL.CCR.5

Strand: Writing

Content Standard 5: Students will create various pieces of journalistically sound writing.

		AR ELA Alignment
W.5.JIII.1	Evaluate original interview questions using advanced research skills for various forms of writing	W.CCR.4, W.CCR.5, W.CCR.7, SL.CCR.1, SL.CCR.6, L.CCR.1, L.CCR.6
W.5.JIII.2	Analyze interviews for relevance to media	W.CCR.6, SL.CCR.2
W.5.JIII.3	Analyze information for validity, relevance, and strength of multiple sources	R.CCR.8, W.CCR.8
W.5.JIII.4	Analyze leads for appropriateness (e.g., content, context, style, model)	W.CCR.4, W.CCR.5, W.CCR.6, W.CCR.10, L.CCR.1, L.CCR.2, L.CCR.3
W.5.JIII.5	Analyze the application of the fundamental questions of journalism in a news story	W.CCR.4, W.CCR.5, W.CCR.6, W.CCR.7
W.5.JIII.6	Analyze the application of news elements in copy	W.CCR.4, W.CCR.5, W.CCR.6, W.CCR.7
W.5.JIII.7	Analyze direct and indirect quotes in copy, verifying appropriate *attribution*	W.CCR.8, W.CCR.9, W.CCR.10

Strand: Writing

Content Standard 5: Students will create various pieces of journalistically sound writing.

		AR ELA Alignment
W.5.JIII.8	Analyze various forms of *journalistically sound* writing suitable for media	W.CCR.4, W.CCR.5, W.CCR.6, L.CCR.1, L.CCR.2, L.CCR.3
W.5.JIII.9	Edit various forms of writing • peer edit • self-edit	W.CCR.5, L.CCR.1, L.CCR.2, L.CCR.3
W.5.JIII.10	Revise original pieces for content and style	W.CCR.5, L.CCR.1, L.CCR.2, L.CCR.3
W.5.JIII.11	Analyze content for media	W.CCR.4, W.CCR.6, W.CCR.10, L.CCR.1, L.CCR.2, L.CCR.3
W.5.JIII.12	Analyze captions for *journalistic style*	W.CCR.4, W.CCR.6, W.CCR.10, L.CCR.1, L.CCR.2, L.CCR.3
W.5.JIII.13	Analyze headlines for *journalistic style*	W.CCR.4, W.CCR.6, W.CCR.10, L.CCR.1, L.CCR.2, L.CCR.3

Strand: Photography

Content Standard 6: Students will demonstrate a working knowledge of photographic principles.

		AR ELA Alignment
PH.6.JIII.1	Evaluate appropriate photographic pieces for media	R.CCR.7, SL.CCR.5
PH.6.JIII.2	Demonstrate the use of camera controls (e.g., aperture, light, blocking, shutter speed)	
PH.6.JIII.3	This skill is taught in Journalism II and should be reinforced as needed. Analyze the use of composition skills of photography (e.g., angle, dominant element, leading lines, rule of thirds, selective focus)	
PH.6.JIII.4	Apply advanced composition skills of photography	
PH.6.JIII.5	Evaluate the role of photojournalism in media	R.CCR.1, R.CCR.2, R.CCR.4, R.CCR.6, R.CCR.9, L.CCR.6

Strand: Publishing

Content Standard 7: Students will publish journalistically sound media.

		AR ELA Alignment
P.7.JIII.1	This skill is taught in Journalism I and should be reinforced as needed. Describe forms of publishing (e.g., newspaper, yearbook, literary magazine, Web, social media)	
P.7.JIII.2	Analyze content for use in media	W.CCR.4, W.CCR.5, W.CCR.6, W.CCR.7, W.CCR.8, W.CCR.9, SL.CCR.3, SL.CCR.4, SL.CCR.5, SL.CCR.6, L.CCR.1, L.CCR.2, L.CCR.3, L.CCR.6
P.7.JIII.3	Publish a variety of original *journalistically sound* pieces	W.CCR.1, W.CCR.2, W.CCR.3, W.CCR.4, W.CCR.5, W.CCR.6, W.CCR.7, W.CCR.8, W.CCR.9, W.CCR.10, SL.CCR.4, SL.CCR.5, SL.CCR.6, L.CCR.1, L.CCR.2, L.CCR.3, L.CCR.5, L.CCR.6

Attribution	Using a source's full name and title when quoting; see style guide for publication (e.g., Associated Press [AP], National Press, Columbia Scholastic Press Association [CSPA])
Code of Ethics	Moral code and standards to which journalists adhere
Journalistically sound	Adheres to the journalistic guidelines for writing and design based on objectivity, responsibility, and credibility
Journalistic style	Style that is determined by journalism organizations in order to maintain consistency in media (e.g., Associated Press, student press organizations)
Typography	The use of text as a graphic element in design

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Lisa Carver - Texarkana	Traci Myers - Foreman
Kimberly Chavez - Camden Fairview	Tim Peerbolte - Greenwood
Susan Colyer - Fort Smith	Erin Radke - Jessieville
Joan Crowder - Arkadelphia	Jacki Reiff - Gravette
April Erickson - South Conway County	Tracie Richard - Hermitage
Jessica Foster - Siloam Springs	Chad Simpson - Clarendon
Sommer Frazer - McGehee	Dallas Sims - Lakeside (Lake Village)
Natalie Free - Pangburn	Vivian Sisk – KIPP: Delta Collegiate
Eric Gamble - Dardanelle	Andrea Speer - Bentonville
Jennifer Garner - Lakeside (Hot Springs)	Steven Trulock - Huntsville
Roger Guevara - Southern Arkansas University	Rosie Valdez - Little Rock
Shelly Hardin - West Memphis	

Journalism IV

Arkansas

English Language Arts Standards

2016

Course Title:	Journalism IV
Course/Unit Credit:	1
Course Number:	415030
Teacher Licensure:	Please refer to the Course Code Management System (https://adedata.arkansas.gov/ccms/) for the most current licensure codes.
Grades:	9-12
Prerequisites:	Journalism I, II, and III

Journalism IV

Journalism III is a prerequisite for Journalism IV. Students entering Journalism II, III, or IV must have successfully completed the preceding year of study. Journalism I is a foundational course and cannot be combined with other courses. Journalism II-IV may be taught within the same class period; however, the student learning expectations for each level are different and must be addressed.

Journalism IV is designed to provide students in media leadership the opportunity to facilitate the production process. Students in Journalism IV will use their advanced journalistic knowledge and leadership skills to facilitate all aspects of media production and to ensure that journalistic guidelines for writing and design, which include objectivity, responsibility, and credibility, are followed. Writing, technology, and visual and electronic media are used as tools for learning as students lead, create, evaluate, and produce.

Journalism I, II, III, and IV do not require Arkansas Department of Education approval.

Strand	Content Standard
Law and Ethics	
	1. Students will evaluate legal and ethical issues.
History	
	2. Students will demonstrate a working knowledge of the history and role of journalism in society.
Management and Organization	
	3. Students will demonstrate a working knowledge of staff management and organization.
Design	
	4. Students will create designs for media.
Writing	
	5. Students will create various pieces of journalistically sound writing.
Photography	
	6. Students will demonstrate a working knowledge of photographic principles.
Publishing	
	7. Students will publish journalistically sound media.

Notes:

1. Each level continues to address earlier Student Learning Expectations (SLEs) as needed.
2. Student Learning Expectations (SLEs) may be taught in any sequence.
3. Italicized words in this document appear in the glossary.
4. All items in a bulleted list are required to be taught.
5. The examples given (e.g.,) are suggestions to guide the instructor.
6. Publishing can include, but is not limited to, school publications (e.g., yearbook, newspaper, literary magazine, online media) and community media.

How the Anchor Standards are Labeled

R . CCR . 1

The letter in the first position of the anchor standard numbering system represents the strand:

Reading (R)

Writing (W)

Speaking and Listening (SL)

Language (L)

The symbol in the second position of the anchor standard numbering system represents college and career readiness.

The number in the third position of the anchor standard numbering system represents the standard.

How the SLEs are Labeled

D . 10 . DIII . 2

D	10	DIII	2
Letters in the first position represent the Strand name (e.g., Delivery).	**Numbers in the second position represent the Standard number (e.g., Standard 10).**	**Symbols in the third position represent the Course name and level (e.g., Debate III).**	**Numbers in the fourth position represent the SLE number (e.g., SLE 2).**

Strand: Law and Ethics

Content Standard 1: Students will evaluate legal and ethical issues.

		AR ELA Alignment
LE.1.JIV.1	Create legal and ethical policies for student media	W.CCR.2, W.CCR.4, W.CCR.5, W.CCR.6, W.CCR.7, W.CCR.8, W.CCR.9, SL.CCR.4, SL.CCR.5, SL.CCR.6, L.CCR.1, L.CCR.2, L.CCR.6
LE.1.JIV.2	Create policies for electronic student media	W.CCR.2, W.CCR.4, W.CCR.5, W.CCR.6, W.CCR.7, W.CCR.8, W.CCR.9, SL.CCR.4, SL.CCR.5, SL.CCR.6, L.CCR.1, L.CCR.2, L.CCR.6
LE.1.JIV.3	Evaluate ethical responsibilities for student media	R.CCR.1, R.CCR.2, R.CCR.3, R.CCR.4, R.CCR.5, R.CCR.6, R.CCR.7, R.CCR.8, R.CCR.10, L.CCR.1, L.CCR.2, L.CCR.3, L.CCR.4, L.CCR.5, L.CCR.6
LE.1.JIV.4	Evaluate ethical responsibilities regarding technological aspects of student media	R.CCR.1, R.CCR.2, R.CCR.3, R.CCR.4, R.CCR.5, R.CCR.6, R.CCR.7, R.CCR.8, R.CCR.10, L.CCR.1, L.CCR.2, L.CCR.3, L.CCR.4, L.CCR.5, L.CCR.6

Strand: History

Content Standard 2: Students will demonstrate a working knowledge of the history and role of journalism in society.

		AR ELA Alignment
H.2.JIV.1	Evaluate current events in a democratic society	R.CCR.1, R.CCR.2, R.CCR.3, R.CCR.4, R.CCR.5, R.CCR.6, R.CCR.7, R.CCR.8, R.CCR.10, L.CCR.1, L.CCR.2, L.CCR.3, L.CCR.4, L.CCR.5, L.CCR.6
H.2.JIV.2	Integrate concepts from current events in contemporary journalism to established student media	R.CCR.7, R.CCR.8, R.CCR.9, R.CCR.10, W.CCR.2, W.CCR.7, W.CCR.8, W.CCR.9, W.CCR.10
H.2.JIV.3	Evaluate photography in contemporary journalism (e.g., emotional connection, how photos enhance text, reader response, storytelling quality of the photo)	R.CCR.7, W.CCR.9

Strand: Management and Organization

Content Standard 3: Students will demonstrate a working knowledge of staff management and organization.

		AR ELA Alignment
MO.3.JIV.1	Create staff organizational and time management strategies necessary to meet student media production schedules	W.CCR.6
MO.3.JIV.2	Create staff plan for financing student media	W.CCR.6
MO.3.JIV.3	Create staff plan to maximize the circulation of student media	W.CCR.6
MO.3.JIV.4	This standard is taught in Journalism I and should be reinforced as needed. Investigate careers in journalism	

Strand: Design

Content Standard 4: Students will create designs for media.

		AR ELA Alignment
D.4.JIV.1	Evaluate designs created for media	R.CCR.7, W.CCR.6, SL.CCR.2, SL.CCR.6, L.CCR.1, L.CCR.2, L.CCR.3
D.4.JIV.2	Create advanced designs for media	W.CCR.6, SL.CCR.5
D.4.JIV.3	Create designs that incorporate trends in media	W.CCR.6, SL.CCR.5

Strand: Writing

Content Standard 5: Students will create various pieces of journalistically sound writing.

		AR ELA Alignment
W.5.JIV.1	Evaluate original interview questions using advanced research skills for various forms of writing	R.CCR.1, R.CCR.4, R.CCR.6, L.CCR.1, L.CCR.2, L.CCR.6
W.5.JIV.2	Analyze interviews for relevance to media	W.CCR.6, SL.CCR.2
W.5.JIV.3	Evaluate information for relevance, accuracy, and completeness of information from multiple sources	R.CCR.8, W.CCR.8
W.5.JIV.4	Evaluate leads for appropriateness	W.CCR.4, W.CCR.5, W.CCR.6, W.CCR.10, L.CCR.1, L.CCR.2, L.CCR.3
W.5.JIV.5	Evaluate the relevance and application of fundamental questions of journalism in a news story	W.CCR.4, W.CCR.5, W.CCR.6, W.CCR.7
W.5.JIV.6	Evaluate the relevance and application of news elements in copy	W.CCR.4, W.CCR.5, W.CCR.6, W.CCR.7
W.5.JIV.7	Evaluate relevance and application of direct and indirect quotes in copy	W.CCR.8, W.CCR.9, W.CCR.10

Strand: Writing

Content Standard 5: Students will create various pieces of journalistically sound writing.

		AR ELA Alignment
W.5.JIV.8	Evaluate various forms of journalistically sound writing for suitable relevance, accuracy, and completeness of information	R.CCR.1, R.CCR.2, R.CCR.2, R.CCR.4, R.CCR.5, R.CCR.6, R.CCR.7, R.CCR.8, R.CCR.9, R.CCR.10, SL.CCR.1, SL.CCR.3, L.CCR.1, L.CCR.2, L.CCR.3
W.5.JIV.9	Edit various forms of writing • peer edit • self-edit	W.CCR.5, L.CCR.1, L.CCR.2, L.CCR.3
W.5.JIV.10	Revise original pieces for content and style	W.CCR.5, L.CCR.1, L.CCR.2, L.CCR.3
W.5.JIV.11	Analyze and organize content for student media	W.CCR.4, W.CCR.6, W.CCR.10, L.CCR.1, L.CCR.2, L.CCR.3
W.5.JIV.12	Evaluate captions for *journalistic style*	W.CCR.4, W.CCR.6, W.CCR.10, L.CCR.1, L.CCR.2, L.CCR.3
W.5.JIV.13	Evaluate headlines for *journalistic style*	W.CCR.4, W.CCR.6, W.CCR.10, L.CCR.1, L.CCR.2, L.CCR.3

Strand: Photography

Content Standard 6: Students will demonstrate a working knowledge of photographic principles.

		AR ELA Alignment
PH.6.JIV.1	Edit and integrate photographic pieces into media	R.CCR.7
PH.6.JIV.2	Apply use of camera controls, lenses, and equipment as needed in student media	
PH.6.JIV.3	This standard is taught in Journalism II and should be reinforced as needed. Analyze the use of composition skills of photography (e.g., angle, dominant element, leading lines, rule of thirds, selective focus)	
PH.6.JIV.4	Edit visual pieces for photographic composition in media	
PH.6.JIV.5	Integrate photojournalism in media (e.g., *convergent media*, videos, *vlogs*)	W.CCR.8

Strand: Publishing

Content Standard 7: Students will publish journalistically sound media.

		AR ELA Alignment
P.7.JIV.1	This standard is taught in Journalism I and should be reinforced as needed. Describe forms of publishing (e.g., newspaper, yearbook, literary magazine, Web, social media)	
P.7.JIV.2	Evaluate and integrate content for media through reporting, writing, editing, photography, layout, and design	W.CCR.4, W.CCR.5, W.CCR.6, W.CCR.7, W.CCR.8, W.CCR.9, SL.CCR.3, SL.CCR.4, SL.CCR.5, SL.CCR.6, L.CCR.1, L.CCR.2, L.CCR.3, L.CCR.6
P.7.JIV.3	Publish a variety of original *journalistically sound* pieces	W.CCR.1, W.CCR.2, W.CCR.3, W.CCR.4, W.CCR.5, W.CCR.6, W.CCR.7, W.CCR.8, W.CCR.9, W.CCR.10, SL.CCR.4, SL.CCR.5, SL.CCR.6, L.CCR.1, L.CCR.2, L.CCR.3, L.CCR.5, L.CCR.6

Convergent media	Multiple media that combines to form one product
Journalistically sound	Adheres to the journalistic guidelines for writing and design based on objectivity, responsibility, and credibility
Journalistic style	Style that is determined by journalism organizations in order to maintain consistency in media (e.g., Associated Press, student press organizations)
Vlogs	Video log embedded in online media

Contributors

The following people contributed to the development of this document:

Jennifer Akers - Cabot	Amy Matthews - Fayetteville
Tammy Alexander - Nashville	Gerri McCann - Manila
Rebecca Allen - Valley View	Amanda McMahan - Magnolia
Jane Balgavy - Jacksonville-North Pulaski	Lynn Meade - University of Arkansas
Brandon Box-Higdem - Bentonville	Alisa Melton - Blytheville
Samantha Carpenter - Virtual Arkansas	Jennifer Murphy - El Dorado
Lisa Carver - Texarkana	Traci Myers - Foreman
Kimberly Chavez - Camden Fairview	Tim Peerbolte - Greenwood
Susan Colyer - Fort Smith	Erin Radke - Jessieville
Joan Crowder - Arkadelphia	Jacki Reiff - Gravette
April Erickson - South Conway County	Tracie Richard - Hermitage
Jessica Foster - Siloam Springs	Chad Simpson - Clarendon
Sommer Frazer - McGehee	Dallas Sims - Lakeside (Lake Village)
Natalie Free - Pangburn	Vivian Sisk – KIPP: Delta Collegiate
Eric Gamble - Dardanelle	Andrea Speer - Bentonville
Jennifer Garner - Lakeside (Hot Springs)	Steven Trulock - Huntsville
Roger Guevara - Southern Arkansas University	Rosie Valdez - Little Rock
Shelly Hardin - West Memphis	

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Oral Communication
One Semester (.5 Credit)

Arkansas
English Language Arts Standards

2016

Course Title: Oral Communication One Semester (.5 Credit)
Course/Unit Credit: .5
Course Number: 414000
Teacher Licensure: Please refer to the Course Code Management System (https://adedata.arkansas.gov/ccms/) for the most current licensure codes.
Grades: 9-12

Oral Communication One Semester (.5 Credit)

Oral Communication One Semester (.5 Credit) will provide students with an understanding of the dynamics of effective communication while speaking, listening, and responding. Students will apply the principles of ethical communication, practice communication competencies, demonstrate effective intrapersonal and interpersonal communication, and deliver a variety of speeches. This course will include but is not limited to ethical communication, responsible social media usage, communication barriers, mass media, conflict resolution, leadership styles, business etiquette, and interviews. Students will deliver formal and informal speeches, participate in debate, and perform oral readings. Oral Communication (One Semester) fulfills the .5 unit of Oral Communication required for graduation. Oral Communication One Semester (.5 Credit) does not require Arkansas Department of Education approval.

Strand	Content Standard
Ethical Communication	
	1. Students will apply the principles of ethical communication.
Communication Competencies	
	2. Students will practice communication competencies.
Communication Applications	3. Students will demonstrate effective intrapersonal communication.
	4. Students will demonstrate effective interpersonal communication.
Public Speaking	
	5. Students will deliver a variety of speeches.

Notes:
1. Student Learning Expectations (SLEs) may be taught in any sequence.
2. Italicized words in this document appear in the glossary.
3. All items in a bulleted list are required to be taught.
4. The examples given (e.g.,) are suggestions to guide the instructor.

How the Anchor Standards are Labeled

R . CCR . 1

The letter in the first position of the anchor standard numbering system represents the strand:

Reading (R)

Writing (W)

Speaking and Listening (SL)

Language (L)

The symbol in the second position of the anchor standard numbering system represents college and career readiness.

The number in the third position of the anchor standard numbering system represents the standard.

How the SLEs are Labeled

D . 10 . DIII . 2

D	10	DIII	2
Letters in the first position represent the Strand name (e.g., Delivery).	Numbers in the second position represent the Standard number (e.g., Standard 10).	Symbols in the third position represent the Course name and level (e.g., Debate III).	Numbers in the fourth position represent the SLE number (e.g., SLE 2).

Strand: 1 Ethical Communication

Content Standard 1: Students will apply the principles of ethical communication.

		AR ELA Alignment
EC.1.OC1S.1	Define ethical communication.	L.CCR.6
EC.1.OC1S.2	Apply principles of ethical communication: • *academic integrity* • avoidance of plagiarism • respect for *diversity*	SL.CCR.4
EC.1.OC1S.3	Apply principles of ethical communication as they apply to social media (e.g., cyber bullying, rights to privacy, slander and libel, district technology policies).	SL.CCR.5

Strand: 2 Communication Competencies

Content Standard 2: Students will practice communication competencies.

		AR ELA Alignment
CC.2.OC1S.1	Discuss the effect of the communication channel on the sending and receiving of messages.	SL.CCR.1, SL.CCR.2, SL.CCR.3, SL.CCR.4
CC.2.OC1S.2	Identify communication barriers: • apprehension • bias • false assumptions • loaded terms • negative nonverbal communication	SL.CCR.3
CC.2.OC1S.3	Demonstrate appropriate listening skills: • active listening • critical listening	SL.CCR.3
CC.2.OC1S.4	Define logical fallacies (e.g., slippery slope, ad hominem, bandwagon, false cause, hasty generalization, begging the question, false dilemma)	SL.CCR.3
CC.2.OC1S.5	Evaluate oral messages in a variety of situations (e.g., public addresses, recorded media, classroom discussions): • clarity • delivery • purpose • reasoning • word choice	SL.CCR.3
CC.2.OC1S.6	Identify context-appropriate usage for oral messages: • connotation and denotation • dialect • jargon • slang • standard English • vocabulary complexity	SL.CCR.4

CC.2.OC1S.7	Demonstrate effective nonverbal communication skills: • attire • facial expressions • gestures • *paralanguage* • *proxemics*	
CC.2.OC1S.8	Demonstrate the ability to give and receive constructive criticism in an interpersonal context	SL.CCR.3
CC.2.OC1S.9	Examine mass media messages: • bias • credibility • propaganda • purpose	R.CCR.6, SL.CCR.3
CC.2.OC1S.10	Discuss social media (e.g., internet etiquette; impact of social media use on employers, military, universities, scholarship committees, relationships).	R.CCR.1, R.CCR.6, SL.CCR.4
CC.2.OC1S.11	Identify a variety of social media uses: • commercial marketing • entertaining • networking • news	R.CCR.6
CC.2.OC1S.12	Discuss the negative effects of social media: • cyber bullying • identity theft • permanency of shared information • personal safety • reputation	R.CCR.1, SL.CCR.4

Strand: 3 Communications Applications

Content Standard 3: Students will demonstrate effective intrapersonal communication.

		AR ELA Standards
CA.3.OC1S.1	Develop intrapersonal communication skills: • goal setting • positive self-concept • positive self-talk • self-confidence	SL.CCR.1
CA.3.OC1S.2	Discuss intrapersonal communication concepts (e.g., *Johari Window* of self-awareness, Maslow's hierarchy of needs, self-fulfilling prophecy, *self-script*, *fundamental attribution error, fixed* vs. *growth mindset, imposter syndrome)*	SL.CCR.1, SL.CCR.4

Strand: 3 Communications Applications

Content Standard 4: Students will demonstrate effective interpersonal communication.

		AR ELA Alignment
CA.4.OC1S.1	Apply conflict-resolution strategies: • differentiate between conflict-resolution styles (e.g., assertive, aggressive, passive, passive/aggressive) • paraphrase • employ reasoning • time out strategy • mutual respect	
CA.4.OC1S.2	Adapt message to the audience: • context (e.g., regional, situational, environmental) • non-verbal communication • vocal delivery (e.g., pace, volume, tone)	SL.CCR.4, SL.CCR.5, SL.CCR.6
CA.4.OC1S.3	Demonstrate conversation skills in informal communication: • extenders • openers/ice breakers • reduction of negative conversation behaviors (e.g., domination, interruptions) • self-disclosure	SL.CCR.4, SL.CCR.6
CA.4.OC1S.4	Examine leadership styles (e.g., autocratic, authoritative, laissez-faire, democratic)	
CA.4.OC1S.5	Participate in collaborative discussions in a variety of contexts (e.g., classroom simulations, club meetings, learning teams, civic meetings, co-curricular contests): • consensus building • group decision-making process • norms • preparation • responses to diverse perspectives • roles	SL.CCR.1, SL.CCR.2, SL.CCR.3, SL.CCR.4, SL.CCR.5, SL.CCR.6
CA.4.OC1S.6	Prepare for a job interview: • attire • prepare for common questions • research the company • resume	SL.CCR.1, SL.CCR.6

CA.4.OC1S.7	Participate in an interview (e.g., job, college, research, newspaper)	SL.CCR.1, SL.CCR.6
CA.4.OC1S.8	Identify appropriate business etiquette: • appearance (e.g., professional attire, business casual dress, grooming) • introductions • proper technology usage (e.g., composing emails, networking, texting)	

Strand: 4 Public Speaking

Content Standard 5: Students will deliver a variety of formal and informal public speeches.

		AR ELA Alignment
PS.5.OC1S.1	Present informal speeches adapting the message to a variety of contexts and tasks (e.g., impromptu, toast, introduction, after dinner, entertainment)	SL.CCR.1, SL.CCR.2, SL.CCR.4, SL.CCR.5, SL.CCR.6
PS.5.OC1S.2	Prepare a variety of formal speeches (e.g., demonstration, informative, persuasive, problem-solution) for delivery • analyze audience • create formal outline • identify purpose • organize speech according to appropriate pattern (e.g. chronological, topical, problem-solution, cause-effect) • practice delivery • reference sources in the speech	SL.CCR.1, SL.CCR.2, SL.CCR.4, SL.CCR.5, SL.CCR.6
PS.5.OC1S.3	Research speech topic: • cite sources • evaluate the credibility of sources • locate appropriate resources (e.g., purpose, audience, task)	R.CCR.1, R.CCR.2, R.CCR.7, R.CCR.8, R.CCR.9, W.CCR.7, W.CCR.8, W.CCR.9
PS.5.OC1S.4	Use figurative language (e.g., allusion, antithesis, euphemism, imagery, metaphor, personification, simile) where appropriate	L.CCR.5
PS.5.OC1S.5	Use supporting materials (e.g., PowerPoint, Prezi, Keystone, prop, poster, PowToons, videos, audio recordings)	SL.CCR.2, SL.CCR.5
PS.5.OC1S.6	Demonstrate the ability to give and receive constructive criticism: • critique oral messages (e.g., clarity, delivery, word choice, body language, use of language, evidence) • define constructive criticism • develop a plan of action based on constructive criticism	SL.CCR.3
PS.5.OC1S.7	Demonstrate effective delivery skills: • nonverbal skills (e.g., gestures, facial expressions, eye contact, attire, *proxemics*) • platform movement • verbal skills (e.g., vocal projection, pace, rate, tone)	SL.CCR.4, SL.CCR.6

PS.5.OC1S.8	Apply debate fundamentals in an informal or formal debate: • establish a resolution for a debate • support or refute the resolution with research • create arguments based on research (e.g., warrant, claim, impact) • present researched arguments to support claims	SL.CCR.4, SL.CCR.5, SL.CCR.6
PS.5.OC1S.9	Perform oral readings (e.g., poetry, prose, dramatic monologues, historical speeches) using effective *paralanguage* • *diction* • mood • vocal expression (e.g., inflection, pause, pitch, rate, volume)	SL.CCR.6

Glossary for Oral Communication One-semester (.5 Credit)

Academic integrity	"Academic integrity is the pursuit of scholarly activity in an open, honest and responsible manner." http://tlt.psu.edu/plagiarism/student-tutorial/defining-plagiarism-and-academic-integrity/
Communication competency	An ability necessary to communicate successfully and efficiently
Diction	The accent, inflection and intonation of speech. Sound quality manifested by an individual speaker, usually judged in terms of prevailing standards of accept ability; enunciation
Diversity	Understanding that each individual is unique and recognizing individual differences (e.g., ability, culture, federally protected categories, gender, race, religion, socio-economic status)
Fixed mindset	The belief that one either is or isn't good at something, based solely on inherent nature, because it is just who one is https://sivers.org/mindset
Fundamental attribution error	Tendency to explain someone's behavior based on internal factors, such as personality or disposition, and to underestimate the influence that external factors, such as situational influences, have on another person's behavior http://study.com/academy/lesson/fundamental-attribution-error-definition-lesson-quiz.html
Growth mindset	The belief that anyone can be good at anything, because one's abilities are entirely due to one's actions. https://sivers.org/mindset
Imposter syndrome	"Chronic self-doubt and a sense of intellectual fraudulence that override any feelings of success or external proof of competence" https://hbr.org/2008/05/overcoming-imposter-syndrome
Johari Window	Model for self-awareness, personal development, group development, and understanding relationships
Paralanguage	Nonverbal means of communication that accompany speech and convey further meaning (e.g., facial expressions, gestures, laughter, tone of voice)
Proxemics	Communicating with others by virtue of the relative positioning of your bodies
Self-script	Phrases that a person has heard repeated about themselves that become part of their own self talk (e.g., " You're a good girl.", "You'll never go anywhere in life.")
Semantics	Study of the meanings of words

Contributors

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Susan Colyer - Fort Smith	Erin Radke - Jessieville
Joan Crowder - Arkadelphia	Jacki Reiff - Gravette
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Jennifer Garner - Lakeside (Hot Springs)	Steven Trulock - Huntsville
Roger Guevara - Southern Arkansas University	Rosie Valdez - Little Rock
Shelly Hardin - West Memphis	

Oral Communication

One Year (1 Credit)

Arkansas
English Language Arts Standards

2016

Course Title: Oral Communication One Year (1 Credit)
Course/Unit Credit: 1
Course Number: 414010
Teacher Licensure: Please refer to the Course Code Management System (https://adedata.arkansas.gov/ccms/) for the most current licensure codes.
Grades: 9-12

Oral Communication One Year (1 Credit)

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Strand	Content Standard
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	5. Students will deliver a variety of speeches.

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The letter in the first position of the anchor standard numbering system represents the strand:

- Reading (R)
- Writing (W)
- Speaking and Listening (SL)
- Language (L)

The symbol in the second position of the anchor standard numbering system represents college and career readiness.

The number in the third position of the anchor standard numbering system represents the standard.

How the SLEs are Labeled

D . 10 . DIII . 2

D	10	DIII	2
Letters in the first position represent the Strand name (e.g., Delivery).	Numbers in the second position represent the Standard number (e.g., Standard 10).	Symbols in the third position represent the Course name and level (e.g., Debate III).	Numbers in the fourth position represent the SLE number (e.g., SLE 2).

Strand 1: Ethical Communication

Content Standard 1: Students will apply the principles of ethical communication.

		AR ELA Alignment
EC.1.OC2S.1	Define ethical communication	L.CCR.6
EC.1.OC2S.2	Apply principles of ethical communication: • *academic integrity* • avoidance of plagiarism • respect for *diversity*	SL.CCR.4
EC.1.OC2S.3	Apply principles of ethical communication as they apply to social media (e.g., cyber bullying, rights to privacy, slander and libel, district technology policies)	SL.CCR.5

Strand 2: Communication Competencies

Content Standard 2: Students will practice communication competencies.

		AR ELA Alignment
CC.2.OC2S.1	Analyze the effect of the *communication channel* on the sending and receiving of messages	SL.CCR.1, SL.CCR.2, SL.CCR.3, SL.CCR.4
CC.2.OC2S.2	Reduce communication barriers: • apprehension • bias • false assumptions • loaded terms • negative nonverbal communication	SL.CCR.1, SL.CCR.6
CC.2.OC2S.3	Adjust for alternative views: • connotation • cultural, educational, and/or social differences • perception •	SL.CCR.6
CC.2.OC2S.4	Demonstrate appropriate listening skills: • active listening • appreciative listening • critical listening • empathetic listening • reflective listening •	SL.CCR.3
CC.2.OC2S.5	Recognize logical fallacies (e.g., slippery slope, ad hominem, bandwagon, false cause, hasty generalization, begging the question, false dilemma)	SL.CCR.3
CC.2.OC2S.6	Evaluate oral messages in a variety of situations (e.g., public addresses, recorded media, classroom discussions): • clarity • delivery • purpose • reasoning • word choice	SL.CCR.2, SL.CCR.3

CC.2.OC2S.7	Identify context-appropriate usage for oral messages: • connotation and denotation • dialect • jargon • slang • standard English • vocabulary complexity	SL.CCR.4
CC.2.OC2S.8	Demonstrate effective nonverbal communication skills: • attire • facial expressions • gestures • *paralanguage* • *proxemics*	
CC.2.OC2S.9	Give and receive constructive criticism in an interpersonal context	SL.CCR.3
CC.2.OC2S.10	Analyze mass media messages: • bias • credibility • propaganda • purpose	R.CCR.6, SL.CCR.3
CC.2.OC2S.11	Develop a social media philosophy (e.g., internet etiquette; impact of social media use on employers, military, universities, scholarship committees, relationships)	SL.CCR.4
CC.2.OC2S.12	Analyze a variety of social media uses: • commercial marketing • entertaining • networking • news	R.CCR.6
CC.2.OC2S.13	Discuss the negative effects of social media: • cyber bullying • identity theft • permanency of shared information • personal safety • reputation	SL.CCR.1, SL.CCR.2, SL.CCR.3, SL.CCR.4, SL.CCR.5, SL.CCR.6

Strand 3: Communications Applications

Content Standard 3: Students will demonstrate effective intrapersonal communication.

		AR ELA Alignment
CA.3.OC2S.1	Develop intrapersonal communication skills: • goal setting • *growth mindset* • perceptual process • positive self-concept • positive self-talk • self-confidence	SL.CCR.1
CA.3.OC2S.2	Discuss these concepts of intrapersonal communication: • *fixed* vs. *growth mindset* • *fundamental attribution error* • *imposter syndrome* • *Johari Window* • Maslow's hierarchy of needs • self-fulfilling prophecy • *self-script*	SL.CCR.1, SL.CCR.4

Strand 3: Communications Applications

Content Standard 4: Students will demonstrate effective interpersonal communication.

		AR ELA Alignment
CA.4.OC2S.1	Apply conflict-resolution strategies: • differentiate between conflict-resolution styles (e.g., assertive, aggressive, passive, passive/aggressive) • employ reasoning • mutual respect • paraphrase • time out strategy	
CA.4.OC2S.2	Adapt message to the audience: • context (e.g., regional, situational, environmental) • non-verbal communication • vocal delivery (e.g., pace, volume, tone)	SL.CCR.4, SL.CCR.5, SL.CCR.6
CA.4.OC2S.3	Demonstrate conversation skills in informal communication • extenders • openers/ice breakers • reduction of negative conversation behaviors (e.g., domination, interruptions) • self-disclosure	SL.CCR.4, SL.CCR.6
CA.4.OC2S.4	Examine leadership styles (e.g., autocratic, authoritative, laissez-faire, democratic)	
CA.4.OC2S.5	Participate in collaborative discussions in a variety of contexts (e.g., classroom simulations, club meetings, learning teams, civic meetings, co-curricular contests): • consensus building • group decision-making process • norms • preparation • questioning techniques • responses to diverse perspectives • roles	SL.CCR.1, SL.CCR.2, SL.CCR.3, SL.CCR.4, SL.CCR.5, SL.CCR.6

CA.4.OC2S.6	Prepare for a job interview: • attire • prepare for common questions • research the company • resume	SL.CCR.1, SL.CCR.6
CA.4.OC2S.7	Participate in an interview (e.g., job, college, research, newspaper)	SL.CCR.1, SL.CCR.6
CA.4.OC2S.8	Demonstrate appropriate business etiquette: • appearance (e.g., professional attire, business casual dress, grooming) • introductions • technology (e.g., composing emails, networking, texting)	

Strand 4: Public Speaking

Content Standard 5: Students will deliver a variety of formal and informal public speeches. .

		AR ELA Alignment
PS.5.OC2S.1	Present informal speeches adapting the message to a variety of contexts and tasks (e.g., impromptu, toast, introduction, after dinner, entertainment)	SL.CCR.1, SL.CCR.2, SL.CCR.4, SL.CCR.5, SL.CCR.6
PS.5.OC2S.2	Present a variety of formal speeches (e.g., demonstration, informative, persuasive, problem-solution) following the appropriate preparation process: • identify purpose • analyze audience • organize speech using appropriate pattern (e.g. chronological, topical, problem-solution, cause-effect) • create formal outline • reference sources in the speech • practice delivery	SL.CCR.1, SL.CCR.2, SL.CCR.4, SL.CCR.5, SL.CCR.6
PS.5.OC2S.3	Research speech topic: • locate appropriate resources (e.g., purpose, audience, task) • evaluate the credibility of sources • cite sources	R.CCR.1, R.CCR.2, R.CCR.7, R.CCR.8, R.CCR.9, W.CCR.7, W.CCR.8, W.CCR.9
PS.5.OC2S.4	Use figurative language (e.g., allusion, antithesis, euphemism, imagery, metaphor, personification, simile)	L.CCR.5
PS.5.OC2S.5	Use supporting materials (e.g., PowerPoint, Prezi, Keystone, prop, poster, PowToons, videos, audio recordings)	SL.CCR.2, SL.CCR.5
PS.5.OC2S.6	Demonstrate the ability to give and receive constructive criticism: • define constructive criticism • develop a plan of action based on constructive criticism • critique oral messages (e.g., clarity, delivery, word choice, body language, use of language, evidence) •	SL.CCR.3
PS.5.OC2S.7	Demonstrate effective delivery skills: • nonverbal skills (e.g., gestures, facial expressions, eye contact, attire, *proxemics*) • platform movement • verbal skills (e.g., vocal projection, pace, rate, tone)	SL.CCR.4, SL.CCR.6

PS.5.OC2S.8	Apply debate fundamentals in a variety of formal and informal debates: • Establish a resolution for a debate • Support or refute the resolution with research • Create arguments based on research (e.g., warrant, claim, impact) • Present researched arguments to support claims	SL.CCR.4, SL.CCR.5, SL.CCR.6
PS.5.OC2S.9	Perform multiple oral readings (e.g., poetry, prose, dramatic monologues, historical speeches) using appropriate *paralanguage:* • *diction* • mood • vocal expressions (e.g., inflection, pause, pitch, rate, volume)	SL.CCR.6

Academic integrity	"Academic integrity is the pursuit of scholarly activity in an open, honest and responsible manner." http://tlt.psu.edu/plagiarism/student-tutorial/defining-plagiarism-and-academic-integrity/
Diction	Sound quality manifested by an individual speaker, usually judged in terms of prevailing standards of accept ability; enunciation. The accent, inflection and intonation of speech.
Diversity	Understanding that each individual is unique and recognizing individual differences (e.g., ability, culture, federally protected categories, gender, race, religion, socio-economic status)
Fixed mindset	The belief that one either is or isn't good at something, based solely on inherent nature, because it is just who one is https://sivers.org/mindset
Fundamental attribution error	Tendency to explain someone's behavior based on internal factors, such as personality or disposition, and to underestimate the influence that external factors, such as situational influences, have on another person's behavior http://study.com/academy/lesson/fundamental-attribution-error-definition-lesson-quiz.html
Growth mindset	The belief that anyone can be good at anything, because one's abilities are entirely due to one's actions. https://sivers.org/mindset
Imposter syndrome	"Chronic self-doubt and a sense of intellectual fraudulence that override any feelings of success or external proof of competence" https://hbr.org/2008/05/overcoming-imposter-syndrome
Johari Window	Model for self-awareness, personal development, group development, and understanding relationships
Paralanguage	Nonverbal means of communication that accompany speech and convey further meaning (e.g., facial expressions, gestures, laughter, tone of voice)
Proxemics	Communicating with others by virtue of the relative positioning of your bodies
Self-script	Phrases that a person has heard repeated about themselves that become part of their own self-talk (e.g., " You're a good girl.", "You'll never go anywhere in life.")

Contributors

The following people contributed to the development of this document:

Jennifer Akers - Cabot	Amy Matthews - Fayetteville
Tammy Alexander - Nashville	Gerri McCann - Manila
Rebecca Allen - Valley View	Amanda McMahan - Magnolia
Jane Balgavy - Jacksonville-North Pulaski	Lynn Meade - University of Arkansas
Brandon Box-Higdem - Bentonville	Alisa Melton - Blytheville
Samantha Carpenter - Virtual Arkansas	Jennifer Murphy - El Dorado
Lisa Carver - Texarkana	Traci Myers - Foreman
Kimberly Chavez - Camden Fairview	Tim Peerbolte - Greenwood
Susan Colyer - Fort Smith	Erin Radke - Jessieville
Joan Crowder - Arkadelphia	Jacki Reiff - Gravette
April Erickson - South Conway County	Tracie Richard - Hermitage
Jessica Foster - Siloam Springs	Chad Simpson - Clarendon
Sommer Frazer - McGehee	Dallas Sims - Lakeside (Lake Village)
Natalie Free - Pangburn	Vivian Sisk – KIPP: Delta Collegiate
Eric Gamble - Dardanelle	Andrea Speer - Bentonville
Jennifer Garner - Lakeside (Hot Springs)	Steven Trulock - Huntsville
Roger Guevara - Southern Arkansas University	Rosie Valdez - Little Rock
Shelly Hardin - West Memphis	

Strategic Reading

Arkansas
English Language Arts Standards

2016

Course Title:	Strategic Reading
Course/Unit Credit:	
Course Number:	358140
Teacher Licensure:	Please refer to the Course Code Management System (https://adedata.arkansas.gov/ccms/) for the most current licensure codes.
Grades:	6-8

Strategic Reading

Strategic Reading is a two-semester course designed to dramatically accelerate reading growth by strengthening comprehension outcomes in middle level grades. In a context of meaningful content, on-going assessment, and focused explicit instruction, students will synthesize literary and informational texts and multicultural literature of diverse formats (e.g., print media, Web-based texts, literary and informational books and articles) and genres. In addition, students will engage in learning events tied to a variety of literary and informational texts with increasing complexity. Additionally, students will demonstrate literacy competence through purposeful application of knowledge and skills from this course, based on individual and collective literacy goals. Strategic Reading does not require Arkansas Department of Education approval.

Strand	Content Standard
Engaging the Reader	
	1. Students will become self-directed readers through exposure to various genres and media by engaging in literacy experiences relevant to personal interests, goals, everyday life, or world events.
Comprehension Strategies	
	2. Students will use a variety of strategies to comprehend literary and informational texts.
Response to Text	
	3. Students will respond to a variety of texts through writing and extended discussion.
Vocabulary Development	
	4. Students will increase vocabulary knowledge through multiple word study and decoding strategies to gain meaning of new words in a variety of contexts.

Notes:

1. Student Learning Expectations (SLEs) may be taught in any sequence.
2. Italicized words in this document appear in the glossary.
3. All items in a bulleted list are required to be taught.
4. The examples given (e.g.,) are suggestions to guide the instructor.

How the Anchor Standards are Labeled

R	.	CCR	.	1

The letter in the first position of the anchor standard numbering system represents the strand:

Reading (R)

Writing (W)

Speaking and Listening (SL)

Language (L)

The symbol in the second position of the anchor standard numbering system represents college and career readiness.

The number in the third position of the anchor standard numbering system represents the standard.

How the SLEs are Labeled

D . 10 . DIII . 2

D	10	DIII	2
Letters in the first position represent the Strand name (e.g., Delivery).	Numbers in the second position represent the Standard number (e.g., Standard 10).	Symbols in the third position represent the Course name and level (e.g., Debate III).	Numbers in the fourth position represent the SLE number (e.g., SLE 2).

Strand: Engaging the Reader

Content Standard 1: Students will become self-directed readers through exposure to various genres and media by engaging in literacy experiences relevant to personal interests, goals, everyday life, or world events.

		AR ELA Alignment
ER.1.SR.1	Analyze personal literary interests by exploring and tracking reading preferences (e.g., peer and teacher reading conferences, *reading logs*, *learning logs*, surveys, self-assessments, personal interest inventories)	W.CCR.2, W.CCR.4, W.CCR.6, W.CCR.7, W.CCR.10, SL.CCR.1, SL.CCR.2, SL.CCR.4, SL.CCR.5, SL.CCR.6, L.CCR.1, L.CCR.2, L.CCR.3, L.CCR.6
ER.1.SR.2	Develop and refine personal learning goals	SL.CCR.1, SL.CCR.6, L.CCR.1, L.CCR.2, L.CCR.3, L.CCR.6
ER.1.SR.3	Prepare for meaningful discussions, individually or collaboratively, through inquiry and analysis (e.g., graphic organizers, *guiding questions*, *essential questions*, *conversation moves*)	R.CCR.1, R.CCR.2, R.CCR.3, R.CCR.4, R.CCR.5, R.CCR.6, R.CCR.7, R.CCR.8, R.CCR.9, R.CCR.10, W.CCR.4, W.CCR.6, W.CCR.7, W.CCR.8, W.CCR.9, W.CCR.10, SL.CCR.1, SL.CCR.2, SL.CCR.3, L.CCR.1, L.CCR.2, L.CCR.3, L.CCR.5, L.CCR.6

ER.1.SR.4	Participate in extended discussions of diverse texts and media in a variety of genres that offer multiple perspectives of real-world experiences between cultures and communities	R.CCR.1, R.CCR.2, R.CCR.3, R.CCR.4, R.CCR.5, R.CCR.6, R.CCR.7, R.CCR.8, R.CCR.9, R.CCR.10, W.CCR.4, W.CCR.6, W.CCR.7, W.CCR.8, W.CCR.9, W.CCR.10, SL.CCR.1, SL.CCR.2, SL.CCR.3, SL.CCR.4, SL.CCR.5, SL.CCR.6, L.CCR.1, L.CCR.2, L.CCR.3, L.CCR.4, L.CCR.5, L.CCR.6
ER.1.SR.5	Engage in a variety of literary experiences to stimulate interests (e.g., book talks, read-alouds, author interviews, book reviews, blurbs, discussion groups)	R.CCR.1, R.CCR.2, R.CCR.3, R.CCR.4, R.CCR.5, R.CCR.6, R.CCR.7, R.CCR.8, R.CCR.9, R.CCR.10, W.CCR.2, W.CCR.4, W.CCR.6, W.CCR.9, W.CCR.10, SL.CCR.1, SL.CCR.2, SL.CCR.3, SL.CCR.4, SL.CCR.5, SL.CCR.6, L.CCR.1, L.CCR.2, L.CCR.3, L.CCR.4, L.CCR.5, L.CCR.6
ER.1.SR.6	Develop questions and *plausible* explanations through collaborative inquiry, using multiple resources	W.CCR.6, W.CCR.7, W.CCR.8, W.CCR.9, SL.CCR.1, SL.CCR.2, SL.CCR.3, SL.CCR.4, SL.CCR.6, L.CCR.1, L.CCR.2, L.CCR.3, L.CCR.6

ER.1.SR.7	Engage in real-world literacy practices (e.g., read and write letters to the editor, view and respond to *multimedia* presentations, navigate Web sites, analyze propaganda, critique news)	R.CCR.7, W.CCR.4, W.CCR.6, W.CCR.7, W.CCR.8, W.CCR.9, W.CCR.10, SL.CCR.4, SL.CCR.5, SL.CCR.6
ER.1.SR.8	Participate in active *inquiry-based activities* including electronic and visual media	W.CCR.6, W.CCR.7, W.CCR.8, W.CCR.9, W.CCR.9, SL.CCR.1, SL.CCR.2, SL.CCR.3, SL.CCR.4, SL.CCR.6, L.CCR.1, L.CCR.2, L.CCR.3, L.CCR.6

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Strand: Comprehension Strategies

Content Standard 2: Students will use a variety of strategies to comprehend literary and informational texts.

		AR ELA Alignment
CS.2.SR.1	Apply effective comprehension strategies to improve understanding of literary and informational texts: • determining importance • inferring • making connections (text-to-self, text-to-world, text-to-text) • noting similarities and differences • predicting • questioning • summarizing and/or paraphrasing • visualizing	R.CCR.1, R.CCR.2, R.CCR.3, R.CCR.4, R.CCR.5, R.CCR.6, R.CCR.7, R.CCR.8, R.CCR.9, R.CCR.10
CS.2.SR.2	Synthesize information and ideas within and across texts and/or media sources to create meaning	R.CCR.1, R.CCR.2, R.CCR.3, R.CCR.4, R.CCR.5, R.CCR.6, R.CCR.7, R.CCR.8, R.CCR.9, R.CCR.10, W.CCR.8, W.CCR.9, SL.CCR.2, SL.CCR.5, L.CCR.1, L.CCR.2, L.CCR.6
CS.2.SR.3	Summarize literary and informational texts succinctly, individually and with peers	R.CCR.2, W.CCR.4, W.CCR.10, SL.CCR.4, SL.CCR.6, L.CCR.1, L.CCR.2, L.CCR.3, L.CCR.6

CS.2.SR.4	Self-monitor comprehension by using fix-up strategies to repair or maintain understanding of text: • annotating texts • asking for help • chunking text • hypothesizing and/or predicting • identifying the central idea of a paragraph, page, or passage • reading further to clarify • rereading • slowing down for complex texts • stopping and thinking • stopping and thinking • underlining and/or highlighting essential information • visualizing a picture • writing questions or notes	R.CCR.10, W.CCR.10, L.CCR.3, L.CCR.4, L.CCR.6
CS.2.SR.5	Activate background knowledge before and during reading by making relevant connections	R.CCR.1, R.CCR.9
CS.2.SR.6	Analyze *text structure* (e.g., description, compare and contrast, chronological, question/answer, problem/solution, cause and effect, definition) to clarify meaning	R.CCR.5, R.CCR.10
CS.2.SR.7	Apply knowledge of *text features* (e.g., bold headings, sidebars, italicized words, tables, charts, graphs, pictures) to determine key ideas and details	R.CCR.1, R.CCR.2, R.CCR.3, R.CCR.10
CS.2.SR.8	Use graphic organizers to identify, organize, and remember important ideas in various formats	W.CCR.4, W.CCR.5, W.CCR.6, W.CCR.8, W.CCR.9, W.CCR.10
CS.2.SR.9	Demonstrate growth of rate, *prosody*, and *automaticity* to build *fluency* through progress monitoring	SL.CCR.1, SL.CCR.6, L.CCR.1, L.CCR.2, L.CCR.3, L.CCR.6
CS.2.SR.10	Implement close reading strategies to navigate complex texts for deeper analysis and interpretation: • chunking the text for a specific reason (e.g., vocabulary, figurative language, literary elements) • purposeful annotation of text • multiple readings with each reading for a different purpose • synthesize readings	R.CCR.10

Strand: Response to Text

Content Standard 3: Students will respond to a variety of texts through writing and extended discussion.

		AR ELA Alignment
RT.3.SR.1	Apply *protocols* for discussion in a variety of settings	SL.CCR.1, SL.CCR.2, SL.CCR.3, SL.CCR.4, SL.CCR.6, L.CCR.1, L.CCR.3, L.CCR.6
RT.3.SR.2	Contribute meaningful responses in collaborative small and whole group settings, building on ideas of others	SL.CCR.1, SL.CCR.2, SL.CCR.3, SL.CCR.4, SL.CCR.6, L.CCR.1, L.CCR.3, L.CCR.6
RT.3.SR.3	Support claims with relevant evidence from multiple sources (e.g., interviews, graphs, charts, literary and informational texts)	W.CCR.1, W.CCR.4, W.CCR.5, W.CCR.6, W.CCR.7, W.CCR.8, W.CCR.9, W.CCR.10, SL.CCR.2, SL.CCR.4, SL.CCR.5, SL.CCR.6 L.CCR.1, L.CCR.2, L.CCR.3, L.CCR.6
RT.3.SR.4	Compare and contrast multiple viewpoints from literary and informational texts	R.CCR.7, R.CCR.9, W.CCR.8, W.CCR.9, W.CCR.10, SL.CCR.2, L.CCR.1, L.CCR.2, L.CCR.3, L.CCR.6
RT.3.SR.5	Generate, pose, and respond to questions in discussion and written formats	W.CCR.4, W.CCR.6, W.CCR.7, W.CCR.10, SL.CCR.1, SL.CCR.6, L.CCR.1, L.CCR.2, L.CCR.3, L.CCR.6
RT.3.SR.6	Respond to literary and informational texts (e.g., quick write, visuals, dramatizations, *multimedia* presentations, *tableau*)	W.CCR.4, W.CCR.6, W.CCR.10, SL.CCR.5, SL.CCR.6, L.CCR.1, L.CCR.2, L.CCR.3, L.CCR.6

RT.3.SR.7	Write as a tool for learning (e.g., personal reactions, note-taking, concept mapping, summarizing, reflecting, monitoring understanding)	W.CCR.4, W.CCR.6, W.CCR.10, L.CCR.1, L.CCR.2, L.CCR.3
RT.3.SR.8	Write to present and defend individual interpretations and/or author's point of view	R.CCR.1, W.CCR.4, W.CCR.8, W.CCR.9, W.CCR.10, SL.CCR.2, SL.CCR.3, SL.CCR.4

Strand: Vocabulary Development

Content Standard 4: Students will increase vocabulary knowledge through multiple word study and decoding strategies to gain meaning of new word in a variety of contexts.

		AR ELA Alignment
VD.4.SR.1	Apply decoding strategies to unknown words (e.g., syllable division patterns, syllable types, phonemic awareness activities, word parts and origins)	L.CCR.4
VD.4.SR.2	Infer word meaning from context	R.CCR.4, L.CCR.4, L.CCR.6
VD.4.SR.3	Apply knowledge from one text to determine word meaning in another text	R.CCR.9, W.CCR.8, W.CCR.9, L.CCR.4
VD.4.SR.4	Build vocabulary (e.g., academic, specialized and/or technical, *high utility*) through wide reading	R.CCR.4, L.CCR.4
VD.4.SR.5	Use word origins, word relationships (e.g., synonyms, antonyms, analogies, *homographs*), and personal connections to develop vocabulary	R.CCR.4, L.CCR.4, L.CCR.5, L.CCR.6
VD.4.SR.6	Apply a range of word learning strategies (e.g., class word walls, *personal word walls*, vocabulary notebooks, semantic mapping, concept definition maps, *Frayer Model*) in order to internalize new vocabulary	R.CCR.4, L.CCR.3, L.CCR.4, L.CCR.5, L.CCR.6
VD.4.SR.7	Select a variety of print (e.g., dictionary, glossary, thesaurus) and digital resources (e.g., online dictionary, visual dictionary) to determine and clarify meaning	L.CCR.4, L.CCR.6
VD.4.SR.8	Develop word consciousness to learn multiple meanings of words (e.g., oxymoron, word play, *palindromes*, *connotation*, *denotation*)	R.CCR.4, L.CCR.3, L.CCR.4, L.CCR.5, L.CCR.6
VD.4.SR.9	Apply knowledge of prefixes, suffixes, and root words to determine meaning of new words	L.CCR.4, L.CCR.6

Automaticity	Acting or doing something spontaneously or unconsciously
Connotation	The idea or feeling that a word invokes in addition to its literal meaning; the implied meaning
Conversation moves	Any smooth, uninterrupted transition from one thing/topic to another
Denotation	The most specific or direct meaning of a word, in contrast to its figurative or associated meanings
Essential questions	Questions that are not answerable with finality in a brief sentence, the aim is to stimulate thought, to provoke inquiry, and to speak more questions
Fluency	The ability to read with appropriate speed, expression, and accuracy
Frayer Model	An adaptation of the concept map; includes the concept word, the definition, characteristics of the concept word, and examples and non-examples of the concept word
Guiding questions	The fundamental question that directs the search for understanding
High utility	Words that are commonly used in formal, academic, and professional contexts (e.g., Beck's Tier Two words)
Homographs	One of two or more words that have the same spelling but differ in origin, meaning, and sometimes pronunciation
Inquiry-based activities	Learning activities based around student questions
Learning log	Documentation of student reflection about self-learning gleamed from reading
Multimedia	Using, involving, or encompassing several media such as photographs, films, art, music, and digital productions
Palindromes	A word, phrase, number, or other sequential unit that can be read the same way in either direction
Personal word walls	A systematically organized collection of words in a personal journal or notebook
Plausible	Seeming reasonable or probable
Prosody	The rhythmic and intonational aspect of language
Protocols	Standard procedures of communication that allow students to voice their opinions, ideas, and concerns with one another in a democratic and orderly manner
Reading log	Form for students to use in tracking their personal reading
Tableau	A description of a scene presented on a stage by silent and motionless costumed participants
Text feature	Includes all the components of a story or article that are not the main body of text (e.g., table of content, index, glossary, bold, headings, sidebars, italicized words, tables, charts, graphs, pictures)
Text structure	The way the author organizes his/her writing (e.g., description, compare and contrast, chronological, question/answer, problem/solution, cause/effect, definition to clarify meaning)

Contributors

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Jennifer Akers - Cabot	Amy Matthews - Fayetteville
Tammy Alexander - Nashville	Gerri McCann - Manila
Rebecca Allen - Valley View	Amanda McMahan - Magnolia
Jane Balgavy - Jacksonville-North Pulaski	Lynn Meade - University of Arkansas
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Roger Guevara - Southern Arkansas University	Rosie Valdez - Little Rock
Shelly Hardin - West Memphis	

Transitional Literacy

Arkansas
English Language Arts Standards

2016

Course Title: Transitional Literacy
Course/Unit Credit: 1
Course Number: 496040
Teacher Licensure: Please refer to the Course Code Management System (https://adedata.arkansas.gov/ccms/) for the most current licensure codes.
Grades: 11-12

Transitional Literacy

Transitional Literacy is a two-semester English language arts (ELA) course, designed to accelerate students' literacy skills essential for college and career readiness. In Transitional Literacy, students receive instruction in reading, writing, speaking and listening, and language, emphasizing literary and informational texts from diverse genres in print and digital formats. The texts selected for the course must be within the Grade 11-12 text complexity band and increase in complexity over time. The course closely examines unique characteristics of texts from each discipline and emphasizes the specific strategies needed to comprehend them. The course focuses on developing the requisite literacy skills for success in higher education and the workforce by incorporating texts from ELA, history/social studies, science, and technical subjects. The texts will also be used as models for student writing products, emphasizing both informative and argumentative types.

Arkansas Code Annotated (A.C.A.) § 6-15-2012(b) states, "(b) A high school shall provide for each student who does not meet the college and career readiness standards under the assessment: (1) One (1) or more transitional courses designed to help the student reach college and career readiness standards; and (2) Related strategies to allow for accelerated skill and knowledge development consistent with the college and career readiness standards." Arkansas schools may fulfill this requirement of providing a transitional course in literacy by offering Transitional Literacy.

It is suggested that students enrolling in this course meet the following criteria:

- be in the 11th or 12th grade and
- have scored below the literacy college readiness determination cut score on an Arkansas Department of Education (ADE) approved college readiness assessment, pursuant to ADE rules and Arkansas Higher Education Coordinating Board policy.

Schools offering Transitional Literacy as outlined above do not need to seek additional ADE approval. Transitional Literacy may be counted as an English language arts career focus elective under Smart Core.

Strand	Content Standard
Engaging the Reader	
	1. Students will become self-directed readers by engaging in literacy experiences relevant to college, career, everyday life, and personal experiences.
Reading	
	2. Students will read and comprehend a variety of informational and literary texts from English language arts, history/social studies, science, and technical subjects.
Writing	
	3. Students will write a variety of discipline-specific texts.
Speaking and Listening	
	4. Students will engage in various modes of verbal and non-verbal discourse.
Language	
	5. Students will increase knowledge and application of vocabulary and language structures used in English language arts, history/social studies, science, and technical subjects.

Notes:

1. Each level continues to address earlier Student Learning Expectations (SLEs) as needed.
2. Student Learning Expectations (SLEs) may be taught in any sequence.
3. Italicized words in this document appear in the glossary.
4. All items in a bulleted list are required to be taught.
5. The examples given (e.g.,) are suggestions to guide the instructor.

How the Anchor Standards are Labeled

R . CCR . 1

The letter in the first position of the anchor standard numbering system represents the strand:

Reading (R)

Writing (W)

Speaking and Listening (SL)

Language (L)

The symbol in the second position of the anchor standard numbering system represents college and career readiness.

The number in the third position of the anchor standard numbering system represents the standard.

How the SLEs are Labeled

D . 10 . DIII . 2

D	10	DIII	2
Letters in the first position represent the Strand name (e.g., Delivery).	Numbers in the second position represent the Standard number (e.g., Standard 10).	Symbols in the third position represent the Course name and level (e.g., Debate III).	Numbers in the fourth position represent the SLE number (e.g., SLE 2).

Strand: Engaging the Reader

Content Standard 1: Students will become self-directed readers by engaging in literacy experiences relevant to college, career, everyday life, and personal experiences.

		AR ELA Alignment
ER.1.TL.1	Set personal learning goals to develop silent reading fluency, reading stamina, and comprehension	SL.CCR.1, SL.CCR.6, L.CCR.1, L.CCR.2, L.CCR.3, L.CCR.6
ER.1.TL.2	Monitor progress toward established personal goals, adjusting strategies and approaches as needed to continue growth	W.CCR.6, W.CCR.9, SL.CCR.2, SL.CCR.4, SL.CCR.5, SL.CCR.6, L.CCR.1, L.CCR.6
ER.1.TL.3	Self-select real-world materials from multiple disciplines as an emerging adult reader	R.CCR.10
ER.1.TL.4	Participate in collaborative learning routines (e.g., blogging, extended discussion, Questioning the Author, Socratic Seminars), using diverse texts that offer multiple perspectives of real-world experiences between cultures and communities	R.CCR.1, R.CCR.2, R.CCR.3, R.CCR.4, R.CCR.5, R.CCR.6, R.CCR.7, R.CCR.8, R.CCR.9, R.CCR.10, W.CCR.4, W.CCR.6, W.CCR.7, W.CCR.8, W.CCR.9, W.CCR.10, SL.CCR.1, SL.CCR.2, SL.CCR.3, SL.CCR.4, SL.CCR.5, SL.CCR.6, L.CCR.1, L.CCR.2, L.CCR.3, L.CCR.4, L.CCR.5, L.CCR.6
ER.1.TL.5	Engage in real-world literacy practices (e.g., comparisons of opinion editorials, construction of *multimedia* presentations, creation of public service announcements, simulations of court and corporate environments)	R.CCR.7, W.CCR.4, W.CCR.6, W.CCR.7, W.CCR.8, W.CCR.9, W.CCR.10, SL.CCR.4, SL.CCR.5, SL.CCR.6

Strand: Reading

Content Standard 2: Students will read and comprehend a variety of informational and literary texts from English language arts, history/social studies, science, and technical subjects.

		AR ELA Alignment
R.2.TL.1	Apply integrated comprehension strategies (e.g., analyze, determine central ideas, evaluate, infer, paraphrase, question, summarize, *synthesize*) to improve understanding of increasingly complex print, non-print, and digital texts during close reading	R.CCR.1, R.CCR.2, R.CCR.3, R.CCR.4, R.CCR.5, R.CCR.6, R.CCR.7, R.CCR.8, R.CCR.9, R.CCR.10
R.2.TL.2	Use fix-up strategies (e.g., chunking text, predicting, rereading, slowing down, visualizing) to self-monitor comprehension and repair or maintain understanding of text	R.CCR.10, W.CCR.10, L.CCR.3, L.CCR.4, L.CCR.6
R.2.TL.3	Apply knowledge of text features (e.g., bold headings, charts, graphs, hyperlinks, interactive diagrams, italicized words, pictures, sidebars, tables) to determine key ideas and details	R.CCR.1, R.CCR.2, R.CCR.3, R.CCR.10
R.2.TL.4	Analyze multiple text structures (e.g., chronological, compare and contrast, definition, problem/solution, procedural, question/answer) to clarify meaning	R.CCR.5, R.CCR.10
R.2.TL.5	Summarize informational and literary texts by accurately and *succinctly* paraphrasing the key ideas and details	R.CCR.2, W.CCR.4, W.CCR.10, SL.CCR.4, SL.CCR.6, L.CCR.1, L.CCR.2, L.CCR.3, L.CCR.6
R.2.TL.6	Analyze informational and literary texts for audience, purpose, and *craft*	R.CCR.4, R.CCR.5, R.CCR.6, R.CCR.9
R.2.TL.7	Analyze informational and literary texts to comprehend explicit and inferred meaning	R.CCR.1, R.CCR.2, R.CCR.3
R.2.TL.8	Analyze literary devices (e.g., allusion, extended metaphor, imagery, irony, paradox, satire) to develop deeper comprehension of informational and literary texts	R.CCR.4, R.CCR.5, L.CCR.5
R.2.TL.9	Comprehend *multimedia* text through analysis of devices (e.g., analogy, center of interest, composition, exaggeration, symbolism) used to convey meaning	R.CCR.7, W.CCR.8, L.CCR.3, L.CCR.5

R.2.TL.10	Evaluate *multimedia* texts for bias, accuracy, and credibility	R.CCR.7, W.CCR.8, L.CCR.3, L.CCR.5
R.2.TL.11	*Synthesize* information and ideas from multiple texts, including primary, secondary, and *multimedia* sources	W.CCR.8, W.CCR.9, SL.CCR.2, SL.CCR.4, SL.CCR.5, L.CCR.1, L.CCR.2, L.CCR.3, L.CCR.5, L.CCR.6

Strand: Writing

Content Standard 3: Students will write a variety of discipline-specific texts.

		AR ELA Alignment
W.3.TL.1	Use the writing process to create formal argumentative and informational texts that are supported with relevant textual evidence, cited from multiple informational and literary sources (e.g., charts, graphs, print and *multimedia* texts, works of art), using a style manual for the specific discipline	W.CCR.1, W.CCR.2, W.CCR.4, W.CCR.5, W.CCR.6, W.CCR.7, W.CCR.8, W.CCR.9, W.CCR.10
W.3.TL.2	Produce *on-demand*, evidence-based writing as a tool for learning	W.CCR.4, W.CCR.6, W.CCR.7, W.CCR.9, W.CCR.10, L.CCR.3, L.CCR.6
W.3.TL.3	Write with clarity to achieve coherence by stating a main idea and establishing and maintaining an organizational structure within which information and ideas flow logically	W.CCR.4, W.CCR.5, W.CCR.6
W.3.TL.4	Write with clarity and coherence for a specific audience and purpose, developing an appropriate register (e.g., formal, informal) through voice, style, and tone	W.CCR.4, W.CCR.5, W.CCR.6, L.CCR.1, L.CCR.2, L.CCR.3
W.3.TL.5	Compare and contrast multiple viewpoints from literary and informational texts written for a broad audience, including historical and scientific texts	R.CCR.1, R.CCR.2, R.CCR.3, R.CCR.9
W.3.TL.6	Interpret recorded data and other information to address a question or to solve a problem through both short and sustained research	R.CCR.7, W.CCR.7, W.CCR.8, W.CCR.9, SL.CCR.2
W.3.TL.7	Write to defend individual interpretations of texts	W.CCR.1, W.CCR.4, W.CCR.5, W.CCR.6, W.CCR.7, W.CCR.8, W.CCR.9, W.CCR.10
W.3.TL.8	Write to explain the author's point of view	W.CCR.1, W.CCR.4, W.CCR.5, W.CCR.6, W.CCR.7, W.CCR.9

W.3.TL.9	Locate, evaluate, and organize information, using technology as available, to complete the writing process independently and with peers	R.CCR.7, W.CCR.4, W.CCR.6, W.CCR.8, SL.CCR.5

Strand: Speaking and Listening

Content Standard 4: Students will engage in various modes of verbal and non-verbal discourse.

		AR ELA Alignment
SL.4.TL.1	Engage in small and large group discussions using a variety of discussion formats (e.g., Fish Bowl, Jigsaw, Socratic Seminars)	SL.CCR.1, SL.CCR.2, SL.CCR.3, SL.CCR.4, SL.CCR.6, L.CCR.1, L.CCR.3, L.CCR.6
SL.4.TL.2	Participate actively and appropriately in discussions about literary and informational texts from English language arts, history/social studies, science, and technical subjects	SL.CCR.1, SL.CCR.2, SL.CCR.3, SL.CCR.4, SL.CCR.6, L.CCR.1, L.CCR.3, L.CCR.6
SL.4.TL.3	Support claims with relevant evidence from multiple literary and informational sources (e.g., charts, graphs, print and *multimedia* texts, works of art) during discussions	SL.CCR.2, SL.CCR.4, SL.CCR.5, SL.CCR.6 L.CCR.1, L.CCR.2, L.CCR.3, L.CCR.6
SL.4.TL.4	Integrate *multimedia* and visual displays into various presentational formats to clarify information, strengthen claims and evidence, and add interest	W.CCR.6, SL.CCR.5
SL.4.TL.5	Use knowledge of language and its conventions according to purpose, audience, and task when speaking	W.CCR.4, SL.CCR.4, L.CCR.1, L.CCR.2, L.CCR.3

Strand: Language

Content Standard 5: Students will increase knowledge and application of vocabulary and language structures used in English language arts, history/social studies, science, and technical subjects.

		AR ELA Alignment
L.5.TL.1	Use a variety of strategies and resources (e.g., contextual analysis, etymology, function, inflected forms, morphology, semantics, dictionaries, vocabulary notebooks) independently to examine various aspects of unfamiliar words to aid comprehension and acquisition of new vocabulary in context	R.CCR.4, L.CCR.4, L.CCR.6
L.5.TL.2	Apply knowledge of affixes and roots (e.g., Greek, Latin) to determine meaning of new words	L.CCR.4, L.CCR.6
L.5.TL.3	Use *denotation* and *connotation* to select appropriate vocabulary for a particular purpose, audience, and task	R.CCR.4, W.CCR.4, L.CCR.3, L.CCR.4
L.5.TL.4	Apply appropriate academic and domain-specific vocabulary when responding to and discussing a wide range of literary and informational text	L.CCR.3, L.CCR.4, L.CCR.5, L.CCR.6
L.5.TL.5	Analyze the contextual meaning of figures of speech (e.g., colloquialisms, idioms) as they influence meaning and tone	R.CCR.4, L.CCR.3, L.CCR.4, L.CCR.5, L.CCR.6
L.5.TL.6	Analyze syntactical structures in individual sentences and paragraphs within a text	R.CCR.5, W.CCR.9, SL.CCR.3, L.CCR.3
L.5.T.7	Analyze transitional elements to identify text structures and relationships of paragraphs within larger sections of text	R.CCR.4, R.CCR.5, L.CCR.3, L.CCR.5
L.5.T.8	Use standard grammatical and syntactical conventions: ● coordination and subordination of phrases and clauses ● pronoun-antecedent agreement ● shifts in verb tense and mood ● subject-verb agreement	W.CCR.4, SL.CCR.4, SL.CCR.6, L.CCR.1, L.CCR.3

Glossary for Transitional Literacy

Connotation	The idea or feeling that a word invokes in addition to its literal meaning; the implied meaning
Craft	The literary elements and rhetorical devices an author uses to create a piece of writing
Denotation	The most specific or direct meaning of a word, in contrast to its figurative or associated meanings; dictionary meaning of a word
Fluency	The ability to read with appropriate speed, expression, and accuracy
Multimedia	Using, involving, or encompassing several media (e.g., photographs, films, art, music, digital productions)
On-demand writing	Writing for a specific purpose within a given amount of time, often scored with a rubric
Reading stamina	The ability to sustain a prolonged period of independent reading
Succinctly	Precisely concise
Synthesize	Combining two or more components to form a new whole. The "components" are the findings of the sources that are gathered and read; the "new whole" is the conclusion drawn from those findings.

Contributors

The following people contributed to the development of this document:

Jennifer Akers - Cabot	Amy Matthews - Fayetteville
Tammy Alexander - Nashville	Gerri McCann - Manila
Rebecca Allen - Valley View	Amanda McMahan - Magnolia
Jane Balgavy - Jacksonville-North Pulaski	Lynn Meade - University of Arkansas
Brandon Box-Higdem - Bentonville	Alisa Melton - Blytheville
Samantha Carpenter - Virtual Arkansas	Jennifer Murphy - El Dorado
Lisa Carver - Texarkana	Traci Myers - Foreman
Kimberly Chavez - Camden Fairview	Tim Peerbolte - Greenwood
Susan Colyer - Fort Smith	Erin Radke - Jessieville
Joan Crowder - Arkadelphia	Jacki Reiff - Gravette
April Erickson - South Conway County	Tracie Richard - Hermitage
Jessica Foster - Siloam Springs	Chad Simpson - Clarendon
Sommer Frazer - McGehee	Dallas Sims - Lakeside (Lake Village)
Natalie Free - Pangburn	Vivian Sisk – KIPP: Delta Collegiate
Eric Gamble - Dardanelle	Andrea Speer - Bentonville
Jennifer Garner - Lakeside (Hot Springs)	Steven Trulock - Huntsville
Roger Guevara - Southern Arkansas University	Rosie Valdez - Little Rock
Shelly Hardin - West Memphis	

Quantitative Literacy Content Standards

2016

Compiled using the Arkansas Mathematics Standards

Course Title: Quantitative Literacy
Course/Unit Credit: 1
Course Number: 439120
Teacher Licensure: Please refer to the Course Code Management System (https://adedata.arkansas.gov/ccms/) for the most current licensure codes.
Grades: 9-12
Prerequisite: Algebra 1

Course Description: This course builds on Algebra I to explore mathematical topics and relationships. Emphasis will be placed on applying modeling as the process of choosing and using appropriate mathematics and statistics to analyze, to better understand, and to improve mathematical understanding in real world situations. Students will represent and process their reasoning and conclusions numerically, graphically, symbolically, and verbally. Quantitative Literacy will help students develop conceptual understanding by supporting them in making connections between concepts and applying previously learned material to new contexts. Students will be expected to use technology, including graphing calculators, computers, or data gathering tools throughout the course. Quantitative Literacy does not require Arkansas Department of Education approval.

Notes:
1. Teacher notes offer clarification of the standards.
2. All items in a bulleted list must be taught.

Quantitative Literacy

Strand	Content Standard
Modeling	
	1. Students will use appropriate mathematical models to solve problems.
Numerical Reasoning	
	2. Students will use number sense and proportional reasoning in real world settings to make and communicate decisions in order to draw conclusions based on quantitative analysis.
Statistics and Probability	
	3. Students will apply statistical and probabilistic reasoning to draw conclusions, to make decisions, and to evaluate outcomes of decisions.
Personal Financial Literacy	
	4. Students will apply mathematics to make informed personal financial decisions.
Business Financial Literacy	
	5. Students will understand the principles and mathematics in business as it applies to economics.

Strand: Modeling

Content Standard: 1. Students will use appropriate mathematical models to solve problems.

M.1.QL.1	Demonstrate understanding of the meaning of a solution and identify when insufficient information is given to solve a problem
M.1.QL.2	Analyze mathematical models, describe limitations, and suggest improvements
M.1.QL.3	Use mathematical models created with spreadsheets or other tools to • estimate solutions for contextual questions • identify patterns • identify how changing parameters affect results
M.1.QL.4	Use mathematical models to make decisions about purchases (e.g., buying a vehicle, home improvement, fashion trends)
M.1.QL.5	Create and use mathematical models for bivariate data sets to • answer questions • draw conclusions • make decisions

Strand: Numerical Reasoning

Content Standard: 2. Students will use number sense and proportional reasoning in real world settings to make and communicate decisions in order to draw conclusions based on quantitative analysis.

NR.2.QL.1	Solve real world problems and interpret results involving calculations with percentages, decimals, and fractions • conversions • percent change (absolute vs relative) • percent of quantities
NR.2.QL.2	Use estimation in real world situations • know when • know how • know why
NR.2.QL.3	• Identify appropriate numeric benchmarks (e.g., use 10% as an estimation for 12%) for estimating calculations • Identify appropriate contextual benchmarks (e.g., population for Arkansas, the United States, and the world) to compare to other numbers (e.g., reasonableness of statistical claims, giving context to numbers)
NR.2.QL.4	Compare magnitudes of numbers in context in different forms (e.g., millions, billions, trillions, national debt, Richter scale, scientific notation)
NR.2.QL.5	Use dimensional analysis to solve problems involving multiple units of measurement (e.g., converting between currencies, determine miles per gallon, appropriate dosages of medicine)
NR.2.QL.6	Solve real world problems requiring interpretation and comparison of various representations of rates and ratios
NR.2.QL.7	Distinguish between proportional and non-proportional real world situations

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Strand: Statistics and Probability

Content Standard: 3. Students will apply statistical and probabilistic reasoning to draw conclusions, to make decisions, and to evaluate outcomes of decisions.

SP.3.QL.1	Create and use charts, tables, and graphs of real world data (with and without technology)
SP.3.QL.2	• Analyze charts, tables and graphs of real world data • Interpret charts, tables and graphs of real world data • Compare charts, tables and graphs of real world data
SP.3.QL.3	Analyze statistical information from studies, surveys, and polls to make informed judgements as to the validity of claims or conclusions (e.g., bias, limitations, sampling, causation vs correlation, misuse of statistics)
SP.3.QL.4	Make decisions about data summarized numerically using measures of center • compare measures of center of two or more data sets • interpret the differences in context • justify the use of a chosen measure Teacher Note: A discussion of variability and outliers would be appropriate.
SP.3.QL.5	Use probabilities to make and justify decisions about risks in everyday life (e.g., types of investments, taking medication, selecting car insurance, playing the lottery)
SP.3.QL.6	Evaluate the validity of claims based on experimental and theoretical probabilities
SP.3.QL.7	Apply rules of counting and probability to compute probabilities of compound real world events • addition rule • multiplication rule • Fundamental Counting Principle • permutation and combinations • visual representations (e.g., Venn diagrams, tree diagrams, lists, two-way tables)

Strand: Personal Financial Literacy
Content Standard: 4. Students will apply mathematics to make informed personal financial decisions.

PF.4.QL.1	Represent and analyze mathematical models for various types of income (e.g., commission, salary, hourly wage)
PF.4.QL.2	Represent and analyze various types of income deductions (e.g., federal and state income taxes, Social Security, Medicare taxes, pre-taxed deductions)
PF.4.QL.3	Analyze expenses to create a household budget utilizing food, shelter, transportation, utilities, insurance, savings, and other expenses
PF.4.QL.4	Analyze various investment instruments for • purposes • advantages • disadvantages • risks (e.g., savings, checking accounts, certificates of deposit, stocks, social security, individual retirement accounts, bonds, annuities)
PF.4.QL.5	Analyze the characteristics of various types of loans (e.g., credit cards, personal loans, student loans, auto financing, mortgages)
PF.4.QL.6	Apply appropriate models to determine the impact of the relationship among loan rates, the term of a loan, the principle amount of a loan, and payments (e.g., amortization table, spreadsheet, compound interest, annual interest rates, continuous rates)

Strand: Business Financial Literacy

Content Standard: 5. Students will understand the principles and mathematics in business as it applies to economics.

BF.5.QL.1	Use real world data to determine how a product or service can be profitable in a community
BF.5.QL.2	Determine fixed and variable expenses of running a business (e.g., startup costs, inventory, construction permits, salaries, equipment, taxes, advertisement)
BF.5.QL.3	Calculate indices and solve problems using common indices • consumer price index • cost of living index • determine what constitutes an index Teacher note: Discussion may include why BMI is not an index.
BF.5.QL.4	Analyze how stock market averages and indices are calculated (e.g., Dow Jones, NASDAQ, S&P 500)
BF.5.QL.5	Calculate how inflation changes the value of the dollar over time Teacher note: Discussion may include percentage change with assumed fixed rate or historical variable rates.

ARKANSAS
K-12 SCIENCE STANDARDS
EDUCATION FOR A NEW GENERATION

Astronomy

2016

Table of Contents

Notes:

1. Student Performance Expectations (PEs) may be taught in any sequence or grouping within a grade level. Several PEs are described as being "partially addressed in this course" because the same PE is revisited in a subsequent course during which that PE is fully addressed.
2. An asterisk (*) indicates an engineering connection to a practice, core idea, or crosscutting concept.
3. The Clarification Statements are examples and additional guidance for the instructor. AR indicates Arkansas-specific Clarification Statements.
4. The Assessment Boundaries delineate content that may be taught but not assessed in large-scale assessments. AR indicates Arkansas-specific Assessment Boundaries.
5. The section entitled "foundation boxes" is reproduced verbatim from *A Framework for K-12 Science Education: Practices, Crosscutting Concepts, and Core Ideas*. Integrated and reprinted with permission from the National Academy of Sciences.
6. The examples given (e.g.,) are suggestions for the instructor.
7. Throughout this document, connections are provided to the nature of science as defined by *A Framework for K-12 Science Education* (NRC 2012).
8. Throughout this document, connections are provided to Engineering, Technology, and Applications of Science as defined by *A Framework for K-12 Science Education* (NRC 2012).
9. Each set of PEs lists connections to other disciplinary core ideas (DCIs) within the Arkansas K-12 Science Standards and to the Arkansas English Language Arts Standards, Arkansas Disciplinary Literacy Standards, and the Arkansas Mathematics Standards.

Arkansas K-12 Science Standards Overview

The Arkansas K-12 Science Standards are based on *A Framework for K-12 Science Education* (NRC 2012) and are meant to reflect a new vision for science education. The following conceptual shifts reflect what is new about these science standards. The Arkansas K-12 Science Standards

- reflect science as it is practiced and experienced in the real world,
- build logically from Kindergarten through Grade 12,
- focus on deeper understanding as well as application of content,
- integrate practices, crosscutting concepts, and core ideas, and
- make explicit connections to literacy and math.

As part of teaching the *Arkansas K-12 Science Standards*, it will be important to instruct and guide students in adopting appropriate safety precautions for their student-directed science investigations. Reducing risk and preventing accidents in science classrooms begin with planning. There are four recommended steps in carrying out a hazard and risk assessment for any planned lab investigation.

1) Identify all hazards. Hazards may be physical, chemical, health, or environmental.
2) Evaluate the type of risk associated with each hazard.
3) Write the procedure and all necessary safety precautions in such a way as to eliminate or reduce the risk associated with each hazard.
4) Prepare for any emergency that might arise in spite of all of the required safety precautions.

According to Arkansas Code Annotated § 6-10-113 (2012) for eye protection, every student and teacher in public schools participating in any chemical or combined chemical-physical laboratories involving caustic or explosive chemicals or hot liquids or solids is required to wear industrial-quality eye protective devices (eye goggles) at all times while participating in science investigations.

The Arkansas K-12 Science Standards outline the knowledge and science and engineering practices that all students should learn by the end of high school. The standards are three-dimensional because each student performance expectation engages students at the nexus of the following three dimensions.

- Dimension 1 describes scientific and engineering practices.
- Dimension 2 describes crosscutting concepts, overarching science concepts that apply across science disciplines.
- Dimension 3 describe core ideas in the science disciplines.

The Science and Engineering Practices

The eight practices describe the major practices that scientists use to investigate, build models and theories of the world around them or engineers use as they build and design systems. The practices are essential for all students to learn and are as follows:

1. Asking questions (for science) and defining problems (for engineering)
2. Developing and using models
3. Planning and carrying out investigations
4. Analyzing and interpreting data
5. Using mathematics and computational thinking
6. Constructing explanations (for science) and designing solutions (for engineering)
7. Engaging in argument from evidence
8. Obtaining, evaluating, and communicating information

Crosscutting Concepts

The seven crosscutting concepts bridge disciplinary boundaries and unit core ideas throughout the fields of science and engineering. Their purpose is to help students deepen their understanding of the disciplinary core ideas, and develop a coherent, and scientifically based view of the world. The seven crosscutting concepts are as follows:

1. *Patterns.* Observed patterns of forms and events guide organization and classification, and they prompt questions about relationships and the factors that influence them.

2. *Cause and effect: Mechanism and explanation*. Events have causes, sometimes simple, sometimes multifaceted. A major activity of science is investigating and explaining causal relationships and the mechanisms by which they are mediated. Such mechanisms can then be tested across given contexts and used to predict and explain events in new contexts.

3. *Scale, proportion, and quantity.* In considering phenomena, it is critical to recognize what is relevant at different measures of size, time, and energy and to recognize how changes in scale, proportion, or quantity affect a system's structure or performance.

4. *Systems and system models.* Defining the system under study—specifying its boundaries and making explicit a model of that system—provides tools for understanding and testing ideas that are applicable throughout science and engineering.

5. *Energy and matter: Flows, cycles, and conservation.* Tracking fluxes of energy and matter into, out of, and within systems helps one understand the systems' possibilities and limitations.

6. *Structure and function.* The way in which an object or living thing is shaped and its substructure determine many of its properties and functions.

7. *Stability and change.* For natural and built systems alike, conditions of stability and determinants of rates of change or evolution of a system are critical elements of study.

Disciplinary Core Ideas

The Disciplinary Core Ideas describe the content that occurs at each grade or course. The Arkansas K-12 Science Standards focus on a limited number of core ideas in science and engineering both within and across the disciplines and is built on the notion of learning as a developmental progression. The Disciplinary Core Ideas are grouped into the following domains:

- Physical Science (PS)
- Life Science (LS)
- Earth and Space Science (ESS)
- Engineering, Technology and Applications of Science (ETS)

Connections to the Arkansas English Language Arts Standards

Evidence-based reasoning is the foundation of good scientific practice. The Arkansas K-12 Science Standards incorporate reasoning skills used in language arts to help students improve mastery and understanding in all three disciplines. The Arkansas K-8 Science Committee made every effort to align grade-by-grade with the English language arts (ELA) standards so concepts support what students are learning in their entire curriculum.

Connections to specific ELA standards are listed for each student performance expectation, giving teachers a blueprint for building comprehensive cross-disciplinary lessons. The intersections between Arkansas K-12 Science Standards and Arkansas ELA Standards teach students to analyze data, model concepts, and strategically use tools through productive talk and shared activity. Reading in science requires an appreciation of the norms and conventions of the discipline of science, including understanding the nature of evidence used, an attention to precision and detail, and the capacity to make and assess intricate arguments, synthesize complex information, and follow detailed procedures and accounts of events and concepts. These practice-based standards help teachers foster a classroom culture where students think and reason together, connecting around the subject matter and core ideas.

Connections to the Arkansas Disciplinary Literacy Standards

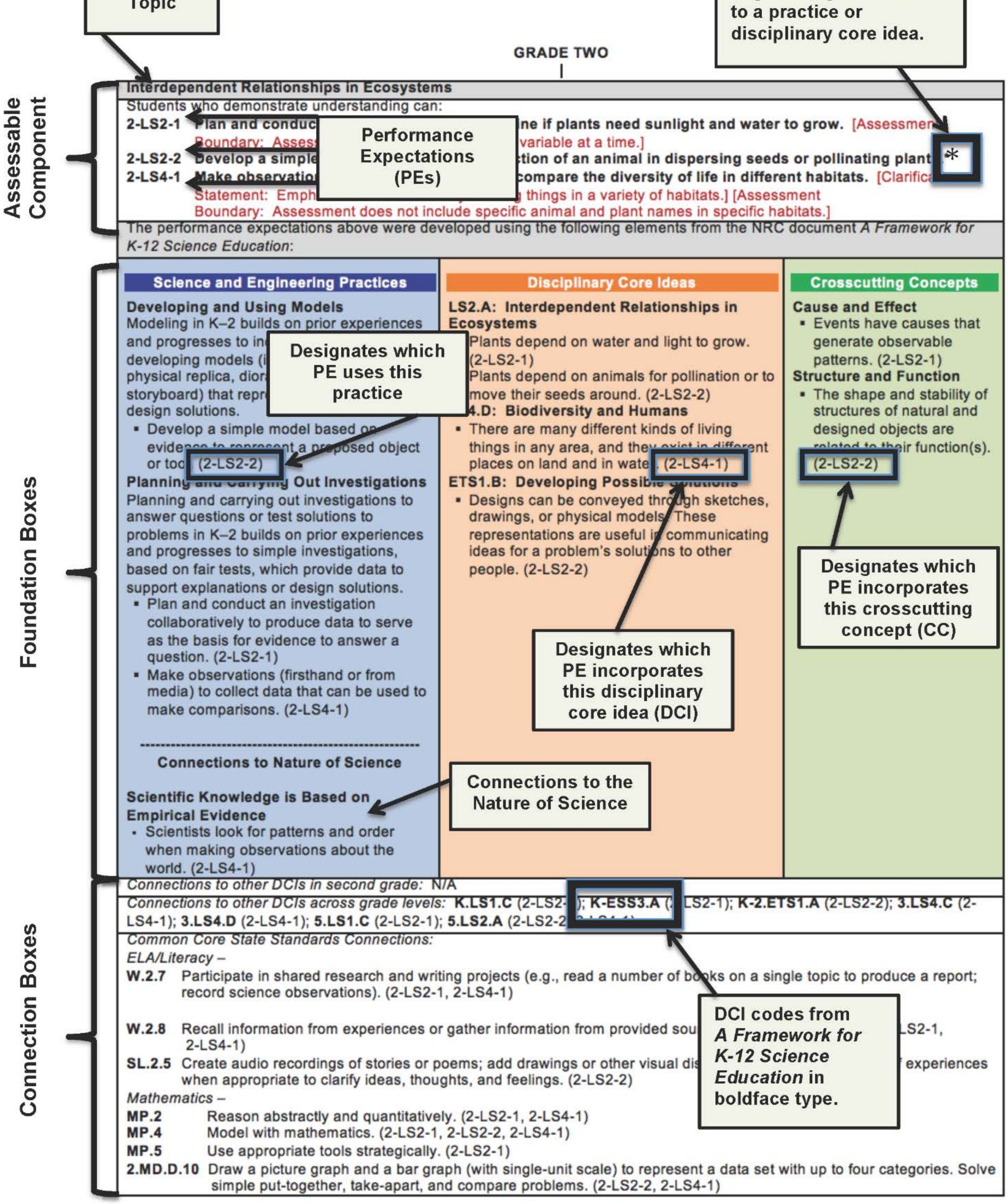
Reading is critical to building knowledge in science. College and career ready reading in science requires an appreciation of the norms and conventions of each discipline, such as the kinds of evidence used in science; an understanding of domain-specific words and phrases; an attention to precise details; and the capacity to evaluate intricate arguments, synthesize complex information, and follow detailed descriptions of events and concepts. When reading scientific and technical texts, students need to be able to gain knowledge from challenging texts that often make extensive use of elaborate diagrams and data to convey information and illustrate concepts. Students must be able to read complex informational texts in science with independence and confidence because the vast majority of reading in college and workforce training programs will be sophisticated nonfiction.

For students, writing is a key means of asserting and defending claims, showing what they know about a science, and conveying what they have experienced, imagined, thought, and felt. To be college and career ready writers, students must take task, purpose, and audience into careful consideration, choosing words, information, structures, and formats deliberately. They need to be able to use technology strategically when creating, refining, and collaborating on writing. They have to become adept at gathering information, evaluating sources, and citing material accurately, reporting finds from their research and analysis of sources in a clear and cogent manner. They must have the flexibility, concentration, and fluency to produce high-quality first-draft text under a tight deadline and the capacity to revisit and make improvements to a piece of writing over multiple drafts when circumstances encourage or require it.

Connections to the Arkansas Mathematics Standards

Science is a quantitative discipline, so it is important for educators to ensure that students' science learning coheres well with their understanding of mathematics. To achieve this alignment, the Arkansas K-12 Science Committee made every effort to ensure that the mathematics standards do not outpace or misalign to the grade-by-grade science standards. Connections to specific math standards are listed for each student performance expectation, giving teachers a blueprint for building comprehensive cross-disciplinary lessons.

How to Read
Arkansas K-12 Science Standards



Astronomy Learning Progression Chart

Topic 1: Observational Astronomy	Topic 2: Early History of Astronomy	Topic 3: Gravitation	Topic 4: Formation of the Solar System	Topic 5: The Earth, Moon, Sun System	Topic 6: Electromag-netic Radiation and Matter	Topic 7: Organic Chemistry	Topic 8: Cosmology
A-ESS1-1AR	A-ESS2-1AR	AR A-ESS1-4	AR A-ESS1-6	AR A5-ESS1-1	AR A6-ESS1-1	AR A7-ESS1-1	AR A8-ESS1-2
A1-ESS1-2AR	A-ESS2-2AR	A-ESS3-1AR	A-ESS4-1AR	A-ESS5-1AR	A-ESS6-1AR	AR A-ESS1-3	A-ESS8-1AR
AR A1-ETS1-2		A-ESS3-2AR	A-ESS4-2AR	A-ESS5-2AR	AR A6-ETS1-1	A-ESS7-1AR	AR A8-ETS1-3
		AR A3-ETS1-4					

Arkansas Clarification Statements (AR)

Arkansas Performance Expectations (AR)

Astronomy Course Overview

The astronomy course is a science course that continues to develop conceptual understanding of the core ideas, science and engineering practices, and crosscutting concepts in the physical science and Earth and space science. Teachers with a physics, physical science, physical/Earth, life/Earth or physics/math license (including an Earth science endorsement) are able to teach this course. Students will earn a core requirement/career focus credit.

Students in astronomy continue to develop fundamental concepts from chemistry, physics, and Earth and space science. The high school performance expectations in astronomy build on the middle school ideas and skills and allow high school students to explain more in-depth phenomena not only in the physical science and Earth and space science. There are eight topics in Astronomy: (1) Observational Astronomy, (2) Early History of Astronomy, (3) Gravitation, (4) Formation of the Solar System, (5) Earth, Moon, and Sun System, (6) Electromagnetic Radiation and Matter, (7) Stellar Evolution, and (8) Cosmology. Students are also expected to demonstrate understanding of several engineering practices, including design and evaluation.

Additionally, it should be noted that the astronomy standards are not intended to be used as curriculum. Instead, the standards are the minimum that students should know and be able to do. Therefore, teachers should continue to differentiate for the needs of their students by adding depth and additional rigor.

Students in astronomy also continue their ability to develop possible solutions for major global problems with engineering design challenges. At the high school level, students are expected to engage with major global issues at the interface of science, technology, society and the environment, and to bring to light the kinds of analytical and strategic thinking that prior training and increased maturity make possible. As in prior levels, these capabilities can be thought of in three stages:

- **Defining the problem** at the high school level requires both qualitative and quantitative analysis. For example, the need to provide food and fresh water for future generations comes into sharp focus when considering the speed at which world population is growing and conditions in countries that have experienced famine. While high school students are not expected to solve these challenges, they are expected to begin thinking about them as problems that can be addressed, at least in part, through engineering.
- **Developing possible solutions** for major global problems begins by breaking them down into smaller problems that can be tackled with engineering methods. To evaluate potential solutions, students are expected to not only consider a wide range of criteria but to also recognize that criteria needs to be prioritized. For example, public safety or environmental protection may be more important than cost or even functionality. Decisions on priorities can then guide tradeoff choices.
- **Improving designs** at the high school level may involve sophisticated methods, such as using computer simulations to model proposed solutions. Students are expected to use such methods to take into account a range of criteria and constraints, anticipate possible societal and environmental impacts, and test the validity of their simulations by comparison to the real world.

Astronomy Topics Overview

The performance expectations in **Topic 1: Observational Astronomy** help students formulate answers to the questions:

- How do objects in the sky form patterns of motion?
- How do humans use maps to find their way on the celestial sphere and classify objects seen in the sky according to location, color, magnitude, and other astronomical measures?

Students recognize and classify objects in the sky based on the prior knowledge gained using observational evidence. Students use star maps to find objects in the sky and extrapolate their predicted locations based on various coordinate systems.

The performance expectations in **Topic 2: Early History of Astronomy** help students formulate answers to the questions:

- How did diverse early societies around the world use astronomy to improve their daily lives?
- How did astronomy develop from a primitive superstition into a modern, mathematically-based science?

Students research astronomical models developed by early civilizations. Students use early models of astronomy to accurately and effectively explain the nature of celestial objects and their patterns of motion. Students develop heliocentric models from geocentric models.

The performance expectations in **Topic 3: Gravitation** help students formulate answers to the questions:

- What motivates and controls the various linear and rotational motions of objects in the cosmos?
- How can mathematical models show linear and orbital accelerated motion?
- How does gravity affect the evolution and structure of discrete objects from the smallest asteroid to the largest galactic clusters?

Students develop models to show the effects and motions of rotationally dynamic systems. Students use Newton's laws of gravitation, Pascal's law of pressure, and the principles of thermodynamics to explain planetary structures across a wide class of objects from small moons to Jovian giants and stars.

The performance expectations in **Topic 4: Formation of the Solar System** help students formulate answers to the questions:

- What is the origin of massive objects in the solar system and what is the role of gravity?
- How do astronomers measure objects and distances in space differently than on Earth?

Students use astronomical units, light years, and parsecs. Students use the gravitational model of planetary assembly and evolution to explain the major classes of planets and their internal structures.

The performance expectations in **Topic 5: The Earth, Moon, Sun System** help students formulate answers to the questions:

- What causes eclipses and lunar phases?
- Why do planets have tides and seasons?
- Why do stars shine for millions of years?

Students predict lunar phases based on observational evidence or orbital data. Students explain why lunar and solar eclipses occur at different frequencies and how the interaction of the Earth-Moon-sun system produces these effects. Students predict varying conditions on other planets and moons based on the Earth's seasonal and tidal cycles.

The performance expectations in **Topic 6: Electromagnetic Radiation and Matter** help students formulate answers to the questions:

- What powers the Sun and how does it transmit energy and information out into space?
- How can light be both a wave and a particle?
- How does the dual nature of light impact the use and development of optical technology?

Students use the concept of full-spectrum electromagnetic radiation to explain how stars transmit both energy and information about their structure and composition. Students investigate the dual wave-particle nature of light.

The performance expectations in **Topic 7: Stellar Evolution** help students formulate answers to the questions:

- How does a star's initial mass and composition uniquely determine its stability, lifespan, structure, and final state after cataclysmic star death?
- Where do various elements in the universe originate and what processes account for their production and abundance?

Students model the life cycle and potential long-term stability of a star given initial conditions of mass and composition. Students model the different pathways for heavy and light element synthesis, and relate these ideas to different known classes of stars.

The performance expectations in **Topic 8: Cosmology** help students formulate answers to the questions:

- What evidence do astronomers use to explain the origins of the universe?
- How are galaxies formed?
- How does evidence support both expansion of the universe and the existence of dark matter and dark energy?

Students develop arguments based upon Hubble's data of galactic motion to account for universal expansion. Students construct a model of galactic rotation data demonstrating the existence and effects of dark matter halos around galaxies.

Astronomy

Topic 1: Observational Astronomy
Students who demonstrate understanding can: **A-ESS1-1AR** **Develop a model using observational evidence that accounts for patterns in the diurnal, seasonal, and annual movements of objects on the celestial sphere.** [Clarification Statement: Students record observations of the night sky or use observational data from computer models (Stellarium.org).] **A1-ESS1-2AR** **Obtain, evaluate, and communicate information gathered from observational evidence, maps, and charts to demonstrate an understanding of the ecliptic patterns, magnitudes, and colors of stars, and the dynamic locations of constellations, asterisms, and planets.** [Clarification Statement: Students use both major coordinate systems (Right Ascension/Declination, Altitude/Azimuth). Students account for the independent dynamic motions of the planets, Moon, and sun in contrast with the fixed nature of constellations. **A1-ETS1-2** **Design a solution to a complex real world problem by breaking it down into smaller, more manageable problems that can be solved through engineering.** [AR Clarification Statement: A possible real world problem would be to design a way to reduce local light pollution to facilitate the observation of the night sky.]
The performance expectations above were developed using the following elements from the NRC document *A Framework for K-12 Science Education*:

Science and Engineering Practices	Disciplinary Core Ideas	Crosscutting Concepts
Constructing Explanations and Designing Solutions Constructing explanations and designing solutions in 9–12 builds on K–8 experiences and progresses to explanations and designs that are supported by multiple and independent student-generated sources of evidence consistent with scientific ideas, principles, and theories. Apply scientific reasoning to link evidence to the claims to assess the extent to which the reasoning and data support the explanation or conclusion. (A1-ETS1-2) **Developing and Using Models** Modeling in 9–12 builds on K–8 experiences and progresses to using, synthesizing, and developing models to predict and show relationships among variables between systems and their components in the natural and designed world(s). ▪ Develop a model based on evidence to illustrate the relationships between systems or between components of a system. (A-ESS1-1AR) **Obtaining, Evaluating, and Communicating Information**	**ESS1.A: The Universe and Its Stars** ▪ The study of stars' light spectra and brightness is used to identify compositional elements of stars, their movements, and their distances from Earth. (A-ESS1-1AR, A1-ESS1-2AR) **ESS1.B: Earth and the Solar System** ▪ Cyclical changes in the shape of Earth's orbit around the sun, together with changes in the tilt of the planet's axis of rotation, both occurring over hundreds of thousands of years, have altered the intensity and distribution of sunlight falling on the earth. These phenomena cause a cycle of ice ages and other gradual climate changes. (A-ESS1-1AR, A1-ESS1-2AR) **PS4.C: Information Technologies and Instrumentation** ▪ Multiple technologies based on the understanding of waves and their interactions with matter are part of everyday experiences in the modern world (e.g., medical imaging,	**Patterns** ▪ Empirical evidence is needed to identify patterns. (A-ESS1-1AR) ▪ Different patterns may be observed at each of the scales at which a system is studied and can provide evidence for causality in explanations of phenomena. (A-ESS1-1AR) **Scale, Proportion, and Quantity** ▪ The significance of a phenomenon is dependent on the scale, proportion, and quantity at which it occurs. (A-ESS1-1AR) ------------------------------------- ***Connections to Engineering, Technology, and Applications of Science***

Obtaining, evaluating, and communicating information in 9–12 builds on K–8 and progresses to evaluating the validity and reliability of the claims, methods, and designs. ▪ Evaluate the validity and reliability of multiple claims that appear in scientific and technical texts or media reports, verifying the data when possible. (A-ESS1-1AR) ▪ Communicate technical information or ideas (e.g. about phenomena and/or the process of development and the design and performance of a proposed process or system) in multiple formats (including orally, graphically, textually, and mathematically). (A-ESS1-1AR) --- ***Connections to Nature of Science*** **Science Models, Laws, Mechanisms, and Theories Explain Natural Phenomena** ▪ A scientific theory is a substantiated explanation of some aspect of the natural world, based on a body of facts that have been repeatedly confirmed through observation and experiment and the science community validates each theory before it is accepted. If new evidence is discovered that the theory does not accommodate, the theory is generally modified in light of this new evidence. (A-ESS1-1AR) ▪ Models, mechanisms, and explanations collectively serve as tools in the development of a scientific theory. (A-ESS1-1AR)	communications, and scanners) and in scientific research. They are essential tools for producing, transmitting, and capturing signals and for storing and interpreting the information contained in them. (A1-ESS1-2AR) **ETS1.A: Defining and Delimiting Engineering Problems** ▪ Criteria and constraints also include satisfying any requirements set by society, such as taking issues of risk mitigation into account, and they should be quantified to the extent possible and stated in such a way that one can tell if a given design meets them. (A1-ETS1-2) ▪ Humanity faces major global challenges today, such as the need for supplies of clean water and food or for energy sources that minimize pollution, which can be addressed through engineering. These global challenges also may have manifestations in local communities. (A1-ETS1-2) **ETS1.B: Developing Possible Solutions** ▪ When evaluating solutions, it is important to take into account a range of constraints, including cost, safety, reliability, and aesthetics, and to consider social, cultural, and environmental impacts. (A1-ETS1-2) ▪ Both physical models and computers can be used in various ways to aid in the engineering design process. Computers are useful for a variety of purposes, such as running simulations to test different ways of solving a problem or to see which one is most efficient or economical; and in making a persuasive presentation to a client about how a given design will meet his or her needs. (A1-ETS1-2) **ETS1.C: Optimizing the Design Solution** Criteria may need to be broken down into simpler ones that can be approached systematically, and decisions about the priority of certain	**Interdependence of Science, Engineering, and Technology** ▪ Science and engineering complement each other in the cycle known as research and development (R&D). Many R&D projects may involve scientists, engineers, and others with wide ranges of expertise. (A1-ETS1-2) **Influence of Engineering, Technology, and Science on Society and the Natural World** New technologies can have deep impacts on society and the environment, including some that were not anticipated. Analysis of costs and benefits is a critical aspect of decisions about technology. (A1-ETS1-2)

	criteria over others (trade-offs) may be needed. (A1-ETS1-2)	

Connections to the Arkansas Disciplinary Literacy Standards:

RST.11-12.1 Cite specific textual evidence to support analysis of science and technical texts, attending to important distinctions the author makes and to any gaps or inconsistencies in the account. *()*

RST.11-12.7 Integrate and evaluate multiple sources of information presented in diverse formats and media (e.g., quantitative data, video, multimedia) in order to address a question or solve a problem. ()

RST.11-12.8 Evaluate the hypotheses, data, analysis, and conclusions in a science or technical text, verifying the data when possible and corroborating or challenging conclusions with other sources of information. *()*

RST.11-12.9 Synthesize information from a range of sources (e.g., texts, experiments, simulations) into a coherent understanding of a process, phenomenon, or concept, resolving conflicting information when possible. ()

WHST.9-12.1 Write arguments focused on *discipline-specific content.* ()

WHST.9-12.2 Write informative/explanatory texts, including the narration of historical events, scientific procedures/ experiments, or technical processes. *()*

Connections to the Arkansas English Language Arts Standards:

SL.11-12.5 Make strategic use of digital media (e.g., textual, graphical, audio, visual, and interactive elements) in presentations to enhance understanding of findings, reasoning, and evidence and to add interest. *()*

Connections to the Arkansas Mathematics Standards:

MP.2 Reason abstractly and quantitatively. ()

MP.4 Model with mathematics. ()

HSN-Q.A.1 Use units as a way to understand problems and to guide the solution of multi-step problems; choose and interpret units consistently in formulas; choose and interpret the scale and the origin in graphs and data displays. ()

HSN-Q.A.2 Define appropriate quantities for the purpose of descriptive modeling.)

HSN-Q.A.3 Choose a level of accuracy appropriate to limitations on measurement when reporting quantities. ()

HSA-SSE.A.1 Interpret expressions that represent a quantity in terms of its context. *()*

HSF-IF.B.5 Relate the domain of a function to its graph and, where applicable, to the quantitative relationship it describes. *()*

HSS-ID.B.6 Represent data on two quantitative variables on a scatter plot, and describe how those variables are related. *()*

Topic 2: Early History of Astronomy

Students who demonstrate understanding can:

A-ESS2-1AR

Engage in arguments from evidence about how the development of astronomy in the pre-telescopic age laid the groundwork for modern astronomy. [Clarification Statement: Emphasis is on development and cultural importance of time keeping, navigation, and measurement of the Earth-Moon system.]

A-ESS2-2AR

Construct explanations of how the telescope impacted the evolution of solar system models from geocentric to heliocentric. [Clarification Statement: Emphasis is on the development of the geocentric model by Aristotle and Ptolemy to the development of the Copernican astronomical model which was facilitated by Galileo's telescopic astronomy.]

The performance expectations above were developed using the following elements from the NRC document *A Framework for K-12 Science Education*:

Science and Engineering Practices

Analyzing and Interpreting Data

Analyzing data in 9–12 builds on K–8 experiences and progresses to introducing more detailed statistical analysis, the comparison of data sets for consistency, and the use of models to generate and analyze data.

- Analyze data using tools, technologies, and/or models (e.g., computational, mathematical) in order to make valid and reliable scientific claims or determine an optimal design solution. (A-ESS2-1AR)

Engaging in Argument from Evidence

Engaging in argument from evidence in 9–12 builds on K–8 experiences and progresses to using appropriate and sufficient evidence and scientific reasoning to defend and critique claims and explanations about the natural and designed world(s). Arguments may also come from current scientific or historical episodes in science.

- Construct an oral and written argument or counter-arguments based on data and evidence. (A-ESS2-1AR)

Constructing Explanations and Designing Solutions

Constructing explanations and designing solutions in 9–12 builds on K–8 experiences and progresses to explanations and designs that are

Disciplinary Core Ideas

PS4.C: Information Technologies and Instrumentation

- Multiple technologies based on the understanding of waves and their interactions with matter are part of everyday experiences in the modern world (e.g., medical imaging, communications, and scanners) and in scientific research. They are essential tools for producing, transmitting, and capturing signals and for storing and interpreting the information contained in them. (A-ESS2-1AR, A-ESS2-2AR)

ETS1.B: Developing Possible Solutions

- Both physical models and computers can be used in various ways to aid in the engineering design process. Computers are useful for a variety of purposes, such as running simulations to test different ways of solving a problem or to see which one is most efficient or economical; and in making a persuasive presentation to a client about how a given design will meet his or her needs. (A-ESS2-1AR, A-ESS2-2AR)

Crosscutting Concepts

Patterns

- Empirical evidence is needed to identify patterns. (A-ESS2-1AR)
- Different patterns may be observed at each of the scales at which a system is studied and can provide evidence for causality in explanations of phenomena. (A-ESS2-1AR)

Scale, Proportion, and Quantity

- The significance of a phenomenon is dependent on the scale, proportion, and quantity at which it occurs. (A-ESS2-2AR)

Systems and System Models

- When investigating or describing a system, the boundaries and initial conditions of the system need to be defined and their inputs and outputs analyzed and

supported by multiple and independent student-generated sources of evidence consistent with scientific ideas, principles and theories. ▪ Evaluate a solution to a complex real-world problem, based on scientific knowledge, student-generated sources of evidence, prioritized criteria, and tradeoff considerations. (A-ESS2-2AR) -- ***Connections to Nature of Science*** **Scientific Knowledge is Based on Empirical Evidence** ▪ Science knowledge is based on empirical evidence. (A-ESS2-1AR, A-ESS2-2AR) ▪ Science disciplines share common rules of evidence used to evaluate explanations about natural systems. (A-ESS2-1AR, A-ESS2-2AR) ▪ Science includes the process of coordinating patterns of evidence with current theory. (A-ESS2-1AR, A-ESS2-2AR)		described using models. (A-ESS2-2AR) ▪ Models (e.g., physical, mathematical, computer models) can be used to simulate systems and interactions—including energy, matter, and information flows—within and between systems at different scales. (A-ESS2-2AR)

Connections to the Arkansas Disciplinary Literacy Standards:

Connections to the Arkansas English Language Arts Standards:

Connections to the Arkansas Mathematics Standards:

Topic 3: Gravitation

Students who demonstrate understanding can:

A-ESS1-4

Use mathematical or computational representations to predict the motion of orbiting objects in the solar system. [AR Clarification Statement: Emphasis is on applying Kepler's laws of elliptical planetary motion to determine how gravitation affects planetary orbits and orbital velocity.]

A-ESS3-1AR

Use mathematics and computational thinking to demonstrate rotationally dynamic systems and how these structures scale from solar systems to galaxies to bound galactic clusters. [Clarification Statement: Emphasis is on the use of mathematical models of rotationally dynamic systems to apply Newton's laws of gravitation and Kepler's laws of planetary motion.]

A-ESS3-2AR

Construct an explanation of how gravitational forces are influenced by mass, density, and radius and how these forces impact the evolution of planetary structure, surfaces, atmospheres, and rings. [Clarification Statement: Emphasis is on how gravitational forces cause changes in planetary structure, including differentiation of the interior and mediation of ring and moon formation.]

A3-ETS1-4

Use a computer simulation to model the impact of proposed solutions to a complex real-world problem with numerous criteria and constraints on interactions within and between systems relevant to the problem. [AR Clarification Statement: Real-world problems could include launching a satellite into geosynchronous orbit or safely landing an orbital vehicle on the surface of a planet or moon. Criteria and constraints could include the mass of the vessel, gravitational conditions on different planets and moons, fuel, materials used, starting position, and velocity vectors.]

The performance expectations above were developed using the following elements from the NRC document *A Framework for K-12 Science Education*:

Science and Engineering Practices

Using Mathematics and Computational Thinking

Mathematical and computational thinking in 9-12 builds on K-8 experiences and progresses to using algebraic thinking and analysis, a range of linear and nonlinear functions including trigonometric functions, exponentials and logarithms, and computational tools for statistical analysis to analyze, represent, and model data. Simple computational simulations are created and used based on mathematical models of basic assumptions.

- Create a computational model or simulation of a phenomenon, designed device, process, or system. (A-ESS1-4 A-ESS3-1AR)
- Use a computational representation of phenomena or design solutions to describe and/or support claims and/or explanations. (A-ESS1-4, A-ESS3-1AR)

Disciplinary Core Ideas

PS2.A: Forces and Motion

- Newton's second law accurately predicts changes in the motion of macroscopic objects. (A-ESS1-4, A-ESS3-2AR)
- Momentum is defined for a particular frame of reference; it is the mass times the velocity of the object. (A-ESS1-4)
- If a system interacts with objects outside itself, the total momentum of the system can change; however, any such change is balanced by changes in the momentum of objects outside the system. (A-ESS1-4)

PS2.B: Types of Interactions

Newton's law of universal gravitation and Coulomb's law provide the mathematical models to describe and predict the effects of gravitational and electrostatic forces between distant objects. (A-ESS3-2AR)

- Forces at a distance are explained by fields (gravitational, electric, and magnetic) permeating space that can transfer energy through space.

Crosscutting Concepts

Cause and Effect

Empirical evidence is required to differentiate between cause and correlation and make claims about specific causes and effects. (A-ESS3-2AR)

Patterns

- Empirical evidence is needed to identify patterns. (A-ESS1-4)
- Different patterns may be observed at each of the scales at which a system is studied and can provide evidence for causality in explanations of phenomena. (A-ESS1-4)

- Use mathematical models and/or computer simulations to predict the effects of a design solution on systems and/or the interactions between systems. (A-ESS1-4, A-ESS3-1AR)

Constructing Explanations and Designing Solutions

Constructing explanations and designing solutions in 9–12 builds on K–8 experiences and progresses to explanations and designs that are supported by multiple and independent student-generated sources of evidence consistent with scientific knowledge, principles, and theories.

Construct an explanation based on valid and reliable evidence obtained from a variety of sources (including students' own investigations, models, theories, simulations, peer review) and the assumption that theories and laws that describe the natural world operate today as they did in the past and will continue to do so in the future. (A-ESS3-2AR)

- Design or refine a solution to a complex real-world problem, based on scientific knowledge, student-generated sources of evidence, prioritized criteria, and tradeoff considerations. (A-ESS3-2AR)
- Design a solution to a complex real-world problem, based on scientific knowledge, student-generated sources of evidence, prioritized criteria, and tradeoff considerations. (A-ESS3-2AR)
- Evaluate a solution to a complex real-world problem, based on scientific knowledge, student-generated sources of evidence, prioritized criteria, and tradeoff considerations. (A-ESS3-2AR)

Developing and Using Models

Modeling in 9–12 builds on K–8 experiences and progresses to using, synthesizing, and developing models to predict and show relationships among variables between systems and their components in the natural and designed world(s).

- Develop a model based on evidence to illustrate the relationships between systems or between components of a system. (A3-ETS1-4)

Magnets or electric currents cause magnetic fields; electric charges or changing magnetic fields cause electric fields. (A-ESS3-2AR)

PS3.C: Relationship Between Energy and Forces

- When two objects interacting through a field change relative position, the energy stored in the field is changed. (A-ESS3-1AR)

ESS1.B: Earth and the Solar System

- Kepler's laws describe common features of the motions of orbiting objects, including their elliptical paths around the sun. Orbits may change due to the gravitational effects from, or collisions with, other objects in the solar system. (A-ESS3-1AR)

ETS1.A: Defining and Delimiting Engineering Problems

- Criteria and constraints also include satisfying any requirements set by society, such as taking issues of risk mitigation into account, and they should be quantified to the extent possible and stated in such a way that one can tell if a given design meets them. (A3-ETS1-4)
- Humanity faces major global challenges today, such as the need for supplies of clean water and food or for energy sources that minimize pollution, which can be addressed through engineering. These global challenges also may have manifestations in local communities. (A3-ETS1-4)

ETS1.B: Developing Possible Solutions

- When evaluating solutions, it is important to take into account a range of constraints, including cost, safety, reliability, and aesthetics, and to consider social, cultural, and environmental impacts. (A3-ETS1-4)
- Both physical models and computers can be used in various ways to aid in the engineering design process. Computers are useful for a variety of purposes, such as running simulations to test different ways of solving a problem or to see which one is most efficient or economical; and in making a persuasive presentation to a client

Scale, Proportion, and Quantity

- The significance of a phenomenon is dependent on the scale, proportion, and quantity at which it occurs. (A-ESS3-1AR)

Stability and Change

- Change and rates of change can be quantified and modeled over very short or very long periods of time. Some system changes are irreversible. (A3-ETS1-4)
- Feedback (negative or positive) can stabilize or destabilize a system. (A3-ETS1-4)

Connections to Engineering, Technology, and Applications of Science

Influence of Engineering, Technology, and Science on Society and the Natural World

- Modern civilization depends on major technological systems. (A3-ETS1-4)
- Engineers continuously modify these technological systems by applying scientific knowledge and engineering design practices to increase benefits while decreasing costs and risks. (A3-ETS1-4)
- New technologies can have deep impacts on society and the environment, including some that were not anticipated. (A3-ETS1-4)

	about how a given design will meet his or her needs. (A3-ETS1-4) **ETS1.C: Optimizing the Design Solution** ▪ Criteria may need to be broken down into simpler ones that can be approached systematically, and decisions about the priority of certain criteria over others (trade-offs) may be needed. (A3-ETS1-4)	▪ Analysis of costs and benefits is a critical aspect of decisions about technology. (A3-ETS1-4) ---------------------------------- ***Connections to Nature of Science*** **Science is a Human Endeavor** ▪ Science is a result of human endeavors, imagination, and creativity. (A3-ETS1-4) **Science Addresses Questions About the Natural and Material World** ▪ Science and technology may raise ethical issues for which science, by itself, does not provide answers and solutions. (A3-ETS1-4) ▪ Science knowledge indicates what can happen in natural systems—not what should happen. The latter involves ethics, values, and human decisions about the use of knowledge. (A3-ETS1-4) ▪ Many decisions are not made using science alone, but rely on social and cultural contexts to resolve issues. (A3-ETS1-4)

Connections to the Arkansas Disciplinary Literacy Standards:

Connections to the Arkansas English Language Arts Standards:

Connections to the Arkansas Mathematics Standards:

Topic 4: Formation of the Solar System

Students who demonstrate understanding can:

A-ESS1-6 **Apply scientific reasoning and evidence from ancient Earth materials, meteorites, and other planetary surfaces to construct an account of Earth's formation and early history.** [AR Clarification Statement: Emphasis is on evidence found on other planetary, lunar, and meteoric surfaces. Evidence could include detection of water, composition of materials, geological activity, and the evolution of planetary surfaces.]

A-ESS4-1AR **Analyze and interpret data to describe how nebular theory and gravitational collapse result in star and solar system formation with distinct regions characterized by different types of planetary and other bodies.** [Clarification Statement: Emphasis is on the origin and development of Laplace's nebular theory. Emphasis is also on regions of the solar system including the inner and outer solar system and the habitable.]

A-ESS4-2AR **Obtain, evaluate, and communicate information about patterns of size and scale of the solar system, our galaxy, and the universe.** [Clarification Statement: Emphasis is on the differences in solar, galactic, and universal distance and size scales using both qualitative and quantitative tools including scientific notation, appropriate astronomical units, light years, and parsecs.]

The performance expectations above were developed using the following elements from the NRC document *A Framework for K-12 Science Education*:

Science and Engineering Practices

Analyzing and Interpreting Data

Analyzing data in 9–12 builds on K–8 experiences and progresses to introducing more detailed statistical analysis, the comparison of data sets for consistency, and the use of models to generate and analyze data.

- Analyze data using computational models in order to make valid and reliable scientific claims. (A-ESS4-1AR)

Constructing Explanations and Designing Solutions

Constructing explanations and designing solutions in 9–12 builds on K–8 experiences and progresses to explanations and designs that are supported by multiple and independent student-generated sources of evidence consistent with scientific ideas, principles and theories.

- Evaluate a solution to a complex real-world problem, based on scientific knowledge, student-generated sources of evidence, prioritized criteria, and tradeoff considerations. (A-ESS1-6)

Disciplinary Core Ideas

ESS1.A: The Universe and Its Stars

- The study of stars' light spectra and brightness is used to identify compositional elements of stars, their movements, and their distances from Earth. (A-ESS4-2AR)

ESS1.B: Earth and the Solar System

- Cyclical changes in the shape of Earth's orbit around the sun, together with changes in the tilt of the planet's axis of rotation, both occurring over hundreds of thousands of years, have altered the intensity and distribution of sunlight falling on the earth. These phenomena cause a cycle of ice ages and other gradual climate changes. (A-ESS1-6)

PS3.B: Conservation of Energy and Energy Transfer

- Conservation of energy means that the total change of energy in any system is always equal to the total energy transferred into or out of the system. (A-ESS4-1AR)
- Energy cannot be created or destroyed, but it can be transported from one place to another and transferred between systems. (A-ESS4-1AR)
- Mathematical expressions, which quantify how the stored energy in a system depends on its configuration (e.g. relative

Crosscutting Concepts

Cause and Effect

- Empirical evidence is required to differentiate between cause and correlation and make claims about specific causes and effects. (A-ESS1-6, A-ESS4-1AR)

Patterns

- Empirical evidence is needed to identify patterns. (A-ESS4-2AR)
- Different patterns may be observed at each of the scales at which a system is studied and can provide evidence for causality in explanations of phenomena. (A-ESS4-2AR)

Scale, Proportion, and Quantity

- The significance of a phenomenon is dependent on the scale, proportion, and quantity at which it occurs.

Obtaining, Evaluating, and Communicating Information Obtaining, evaluating, and communicating information in 9–12 builds on K–8 and progresses to evaluating the validity and reliability of the claims, methods, and designs. ▪ Evaluate the validity and reliability of multiple claims that appear in scientific and technical texts or media reports, verifying the data when possible. (A-ESS4-2AR) ▪ Communicate technical information or ideas (e.g. about phenomena and/or the process of development and the design and performance of a proposed process or system) in multiple formats (including orally, graphically, textually, and mathematically). (A-ESS4-2AR) --- ***Connections to Nature of Science*** **Scientific Knowledge is Based on Empirical Evidence** ▪ Science arguments are strengthened by multiple lines of evidence supporting a single explanation. (A-ESS4-1AR, A-ESS4-2AR) **Scientific Investigations Use a Variety of Methods** ▪ Science investigations use diverse methods and do not always use the same set of procedures to obtain data. (A-ESS4-1AR, A-ESS4-2AR) ▪ New technologies advance scientific knowledge. (A-ESS4-1AR, A-ESS4-2AR) **Scientific Knowledge is Based on Empirical Evidence** ▪ Science knowledge is based on empirical evidence. (A-ESS4-1AR, A-ESS4-2AR) ▪ Science arguments are strengthened by multiple lines of evidence supporting a single explanation. (A-ESS4-1AR, A-ESS4-2AR)	positions of charged particles, compression of a spring) and how kinetic energy depends on mass and speed, allow the concept of conservation of energy to be used to predict and describe system behavior. (A-ESS4-1AR)	(A-ESS4-2AR)

Connections to the Arkansas Disciplinary Literacy Standards:

Connections to the Arkansas English Language Arts Standards:

Connections to the Arkansas Mathematics Standards:

Topic 5: The Earth-Moon-Sun System

Students who demonstrate understanding can:

A5-ESS1-1 **Develop a model based on evidence to illustrate the lifespan of the sun and the role of nuclear fusion in the sun's core to release energy in the form of radiation.** [AR Clarification Statement: This PE is partially addressed in this topic. Emphasis is on magnetic processes in the sun and their effects on the solar surface and space weather.]

A-ESS5-1AR **Ask questions about relationships among the Earth, Moon, and sun to clarify the patterns of orbital positions that produce lunar phases and eclipses.** [Clarification Statement: Emphasis is on the positional nature of the lunar phases, including solar and lunar eclipses, and how orbital angles between Earth, Moon, and sun create these effects.]

A-ESS5-2AR **Plan and carry out investigations to demonstrate how relative orbital positions of the Earth, Moon, and sun influence energy and matter flow into and out of a system to create tides and seasons, orbital angles between Earth, Moon, and sun create these effects.** [Clarification Statement: Emphasis is on identifying positional relationships that produce tides on Earth (e.g., spring and neap tides, lunar perigee and apogee). Emphasis is also on positional relationships that produce seasons on Earth and other planets (e.g., axial tilt, perihelion, aphelion).]

The performance expectations above were developed using the following elements from the NRC document *A Framework for K-12 Science Education*:

Science and Engineering Practices

Asking Questions and Defining Problems
Asking questions and defining problems in 9–12 builds on K–8 experiences and progresses to formulating, refining, and evaluating empirically testable questions and design problems using models and simulations.
- Analyze complex real-world problems by specifying criteria and constraints for successful solutions. (A-ESS5-1AR)

Developing and Using Models
Modeling in 9–12 builds on K–8 experiences and progresses to using, synthesizing, and developing models to predict and show relationships among variables between systems and their components in the natural and designed world(s).
- Use a model to provide mechanistic accounts of phenomena. (A-ESS5-1AR)

Planning and Carrying Out Investigations
Planning and carrying out investigations in 9-12 builds on K-8 experiences and progresses to include investigations that provide

Disciplinary Core Ideas

ESS1.B: Earth and the Solar System
- Cyclical changes in the shape of Earth's orbit around the sun, together with changes in the tilt of the planet's axis of rotation, both occurring over hundreds of thousands of years, have altered the intensity and distribution of sunlight falling on the earth. These phenomena cause a cycle of ice ages and other gradual climate changes. (A-ESS5-1AR, A-ESS5-2AR)

ESS2.A: Earth Materials and Systems
- The geological record shows that changes to global and regional climate can be caused by interactions among changes in the sun's energy output or Earth's orbit, tectonic events, ocean circulation, volcanic activity, glaciers, vegetation, and human activities. These changes can occur on a variety of time scales from sudden (e.g., volcanic ash clouds) to intermediate (ice ages) to very long-term tectonic cycles. (A-ESS5-1AR, A-ESS5-2AR)

ESS2.D: Weather and Climate
- The foundation for Earth's global climate systems is the electromagnetic radiation from the sun, as well as its reflection, absorption, storage, and redistribution among the atmosphere, ocean, and land

Crosscutting Concepts

Energy and Matter
- The total amount of energy and matter in closed systems is conserved. (A5-ESS1-1, A-ESS5-2AR)
- Energy drives the cycling of matter within and between systems. (A5-ESS1-1, A-ESS5-2AR)

Structure and Function
- The functions and properties of natural and designed objects and systems can be inferred from their overall structure, the way their components are shaped and used, and the molecular substructures of its various materials. (A5-ESS1-1)

evidence for and test conceptual, mathematical, physical, and empirical models. ▪ Plan and conduct an investigation individually and collaboratively to produce data to serve as the basis for evidence, and in the design: decide on types, how much, and accuracy of data needed to produce reliable measurements and consider limitations on the precision of the data (e.g., number of trials, cost, risk, time), and refine the design accordingly. (A-ESS5-2AR) -- ***Connections to Nature of Science*** **Scientific Knowledge is Based on Empirical Evidence** ▪ Science arguments are strengthened by multiple lines of evidence supporting a single explanation. (A-ESS5-1AR, A-ESS5-2AR) **Scientific Investigations Use a Variety of Methods** ▪ Science investigations use diverse methods and do not always use the same set of procedures to obtain data. (A-ESS5-1AR, A-ESS5-2AR) ▪ New technologies advance scientific knowledge. (A-ESS5-1AR, A-ESS5-2AR) **Scientific Knowledge is Based on Empirical Evidence** ▪ Science knowledge is based on empirical evidence. (A-ESS5-1AR, A-ESS5-2AR) ▪ Science arguments are strengthened by multiple lines of evidence supporting a single explanation. (A-ESS5-1AR, A-ESS5-2AR)	systems, and this energy's re-radiation into space. (A5-ESS1-1) **PS3.A: Definitions of Energy** Energy is a quantitative property of a system that depends on the motion and interactions of matter and radiation within that system. That there is a single quantity called energy is due to the fact that a system's total energy is conserved, even as, within the system, energy is continually transferred from one object to another and between its various possible forms. (A5-ESS1-1, A-ESS5-2AR)	**Patterns** ▪ Empirical evidence is needed to identify patterns. (A-ESS5-1AR) ▪ Different patterns may be observed at each of the scales at which a system is studied and can provide evidence for causality in explanations of phenomena. (A5-ESS1-1)
Connections to the Arkansas Disciplinary Literacy Standards: *Connections to the Arkansas English Language Arts Standards:* *Connections to the Arkansas Mathematics Standards:*		

Topic 6: Electromagnetic Radiation and Matter

Students who demonstrate understanding can:

A6-ESS1-1 **Develop a model based on evidence to illustrate the lifespan of the sun and the role of nuclear fusion in the sun's core to release energy in the form of radiation.** [AR Clarification Statement: This PE is partially addressed in this topic. Emphasis is on the role of nuclear fusion in the sun's core producing radiant energy that reaches out into space and carries information about the sun's composition, temperature, and other physical processes.]

A-ESS6-1AR **Plan and carry out investigations to demonstrate the dual nature of light as a wave and particle that transmits energy and information about the nature and motion of the matter that emitted it.** [Clarification Statement: Emphasis is on the wave and particle nature of light, including the entire range of the electromagnetic spectrum, the use of spectroscopy to investigate the composition of matter, and the use of Doppler shift to determine the relative motion of stars and galaxies.]

A6-ETS1-1 **Analyze a major global challenge to specify qualitative and quantitative criteria and constraints for solutions that account for societal needs and wants.** [AR Clarification Statement: Possible major global challenges could include disruptions to communication and navigational networks including satellites and land-based communications or use and design of night vision goggles that convert electromagnetic radiation beyond the visible range into useful information.]

The performance expectations above were developed using the following elements from the NRC document *A Framework for K-12 Science Education*:

Science and Engineering Practices	Disciplinary Core Ideas	Crosscutting Concepts
Developing and Using Models Modeling in 9–12 builds on K–8 experiences and progresses to using, synthesizing, and developing models to predict and show relationships among variables between systems and their components in the natural and designed world(s). ▪ Use a model to provide mechanistic accounts of phenomena. (A6-ESS1-1) **Planning and Carrying Out Investigations** Planning and carrying out investigations in 9-12 builds on K-8 experiences and progresses to include investigations that provide evidence for and test conceptual, mathematical, physical, and empirical models. ▪ Plan and conduct an investigation individually and collaboratively to produce data to serve as the basis for evidence, and in the design: decide on types, how much, and accuracy of data needed to produce reliable measurements	**PS1.A: Structure and Properties of Matter** ▪ A stable molecule has less energy than the same set of atoms separated; one must provide at least this energy in order to take the molecule apart. (A-ESS6-1AR) **PS1.B: Chemical Reactions** ▪ Chemical processes, their rates, and whether or not energy is stored or released can be understood in terms of the collisions of molecules and the rearrangements of atoms into new molecules, with consequent changes in the sum of all bond energies in the set of molecules that are matched by changes in kinetic energy. (A6-ESS1-1) **PS3.A: Definitions of Energy** Energy is a quantitative property of a system that depends on the motion and interactions of matter and radiation within that system. That there is a single quantity called energy is due to the fact that a system's total energy is conserved, even as, within the system, energy is continually transferred from one object to another and between its various possible forms. (A-ESS6-1AR)	**Energy and Matter** ▪ The total amount of energy and matter in closed systems is conserved. (A-ESS6-1AR) ▪ Energy drives the cycling of matter within and between systems. (A-ESS6-1AR) **Systems and System Models** ▪ When investigating or describing a system, the boundaries and initial conditions of the system need to be defined and their inputs and outputs analyzed and described using models. (A6-ESS1-1) ▪ Models (e.g., physical, mathematical,

and consider limitations on the precision of the data (e.g., number of trials, cost, risk, time), and refine the design accordingly. (A-ESS6-1AR)

Using Mathematics and Computational Thinking
Mathematical and computational thinking in 9-12 builds on K-8 experiences and progresses to using algebraic thinking and analysis, a range of linear and nonlinear functions including trigonometric functions, exponentials and logarithms, and computational tools for statistical analysis to analyze, represent, and model data. Simple computational simulations are created and used based on mathematical models of basic assumptions.

- Create a computational model or simulation of a phenomenon, designed device, process, or system. (A6-ETS1-1)
- Use a computational representation of phenomena or design solutions to describe and/or support claims and/or explanations. (A6-ETS1-1)
- Use mathematical models and/or computer simulations to predict the effects of a design solution on systems and/or the interactions between systems. (A6-ETS1-1)

Connections to Nature of Science

Scientific Knowledge is Based on Empirical Evidence

- Science arguments are strengthened by multiple lines of evidence supporting a single explanation. (A6-ESS1-1)

Scientific Investigations Use a Variety of Methods

- Science investigations use diverse methods and do not always use the same set of procedures to obtain data. (A6-ESS1-1, A-ESS6-1AR)
- New technologies advance scientific knowledge. (A6-ESS1-1, A-ESS6-1AR)

PS4.B Electromagnetic Radiation

- Atoms of each element emit and absorb characteristic frequencies of light. These characteristics allow identification of the presence of an element, even in microscopic quantities. (A-ESS6-1AR)
- Electromagnetic radiation (e.g., radio, microwaves, light) can be modeled as a wave of changing electric and magnetic fields or as particles called photons. The wave model is useful for explaining many features of electromagnetic radiation, and the particle model explains other features. (A-ESS6-1AR)
- When light or longer wavelength electromagnetic radiation is absorbed in matter, it is generally converted into thermal energy (heat). Shorter wavelength electromagnetic radiation (ultraviolet, X-rays, gamma rays) can ionize atoms and cause damage to living cells. (A-ESS6-1AR)
- Photoelectric materials emit electrons when they absorb light of a high-enough frequency. (A-ESS6-1AR)

ESS1.A: The Universe and Its Stars

- The study of stars' light spectra and brightness is used to identify compositional elements of stars, their movements, and their distances from Earth. (A6-ESS1-1)

ESS1.B: Earth and the Solar System

- Cyclical changes in the shape of Earth's orbit around the sun, together with changes in the tilt of the planet's axis of rotation, both occurring over hundreds of thousands of years, have altered the intensity and distribution of sunlight falling on the earth. These phenomena cause a cycle of ice ages and other gradual climate changes. (A6-ESS1-1)

ETS1.B: Developing Possible Solutions

- When evaluating solutions, it is important to take into account a range of constraints, including cost, safety, reliability, and aesthetics, and to consider social, cultural, and environmental impacts. (A6-ETS1-1)

computer models) can be used to simulate systems and interactions—including energy, matter, and information flows—within and between systems at different scales. (A6-ESS1-1)

Connections to Engineering, Technology, and Applications of Science

Influence of Science, Engineering, and Technology on Society and the Natural World
New technologies can have deep impacts on society and the environment, including some that were not anticipated. Analysis of costs and benefits is a critical aspect of decisions about technology. (A6-ETS1-1)

Scientific Knowledge is Based on Empirical Evidence ▪ Science knowledge is based on empirical evidence. (A6-ESS1-1, A-ESS6-1AR) ▪ Science arguments are strengthened by multiple lines of evidence supporting a single explanation. (A6-ESS1-1, A-ESS6-1AR)		

Connections to the Arkansas Disciplinary Literacy Standards:

Connections to the Arkansas English Language Arts Standards:

Connections to the Arkansas Mathematics Standards:

Topic 7: Stellar Evolution

Students who demonstrate understanding can:

A7-ESS1-1 **Develop a model based on evidence to illustrate the lifespan of the sun and the role of nuclear fusion in the sun's core to release energy in the form of radiation.** [AR Clarification Statement: Emphasis is on developing a model based on evidence to illustrate the lifespan of the sun.]

A-ESS1-3 **Communicate scientific ideas about the way stars, over their lifecycle, produce elements.** [AR Clarification Statement: Emphasis is on the fusion process and the production of elements of atomic #2 (helium) - #26 (iron); elements more massive than iron are produced only during a supernova event at the end of a star's life.]

A-ESS7-1AR **Construct an explanation of how a star's initial mass uniquely determines the conditions that affect stability and factors that control rates of change over its lifetime.** [Clarification Statement: Emphasis is on how initial mass determines the life cycle of a star as described by the Russell-Vogt theorem.]

The performance expectations above were developed using the following elements from the NRC document *A Framework for K-12 Science Education*:

Science and Engineering Practices

Developing and Using Models
Modeling in 9–12 builds on K–8 experiences and progresses to using, synthesizing, and developing models to predict and show relationships among variables between systems and their components in the natural and designed world(s).
- Use a model to provide mechanistic accounts of phenomena. (A7-ESS1-1)

Constructing Explanations and Designing Solutions
Constructing explanations and designing solutions in 9–12 builds on K–8 experiences and progresses to explanations and designs that are supported by multiple and independent student-generated sources of evidence consistent with scientific ideas, principles and theories.
- Evaluate a solution to a complex real-world problem, based on scientific knowledge, student-generated sources of evidence, prioritized criteria, and tradeoff considerations. (A-ESS7-1AR)

Obtaining, Evaluating, and Communicating Information
Obtaining, evaluating, and communicating information in 9–12 builds on K–8 and progresses to

Disciplinary Core Ideas

PS4.B Electromagnetic Radiation
- Atoms of each element emit and absorb characteristic frequencies of light. These characteristics allow identification of the presence of an element, even in microscopic quantities. (A7-ESS1-1, A-ESS1-3, A-ESS7-1AR)

ESS1.A: The Universe and Its Stars
- The study of stars' light spectra and brightness is used to identify compositional elements of stars, their movements, and their distances from Earth. (A7-ESS1-1, A-ESS1-3, A-ESS7-1AR)

ESS1.B: Earth and the Solar System
- Cyclical changes in the shape of Earth's orbit around the sun, together with changes in the tilt of the planet's axis of rotation, both occurring over hundreds of thousands of years, have altered the intensity and distribution of sunlight falling on the earth. These phenomena cause a cycle of ice ages and other gradual climate changes. (A7-ESS1-1, A-ESS1-3, A-ESS7-1AR)

Crosscutting Concepts

Cause and Effect
- Empirical evidence is required to differentiate between cause and correlation and make claims about specific causes and effects. (A7-ESS1-1)

Structure and Function
- The functions and properties of natural and designed objects and systems can be inferred from their overall structure, the way their components are shaped and used, and the molecular substructures of its various materials. (A-ESS1-3, A-ESS7-1AR)

Scale, Proportion, and Quantity
- The significance of a phenomenon is dependent on the scale, proportion, and quantity at which it occurs. (A7-ESS1-1)

evaluating the validity and reliability of the claims, methods, and designs. ▪ Evaluate the validity and reliability of multiple claims that appear in scientific and technical texts or media reports, verifying the data when possible. (A-ESS1-3) ▪ Communicate technical information or ideas (e.g. about phenomena and/or the process of development and the design and performance of a proposed process or system) in multiple formats (including orally, graphically, textually, and mathematically). (A-ESS1-3) **---** ***Connections to Nature of Science*** **Scientific Knowledge is Based on Empirical Evidence** ▪ Science arguments are strengthened by multiple lines of evidence supporting a single explanation. (A7-ESS1-1, A-ESS1-3, A-ESS7-1AR) **Scientific Investigations Use a Variety of Methods** ▪ Science investigations use diverse methods and do not always use the same set of procedures to obtain data. (A7-ESS1-1, A-ESS1-3, A-ESS7-1AR) ▪ New technologies advance scientific knowledge. (A7-ESS1-1, A-ESS1-3, A-ESS7-1AR) **Scientific Knowledge is Based on Empirical Evidence** ▪ Science knowledge is based on empirical evidence. (A7-ESS1-1, A-ESS1-3, A-ESS7-1AR) ▪ Science arguments are strengthened by multiple lines of evidence supporting a single explanation. (A7-ESS1-1, A-ESS1-3, A-ESS7-1AR)		

Connections to the Arkansas Disciplinary Literacy Standards:

Connections to the Arkansas English Language Arts Standards:

Connections to the Arkansas Mathematics Standards:

Topic 8: Cosmology

Students who demonstrate understanding can:

A-ESS1-2 **Construct an explanation of the Big Bang theory based on astronomical evidence of light spectra, motion of distant galaxies, and composition of matter in the universe.** [AR Clarification Statement: Emphasis is on dark energy, accelerating cosmic expansion, Hubble's law, and the discovery of the expansion of the universe. Examples of evidence could include cosmic abundances of light elements, the red shift found in galactic spectra, and cosmic microwave background radiation.]

A-ESS8-1AR **Construct an argument from evidence that the formation of galactic structures depends on a spherical dark matter halo that surrounds a galaxy and supermassive black holes at the center of the galaxy.** [Clarification Standard: Emphasis is placed on galactic structures which influence the evolution of the galaxy and influence the rates of star formation in higher density regions of the galaxy.]

A8-ETS1-3 **Evaluate a solution to a complex real world problem based upon prioritized criteria and tradeoffs that account for a range of constraints, including cost, safety, reliability, and aesthetics as well as possible social, cultural, and environmental impacts.** [AR Clarification Statement: Use qualitative and quantitative data to analyze a major global challenge for space systems which could include human space travel, terraforming, and colonizing other planets.]

The performance expectations above were developed using the following elements from the NRC document *A Framework for K-12 Science Education*:

Science and Engineering Practices

Engaging in Argument from Evidence

Engaging in argument from evidence in 9–12 builds on K–8 experiences and progresses to using appropriate and sufficient evidence and scientific reasoning to defend and critique claims and explanations about natural and designed world(s). Arguments may also come from current scientific or historical episodes in science.

- Evaluate competing design solutions to a real-world problem based on scientific ideas and principles, empirical evidence, and logical arguments regarding relevant factors (e.g. economic, societal, environmental, ethical considerations). (A-ESS8-1AR)

Constructing Explanations and Designing Solutions

Constructing explanations and designing solutions in 9–12 builds on K–8 experiences and progresses to explanations and designs that are supported by multiple and independent student-generated sources of evidence consistent with scientific ideas, principles and

Disciplinary Core Ideas

PS4.B Electromagnetic Radiation

- Atoms of each element emit and absorb characteristic frequencies of light. These characteristics allow identification of the presence of an element, even in microscopic quantities. (A-ESS1-2)

ESS1.A: The Universe and Its Stars

- The study of stars' light spectra and brightness is used to identify compositional elements of stars, their movements, and their distances from Earth. (A-ESS1-2)
- The Big Bang theory is supported by observations of distant galaxies receding from our own, of the measured composition of stars and non-stellar gases, and of the maps of spectra of the primordial radiation (cosmic microwave background) that still fills the universe. (A-ESS1-2)
- Other than the hydrogen and helium formed at the time of the Big Bang, nuclear fusion within stars produces all atomic nuclei lighter than and including iron, and the process releases electromagnetic energy. Heavier elements are produced when certain massive stars achieve a supernova stage and explode. (A-ESS1-2)

Crosscutting Concepts

Energy and Matter

- The total amount of energy and matter in closed systems is conserved. (A-ESS1-2)
- Energy drives the cycling of matter within and between systems. (A-ESS1-2)

Structure and Function

The functions and properties of natural and designed objects and systems can be inferred from their overall structure, the way their components are shaped and used, and the molecular substructures of its various materials. (A-ESS8-1AR)

Connections to Engineering, Technology, and Applications of Science

Influence of Science, Engineering, and Technology on Society and the Natural World

theories. ▪ Evaluate a solution to a complex real-world problem, based on scientific knowledge, student-generated sources of evidence, prioritized criteria, and tradeoff considerations. (A-ESS1-2) --- ***Connections to Nature of Science*** **Scientific Knowledge is Based on Empirical Evidence** ▪ Science arguments are strengthened by multiple lines of evidence supporting a single explanation. (A-ESS8-1AR) **Scientific Investigations Use a Variety of Methods** ▪ Science investigations use diverse methods and do not always use the same set of procedures to obtain data. (A-ESS8-1AR) ▪ New technologies advance scientific knowledge. (A-ESS8-1AR) **Scientific Knowledge is Based on Empirical Evidence** ▪ Science knowledge is based on empirical evidence. (A-ESS8-1AR) ▪ Science arguments are strengthened by multiple lines of evidence supporting a single explanation. (A-ESS8-1AR)	**ETS1.B: Developing Possible Solutions** ▪ When evaluating solutions, it is important to take into account a range of constraints, including cost, safety, reliability, and aesthetics, and to consider social, cultural, and environmental impacts. (A8-ETS1-3)	New technologies can have deep impacts on society and the environment, including some that were not anticipated. Analysis of costs and benefits is a critical aspect of decisions about technology. (A8-ETS1-3)
Connections to the Arkansas Disciplinary Literacy Standards: *Connections to the Arkansas English Language Arts Standards:* *Connections to the Arkansas Mathematics Standards:*		

Contributors

The following educators contributed to the development of this course:

Susan Allison – Benton School District	Rebecca Koelling – Highland School District
Katie Anderson – Little Rock School District	Karen Ladd – Nettleton School District
Dr. Katherine Auld - Northwest Arkansas Community College	Steven Long – Rogers School District
Dr. Daniel Barth - University of Arkansas at Fayetteville	Chris Lynch – Black River Technical College
Angela Bassham – Salem School District	Jacki Marlin – Perryville School District
Allison Belcher – Little Rock School District	Monica Meadows – Pulaski County Special School District
Debbie Bilyeu – Arkansas AIMS	Patti Meeks – Hamburg School District
Tami Blair – Texarkana School District	Melissa Miller – Farmington School District
Stephen Brodie – University of Arkansas at Fort Smith STEM Center	Dr. Jim Musser – Arkansas Tech University
Stephanie Brown – Quitman School District	Nanette Nichols – Wilbur D. Mills AR Education Cooperative
Cindy Bunch – Manila School District	Dennis Pevey – eSTEM Public Charter School
Cindy Cardwell – Bentonville School District	Tami Philyaw – Smackover – Norphlet School District
Larry Cooper – Springdale School District	Kathy Prislovsky – Stuttgart School District
Sarah Croswell – Virtual Arkansas Academy	Kathy Prophet – Springdale School District
Tami Eggensperger – Cabot School District	Rhonda Riggin – Booneville School District
Shelley Forbess – El Dorado School District	Will Squires – Caddo Hills School District
Kyla Gentry – Searcy School District	Tim Trawick – Conway School District
Jenna Gill – Siloam Springs School District	David Wentz – Pea Ridge School District
Douglas Hammon – Little Rock School District	Andrew Williams – University of Arkansas at Monticello
Keith Harris – University of Arkansas at Little Rock Partnership for STEM Education	Wendi J.W. Williams – Northwest Arkansas Community College
Leonda Holthoff – Star City School District	Cathy Wissehr – University of Arkansas at Fayetteville
Amanda Jones – Poyen School District	Diedra Young – Ridgway Christian High School, Pine Bluff

ARKANSAS
K-12 SCIENCE STANDARDS
EDUCATION FOR A NEW GENERATION

Biology - Integrated

2016

Table of Contents

Notes:

1. Student Performance Expectations (PEs) may be taught in any sequence or grouping within a grade level. Several PEs are described as being "partially addressed in this course" because the same PE is revisited in a subsequent course during which that PE is fully addressed.
2. An asterisk (*) indicates an engineering connection to a practice, core idea, or crosscutting concept.
3. The Clarification Statements are examples and additional guidance for the instructor. AR indicates Arkansas-specific Clarification Statements.
4. The Assessment Boundaries delineate content that may be taught but not assessed in large-scale assessments. AR indicates Arkansas-specific Assessment Boundaries.
5. The section entitled "foundation boxes" is reproduced verbatim from *A Framework for K-12 Science Education: Practices, Crosscutting Concepts, and Core Ideas*. Integrated and reprinted with permission from the National Academy of Sciences.
6. The examples given (e.g.,) are suggestions for the instructor.
7. Throughout this document, connections are provided to the nature of science as defined by *A Framework for K-12 Science Education* (NRC 2012).
8. Throughout this document, connections are provided to Engineering, Technology, and Applications of Science as defined by *A Framework for K-12 Science Education* (NRC 2012).
9. Each set of PEs lists connections to other disciplinary core ideas (DCIs) within the Arkansas K-12 Science Standards and to the Arkansas English Language Arts Standards, Arkansas Disciplinary Literacy Standards, and the Arkansas Mathematics Standards.

Arkansas K-12 Science Standards Overview

The Arkansas K-12 Science Standards are based on *A Framework for K-12 Science Education* (NRC 2012) and are meant to reflect a new vision for science education. The following conceptual shifts reflect what is new about these science standards. The Arkansas K-12 Science Standards

- reflect science as it is practiced and experienced in the real world,
- build logically from Kindergarten through Grade 12,
- focus on deeper understanding as well as application of content,
- integrate practices, crosscutting concepts, and core ideas, and
- make explicit connections to literacy and math.

As part of teaching the Arkansas K-12 Science Standards, it will be important to instruct and guide students in adopting appropriate safety precautions for their student-directed science investigations. Reducing risk and preventing accidents in science classrooms begin with planning. There are four recommended steps in carrying out a hazard and risk assessment for any planned lab investigation.

1) Identify all hazards. Hazards may be physical, chemical, health, or environmental.
2) Evaluate the type of risk associated with each hazard.
3) Write the procedure and all necessary safety precautions in such a way as to eliminate or reduce the risk associated with each hazard.
4) Prepare for any emergency that might arise in spite of all of the required safety precautions.

According to Arkansas Code Annotated § 6-10-113 (2012) for eye protection, every student and teacher in public schools participating in any chemical or combined chemical-physical laboratories involving caustic or explosive chemicals or hot liquids or solids is required to wear industrial-quality eye protective devices (eye goggles) at all times while participating in science investigations.

The Arkansas K-12 Science Standards outline the knowledge and science and engineering practices that all students should learn by the end of high school. The standards are three-dimensional because each student performance expectation engages students at the nexus of the following three dimensions.

- Dimension 1 describes scientific and engineering practices.
- Dimension 2 describes crosscutting concepts, overarching science concepts that apply across science disciplines.
- Dimension 3 describe core ideas in the science disciplines.

The Science and Engineering Practices

The eight practices describe the major practices that scientists use to investigate, build models and theories of the world around them or engineers use as they build and design systems. The practices are essential for all students to learn and are as follows:

1. Asking questions (for science) and defining problems (for engineering)
2. Developing and using models
3. Planning and carrying out investigations
4. Analyzing and interpreting data
5. Using mathematics and computational thinking
6. Constructing explanations (for science) and designing solutions (for engineering)
7. Engaging in argument from evidence
8. Obtaining, evaluating, and communicating information

Crosscutting Concepts

The seven crosscutting concepts bridge disciplinary boundaries and unit core ideas throughout the fields of science and engineering. Their purpose is to help students deepen their understanding of the disciplinary core ideas, and develop a coherent, and scientifically based view of the world. The seven crosscutting concepts are as follows:

1. *Patterns.* Observed patterns of forms and events guide organization and classification, and they prompt questions about relationships and the factors that influence them.

2. *Cause and effect: Mechanism and explanation*. Events have causes, sometimes simple, sometimes multifaceted. A major activity of science is investigating and explaining causal relationships and the mechanisms by which they are mediated. Such mechanisms can then be tested across given contexts and used to predict and explain events in new contexts.

3. *Scale, proportion, and quantity.* In considering phenomena, it is critical to recognize what is relevant at different measures of size, time, and energy and to recognize how changes in scale, proportion, or quantity affect a system's structure or performance.

4. *Systems and system models.* Defining the system under study—specifying its boundaries and making explicit a model of that system—provides tools for understanding and testing ideas that are applicable throughout science and engineering.

5. *Energy and matter: Flows, cycles, and conservation.* Tracking fluxes of energy and matter into, out of, and within systems helps one understand the systems' possibilities and limitations.

6. *Structure and function.* The way in which an object or living thing is shaped and its substructure determine many of its properties and functions.

7. *Stability and change.* For natural and built systems alike, conditions of stability and determinants of rates of change or evolution of a system are critical elements of study.

Disciplinary Core Ideas

The Disciplinary Core Ideas describe the content that occurs at each grade or course. The Arkansas K-12 Science Standards focus on a limited number of core ideas in science and engineering both within and across the disciplines and is built on the notion of learning as a developmental progression. The Disciplinary Core Ideas are grouped into the following domains:

- Physical Science (PS)
- Life Science (LS)
- Earth and Space Science (ESS)
- Engineering, Technology and Applications of Science (ETS)

Connections to the Arkansas English Language Arts Standards

Evidence-based reasoning is the foundation of good scientific practice. The Arkansas K-12 Science Standards incorporate reasoning skills used in language arts to help students improve mastery and understanding in all three disciplines. The Arkansas K-8 Science Committee made every effort to align grade-by-grade with the English language arts (ELA) standards so concepts support what students are learning in their entire curriculum. Connections to specific ELA standards are listed for each student performance expectation, giving teachers a blueprint for building comprehensive cross-disciplinary lessons.

The intersections between Arkansas K-12 Science Standards and Arkansas ELA Standards teach students to analyze data, model concepts, and strategically use tools through productive talk and shared activity. Reading in science requires an appreciation of the norms and conventions of the discipline of science, including understanding

the nature of evidence used, an attention to precision and detail, and the capacity to make and assess intricate arguments, synthesize complex information, and follow detailed procedures and accounts of events and concepts. These practice-based standards help teachers foster a classroom culture where students think and reason together, connecting around the subject matter and core ideas.

Connections to the Arkansas Disciplinary Literacy Standards

Reading is critical to building knowledge in science. College and career ready reading in science requires an appreciation of the norms and conventions of each discipline, such as the kinds of evidence used in science; an understanding of domain-specific words and phrases; an attention to precise details; and the capacity to evaluate intricate arguments, synthesize complex information, and follow detailed descriptions of events and concepts. When reading scientific and technical texts, students need to be able to gain knowledge from challenging texts that often make extensive use of elaborate diagrams and data to convey information and illustrate concepts. Students must be able to read complex informational texts in science with independence and confidence because the vast majority of reading in college and workforce training programs will be sophisticated nonfiction.

For students, writing is a key means of asserting and defending claims, showing what they know about a science, and conveying what they have experienced, imagined, thought, and felt. To be college and career ready writers, students must take task, purpose, and audience into careful consideration, choosing words, information, structures, and formats deliberately. They need to be able to use technology strategically when creating, refining, and collaborating on writing. They have to become adept at gathering information, evaluating sources, and citing material accurately, reporting finds from their research and analysis of sources in a clear and cogent manner. They must have the flexibility, concentration, and fluency to produce high-quality first-draft text under a tight deadline and the capacity to revisit and make improvements to a piece of writing over multiple drafts when circumstances encourage or require it.

Connections to the Arkansas Mathematics Standards

Science is a quantitative discipline, so it is important for educators to ensure that students' science learning coheres well with their understanding of mathematics. To achieve this alignment, the Arkansas K-12 Science Committee made every effort to ensure that the mathematics standards do not outpace or misalign to the grade-by-grade science standards. Connections to specific math standards are listed for each student performance expectation, giving teachers a blueprint for building comprehensive cross-disciplinary lessons.

How to Read
Arkansas K-12 Science

Topic

GRADE TWO

An asterisk indicates an engineering connection to a practice or disciplinary core idea.

Interdependent Relationships in Ecosystems

Students who demonstrate understanding can:

2-LS2-1 Plan and conduct an investigation to determine if plants need sunlight and water to grow. [Assessment Boundary: Assessment is limited to testing one variab

Student Performance Expectations (PEs)

*****

2-LS2-2 Develop a simple model that mimics the function o **eeds or pollinating plants.**

2-LS4-1 Make observations of plants and animals to compa **fferent habitats.** [Clarification Statement: Emphasis is on the diversity of living thing ssessment Boundary: Assessment does not include specific animal and plant names in specific habitats.]

The performance expectations above were developed using the following elements from the NRC document *A Framework for K-12 Science Education*:

Science and Engineering Practices	Disciplinary Core Ideas	Crosscutting Concepts
Developing and Using Models Modeling in K–2 builds on prior experiences and progresses to include using and developing models (i.e., diagram, drawing, physical replica, diorama, dramatization, or storyboard) that represent concrete events or design solutions. ▪ Develop a simple model based on evidence to represent a proposed object or tool. (2-LS2-2) **Planning and Carrying Out Investigations** Planning and carrying out investigations to answer questions or test solutions to problems in K–2 builds on prior experiences and progresses to simple investigations, based on fair tests, which provide data to support explanations or design solutions. ▪ Plan and conduct an investi collaboratively to produce da as the basis for evidence to question. (2-LS2-1) ▪ Make observations (firsthand or from media) to collect data that can be used to make comparisons. (2-LS4-1) **Designates which PE uses this practice** --- **Connections to Nature of Science** **Scientific Knowledge is Based on Empirical Evidence** ▪ Scientists look for patterns and order when making observations about the world. (2-LS4-1)	**LS2.A: Interdependent Relationships in Ecosystems** ▪ Plants depend on water and light to grow. (2-LS2-1) ▪ Plants depend on animals for pollination or to move their seeds around. (2-LS2-2) **LS4.D: Biodiversity and Humans** ▪ There are many different kinds of living things in any area, and they exist in different places on land and in water. (2-LS4-1) **ETS1.B: Developing Possible Solutions** ▪ Designs can be conveyed through sketches, drawings, or physical models. These representations are useful in communicating ideas for a problem's solutions to other people. (2-LS2-2) ▪ **Designates which PE incorporates this disciplinary core idea (DCI)** **Connections to the Nature of Science**	**Cause and Effect** ▪ Events have causes that generate observable patterns. (2-LS2-1) **Structure and Function** ▪ The shape and stability of structures of natural and designed objects are related to their function(s). (2-LS2-2) **Designates which PE incorporates this crosscutting concept (CC)** **DCI codes from *A Framework for K-12 Science Education* in boldface type.**

Connections to other DCIs in second grade: N/A

Connections to other DCIs across grade levels: **K.LS1.C** (2-LS2-1); **K-ESS3.A** (2-LS2-1); **K-2.ETS1.A** (2-LS2-2); **3.LS4.C** (2-LS4-1); **3.LS4.D** (2-LS4-1); **5.LS1.C** (2-LS2-1); **5.LS2.A** (2-LS2-2, 2-LS4-1)

Connections to the Arkansas English Language Arts and Mathematics Standards are often found by scrolling to the next page

Biology Course Learning Progression Chart

Topic 1: Cycling of Matter and Energy	Topic 2: Structure and Function	Topic 3: Biodiversity and Population Dynamics	Topic 4: Genetic Variations in Organisms	Topic 5: Evolution by Natural Selection	Topic 6: Life and Earth's Systems	Topic 7: Human Impacts on Earth's Systems
AR BI-LS1-5	BI-LS1-1	BI-LS2-1	BI-LS1-4	BI-LS4-1	BI-ESS2-2	AR BI-ESS3-1
BI-LS1-7	AR BI-LS1-2	BI-LS2-2	BI-LS3-1	BI-LS4-2	BI-ESS2-4	AR BI-ESS3-2
BI-LS2-3	BI-LS1-3	BI-LS2-6	BI-LS3-2	BI-LS4-3	AR BI-ESS2-5	BI-ESS3-3
AR BI-LS 2-4	BI-LS1-6	AR BI-LS2-7	BI-LS3-3	BI-LS4-4	AR BI-ESS3-5	AR BI-ESS3-4
BI-LS2-5		BI-LS2-8		BI-LS4-5	AR BI6-ETS1-2	AR BI-ESS3-6
BI-ESS2-6		AR BI-LS4-6		AR BI-ESS2-7	AR BI6-ETS1-3	AR BI7-ETS1-1
		AR BI3-ETS1-3				AR BI7-ETS1-2
		AR BI3-ETS1-4				AR BI7-ETS1-4

Arkansas Clarification Statement/Assessment Boundary (AR)

Biology - Integrated Course Overview

The Arkansas K-12 Science Standards for biology is an integrated science course that focuses on conceptual understanding of foundational life and Earth science core ideas, science and engineering practices, and crosscutting concepts, and is an integration of life science, Earth and space science, and engineering design standards. It is recommended that students be enrolled in geometry concurrently with this course. Teachers with Biology, Life/Earth, and Life Science licenses are qualified to teach this course. Students will earn 1 unit of Smart Core/biology credit for graduation.

Students in Biology - Integrated develop understanding of key concepts that help them make sense of the interactions between life science and Earth and space science. The ideas are building upon students' understanding of disciplinary ideas, science and engineering practices, and crosscutting concepts from earlier grades. There are seven topics in Biology - Integrated: (1) Cycling of Matter and Energy, (2) Structure and Function, (3) Biodiversity and Population Dynamics, (4) Genetic Variations in Organisms, (5) Evolution by Natural Selection, (6) Earth's Changing Climate, and (7) Humans and Natural Systems. The performance expectations 9standards) for high school Biology - Integrated blend core ideas with scientific and engineering practices and crosscutting concepts to support students in developing usable knowledge that can be applied across the science disciplines. While the performance expectations indicate particular practices to address specific disciplinary core ideas, it is recommended that teachers include a variety of practices and strategies in their instruction.

Connections with other science disciplines help high school students develop these capabilities in various contexts. For example, in the life sciences students are expected to design, evaluate, and refine a solution for reducing human impact on the environment (BI-LS2-7) and to create or revise a simulation to test solutions for mitigating adverse impacts of human activity on biodiversity (BI-LS4-6). In the Earth and space sciences, students apply their engineering capabilities to reduce human impacts on Earth systems, and improve social and environmental cost-benefit ratios (BI-ESS3-2, BI-ESS3-4).

Additionally, it should be noted the biology standards are not intended to be used as curriculum. Instead, the standards are the minimum that students should know and be able to do. Therefore, teachers should continue to differentiate for the needs of their students by adding depth and additional rigor.

Students in biology also continue their ability to develop possible solutions for major global problems with engineering design challenges. At the high school level, students are expected to engage with major global issues at the interface of science, technology, society and the environment, and to bring to light the kinds of analytical and strategic thinking that prior training and increased maturity make possible. As in prior levels, these capabilities can be thought of in three stages:

- **Defining the problem** at the high school level requires both qualitative and quantitative analysis. For example, the need to provide food and fresh water for future generations comes into sharp focus when considering the speed at which world population is growing and conditions in countries that have experienced famine. While high school students are not expected to solve these challenges, they are expected to begin thinking about them as problems that can be addressed, at least in part, through engineering.
- **Developing possible solutions** for major global problems begins by breaking them down into smaller problems that can be tackled with engineering methods. To evaluate potential solutions, students are expected to not only consider a wide range of criteria but to also recognize that criteria needs to be prioritized. For example, public safety or environmental protection may be more important than cost or even functionality. Decisions on priorities can then guide tradeoff choices.
- **Improving designs** at the high school level may involve sophisticated methods, such as using computer simulations to model proposed solutions. Students are expected to use such methods to take into account a range of criteria and constraints, anticipate possible societal and environmental impacts, and test the validity of their simulations by comparison to the real world.

Biology - Integrated Topics Overview

The performance expectations in **Topic 1: Cycling of Matter and Energy** help students answer the question:

- How do matter and energy move through an ecosystem?

Students construct explanations, develop models, and use mathematical representations to demonstrate how the cycling of carbon-based molecules through photosynthesis and cellular respiration enables the flow of energy among organisms and within ecosystems. Students use quantitative models specifically to illustrate the role of photosynthesis and cellular respiration as two processes by which carbon is cycled among the biosphere, atmosphere, hydrosphere, and geosphere.

The performance expectations in **Topic 2: Structure and Function** help students formulate an answer to the question:

- How do the structures of organisms enable living organisms to function?

Students investigate explanations for the structure and function of cells as the basic units of life, the hierarchical systems of organisms, and the role of specialized cells for maintenance and growth. Students demonstrate understanding of how systems of cells function together to support the life processes by reading critically, using models, and conducting investigations.

The performance expectations in **Topic 3: Biodiversity and Population Dynamics** help students answer the question:

- How do biotic and abiotic factors affect biodiversity?

Students investigate the role of biodiversity in ecosystems and the role of animal behavior on survival of individuals and species. Students analyze how organisms interact with each other and their physical environment, how organisms change the environment, and how these changes affect both organisms and the environment. Students use evidence to explain those interactions and changes. Students explore solutions for major global problems, evaluate possible solutions for reducing the impact of human activities on biodiversity, and use computer simulations to model and test those solutions, considering a wide range of criteria including cost-benefit analysis.

The performance expectations in **Topic 4: Genetic Variations in Organisms** help students in formulating answers to the questions:

- How are the characteristics of one generation related to previous and future generations?
- How does genetic variation contribute to biodiversity?

Students explain the relationship of DNA and chromosomes to cellular division, protein synthesis, and mutations. Students analyze the mechanisms of inheritance and gene expression, as well as environmental and genetic causes of gene mutations. Students formulate questions and construct arguments about ethical issues related to the genetic modification of organisms. Students develop conceptual models for the role of DNA in the unity of life on Earth and use statistical models to explain the importance of variation within population for the survival and evolution of species.

The performance expectations in **Topic 5: Evolution by Natural Selection** help students answer the questions:

- How very different organisms also have so many similarities?
- What causes species to change over time?

Students investigate patterns to find relationships between environmental conditions and natural selection, highlighting factors that drive the evolution or extinction of species over time. Students utilize statistics and probability to investigate the distribution of genes and traits in a population over time, demonstrating how natural selection leads to the adaptation of populations. Students analyze scientific evidence, ranging from the fossil record to genetic relationships, to evaluate how multiple lines of evidence support the scientific theories of natural selection and evolution.

The performance expectations in **Topic 6: Life and Earth's Systems** help students answer the question:

- How does life influence Earth's systems?
- How do Earth's systems influence life?

Students investigate the interrelationships between biotic and abiotic factors that contribute to changes in Earth's dynamic systems. Students examine how Earth's systems may appear stable, change slowly over long periods of time, or change abruptly, with significant consequences for living organisms. Students develop models and analyze data to explain and forecast changes to Earth's various climates. Students examine how climate change can occur when certain parts of Earth's systems are altered and predict how living organisms may affect and be affected. Students study the relationship of blue-green algae and oxygen concentration in the atmosphere; then, investigate how the rate of fresh water intrusion from melting polar ice affects the growth of the blue-green algae. While this topic does not address biological processes specifically, instruction should highlight the connection between climate and living systems.

The performance expectations in **Topic 7: Human Impacts on Earth's Systems** help students formulate answers to the questions:

- How have Earth's systems affected human populations and human activities?
- How do human activities impact Earth's systems?

Students examine the complex interdependence between humans and their environment by simulating specific relationships between natural resources, natural hazards, climate, biodiversity, and the sustainability of human populations. Students analyze geoscience models to highlight the interactions between Earth's various systems, forecast future rates of global or regional climate change, and predict the resulting impacts on the environment. Students utilize science and engineering practices to evaluate and refine solutions that reduce human impacts on natural systems, manage natural resources, protect biodiversity, and maintain healthy ecosystems.

Biology - Integrated

Topic 1: Cycling of Matter and Energy

Students who demonstrate understanding can:

BI-LS1-5 **Use a model to illustrate how photosynthesis transforms light energy into stored chemical energy.** [AR Clarification Statement: This PE is fully addressed in this course. Emphasis is on illustrating inputs and outputs of matter and the transfer and transformation of energy in photosynthesis by plants and other photosynthesizing organisms. Examples of models could include diagrams, chemical equations, and conceptual models.] [Assessment Boundary: Assessment does not include specific biochemical steps.]

BI-LS1-7 **Use a model to illustrate that cellular respiration is a chemical process whereby the bonds of food molecules and oxygen molecules are broken and the bonds in new compounds are formed resulting in a net transfer of energy.** [Clarification Statement: Emphasis is on the conceptual understanding of the inputs and outputs of the process of cellular respiration.] [Assessment Boundary: Assessment should not include identification of the steps or specific processes involved in cellular respiration.]

BI-LS2-3 **Construct and revise an explanation based on evidence for the cycling of matter and flow of energy in aerobic and anaerobic conditions.** [Clarification Statement: Emphasis is on conceptual understanding of the role of aerobic and anaerobic respiration in different environments.] [Assessment Boundary: Assessment does not include the specific chemical processes of either aerobic or anaerobic respiration.]

BI-LS2-4 **Use mathematical representations to support claims for the cycling of matter and flow of energy among organisms in an ecosystem.** [AR clarification Statement: This PE is fully addressed in this course. Emphasis is on the transfer of energy and matter between trophic levels and the relative proportion of organisms at each trophic level.] [Assessment Boundary: Assessment is limited to proportional reasoning to describe the cycling of matter and flow of energy.

BI-LS2-5 **Develop a model to illustrate the role of photosynthesis and cellular respiration in the cycling of carbon among the biosphere, atmosphere, hydrosphere, and geosphere.** [Clarification Statement: Examples of models could include simulations and mathematical models.] [Assessment Boundary: Assessment does not include the specific chemical steps of photosynthesis and respiration.]

BI-ESS2-6 **Develop a quantitative model to describe the cycling of carbon among the hydrosphere, atmosphere, geosphere, and biosphere.** [Clarification Statement: Emphasis is on modeling biogeochemical cycles that include the cycling of carbon through the ocean, atmosphere, soil, and biosphere (including humans), providing the foundation for living organisms.]

The performance expectations above were developed using the following elements from the NRC document *A Framework for K-12 Science Education*:

Science and Engineering Practices	Disciplinary Core Ideas	Crosscutting Concepts
Developing and Using Models Modeling in 9–12 builds on K–8 experiences and progresses to using, synthesizing, and developing models to predict and show relationships among variables between systems and their components in the natural and designed worlds. ▪ Use a model based on evidence to illustrate the relationships between systems or between components of a system. (BI-LS1-5, B-LS1-7) ▪ Develop a model based on evidence to illustrate the relationships between	**LS1.C: Organization for Matter and Energy Flow in Organisms** ▪ The process of photosynthesis converts light energy to stored chemical energy by converting carbon dioxide plus water into sugars plus released oxygen. (BI-LS1-5) ▪ As matter and energy flow through different organizational levels of living systems, chemical elements are recombined in different ways to form different products. (BI-LS1-7)	**Energy and Matter** ▪ Changes of energy and matter in a system can be described in terms of energy and matter flows into, out of, and within that system. (BI-LS1-5) ▪ Energy cannot be created or destroyed—it only moves between one place and another place, between objects and/or fields, or between systems.

systems or between components of a system. (BI-ESS2-6, BI-LS2-5) **Constructing Explanations and Designing Solutions** Constructing explanations and designing solutions in 9–12 builds on K–8 experiences and progresses to explanations and designs that are supported by multiple and independent student-generated sources of evidence consistent with scientific ideas, principles, and theories. ▪ Construct and revise an explanation based on valid and reliable evidence obtained from a variety of sources (including students' own investigations, models, theories, simulations, peer review) and the assumption that theories and laws that describe the natural world operate today as they did in the past and will continue to do so in the future. (BI-LS1-6, BI-LS2-3) **Using Mathematics and Computational Thinking** Mathematical and computational thinking in 9-12 builds on K-8 experiences and progresses to using algebraic thinking and analysis, a range of linear and nonlinear functions including trigonometric functions, exponentials and logarithms, and computational tools for statistical analysis to analyze, represent, and model data. Simple computational simulations are created and used based on mathematical models of basic assumptions. ▪ Use mathematical representations of phenomena or design solutions to support claims. (BI-LS2-4)	▪ As a result of these chemical reactions, energy is transferred from one system of interacting molecules to another. Cellular respiration is a chemical process in which the bonds of food molecules and oxygen molecules are broken and new compounds are formed that can transport energy to muscles. Cellular respiration also releases the energy needed to maintain body temperature despite ongoing energy transfer to the surrounding environment. (BI-LS1-7) **LS2.B: Cycles of Matter and Energy Transfer in Ecosystems** ▪ Photosynthesis and cellular respiration (including anaerobic processes) provide most of the energy for life processes. (BI-LS2-3) ▪ Plants or algae form the lowest level of the food web. At each link upward in a food web, only a small fraction of the matter consumed at the lower level is transferred upward, to produce growth and release energy in cellular respiration at the higher level. Given this inefficiency, there are generally fewer organisms at higher levels of a food web. Some matter reacts to release energy for life functions, some matter is stored in newly made structures, and much is discarded. The chemical elements that make up the molecules of organisms pass through food webs and into and out of the atmosphere and soil, and they are combined and recombined in different ways. At each link in an ecosystem, matter and energy are conserved. (BI-LS2-4) ▪ Photosynthesis and cellular respiration are important components of the carbon cycle, in which carbon is exchanged among the biosphere, atmosphere, oceans, and geosphere through chemical, physical, geological, and biological processes. (BI-LS2-5) **PS3.D: Energy in Chemical Processes** ▪ The main way that solar energy is captured and stored on Earth is through the complex chemical	(BI-LS1-7, BI-LS2-4) ▪ The total amount of energy and matter in closed systems is conserved. (BI-ESS2-6) ▪ Energy drives the cycling of matter within and between systems. (BI-LS2-3) **Systems and System Models** ▪ Models (e.g., physical, mathematical, computer models) can be used to simulate systems and interactions—including energy, matter, and information flows—within and between systems at different scales. (BI-LS2-5)

	process known as photosynthesis. (BI-LS2-5) **ESS2.D: Weather and Climate** ▪ Gradual atmospheric changes were due to plants and other organisms that captured carbon dioxide and released oxygen. (BI-ESS2-6) ▪ Changes in the atmosphere due to human activity have increased carbon dioxide concentrations and thus affect climate. (BI-ESS2-6)	

Connections to other DCIs in this course: **BI.PS1.A** (BI-ESS2-6)**; BI.PS1.B** (BI-LS1-5,BI-LS1-7, BI-LS2-3, BI-LS2-5, BI-ESS2-6); **BI.PS2.B** (BI-LS1-7); **BI.PS3.B** (BI-LS1-5, BI-LS1-7, BI-LS2-3, BI-LS2-4); **BI.PS3.D** (BI-LS2-3, BI-LS2-4); **BI.LS1.C** (BI-ESS2-6)**; BI.LS2.B** (BI-ESS2-6)**; BI.ESS2.A** (BI-LS2-3); **BI.ESS2.D** (BI-LS2-5); **BI.ESS3.C**(BI-ESS2-6)**; BI.ESS3.D** (BI-ESS2-6)

Connections to DCIs across grade-bands: **7.PS1.A** (BI-ESS2-6); **7.PS1.B** (BI-LS1-5, BI-LS1-7, BI-LS2-3); **6.PS3.D** (BI-LS1-5, BI-LS1-7, BI-LS2-3, BI-LS2-4, BI-LS2-5, BI-ESS2-6); **8.PS4.B** (BI-ESS2-6)**; 7.LS1.C** (BI-LS1-5, BII-LS1-7, B-LS2-3, BI-LS2-5, BI-LS2-4); **7.LS2.B** (BI-LS1-5, BI-LS1-7, BI-LS2-3, BI-LS2-4, BI-LS2-5, BI-ESS2-6); **7.ESS2.A** (BI-LS2-5, BI-ESS2-6)**; 7.ESS2.B** (BI-ESS2-6)**; 7.ESS2.C** (BI-ESS2-6)**; 6.ESS3.C** (BI-ESS2-6)**; 6.ESS3.D** (BI-ESS2-6)

Connections to the Arkansas Disciplinary Literacy Standards:

RST.11-12.1 Cite specific textual evidence to support analysis of science and technical texts, attending to important distinctions the author makes and to any gaps or inconsistencies in the account. (BI-LS2-3)

WHST.9-12.2 Write informative/explanatory texts, including the narration of historical events, scientific procedures/ experiments, or technical processes. (BI-LS2-3)

WHST.9-12.5 Develop and strengthen writing as needed by planning, revising, editing, rewriting, or trying a new approach, focusing on addressing what is most significant for a specific purpose and audience. (BI-LS2-3)

Connections to the Arkansas English Language Arts Standards:

SL.11-12.5 Make strategic use of digital media (e.g., textual, graphical, auditory, visual, and interactive elements) in presentations to enhance understanding of findings, reasoning, and evidence and to add interest. (BI-LS1-5, BI-LS1-7)

Connections to the Arkansas Mathematics Standards:

MP.2 Reason abstractly and quantitatively. (BI-ESS2-6, BI-LS2-4)

MP.4 Model with mathematics. (BI-ESS2-6, BI-LS2-4)

HSN.Q.A.1 Use units as a way to understand problems and to guide the solution of multi-step problems; choose and interpret units consistently in formulas; choose and interpret the scale and the origin in graphs and data displays. (BI-ESS2-6, BI-LS2-4)

HSN.Q.A.2 Define appropriate quantities for the purpose of descriptive modeling. (BI-ESS2-6, BI-LS2-4)

HSN.Q.A.3 Choose a level of accuracy appropriate to limitations on measurement when reporting quantities. (BI-ESS2-6, BI-LS2-4)

Topic 2: Structure and Function

Students who demonstrate understanding can:

BI-LS1-1 **Construct an explanation based on evidence for how the structure of DNA determines the structure of proteins which carry out the essential functions of life through systems of specialized cells.** [Assessment Boundary: Assessment does not include identification of specific cell or tissue types, whole body systems, specific protein structures and functions, or the biochemistry of protein synthesis.]

BI-LS1-2 **Develop and use a model to illustrate the hierarchical organization of interacting systems that provide specific functions within multicellular organisms.** [AR Clarification Statement: Emphasis is on functions at the organism system level such as nutrient uptake, water delivery, and organism movement in response to neural stimuli. This could include all types of multicellular organisms. An example of an interacting system could be an artery depending on the proper function of elastic tissue and smooth muscle to regulate and deliver the proper amount of blood within the circulatory system]. [Assessment Boundary: Assessment does not include interactions and functions at the molecular or chemical reaction level.]

BI-LS1-3 **Plan and conduct an investigation to provide evidence that feedback mechanisms maintain homeostasis.** [Clarification Statement: Examples of investigations could include heart rate response to exercise, stomate response to moisture and temperature, and root development in response to water levels.] [Assessment Boundary: Assessment does not include the cellular processes involved in the feedback mechanism.]

BI-LS1-6 **Construct and revise an explanation based on evidence for how carbon, hydrogen, and oxygen from sugar molecules may combine with other elements to form amino acids and/or other large carbon-based molecules.** [Clarification Statement: Emphasis is on using evidence from models and simulations to support explanations.] [Assessment Boundary: Assessment does not include the details of the specific chemical reactions or identification of macromolecules.]

The performance expectations above were developed using the following elements from the NRC document *A Framework for K-12 Science Education*:

Science and Engineering Practices	Disciplinary Core Ideas	Crosscutting Concepts
Developing and Using Models Modeling in 9–12 builds on K–8 experiences and progresses to using, synthesizing, and developing models to predict and show relationships among variables between systems and their components in the natural and designed worlds. ▪ Develop and use a model based on evidence to illustrate the relationships between systems or between components of a system. (BI-LS1-2) **Planning and Carrying Out Investigations** Planning and carrying out in 9-12 builds on K-8 experiences and progresses to include investigations that provide evidence for and test conceptual, mathematical, physical, and empirical models. ▪ Plan and conduct an investigation individually and collaboratively to produce data to serve as the basis for	**LS1.A: Structure and Function** ▪ Systems of specialized cells within organisms help them perform the essential functions of life. (BI-LS1-1) ▪ All cells contain genetic information in the form of DNA molecules. Genes are regions in the DNA that contain the instructions that code for the formation of proteins, which carry out most of the work of cells. (BI-LS1-1, BI-LS3-1) ▪ Multicellular organisms have a hierarchical structural organization, in which any one system is made up of numerous parts and is itself a component of the next level. (BI-LS1-2) ▪ Feedback mechanisms maintain a living system's internal conditions within certain limits and mediate behaviors, allowing it to remain alive and functional even as external conditions change within some	**Systems and System Models** ▪ Models (e.g., physical, mathematical, computer models) can be used to simulate systems and interactions—including energy, matter, and information flows—within and between systems at different scales. (BI-LS1-2), **Structure and Function** ▪ Investigating or designing new systems or structures requires a detailed examination of the properties of different materials, the structures of different components, and connections of components to reveal its

evidence, and in the design: decide on types, how much, and accuracy of data needed to produce reliable measurements and consider limitations on the precision of the data (e.g., number of trials, cost, risk, time), and refine the design accordingly. (BI-LS1-3) **Constructing Explanations and Designing Solutions** Constructing explanations and designing solutions in 9–12 builds on K–8 experiences and progresses to explanations and designs that are supported by multiple and independent student-generated sources of evidence consistent with scientific ideas, principles, and theories. ▪ Construct an explanation based on valid and reliable evidence obtained from a variety of sources (including students' own investigations, models, theories, simulations, peer review) and the assumption that theories and laws that describe the natural world operate today as they did in the past and will continue to do so in the future. (BI-LS1-1) ▪ Construct and revise an explanation based on valid and reliable evidence obtained from a variety of sources (including students' own investigations, models, theories, simulations, peer review) and the assumption that theories and laws that describe the natural world operate today as they did in the past and will continue to do so in the future. (BI-LS1-6) **---** **Connections to Nature of Science** **Scientific Investigations Use a Variety of Methods** ▪ Scientific inquiry is characterized by a common set of values that include: logical thinking, precision, open-mindedness, objectivity, skepticism, replicability of results, and honest and ethical reporting of findings. (BI-LS1-3)	range. Feedback mechanisms can encourage (through positive feedback) or discourage (negative feedback) what is going on inside the living system. (BI-LS1-3) **LS1.C: Organization for Matter and Energy Flow in Organisms** ▪ The sugar molecules thus formed contain carbon, hydrogen, and oxygen: their hydrocarbon backbones are used to make amino acids and other carbon-based molecules that can be assembled into larger molecules (proteins or DNA), used for example to form new cells. (BI-LS1-6) ▪ As matter and energy flow through different organizational levels of living systems, chemical elements are recombined in different ways to form different products. (BI-LS1-6)	function and/or solve a problem. (BI-LS1-1) **Stability and Change** ▪ Feedback (negative or positive) can stabilize or destabilize a system. (BI-LS1-3) **Energy and Matter** ▪ Changes of energy and matter in a system can be described in terms of energy and matter flows into, out of, and within that system. (BI-LS1-6)

Connections to other DCIs in this course: **BI.LS3.A** (BI-LS1-1); **BI.PS1.B** (BI-LS1-6)

Connections of DCIs across grade-bands: **6.LS1.A** (BI-LS1-1, BI-LS1-2, BI-LS1-3); **8.LS3.A** (BI-LS1-1); **6.LS3.B** (BI-LS1-1) **7.PS1.A** (BI-LS1-6); **7.PS1.B** (BI-LS1-6,); **6.PS3.D** (BI-LS1-6) **7.LS1.C** (BI-LS1-6)

Connections to the Arkansas Disciplinary Literacy Standards:	
RST.11-12.1	Cite specific textual evidence to support analysis of science and technical texts, attending to important distinctions the author makes and to any gaps or inconsistencies in the account. (BI-LS1-1, BI-LS1-6)
WHST.9-12.2	Write informative/explanatory texts, including the narration of historical events, scientific procedures/ experiments, or technical processes. (BI-LS1-1, BI-LS1-6)
WHST.9-12.5	Develop and strengthen writing as needed by planning, revising, editing, rewriting, or trying a new approach, focusing on addressing what is most significant for a specific purpose and audience. (BI-LS1-6)
WHST.9-12.7	Conduct short as well as more sustained research projects to answer a question (including a self-generated question) or solve a problem; narrow or broaden the inquiry when appropriate; synthesize multiple sources on the subject, demonstrating understanding of the subject under investigation. (BI-LS1-3)
WHST.9-12.9	Draw evidence from informational texts to support analysis, reflection, and research. (BI-LS1-1, BI-LS1-6)
WHST.11-12.8	Gather relevant information from multiple authoritative print and digital sources, using advanced searches effectively; assess the strengths and limitations of each source in terms of the specific task, purpose, and audience; integrate information into the text selectively to maintain the flow of ideas, avoiding plagiarism and overreliance on any one source and following a standard format for citation. (BI-LS1-3)
Connections to the Arkansas English Language Arts Standards:	
SL.11-12.5	Make strategic use of digital media (e.g., textual, graphical, auditory, visual, and interactive elements) in presentations to enhance understanding of findings, reasoning, and evidence and to add interest. (BI-LS1-2)
Connections to the Arkansas Mathematics Standards: N/A	

Topic 3: Biodiversity and Population Dynamics
Students who demonstrate understanding can: **BI-LS2-1** **Use mathematical and/or computational representations to support explanations of factors that affect carrying capacity of ecosystems at different scales.** [Clarification Statement: Emphasis is on quantitative analysis and comparison of the relationships among interdependent factors including boundaries, resources, climate, and competition. Examples of mathematical comparisons could include graphs, charts, histograms, and population changes gathered from simulations or historical data sets.] [Assessment Boundary: Assessment does not include deriving mathematical equations to make comparisons.] **BI-LS2-2** **Use mathematical representations to support and revise explanations based on evidence about factors affecting biodiversity and populations in ecosystems of different scales.** [Clarification Statement: Examples of mathematical representations include finding the average, determining trends, and using graphical comparisons of multiple sets of data.] [Assessment Boundary: Assessment is limited to provided data.] **BI-LS2-6** **Evaluate the claims, evidence, and reasoning that the complex interactions in ecosystems maintain relatively consistent numbers and types of organisms in stable conditions, but changing conditions may result in a new ecosystem.** [Clarification Statement: Examples of changes in ecosystem conditions could include modest biological or physical changes, such as moderate hunting or a seasonal flood; and extreme changes, such as volcanic eruption or sea level rise.] **BI-LS2-7** **Design, evaluate, and refine a solution for reducing the impacts of human activities on the environment and biodiversity.*** [AR Clarification Statement: This PE is fully addressed in this course. Emphasis is on the impact of human activities on biodiversity such as dissemination of invasive species, habitat degradation, and water quality.] [AR Assessment Boundary: Assessment is to include student choice from multiple scenarios.] **BI-LS2-8** **Evaluate the evidence for the role of group behavior on individual and species' chances to survive and reproduce.** [Clarification Statement: Emphasis is on: (1) distinguishing between group and individual behavior, (2) identifying evidence supporting the outcomes of group behavior, and (3) developing logical and reasonable arguments based on evidence. Examples of group behaviors could include flocking, schooling, herding, and cooperative behaviors such as hunting, migrating, and swarming.] **BI-LS4-6** **Create or revise a simulation to test a solution to mitigate adverse impacts of human activity on biodiversity.*** [AR Clarification Statement: Emphasis is on refining solutions for a proposed problem related to threatened or endangered species, genetic variation of organisms for multiple species, and biodiversity.] **BI3-ETS1-3** **Evaluate a solution to a complex real-world problem based on prioritized criteria and trade-offs that account for a range of constraints, including cost, safety, reliability, and aesthetics, as well as possible social, cultural, and environmental impacts**. [AR Clarification Statement: Problems could include effect of logging on animal or human populations, response to invasive species, agricultural practices, creating dams, and maintaining fish populations in public lakes.] **BI3-ETS1-4** **Use a computer simulation to model the impact of proposed solutions to a complex real-world problem with numerous criteria and constraints on interactions within and between systems relevant to the problem.** [AR Clarification Statement: Could include simulations of population dynamics, genetic drift, evolution, and migration.]
The performance expectations above were developed using the following elements from the NRC document *A Framework for K-12 Science Education*:

Science and Engineering Practices	Disciplinary Core Ideas	Crosscutting Concepts
Using Mathematics and Computational Thinking Mathematical and computational thinking in 9-12 builds on K-8 experiences and progresses to using algebraic thinking and analysis, a range of linear and nonlinear functions including trigonometric functions, exponentials and logarithms, and computational tools for statistical analysis to analyze, represent, and model data. Simple computational simulations are created and used based on mathematical models of basic assumptions. ▪ Use mathematical and/or computational representations of phenomena or design solutions to support explanations. (BI-LS2-1) ▪ Use mathematical representations of phenomena or design solutions to support and revise explanations. (BI-LS2-2) ▪ Create or revise a simulation of a phenomenon, designed device, process, or system. (BI-LS4-6) ▪ Use mathematical models and/or computer simulations to predict the effects of a design solution on systems and/or the interactions between systems. (BI3-ETS1-4) **Constructing Explanations and Designing Solutions** Constructing explanations and designing solutions in 9–12 builds on K–8 experiences and progresses to explanations and designs that are supported by multiple and independent student-generated sources of evidence consistent with scientific ideas, principles, and theories. ▪ Design, evaluate, and refine a solution to a complex real-world problem, based on scientific knowledge, student-generated sources of evidence, prioritized criteria, and tradeoff considerations. (BI-LS2-7)	**LS2.A: Interdependent Relationships in Ecosystems** ▪ Ecosystems have carrying capacities, which are limits to the numbers of organisms and populations they can support. These limits result from such factors as the availability of living and nonliving resources and from such challenges such as predation, competition, and disease. Organisms would have the capacity to produce populations of great size were it not for the fact that environments and resources are finite. This fundamental tension affects the abundance (number of individuals) of species in any given ecosystem. (BI-LS2-1, BI-LS2-2) **LS2.C: Ecosystem Dynamics, Functioning, and Resilience** ▪ A complex set of interactions within an ecosystem can keep its numbers and types of organisms relatively constant over long periods of time under stable conditions. If a modest biological or physical disturbance to an ecosystem occurs, it may return to its more or less original status (i.e., the ecosystem is resilient), as opposed to becoming a very different ecosystem. Extreme fluctuations in conditions or the size of any population, however, can challenge the functioning of ecosystems in terms of resources and habitat availability. (BI-LS2-2, BI-LS2-6) ▪ Moreover, anthropogenic changes (induced by human activity) in the environment—including habitat destruction, pollution, introduction of invasive species, overexploitation, and climate change—can disrupt an ecosystem and threaten the survival of some species. (BI-LS2-7) **LS4.C: Adaptation** ▪ Changes in the physical environment, whether naturally occurring or human induced, have thus contributed to the expansion of some species, the emergence of new distinct species as populations diverge under different conditions, and the decline–and sometimes the extinction–of some species. (BI-LS4-6)	**Cause and Effect** ▪ Empirical evidence is required to differentiate between cause and correlation and make claims about specific causes and effects. (BI-LS2-8, BI-LS4-6) **Scale, Proportion, and Quantity** ▪ The significance of a phenomenon is dependent on the scale, proportion, and quantity at which it occurs. (BI-LS2-1) ▪ Using the concept of orders of magnitude allows one to understand how a model at one scale relates to a model at another scale. (BI-LS2-2) **Stability and Change** ▪ Much of science deals with constructing explanations of how things change and how they remain stable. (BI-LS2-6, BI-LS2-7) **Systems and System Models** ▪ Models (e.g., physical, mathematical, computer models) can be used to simulate systems and interactions—including energy, matter, and information flows— within and between systems at different scales. (BI3-ETS1-4) --------------------------------------- **Connections to Engineering, Technology, and Applications of Science** **Influence of Science, Engineering, and Technology on Society and the Natural World** New technologies can have deep impacts on society and the environment, including

▪ Evaluate a solution to a complex real-world problem, based on scientific knowledge, student-generated sources of evidence, prioritized criteria, and tradeoff considerations. (BI3-ETS1-3) **Engaging in Argument from Evidence** Engaging in argument from evidence in 9–12 builds on K–8 experiences and progresses to using appropriate and sufficient evidence and scientific reasoning to defend and critique claims and explanations about the natural and designed world(s). Arguments may also come from current scientific or historical episodes in science. ▪ Evaluate the claims, evidence, and reasoning behind currently accepted explanations or solutions to determine the merits of arguments. (BI-LS2-6) ▪ Evaluate the evidence behind currently accepted explanations to determine the merits of arguments. (BI-LS2-8) --- **Connections to Nature of Science** **Scientific Knowledge is Open to Revision in Light of New Evidence** ▪ Scientific argumentation is a mode of logical discourse used to clarify the strength of relationships between ideas and evidence that may result in revision of an explanation. (BI-LS2-6, BI-LS2-8)	**LS2.D: Social Interactions and Group Behavior** ▪ Group behavior has evolved because membership can increase the chances of survival for individuals and their genetic relatives. (BI-LS2-8) **LS4.D: Biodiversity and Humans** ▪ Biodiversity is increased by the formation of new species (speciation) and decreased by the loss of species (extinction). (BI-LS2-7) ▪ Humans depend on the living world for the resources and other benefits provided by biodiversity. But human activity is also having adverse impacts on biodiversity through overpopulation, overexploitation, habitat destruction, pollution, introduction of invasive species, and climate change. Thus sustaining biodiversity so that ecosystem functioning and productivity are maintained is essential to supporting and enhancing life on Earth. Sustaining biodiversity also aids humanity by preserving landscapes of recreational or inspirational value. (BI-LS4-6, BI-LS2-7) **ETS1.B: Developing Possible Solutions** ▪ When evaluating solutions it is important to take into account a range of constraints including cost, safety, reliability and aesthetics and to consider social, cultural and environmental impacts. (BI3-ETS1-3, BI-LS2-7, BI-LS4-6) ▪ Both physical models and computers can be used in various ways to aid in the engineering design process. Computers are useful for a variety of purposes, such as running simulations to test different ways of solving a problem or to see which one is most efficient or economical; and in making a persuasive presentation to a client about how a given design will meet his or her needs. (BI3-ETS1-4, BI-LS4-6)	some that were not anticipated. Analysis of costs and benefits is a critical aspect of decisions about technology. (BI3-ETS1-3)

Connections to other DCIs in this course: **BI.ESS2.D** (BI-LS2-7, BI-LS4-6); **B.ESS3.A** (BI-LS2-2, BI-LS2-7, BI-LS4-6); **BI.ESS3.C** (BI-LS2-2, BI-LS2-7, BI-LS4-6); **BI.ESS3.D** (BI-LS2-2, BI-LS4-6)

Connections of DCIs across grade-bands: **6.LS1.B** (BI-LS2-8); 7**.LS2.A** (BI-LS2-1, BI-LS2-2, BI-LS2-6); **7.LS2.C** (BI-LS2-1, BI-LS2-2, BI-LS2-6, BI-LS2-7, BI-LS4-6); **6.ESS2.E** (BI-LS2-6); **6.ESS3.A** (BI-LS2-1); **6.ESS3.C** (BI-LS2-1, BI-LS2-2, B-LS2-6, BI-LS2-7, BI-LS4-6); **6.ESS3.D** (BI-LS2-7); **6-8.ETS1.A** (BI3-ETS1-3, BI-3-ETS1-4);
6-8.ETS1.B (BI3-ETS1-3, BI3-ETS1-4); **6-8.ETS1.C** (BI3-ETS1-4)

Connections to the Arkansas Disciplinary Literacy Standards:
RST.9-10.8 Assess the extent to which the reasoning and evidence in a text support the author's claim or a recommendation for solving a scientific or technical problem. (BI-LS2-6, BI-LS2-7, BI-LS2-8)

RST.11-12.1	Cite specific textual evidence to support analysis of science and technical texts, attending to important distinctions the author makes and to any gaps or inconsistencies in the account. (BI-LS2-1, BI-LS2-2, BI-LS2-6, BI-LS2-8)
RST.11-12.7	Integrate and evaluate multiple sources of information presented in diverse formats and media (e.g., quantitative data, video, multimedia) in order to address a question or solve a problem. (BI-LS2-6, BI-LS2-7, BI-LS2-8, BI3-ETS1-3)
RST.11-12.8	Evaluate the hypotheses, data, analysis, and conclusions in a science or technical text, verifying the data when possible and corroborating or challenging conclusions with other sources of information. (BI-LS2-6, BI-LS2-7, BI-LS2-8, BI3-ETS1-3)
RST.11-12.9	Synthesize information from a range of sources (e.g., texts, experiments, simulations) into a coherent understanding of a process, phenomenon, or concept, resolving conflicting information when possible. (BI3-ETS1-3)
WHST.9-12.2	Write informative/explanatory texts, including the narration of historical events, scientific procedures/ experiments, or technical processes. (BI-LS2-1, BI-LS2-2)
WHST.9-12.5	Develop and strengthen writing as needed by planning, revising, editing, rewriting, or trying a new approach, focusing on addressing what is most significant for a specific purpose and audience. (BI-LS4-6)
WHST.9-12.7	Conduct short as well as more sustained research projects to answer a question (including a self-generated question) or solve a problem; narrow or broaden the inquiry when appropriate; synthesize multiple sources on the subject, demonstrating understanding of the subject under investigation. (BI-LS2-7, BI-LS4-6)
Connections to the Arkansas Mathematics Standards:	
MP.2	Reason abstractly and quantitatively. (BI-LS2-1, BI-LS2-2, BI-LS2-6, BI-LS2-7, BI3-ETS1-4)
MP.4	Model with mathematics. (BI-LS2-1, BI-LS2-2, BI3-ETS1-4)
HSN.Q.A.1	Use units as a way to understand problems and to guide the solution of multi-step problems; choose and interpret units consistently in formulas; choose and interpret the scale and the origin in graphs and data displays. (BI-LS2-1, BI-LS2-2, BI-LS2-7)
HSN.Q.A.2	Define appropriate quantities for the purpose of descriptive modeling. (BI-LS2-1, BI-LS2-2, BI-LS2-7)
HSN.Q.A.3	Choose a level of accuracy appropriate to limitations on measurement when reporting quantities. (BI-LS2-1, BI-LS2-2, BI-LS2-7)
HSS.ID.A.1	Represent data with plots on the real number line. (BI-LS2-6)
HSS.IC.A.1	Recognize statistics as a process for making inferences about population parameters based on a random sample from that population. (BI-LS2-6)
HSS.IC.B.6	Read and explain, in context, the validity of data from outside reports by identifying the variables as quantitative or categorical, describing how the data was collected, indicating any potential biases or flaws, and identifying inferences the author of the report made from sample data. (BI-LS2-6)

Topic 4: Genetic Variations in Organisms

Students who demonstrate understanding can:

BI-LS1-4 Use a model to illustrate the role of cellular division (mitosis) and differentiation in producing and maintaining complex organisms. [Assessment Boundary: Assessment does not include specific gene control mechanisms or rote memorization of the steps of mitosis.]

BI-LS3-1 Ask questions to clarify relationships about the role of DNA and chromosomes in coding the instructions for characteristic traits passed from parents to offspring. [Assessment Boundary: Assessment does not include the phases of meiosis or the biochemical mechanism of specific steps in the process.]

BI-LS3-2 Make and defend a claim based on evidence that inheritable genetic variations may result from: (1) new genetic combinations through meiosis, (2) viable errors occurring during replication, and/or (3) mutations caused by environmental factors. [Clarification Statement: Emphasis is on using data to support arguments for the way variation occurs.] [Assessment Boundary: Assessment does not include the phases of meiosis or the biochemical mechanism of specific steps in the process.]

BI-LS3-3 Apply concepts of statistics and probability to explain the variation and distribution of expressed traits in a population. [Clarification Statement: Emphasis is on the use of mathematics to describe the probability of traits as it relates to genetic and environmental factors in the expression of traits.] [Assessment Boundary: Assessment does not include Hardy-Weinberg calculations.]

The performance expectations above were developed using the following elements from the NRC document *A Framework for K-12 Science Education*:

Science and Engineering Practices

Developing and Using Models

Modeling in 9–12 builds on K–8 experiences and progresses to using, synthesizing, and developing models to predict and show relationships among variables between systems and their components in the natural and designed worlds.

- Use a model based on evidence to illustrate the relationships between systems or between components of a system. (BI-LS1-4)

Asking Questions and Defining Problems

Asking questions and defining problems in 9-12 builds on K-8 experiences and progresses to formulating, refining, and evaluating empirically testable questions and design problems using models and simulations.

- Ask questions that arise from examining models or a theory to clarify relationships. (BI-LS3-1)

Analyzing and Interpreting Data

Analyzing data in 9-12 builds on K-8 experiences and progresses to introducing more detailed statistical analysis, the comparison of data sets for consistency, and the use of models to generate and analyze data.

Disciplinary Core Ideas

LS1.B: Growth and Development of Organisms

- In multicellular organisms individual cells grow and then divide via a process called mitosis, thereby allowing the organism to grow. The organism begins as a single cell (fertilized egg) that divides successively to produce many cells, with each parent cell passing identical genetic material (two variants of each chromosome pair) to both daughter cells. Cellular division and differentiation produce and maintain a complex organism, composed of systems of tissues and organs that work together to meet the needs of the whole organism. (BI-LS1-4)

LS1.A: Structure and Function

- All cells contain genetic information in the form of DNA molecules. Genes are regions in the DNA that contain the instructions that code for the formation of proteins. (BI-LS3-1, BI-LS1-1)

LS3.A: Inheritance of Traits

- Each chromosome consists of a single very long DNA molecule,

Crosscutting Concepts

Systems and System Models

- Models (e.g., physical, mathematical, computer models) can be used to simulate systems and interactions—including energy, matter, and information flows—within and between systems at different scales. (BI-LS1-4)

Cause and Effect

- Empirical evidence is required to differentiate between cause and correlation and make claims about specific causes and effects. (BI-LS3-1, BI-LS3-2)

Scale, Proportion, and Quantity

- Algebraic thinking is used to examine scientific data and predict the effect of a change in one variable on another (e.g., linear growth vs. exponential growth). (BI-LS3-3)

▪ Apply concepts of statistics and probability (including determining function fits to data, slope, intercept, and correlation coefficient for linear fits) to scientific and engineering questions and problems, using digital tools when feasible. (BI-LS3-3) **Engaging in Argument from Evidence** Engaging in argument from evidence in 9-12 builds on K-8 experiences and progresses to using appropriate and sufficient evidence and scientific reasoning to defend and critique claims and explanations about the natural and designed world(s). Arguments may also come from current scientific or historical episodes in science. ▪ Make and defend a claim based on evidence about the natural world that reflects scientific knowledge, and student-generated evidence. (BI-LS3-2)	and each gene on the chromosome is a particular segment of that DNA. The instructions for forming species' characteristics are carried in DNA. All cells in an organism have the same genetic content, but the genes used (expressed) by the cell may be regulated in different ways. Not all DNA codes for a protein; some segments of DNA are involved in regulatory or structural functions, and some have no as-yet known function. (BI-LS3-1) **LS3.B: Variation of Traits** ▪ In sexual reproduction, chromosomes can sometimes swap sections during the process of meiosis (cell division), thereby creating new genetic combinations and thus more genetic variation. Although DNA replication is tightly regulated and remarkably accurate, errors do occur and result in mutations, which are also a source of genetic variation. Environmental factors can also cause mutations in genes, and viable mutations are inherited. (BI-LS3-2) ▪ Environmental factors also affect expression of traits, and hence affect the probability of occurrences of traits in a population. Thus the variation and distribution of traits observed depends on both genetic and environmental factors. (BI-LS3-2, BI-LS3-3)	-- **Connections to Nature of Science** **Science is a Human Endeavor** ▪ Technological advances have influenced the progress of science and science has influenced advances in technology. (BI-LS3-3) ▪ Science and engineering are influenced by society and society is influenced by science and engineering. (BI-LS3-3)

Connections to other DCIs in this course: **BI.LS2.A** (BI-LS3-3); **BI.LS4.B** (BI-LS3-3); **BI.LS4.C** (BI-LS3-3)

Connections across grade-bands: **6.LS1.A** (BI-LS1-4); **6.LS1.B** (BI-LS1-4); **7.LS2.A** (BI-LS3-3); **8.LS3.A** (BI-LS1-4, BI-LS3-1, BI-LS3-2); **7.LS3.B** (BI-LS3-1,BI-LS3-2, BI-LS3-3); **BI.LS4.C** (BI-LS3-3)

Connections to the Arkansas Disciplinary Literacy Standards:

RST.11-12.1 Cite specific textual evidence to support analysis of science and technical texts, attending to important distinctions the author makes and to any gaps or inconsistencies in the account. (BI-LS3-1, BI-LS3-2)

RST.11-12.9 Synthesize information from a range of sources (e.g., texts, experiments, simulations) into a coherent understanding of a process, phenomenon, or concept, resolving conflicting information when possible. (BI-LS3-1)

WHST.9-12.1 Write arguments focused on *discipline-specific content.* (BI-LS3-2)

Connections to the Arkansas English Language Arts Standards:	
SL.11-12.5	Make strategic use of digital media (e.g., textual, graphical, auditory, visual, and interactive elements) in presentations to enhance understanding of findings, reasoning, and evidence and to add interest. (BI-LS1-4)
Connections to the Arkansas Mathematics Standards:	
MP.2	Reason abstractly and quantitatively. (BI-LS3-2, BI-LS3-3)
MP.4	Model with mathematics. (BI-LS1-4)
HSF.IF.C.7	Graph functions expressed symbolically and show key features of the graph, with and without and using technology; given linear and quadratic functions and, when applicable, show intercepts, maxima, and minima; graph square root, cube root, and piecewise-defined functions, including step functions and absolute value functions; graph polynomial functions, identifying zeros when suitable factorizations are available, and show end behavior; graph rational functions, identifying zeros and asymptotes when suitable factorizations are available, and showing end behavior; graph exponential and logarithmic functions, showing period, midline, and amplitude. (BI-LS1-4)
HSF.BF.A.1	Write a function that describes a relationship between two quantities; from a context, determine an explicit expressions, a recursive process, or steps for calculation; combine standard function types using arithmetic operations (e.g., given that f(x) and g(x) are functions developed from a context, find (f+g)(x), (f – g)(x), (fg)(x), (f/g)(x), and any combination thereof, given g(x)≠0. (BI-LS1-4)

Topic 5: Evolution by Natural Selection

Students who demonstrate understanding can:

BI-LS4-1 Communicate scientific information that common ancestry and biological evolution are supported by multiple lines of empirical evidence. [Clarification Statement: Emphasis is on a conceptual understanding of the role each line of evidence has relating to common ancestry and biological evolution. Examples of evidence could include similarities in DNA sequences, anatomical structures, and order of appearance of structures in embryological development.]

BI-LS4-2 Construct an explanation based on evidence that the process of evolution primarily results from four factors: (1) the potential for a species to increase in number, (2) the heritable genetic variation of individuals in a species due to mutation and sexual reproduction, (3) competition for limited resources, and (4) the proliferation of those organisms that are better able to survive and reproduce in the environment. [Clarification Statement: Emphasis is on using evidence to explain the influence each of the four factors has on number of organisms, behaviors, morphology, or physiology in terms of ability to compete for limited resources and subsequent survival of individuals and adaptation of species. Examples of evidence could include mathematical models such as simple distribution graphs and proportional reasoning.] [Assessment Boundary: Assessment does not include other mechanisms of evolution, such as genetic drift, gene flow through migration, and co-evolution.]

BI-LS4-3 Apply concepts of statistics and probability to support explanations that organisms with an advantageous heritable trait tend to increase in proportion to organisms lacking this trait. [Clarification Statement: Emphasis is on analyzing shifts in numerical distribution of traits and using these shifts as evidence to support explanations.] [Assessment Boundary: Assessment is limited to basic statistical and graphical analysis. Assessment does not include allele frequency calculations.]

BI-LS4-4 Construct an explanation based on evidence for how natural selection leads to adaptation of populations. [Clarification Statement: Emphasis is on using data to provide evidence for how specific biotic and abiotic differences in ecosystems (such as ranges of seasonal temperature, long-term climate change, acidity, light, geographic barriers, or evolution of other organisms) contribute to a change in gene frequency over time, leading to adaptation of populations.]

BI-LS4-5 Evaluate the evidence supporting claims that changes in environmental conditions may result in: (1) increases in the number of individuals of some species, (2) the emergence of new species over time, and (3) the extinction of other species. [Clarification Statement: Emphasis is on determining cause and effect relationships for how changes to the environment such as deforestation, fishing, application of fertilizers, drought, flood, and the rate of change of the environment affect distribution or disappearance of traits in species.]

BI-ESS2-7 Construct an argument based on evidence about the simultaneous coevolution of Earth's systems and life on Earth. [AR Clarification Statement: This PE is fully addressed in this course. Emphasis in the course is on developing a claim and evaluating and critiquing the evidence for simultaneous co-evolution. Emphasis is on the causes, effects, and feedback loops between the biosphere and Earth's other systems which continuously alters Earth's surface. Examples could include how photosynthetic life altered the atmosphere through the production of oxygen, which increased weathering rates and allowed for the evolution of animal life; how microbial life on land increased the formation of soil which allowed for the evolution of land plants; and how the evolution of corals created reefs which altered patterns of erosion and deposition along coastlines and provided habitats for the evolution of life forms.] [Assessment Boundary: Assessment does not include a comprehensive understanding of the mechanisms of how the biosphere interacts with all of Earth's other systems.]

The performance expectations above were developed using the following elements from the NRC document *A Framework for K-12 Science Education*:

Science and Engineering Practices	Disciplinary Core Ideas	Crosscutting Concepts
Analyzing and Interpreting Data Analyzing data in 9–12 builds on K–8 experiences and progresses to introducing more detailed statistical	**LS4.A: Evidence of Common Ancestry and Diversity** ▪ Genetic information provides evidence of evolution. DNA sequences vary	**Patterns** ▪ Different patterns may be observed at each of the scales at which

analysis, the comparison of data sets for consistency, and the use of models to generate and analyze data. ▪ Apply concepts of statistics and probability (including determining function fits to data, slope, intercept, and correlation coefficient for linear fits) to scientific and engineering questions and problems, using digital tools when feasible. (BI-LS4-3) **Constructing Explanations and Designing Solutions** Constructing explanations and designing solutions in 9–12 builds on K–8 experiences and progresses to explanations and designs that are supported by multiple and independent student-generated sources of evidence consistent with scientific ideas, principles, and theories. ▪ Construct an explanation based on valid and reliable evidence obtained from a variety of sources (including students' own investigations, models, theories, simulations, peer review) and the assumption that theories and laws that describe the natural world operate today as they did in the past and will continue to do so in the future. (BI-LS4-2, BI-LS4-4) **Engaging in Argument from Evidence** Engaging in argument from evidence in 9-12 builds on K-8 experiences and progresses to using appropriate and sufficient evidence and scientific reasoning to defend and critique claims and explanations about the natural and designed world(s). Arguments may also come from current or historical episodes in science. ▪ Evaluate the evidence behind currently accepted explanations or solutions to determine the merits of arguments. (BI-LS4-5) ▪ Construct an oral and written argument or counter-arguments based on data and evidence. (BI-ESS2-7) **Obtaining, Evaluating, and Communicating Information** Obtaining, evaluating, and communicating information in 9–12 builds on K–8 experiences and progresses to evaluating the validity and reliability of the claims, methods, and designs.	among species, but there are many overlaps; in fact, the ongoing branching that produces multiple lines of descent can be inferred by comparing the DNA sequences of different organisms. Such information is also derivable from the similarities and differences in amino acid sequences and from anatomical and embryological evidence. (BI-LS4-1) **LS4.B: Natural Selection** ▪ Natural selection occurs only if there is both (1) variation in the genetic information between organisms in a population and (2) variation in the expression of that genetic information—that is, trait variation—that leads to differences in performance among individuals. (BI-LS4-2, BI-LS4-3) ▪ The traits that positively affect survival are more likely to be reproduced, and thus are more common in the population. (BI-LS4-3) **LS4.C: Adaptation** ▪ Evolution is a consequence of the interaction of four factors: (1) the potential for a species to increase in number, (2) the genetic variation of individuals in a species due to mutation and sexual reproduction, (3) competition for an environment's limited supply of the resources that individuals need in order to survive and reproduce, and (4) the ensuing proliferation of those organisms that are better able to survive and reproduce in that environment. (BI-LS4-2) ▪ Natural selection leads to adaptation, that is, to a population dominated by organisms that are anatomically, behaviorally, and physiologically well suited to survive and reproduce in a specific environment. That is, the differential survival and reproduction of organisms in a population that have an advantageous heritable trait leads to an increase in the proportion of individuals in future generations that have the trait and to a decrease in the proportion of individuals that do not. (BI-LS4-3, BI-LS4-4) ▪ Adaptation also means that the distribution of traits in a population can change when conditions change. (BI-LS4-3)	a system is studied and can provide evidence for causality in explanations of phenomena. (BI-LS4-1, BI-LS4-3) **Cause and Effect** ▪ Empirical evidence is required to differentiate between cause and correlation and make claims about specific causes and effects. (BI-LS4-2, BI-LS4-4, BI-LS4-5) **Stability and Change** ▪ Much of science deals with constructing explanations of how things change and how they remain stable. (BI-ESS2-7) --------------------------------- **Connections to Nature of Science** **Scientific Knowledge Assumes an Order and Consistency in Natural Systems** ▪ Scientific knowledge is based on the assumption that natural laws operate today as they did in the past and they will continue to do so in the future. (BI-LS4-1, BI-LS4-4)

▪ Communicate scientific information (e.g., about phenomena and/or the process of development and the design and performance of a proposed process or system) in multiple formats (including orally, graphically, textually, and mathematically). (BI-LS4-1) -- **Connections to Nature of Science** **Science Models, Laws, Mechanisms, and Theories Explain Natural Phenomena** ▪ A scientific theory is a substantiated explanation of some aspect of the natural world, based on a body of facts that have been repeatedly confirmed through observation and experiment and the science community validates each theory before it is accepted. If new evidence is discovered that the theory does not accommodate, the theory is generally modified in light of this new evidence. (BI-LS4-1)	▪ Changes in the physical environment, whether naturally occurring or human induced, have thus contributed to the expansion of some species, the emergence of new distinct species as populations diverge under different conditions, and the decline–and sometimes the extinction–of some species. (BI-LS4-5) ▪ Species become extinct because they can no longer survive and reproduce in their altered environment. If members cannot adjust to change that is too fast or drastic, the opportunity for the species' evolution is lost. (BI-LS4-5) **ESS2.D: Weather and Climate** ▪ Gradual atmospheric changes were due to plants and other organisms that captured carbon dioxide and released oxygen. (BI-ESS2-7) **ESS2.E: Biogeology** ▪ The many dynamic and delicate feedbacks between the biosphere and other Earth systems cause a continual co-evolution of Earth's surface and the life that exists on it. (BI-ESS2-7)	

Connections to other DCIs in this course: **BI.LS2.A** (BI-LS4-2, BI-LS4-3, BI-LS4-4, BI-LS4-5, BI-ESS2-7); **BI.LS2.C** (BI-ESS2-7); **BI.LS2.D** (BI-LS4-2, BI-LS4-3, BI-LS4-4, BI-LS4-5); **BI.LS3.A** (BI-LS4-1); **BI.LS3.B** (BI-LS4-1, BI-LS4-2, BI-LS4-3, BI-LS4-5); **BI.LS4.A** (BI-ESS2-7); **BI.LS4.B** (BI-ESS2-7); **BI.LS4.C** (BI-ESS2-7); **BI.LS4.D** (B-ESS2-7); **BI.ESS3.A** (BI-LS4-2, BI-LS4-5)

Connections across grade-bands: **7.LS2.A** (BI-LS4-2, BI-LS4-3, BI-LS4-5, BI-ESS2-7); **7.LS2.C** (BI-LS4-5, BI-ESS2-7);**8.LS3.A** (BI-LS4-1); **6.LS3.B** (BI-LS4-1, BI-LS4-2, BI-LS4-3); **8.LS4.A** (BI-LS4-1, BI-ESS2-7); **8.LS4.B** (BI-LS4-2, BI-LS4-3, BI-LS4-4, BI-ESS2-7); **8.LS4.C** (BI-LS4-2, BI-LS4-3, BI-LS4-4, BI-LS4-5, BI-ESS2-7); **8.ESS1.C** (BI-LS4-1); **7.ESS2.A** (BI-ESS2-7); **6.ESS2.C** (BI-ESS2-7); **6.ESS3.C** (BI-LS4-5, BI-ESS2-7)

Connections to the Arkansas Disciplinary Literacy Standards:

RST.11-12.1 Cite specific textual evidence to support analysis of science and technical texts, attending to important distinctions the author makes and to any gaps or inconsistencies in the account. (BI-LS4-1, BI-LS4-2, BI-LS4-3, BI-LS4-4)

RST.11-12.8 Evaluate the hypotheses, data, analysis, and conclusions in a science or technical text, verifying the data when possible and corroborating or challenging conclusions with other sources of information. (BI-LS4-5)

WHST.9-12.1 Write arguments focused on *discipline-specific content.* (BI-ESS2-7)

WHST.9-12.2 Write informative/explanatory texts, including the narration of historical events, scientific procedures/ experiments, or technical processes. (BI-LS4-1), BI-LS4-2, BI-LS4-3, BI-LS4-4)

WHST.9-12.9 Draw evidence from informational texts to support analysis, reflection, and research. (BI-LS4-1, BI-LS4-2, BI-LS4-3, BI-LS4-4, BI-LS4-5)

Connections to the Arkansas English Language Arts Standards:

SL.11-12.4 Present information, findings, and supporting evidence, conveying a clear and distinct perspective, such that listeners can follow the line of reasoning, alternative or opposing perspectives are addressed, and the organization, development, substance, and style are appropriate to purpose, audience, and a range of formal and informal tasks. (BI-LS4-1, BI-LS4-2)

Connections to the Arkansas Mathematics Standards:	
MP.2	Reason abstractly and quantitatively. (BI-LS4-1, BI-LS4-2, BI-LS4-3, BI-LS4-4, BI-LS4-5)
MP.4	Model with mathematics. (BI-LS4-2)
HSS.IC.A.1	Recognize statistics as a process for making inferences about population parameters based on a random sample from that population.(BI-LS4-3)

Topic 6: Life and Earth's Systems		
Students who demonstrate understanding can: **BI-ESS2-2** **Analyze geoscience data to make the claim that one change to Earth's surface can create feedbacks that cause changes to other Earth systems.** [Clarification Statement: Examples could include climate feedbacks, such as how an increase in greenhouse gases causes a rise in global temperatures that melts glacial ice, which reduces the amount of sunlight reflected from Earth's surface, increasing surface temperatures and further reducing the amount of ice. Examples could also be taken from other system interactions, such as how the loss of ground vegetation causes an increase in water runoff and soil erosion; how dammed rivers increase groundwater recharge, decrease sediment transport, and increase coastal erosion; or how the loss of wetlands causes a decrease in local humidity that further reduces the wetland extent.] **BI-ESS2-4** **Use a model to describe how variations in the flow of energy into and out of Earth's systems result in changes in climate.** [Clarification Statement: Examples of the causes of climate change differ by timescale, over 1-10 years: large volcanic eruption, ocean circulation; 10-100s of years: changes in human activity, ocean circulation, solar output; 10-100s of thousands of years: changes to Earth's orbit and the orientation of its axis; and 10-100s of millions of years: long-term changes in atmospheric composition.] [Assessment Boundary: Assessment of the results of changes in climate is limited to changes in surface temperatures, precipitation patterns, glacial ice volumes, sea levels, and biosphere distribution.] **BI-ESS2-5** **Plan and conduct an investigation of the properties of water and its effects on Earth materials and surface processes.** [AR Clarification Statement: This PE is partially addressed in this course. Emphasis in this course is on the properties of water and the water cycle.] **BI-ESS3-5** **Analyze geoscience data and the results from global climate models to make an evidence-based forecast of the current rate of global or regional climate change and associated future impacts to Earth systems.** [AR Clarification Statement: Examples of evidence (precipitation and temperature) for both data and climate models and their associated impacts (sea level changes, glacial ice volumes, and atmosphere and ocean composition) could be found at National Oceanic and Atmospheric Administration, National Weather Service, and United States Geological Survey.] [Assessment Boundary: Assessment is limited to one example of a climate change and its associated impacts.] **BI6-ETS1-2** **Design a solution to a complex real-world problem by breaking it down into smaller, more manageable problems that can be solved through engineering.** [AR Clarification Statement: Proposed problems could include increases in pollution, greenhouse gases, water runoff and soil erosion, coastal erosion, and loss of wetlands.] **BI6-ETS1-3** **Evaluate a solution to a complex real-world problem based on prioritized criteria and trade-offs that account for a range of constraints, including cost, safety, reliability, and aesthetics, as well as possible social, cultural, and environmental impacts.** [AR Clarification Statement: The solutions could be designed by students or identified from scientific studies.]		
The performance expectations above were developed using the following elements from the NRC document *A Framework for K-12 Science Education*:		
Science and Engineering Practices	**Disciplinary Core Ideas**	**Crosscutting Concepts**
Developing and Using Models Modeling in 9–12 builds on K–8 experiences and progresses to using, synthesizing, and developing models to predict and show relationships among variables between systems and their	**ESS1.B: Earth and the Solar System** Cyclical changes in the shape of Earth's orbit around the sun, together with changes in the tilt of the planet's axis of rotation, both occurring over hundreds of thousands of years, have altered the intensity and distribution of sunlight falling on the earth. These phenomena cause a cycle of ice ages	**Cause and Effect** **Empirical evidence is** required to differentiate between cause and correlation and make claims about specific causes and effects. (BI-ESS2-4) **Structure and Function**

components in the natural and designed world(s). ▪ Use a model to provide mechanistic accounts of phenomena. (BI-ESS2-4) **Planning and Carrying Out Investigations** Planning and carrying out investigations in 9-12 builds on K-8 experiences and progresses to include investigations that provide evidence for and test conceptual, mathematical, physical, and empirical models. ▪ Plan and conduct an investigation individually and collaboratively to produce data to serve as the basis for evidence, and in the design: decide on types, how much, and accuracy of data needed to produce reliable measurements and consider limitations on the precision of the data (e.g., number of trials, cost, risk, time), and refine the design accordingly. (BI-ESS2-5) **Analyzing and Interpreting Data** Analyzing data in 9–12 builds on K–8 experiences and progresses to introducing more detailed statistical analysis, the comparison of data sets for consistency, and the use of models to generate and analyze data. ▪ Analyze data using tools, technologies, and/or models (e.g., computational, mathematical) in order to make valid and reliable scientific claims or determine an optimal design solution. (BI-ESS2-2) ▪ Analyze data using computational models in order to make valid and reliable scientific claims. (BI-ESS3-5) **Constructing Explanations and Designing Solutions** Constructing explanations and designing solutions in 9–12 builds on K–8 experiences and progresses to explanations and designs that are supported by multiple and independent student-generated	and other gradual climate changes. (BI-ESS2-4) **ESS2.A: Earth Materials and Systems** ▪ Earth's systems, being dynamic and interacting, cause feedback effects that can increase or decrease the original changes. (BI-ESS2-2) ▪ The geological record shows that changes to global and regional climate can be caused by interactions among changes in the sun's energy output or Earth's orbit, tectonic events, ocean circulation, volcanic activity, glaciers, vegetation, and human activities. These changes can occur on a variety of time scales from sudden (e.g., volcanic ash clouds) to intermediate (ice ages) to very long-term tectonic cycles. (BI-ESS2-4) **ESS2.C: The Roles of Water in Earth's Surface Processes** ▪ The abundance of liquid water on Earth's surface and its unique combination of physical and chemical properties are central to the planet's dynamics. These properties include water's exceptional capacity to absorb, store, and release large amounts of energy, transmit sunlight, expand upon freezing, dissolve and transport materials, and lower the viscosities and melting points of rocks. BI-ESS2-5) **ESS2.D: Weather and Climate** ▪ The foundation for Earth's global climate systems is the electromagnetic radiation from the sun, as well as its reflection, absorption, storage, and redistribution among the atmosphere, ocean, and land systems, and this energy's re-radiation into space. (BI-ESS2-2, BI-ESS2-4) ▪ Changes in the atmosphere due to human activity have increased carbon dioxide concentrations and thus affect climate. (BI-ESS2-4) **ESS3.D: Global Climate Change** ▪ Though the magnitudes of human impacts are greater than they have ever been, so too are human abilities to model, predict, and manage current and future impacts. (BI-ESS3-5)	▪ The functions and properties of natural and designed objects and systems can be inferred from their overall structure, the way their components are shaped and used, and the molecular substructures of its various materials. (BI-ESS2-5) **Stability and Change** ▪ Feedback (negative or positive) can stabilize or destabilize a system. (BI-ESS2-2) ▪ Change and rates of change can be quantified and modeled over very short or very long periods of time. Some system changes are irreversible. (BI-ESS3-5) -- **Connections to Engineering, Technology, and Applications of Science** **Influence of Engineering, Technology, and Science on Society and the Natural World** ▪ New technologies can have deep impacts on society and the environment, including some that were not anticipated. Analysis of costs and benefits is a critical aspect of decisions about technology. (BI-ESS2-2, BI6-ETS1-3)

sources of evidence consistent with scientific ideas, principles and theories. ▪ Design a solution to a complex real-world problem, based on scientific knowledge, student-generated sources of evidence, prioritized criteria, and tradeoff considerations. (BI6-ETS1-2) Evaluate a solution to a complex real-world problem, based on scientific knowledge, student-generated sources of evidence, prioritized criteria, and tradeoff considerations. (BI6-ETS1-3) **---** **Connections to Nature of Science** **Scientific Investigations Use a Variety of Methods** ▪ Science investigations use diverse methods and do not always use the same set of procedures to obtain data. (BI-ESS3-5) ▪ New technologies advance scientific knowledge. (BI-ESS3-5) **Scientific Knowledge is Based on Empirical Evidence** ▪ Science knowledge is based on empirical evidence. (BI-ESS3-5) ▪ Science arguments are strengthened by multiple lines of evidence supporting a single explanation. (BI-ESS2-4, BI-ESS3-5)	**ETS1.B: Developing Possible Solutions** ▪ When evaluating solutions, it is important to take into account a range of constraints, including cost, safety, reliability, and aesthetics, and to consider social, cultural, and environmental impacts. (BI6-ETS1-3) **ETS1.C: Optimizing the Design Solution** ▪ Criteria may need to be broken down into simpler ones that can be approached systematically, and decisions about the priority of certain criteria over others (trade-offs) may be needed. (BI6-ETS1-2)	

Connections to other DCIs in this course: **BI.LS1.C** (BI-ESS3-5); **BI.LS2.B** (BI-ESS2-2); **BI.LS2.C** (BI-ESS2-2, BI-ESS2-4); **BI.LS4.D** (BI-ESS2-2); **BI.ESS3.C** (BI-ESS2-2, BI-ESS2-4, BI-ESS2-5); **BI.ESS3.D** (BI-ESS2-2, BI-ESS2-4)

Connections of DCIs across grade-bands: **7.PS1.A** (BI-ESS2-5); **8.PS3.A** (BI-ESS2-4); **8.PS3.B** (BI-ESS2-4, BI-ESS3-5); **6.PS3.D** (BI-ESS2-2, BI-ESS2-4, BI-ESS3-5); **8.PS4.B** (BI-ESS2-2, BI-ESS2-4, BI-ESS2-5); **6.LS1.C** (BI-ESS2-4); **7.LS2.B** (BI-ESS2-2, BI-ESS2-4); **7.LS2.C** (BI-ESS2-2, BI-ESS2-4); **8.LS4.C** (BI-ESS2-2); **7.ESS2.A** (BI-ESS2-2, BI-ESS2-4, BI-ESS2-5, BI-ESS3-5); **7.ESS2.B** (BI-ESS2-2, BI-ESS2-4); **6.ESS2.C** (BI-ESS2-2, BI-ESS2-4, BI-ESS2-5); **6.ESS2.D** (BI-ESS2-2, BI-ESS2-4, BI-ESS2-5, BI-ESS3-5); **7.ESS3.B** (BI-ESS3-5); **6.ESS3.C** (BI-ESS2-2, BI-ESS2-4, BI-ESS3-5); **6.ESS3.D** (BI-ESS2-2, BI-ESS2-4, BI-ESS3-5); **6-8.ETS1.A** (BI6-ETS1-2, BI6-ETS1-3); **6-8.ETS1.B** (BI6-ETS1-2, BI6-ETS1-3); **6-8.ETS1.C** (BI6-ETS1-2)

Connections to the Arkansas Disciplinary Literacy Standards:

RST.11-12.1 Cite specific textual evidence to support analysis of science and technical texts, attending to important distinctions the author makes and to any gaps or inconsistencies in the account. (BI-ESS2-2, BI-ESS3-5)

RST.11-12.2 Determine the central ideas or conclusions of a text; summarize complex concepts, processes, or information presented in a text by paraphrasing them in simpler but still accurate terms. (BI-ESS2-2, BI-ESS3-5)

RST.11-12.7	Integrate and evaluate multiple sources of information presented in diverse formats and media (e.g., quantitative data, video, multimedia) in order to address a question or solve a problem. (BI-ESS3-5, BI6-ETS1-3)
RST.11-12.8	Evaluate the hypotheses, data, analysis, and conclusions in a science or technical text, verifying the data when possible and corroborating or challenging conclusions with other sources of information. (BI6-ETS1-3)
RST.11-12.9	Synthesize information from a range of sources (e.g., texts, experiments, simulations) into a coherent understanding of a process, phenomenon, or concept, resolving conflicting information when possible. (BI6-ETS1-3)
WHST.9-12.7	Conduct short as well as more sustained research projects to answer a question (including a self-generated question) or solve a problem; narrow or broaden the inquiry when appropriate; synthesize multiple sources on the subject, demonstrating understanding of the subject under investigation. (BI-ESS2-5)
Connections to the Arkansas English Language Arts Standards:	
SL.11-12.5	Make strategic use of digital media (e.g., textual, graphical, auditory, visual, and interactive elements) in presentations to enhance understanding of findings, reasoning, and evidence and to add interest. (BI-ESS2-4)
Connections to the Arkansas Mathematics Standards:	
MP.2	Reason abstractly and quantitatively. (BI-ESS2-2, BI-ESS2-4, BI-ESS3-5. BI6-ETS1-3)
MP.4	Model with mathematics. (BI-ESS2-4, BI6-ETS1-2, BI6-ETS1-3)
HSN.Q.A.1	Use units as a way to understand problems and to guide the solution of multi-step problems; choose and interpret units consistently in formulas; choose and interpret the scale and the origin in graphs and data displays. (BI-ESS2-2, BI-ESS2-4, BI-ESS3-5)
HSN.Q.A.2	Define appropriate quantities for the purpose of descriptive modeling. (BI-ESS2-4, BI-ESS3-5)
HSN.Q.A.3	Choose a level of accuracy appropriate to limitations on measurement when reporting quantities. (BI-ESS2-2, BI-ESS2-4, BI-ESS2-5, BI-ESS3-5)

Topic 7: Human Impacts on Earth's Systems
Students who demonstrate understanding can: **BI-ESS3-1 Construct an explanation based on evidence for how the availability of natural resources, occurrence of natural hazards, and changes in climate have influenced human activity.** [AR Clarification Statement: This PE is fully addressed in this course. Emphasis is on the way climate change has impacted human populations and how natural resources and natural hazards impact human societies. Examples of climate change results which affect populations or drive mass migrations could include changes to sea level, regional patterns of temperature and precipitation, and types of crops and livestock available. Examples of the dependence of human populations on technology to acquire natural resources and to avoid natural hazards could include damming rivers, natural gas fracking, thunderstorm sirens, and severe weather text alerts.] **BI-ESS3-2 Evaluate competing design solutions for developing, managing, and utilizing energy and mineral resources based on cost-benefit ratios.*** [AR Clarification Statement: This PE is fully addressed in this course. Emphasis in this course is on the designs of possible solutions. Emphasis is on the conservation, recycling, and reuse of resources (minerals and metals), and on minimizing impacts. Examples could include developing best practices for agricultural soil use, mining (coal, tar sands, and oil shales), and pumping (petroleum and natural gas).] **BI-ESS3-3 Create a computational simulation to illustrate the relationships among management of natural resources, the sustainability of human populations, and biodiversity.** [Clarification Statement: Examples of factors that affect the management of natural resources include costs of resource extraction and waste management, per-capita consumption, and the development of new technologies. Examples of factors that affect human sustainability include agricultural efficiency, levels of conservation, and urban planning.] [Assessment Boundary: Assessment for computational simulations is limited to using provided multi-parameter programs or constructing simplified spreadsheet calculations.] **BI-ESS3-4 Evaluate or refine a technological solution that reduces impacts of human activities on natural systems.*** [AR Clarification Statement: This PE is partially addressed in this course. Examples of data on the impacts of human activities could include the quantities and types of pollutants released, changes to biomass and species diversity, and changes in land surface (urban development, agriculture or livestock, and surface mining). Examples for limiting future impacts could range from local efforts (reducing, reusing, and recycling resources) to large-scale bioengineering design solutions (altering global temperatures by making large changes to the atmosphere or ocean).] **BI-ESS3-6 Use a computational representation to illustrate the relationships among Earth systems and how those relationships are being modified due to human activity**. [AR Clarification Statement: Examples of Earth systems to be considered are the hydrosphere, atmosphere, cryosphere, geosphere, and biosphere. Examples of far-reaching impacts related to human activity, include how increases in one or more atmospheric gasses (COx, NOx, Sox), and volatile organic compounds), and particulate matter could impact other Earth systems. For example, an increase in carbon dioxide results in an increase in photosynthetic biomass and ocean acidification with resulting impacts on marine populations.] [Assessment Boundary: Assessment does not include running computational representations but is limited to using the published results of scientific computational models.] **BI7-ETS1-1 Analyze a major global challenge to specify qualitative and quantitative criteria and constraints for solutions that account for societal needs and wants.** [AR Clarification Statement: Examples could include recycling, increased atmospheric carbon dioxide, ocean acidification, impacts on marine populations, increased wildfire occurrence, deforestation, and overfishing.] **BI7-ETS1-4 Use a computer simulation to model the impact of proposed solutions to a complex real-world problem with numerous criteria and constraints on interactions within and between systems relevant to the problem.** [AR Clarification Statement: Simulations could include management of natural resources for sustainable yields, agricultural efficiency to feed a growing world population, and urban planning to maximize green space.]

The performance expectations above were developed using the following elements from the NRC document *A Framework for K-12 Science Education*:

Science and Engineering Practices

Using Mathematics and Computational Thinking

Mathematical and computational thinking in 9-12 builds on K-8 experiences and progresses to using algebraic thinking and analysis, a range of linear and nonlinear functions including trigonometric functions, exponentials and logarithms, and computational tools for statistical analysis to analyze, represent, and model data. Simple computational simulations are created and used based on mathematical models of basic assumptions.

- Create a computational model or simulation of a phenomenon, designed device, process, or system. (BI-ESS3-3)
- Use a computational representation of phenomena or design solutions to describe and/or support claims and/or explanations. (BI-ESS3-6)
- Use mathematical models and/or computer simulations to predict the effects of a design solution on systems and/or the interactions between systems. (BI7-ETS1-4)

Constructing Explanations and Designing Solutions

Constructing explanations and designing solutions in 9–12 builds on K–8 experiences and progresses to explanations and designs that are supported by multiple and independent student-generated sources of evidence consistent with scientific knowledge, principles, and theories.

- Construct an explanation based on valid and reliable evidence obtained from a variety of sources (including students' own investigations, models, theories, simulations, peer review) and the assumption that theories and laws that describe the natural world operate today as they did in the past and will continue to do so in the future. (BI-ESS3-1)
- Design or refine a solution to a complex real-world problem, based on

Disciplinary Core Ideas

ESS2.D: Weather and Climate

- Current models predict that, although future regional climate changes will be complex and varied, average global temperatures will continue to rise. The outcomes predicted by global climate models strongly depend on the amounts of human-generated greenhouse gases added to the atmosphere each year and by the ways in which these gases are absorbed by the ocean and biosphere. (BI-ESS3-6)

ESS3.A: Natural Resources

- Resource availability has guided the development of human society. (BI-ESS3-1)
- All forms of energy production and other resource extraction have associated economic, social, environmental, and geopolitical costs and risks as well as benefits. New technologies and social regulations can change the balance of these factors. (BI-ESS3-2)

ESS3.B: Natural Hazards

- Natural hazards and other geologic events have shaped the course of human history; [they] have significantly altered the sizes of human populations and have driven human migrations. (BI-ESS3-1)

ESS3.C: Human Impacts on Earth Systems

- The sustainability of human societies and the biodiversity that supports them requires responsible management of natural resources. (B-ESS3-3)
- Scientists and engineers can make major contributions by developing technologies that produce less pollution and waste and that preclude ecosystem degradation. (BI-ESS3-4)

ESS3.D: Global Climate Change

- Through computer simulations and other studies, important discoveries are still being made about how the ocean, the atmosphere, and the

Crosscutting Concepts

Cause and Effect

- Empirical evidence is required to differentiate between cause and correlation and make claims about specific causes and effects. (BI-ESS3-1)

Systems and System Models

- When investigating or describing a system, the boundaries and initial conditions of the system need to be defined and their inputs and outputs analyzed and described using models. (BI-ESS3-6)
- Models (e.g., physical, mathematical, computer models) can be used to simulate systems and interactions—including energy, matter, and information flows— within and between systems at different scales. (BI7-ETS1-4)

Stability and Change

- Change and rates of change can be quantified and modeled over very short or very long periods of time. Some system changes are irreversible. (BI-ESS3-3)
- Feedback (negative or positive) can stabilize or destabilize a system. (BI-ESS3-4)

Connections to Engineering, Technology, and Applications of Science

Influence of Engineering, Technology, and Science

scientific knowledge, student-generated sources of evidence, prioritized criteria, and tradeoff considerations. (BI-ESS3-4)

Engaging in Argument from Evidence

Engaging in argument from evidence in 9–12 builds on K–8 experiences and progresses to using appropriate and sufficient evidence and scientific reasoning to defend and critique claims and explanations about natural and designed world(s). Arguments may also come from current scientific or historical episodes in science.

- Evaluate competing design solutions to a real-world problem based on scientific ideas and principles, empirical evidence, and logical arguments regarding relevant factors (e.g. economic, societal, environmental, ethical considerations). (BI-ESS3-2)

Asking Questions and Defining Problems

Asking questions and defining problems in 9–12 builds on K–8 experiences and progresses to formulating, refining, and evaluating empirically testable questions and design problems using models and simulations.

- Analyze complex real-world problems by specifying criteria and constraints for successful solutions. (BI7-ETS1-1)

biosphere interact and are modified in response to human activities. (BI-ESS3-6)

ETS1.A: Defining and Delimiting Engineering Problems

- Criteria and constraints also include satisfying any requirements set by society, such as taking issues of risk mitigation into account, and they should be quantified to the extent possible and stated in such a way that one can tell if a given design meets them. (BI7-ETS1-1)
- Humanity faces major global challenges today, such as the need for supplies of clean water and food or for energy sources that minimize pollution, which can be addressed through engineering. These global challenges also may have manifestations in local communities. (BI7-ETS1-1)

ETS1.B: Developing Possible Solutions

- When evaluating solutions, it is important to take into account a range of constraints, including cost, safety, reliability, and aesthetics, and to consider social, cultural, and environmental impacts. (BI-ESS3-2, BI-ESS3-4)
- Both physical models and computers can be used in various ways to aid in the engineering design process. Computers are useful for a variety of purposes, such as running simulations to test different ways of solving a problem or to see which one is most efficient or economical; and in making a persuasive presentation to a client about how a given design will meet his or her needs. (BI7-ETS1-4)

on Society and the Natural World

- Modern civilization depends on major technological systems. (BI-ESS3-1, BI-ESS3-3)
- Engineers continuously modify these technological systems by applying scientific knowledge and engineering design practices to increase benefits while decreasing costs and risks. (BI-ESS3-2, BI-ESS3-4)
- New technologies can have deep impacts on society and the environment, including some that were not anticipated. (BI-ESS3-3)
- Analysis of costs and benefits is a critical aspect of decisions about technology. (BI-ESS3-2)
- New technologies can have deep impacts on society and the environment, including some that were not anticipated. Analysis of costs and benefits is a critical aspect of decisions about technology. (BI7-ETS1-1)

Connections to Nature of Science

Science is a Human Endeavor

- Science is a result of human endeavors, imagination, and creativity. (BI-ESS3-3)

Science Addresses Questions About the Natural and Material World

- Science and technology may raise ethical issues for which science, by itself, does not provide

		answers and solutions. (BI-ESS3-2) ▪ Science knowledge indicates what can happen in natural systems—not what should happen. The latter involves ethics, values, and human decisions about the use of knowledge. (BI-ESS3-2) ▪ Many decisions are not made using science alone, but rely on social and cultural contexts to resolve issues. (BI-ESS3-2)

Connections to other DCIs in this course: **BI.LS2.A** (BI-ESS3-2, BI-ESS3-3); **BI.LS2.B** (BI-ESS3-2, BI-ESS3-3, BI-ESS3-6); **BI.LS2.C** (BI-ESS3-3, BI-ESS3-4, BI-ESS3-6); **BI.LS4.D** (BI-ESS3-2, BI-ESS3-3, BI-ESS3-4, BI-ESS3-6); **BI.ESS2.A** (BI-ESS3-2, BI-ESS3-3, BI-ESS3-6); **BI.ESS2.E** (BI-ESS3-3)

Connections of DCIs across grade-bands: **7.PS1.B** (BI-ESS3-3); **6.PS3.D** (BI-ESS3-2); **7.LS2.A** (BI-ESS3-1, BI-ESS3-2, BI-ESS3-3); **8.LS2.B** (BI-ESS3-2, BI-ESS3-3); **7.LS2.C** (BI-ESS3-3, BI-ESS3-4, BI-ESS3-6); **8.LS4.C** (BI-ESS3-3); **8.LS4.D** (BI-ESS3-1, BI-ESS3-2, BI-ESS3-3); **7.ESS2.A** (BI-ESS3-1, BI-ESS3-3, BI-ESS3-4, BI-ESS3-6); **6.ESS2.C** (BI-ESS3-6); **7.ESS3.A** (BI-ESS3-1, BI-ESS3-2, BI-ESS3-3); **6.ESS3.B** (BI-ESS3-1, BI-ESS3-4); **6.ESS3.C** (B-ESS3-2 B-ESS3-3, B-ESS3-4, B-ESS3-6); 6**.ESS3.D** (B-ESS3-4, B-ESS3-6) **6-8.ETS1.A** (BI7-ETS1-1, BI7-ETS1-4); **6-8.ETS1.B** (BI7-ETS1-4); **6-8.ETS1.C** (BI7-ETS1-4)

Connections to the Arkansas Disciplinary Literacy Standards:

RST.11-12.1 Cite specific textual evidence to support analysis of science and technical texts, attending to important distinctions the author makes and to any gaps or inconsistencies in the account. (BI-ESS3-1, BI-ESS3-2, BI-ESS3-4)

RST.11-12.7 Integrate and evaluate multiple sources of information presented in diverse formats and media (e.g., quantitative data, video, multimedia) in order to address a question or solve a problem. (BI7-ETS1-1)

RST.11-12.8 Evaluate the hypotheses, data, analysis, and conclusions in a science or technical text, verifying the data when possible and corroborating or challenging conclusions with other sources of information. (BI-ESS3-2, BI-ESS3-4, BI7-ETS1-1)

RST.11-12.9 Synthesize information from a range of sources (e.g., texts, experiments, simulations) into a coherent understanding of a process, phenomenon, or concept, resolving conflicting information when possible. (BI7-ETS1-1)

WHST.9-12.2 Write informative/explanatory texts, including the narration of historical events, scientific procedures/ experiments, or technical processes. (BI-ESS3-1)

Connections to the Arkansas Mathematics Standards:

MP.2 Reason abstractly and quantitatively. (BI-ESS3-1, BI-ESS3-2, BI-ESS3-3, BI-ESS3-4), BI-ESS3-6, BI7-ETS1-1)

MP.4 Model with mathematics. (BI-ESS3-3, BI-ESS3-6, BI7-ETS1-1)

HSN.Q.A.1 Use units as a way to understand problems and to guide the solution of multi-step problems; choose and interpret units consistently in formulas; choose and interpret the scale and the origin in graphs and data displays. (BI-ESS3-1, BI-ESS3-4, BI-ESS3-6)

HSN.Q.A.2 Define appropriate quantities for the purpose of descriptive modeling. (BI-ESS3-1, BI-ESS3-4, BI-ESS3-6)

HSN.Q.A.3 Choose a level of accuracy appropriate to limitations on measurement when reporting quantities. (BI-ESS3-1, BI-ESS3-4, BI-ESS3-6)

Contributors

The following educators contributed to the development of this course:

Susan Allison – Benton School District	Steven Long – Rogers School District
Angela Bassham – Salem School District	Brandon Lucius – Osceola School District
Allison Belcher – Little Rock School District	Matt Martin – Centerpoint School District
Debbie Bilyeu – Arkansas AIMS	Patti Meeks – Hamburg School District
Tami Blair – Texarkana School District	Melissa Miller – Farmington School District
Stephen Brodie – University of Arkansas at Fort Smith STEM Center	Jim Musser – Arkansas Tech University
Stephanie Brown – Quitman School District	Nanette Nichols – Wilbur D. Mills AR Education Cooperative
Sarah Croswell – Virtual Arkansas	John Nilz – North Little Rock School District
Tami Eggensperger – Cabot School District	Dennis Pevey – eSTEM Public Charter School
Jenna Gill – Siloam Springs School District	Tami Philyaw – Smackover – Norphlet School District
Douglas Hammon – Little Rock School District	Kathy Prophet – Springdale School District
Keith Harris – University of Arkansas at Little Rock Partnership for STEM Education	Carrie Shell – Highland School District
Lynne Hehr – University of Arkansas at Fayetteville STEM Center for Math and Science Education –	Will Squires – Caddo Hills School District
Leonda Holthoff – Star City School District	Eddie Tucker – Hamburg School District
Courtney Jones – Lincoln Consolidated School District	Jon White – Harding University
Rebecca Koelling – Highland School District	Andrew Williams – University of Arkansas at Monticello
Karen Ladd – Nettleton School District	Wendi J.W. Williams – Northwest Arkansas Community College
John Levy – North Arkansas College	Cathy Wissehr – University of Arkansas at Fayetteville

ARKANSAS

K-12 SCIENCE STANDARDS

EDUCATION FOR A NEW GENERATION

Chemistry

2016

Table of Contents

Notes:

1. Student Performance Expectations (PEs) may be taught in any sequence or grouping within a grade level. Several PEs are described as being “partially addressed in this course” because the same PE is revisited in a subsequent course during which that PE is fully addressed.
2. An asterisk (*) indicates an engineering connection to a practice, core idea, or crosscutting concept.
3. The Performance Expectation codes ending in AR indicate Arkansas-specific standards.
4. The Clarification Statements are examples and additional guidance for the instructor. AR indicates Arkansas-specific Clarification Statements.
5. The Assessment Boundaries delineate content that may be taught but not assessed in large-scale assessments. AR indicates Arkansas-specific Assessment Boundaries.
6. The section entitled “foundation boxes” is reproduced verbatim from *A Framework for K-12 Science Education: Practices, Crosscutting Concepts, and Core Ideas*. Integrated and reprinted with permission from the National Academy of Sciences.
7. The examples given (e.g.,) are suggestions for the instructor.
8. Throughout this document, connections are provided to the nature of science as defined by *A Framework for K-12 Science Education* (NRC 2012).
9. Throughout this document, connections are provided to Engineering, Technology, and Applications of Science as defined by *A Framework for K-12 Science Education* (NRC 2012).
10. Each set of PEs lists connections to other disciplinary core ideas (DCIs) within the Arkansas K-12 Science Standards and to the Arkansas English Language Arts Standards, Arkansas Disciplinary Literacy Standards, and the Arkansas Mathematics Standards.

Arkansas K-12 Science Standards Overview

The Arkansas K-12 Science Standards are based on *A Framework for K-12 Science Education* (NRC 2012) and are meant to reflect a new vision for science education. The following conceptual shifts reflect what is new about these science standards. The Arkansas K-12 Science Standards

- reflect science as it is practiced and experienced in the real world,
- build logically from Kindergarten through Grade 12,
- focus on deeper understanding as well as application of content,
- integrate practices, crosscutting concepts, and core ideas, and
- make explicit connections to literacy and math.

As part of teaching the *Arkansas K-12 Science Standards*, it will be important to instruct and guide students in adopting appropriate safety precautions for their student-directed science investigations. Reducing risk and preventing accidents in science classrooms begin with planning. There are four recommended steps in carrying out a hazard and risk assessment for any planned lab investigation.

1) Identify all hazards. Hazards may be physical, chemical, health, or environmental.
2) Evaluate the type of risk associated with each hazard.
3) Write the procedure and all necessary safety precautions in such a way as to eliminate or reduce the risk associated with each hazard.
4) Prepare for any emergency that might arise in spite of all of the required safety precautions.

According to Arkansas Code Annotated § 6-10-113 (2012) for eye protection, every student and teacher in public schools participating in any chemical or combined chemical-physical laboratories involving caustic or explosive chemicals or hot liquids or solids is required to wear industrial-quality eye protective devices (eye goggles) at all times while participating in science investigations.

The Arkansas K-12 Science Standards outline the knowledge and science and engineering practices that all students should learn by the end of high school. The standards are three-dimensional because each student performance expectation engages students at the nexus of the following three dimensions.

- Dimension 1 describes scientific and engineering practices.
- Dimension 2 describes crosscutting concepts, overarching science concepts that apply across science disciplines.
- Dimension 3 describe core ideas in the science disciplines.

The Science and Engineering Practices

The eight practices describe the major practices that scientists use to investigate, build models and theories of the world around them or engineers use as they build and design systems. The practices are essential for all students to learn and are as follows:

1. Asking questions (for science) and defining problems (for engineering)
2. Developing and using models
3. Planning and carrying out investigations
4. Analyzing and interpreting data
5. Using mathematics and computational thinking
6. Constructing explanations (for science) and designing solutions (for engineering)
7. Engaging in argument from evidence
8. Obtaining, evaluating, and communicating information

Crosscutting Concepts

The seven crosscutting concepts bridge disciplinary boundaries and unit core ideas throughout the fields of science and engineering. Their purpose is to help students deepen their understanding of the disciplinary core ideas, and develop a coherent, and scientifically based view of the world. The seven crosscutting concepts are as follows:
1. *Patterns.* Observed patterns of forms and events guide organization and classification, and they prompt questions about relationships and the factors that influence them.
2. *Cause and effect: Mechanism and explanation*. Events have causes, sometimes simple, sometimes multifaceted. A major activity of science is investigating and explaining causal relationships and the mechanisms by which they are mediated. Such mechanisms can then be tested across given contexts and used to predict and explain events in new contexts.
3. *Scale, proportion, and quantity.* In considering phenomena, it is critical to recognize what is relevant at different measures of size, time, and energy and to recognize how changes in scale, proportion, or quantity affect a system's structure or performance.
4. *Systems and system models.* Defining the system under study—specifying its boundaries and making explicit a model of that system—provides tools for understanding and testing ideas that are applicable throughout science and engineering.
5. *Energy and matter: Flows, cycles, and conservation.* Tracking fluxes of energy and matter into, out of, and within systems helps one understand the systems' possibilities and limitations.
6. *Structure and function.* The way in which an object or living thing is shaped and its substructure determine many of its properties and functions.
7. *Stability and change.* For natural and built systems alike, conditions of stability and determinants of rates of change or evolution of a system are critical elements of study.

Disciplinary Core Ideas

The Disciplinary Core Ideas describe the content that occurs at each grade or course. The Arkansas K-12 Science Standards focus on a limited number of core ideas in science and engineering both within and across the disciplines and is built on the notion of learning as a developmental progression. The Disciplinary Core Ideas are grouped into the following domains:

- Physical Science (PS)
- Life Science (LS)
- Earth and Space Science (ESS)
- Engineering, Technology and Applications of Science (ETS)

Connections to the Arkansas English Language Arts Standards

Evidence-based reasoning is the foundation of good scientific practice. The Arkansas K-12 Science Standards incorporate reasoning skills used in language arts to help students improve mastery and understanding in all three disciplines. The Arkansas K-8 Science Committee made every effort to align grade-by-grade with the English language arts (ELA) standards so concepts support what students are learning in their entire curriculum. Connections to specific ELA standards are listed for each student performance expectation, giving teachers a blueprint for building comprehensive cross-disciplinary lessons.
The intersections between Arkansas K-12 Science Standards and Arkansas ELA Standards teach students to analyze data, model concepts, and strategically use tools through productive talk and shared

activity. Reading in science requires an appreciation of the norms and conventions of the discipline of science, including understanding the nature of evidence used, an attention to precision and detail, and the capacity to make and assess intricate arguments, synthesize complex information, and follow detailed procedures and accounts of events and concepts. These practice-based standards help teachers foster a classroom culture where students think and reason together, connecting around the subject matter and core ideas.

Connections to the Arkansas Disciplinary Literacy Standards

Reading is critical to building knowledge in science. College and career ready reading in science requires an appreciation of the norms and conventions of each discipline, such as the kinds of evidence used in science; an understanding of domain-specific words and phrases; an attention to precise details; and the capacity to evaluate intricate arguments, synthesize complex information, and follow detailed descriptions of events and concepts. When reading scientific and technical texts, students need to be able to gain knowledge from challenging texts that often make extensive use of elaborate diagrams and data to convey information and illustrate concepts. Students must be able to read complex informational texts in science with independence and confidence because the vast majority of reading in college and workforce training programs will be sophisticated nonfiction.

For students, writing is a key means of asserting and defending claims, showing what they know about a science, and conveying what they have experienced, imagined, thought, and felt. To be college and career ready writers, students must take task, purpose, and audience into careful consideration, choosing words, information, structures, and formats deliberately. They need to be able to use technology strategically when creating, refining, and collaborating on writing. They have to become adept at gathering information, evaluating sources, and citing material accurately, reporting finds from their research and analysis of sources in a clear and cogent manner. They must have the flexibility, concentration, and fluency to produce high-quality first-draft text under a tight deadline and the capacity to revisit and make improvements to a piece of writing over multiple drafts when circumstances encourage or require it.

Connections to the Arkansas Mathematics Standards

Science is a quantitative discipline, so it is important for educators to ensure that students' science learning coheres well with their understanding of mathematics. To achieve this alignment, the Arkansas K-12 Science Committee made every effort to ensure that the mathematics standards do not outpace or misalign to the grade-by-grade science standards. Connections to specific math standards are listed for each student performance expectation, giving teachers a blueprint for building comprehensive cross-disciplinary lessons.

How to Read
Arkansas K-12 Science

Topic

An asterisk indicates an engineering connection to a practice or disciplinary core idea.

GRADE TWO

Interdependent Relationships in Ecosystems		
Students who demonstrate understanding can: **2-LS2-1 Plan and conduct an investigation to determine if plants need sunlight and water to grow.** [Assessment Boundary: Assessment is limited to testing one variab… **Student Performance Expectations (PEs)** **2-LS2-2 Develop a simple model that mimics the function o… eeds or pollinating plants.** * **2-LS4-1 Make observations of plants and animals to compa… fferent habitats.** [Clarification Statement: Emphasis is on the diversity of living things… …ssessment Boundary: Assessment does not include specific animal and plant names in specific habitats.]		
The performance expectations above were developed using the following elements from the NRC document *A Framework for K-12 Science Education*:		
Science and Engineering Practices	**Disciplinary Core Ideas**	**Crosscutting Concepts**
Developing and Using Models Modeling in K–2 builds on prior experiences and progresses to include using and developing models (i.e., diagram, drawing, physical replica, diorama, dramatization, or storyboard) that represent concrete events or design solutions. ▪ Develop a simple model based on evidence to represent a proposed object or tool. (2-LS2-2) **Planning and Carrying Out Investigations** Planning and carrying out investigations to answer questions or test solutions to problems in K–2 builds on prior experiences and progresses to simple investigations, based on fair tests, which provide data to support explanations or design solutions. ▪ Plan and conduct an investig… collaboratively to produce da… as the basis for evidence to a… question. (2-LS2-1) ▪ Make observations (firsthand or from media) to collect data that can be used to make comparisons. (2-LS4-1) **Designates which PE uses this practice** --- **Connections to Nature of Science** **Scientific Knowledge is Based on Empirical Evidence** ▪ Scientists look for patterns and order when making observations about the world. (2-LS4-1)	**LS2.A: Interdependent Relationships in Ecosystems** ▪ Plants depend on water and light to grow. (2-LS2-1) ▪ Plants depend on animals for pollination or to move their seeds around. (2-LS2-2) **LS4.D: Biodiversity and Humans** ▪ There are many different kinds of living things in any area, and they exist in different places on land and in water. (2-LS4-1) **ETS1.B: Developing Possible Solutions** ▪ Designs can be conveyed through sketches, drawings, or physical models. These representations are useful in communicating ideas for a problem's solutions to other people. (2-LS2-2) ▪ **Designates which PE incorporates this disciplinary core idea (DCI)** **Connections to the Nature of Science**	**Cause and Effect** ▪ Events have causes that generate observable patterns. (2-LS2-1) **Structure and Function** ▪ The shape and stability of structures of natural and designed objects are related to their function(s). (2-LS2-2) **Designates which PE incorporates this crosscutting concept (CC)** **DCI codes from *A Framework for K-12 Science Education* in boldface type.**
Connections to other DCIs in second grade: N/A		
Connections to other DCIs across grade levels: **K.LS1.C** (2-LS2-1); **K-ESS3.A** (2-LS2-1); **K-2.ETS1.A** (2-LS2-2); **3.LS4.C** (2-LS4-1); **3.LS4.D** (2-LS4-1); **5.LS1.C** (2-LS2-1); **5.LS2.A** (2-LS2-2, 2-LS4-1)		

Connections to the Arkansas English Language Arts and Mathematics Standards are often found by scrolling to the next page

Chemistry Learning Progression Chart

Topic 1: Structure of Matter	Topic 2: Properties of Matter	Topic 3: Reactions	Topic 4: Kinetics and Kinetic Molecular Theory	Topic 5: Thermo-chemistry	Topic 6: Equilibrium	Topic 7: Organic Chemistry
AR C1-PS1-1 C-PS1-1AR C-PS1-2AR C-PS1-3AR C-PS1-4AR AR C-PS1-8 AR C-PS4-3 AR C1-ETS1-3	AR C2-PS1-1 AR C-PS1-3 C-PS2-1AR C-PS2-2AR C-PS2-3AR C-PS2-4AR	AR C-PS1-2 AR C-PS1-7 C-PS3-1AR C-PS3-2AR C-PS3-3AR AR C3-ETS1-3	AR C-PS1-5 C-PS4-1AR C-PS4-2AR AR C4-ETS1-4	AR C-PS1-4 C-PS5-1AR C-PS5-2AR AR C5-ETS1-4	AR C-PS1-6 C-PS6-1AR AR C6-ETS1-2	C-7-1AR C-7-2AR AR C7-ETS1-1

Arkansas Clarification Statements (AR)
Arkansas Performance Expectations (AR)

Chemistry Course Overview

Chemistry is a science course that builds upon students' understanding of the core ideas, science and engineering practices, and crosscutting concepts in the chemistry - integrated course. Candidates for this course are students who have completed chemistry - integrated and are seeking a deeper understanding of chemistry concepts. Teachers with a chemistry, physical science, physical/Earth, or other license as approved by ADE are able to teach this course. Students will earn 1 career focus credit.

There are seven topics in chemistry: (1) Structure of Matter, (2) Properties of Matter, (3) Reactions, (4) Kinetics and Kinetic Molecular Theory, (5) Thermochemistry, (6) Equilibrium, and (7) Organic Chemistry.

It should be noted that the chemistry standards are not intended to be used as curriculum. Instead, the standards are the minimum that students should know and be able to do. Therefore, teachers should continue to differentiate for the needs of their students by adding depth and additional rigor.

Students in chemistry also continue their ability to develop possible solutions for major global problems with engineering design challenges. At the high school level, students are expected to engage with major global issues at the interface of science, technology, society and the environment, and to bring to light the kinds of analytical and strategic thinking that prior training and increased maturity make possible. As in prior levels, these capabilities can be thought of in three stages:

- **Defining the problem** at the high school level requires both qualitative and quantitative analysis. For example, the need to provide food and fresh water for future generations comes into sharp focus when considering the speed at which world population is growing and conditions in countries that have experienced famine. While high school students are not expected to solve these challenges, they are expected to begin thinking about them as problems that can be addressed, at least in part, through engineering.
- **Developing possible solutions** for major global problems begins by breaking them down into smaller problems that can be tackled with engineering methods. To evaluate potential solutions, students are expected to not only consider a wide range of criteria but to also recognize that criteria needs to be prioritized. For example, public safety or environmental protection may be more important than cost or even functionality. Decisions on priorities can then guide tradeoff choices.
- **Improving designs** at the high school level may involve sophisticated methods, such as using computer simulations to model proposed solutions. Students are expected to use such methods to take into account a range of criteria and constraints, anticipate possible societal and environmental impacts, and test the validity of their simulations by comparison to the real world.

Chemistry Topics Overview

The performance expectations in **Topic 1: Structure of Matter** help students formulate an answer to the questions:
• What is the relationship between the structure and properties of matter?
• How do nuclear reactions differ from chemical reactions?
• How do electromagnetic radiation and matter interact?

Students use models to predict the substructure of atoms and provide more mechanistic explanations of the properties of substances. Students use patterns within the periodic table as a tool to explain and predict the properties of elements. Students use models of electromagnetic radiation to explore quantum mechanics. Students develop and use models of nuclear processes.

The performance expectations in **Topic 2: Properties of Matter** help students formulate an answer to the questions:
• How does the structure of matter determine its properties?
• How is matter characterized and identified?
• How is the mole concept used to quantify matter?

Students model the formation of bonds in compounds. Students identify and characterize various substances using formulas and nomenclature. Students use Coulomb's Law to describe and predict electrostatic forces between particles. Students quantify matter through the application of the mole concept.

The performance expectations in **Topic 3: Reactions** help students formulate an answer to the questions:
• How do substances combine or change (react) to make new substances?
• How are patterns used to predict chemical reactions?
• How are the mole concept and stoichiometry used to quantify matter in chemical reactions?

Students predict products of chemical reactions based on the rearrangements of atoms. Stoichiometry is used to determine quantities of reactants and products. Students use graphical models to explain energy changes.

The performance expectations in **Topic 4: Kinetics and Kinetic Molecular Theory** help students formulate an answer to the questions:
• How does collision theory explain the reactivity of matter?
• How does the kinetic molecular theory explain gas laws?

Students explain changes in the rate of reactions as temperature or concentration is changed. Students model particle response to changing variables based on gas laws and make predictions from data. In addition, students apply knowledge of reactions and solution stoichiometry to gaseous reactions and gas stoichiometry.

The performance expectations in **Topic 5: Thermochemistry** help students formulate an answer to the questions:
• How can energy transferred in a system be described in terms of changes in total bond energy?
• How does catalysis affect a chemical reaction?

Energy is understood as a quantitative property of a system. The total change of energy in any system is always equal to the total energy transferred into or out of the system. Energy stored in bonds is used to explain the change in energy of a reaction. Students explain changes in energy, the role of activation energy, and the effect of a catalyst.

The performance expectations in **Topic 6: Equilibrium** help students formulate an answer to the questions:
• How can the relationship between a reaction and the reverse reaction be described?
• How is Le Chatelier's principle used to predict changes in a reversible reaction?

Students describe chemical reactions as reversible processes. In addition, students describe the effects of changing concentration, pressure, or temperature on the equilibrium of the system.

The performance expectations in **Topic 7: Organic Chemistry** help students formulate an answer to the question:
• How can patterns in chemical structure be used to identify organic compounds?

Students examine and identify different organic compounds through nomenclature of simple structures. Students identify various organic functional groups. The importance and widespread use of organics in both industrial and biological systems are described.

Topic 1: Structure of Matter

Students who demonstrate understanding can:

C1-PS1-1 **Use the periodic table as a model to predict the relative properties of elements based on the patterns of electrons in the outermost energy level of atoms.** [AR Clarification Statement: Examples of properties predicted from patterns could include atomic radius, ionization energy, and electronegativity.]

C-PS1-1AR **Obtain, evaluate, and communicate information on the evolution of atomic models over time.** [Clarification Statement: Examples of models could include solid particle, plum pudding, planetary, and quantum mechanical).]

C-PS1-2AR **Obtain, evaluate, and communicate information using Coulomb's law to describe and predict patterns of electrostatic forces between particles.** [Clarification Statement: Emphasis is on both quantitative and conceptual descriptions of electrical fields based on periodic trends.]

C-PS1-3AR **Use mathematical representations and computational thinking to support a claim that patterns exist among the frequency, wavelength, and speed of waves**. [Clarification Statement: Emphasis is on quantitative calculations.]

C-PS1-4AR **Analyze and interpret data of absorption and emission of energy in the form of electromagnetic radiation and models of the atom**. [Clarification Statement: Emphasis is on photons provide information about the energy and location of the electrons. Models include the Bohr model and Quantum Mechanical model. Examples of investigations could include flame tests and analysis of atomic line spectra.]

C-PS4-3 **Evaluate the claims, evidence, and reasoning behind the idea that electromagnetic radiation can be described either by a wave model or a particle model, and that for some situations one model is more useful than the other.** [AR Clarification Statement: Emphasis is on the particle-wave nature of light and electrons to understand the quantum model of the atom, including quantum numbers and the photoelectric effect.]

C-PS1-8 **Develop models to illustrate the changes in the composition of the nucleus of the atom and the energy released during the processes of fission, fusion, and radioactive decay.** [AR Clarification Statement: Emphasis is on quantitative models of nuclear processes including balancing nuclear equations, determining the rate of radioactive decay, and practical applications of nuclear energy and nuclear medicine).]

C1-ETS1-3 **Evaluate a solution to a complex real-world problem based on prioritized criteria and tradeoffs that account for a range of constraints, including cost, safety, reliability, and aesthetics, as well as possible social, cultural, and environmental impacts.** [AR Clarification Statement: Examples could include alternative energy such as nuclear, wind, and solar.]

The performance expectations above were developed using the following elements from the NRC document *A Framework for K-12 Science Education*:

Science and Engineering Practices	Disciplinary Core Ideas	Crosscutting Concepts
Developing and Using Models Modeling in 9–12 builds on K–8 and progresses to using, synthesizing, and developing models to predict and show relationships among variables between systems and their components in the natural and designed worlds. ▪ Use a model to predict the relationships between systems or between components of a system.	**PS1.A: Structure and Properties of Matter** ▪ Each atom has a charged substructure consisting of a nucleus, which is made of protons and neutrons, surrounded by electrons. (C1-PS1-1, C-PS1-1AR) ▪ The periodic table orders elements horizontally by the	**Patterns** ▪ Empirical evidence is needed to identify patterns. (C1-PS1-1, C-PS1-1AR, C-PS1-2AR, C-PS1-3AR) ▪ Different patterns may be observed at each of the scales at which a system is studied and can provide

(C1-PS1-1, C-PS1-8)

Using Mathematics and Computational Thinking

Mathematical and computational thinking at the 9–12 level builds on K–8 and progresses to using algebraic thinking and analysis, a range of linear and nonlinear functions including trigonometric functions, exponentials and logarithms, and computational tools for statistical analysis to analyze, represent, and model data. Simple computational simulations are created and used based on mathematical models of basic assumptions.

Use mathematical representations of phenomena to support claims. (C-PS1-3AR)

Obtaining, Evaluating, and Communicating Information

Obtaining, evaluating, and communicating information in 9–12 builds on K–8 and progresses to evaluating the validity and reliability of the claims, methods, and designs.

- Evaluate the validity and reliability of multiple claims that appear in scientific and technical texts or media reports, verifying the data when possible. (C-PS1-1AR, C-PS1-2AR, C-PS4-3)
- Communicate technical information or ideas (e.g. about phenomena and/or the process of development and the design and performance of a proposed process or system) in multiple formats (including orally, graphically, textually, and mathematically). (C-PS1-1AR, C-PS1-2AR, C-PS4-3)

Analyzing and Interpreting Data

Analyzing data in 9–12 builds on K–8 and progresses to introducing more detailed statistical analysis, the comparison of data sets for consistency, and the use of models to generate and analyze data.

- Analyze data using tools, technologies, and/or models (e.g., computational, mathematical) in order to make valid and reliable

number of protons in the atom's nucleus and places those with similar chemical properties in columns. The repeating patterns of this table reflect patterns of outer electron states. (C1-PS1-1)

- The structure and interactions of matter at the bulk scale are determined by electrical forces within and between atoms. (C1-PS1-1, C-PS1-1AR)

PS1.C: Nuclear Processes

- Nuclear processes, including fusion, fission, and radioactive decays of unstable nuclei, involve release or absorption of energy. The total number of neutrons plus protons does not change in any nuclear process. (C-PS1-8)

PS2.B: Types of Interactions

- Attraction and repulsion between electric charges at the atomic scale explain the structure, properties, and transformations of matter, as well as the contact forces between material objects. (C1-PS1-1)

PS4.A: Wave Properties

- The wavelength and frequency of a wave are related to one another by the speed of travel of the wave, which depends on the type of wave and the medium through which it is passing. (C-PS1-3AR)

PS4.B Electromagnetic Radiation

Atoms of each element emit and absorb characteristic frequencies of light. These characteristics allow identification of the presence of an element, even in microscopic quantities. (C-PS1-4AR)

- Electromagnetic radiation (e.g., radio, microwaves, light) can be modeled as a wave of changing electric and magnetic fields or as particles called photons. The wave model is useful for

evidence for causality in explanations of phenomena. (C1-PS1-1, C-PS1-1AR, C-PS1-2AR, C-PS1-3AR)

Systems and System Models

- When investigating or describing a system, the boundaries and initial conditions of the system need to be defined and their inputs and outputs analyzed and described using models. (C-PS1-4AR, C-PS4-3) Models can be used to predict the behavior of a system, but these predictions have limited precision and reliability due to the assumptions and approximations inherent in models. (C-PS1-4AR, C-PS4-3)

Energy and Matter

- The total amount of energy and matter in closed systems is conserved. (C-PS1-4AR)
- Changes of energy and matter in a system can be described in terms of energy and matter flows into, out of, and within that system. (C-PS1-4AR)
- Energy cannot be created or destroyed—it only moves between one place and another place, between objects and/or fields, or between systems. (C-PS1-4AR)

Scale, Proportion, and Quantity

- The significance of a phenomenon is dependent on the scale, proportion, and quantity at which it occurs. (C-PS1-8)

Connections to Engineering, Technology, and Applications of Science

scientific claims or determine an optimal design solution. (C-PS1-4AR)	explaining many features of electromagnetic radiation, and the particle model explains other features. (C-PS4-3) **ETS1.B: Developing Possible Solutions** When evaluating solutions it is important to take into account a range of constraints including cost, safety, reliability and aesthetics and to consider social, cultural and environmental impacts. (C1-ETS1-3)	**Influence of Science, Engineering, and Technology on Society and the Natural World** ▪ Modern civilization depends on major technological systems. Engineers continuously modify these technological systems by applying scientific knowledge and engineering design practices to increase benefits while decreasing costs and risks. (C1-ETS1-3) ▪ New technologies can have deep impacts on society and the environment, including some that were not anticipated. Analysis of costs and benefits is a critical aspect of decisions about technology. (C1-ETS1-3) **-----------------------------------** **Connections to Nature of Science** **Scientific Knowledge Assumes an Order and Consistency in Natural Systems** ▪ Science assumes the universe is a vast single system in which basic laws are consistent. (C-PS4-3)

Connections to the Arkansas Disciplinary Literacy Standards:

RST.9-10.8	Assess the extent to which the reasoning and evidence in a text support the author's claim or a recommendation for solving a scientific or technical problem. ()
RST.11-12.1	Cite specific textual evidence to support analysis of science and technical texts, attending to important distinctions the author makes and to any gaps or inconsistencies in the account. *()*
RST.11-12.7	Integrate and evaluate multiple sources of information presented in diverse formats and media (e.g., quantitative data, video, multimedia) in order to address a question or solve a problem. *()*
RST.11-12.8	Evaluate the hypotheses, data, analysis, and conclusions in a science or technical text, verifying the data when possible and corroborating or challenging conclusions with other sources of information. ()
WHST.9-12.2	Write informative/explanatory texts, including the narration of historical events, scientific procedures/ experiments, or technical processes. *()*
WHST.11-12.8	Gather relevant information from multiple authoritative print and digital sources, using advanced searches effectively; assess the strengths and limitations of each source in terms of the specific task, purpose, and audience; integrate information into the text selectively to maintain the flow

of ideas, avoiding plagiarism and overreliance on any one source and following a standard format for citation. ()

Connections to the Arkansas English Language Arts Standards:

Connections to the Arkansas Mathematics Standards:

MP.2 Reason abstractly and quantitatively. (*)*

MP.4 Model with mathematics. (

HSA-SSE.A.1 Interpret expressions that represent a quantity in terms of its context. (*)*

HSA-SSE.B.3 Choose and produce an equivalent form of an expression to reveal and explain properties of the quantity represented by the expression. *()*

HSA.CED.A.4 Rearrange formulas to highlight a quantity of interest, using the same reasoning as in solving equations. *()*

Topic 2: Properties of Matter

Students who demonstrate understanding can:

C2-PS1-1 Use the periodic table as a model to predict the relative properties of elements based on the patterns of electrons in the outermost energy level of atoms. [AR Clarification Statement: Emphasis is on types of bonds (ionic, covalent, metallic) formed and numbers of bonds.]

C-PS1-3 Plan and conduct an investigation to gather evidence to compare the structure of substances at the bulk scale to infer the strength of electrical forces between particles. [AR Clarification Statement: Emphasis is on understanding the strengths of forces between particles, including identifying and naming specific intermolecular forces. Emphasis is on Coulomb's law]

C-PS2-1AR Develop and use models to explain the differences between chemical compounds using patterns as a method for identification. [Clarification Statement: Emphasis is on nomenclature and formula writing based on the type of compound (ionic, binary molecular, acids). Ionic compounds could include polyatomic ions.]

C-PS2-2AR Use mathematics and computational thinking to apply Coulomb's law to determine scale, proportion, and quantity of forces between particles. [Clarification Statement: Emphasis is on intermolecular forces in binary compounds using hydrogen bonding, dipole-dipole, and London dispersion.]

C-PS2-3AR Use mathematical representations to quantify matter through the analysis of patterns in chemical compounds. [Clarification Statement: Emphasis is on the mole concept, empirical formula, molecular formula, percent composition, and law of constant composition.]

C-PS2-4AR Develop and use a model of two particles interacting through electric fields to illustrate forces between particles and the changes in energy due to the interaction. [Clarification Statement: Examples of models could include drawings and diagrams (Lewis structures or other types of dot diagrams).]

C2-ETS1-2

Design a solution to a complex real-world problem by breaking it down into smaller, more manageable problems that can be solved through engineering. [AR Clarification Statement: Examples could include designing a method to test properties of solutions (conductivity, pH, turbidity) or a method to separate mixtures.]

The performance expectations above were developed using the following elements from the NRC document *A Framework for K-12 Science Education*:

Science and Engineering Practices	Disciplinary Core Ideas	Crosscutting Concepts
Developing and Using Models Modeling in 9–12 builds on K–8 experiences and progresses to using, synthesizing, and developing models to predict and show relationships among variables between systems and their components in the natural and designed world(s). ▪ Develop a model based on evidence to illustrate the relationships between systems or between components of a system. (C2-PS1-1, C-PS2-1AR, C-PS2-4AR) **Constructing Explanations and Designing Solutions**	**PS1.B: Chemical Reactions** ▪ The fact that atoms are conserved, together with knowledge of the chemical properties of the elements involved, can be used to describe and predict chemical reactions. (C2-PS1-1) **PS2.B: Types of Interactions** ▪ Attraction and repulsion between electric charges at the atomic scale explain the structure, properties, and transformations of matter, as well as the contact forces	**Patterns** ▪ Empirical evidence is needed to identify patterns. (C2-PS1-1, C-PS2-1AR, C-PS2-3AR) ▪ Different patterns may be observed at each of the scales at which a system is studied and can provide evidence for causality in explanations of phenomena. (C2-PS1-1, C-PS2-1AR, C-PS2-3AR)

Constructing explanations and designing solutions in 9–12 builds on K–8 experiences and progresses to explanations and designs that are supported by multiple and independent student-generated sources of evidence consistent with scientific ideas, principles, and theories. ▪ Apply scientific reasoning to link evidence to the claims to assess the extent to which the reasoning and data support the explanation or conclusion. (C2-ETS1-2) ▪ Design a solution to a complex real-world problem, based on scientific knowledge, student-generated sources of evidence, prioritized criteria, and tradeoff considerations. (C2-ETS1-2) ▪ Evaluate a solution to a complex real-world problem, based on scientific knowledge, student-generated sources of evidence, prioritized criteria, and tradeoff considerations. (C2-ETS1-2) **Planning and Carrying Out Investigations** Planning and carrying out investigations in 9-12 builds on K-8 experiences and progresses to include investigations that provide evidence for and test conceptual, mathematical, physical, and empirical models. ▪ Plan and conduct an investigation individually and collaboratively to produce data to serve as the basis for evidence, and in the design: decide on types, how much, and accuracy of data needed to produce reliable measurements and consider limitations on the precision of the data (e.g., number of trials, cost, risk, time), and refine the design accordingly. (C-PS1-3) **Asking Questions and Defining Problems** Asking questions and defining problems in 9–12 builds on K–8 experiences and progresses to	between material objects. (C2-PS1-1, C-PS1-3) **PS1.A: Structure and Properties of Matter** ▪ The structure and interactions of matter at the bulk scale are determined by electrical forces within and between atoms. (C-PS1-3, C-PS2-2AR) ▪ Stable forms of matter are those in which the electric and magnetic field energy is minimized. A stable molecule has less energy than the same set of atoms separated; one must provide at least this energy in order to take the molecule apart. (C-PS2-4AR) ▪ The fact that atoms are conserved, together with knowledge of the chemical properties of the elements involved, can be used to describe and predict chemical reactions. (C-PS2-4AR) **ETS1.C: Optimizing the Design Solution** ▪ Criteria may need to be broken down into simpler ones that can be approached systematically, and decisions about the priority of certain criteria over others (trade-offs) may be needed. (C2-ETS1-2)	**Energy and Matter** ▪ The total amount of energy and matter in closed systems is conserved. (C-PS2-4AR) ▪ Changes of energy and matter in a system can be described in terms of energy and matter flows into, out of, and within that system. (C-PS2-4AR) ▪ Energy cannot be created or destroyed—it only moves between one place and another place, between objects and/or fields, or between systems. (C-PS2-4AR) **Scale, Proportion, and Quantity** ▪ The significance of a phenomenon is dependent on the scale, proportion, and quantity at which it occurs. (C-PS2-2AR, C-PS1-3) ------------------------------------ **Connections to Engineering, Technology, and Applications of Science** **Influence of Science, Engineering, and Technology on Society and the Natural World** ▪ Modern civilization depends on major technological systems. Engineers continuously modify these technological systems by applying scientific knowledge and engineering design practices to increase benefits while decreasing costs and risks. (C2-ETS1-2) ▪ New technologies can have deep impacts on society and the environment, including some that were not anticipated. Analysis of costs and benefits is a critical aspect of decisions about technology. (C2-ETS1-2) ------------------------------------

formulating, refining, and evaluating empirically testable questions and design problems using models and simulations. Analyze complex real-world problems by specifying criteria and constraints for successful solutions. (C2-ETS1-2) **Using Mathematics and Computational Thinking** Mathematical and computational thinking in 9-12 builds on K-8 experiences and progresses to using algebraic thinking and analysis, a range of linear and nonlinear functions including trigonometric functions, exponentials and logarithms, and computational tools for statistical analysis to analyze, represent, and model data. Simple computational simulations are created and used based on mathematical models of basic assumptions. ▪ Use mathematical models and/or computer simulations to predict the effects of a design solution on systems and/or the interactions between systems. (C-PS2-2AR, C-PS2-3AR) **---** **Connections to Nature of Science** **Science Models, Laws, Mechanisms, and Theories Explain Natural Phenomena** ▪ A scientific theory is a substantiated explanation of some aspect of the natural world, based on a body of facts that have been repeatedly confirmed through observation and experiment and the science community validates each theory before it is accepted. If new evidence is discovered that the theory does not accommodate, the theory is generally modified in light of this new evidence. (C2-PS1-1, C-PS1-3) Models, mechanisms, and explanations collectively serve as tools in the development of a scientific theory.		**Connections to Nature of Science** **Scientific Knowledge Assumes an Order and Consistency in Natural Systems** ▪ Science assumes the universe is a vast single system in which basic laws are consistent. (C-PS1-3)

(C2-PS1-1, C-PS1-3)		

Connections to the Arkansas Disciplinary Literacy Standards:

Connections to the Arkansas English Language Arts Standards:

Connections to the Arkansas Mathematics Standards:

Topic 3: Reactions

Students who demonstrate understanding can:

C-PS1-2 **Construct and revise an explanation for the outcome of a simple chemical reaction based on the outermost electron states of atoms, trends in the periodic table, and knowledge of the patterns of chemical properties.** [AR Clarification Statement: An example could include recognizing patterns to predict reaction products including transition elements.]

C-PS1-7 **Use mathematical representations to support the claim that atoms, and therefore mass, are conserved during a chemical reaction.** [AR Clarification Statement: Emphasis is on demonstrating conservation of mass through mole concept, stoichiometry, limiting and excess reagents.]

C-PS3-1AR **Use mathematical representations to analyze the proportion and quantity of particles in solution.** [Clarification Statement: Emphasis is on concentration (molarity, molality) solutions and developing net ionic equations.]

C-PS3-2AR **Construct an explanation of the relationship between energy and the behavior of particles.** [Clarification Statement: Emphasis is on qualitative evidence of particle behavior in different states of matter. Examples of evidence could include phase diagrams or heating curves.]

C-PS3-3AR **Plan and carry out an investigation to predict the outcome of a chemical reaction based on patterns of chemical properties.** [Clarification Statement: Examples of various reaction types could include acid base, precipitation, or redox. Examples of patterns could include the use of solubility rules, activity series, or titrations.]

C3-ETS1-3

Evaluate a solution to a complex real-world problem based on prioritized criteria and tradeoffs that account for a range of constraints, including cost, safety, reliability, and aesthetics, as well as possible social, cultural, and environmental impacts. [AR Clarification Statement: Examples could include the effects of concentration of solutions on the freezing/boiling point (melting of ice on roadways).]

The performance expectations above were developed using the following elements from the NRC document *A Framework for K-12 Science Education*:

Science and Engineering Practices	Disciplinary Core Ideas	Crosscutting Concepts
Constructing Explanations and Designing Solutions Constructing explanations and designing solutions in 9–12 builds on K–8 experiences and progresses to explanations and designs that are supported by multiple and independent student-generated sources of evidence consistent with scientific ideas, principles, and theories. ▪ Construct and revise an explanation based on valid and reliable evidence obtained from a variety of sources (including students' own investigations, models, theories, simulations, peer review) and the assumption that theories and laws that describe the natural world operate today as they	**PS1.A: Structure and Properties of Matter** The periodic table orders elements horizontally by the number of protons in the atom's nucleus and places those with similar chemical properties in columns. The repeating patterns of this table reflect patterns of outer electron states. (C-PS1-2) **PS1.B: Chemical Reactions** ▪ The fact that atoms are conserved, together with knowledge of the chemical properties of the elements involved, can be used to describe and predict	**Patterns** ▪ Empirical evidence is needed to identify patterns. (C-PS1-2, C-PS3-3AR) Different patterns may be observed at each of the scales at which a system is studied and can provide evidence for causality in explanations of phenomena. (C-PS1-2, C-PS3-3AR) **Energy and Matter** ▪ The total amount of energy and matter in closed systems is conserved. (C-PS3-2AR) ▪ Changes of energy and matter in a system can be described in terms of energy and matter flows into, out of, and within that system. (C-PS3-2AR)

did in the past and will continue to do so in the future. (C3-ETS1-3, C-PS1-2, C-PS3-2AR) ▪ Refine a solution to a complex real-world problem, based on scientific knowledge, student-generated sources of evidence, prioritized criteria, and tradeoff considerations. (C3-ETS1-3, C-PS1-2, C-PS3-2AR) ▪ Design a solution to a complex real-world problem, based on scientific knowledge, student-generated sources of evidence, prioritized criteria, and tradeoff considerations. (C3-ETS1-3, C-PS1-2, C-PS3-2AR) **Using Mathematics and Computational Thinking** Mathematical and computational thinking at the 9–12 level builds on K–8 and progresses to using algebraic thinking and analysis, a range of linear and nonlinear functions including trigonometric functions, exponentials and logarithms, and computational tools for statistical analysis to analyze, represent, and model data. Simple computational simulations are created and used based on mathematical models of basic assumptions. Create a computational model or simulation of a phenomenon, designed device, process, or system. (C-PS1-7, C-PS3-1AR) **Asking Questions and Defining Problems** Asking questions and defining problems in 9–12 builds on K–8 experiences and progresses to formulating, refining, and evaluating empirically testable questions and design problems using models and simulations. ▪ Analyze complex real-world problems by specifying criteria and constraints for successful solutions. (C3-ETS1-3)	chemical reactions. (C-PS1-2, C-PS3-3AR, C-PS1-7) **PS3.A: Definitions of Energy** Energy is a quantitative property of a system that depends on the motion and interactions of matter and radiation within that system. That there is a single quantity called energy is due to the fact that a system's total energy is conserved, even as, within the system, energy is continually transferred from one object to another and between its various possible forms. (C-PS3-2AR) **ETS1.B: Developing Possible Solutions** ▪ When evaluating solutions, it is important to take into account a range of constraints, including cost, safety, reliability, and aesthetics, and to consider social, cultural, and environmental impacts. (C3-ETS1-3)	▪ Energy cannot be created or destroyed—it only moves between one place and another place, between objects and/or fields, or between systems. (C-PS3-2AR) **Systems and System Models** ▪ When investigating or describing a system, the boundaries and initial conditions of the system need to be defined and their inputs and outputs analyzed and described using models. (C-PS1-7, C-PS3-1AR) Models can be used to predict the behavior of a system, but these predictions have limited precision and reliability due to the assumptions and approximations inherent in models. (C-PS1-7, C-PS3-1AR) --- **Connections to Engineering, Technology, and Applications of Science** **Interdependence of Science, Engineering, and Technology** ▪ Science and engineering complement each other in the cycle known as research and development (R&D). Many R&D projects may involve scientists, engineers, and others with wide ranges of expertise. (C3-ETS1-3) **Influence of Engineering, Technology, and Science on Society and the Natural World** ▪ Engineers continuously modify these technological systems by applying scientific knowledge and engineering design practices to increase benefits while decreasing costs and risks. (C3-ETS1-3)

Planning and Carrying Out Investigations Planning and carrying out investigations in 9-12 builds on K-8 experiences and progresses to include investigations that provide evidence for and test conceptual, mathematical, physical, and empirical models. ▪ Plan and conduct an investigation individually and collaboratively to produce data to serve as the basis for evidence, and in the design: decide on types, how much, and accuracy of data needed to produce reliable measurements and consider limitations on the precision of the data (e.g., number of trials, cost, risk, time), and refine the design accordingly. (C-PS3-3AR) **Analyzing and Interpreting Data** Analyzing data in 9–12 builds on K–8 and progresses to introducing more detailed statistical analysis, the comparison of data sets for consistency, and the use of models to generate and analyze data. ▪ Analyze data using tools, technologies, and/or models (e.g., computational, mathematical) in order to make valid and reliable scientific claims or determine an optimal design solution. (C-PS3-2AR)		▪ New technologies can have deep impacts on society and the environment, including some that were not anticipated. Analysis of costs and benefits is a critical aspect of decisions about technology. (C3-ETS1-3)

Connections to the Arkansas Disciplinary Literacy Standards:

Connections to the Arkansas English Language Arts Standards:

Connections to the Arkansas Mathematics Standards:

Topic 4: Kinetics and Kinetic Molecular Theory		
Students who demonstrate understanding can: **C-PS1-5 Apply scientific principles and evidence to provide an explanation about the effects of changing the temperature or concentration of the reacting particles on the rate at which a reaction occurs.** [AR Clarification Statement: Emphasis is on student reasoning that focuses on Collison theory.] **C-PS4-1AR Plan and carry out investigations to examine stability and change exhibited by gas particles in a closed system.** [Clarification Statement: Emphasis is on the relationships between pressure, volume, temperature, and quantity of particles (Graham's law of effusion, Dalton's law of partial pressure, gas stoichiometry).] **C-PS4-2AR Argue from evidence cause and effect relationships of factors influencing behavior of gas particles.** [Clarification Statement: Emphasis is on the kinetic molecular theory.] **C4-ETS1-4 Use a computer simulation to model the impact of proposed solutions to a complex real-world problem with numerous criteria and constraints on interactions within and between systems relevant to the problem.** [AR Clarification Statement: An example could include the Haber process used to produce ammonia.]		
The performance expectations above were developed using the following elements from the NRC document *A Framework for K-12 Science Education*:		
Science and Engineering Practices	**Disciplinary Core Ideas**	**Crosscutting Concepts**
Using Mathematics and Computational Thinking Mathematical and computational thinking at the 9-12 level builds on K-8 and progresses to using algebraic thinking and analysis, a range of linear and nonlinear functions including trigonometric functions, exponentials and logarithms, and computational tools for statistical analysis to analyze, represent, and model data. Simple computational simulations are created and used based on mathematical models of basic assumptions. ▪ Use mathematical representations of phenomena or design solutions to describe and/or support claims and/or explanations. (C-PS4-1AR, C4-ETS1-4) ▪ Use mathematical models and/or computer simulations to predict the effects of a design solution on systems and/or the interactions between systems. (C-PS4-1AR, C4-ETS1-4)	**PS1.B: Chemical Reactions** ▪ Chemical processes, their rates, and whether or not energy is stored or released can be understood in terms of the collisions of molecules and the rearrangements of atoms into new molecules, with consequent changes in the sum of all bond energies in the set of molecules that are matched by changes in kinetic energy. (C-PS1-5, C-PS4-2AR) **PS3.B: Conservation of Energy and Energy Transfer** ▪ Mathematical expressions, which quantify how the stored energy in a system depends on its configuration (e.g. relative positions of charged particles, compression of a spring) and how kinetic energy depends on mass and speed, allow the concept of conservation of energy to be used to predict and describe system behavior. (C-PS4-1AR) **ETS1.B: Developing Possible Solutions** ▪ Both physical models and computers can be used in various	**Patterns** ▪ Empirical evidence is needed to identify patterns. (C-PS1-5) ▪ Different patterns may be observed at each of the scales at which a system is studied and can provide evidence for causality in explanations of phenomena. (C-PS1-5) **Cause and Effect** ▪ Empirical evidence is required to differentiate between cause and correlation and make claims about specific causes and effects. (C-PS4-2AR) ▪ Cause and effect relationships can be suggested and predicted for complex natural and human designed systems by examining what is known about smaller scale mechanisms within the system. (C-PS4-2AR) ▪ Systems can be designed to cause a desired effect. (C-PS4-2AR) **Stability and Change** ▪ Much of science deals with constructing explanations of how

Engaging in Argument from Evidence Engaging in argument from evidence in 9–12 builds on K–8 experiences and progresses to using appropriate and sufficient evidence and scientific reasoning to defend and critique claims and explanations about natural and designed worlds. Arguments may also come from current scientific or historical episodes in science. ▪ Evaluate the claims, evidence, and reasoning behind currently accepted explanations or solutions to determine the merits of arguments. (C-PS4-2AR) **Constructing Explanations and Designing Solutions** Constructing explanations and designing solutions in 9–12 builds on K–8 experiences and progresses to explanations and designs that are supported by multiple and independent student-generated sources of evidence consistent with scientific ideas, principles, and theories. ▪ Apply scientific reasoning to link evidence to the claims to assess the extent to which the reasoning and data support the explanation or conclusion. (C-PS1-5, C4-ETS1-4) ▪ Evaluate a solution to a complex real-world problem, based on scientific knowledge, student-generated sources of evidence, prioritized criteria, and tradeoff considerations. (C-PS1-5, C4-ETS1-4) **Planning and Carrying Out Investigations** Planning and carrying out investigations in 9-12 builds on K-8 experiences and progresses to include investigations that provide evidence for and test conceptual, mathematical, physical, and empirical models.	ways to aid in the engineering design process. Computers are useful for a variety of purposes, such as running simulations to test different ways of solving a problem or to see which one is most efficient or economical; and in making a persuasive presentation to a client about how a given design will meet his or her needs. (C4-ETS1-4)	things change and how they remain stable. (C-PS4-1AR) **Systems and System Models** ▪ When investigating or describing a system, the boundaries and initial conditions of the system need to be defined and their inputs and outputs analyzed and described using models. (C-PS4-1AR, C4-ETS1-4) ▪ Models can be used to predict the behavior of a system, but these predictions have limited precision and reliability due to the assumptions and approximations inherent in models. (C-PS4-1AR, C4-ETS1-4) -- **Connections to Engineering, Technology, and Applications of Science** **Interdependence of Science, Engineering, and Technology** ▪ Science and engineering complement each other in the cycle known as research and development (R&D). (C4-ETS1-4) **Influence of Engineering, Technology, and Science on Society and the Natural World** ▪ Modern civilization depends on major technological systems. (C4-ETS1-4)

▪ Plan and conduct an investigation individually and collaboratively to produce data to serve as the basis for evidence, and in the design: decide on types, how much, and accuracy of data needed to produce reliable measurements and consider limitations on the precision of the data (e.g., number of trials, cost, risk, time), and refine the design accordingly. (C-PS4-1AR) -- **Connections to Nature of Science** **Science Models, Laws, Mechanisms, and Theories Explain Natural Phenomena** ▪ A scientific theory is a substantiated explanation of some aspect of the natural world, based on a body of facts that have been repeatedly confirmed through observation and experiment and the science community validates each theory before it is accepted. If new evidence is discovered that the theory does not accommodate, the theory is generally modified in light of this new evidence. (C4-ETS1-4)		
Connections to the Arkansas Disciplinary Literacy Standards: Connections to the Arkansas English Language Arts Standards: Connections to the Arkansas Mathematics Standards:		

Topic 5: Thermochemistry

Students who demonstrate understanding can:

C-PS1-4 Develop a model to illustrate that the release or absorption of energy from a chemical reaction system depends upon the changes in total bond energy. [AR Clarification Statement: Emphasis is on a chemical reaction as a system that affects energy change (Hess's Law, net bond energy, endothermic, exothermic).]

C-PS5-1AR Analyze and interpret data to explain energy (enthalpy) changes of a reaction. [Clarification Statement: Emphasis is on describing energy changes of a reaction (activation energy, catalyst).]

C-PS5-2AR Plan and conduct an investigation to calculate changes in energy within a system and/or energy flows in and out of a system. [Clarification Statement: Emphasis is on the use of mathematical expressions to describe the change in energy within the system. Investigations could include electrochemistry (electrolysis).]

C5-ETS1-4 Use a computer simulation to model the impact of proposed solutions to a complex real-world problem with numerous criteria and constraints on interactions within and between systems relevant to the problem. [AR Clarification Statement: Examples could include the efficiency of the internal combustion engine.]

The performance expectations above were developed using the following elements from the NRC document *A Framework for K-12 Science Education*:

Science and Engineering Practices

Analyzing and Interpreting Data

Analyzing data in 9–12 builds on K–8 and progresses to introducing more detailed statistical analysis, the comparison of data sets for consistency, and the use of models to generate and analyze data.

- Analyze data using tools, technologies, and/or models (e.g., computational, mathematical) in order to make valid and reliable scientific claims or determine an optimal design solution. (C-PS5-1AR)

Developing and Using Models

Modeling in 9–12 builds on K–8 and progresses to using, synthesizing, and developing models to predict and show relationships among variables between systems and their components in the natural and designed worlds.

- Develop and use a model based on evidence to illustrate the relationships between systems or between components of a system. (C-PS1-4)

Disciplinary Core Ideas

PS1.A: Structure and Properties of Matter

- A stable molecule has less energy than the same set of atoms separated; one must provide at least this energy in order to take the molecule apart. (C-PS1-4, C-PS5-1AR)

PS1.B: Chemical Reactions

- Chemical processes, their rates, and whether or not energy is stored or released can be understood in terms of the collisions of molecules and the rearrangements of atoms into new molecules, with consequent changes in the sum of all bond energies in the set of molecules that are matched by changes in kinetic energy. (C-PS1-4, C-PS5-1AR)

PS3.B: Conservation of Energy and Energy Transfer

- Conservation of energy means that the total change of energy in any system is always equal to the total energy transferred into or out of the system. (C-PS5-2AR)

Crosscutting Concepts

Energy and Matter

- The total amount of energy and matter in closed systems is conserved. (C-PS1-4, C-PS5-1AR, C-PS5-2AR)
- Changes of energy and matter in a system can be described in terms of energy and matter flows into, out of, and within that system. (C-PS1-4, C-PS5-1AR, C-PS5-2AR)
- Energy cannot be created or destroyed—it only moves between one place and another place, between objects and/or fields, or between systems. (C-PS1-4, C-PS5-1AR, C-PS5-2AR)

Systems and System Models

- When investigating or describing a system, the boundaries and initial conditions of the system need to be defined and their inputs and outputs analyzed and described using models.

Planning and Carrying Out Investigations Planning and carrying out investigations in 9-12 builds on K-8 experiences and progresses to include investigations that provide evidence for and test conceptual, mathematical, physical, and empirical models. ▪ Plan and conduct an investigation individually and collaboratively to produce data to serve as the basis for evidence, and in the design: decide on types, how much, and accuracy of data needed to produce reliable measurements and consider limitations on the precision of the data (e.g., number of trials, cost, risk, time), and refine the design accordingly. (C-PS5-2AR) -- **Connections to Nature of Science** **Science Models, Laws, Mechanisms, and Theories Explain Natural Phenomena** ▪ Theories and laws provide explanations in science. (C-PS1-4) ▪ Laws are statements or descriptions of the relationships among observable phenomena. (C-PS1-4)	▪ Mathematical expressions, which quantify how the stored energy in a system depends on its configuration (e.g. relative positions of charged particles, compression of a spring) and how kinetic energy depends on mass and speed, allow the concept of conservation of energy to be used to predict and describe system behavior. (C-PS5-2AR) **ETS1.C: Optimizing the Design Solution** Criteria may need to be broken down into simpler ones that can be approached systematically, and decisions about the priority of certain criteria over others (tradeoffs) may be needed. (C5-ETS1-4)	(C-PS5-2AR, C5-ETS1-4) Models can be used to predict the behavior of a system, but these predictions have limited precision and reliability due to the assumptions and approximations inherent in models. (C-PS5-2AR, C5-ETS1-4) -------------------------------------- **Connections to Engineering, Technology, and Applications of Science** **Interdependence of Science, Engineering, and Technology** ▪ Science and engineering complement each other in the cycle known as research and development (R&D). Many R&D projects may involve scientists, engineers, and others with wide ranges of expertise. (C5-ETS1-4)

Connections to the Arkansas Disciplinary Literacy Standards:

Connections to the Arkansas English Language Arts Standards:

SL.11-12.5 Make strategic use of digital media (e.g., textual, graphical, audio, visual, and interactive elements) in presentations to enhance understanding of findings, reasoning, and evidence and to add interest. *()*

Connections to the Arkansas Mathematics Standards:

Topic 6: Equilibrium

Students who demonstrate understanding can:

C-PS1-6 **Refine the design of a chemical system by specifying a change in conditions that would produce increased amounts of products at equilibrium.*** [AR Clarification Statement: Emphasis is on the application of Le Chatelier's Principle and on refining designs of chemical reaction systems, including descriptions of the connection between changes made at the macroscopic level and what happens at the molecular level. Examples of designs could include different ways to increase product formation including adding reactants, removing products, changing pressure, and changing temperature.]

C-PS6-1AR

Analyze and interpret data to explain the change in concentration of products and reactants, and the stable state achieved under reversible conditions. [Clarification Statement: Emphasis is on a qualitative equilibrium.]

C6-ETS1-2

Design a solution to a complex real-world problem by breaking it down into smaller, more manageable problems that can be solved through engineering. [AR Clarification Statement: Examples could include Haber process and other industrial processes.]

The performance expectations above were developed using the following elements from the NRC document *A Framework for K-12 Science Education*:

Science and Engineering Practices	Disciplinary Core Ideas	Crosscutting Concepts
Constructing Explanations and Designing Solutions Constructing explanations and designing solutions in 9–12 builds on K–8 experiences and progresses to explanations and designs that are supported by multiple and independent student-generated sources of evidence consistent with scientific ideas, principles and theories. ▪ Evaluate a solution to a complex real-world problem, based on scientific knowledge, student-generated sources of evidence, prioritized criteria, and tradeoff considerations. (C-PS1-6, C6-ETS1-2) **Analyzing and Interpreting Data** Analyzing data in 9–12 builds on K–8 and progresses to introducing more detailed statistical analysis, the comparison of data sets for consistency, and the use of models to generate and analyze data. ▪ Analyze data using tools, technologies, and/or models (e.g., computational, mathematical) in	**ETS1.B: Developing Possible Solutions** ▪ When evaluating solutions, it is important to take into account a range of constraints, including cost, safety, reliability, and aesthetics, and to consider social, cultural, and environmental impacts. (C-PS1-6, C6-ETS1-2) ▪ Both physical models and computers can be used in various ways to aid in the engineering design process. Computers are useful for a variety of purposes, such as running simulations to test different ways of solving a problem or to see which one is most efficient or economical; and in making a persuasive presentation to a client about how a given design will meet his or her needs. (C-PS1-6, C6-ETS1-2)	**Stability and Change** ▪ Change and rates of change can be quantified and modeled over very short or very long periods of time. Some system changes are irreversible. (C-PS6-1AR) **Systems and System Models** ▪ When investigating or describing a system, the boundaries and initial conditions of the system need to be defined and their inputs and outputs analyzed and described using models. (C-PS1-6) ▪ Models can be used to predict the behavior of a system, but these predictions have limited precision and reliability due to the assumptions and approximations inherent in models. (C-PS1-6) ---------------------------------------

order to make valid and reliable scientific claims or determine an optimal design solution. (C-PS6-1AR)		**Connections to Engineering, Technology, and Applications of Science** **Influence of Engineering, Technology, and Science on Society and the Natural World** ▪ Modern civilization depends on major technological systems. (C6-ETS1-2) ▪ New technologies can have deep impacts on society and the environment, including some that were not anticipated. (C6-ETS1-2) ▪ New technologies can have deep impacts on society and the environment, including some that were not anticipated. Analysis of costs and benefits is a critical aspect of decisions about technology. (C6-ETS1-2) ------------------------------------ **Connections to Nature of Science** **Science is a Human Endeavor** ▪ Science is a result of human endeavors, imagination, and creativity. (C-PS1-6)

Connections to the Arkansas Disciplinary Literacy Standards:

Connections to the Arkansas English Language Arts Standards:

Connections to the Arkansas Mathematics Standards:

Topic 7: Organic Chemistry		
Students who demonstrate understanding can: **C-PS7-1AR Obtain and combine information to describe differences between alkanes, alkenes, and alkynes.** [Clarification Statement: Emphasis is on using patterns as a method for identification, nomenclature, and formula writing for hydrocarbons one through ten.] **C-PS7-2AR Obtain and combine information to describe differences between various functional groups.** [Clarification Statement: Emphasis is on using patterns as a method for identifing differences among alcohol, aldehyde, ketone, ether, carboxylic acid, ester, amine, and amide groups.] **C7-ETS1-1 Analyze a major global challenge to specify qualitative and quantitative criteria and constraints for solutions that account for societal needs and wants.** [AR Clarification Statement: Emphasis could be on crude oil refining process, supply, and demand.]		
The performance expectations above were developed using the following elements from the NRC document *A Framework for K-12 Science Education*:		
Science and Engineering Practices	**Disciplinary Core Ideas**	**Crosscutting Concepts**
Analyzing and Interpreting Data Analyzing data in 9–12 builds on K–8 and progresses to introducing more detailed statistical analysis, the comparison of data sets for consistency, and the use of models to generate and analyze data. ▪ Analyze data using tools, technologies, and/or models (e.g., computational, mathematical) in order to make valid and reliable scientific claims or determine an optimal design solution. (C7-ETS1-1) **Obtaining, Evaluating, and Communicating Information** Obtaining, evaluating, and communicating information in 9–12 builds on K–8 experiences and progresses to evaluating the validity and reliability of the claims, methods, and designs. ▪ Communicate scientific ideas (e.g. about phenomena and/or the process of development and the design and performance of a proposed process or system) in multiple formats (including orally, graphically, textually, and mathematically). (C-PS7-1AR, C-PS7-2AR) --	**ETS1.C: Optimizing the Design Solution** Criteria may need to be broken down into simpler ones that can be approached systematically, and decisions about the priority of certain criteria over others (trade-offs) may be needed. (C7-ETS1-1)	**Patterns** ▪ Different patterns may be observed at each of the scales at which a system is studied and can provide evidence for causality in explanations of phenomena. (C-PS7-1AR, C-PS7-2AR) ▪ Empirical evidence is needed to identify patterns. (C-PS7-1AR, C-PS7-2AR) **Structure and Function** ▪ Investigating or designing new systems or structures requires a detailed examination of the properties of different materials, the structures of different components, and connections of components to reveal its function and/or solve a problem. (C-PS7-2AR) -- **Connections to Engineering, Technology, and Applications of Science** **Interdependence of Science, Engineering, and Technology** ▪ Science and engineering complement each other in the cycle known as research and development (R&D). Many R&D projects may involve scientists, engineers, and

Connections to Nature of Science **Science Models, Laws, Mechanisms, and Theories Explain Natural Phenomena** ▪ Theories and laws provide explanations in science. () ▪ Laws are statements or descriptions of the relationships among observable phenomena. ()		others with wide ranges of expertise. (C7-ETS1-1)

Connections to the Arkansas Disciplinary Literacy Standards:

Connections to the Arkansas English Language Arts Standards:

Connections to the Arkansas Mathematics Standards:

Contributors

The following educators contributed to the development of this course:

Susan Allison – Benton School District	Rebecca Koelling – Highland School District
Katie Anderson – Little Rock School District	Karen Ladd – Nettleton School District
Dr. Katherine Auld - Northwest Arkansas Community College	Steven Long – Rogers School District
Dr. Daniel Barth - University of Arkansas at Fayetteville	Chris Lynch – Black River Technical College
Angela Bassham – Salem School District	Jacki Marlin – Perryville School District
Allison Belcher – Little Rock School District	Monica Meadows – Pulaski County Special School District
Debbie Bilyeu – Arkansas AIMS	Patti Meeks – Hamburg School District
Tami Blair – Texarkana School District	Melissa Miller – Farmington School District
Stephen Brodie – University of Arkansas at Fort Smith STEM Center	Jim Musser – Arkansas Tech University
Stephanie Brown – Quitman School District	Nanette Nichols – Wilbur D. Mills AR Education Cooperative
Cindy Bunch – Manila School District	Dennis Pevey – eSTEM Public Charter School
Cindy Cardwell – Bentonville School District	Tami Philyaw – Smackover – Norphlet School District
Larry Cooper – Springdale School District	Kathy Prislovsky – Stuttgart School District
Sarah Croswell – Virtual Arkansas Academy	Kathy Prophet – Springdale School District
Tami Eggensperger – Cabot School District	Rhonda Riggin – Booneville School District
Shelley Forbess – El Dorado School District	Will Squires – Caddo Hills School District
Kyla Gentry – Searcy School District	Tim Trawick – Conway School District
Jenna Gill – Siloam Springs School District	David Wentz – Pea Ridge School District
Douglas Hammon – Little Rock School District	Andrew Williams – University of Arkansas at Monticello
Keith Harris – University of Arkansas at Little Rock Partnership for STEM Education	Wendi J.W. Williams – Northwest Arkansas Community College
Leonda Holthoff – Star City School District	Cathy Wissehr – University of Arkansas at Fayetteville
Amanda Jones – Poyen School District	Diedra Young – Ridgway Christian High School, Pine Bluff Arkansas

ARKANSAS

K-12 SCIENCE STANDARDS

EDUCATION FOR A NEW GENERATION

Chemistry - Integrated

2016

Table of Contents

Notes:

1. Student Performance Expectations (PEs) may be taught in any sequence or grouping within a grade level. Several PEs are described as being “partially addressed in this course” because the same PE is revisited in a subsequent course during which that PE is fully addressed.
2. An asterisk (*) indicates an engineering connection to a practice, core idea, or crosscutting concept.
3. The Clarification Statements are examples and additional guidance for the instructor. AR indicates Arkansas-specific Clarification Statements.
4. The Assessment Boundaries delineate content that may be taught but not assessed in large-scale assessments. AR indicates Arkansas-specific Assessment Boundaries.
5. The section entitled “foundation boxes” is reproduced verbatim from *A Framework for K-12 Science Education: Practices, Crosscutting Concepts, and Core Ideas*. Integrated and reprinted with permission from the National Academy of Sciences.
6. The examples given (e.g.,) are suggestions for the instructor.
7. Throughout this document, connections are provided to the nature of science as defined by *A Framework for K-12 Science Education* (NRC 2012).
8. Throughout this document, connections are provided to Engineering, Technology, and Applications of Science as defined by *A Framework for K-12 Science Education* (NRC 2012).
9. Each set of PEs lists connections to other disciplinary core ideas (DCIs) within the Arkansas K-12 Science Standards and to the Arkansas English Language Arts Standards, Arkansas Disciplinary Literacy Standards, and the Arkansas Mathematics Standards.

Arkansas K-12 Science Standards Overview

The Arkansas K-12 Science Standards are based on *A Framework for K-12 Science Education* (NRC 2012) and are meant to reflect a new vision for science education. The following conceptual shifts reflect what is new about these science standards. The Arkansas K-12 Science Standards

- reflect science as it is practiced and experienced in the real world,
- build logically from Kindergarten through Grade 12,
- focus on deeper understanding as well as application of content,
- integrate practices, crosscutting concepts, and core ideas, and
- make explicit connections to literacy and math.

As part of teaching the Arkansas K-12 Science Standards, it will be important to instruct and guide students in adopting appropriate safety precautions for their student-directed science investigations. Reducing risk and preventing accidents in science classrooms begin with planning. There are four recommended steps in carrying out a hazard and risk assessment for any planned lab investigation.

1) Identify all hazards. Hazards may be physical, chemical, health, or environmental.
2) Evaluate the type of risk associated with each hazard.
3) Write the procedure and all necessary safety precautions in such a way as to eliminate or reduce the risk associated with each hazard.
4) Prepare for any emergency that might arise in spite of all of the required safety precautions.

According to Arkansas Code Annotated § 6-10-113 (2012) for eye protection, every student and teacher in public schools participating in any chemical or combined chemical-physical laboratories involving caustic or explosive chemicals or hot liquids or solids is required to wear industrial-quality eye protective devices (eye goggles) at all times while participating in science investigations.

The Arkansas K-12 Science Standards outline the knowledge and science and engineering practices that all students should learn by the end of high school. The standards are three-dimensional because each student performance expectation engages students at the nexus of the following three dimensions.

- Dimension 1 describes scientific and engineering practices.
- Dimension 2 describes crosscutting concepts, overarching science concepts that apply across science disciplines.
- Dimension 3 describe core ideas in the science disciplines.

The Science and Engineering Practices

The eight practices describe the major practices that scientists use to investigate, build models and theories of the world around them or engineers use as they build and design systems. The practices are essential for all students to learn and are as follows:

1. Asking questions (for science) and defining problems (for engineering)
2. Developing and using models
3. Planning and carrying out investigations
4. Analyzing and interpreting data
5. Using mathematics and computational thinking
6. Constructing explanations (for science) and designing solutions (for engineering)
7. Engaging in argument from evidence
8. Obtaining, evaluating, and communicating information

Crosscutting Concepts

The seven crosscutting concepts bridge disciplinary boundaries and unit core ideas throughout the fields of science and engineering. Their purpose is to help students deepen their understanding of the disciplinary core ideas, and develop a coherent, and scientifically based view of the world. The seven crosscutting concepts are as follows:

1. *Patterns.* Observed patterns of forms and events guide organization and classification, and they prompt questions about relationships and the factors that influence them.
2. *Cause and effect: Mechanism and explanation*. Events have causes, sometimes simple, sometimes multifaceted. A major activity of science is investigating and explaining causal relationships and the mechanisms by which they are mediated. Such mechanisms can then be tested across given contexts and used to predict and explain events in new contexts.
3. *Scale, proportion, and quantity.* In considering phenomena, it is critical to recognize what is relevant at different measures of size, time, and energy and to recognize how changes in scale, proportion, or quantity affect a system's structure or performance.
4. *Systems and system models.* Defining the system under study—specifying its boundaries and making explicit a model of that system—provides tools for understanding and testing ideas that are applicable throughout science and engineering.
5. *Energy and matter: Flows, cycles, and conservation.* Tracking fluxes of energy and matter into, out of, and within systems helps one understand the systems' possibilities and limitations.
6. *Structure and function.* The way in which an object or living thing is shaped and its substructure determine many of its properties and functions.
7. *Stability and change.* For natural and built systems alike, conditions of stability and determinants of rates of change or evolution of a system are critical elements of study.

Disciplinary Core Ideas

The Disciplinary Core Ideas describe the content that occurs at each grade or course. The Arkansas K-12 Science Standards focus on a limited number of core ideas in science and engineering both within and across the disciplines and is built on the notion of learning as a developmental progression. The Disciplinary Core Ideas are grouped into the following domains:

- Physical Science (PS)
- Life Science (LS)
- Earth and Space Science (ESS)
- Engineering, Technology and Applications of Science (ETS)

Connections to the Arkansas English Language Arts Standards

Evidence-based reasoning is the foundation of good scientific practice. The Arkansas K-12 Science Standards incorporate reasoning skills used in language arts to help students improve mastery and understanding in all three disciplines. The Arkansas K-8 Science Committee made every effort to align grade-by-grade with the English language arts (ELA) standards so concepts support what students are learning in their entire curriculum. Connections to specific ELA standards are listed for each student performance expectation, giving teachers a blueprint for building comprehensive cross-disciplinary lessons.

The intersections between Arkansas K-12 Science Standards and Arkansas ELA Standards teach students to analyze data, model concepts, and strategically use tools through productive talk and shared activity. Reading in science requires an appreciation of the norms and conventions of the discipline of

science, including understanding the nature of evidence used, an attention to precision and detail, and the capacity to make and assess intricate arguments, synthesize complex information, and follow detailed procedures and accounts of events and concepts. These practice-based standards help teachers foster a classroom culture where students think and reason together, connecting around the subject matter and core ideas.

Connections to the Arkansas Disciplinary Literacy Standards

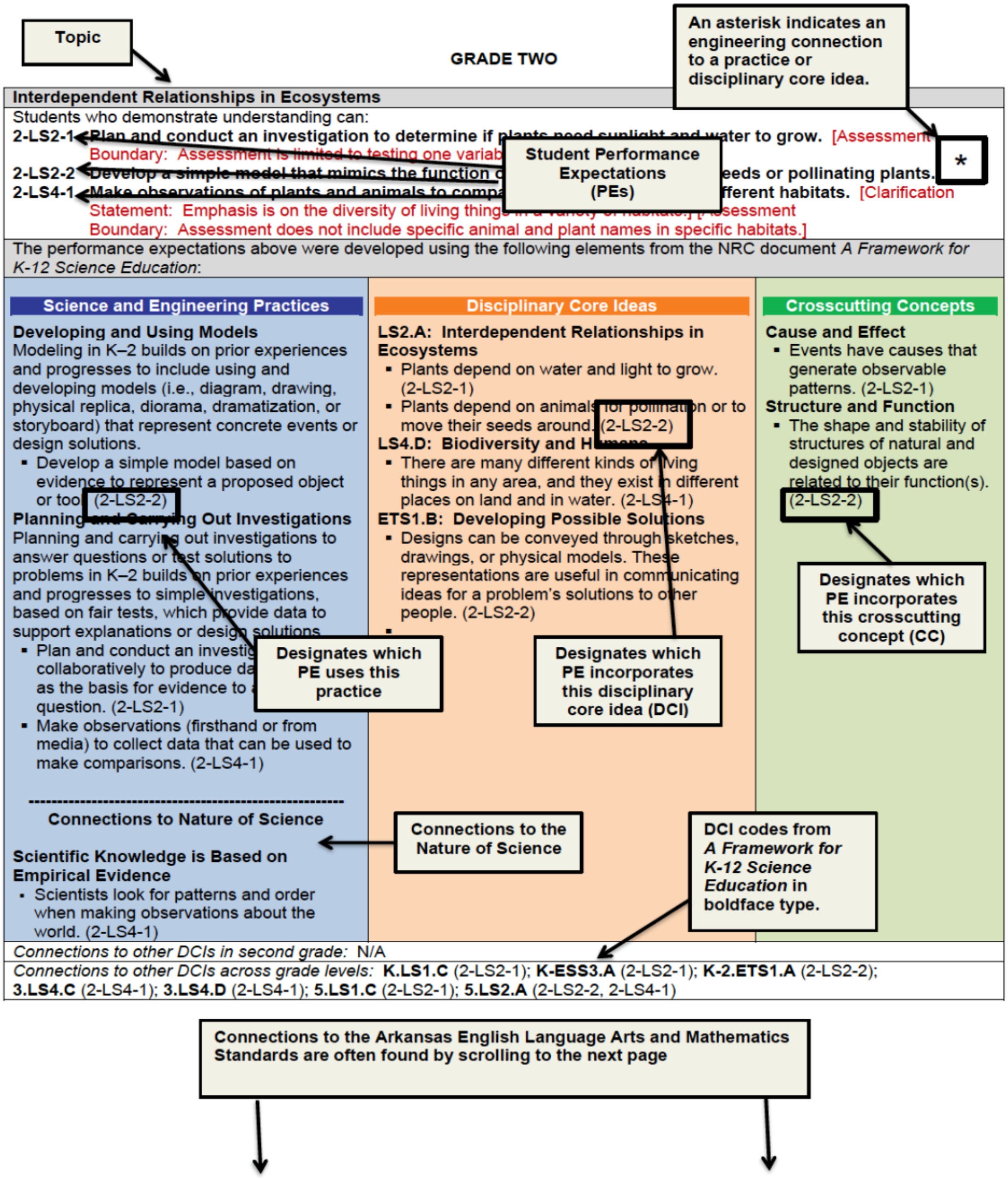
Reading is critical to building knowledge in science. College and career ready reading in science requires an appreciation of the norms and conventions of each discipline, such as the kinds of evidence used in science; an understanding of domain-specific words and phrases; an attention to precise details; and the capacity to evaluate intricate arguments, synthesize complex information, and follow detailed descriptions of events and concepts. When reading scientific and technical texts, students need to be able to gain knowledge from challenging texts that often make extensive use of elaborate diagrams and data to convey information and illustrate concepts. Students must be able to read complex informational texts in science with independence and confidence because the vast majority of reading in college and workforce training programs will be sophisticated nonfiction.

For students, writing is a key means of asserting and defending claims, showing what they know about a science, and conveying what they have experienced, imagined, thought, and felt. To be college and career ready writers, students must take task, purpose, and audience into careful consideration, choosing words, information, structures, and formats deliberately. They need to be able to use technology strategically when creating, refining, and collaborating on writing. They have to become adept at gathering information, evaluating sources, and citing material accurately, reporting finds from their research and analysis of sources in a clear and cogent manner. They must have the flexibility, concentration, and fluency to produce high-quality first-draft text under a tight deadline and the capacity to revisit and make improvements to a piece of writing over multiple drafts when circumstances encourage or require it.

Connections to the Arkansas Mathematics Standards

Science is a quantitative discipline, so it is important for educators to ensure that students' science learning coheres well with their understanding of mathematics. To achieve this alignment, the Arkansas K-12 Science Committee made every effort to ensure that the mathematics standards do not outpace or misalign to the grade-by-grade science standards. Connections to specific math standards are listed for each student performance expectation, giving teachers a blueprint for building comprehensive cross-disciplinary lessons.

How to Read
Arkansas K-12 Science



GRADE TWO

Interdependent Relationships in Ecosystems

Students who demonstrate understanding can:

2-LS2-1. Plan and conduct an investigation to determine if plants need sunlight and water to grow. [Assessment Boundary: Assessment is limited to testing one variab...]

2-LS2-2. Develop a simple model that mimics the function o... eeds or pollinating plants.

2-LS4-1. Make observations of plants and animals to compa... fferent habitats. [Clarification Statement: Emphasis is on the diversity of living thing... Assessment Boundary: Assessment does not include specific animal and plant names in specific habitats.]

The performance expectations above were developed using the following elements from the NRC document *A Framework for K-12 Science Education*:

Science and Engineering Practices	Disciplinary Core Ideas	Crosscutting Concepts
Developing and Using Models Modeling in K–2 builds on prior experiences and progresses to include using and developing models (i.e., diagram, drawing, physical replica, diorama, dramatization, or storyboard) that represent concrete events or design solutions. ▪ Develop a simple model based on evidence to represent a proposed object or tool. (2-LS2-2) **Planning and Carrying Out Investigations** Planning and carrying out investigations to answer questions or test solutions to problems in K–2 builds on prior experiences and progresses to simple investigations, based on fair tests, which provide data to support explanations or design solutions. ▪ Plan and conduct an investig... collaboratively to produce da... as the basis for evidence to a... question. (2-LS2-1) ▪ Make observations (firsthand or from media) to collect data that can be used to make comparisons. (2-LS4-1) --- **Connections to Nature of Science** **Scientific Knowledge is Based on Empirical Evidence** ▪ Scientists look for patterns and order when making observations about the world. (2-LS4-1)	**LS2.A: Interdependent Relationships in Ecosystems** ▪ Plants depend on water and light to grow. (2-LS2-1) ▪ Plants depend on animals for pollination or to move their seeds around. (2-LS2-2) **LS4.D: Biodiversity and Humans** ▪ There are many different kinds of living things in any area, and they exist in different places on land and in water. (2-LS4-1) **ETS1.B: Developing Possible Solutions** ▪ Designs can be conveyed through sketches, drawings, or physical models. These representations are useful in communicating ideas for a problem's solutions to other people. (2-LS2-2) ▪	**Cause and Effect** ▪ Events have causes that generate observable patterns. (2-LS2-1) **Structure and Function** ▪ The shape and stability of structures of natural and designed objects are related to their function(s). (2-LS2-2)

Connections to other DCIs in second grade: N/A

Connections to other DCIs across grade levels: **K.LS1.C** (2-LS2-1); **K-ESS3.A** (2-LS2-1); **K-2.ETS1.A** (2-LS2-2); **3.LS4.C** (2-LS4-1); **3.LS4.D** (2-LS4-1); **5.LS1.C** (2-LS2-1); **5.LS2.A** (2-LS2-2, 2-LS4-1)

Chemistry - Integrated Learning Progression Chart

Topic 1: Matter and Chemical Reactions	Topic 2: Nuclear Reactions	Topic 3: Energy Flow	Topic 4: Waves	Topic 5: Forces
AR CI-PS1-1	CI-PS1-8	CI-PS1-4	AR CI-PS4-1	AR CI-PS2-1
AR CI-PS1-2	CI-ESS1-1	CI-PS1-5	CI-PS4-3	CI-PS2-2
AR CI-PS1-3	CI-ESS1-3	AR CI-PS3-1	CI-PS4-4	CI-PS2-4
CI-PS1-6	CI-ESS1-6	CI-ESS1-2	CI-PS4-5	CI-PS3-5
AR CI-PS1-7	AR CI2-ETS1-1	CI-ESS2-3	AR CI4-ETS1-4	CI-ESS1-4
CI-ESS2-5	AR CI2-ETS1-2	AR CI-ESS3-4		AR CI5-ETS1-2
AR CI1-ETS1-2	AR CI2-ETS1-3	AR CI3-ETS1-1		
	AR CI2-ETS1-4			

Arkansas Clarification Statement/Assessment Boundary (AR)

Chemistry - Integrated Course Overview

The Arkansas K-12 Science Standards for chemistry is an integrated science course that focuses on conceptual understanding of the foundational chemistry and physics core ideas, science and engineering practices, and crosscutting concepts and is composed of chemistry, physics, Earth and space science, and engineering design standards. It is recommended that students be enrolled in algebra II concurrently with this course. Teachers with chemistry, physics, physical Science, physical/Earth, or physics/math licenses are qualified to teach this course. Students will earn a 1 unit of Smart Core/chemistry credit for graduation.

Students in chemistry - integrated fully develop their understanding of the core ideas in the physical and Earth and space sciences. These ideas include the more complex concepts from chemistry, physics, and Earth science but are intended to leave room for expanded study in career-focus high school courses. The performance expectations (standards) build on the physical science ideas and skills and allow high school students to explain more in-depth phenomena foundational to chemistry, physics, and Earth and space sciences as well. These performance expectations blend the core ideas with scientific and engineering practices and crosscutting concepts to support students in developing usable knowledge to explain ideas across these science disciplines. In the physical science performance expectations at the high school level, there is a focus on several scientific practices.

Connections with other science disciplines help high school students develop these capabilities in various contexts. For example, in the environmental science course students re-apply their engineering capabilities to reduce human impacts on Earth systems and improve social and environmental cost-benefit ratios (ENV-ESS3-3, ENV-ESS3-4).

Additionally, it should be noted that the chemistry - integrated standards are not intended to be used as curriculum. Instead, the standards are the minimum that students should know and be able to do. Therefore, teachers should continue to differentiate for the needs of their students by adding depth and additional rigor.

Students in Chemistry - Integrated also continue their ability to develop possible solutions for major global problems with engineering design challenges. At the high school level, students are expected to engage with major global issues at the interface of science, technology, society and the environment, and to bring to light the kinds of analytical and strategic thinking that prior training and increased maturity make possible. As in prior levels, these capabilities can be thought of in three stages:

- **Defining the problem** at the high school level requires both qualitative and quantitative analysis. For example, the need to provide food and fresh water for future generations comes into sharp focus when considering the speed at which world population is growing and conditions in countries that have experienced famine. While high school students are not expected to solve these challenges, they are expected to begin thinking about them as problems that can be addressed, at least in part, through engineering.
- **Developing possible solutions** for major global problems begins by breaking them down into smaller problems that can be tackled with engineering methods. To evaluate potential solutions, students are expected to not only consider a wide range of criteria but to also recognize that criteria needs to be prioritized. For example, public safety or environmental protection may be more important than cost or even functionality. Decisions on priorities can then guide tradeoff choices.
- **Improving designs** at the high school level may involve sophisticated methods, such as using computer simulations to model proposed solutions. Students are expected to use such methods to take into account a range of criteria and constraints, anticipate possible societal and environmental impacts, and test the validity of their simulations by comparison to the real world.

Chemistry - Integrated Topics Overview

The performance expectations associated with **Topic 1: Matter and Chemical Reactions** help students formulate an answer to the following focus questions:

- How can the structure and properties of matter be explained?
- How do substances combine or change (react) to make new substances?
- How can patterns be used to characterize and predict chemical reactions?

Students are expected to develop an understanding of the substructure of atoms and provide more mechanistic explanations of the properties of substances. Students are expected to learn how to use the periodic table as a tool to explain and predict the properties of elements. Chemical reactions, including rates of reactions and energy changes, can be understood by students at this level in terms of the collisions of molecules and the rearrangements of atoms. Using this expanded knowledge of chemical reactions, students are able to explain important biological and geophysical phenomena. Students are also able to apply an understanding of the process of optimization in engineering design to chemical reaction systems.

The performance expectations associated with **Topic 2: Nuclear Reactions** support student understanding of nuclear processes. Students formulate an answer to the following focus questions:

- How do nuclear reactions differ from chemical reactions?
- What nuclear processes are associated with stars?
- How do nuclear reactions differ from chemical reactions?
- How are elements transformed through nuclear processes?

Students are expected to develop and understanding of the formation and abundance of elements, radioactivity, the release of energy from the sun and other stars, and the generation of nuclear power.

The performance expectations associated with **Topic 3: Energy Flow** help students formulate an answer to the following focus questions:

- How does energy flow in a system?
- How is energy transferred?
- How is energy conserved?
- How does energy flow in a system?

This topic is broken down into four ideas: definitions of energy, conservation of energy and energy transfer, the relationship between energy and forces, and energy in chemical process and everyday life. Students are expected to develop an understanding of energy as a quantitative property of a system that depends on the motion and interactions of matter and radiation within that system. The total change of energy in any system is always equal to the total energy transferred into or out of the system. Students develop an understanding that energy at both the macroscopic and the atomic scale can be accounted for as either motions of particles or energy associated with the configuration (relative positions) of particles. In some cases, the energy associated with the configuration of particles can be thought of as stored in fields. Additionally, students explore energy interactions associated with geologic processes such as plate tectonics, seismic waves, and convection. Students demonstrate understanding of engineering principles by designing, building, and refining devices associated with the conversion of energy.

The performance expectations associated with **Topic 4: Waves** help students formulate an answer to the following focus questions:

- How do the properties of waves affect their function?
- How are waves used to transfer energy?
- How are waves used to send and store information?
- How do electromagnetic radiation and matter interact?

This topic is broken down into wave properties, electromagnetic radiation, and information technologies/instrumentation. Students are expected to develop an understanding of how wave properties and the interactions of electromagnetic radiation with matter can transfer information across long distances, store information, and be used to investigate nature on many scales. Models of electromagnetic radiation as either a wave of changing electric/magnetic fields and/or as particles are developed and used. Students understand that combining waves of different frequencies can make a wide variety of patterns and thereby encode and transmit information. Students demonstrate understanding of engineering ideas by presenting information about how technological devices use the principles of wave behavior and wave interactions with matter to transmit and capture information and energy.

The performance expectations associated with **Topic 5: Forces** help students formulate an answer to the following focus questions:

- How do forces cause microscopic to macroscopic changes?
- How can one explain and predict interactions between objects and within systems of objects?
- How do intermolecular forces determine properties such as melting point, boiling point, vapor pressure, and surface tension?
- How does the net momentum of particles on the microscale relate to Kinetic Molecular Theory?
- How can forces and momentum be modeled mathematically?

This topic is broken down into forces and motion as well as types of interactions. Students are expected to develop an understanding of forces and interactions as they are described by Newton's laws. Students are expected to develop an understanding that the total momentum of a system of objects is conserved when there is no net force on the system. Students are able to use Newton's law of gravitation and Coulomb's law to describe and predict the gravitational and electrostatic forces between objects. Students are able to apply scientific and engineering ideas to design, evaluate, and refine a device that minimizes the force on a macroscopic object during a collision.

Chemistry - Integrated

Topic 1: Matter and Chemical Reactions

Students who demonstrate understanding can:

CI-PS1-1 Use the periodic table as a model to predict the relative properties of elements based on the patterns of electrons in the outermost energy level of atoms. [AR Clarification Statement: This PE is fully addressed in this course. Examples of properties that could be predicted from patterns could include reactivity of metals, types of bonds formed, numbers of bonds formed, and reactions with oxygen.] [AR Assessment Boundary: Assessment is limited to main group elements. Assessment does not include exceptions to periodic trends.]

CI-PS1-2 Construct and revise an explanation for the outcome of a simple chemical reaction based on the outermost electron states of atoms, trends in the periodic table, and knowledge of the patterns of chemical properties. [AR Clarification Statement: This PE is fully addressed in this course. Examples of chemical reactions could include the reaction of sodium and chlorine, carbon and oxygen, and carbon and hydrogen.] [Assessment Boundary: Assessment is limited to chemical reactions involving main group elements and combustion reactions.]

CI-PS1-3 Plan and conduct an investigation to gather evidence to compare the structure of substances at the bulk scale to infer the strength of electrical forces between particles. [AR Clarification Statement: This PE is fully addressed in this course. Emphasis is on understanding the strengths of forces between particles, including identifying and naming specific intermolecular forces (dipole-dipole). Examples of particles could include ions, atoms, molecules, and networked materials (graphite). Examples of bulk properties of substances could include the melting point and boiling point, vapor pressure, and surface tension.] [Assessment Boundary: Assessment does not include Raoult's law calculations of vapor pressure.]

CI-PS1-6 Refine the design of a chemical system by specifying a change in conditions that would produce increased amounts of products at equilibrium.* [Clarification Statement: Emphasis is on the application of Le Chatelier's Principle and on refining designs of chemical reaction systems, including descriptions of the connection between changes made at the macroscopic level and what happens at the molecular level. Examples of designs could include different ways to increase product formation including adding reactants or removing products.] [Assessment Boundary: Assessment is limited to specifying the change in only one variable at a time. Assessment does not include calculating equilibrium constants and concentrations.]

CI-PS1-7 Use mathematical representations to support the claim that atoms, and therefore mass, are conserved during a chemical reaction. [AR Clarification Statement: This PE is fully addressed in this course. Emphasis is on demonstrating conservation of mass through the mole concept and stoichiometry. Emphasis is on assessing students' use of mathematical thinking, not on memorization and rote application of problem-solving techniques.] [Assessment Boundary: Assessment does not include complex chemical reactions.]

CI-ESS2-5 Plan and conduct an investigation of the properties of water and its effects on Earth materials and surface processes. [Clarification Statement: Emphasis is on mechanical and chemical investigations with water and a variety of solid materials to provide the evidence for connections between the hydrologic cycle and system interactions commonly known as the rock cycle. Examples of mechanical investigations include stream transportation and deposition using a stream table, erosion using variations in soil moisture content, or frost wedging by the expansion of water as it freezes. Examples of chemical investigations include chemical weathering and recrystallization (by testing the solubility of different materials) or melt generation (by examining how water lowers the melting temperature of most solids).]

CI1-ETS1-2

Design a solution to a complex real-world problem by breaking it down into smaller, more manageable problems that can be solved through engineering. . [AR Clarification Statement: Examples of real-world problems could include wastewater treatment, production of biofuels, and the impact of heavy metals or phosphate pollutants on the environment.]

The performance expectations above were developed using the following elements from the NRC document *A Framework for K-12 Science Education*:

Science and Engineering Practices	Disciplinary Core Ideas	Crosscutting Concepts
Developing and Using Models Modeling in 9–12 builds on K–8 and progresses to using, synthesizing, and developing models to predict and show relationships among variables between systems and their components in the natural and designed worlds. ▪ Use a model to predict the relationships between systems or between components of a system. (CI-PS1-1) **Planning and Carrying Out Investigations** Planning and carrying out investigations in 9-12 builds on K-8 experiences and progresses to include investigations that provide evidence for and test conceptual, mathematical, physical, and empirical models. ▪ Plan and conduct an investigation individually and collaboratively to produce data to serve as the basis for evidence, and in the design: decide on types, how much, and accuracy of data needed to produce reliable measurements and consider limitations on the precision of the data (e.g., number of trials, cost, risk, time), and refine the design accordingly. (CI-PS1-3, CI-ESS2-5) **Using Mathematics and Computational Thinking** Mathematical and computational thinking at the 9–12 level builds on K–8 and progresses to using algebraic thinking and analysis, a range of linear and nonlinear functions including trigonometric functions, exponentials and logarithms, and computational tools for statistical analysis to analyze, represent, and model data. Simple computational simulations are created and used based on mathematical models of basic assumptions. ▪ Use mathematical representations of phenomena to support claims. (CI-PS1-7)	**PS1.A: Structure and Properties of Matter** ▪ Each atom has a charged substructure consisting of a nucleus, which is made of protons and neutrons, surrounded by electrons. (CI-PS1-1) ▪ The periodic table orders elements horizontally by the number of protons in the atom's nucleus and places those with similar chemical properties in columns. The repeating patterns of this table reflect patterns of outer electron states. (CI-PS1-1, CI-PS1-2) ▪ The structure and interactions of matter at the bulk scale are determined by electrical forces within and between atoms. (CI-PS1-3) **PS1.B: Chemical Reactions** ▪ In many situations, a dynamic and condition-dependent balance between a reaction and the reverse reaction determines the numbers of all types of molecules present. (CI-PS1-6) ▪ The fact that atoms are conserved, together with knowledge of the chemical properties of the elements involved, can be used to describe and predict chemical reactions. (CI-PS1-2, CI-PS1-7) **PS2.B: Types of Interactions** ▪ Attraction and repulsion between electric charges at the atomic scale explain the structure, properties, and transformations of matter, as well as the contact forces between material objects. (CI-PS1-1, CI-PS1-3) **PS2.B: Types of Interactions** ▪ Attraction and repulsion between electric charges at the atomic scale explain the structure, properties, and transformations of matter, as	**Patterns** ▪ Different patterns may be observed at each of the scales at which a system is studied and can provide evidence for causality in explanations of phenomena. (CI-PS1-1, CI-PS1-2, CI-PS1-3) **Energy and Matter** ▪ The total amount of energy and matter in closed systems is conserved. (CI-PS1-7) **Stability and Change** ▪ Much of science deals with constructing explanations of how things change and how they remain stable. (CI-PS1-6) **Structure and Function** ▪ The functions and properties of natural and designed objects and systems can be inferred from their overall structure, the way their components are shaped and used, and the molecular substructures of its various materials. (CI-ESS2-5) --------------------------------------- ***Connections to Nature of Science*** **Scientific Knowledge Assumes an Order and Consistency in Natural Systems** ▪ Science assumes the universe is a vast single system in which basic laws are consistent. (CI-PS1-7)

Constructing Explanations and Designing Solutions Constructing explanations and designing solutions in 9–12 builds on K–8 experiences and progresses to explanations and designs that are supported by multiple and independent student-generated sources of evidence consistent with scientific ideas, principles, and theories. ▪ Construct and revise an explanation based on valid and reliable evidence obtained from a variety of sources (including students' own investigations, models, theories, simulations, peer review) and the assumption that theories and laws that describe the natural world operate today as they did in the past and will continue to do so in the future. (CI-PS1-2) Refine a solution to a complex real-world problem, based on scientific knowledge, student-generated sources of evidence, prioritized criteria, and tradeoff considerations. (CI-PS1-6) ▪ Design a solution to a complex real-world problem, based on scientific knowledge, student-generated sources of evidence, prioritized criteria, and tradeoff considerations. (CI1-ETS1-2)	well as the contact forces between material objects. (CI-PS1-1,CI-PS1-3) **ESS2.C: The Roles of Water in Earth's Surface Processes** ▪ The abundance of liquid water on Earth's surface and its unique combination of physical and chemical properties are central to the planet's dynamics. These properties include water's exceptional capacity to absorb, store, and release large amounts of energy, transmit sunlight, expand upon freezing, dissolve and transport materials, and lower the viscosities and melting points of rocks. (CI-ESS2-5) **ETS1.C: Optimizing the Design Solution** Criteria may need to be broken down into simpler ones that can be approached systematically, and decisions about the priority of certain criteria over others (trade-offs) may be needed. (CI-PS1-6) **ETS1.C: Optimizing the Design Solution** Criteria may need to be broken down into simpler ones that can be approached systematically, and decisions about the priority of certain criteria over others (trade-offs) may be needed. (CI1-ETS1-2)	

Connections to other DCIs in this course: **CI.ESS2.C** (CI-PS1-2, CI-PS1-3); **CI.PS1.A** (CI-ESS2-5); **CI.PS1.B** (CI-ESS2-5); **CI.PS3.B** (CI-ESS2-5)

Connections to DCIs across grade-bands: **7.PS1.A** (CI-PS1-1, CI-PS1-2, CI-PS1-3, CI-PS1-7, CI-ESS2-5); **7.PS1.B**, (CI-PS1-1, CI-PS1-2, CI-PS1-6, CI-PS1-7); **8.PS2.B** (CI-PS1-3); **7.ESS2.A** (CI-PS1-7); **8.PS4.B** (CI-ESS2-5); **7.ESS2.A** (CI-ESS2-5); **7.ESS2.C** (CI-ESS2-5); **6.ESS2.D** (CI-ESS2-5); **6-8.ETS1.A** (CI1-ETS1-2); **6-8.ETS1.B** (CI1-ETS1-2); **6-8.ETS1.C** (CI1-ETS1-2)

Connections to the Arkansas Disciplinary Literacy Standards:

RST.9-10.7 Translate quantitative or technical information expressed in words in a text into visual form (e.g., a table or chart) and translate information expressed visually or mathematically (e.g., in an equation) into words. (CI-PS1-1)

RST.11-12.1 Cite specific textual evidence to support analysis of science and technical texts, attending to important distinctions the author makes and to any gaps or inconsistencies in the account. (CI-PS1-3)

WHST.9-12.2 Write informative/explanatory texts, including the narration of historical events, scientific procedures/ experiments, or technical processes. (CI-PS1-2)

WHST.9-12.5	Develop and strengthen writing as needed by planning, revising, editing, rewriting, or trying a new approach, focusing on addressing what is most significant for a specific purpose and audience. (CI-PS1-2)
WHST.9-12.7	Conduct short as well as more sustained research projects to answer a question (including a self-generated question) or solve a problem; narrow or broaden the inquiry when appropriate; synthesize multiple sources on the subject, demonstrating understanding of the subject under investigation. (CI-PS1-3, CI-PS1-6, CI-ESS2-5)
WHST.11-12.8	Gather relevant information from multiple authoritative print and digital sources, using advanced searches effectively; assess the strengths and limitations of each source in terms of the specific task, purpose, and audience; integrate information into the text selectively to maintain the flow of ideas, avoiding plagiarism and overreliance on any one source and following a standard format for citation. (CI-PS1-3)
WHST.9-12.9	Draw evidence from informational texts to support analysis, reflection, and research. (CI-PS1-3)
Connections to the Arkansas Mathematics Standards:	
MP.2	Reason abstractly and quantitatively. (CI-PS1-7)
MP.4	Model with mathematics. (CI1-ETS1-2)
HSN.Q.A.1	Use units as a way to understand problems and to guide the solution of multi-step problems; choose and interpret units consistently in formulas; choose and interpret the scale and the origin in graphs and data displays. (CI-PS1-2, CI-PS1-3, CI-PS1-7)
HSN.Q.A.2	Define appropriate quantities for the purpose of descriptive modeling. (CI-PS1-7)
HSN.Q.A.3	Choose a level of accuracy appropriate to limitations on measurement when reporting quantities. (CI-PS1-2, CI-PS1-3, CI-PS1-7, CI-ESS2-5)

Chemistry - Integrated

Topic 2: Nuclear Reactions
Students who demonstrate understanding can: **CI-PS1-8 Develop models to illustrate the changes in the composition of the nucleus of the atom and the energy released during the processes of fission, fusion, and radioactive decay.** [Clarification Statement: Emphasis is on simple qualitative models, such as pictures or diagrams, and on the scale of energy released in nuclear processes relative to other kinds of transformations.] [Assessment Boundary: Assessment does not include quantitative calculation of energy released. Assessment is limited to alpha, beta, and gamma radioactive decays.] **CI-ESS1-1 Develop a model based on evidence to illustrate the life span of the sun and the role of nuclear fusion in the sun's core to release energy that eventually reaches Earth in the form of radiation.** [Clarification Statement: Emphasis is on the energy transfer mechanisms that allow energy from nuclear fusion in the sun's core to reach Earth. Examples of evidence for the model include observations of the masses and lifetimes of other stars, as well as the ways that the sun's radiation varies due to sudden solar flares ("space weather"), the 11-year sunspot cycle, and non-cyclic variations over centuries.] [Assessment Boundary: Assessment does not include details of the atomic and sub-atomic processes involved with the sun's nuclear fusion.] **CI-ESS1-3 Communicate scientific ideas about the way stars, over their life cycle, produce elements.** [Clarification Statement: Emphasis is on the way nucleosynthesis, and therefore the different elements created, varies as a function of the mass of a star and the stage of its lifetime.] [Assessment Boundary: Details of the many different nucleosynthesis pathways for stars of differing masses are not assessed.] **CI-ESS1-6 Apply scientific reasoning and evidence from ancient Earth materials, meteorites, and other planetary surfaces to construct an account of Earth's formation and early history.** [Clarification Statement: Emphasis is on using available evidence within the solar system to reconstruct the early history of Earth, which formed along with the rest of the solar system 4.6 billion years ago. Examples of evidence include the absolute ages of ancient materials (obtained by radiometric dating of meteorites, moon rocks, and Earth's oldest minerals), the sizes and compositions of solar system objects, and the impact cratering record of planetary surfaces.] **CI2-ETS1-1** **Analyze a major global challenge to specify qualitative and quantitative criteria and constraints for solutions that account for societal needs and wants.** [AR Clarification Statement: Emphasis is on the specific needs and constraints involved with power generation.] **CI2-ETS1-2** **Design a solution to a complex real-world problem by breaking it down into smaller, more manageable problems that can be solved through engineering.** [AR Clarification Statement: Emphasis is on nuclear power management.] **CI2-ETS1-3** **Evaluate a solution to a complex real-world problem based on prioritized criteria and trade-offs that account for a range of constraints, including cost, safety, reliability, and aesthetics, as well as possible social, cultural, and environmental impacts.** [AR Clarification Statement: Emphasis is on the relationship between nuclear fission and fusion.] **CI2-ETS1-4** **Use a computer simulation to model the impact of proposed solutions to a complex real-world problem with numerous criteria and constraints on interactions within and between systems relevant to the problem.** [AR Clarification Statement: Examples could include nuclear weapons and nuclear medicine (radioisotopes or radiation therapy).]
The performance expectations above were developed using the following elements from the NRC document *A Framework for K-12 Science Education*:

Science and Engineering Practices	Disciplinary Core Ideas	Crosscutting Concepts

Developing and Using Models Modeling in 9–12 builds on K–8 experiences and progresses to using, synthesizing, and developing models to predict and show relationships among variables between systems and their components in the natural and designed world(s). ▪ Develop a model based on evidence to illustrate the relationships between systems or between components of a system. (CI-ESS1-1, CI-PS1-8) **Constructing Explanations and Designing Solutions** Constructing explanations and designing solutions in 9–12 builds on K–8 experiences and progresses to explanations and designs that are supported by multiple and independent student-generated sources of evidence consistent with scientific ideas, principles, and theories. ▪ Apply scientific reasoning to link evidence to the claims to assess the extent to which the reasoning and data support the explanation or conclusion. (CI-ESS1-6) ▪ Design a solution to a complex real-world problem, based on scientific knowledge, student-generated sources of evidence, prioritized criteria, and tradeoff considerations. (CI2-ETS1-2) ▪ Evaluate a solution to a complex real-world problem, based on scientific knowledge, student-generated sources of evidence, prioritized criteria, and tradeoff considerations. (CI2-ETS1-3) **Obtaining, Evaluating, and Communicating Information** Obtaining, evaluating, and communicating information in 9–12 builds on K–8 experiences and progresses to evaluating the validity and reliability of the claims, methods, and designs. ▪ Communicate scientific ideas (e.g. about phenomena and/or the process of development and the	**ESS1.A: The Universe and Its Stars** ▪ The star called the sun is changing and will burn out over a lifespan of approximately 10 billion years. (CI-ESS1-1) ▪ The study of stars' light spectra and brightness is used to identify compositional elements of stars, their movements, and their distances from Earth. (CI-ESS1-3) ▪ Other than the hydrogen and helium formed at the time of the Big Bang, nuclear fusion within stars produces all atomic nuclei lighter than and including iron, and the process releases electromagnetic energy. Heavier elements are produced when certain massive stars achieve a supernova stage and explode. (CI-ESS1-3) **ESS1.C: The History of Planet Earth** ▪ Although active geologic processes, such as plate tectonics and erosion, have destroyed or altered most of the very early rock record on Earth, other objects in the solar system, such as lunar rocks, asteroids, and meteorites, have changed little over billions of years. Studying these objects can provide information about Earth's formation and early history. (CI-ESS1-6) **PS1.C: Nuclear Processes** ▪ Spontaneous radioactive decays follow a characteristic exponential decay law. Nuclear lifetimes allow radiometric dating to be used to determine the ages of rocks and other materials. (CI-ESS1-6) **PS3.D: Energy in Chemical Processes and Everyday Life** ▪ Nuclear Fusion processes in the center of the sun release the energy that ultimately reaches Earth as radiation. (CI-ESS1-1)	**Scale, Proportion, and Quantity** ▪ The significance of a phenomenon is dependent on the scale, proportion, and quantity at which it occurs. (CI-ESS1-1) **Energy and Matter** ▪ In nuclear processes, atoms are not conserved, but the total number of protons plus neutrons is conserved. (CI-PS1-8, CI-ESS1-3) **Stability and Change** ▪ Much of science deals with constructing explanations of how things change and how they remain stable. (CI-ESS1-6) **Systems and System Models** ▪ Models (e.g., physical, mathematical, computer models) can be used to simulate systems and interactions—including energy, matter, and information flows—within and between systems at different scales. (CI2-ETS1-4) --- ***Connections to Engineering, Technology, and Applications of Science*** **Influence of Science, Engineering, and Technology on Society and the Natural World** New technologies can have deep impacts on society and the environment, including some that were not anticipated. Analysis of costs and benefits is a critical aspect of decisions about technology. (CI2-ETS1-1, CI2-ETS1-3)

design and performance of a proposed process or system) in multiple formats (including orally, graphically, textually, and mathematically). (CI-ESS1-3) **Asking Questions and Defining Problems** Asking questions and defining problems in 9–12 builds on K–8 experiences and progresses to formulating, refining, and evaluating empirically testable questions and design problems using models and simulations. ▪ Analyze complex real-world problems by specifying criteria and constraints for successful solutions. (CI2-ETS1-1) **Using Mathematics and Computational Thinking** Mathematical and computational thinking in 9-12 builds on K-8 experiences and progresses to using algebraic thinking and analysis, a range of linear and nonlinear functions including trigonometric functions, exponentials and logarithms, and computational tools for statistical analysis to analyze, represent, and model data. Simple computational simulations are created and used based on mathematical models of basic assumptions. ▪ Use mathematical models and/or computer simulations to predict the effects of a design solution on systems and/or the interactions between systems. (CI2-ETS1-4) **---** ***Connections to Nature of Science*** **Science Models, Laws, Mechanisms, and Theories Explain Natural Phenomena** ▪ A scientific theory is a substantiated explanation of some aspect of the natural world, based on a body of facts that have been repeatedly confirmed through observation and experiment and the science	**PS1.C: Nuclear Processes** ▪ Nuclear processes, including fusion, fission, and radioactive decays of unstable nuclei, involve release or absorption of energy. The total number of neutrons plus protons does not change in any nuclear process. (CI-PS1-8) **ETS1.A: Defining and Delimiting Engineering Problems** ▪ Criteria and constraints also include satisfying any requirements set by society, such as taking issues of risk mitigation into account, and they should be quantified to the extent possible and stated in such a way that one can tell if a given design meets them. (CI2-ETS1-1) ▪ Humanity faces major global challenges today, such as the need for supplies of clean water and food or for energy sources that minimize pollution, which can be addressed through engineering. These global challenges also may have manifestations in local communities. (CI2-ETS1-1) **ETS1.B: Developing Possible Solutions** ▪ When evaluating solutions, it is important to take into account a range of constraints, including cost, safety, reliability, and aesthetics, and to consider social, cultural, and environmental impacts. (CI2-ETS1-3) ▪ Both physical models and computers can be used in various ways to aid in the engineering design process. Computers are useful for a variety of purposes, such as running simulations to test different ways of solving a problem or to see which one is most efficient or economical; and in making a persuasive presentation to a client about how a given design will meet his or her needs. (CI2-ETS1-4)	

community validates each theory before it is accepted. If new evidence is discovered that the theory does not accommodate, the theory is generally modified in light of this new evidence. (CI-ESS1-6) Models, mechanisms, and explanations collectively serve as tools in the development of a scientific theory. (CI-ESS1-6)	**ETS1.C: Optimizing the Design Solution** ▪ Criteria may need to be broken down into simpler ones that can be approached systematically, and decisions about the priority of certain criteria over others (trade-offs) may be needed. (CI2-ETS1-2)	

Connections to other DCIs in this course: **CI.PS1.A** (CI-ESS1-3); **CI.PS1.C** (CI-ESS1-1, CI-ESS1-3); **CI.PS2.A** (CI-ESS1-6); **CI.PS2.B** (CI-ESS1-6); **CI.PS3.A** (CI-ESS1-1, CI-PS1-8)**; CI.PS3.D** (CI-PS1-8); **CI.ESS1.A** (CI-PS1-8); **CI.ESS1.C** (CI-PS1-8)

Connections of DCIs across grade-bands: **7.PS1.A** (CI-ESS1-1, CI-ESS1-3, CI-PS1-8); **CI.PS1.B** (CI-PS1-8); **8.PS2.B** (CI-ESS1-6); **8.PS4.B** (CI-ESS1-1); **8.ESS1.A** (CI-ESS1-1, CI-ESS1-3); **8.ESS1.B** (CI-ESS1-6); **8.ESS1.C** (CI-ESS1-6); **7.ESS2.A** (CI-ESS1-1, CI-ESS1-6, CI-PS1-8); **7.ESS2.B** (CI-ESS1-6); **6.ESS2.D** (CI-ESS1-1); **6-8.ETS1.A** (CI2-ETS1-1, CI2-ETS1-2, CI2-ETS1-3, CI2-ETS1-4); **6-8.ETS1.B** (CI2-ETS1-2, CI2-ETS1-3, CI2-ETS1-4); **6-8.ETS1.C** (CI2-ETS1-2, CI2-ETS1-4)

Connections to the Arkansas Disciplinary Literacy Standards:

RST.11-12.1 Cite specific textual evidence to support analysis of science and technical texts, attending to important distinctions the author makes and to any gaps or inconsistencies in the account. (CI-ESS1-1, CI-ESS1-6)

RST.11-12.7 Integrate and evaluate multiple sources of information presented in diverse formats and media (e.g., quantitative data, video, multimedia) in order to address a question or solve a problem. (CI2-ETS1-1, CI2-ETS1-3)

RST.11-12.8 Evaluate the hypotheses, data, analysis, and conclusions in a science or technical text, verifying the data when possible and corroborating or challenging conclusions with other sources of information. (CI-ESS1-6, CI2-ETS1-1, CI2-ETS1-3)

RST.11-12.9 Synthesize information from a range of sources (e.g., texts, experiments, simulations) into a coherent understanding of a process, phenomenon, or concept, resolving conflicting information when possible. (CI2-ETS1-1, CI2-ETS1-3)

WHST.9-12.1 Write arguments focused on discipline-specific content. (CI-ESS1-6)

WHST.9-12.2 Write informative/explanatory texts, including the narration of historical events, scientific procedures/ experiments, or technical processes. (CI-ESS1-3)

Connections to the Arkansas Language Arts Standards:

SL.11-12.4 Present information, findings, and supporting evidence, conveying a clear and distinct perspective, such that listeners can follow the line of reasoning, alternative or opposing perspectives are addressed, and the organization, development, substance, and style are appropriate to purpose, audience, and a range of formal and informal tasks. (CI-ESS1-3)

Connections to the Arkansas Mathematics Standards:

MP.2 Reason abstractly and quantitatively. (CI-ESS1-1, CI-ESS1-3, CI-ESS1-6, CI2-ETS1-1, CI2-ETS1-3, CI2-ETS1-4)

MP.4 Model with mathematics. (CI-ESS1-1, CI-PS1-8, CI2-ETS1-1, CI2-ETS1-2, CI2-ETS1-3, CI2-ETS1-4)

HSN.Q.A.1 Use units as a way to understand problems and to guide the solution of multi-step problems; choose and interpret units consistently in formulas; choose and interpret the scale and the origin in graphs and data displays. (CI-ESS1-1, CI-ESS1-6, CI-PS1-8)

HSN.Q.A.2 Define appropriate quantities for the purpose of descriptive modeling. (CI-ESS1-1, CI-PS1-8, CI-ESS1-6)

HSN.Q.A.3	Choose a level of accuracy appropriate to limitations on measurement when reporting quantities. (CI-ESS1-1, CI-ESS1-6, CI-PS1-8)
HSA.SSE.A.1	Interpret expressions that represent a quantity in terms of its context; interpret parts of an expression using appropriate vocabulary, such as terms, factors, and coefficients; interpret complicated expressions by viewing one or more of their parts as a single entity. (CI-ESS1-1)
HSA.CED.A.2	Create equations in two or more variables to represent relationships between quantities; graph equations, in two variables, on coordinate plane. (CI-ESS1-1)
HSA.CED.A.4	Rearrange literal equations using the properties of equality. (CI-ESS1-1)
HSF.IF.B.5	Relate the domain of a function to its graph; relate the domain of a function to the quantitative relationship it describes. (CI-ESS1-6)
HSS.ID.B.6	Represent data on two quantitative variables on a scatter plot, and describe how those variables are related; fit a function to the data; use functions fitted to solve problems in the context of data; informally assess the fit of a function by plotting and analyzing residuals. (CI-ESS1-6)

Chemistry - Integrated

Topic 3: Energy Flow

Students who demonstrate understanding can:

CI-PS1-4 Develop a model to illustrate that the release or absorption of energy from a chemical reaction system depends upon the changes in total bond energy. [Clarification Statement: Emphasis is on the idea that a chemical reaction is a system that affects the energy change. Examples of models could include molecular-level drawings and diagrams of reactions, graphs showing the relative energies of reactants and products, and representations showing energy is conserved.] [Assessment Boundary: Assessment does not include calculating the total bond energy changes during a chemical reaction from the bond energies of reactants and products.]

CI-PS1-5 Apply scientific principles and evidence to provide an explanation about the effects of changing the temperature or concentration of the reacting particles on the rate at which a reaction occurs. [Clarification Statement: Emphasis is on student reasoning that focuses on the number and energy of collisions between molecules.] [Assessment Boundary: Assessment is limited to simple reactions in which there are only two reactants; evidence from temperature, concentration, and rate data; and qualitative relationships between rate and temperature.]

CI-PS3-1 Create a computational model to calculate the change in the energy of one component in a system when the change in energy of the other component(s) and energy flows in and out of the system are known. [AR Clarification Statement: This PE is fully addressed in this course. Emphasis is on explaining the meaning of mathematical expressions used in the model.] [AR Assessment Boundary: Assessment is limited to systems of two or three components and to thermal energy, kinetic energy, and the energies in gravitational, magnetic, or electric fields.]

CI-ESS1-2 Construct an explanation of the Big Bang theory based on astronomical evidence of light spectra, motion of distant galaxies, and composition of matter in the universe. [Clarification Statement: Emphasis is on the astronomical evidence of the red shift of light from galaxies as an indication that the universe is currently expanding, the cosmic microwave background as the remnant radiation from the Big Bang, and the observed composition of ordinary matter of the universe, primarily found in stars and interstellar gases (from the spectra of electromagnetic radiation from stars), which matches that predicted by the Big Bang theory (3/4 hydrogen and 1/4 helium).]

CI-ESS2-3 Develop a model based on evidence of Earth's interior to describe the cycling of matter by thermal convection. [Clarification Statement: Emphasis is on both a one dimensional model of Earth, with radial layers determined by density, and a three-dimensional model, which is controlled by mantle convection and the resulting plate tectonics. Examples of evidence include maps of Earth's three-dimensional structure obtained from seismic waves, records of the rate of change of Earth's magnetic field (as constraints on convection in the outer core), and identification of the composition of Earth's layers from high-pressure laboratory experiments.]

CI-ESS3-4 Evaluate or refine a technological solution that reduces impacts of human activities on natural systems.* [AR Clarification Statement: This PE is fully addressed in this course. Emphasis is on the impacts of human activities on physical systems. Examples of data on the impacts of human activities could include the quantities and types of pollutants released (fertilizer, surface mining, and nuclear byproducts). Examples for limiting future impacts could range from local efforts (reducing, reusing, and recycling resources) to large-scale engineering design solutions (nuclear power, photovoltaic cells, wind power, and water power).]

CI3-ETS1-1

Analyze a major global challenge to specify qualitative and quantitative criteria and constraints for solutions that account for societal needs and wants. [AR Clarification Statement: Examples of the applications could include renewable energy resources (solar cells and wind farms), the Haber process for the production of fertilizers, and increased fuel efficiency of combustion engines.]

The performance expectations above were developed using the following elements from the NRC document *A Framework for K-12 Science Education*:

Science and Engineering Practices

Developing and Using Models

Modeling in 9–12 builds on K–8 and progresses to using, synthesizing, and developing models to predict and show relationships among variables between systems and their components in the natural and designed worlds.

- Develop a model based on evidence to illustrate the relationships between systems or between components of a system. (CI-PS1-4, CI-ESS2-3)

Constructing Explanations and Designing Solutions

Constructing explanations and designing solutions in 9–12 builds on K–8 experiences and progresses to explanations and designs that are supported by multiple and independent student-generated sources of evidence consistent with scientific ideas, principles, and theories.

- Apply scientific principles and evidence to provide an explanation of phenomena and solve design problems, taking into account possible unanticipated effects. (CI-PS1-5)
- Construct an explanation based on valid and reliable evidence obtained from a variety of sources (including students' own investigations, theories, simulations, peer review) and the assumption that theories and laws that describe the natural world operate today as they did in the past and will continue to do so in the future. (CI-ESS1-2)
- Design or refine a solution to a complex real-world problem, based on scientific knowledge, student-generated sources of evidence, prioritized criteria, and tradeoff considerations. (CI-ESS3-4)

Using Mathematics and Computational Thinking

Mathematical and computational thinking at the 9–12 level builds on K–8 and progresses to using algebraic thinking and analysis, a range of linear and nonlinear functions including

Disciplinary Core Ideas

PS1.A: Structure and Properties of Matter

- A stable molecule has less energy than the same set of atoms separated; one must provide at least this energy in order to take the molecule apart. (CI-PS1-4)

PS1.B: Chemical Reactions

- Chemical processes, their rates, and whether or not energy is stored or released can be understood in terms of the collisions of molecules and the rearrangements of atoms into new molecules, with consequent changes in the sum of all bond energies in the set of molecules that are matched by changes in kinetic energy. (CI-PS1-4, CI-PS1-5)

PS3.A: Definitions of Energy

Energy is a quantitative property of a system that depends on the motion and interactions of matter and radiation within that system. That there is a single quantity called energy is due to the fact that a system's total energy is conserved, even as, within the system, energy is continually transferred from one object to another and between its various possible forms. (CI-PS3-1)

PS3.B: Conservation of Energy and Energy Transfer

- Conservation of energy means that the total change of energy in any system is always equal to the total energy transferred into or out of the system. (CI-PS3-1)
- Energy cannot be created or destroyed, but it can be transported from one place to another and transferred between systems. (CI-PS3-1)
- Mathematical expressions, which quantify how the stored energy in a system depends on its configuration (e.g. relative positions of charged particles, compression

Crosscutting Concepts

Patterns

- Different patterns may be observed at each of the scales at which a system is studied and can provide evidence for causality in explanations of phenomena. (CI-PS1-5)

Energy and Matter

- Changes of energy and matter in a system can be described in terms of energy and matter flows into, out of, and within that system. (CI-PS1-4)
- Energy cannot be created or destroyed–only moved between one place and another place, between objects and/or fields, or between systems. (CI-ESS1-2)
- Energy drives the cycling of matter within and between systems. (CI-ESS2-3)

Systems and System Models

- Models can be used to predict the behavior of a system, but these predictions have limited precision and reliability due to the assumptions and approximations inherent in models. (CI-PS3-1)

Stability and Change

- Feedback (negative or positive) can stabilize or destabilize a system. (CI-ESS3-4)

Connections to Nature of Science

Scientific Knowledge Assumes an Order and

trigonometric functions, exponentials and logarithms, and computational tools for statistical analysis to analyze, represent, and model data. Simple computational simulations are created and used based on mathematical models of basic assumptions.

- Create a computational model or simulation of a phenomenon, designed device, process, or system. (CI-PS3-1)

Asking Questions and Defining Problems

Asking questions and defining problems in 9–12 builds on K–8 experiences and progresses to formulating, refining, and evaluating empirically testable questions and design problems using models and simulations.

- Analyze complex real-world problems by specifying criteria and constraints for successful solutions. (CI3-ETS1-1)

of a spring) and how kinetic energy depends on mass and speed, allow the concept of conservation of energy to be used to predict and describe system behavior. (CI-PS3-1)

- The availability of energy limits what can occur in any system. (CI-PS3-1)

PS4.B Electromagnetic Radiation

- Atoms of each element emit and absorb characteristic frequencies of light. These characteristics allow identification of the presence of an element, even in microscopic quantities. (CI-ESS1-2)

ESS1.A: The Universe and Its Stars

- The study of stars' light spectra and brightness is used to identify compositional elements of stars, their movements, and their distances from Earth. (CI-ESS1-2)
- The Big Bang theory is supported by observations of distant galaxies receding from our own, of the measured composition of stars and non-stellar gases, and of the maps of spectra of the primordial radiation (cosmic microwave background) that still fills the universe. (CI-ESS1-2)
- Other than the hydrogen and helium formed at the time of the Big Bang, nuclear fusion within stars produces all atomic nuclei lighter than and including iron, and the process releases electromagnetic energy. Heavier elements are produced when certain massive stars achieve a supernova stage and explode. (CI-ESS1-2)

ESS2.A: Earth Materials and Systems

- Evidence from deep probes and seismic waves, reconstructions of historical changes in Earth's surface and its magnetic field, and an understanding of physical and chemical processes lead to a model of Earth with a hot but solid inner core, a liquid outer core, a

Consistency in Natural Systems

- Science assumes the universe is a vast single system in which basic laws are consistent. (CI-PS3-1, CI-ESS1-2)
- Scientific knowledge is based on the assumption that natural laws operate today as they did in the past and they will continue to do so in the future. (CI-ESS1-2)

Connections to Engineering, Technology, and Applications of Science

Interdependence of Science, Engineering, and Technology

- Science and engineering complement each other in the cycle known as research and development (R&D). Many R&D projects may involve scientists, engineers, and others with wide ranges of expertise. (CI-ESS1-2, CI-ESS2-3)

Influence of Engineering, Technology, and Science on Society and the Natural World

- Engineers continuously modify these technological systems by applying scientific knowledge and engineering design practices to increase benefits while decreasing costs and risks. (CI-ESS3-4)
- New technologies can have deep impacts on society and the environment, including some that were not

	solid mantle and crust. Motions of the mantle and its plates occur primarily through thermal convection, which involves the cycling of matter due to the outward flow of energy from Earth's interior and gravitational movement of denser materials toward the interior. (CI-ESS2-3) **ESS2.B: Plate Tectonics and Large-Scale System Interactions** ▪ The radioactive decay of unstable isotopes continually generates new energy within Earth's crust and mantle, providing the primary source of the heat that drives mantle convection. Plate tectonics can be viewed as the surface expression of mantle convection. (CI-ESS2-3) **ESS3.C: Human Impacts on Earth Systems** ▪ Scientists and engineers can make major contributions by developing technologies that produce less pollution and waste and that preclude ecosystem degradation. (CI-ESS3-4) **ETS1.A: Defining and Delimiting Engineering Problems** ▪ Criteria and constraints also include satisfying any requirements set by society, such as taking issues of risk mitigation into account, and they should be quantified to the extent possible and stated in such a way that one can tell if a given design meets them. (CI3-ETS1-1) ▪ Humanity faces major global challenges today, such as the need for supplies of clean water and food or for energy sources that minimize pollution, which can be addressed through engineering. These global challenges also may have manifestations in local communities. (CI3-ETS1-1)	anticipated. Analysis of costs and benefits is a critical aspect of decisions about technology. (CI3-ETS1-1)

	ETS1.B: Developing Possible Solutions ▪ When evaluating solutions, it is important to take into account a range of constraints, including cost, safety, reliability, and aesthetics, and to consider social, cultural, and environmental impacts. (CI-ESS3-4)	

Connections to other DCIs in this course: **CI.PS1.A** (CI-ESS1-2); **CI.PS1.B** (CI-PS3-1); **CI.PS1.C** (CI-ESS1-2); **CI.PS2.B** (CI-ESS2-3); **CI.PS3.A** (CI-PS1-4, CI-PS1-5, CI-ESS1-2); **CI.PS4.A** (CI-ESS1-2); **CI.ESS1.A** (CI-PS1-8, CI-PS3-1)

Connections to DCIs across grade-bands: **7.PS1.A** (CI-PS1-4, CI-ESS1-2, CI-ESS2-3); **7.PS1.B** (CI-PS1-4, CI-PS1-5, CI-ESS2-3); **8.PS2.B** (CI-PS1-4, CI-PS1-5,CI-ESS2-3); **8.PS3.A** (CI-PS1-5, CI-ESS2-3, CI-ESS2-3); **8.PS3.B** (CI-PS1-5),(CI-PS3-1),(CI-ESS2-3); **6.PS3.D** (CI-PS1-4); **8.PS4.B** (CI-ESS1-2); **8.ESS1.A** (CI-ESS1-2); **7.ESS2.A** (CI-PS3-1, CI-ESS2-3, CI-ESS3-4); **7.ESS2.B** (CI-ESS2-3); **7.ESS3.B** (CI-ESS3-4); **6.ESS3.C** (CI-ESS3-4); **6.ESS3.D** (CI-ESS3-4); **6-8.ETS1.A** (CI3-ETS1-1)

Connections to the Arkansas Disciplinary Literacy Standards:

RST.11-12.1 Cite specific textual evidence to support analysis of science and technical texts, attending to important distinctions the author makes and to any gaps or inconsistencies in the account. (CI-PS1-5, CI-ESS1-2, CI-ESS2-3, CI-ESS3-4)

RST.11-12.7 Integrate and evaluate multiple sources of information presented in diverse formats and media (e.g., quantitative data, video, multimedia) in order to address a question or solve a problem. (CI3-ETS1-1)

RST.11-12.8 Evaluate the hypotheses, data, analysis, and conclusions in a science or technical text, verifying the data when possible and corroborating or challenging conclusions with other sources of information. (CI-ESS3-4, CI3-ETS1-1)

RST.11-12.9 Synthesize information from a range of sources (e.g., texts, experiments, simulations) into a coherent understanding of a process, phenomenon, or concept, resolving conflicting information when possible. (CI3-ETS1-1)

WHST.9-12.2 Write informative/explanatory texts, including the narration of historical events, scientific procedures/ experiments, or technical processes. (CI-PS1-5, CI-ESS1-2)

Connections to the Arkansas English Language Arts Standards:

SL.11-12.5 Make strategic use of digital media (e.g., textual, graphical, audio, visual, and interactive elements) in presentations to enhance understanding of findings, reasoning, and evidence and to add interest. (CI-PS1-4, CI-PS3-1, CI-ESS2-3)

Connections to the Arkansas Mathematics Standards:

MP.2 Reason abstractly and quantitatively. (CI-PS1-5, CI-PS3-1, CI-ESS1-2, CI-ESS2-3, CI-ESS3-4, CI3-ETS1-1)

MP.4 Model with mathematics. (CI-PS1-4, CI-PS3-1, CI-ESS2-3, CI3-ETS1-1)

HSN.Q.A.1 Use units as a way to understand problems and to guide the solution of multi-step problems; choose and interpret units consistently in formulas; choose and interpret the scale and the origin in graphs and data displays. (CI-PS1-4, CI-PS1-5, CI-PS3-1, CI-ESS1-2, CI-ESS2-3, CI-ESS3-4)

HSN.Q.A.2 Define appropriate quantities for the purpose of descriptive modeling. (CI-PS1-4, CI-PS3-1, CI-ESS1-2, CI-ESS2-3, CI-ESS3-4)

HSN.Q.A.3 Choose a level of accuracy appropriate to limitations on measurement when reporting quantities. (CI-PS1-4, CI-PS1-5, CI-PS3-1, CI-ESS1-2, CI-ESS2-3, CI-ESS3-4)

HSA.SSE.A.1 Interpret expressions that represent a quantity in terms of its context; interpret parts of an expression using appropriate vocabulary, such as terms, factors, and coefficients; interpret complicated expressions by viewing one or more of their parts as a single entity. (CI-ESS1-2)

HSA.CED.A.2	Create equations in two or more variables to represent relationships between quantities; graph equations, in two variables, on a coordinate plane. (CI-ESS1-2)
HSA.CED.A.4	Rearrange literal equations using the properties of equality. (CI-ESS1-2)

Topic 4: Waves

Students who demonstrate understanding can:

CI-PS4-1 Use mathematical representations to support a claim regarding relationships among the frequency, wavelength, and speed of waves traveling in various media. [AR Clarification Statement: This PE is fully addressed in this course. Examples of data could include electromagnetic radiation traveling in a vacuum and glass as well as seismic waves traveling through the Earth.] [Assessment Boundary: Assessment is limited to algebraic relationships and describing those relationships qualitatively.]

CI-PS4-3 Evaluate the claims, evidence, and reasoning behind the idea that electromagnetic radiation can be described either by a wave model or a particle model, and that for some situations one model is more useful than the other. [Clarification Statement: Emphasis is on how the experimental evidence supports the claim and how a theory is generally modified in light of new evidence. Examples of a phenomenon could include resonance, interference, diffraction, and photoelectric effect.] [Assessment Boundary: Assessment does not include using quantum theory.]

CI-PS4-4 Evaluate the validity and reliability of claims in published materials of the effects that different frequencies of electromagnetic radiation have when absorbed by matter. [Clarification Statement: Emphasis is on the idea that photons associated with different frequencies of light have different energies, and the damage to living tissue from electromagnetic radiation depends on the energy of the radiation. Examples of published materials could include trade books, magazines, web resources, videos, and other passages that may reflect bias.] [Assessment Boundary: Assessment is limited to qualitative descriptions.]

CI-PS4-5 Communicate technical information about how some technological devices use the principles of wave behavior and wave interactions with matter to transmit and capture information and energy.* [Clarification Statement: Examples could include solar cells capturing light and converting it to electricity; medical imaging; and communications technology.] [Assessment Boundary: Assessments are limited to qualitative information. Assessments do not include band theory.]

CI4-ETS1-4

Use a computer simulation to model the impact of proposed solutions to a complex real-world problem with numerous criteria and constraints on interactions within and between systems relevant to the problem. [AR Clarification Statement: Examples could include information transfer using fiber optics, radio waves, and medical imaging.]

The performance expectations above were developed using the following elements from the NRC document *A Framework for K-12 Science Education*:

Science and Engineering Practices	Disciplinary Core Ideas	Crosscutting Concepts
Using Mathematics and Computational Thinking Mathematical and computational thinking at the 9-12 level builds on K-8 and progresses to using algebraic thinking and analysis, a range of linear and nonlinear functions including trigonometric functions, exponentials and logarithms, and computational tools for statistical analysis to analyze, represent, and model data. Simple computational simulations are created and used based on mathematical models of basic assumptions. ▪ Use mathematical representations of phenomena or design solutions to	**PS3.D: Energy in Chemical Processes** ▪ Solar cells are human-made devices that likewise capture the sun's energy and produce electrical energy. (CI-PS4-5) **PS4.A: Wave Properties** ▪ The wavelength and frequency of a wave are related to one another by the speed of travel of the wave, which depends on the type of wave and the medium through which it is passing. (CI-PS4-1)	**Cause and Effect** ▪ Empirical evidence is required to differentiate between cause and correlation and make claims about specific causes and effects. (CI-PS4-1) ▪ Cause and effect relationships can be suggested and predicted for complex natural and human designed systems by examining what is

- describe and/or support claims and/or explanations. (CI-PS4-1)
- Use mathematical models and/or computer simulations to predict the effects of a design solution on systems and/or the interactions between systems. (CI4-ETS1-4)

Engaging in Argument from Evidence

Engaging in argument from evidence in 9–12 builds on K–8 experiences and progresses to using appropriate and sufficient evidence and scientific reasoning to defend and critique claims and explanations about natural and designed worlds. Arguments may also come from current scientific or historical episodes in science.

- Evaluate the claims, evidence, and reasoning behind currently accepted explanations or solutions to determine the merits of arguments. (CI-PS4-3)

Obtaining, Evaluating, and Communicating Information

Obtaining, evaluating, and communicating information in 9–12 builds on K–8 and progresses to evaluating the validity and reliability of the claims, methods, and designs.

- Evaluate the validity and reliability of multiple claims that appear in scientific and technical texts or media reports, verifying the data when possible. (CI-PS4-4)
- Communicate technical information or ideas (e.g. about phenomena and/or the process of development and the design and performance of a proposed process or system) in multiple formats (including orally, graphically, textually, and mathematically). (CI-PS4-5)

Connections to Nature of Science

Science Models, Laws, Mechanisms, and Theories Explain Natural Phenomena

- A scientific theory is a substantiated explanation of some aspect of the natural world, based on a body of facts that have been repeatedly confirmed

- Information can be digitized (e.g., a picture stored as the values of an array of pixels); in this form, it can be stored reliably in computer memory and sent over long distances as a series of wave pulses. (CI-PS4-5)
- [From the 3–5 grade band endpoints] Waves can add or cancel one another as they cross, depending on their relative phase (i.e., relative position of peaks and troughs of the waves), but they emerge unaffected by each other. (Boundary: The discussion at this grade level is qualitative only; it can be based on the fact that two different sounds can pass a location in different directions without getting mixed up.) (CI-PS4-3)

PS4.B: Electromagnetic Radiation

- Electromagnetic radiation (e.g., radio, microwaves, light) can be modeled as a wave of changing electric and magnetic fields or as particles called photons. The wave model is useful for explaining many features of electromagnetic radiation, and the particle model explains other features. (CI-PS4-3)
- When light or longer wavelength electromagnetic radiation is absorbed in matter, it is generally converted into thermal energy (heat). Shorter wavelength electromagnetic radiation (ultraviolet, X-rays, gamma rays) can ionize atoms and cause damage to living cells. (CI-PS4-4)
- Photoelectric materials emit electrons when they absorb light of a high-enough frequency. (CI-PS4-5)

PS4.C: Information Technologies and Instrumentation

- Multiple technologies based on the understanding of waves and their interactions with matter are part of everyday experiences in the modern world (e.g., medical imaging, communications, and scanners) and in scientific research. They are essential tools for producing, transmitting, and capturing signals

known about smaller scale mechanisms within the system. (CI-PS4-4)
- Systems can be designed to cause a desired effect. (CI-PS4-5)

Systems and System Models

- Models (e.g., physical, mathematical, computer models) can be used to simulate systems and interactions—including energy, matter, and information flows—within and between systems at different scales. (CI-PS4-3, CI4-ETS1-4)

Connections to Engineering, Technology, and Applications of Science

Interdependence of Science, Engineering, and Technology

- Science and engineering complement each other in the cycle known as research and development (R&D). (CI-PS4-5)

Influence of Engineering, Technology, and Science on Society and the Natural World

- Modern civilization depends on major technological systems. (CI-PS4-5)

through observation and experiment and the science community validates each theory before it is accepted. If new evidence is discovered that the theory does not accommodate, the theory is generally modified in light of this new evidence. (CI-PS4-3)	and for storing and interpreting the information contained in them. (CI-PS4-5) **ETS1.B: Developing Possible Solutions** ▪ Both physical models and computers can be used in various ways to aid in the engineering design process. Computers are useful for a variety of purposes, such as running simulations to test different ways of solving a problem or to see which one is most efficient or economical; and in making a persuasive presentation to a client about how a given design will meet his or her needs. (CI4-ETS1-4)	

Connections to other DCIs in this course: **CI.PS1.C** (CI-PS4-4); **CI.PS3.A** (CI-PS4-4, CI-PS4-5); **CI.PS3.D** (CI-PS4-3, CI-PS4-4); **CI.ESS1.A** (CI-PS4-3); **CI.ESS2.A** (CI-PS4-1); **CI.ESS2.D** (CI-PS4-3)

Connections to DCIs across grade-bands: **6.PS3.D** (CI-PS4-4); **8.PS4.A** (CI-PS4-1, CI-PS4-5); **8.PS4.B** (CI-PS4-1, CI-PS4-3, CI-PS4-4, CI-PS4-5); **8.PS4.C**,(CI-PS4-5); **6.ESS2.D** (CI-PS4-4); **6-8.ETS1.A** (CI4-ETS1-4); **6-8.ETS1.B** (CI4-ETS1-4); **6-8.ETS1.C** (CI4-ETS1-4)

Connections to the Arkansas Disciplinary Literacy Standards:

RST.9-10.8 Assess the extent to which the reasoning and evidence in a text support the author's claim or a recommendation for solving a scientific or technical problem. (CI-PS4-3, CI-PS4-4)

RST.11-12.1 Cite specific textual evidence to support analysis of science and technical texts, attending to important distinctions the author makes and to any gaps or inconsistencies in the account. (CI-PS4-3, CI-PS4-4)

RST.11-12.7 Integrate and evaluate multiple sources of information presented in diverse formats and media (e.g., quantitative data, video, multimedia) in order to address a question or solve a problem. (CI-PS4-1, CI-PS4-4)

RST.11-12.8 Evaluate the hypotheses, data, analysis, and conclusions in a science or technical text, verifying the data when possible and corroborating or challenging conclusions with other sources of information. (CI-PS4-3, CI-PS4-4)

WHST.9-12.2 Write informative/explanatory texts, including the narration of historical events, scientific procedures/ experiments, or technical processes. (CI-PS4-5)

WHST.11-12.8 Gather relevant information from multiple authoritative print and digital sources, using advanced searches effectively; assess the strengths and limitations of each source in terms of the specific task, purpose, and audience; integrate information into the text selectively to maintain the flow of ideas, avoiding plagiarism and overreliance on any one source and following a standard format for citation. (CI-PS4-4)

Connections to the Arkansas Mathematics Standards:

MP.2 Reason abstractly and quantitatively. (CI-PS4-1, CI-PS4-3, CI4-ETS1-4)

MP.4 Model with mathematics. (CI-PS4-1, CI-ETS1-4)

HSA.SSE.A.1 Interpret expressions that represent a quantity in terms of its context. (CI-PS4-1, CI-PS4-3)

HSA.SSE.B.3 Choose and produce an equivalent form of an expression to reveal and explain properties of the quantity represented by the expression; factor a quadratic expression to reveal the zeros of the function it defines; complete the square in a quadratic expression to reveal the maximum or minimum value of the function it defines; use the properties of exponents to transform expressions for exponential functions. (CI-PS4-1, CI-PS4-3)

HSA.CED.A.4 Rearrange literal equations using the properties of equality. (CI-PS4-1, CI-PS4-3)

Topic 5: Forces

Students who demonstrate understanding can:

CI-PS2-1 Analyze data to support the claim that Newton's second law of motion describes the mathematical relationship among the net force on a macroscopic object, its mass, and its acceleration. [AR Clarification Statement: This PE is fully addressed in this course. Examples of data could include tables or graphs of position or velocity as a function of time for objects subject to a net unbalanced force (a falling object, an object rolling down a ramp, or a moving object being pulled by a constant force).] [Assessment Boundary: Assessment is limited to one-dimensional motion and to macroscopic objects moving at non-relativistic speeds.]

CI-PS2-2 Use mathematical representations to support the claim that the total momentum of a system of objects is conserved when there is no net force on the system. [Clarification Statement: Emphasis is on the quantitative conservation of momentum in interactions and the qualitative meaning of this principle.] [Assessment Boundary: Assessment is limited to systems of two macroscopic bodies moving in one dimension.]

CI-PS2-4 Use mathematical representations of Newton's Law of Gravitation and Coulomb's Law to describe and predict the gravitational and electrostatic forces between objects. [Clarification Statement: Emphasis is on both quantitative and conceptual descriptions of gravitational and electric fields.] [Assessment Boundary: Assessment is limited to systems with two objects.]

CI-PS3-5 Develop and use a model of two objects interacting through electric or magnetic fields to illustrate the forces between objects and the changes in energy of the objects due to the interaction. [Clarification Statement: Examples of models could include drawings, diagrams, and texts, such as drawings of what happens when two charges of opposite polarity are near each other.] [Assessment Boundary: Assessment is limited to systems containing two objects.]

CI-ESS1-4 Use mathematical or computational representations to predict the motion of orbiting objects in the solar system. [Clarification Statement: Emphasis is on Newtonian gravitational laws governing orbital motions, which apply to human-made satellites as well as planets and moons.] [Assessment Boundary: Mathematical representations for the gravitational attraction of bodies and Kepler's laws of orbital motions should not deal with more than two bodies, nor involve calculus.]

CI5-ETS1-2

Design a solution to a complex real-world problem by breaking it down into smaller, more manageable problems that can be solved through engineering. [AR Clarification Statement: Examples of solutions could include satellite deployment, airbag design, gravity assist, sports safety, and elevators.]

The performance expectations above were developed using the following elements from the NRC document *A Framework for K-12 Science Education*:

Science and Engineering Practices	Disciplinary Core Ideas	Crosscutting Concepts
Analyzing and Interpreting Data Analyzing data in 9–12 builds on K–8 and progresses to introducing more detailed statistical analysis, the comparison of data sets for consistency, and the use of models to generate and analyze data. ▪ Analyze data using tools, technologies, and/or models (e.g., computational, mathematical) in order to make valid and reliable scientific claims or determine an optimal design solution. (CI-PS2-1)	**PS2.A: Forces and Motion** ▪ Newton's second law accurately predicts changes in the motion of macroscopic objects. (CI-PS2-1) ▪ Momentum is defined for a particular frame of reference; it is the mass times the velocity of the object. (CI-PS2-2) ▪ If a system interacts with objects outside itself, the total momentum of the system can change; however, any such change is	**Patterns** ▪ Different patterns may be observed at each of the scales at which a system is studied and can provide evidence for causality in explanations of phenomena. (CI-PS2-4) **Cause and Effect** ▪ Empirical evidence is required to differentiate between cause and

Using Mathematics and Computational Thinking Mathematical and computational thinking at the 9–12 level builds on K–8 and progresses to using algebraic thinking and analysis, a range of linear and nonlinear functions including trigonometric functions, exponentials and logarithms, and computational tools for statistical analysis to analyze, represent, and model data. Simple computational simulations are created and used based on mathematical models of basic assumptions. ▪ Use mathematical representations of phenomena to describe explanations. (CI-PS2-2, CI-PS2-4, CI-ESS1-4) **Developing and Using Models** Modeling in 9–12 builds on K–8 and progresses to using, synthesizing, and developing models to predict and show relationships among variables between systems and their components in the natural and designed worlds. ▪ Develop and use a model based on evidence to illustrate the relationships between systems or between components of a system. (CI-PS3-2, CI-PS3-5) **Constructing Explanations and Designing Solutions** Constructing explanations and designing solutions in 9–12 builds on K–8 experiences and progresses to explanations and designs that are supported by multiple and independent student-generated sources of evidence consistent with scientific ideas, principles and theories. ▪ Design a solution to a complex real-world problem, based on scientific knowledge, student-generated sources of evidence, prioritized criteria, and tradeoff considerations. (CI5-ETS1-2)	balanced by changes in the momentum of objects outside the system. (CI-PS2-2) **PS2.B: Types of Interactions** ▪ Newton's law of universal gravitation and Coulomb's law provide the mathematical models to describe and predict the effects of gravitational and electrostatic forces between distant objects. (CI-PS2-4) ▪ Forces at a distance are explained by fields (gravitational, electric, and magnetic) permeating space that can transfer energy through space. Magnets or electric currents cause magnetic fields; electric charges or changing magnetic fields cause electric fields. (CI-PS2-4) **PS3.C: Relationship Between Energy and Forces** ▪ When two objects interacting through a field change relative position, the energy stored in the field is changed. (CI-PS3-5) **ESS1.B: Earth and the Solar System** ▪ Kepler's laws describe common features of the motions of orbiting objects, including their elliptical paths around the sun. Orbits may change due to the gravitational effects from, or collisions with, other objects in the solar system. (CI-ESS1-4) **ETS1.C: Optimizing the Design Solution** Criteria may need to be broken down into simpler ones that can be approached systematically, and decisions about the priority of certain criteria over others (trade-offs) may be needed. (CI5-ETS1-2)	correlation and make claims about specific causes and effects. (CI-PS2-1) ▪ Cause and effect relationships can be suggested and predicted for complex natural and human designed systems by examining what is known about smaller scale mechanisms within the system. (CI-PS3-5) **Systems and System Models** ▪ When investigating or describing a system, the boundaries and initial conditions of the system need to be defined. (CI-PS2-2) **Scale, Proportion, and Quantity** ▪ Algebraic thinking is used to examine scientific data and predict the effect of a change in one variable on another (e.g., linear growth vs. exponential growth). (CI-ESS1-4) ----------------------------------- ***Connections to Engineering, Technology, and Applications of Science*** **Interdependence of Science, Engineering, and Technology** ▪ Science and engineering complement each other in the cycle known as research and development (R&D). Many R&D projects may involve scientists, engineers, and others with wide ranges of expertise. (CI-ESS1-4)

-- ***Connections to Nature of Science*** **Science Models, Laws, Mechanisms, and Theories Explain Natural Phenomena** ▪ Theories and laws provide explanations in science. (CI-PS2-1, CI-PS2-4) ▪ Laws are statements or descriptions of the relationships among observable phenomena. (CI-PS2-1, CI-PS2-4)		

Connections to other DCIs in this course: **CI.PS3.A** (HS-PS2-4); **CI.PS2.B** (CI-PS3-5, CI-ESS1-4); **CI.PS3.C** (CI-PS2-1); **CI.ESS1.A** (CI-PS2-1, CI-PS2-2, CI-PS2-4); **CI.ESS1.B** (CI-PS2-4); **CI.ESS1.C** (CI-PS2-1, CI-PS2-2, CI-PS2-4); **CI.ESS2.C** (CI-PS2-1, CI-PS2-4)

Connections to DCIs across grade-bands: **8.PS2.A** (CI-PS2-1, CI-PS2-2, CI-ESS1-4); **8.PS2.B** (CI-PS2-4, CI-PS3-5, CI-ESS1-4); **6.PS3.C** (CI-PS2-1, CI-PS2-2, CI-PS3-5); **8.ESS1.A** (CI-ESS1-4); **8.ESS1.B** (CI-PS2-4, CI-ESS1-4); **7.ESS2.B** (CI-ESS1-5); **6-8.ETS1.A** (CI5-ETS1-2); **6-8.ETS1.B** (CI5-ETS1-2); **6-8.ETS1.C** (CI5-ETS1-2)

Connections to the Arkansas Disciplinary Literacy Standards:

RST.11-12.1 Cite specific textual evidence to support analysis of science and technical texts, attending to important distinctions the author makes and to any gaps or inconsistencies in the account. (CI-PS2-1)

RST.11-12.7 Integrate and evaluate multiple sources of information presented in diverse formats and media (e.g., quantitative data, video, multimedia) in order to address a question or solve a problem. (CI-PS2-1)

WHST.9-12.7 Conduct short as well as more sustained research projects to answer a question (including a self-generated question) or solve a problem; narrow or broaden the inquiry when appropriate; synthesize multiple sources on the subject, demonstrating understanding of the subject under investigation.(CI-PS3-5)

WHST.11-12.8 Gather relevant information from multiple authoritative print and digital sources, using advanced searches effectively; assess the strengths and limitations of each source in terms of the specific task, purpose, and audience; integrate information into the text selectively to maintain the flow of ideas, avoiding plagiarism and overreliance on any one source and following a standard format for citation. (CI-PS3-5)

WHST.9-12.9 Draw evidence from informational texts to support analysis, reflection, and research. (CI-PS2-1, CI-PS3-5)

Connections to the Arkansas English Language Arts Standards

SL.11-12.5 Make strategic use of digital media (e.g., textual, graphical, audio, visual, and interactive elements) in presentations to enhance understanding of findings, reasoning, and evidence and to add interest. (CI-PS3-5)

Connections to the Arkansas Mathematics Standards:

MP.2 Reason abstractly and quantitatively. (CI-PS2-1, CI-PS2-2, CI-PS2-4, CI-PS3-5, CI-ESS1-4, CI-ESS1-5)

MP.4 Model with mathematics. (CI-PS2-1, CI-PS2-2, CI-PS2-4, CI-PS3-5, CI-ESS1-4, CI5-ETS1-2)

HSN.Q.A.1 Use units as a way to understand problems and to guide the solution of multi-step problems; choose and interpret units consistently in formulas; choose and interpret the scale and the origin in graphs and data displays. (CI-PS2-1, CI-PS2-2, CI-PS2-4, CI-ESS1-4, CI-ESS1-5)

HSN.Q.A.2 Define appropriate quantities for the purpose of descriptive modeling. (CI-PS2-1, CI-PS2-2, CI-PS2-4, CI-ESS1-4, CI-ESS1-5)

HSN.Q.A.3	Choose a level of accuracy appropriate to limitations on measurement when reporting quantities. (CI-PS2-1, CI-PS2-2, CI-PS2-4, CI-ESS1-4, CI-ESS1-5)
HSA.SSE.A.1	Interpret expressions that represent a quantity in terms of its context; interpret parts of an expression using appropriate vocabulary, such as terms, factors, and coefficients; interpret complicated expressions by viewing one or more of their parts as a single entity. (CI-PS2-1, CI-PS2-4, CI-ESS1-4)
HSA.CED.A.2	Create equations in two or more variables to represent relationships between quantities; graph equations, in two variables, on a coordinate plane. (CI-ESS1-4)
HSA.SSE.B.3	Choose and produce an equivalent form of an expression to reveal and explain properties of the quantity represented by the expression; factor a quadratic expressions to reveal the zeros of the function it defines; complete the square in a quadratic expression to reveal the maximum or minimum value of the function it defines; use the properties of exponents to transform expressions for exponential functions. (CI-PS2-1, CI-PS2-4)
HSA.CED.A.1	Create equations and inequalities in one variable and use them to solve problems. (CI-PS2-1, CI-PS2-2)
HSA.CED.A.2	Create equations in two or more variables to represent relationships between quantities; graph equations. In two variables, on a coordinate plane. (CI-PS2-1, CI-PS2-2)
HSA.CED.A.4	Rearrange literal equations using the properties of equality. (CI-PS2-1, CI-PS2-2, CI-ESS1-4)
HSF.IF.C.7	Graph functions expressed symbolically and show key features of the graph, with and without technology; graph linear and quadratic functions and, when applicable, show intercepts, maxima, and minima; graph square root, cube root, and piecewise-defined functions, including step functions and absolute value functions; graph polynomial functions, identifying zeros when suitable factorizations are available, and showing end behavior; graph rational functions, identifying zeros and asymptotes when suitable factorizations are available, and showing end behavior; graph exponential and logarithmic functions, showing intercepts and end behavior; graph trigonometric functions, showing period, midline, and amplitude. (CI-PS2-1)
HSS.ID.A.1	Represent data with plots on the real number line (dot plots, histograms, and box plots). (CI-PS2-1)

Contributors

The following educators contributed to the development of this course:

Susan Allison – Benton School District	Steven Long – Rogers School District
Angela Bassham – Salem School District	Brandon Lucius – Osceola School District
Allison Belcher – Little Rock School District	Matt Martin – Centerpoint School District
Debbie Bilyeu – Arkansas AIMS	Patti Meeks – Hamburg School District
Tami Blair – Texarkana School District	Melissa Miller – Farmington School District
Stephen Brodie – University of Arkansas at Fort Smith STEM Center	Jim Musser – Arkansas Tech University
Stephanie Brown – Quitman School District	Nanette Nichols – Wilbur D. Mills AR Education Cooperative
Sarah Croswell – Virtual Arkansas	John Nilz – North Little Rock School District
Tami Eggensperger – Cabot School District	Dennis Pevey – eSTEM Public Charter School
Jenna Gill – Siloam Springs School District	Tami Philyaw – Smackover – Norphlet School District
Douglas Hammon – Little Rock School District	Kathy Prophet – Springdale School District
Keith Harris – University of Arkansas at Little Rock Partnership for STEM Education	Carrie Shell – Highland School District
Lynne Hehr – University of Arkansas at Fayetteville STEM Center for Math and Science Education –	Will Squires – Caddo Hills School District
Leonda Holthoff – Star City School District	Eddie Tucker – Hamburg School District
Courtney Jones – Lincoln Consolidated School District	Jon White – Harding University
Rebecca Koelling – Highland School District	Andrew Williams – University of Arkansas at Monticello
Karen Ladd – Nettleton School District	Wendi J.W. Williams – Northwest Arkansas Community College
John Levy – North Arkansas College	Cathy Wissehr – University of Arkansas at Fayetteville

ARKANSAS
K-12 SCIENCE STANDARDS
EDUCATION FOR A NEW GENERATION

Earth Science

2016

Table of Contents

Notes:

1. Student Performance Expectations (PEs) may be taught in any sequence or grouping within a grade level. Several PEs are described as being "partially addressed in this course" because the same PE is revisited in a subsequent course during which that PE is fully addressed.
2. An asterisk (*) indicates an engineering connection to a practice, core idea, or crosscutting concept.
3. The Clarification Statements are examples and additional guidance for the instructor. AR indicates Arkansas-specific Clarification Statements.
4. The Assessment Boundaries delineate content that may be taught but not assessed in large-scale assessments. AR indicates Arkansas-specific Assessment Boundaries.
5. The section entitled "foundation boxes" is reproduced verbatim from *A Framework for K-12 Science Education: Practices, Crosscutting Concepts, and Core Ideas*. Integrated and reprinted with permission from the National Academy of Sciences.
6. The examples given (e.g.,) are suggestions for the instructor.
7. Throughout this document, connections are provided to the nature of science as defined by *A Framework for K-12 Science Education* (NRC 2012).
8. Throughout this document, connections are provided to Engineering, Technology, and Applications of Science as defined by *A Framework for K-12 Science Education* (NRC 2012).
9. Each set of PEs lists connections to other disciplinary core ideas (DCIs) within the Arkansas K-12 Science Standards and to the Arkansas English Language Arts Standards, Arkansas Disciplinary Literacy Standards, and the Arkansas Mathematics Standards.

Arkansas K-12 Science Standards Overview

The Arkansas K-12 Science Standards are based on *A Framework for K-12 Science Education* (NRC 2012) and are meant to reflect a new vision for science education. The following conceptual shifts reflect what is new about these science standards. The Arkansas K-12 Science Standards

- reflect science as it is practiced and experienced in the real world,
- build logically from Kindergarten through Grade 12,
- focus on deeper understanding as well as application of content,
- integrate practices, crosscutting concepts, and core ideas, and
- make explicit connections to literacy and math.

As part of teaching the *Arkansas K-12 Science Standards*, it will be important to instruct and guide students in adopting appropriate safety precautions for their student-directed science investigations. Reducing risk and preventing accidents in science classrooms begin with planning. There are four recommended steps in carrying out a hazard and risk assessment for any planned lab investigation.

1) Identify all hazards. Hazards may be physical, chemical, health, or environmental.
2) Evaluate the type of risk associated with each hazard.
3) Write the procedure and all necessary safety precautions in such a way as to eliminate or reduce the risk associated with each hazard.
4) Prepare for any emergency that might arise in spite of all of the required safety precautions.

According to Arkansas Code Annotated § 6-10-113 (2012) for eye protection, every student and teacher in public schools participating in any chemical or combined chemical-physical laboratories involving caustic or explosive chemicals or hot liquids or solids is required to wear industrial-quality eye protective devices (eye goggles) at all times while participating in science investigations.

The Arkansas K-12 Science Standards outline the knowledge and science and engineering practices that all students should learn by the end of high school. The standards are three-dimensional because each student performance expectation engages students at the nexus of the following three dimensions.

- Dimension 1 describes scientific and engineering practices.
- Dimension 2 describes crosscutting concepts, overarching science concepts that apply across science disciplines.
- Dimension 3 describe core ideas in the science disciplines.

The Science and Engineering Practices

The eight practices describe the major practices that scientists use to investigate, build models and theories of the world around them or engineers use as they build and design systems. The practices are essential for all students to learn and are as follows:

1. Asking questions (for science) and defining problems (for engineering)
2. Developing and using models
3. Planning and carrying out investigations
4. Analyzing and interpreting data
5. Using mathematics and computational thinking
6. Constructing explanations (for science) and designing solutions (for engineering)
7. Engaging in argument from evidence
8. Obtaining, evaluating, and communicating information

Crosscutting Concepts

The seven crosscutting concepts bridge disciplinary boundaries and unit core ideas throughout the fields of science and engineering. Their purpose is to help students deepen their understanding of the disciplinary core ideas, and develop a coherent, and scientifically based view of the world. The seven crosscutting concepts are as follows:

1. *Patterns.* Observed patterns of forms and events guide organization and classification, and they prompt questions about relationships and the factors that influence them.

2. *Cause and effect: Mechanism and explanation*. Events have causes, sometimes simple, sometimes multifaceted. A major activity of science is investigating and explaining causal relationships and the mechanisms by which they are mediated. Such mechanisms can then be tested across given contexts and used to predict and explain events in new contexts.

3. *Scale, proportion, and quantity.* In considering phenomena, it is critical to recognize what is relevant at different measures of size, time, and energy and to recognize how changes in scale, proportion, or quantity affect a system's structure or performance.

4. *Systems and system models.* Defining the system under study—specifying its boundaries and making explicit a model of that system—provides tools for understanding and testing ideas that are applicable throughout science and engineering.

5. *Energy and matter: Flows, cycles, and conservation.* Tracking fluxes of energy and matter into, out of, and within systems helps one understand the systems' possibilities and limitations.

6. *Structure and function.* The way in which an object or living thing is shaped and its substructure determine many of its properties and functions.

7. *Stability and change.* For natural and built systems alike, conditions of stability and determinants of rates of change or evolution of a system are critical elements of study.

Disciplinary Core Ideas

The Disciplinary Core Ideas describe the content that occurs at each grade or course. The Arkansas K-12 Science Standards focus on a limited number of core ideas in science and engineering both within and across the disciplines and is built on the notion of learning as a developmental progression. The Disciplinary Core Ideas are grouped into the following domains:

- Physical Science (PS)
- Life Science (LS)
- Earth and Space Science (ESS)
- Engineering, Technology and Applications of Science (ETS)

Connections to the Arkansas English Language Arts Standards

Evidence-based reasoning is the foundation of good scientific practice. The Arkansas K-12 Science Standards incorporate reasoning skills used in language arts to help students improve mastery and understanding in all three disciplines. The Arkansas K-8 Science Committee made every effort to align grade-by-grade with the English language arts (ELA) standards so concepts support what students are learning in their entire curriculum. Connections to specific ELA standards are listed for each student performance expectation, giving teachers a blueprint for building comprehensive cross-disciplinary lessons.

The intersections between Arkansas K-12 Science Standards and Arkansas ELA Standards teach students to analyze data, model concepts, and strategically use tools through productive talk and shared activity. Reading in science requires an appreciation of the norms and conventions of the discipline of science, including understanding the nature of evidence used, an attention to precision and detail, and the capacity to make and assess intricate arguments, synthesize complex information, and follow detailed procedures and accounts of events and concepts. These practice-based standards help teachers foster a classroom culture where students think and reason together, connecting around the subject matter and core ideas.

Connections to the Arkansas Disciplinary Literacy Standards

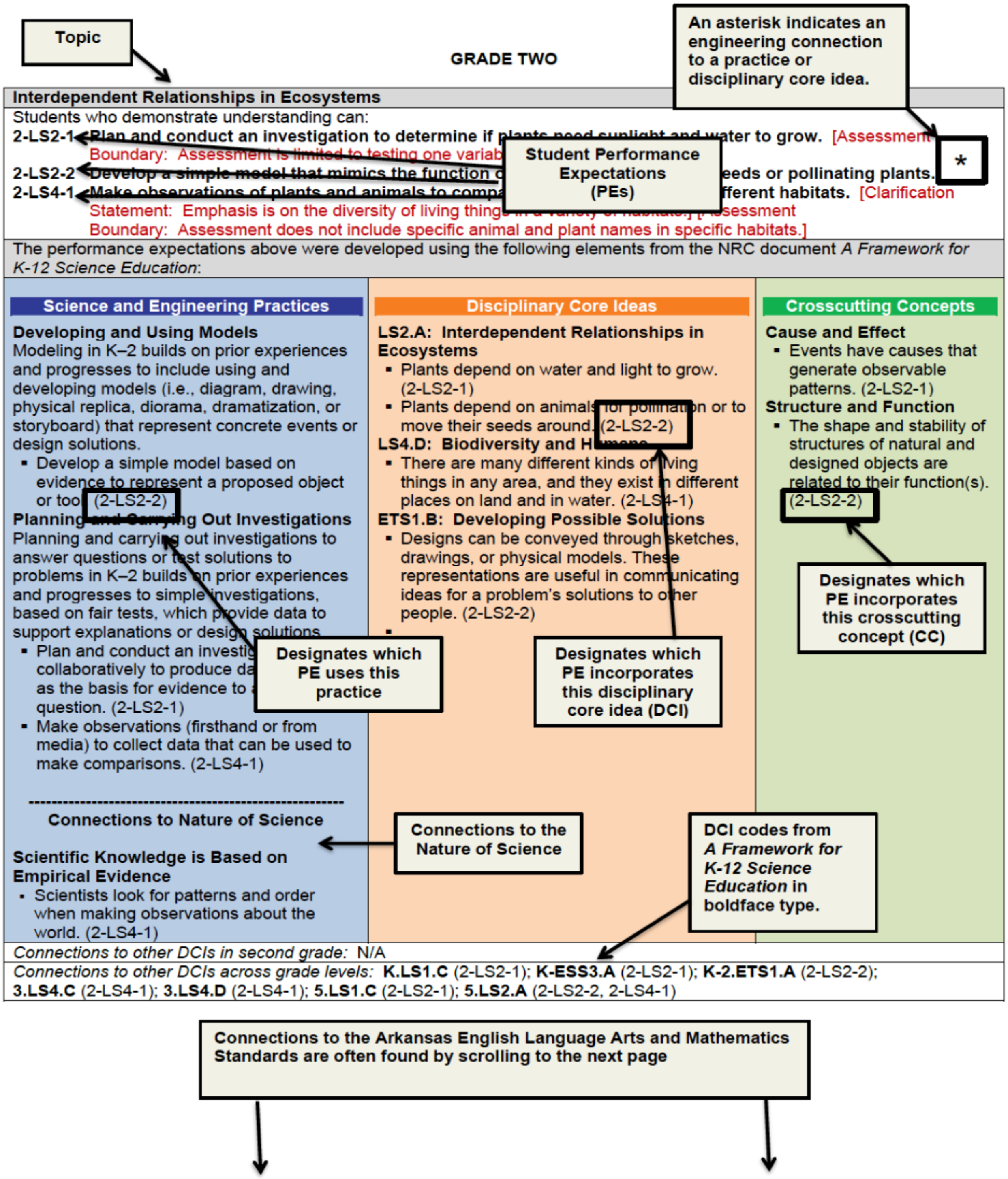
Reading is critical to building knowledge in science. College and career ready reading in science requires an appreciation of the norms and conventions of each discipline, such as the kinds of evidence used in science; an understanding of domain-specific words and phrases; an attention to precise details; and the capacity to evaluate intricate arguments, synthesize complex information, and follow detailed descriptions of events and concepts. When reading scientific and technical texts, students need to be able to gain knowledge from challenging texts that often make extensive use of elaborate diagrams and data to convey information and illustrate concepts. Students must be able to read complex informational texts in science with independence and confidence because the vast majority of reading in college and workforce training programs will be sophisticated nonfiction.

For students, writing is a key means of asserting and defending claims, showing what they know about a science, and conveying what they have experienced, imagined, thought, and felt. To be college and career ready writers, students must take task, purpose, and audience into careful consideration, choosing words, information, structures, and formats deliberately. They need to be able to use technology strategically when creating, refining, and collaborating on writing. They have to become adept at gathering information, evaluating sources, and citing material accurately, reporting finds from their research and analysis of sources in a clear and cogent manner. They must have the flexibility, concentration, and fluency to produce high-quality first-draft text under a tight deadline and the capacity to revisit and make improvements to a piece of writing over multiple drafts when circumstances encourage or require it.

Connections to the Arkansas Mathematics Standards

Science is a quantitative discipline, so it is important for educators to ensure that students’ science learning coheres well with their understanding of mathematics. To achieve this alignment, the Arkansas K-12 Science Committee made every effort to ensure that the mathematics standards do not outpace or misalign to the grade-by-grade science standards. Connections to specific math standards are listed for each student performance expectation, giving teachers a blueprint for building comprehensive cross-disciplinary lessons.

How to Read
Arkansas K-12 Science



GRADE TWO

Interdependent Relationships in Ecosystems

Students who demonstrate understanding can:

2-LS2-1 Plan and conduct an investigation to determine if plants need sunlight and water to grow. [Assessment Boundary: Assessment is limited to testing one variab…]

2-LS2-2 Develop a simple model that mimics the function of … seeds or pollinating plants. *

2-LS4-1 Make observations of plants and animals to compa… fferent habitats. [Clarification Statement: Emphasis is on the diversity of living things … [Assessment Boundary: Assessment does not include specific animal and plant names in specific habitats.]

The performance expectations above were developed using the following elements from the NRC document *A Framework for K-12 Science Education*:

Science and Engineering Practices	Disciplinary Core Ideas	Crosscutting Concepts
Developing and Using Models Modeling in K–2 builds on prior experiences and progresses to include using and developing models (i.e., diagram, drawing, physical replica, diorama, dramatization, or storyboard) that represent concrete events or design solutions. ▪ Develop a simple model based on evidence to represent a proposed object or tool. (2-LS2-2) **Planning and Carrying Out Investigations** Planning and carrying out investigations to answer questions or test solutions to problems in K–2 builds on prior experiences and progresses to simple investigations, based on fair tests, which provide data to support explanations or design solutions. ▪ Plan and conduct an investig… collaboratively to produce da… as the basis for evidence to … question. (2-LS2-1) ▪ Make observations (firsthand or from media) to collect data that can be used to make comparisons. (2-LS4-1) --- **Connections to Nature of Science** **Scientific Knowledge is Based on Empirical Evidence** ▪ Scientists look for patterns and order when making observations about the world. (2-LS4-1)	**LS2.A: Interdependent Relationships in Ecosystems** ▪ Plants depend on water and light to grow. (2-LS2-1) ▪ Plants depend on animals for pollination or to move their seeds around. (2-LS2-2) **LS4.D: Biodiversity and Humans** ▪ There are many different kinds of living things in any area, and they exist in different places on land and in water. (2-LS4-1) **ETS1.B: Developing Possible Solutions** ▪ Designs can be conveyed through sketches, drawings, or physical models. These representations are useful in communicating ideas for a problem's solutions to other people. (2-LS2-2) ▪	**Cause and Effect** ▪ Events have causes that generate observable patterns. (2-LS2-1) **Structure and Function** ▪ The shape and stability of structures of natural and designed objects are related to their function(s). (2-LS2-2)

Connections to other DCIs in second grade: N/A

Connections to other DCIs across grade levels: **K.LS1.C** (2-LS2-1); **K-ESS3.A** (2-LS2-1); **K-2.ETS1.A** (2-LS2-2); **3.LS4.C** (2-LS4-1); **3.LS4.D** (2-LS4-1); **5.LS1.C** (2-LS2-1); **5.LS2.A** (2-LS2-2, 2-LS4-1)

Earth Science Learning Progression Chart

Topic 1: History of the Earth	Topic 2: Earth's Systems	Topic 3: Human Sustainability	Topic 4: Weather and Climate
AR ES-ESS1-5 AR ES-ESS1-6 AR ES-ESS2-1 AR ES1-ETS1-1	ES-ESS2-2 ES-ESS2-3 AR ES-ESS2-5 AR ES-ESS2-6 AR ES-ESS2-7 AR ES2-ETS1-1 AR ES2-ETS1-3	AR ES-ESS3-1 AR ES-ESS3-2 AR ES-ESS3-3 AR ES-ESS3-4 AR ES-ESS3-6 AR ES3-ETS1-1 AR ES3-ETS1-2 AR ES3-ETS1-3 AR ES3-ETS1-4	AR ES-ESS2-4 AR ES-ESS3-5 AR ES4-ETS1-3

Arkansas Clarification Statements (AR)

Earth Science Course Overview

Earth science is a science course that continues to develop conceptual understanding of the interactions in Earth science, physical science, and life science systems by investigating Arkansas-specific phenomena. Students are building understanding of core ideas, science and engineering practices, and crosscutting concepts from previous science courses. The standards are built around the Earth science-systems approach which strongly reflects the many societally relevant aspects of Earth sciences (resources, hazards, environmental impacts) with an emphasis on using engineering and technology concepts to design solutions to challenges facing human society. Teachers with a physical/Earth, life/Earth license (including an Earth science endorsement) or others as approved by ADE are able to teach this course. Students will earn 1 Core requirement/career focus credit.

Students in Earth science develop understanding of key concepts that help them make sense of the interactions in Earth science, physical science, and life science. These concepts are building upon students' understanding of disciplinary ideas, science and engineering practices, and crosscutting concepts from earlier grades and high school science courses. There are four topics in Earth science: (1) History of the Earth, (2) Earth Systems, (3) Sustainability, and (4) Weather and Climate. The performance expectations engage students in core ideas of Earth science with an emphasis on using engineering and technology to design solutions to challenges facing human society. While the performance expectations indicate particular practices to address specific disciplinary core ideas, it is recommended that teachers include a variety of practices and strategies in their instruction.

Additionally, it should be noted that the Earth science standards are not intended to be used as curriculum. Instead, the standards are the minimum that students should know and be able to do. Therefore, teachers should continue to differentiate for the needs of their students by adding depth and additional rigor.

Students in Earth science also continue their ability to develop possible solutions for major global problems with engineering design challenges. At the high school level, students are expected to engage with major global issues at the interface of science, technology, society and the environment, and to bring to light the kinds of analytical and strategic thinking that prior training and increased maturity make possible. As in prior levels, these capabilities can be thought of in three stages:

- **Defining the problem** at the high school level requires both qualitative and quantitative analysis. For example, the need to provide food and fresh water for future generations comes into sharp focus when considering the speed at which world population is growing and conditions in countries that have experienced famine. While high school students are not expected to solve these challenges, they are expected to begin thinking about them as problems that can be addressed, at least in part, through engineering.
- **Developing possible solutions** for major global problems begins by breaking them down into smaller problems that can be tackled with engineering methods. To evaluate potential solutions, students are expected to not only consider a wide range of criteria but to also recognize that criteria needs to be prioritized. For example, public safety or environmental protection may be more important than cost or even functionality. Decisions on priorities can then guide tradeoff choices.
- **Improving designs** at the high school level may involve sophisticated methods, such as using computer simulations to model proposed solutions. Students are expected to use such methods to take into account a range of criteria and constraints, anticipate possible societal and environmental impacts, and test the validity of their simulations by comparison to the real world.

Earth Science Topics Overview

The performance expectations in **Topic 1: History of the Earth** help students formulate answers to the questions:

- How do people reconstruct and date events in Earth's planetary history?
- Why do the continents move?

Students construct explanations for the scales of time over which Earth's processes operate. Earth science involves making inferences about events in Earth's history based on data records. A mathematical analysis of radiometric dating is used to comprehend how absolute ages are obtained for the geologic record. A key to Earth's history is the coevolution of the biosphere with Earth's other systems.

The performance expectations in **Topic 2: Earth's Systems** help students formulate answers to the questions:

- How do major Earth systems interact?
- How and why is Earth constantly changing?
- How do properties and movements of water shape Earth's surface and affect its systems?

Students develop models and explanations for how feedbacks between different Earth systems control the appearance of Earth's surface. Students investigate how water affects weather and chemical cycles.

The performance expectations in **Topic 3: Sustainability** help students formulate answers to the questions:

- How do humans depend on Earth's resources?
- How do humans change the planet?

Students investigate relationships between humans and Earth's systems through the impacts of natural hazards, natural resources, and environment. Students explore how humans can be agents for significant change in Earth's systems and that all of Earth's systems are interconnected. Changes in one system can produce unforeseen changes in others.

The performance expectations in **Topic 4: Weather and Climate** help students formulate answers to the questions:

- What regulates weather and climate?
- How do people model and predict the effects of human activities on Earth's climate?

Students use models to form explanations for the system interactions that control weather and climate, with a major emphasis on the mechanisms and implications of climate change. Students analyze and interpret geoscience data to construct explanations for factors that drive climate change over a wide range of time scales.

Earth Science

Topic 1: History of Earth

Students who demonstrate understanding can:

ES-ESS1-5 Evaluate evidence of the past and current movements of continental and oceanic crust and the theory of plate tectonics to explain the ages of crustal rocks. [AR Clarification Statement: Emphasis is on the ability of plate tectonics to explain the ages of crustal (continental and oceanic) rocks using the tectonic history of Arkansas as part of the global history.]

ES-ESS1-6 Apply scientific reasoning and evidence from ancient Earth materials, meteorites, and other planetary surfaces to construct an account of Earth's formation and early history. [AR Clarification Statement: Emphasis is on evidence found in the Americas. Examples of formations caused by impacts include Manicouagan, Quebec; Chicxulub, Yucatan; Chesapeake Bay, Virginia; Beaver Head, Idaho and Montana. Examples of dating methods (e.g., Carbon-14 or Rubidium – Strontium) to gather evidence are the absolute ages of ancient or modern materials.]

ES-ESS2-1 Develop a model to illustrate how Earth's internal and surface processes operate at different spatial and temporal scales to form continental and ocean-floor features. [AR Clarification Statement: Emphasis is on the constructive and destructive forces responsible for the formation of the Arkansas physiographic regions (Ozark Plateaus, Arkansas River Valley, Ouachita Mountains, West Gulf Coastal Plain, and Mississippi River Alluvial Plain).

ES1-ETS1-1

Analyze a major global challenge to specify qualitative and quantitative criteria and constraints for solutions that account for societal needs and wants. [AR Clarification Statement: Examples of major global challenges could include fossil fuel analysis, coastal flooding solutions, and pandemic management and safety solutions.]

The performance expectations above were developed using the following elements from the NRC document *A Framework for K-12 Science Education*:

Science and Engineering Practices

Constructing Explanations and Designing Solutions

Constructing explanations and designing solutions in 9–12 builds on K–8 experiences and progresses to explanations and designs that are supported by multiple and independent student-generated sources of evidence consistent with scientific ideas, principles, and theories.

- Apply scientific reasoning to link evidence to the claims to assess the extent to which the reasoning and data support the explanation or conclusion. (ES-ESS1-6)

Engaging in Argument from Evidence

Engaging in argument from evidence in 9–12 builds on K–8 experiences and progresses to using appropriate and sufficient evidence and scientific reasoning to defend and critique claims and explanations about the natural and designed world(s). Arguments may also come from current scientific or historical episodes in science.

Disciplinary Core Ideas

ESS1.C: The History of Planet Earth

- Continental rocks, which can be older than 4 billion years, are generally much older than the rocks of the ocean floor, which are less than 200 million years old. (ES-ESS1-5)
- Although active geologic processes, such as plate tectonics and erosion, have destroyed or altered most of the very early rock record on Earth, other objects in the solar system, such as lunar rocks, asteroids, and meteorites, have changed little over billions of years. Studying these objects can provide information about Earth's formation and early history. (ES-ESS1-6)

ESS2.A: Earth Materials and Systems

- Earth's systems, being dynamic and interacting, cause feedback effects that can increase or

Crosscutting Concepts

Patterns

- Empirical evidence is needed to identify patterns. (ES-ESS1-5)

Stability and Change

- Much of science deals with constructing explanations of how things change and how they remain stable. (ES-ESS1-6)
- Feedback (negative or positive) can stabilize or destabilize a system. (ES-ESS2-2)

Connections to Engineering, Technology, and Applications of Science

▪ Evaluate evidence behind currently accepted explanations or solutions to determine the merits of arguments. (ES-ESS1-5) **Analyzing and Interpreting Data** Analyzing data in 9–12 builds on K–8 experiences and progresses to introducing more detailed statistical analysis, the comparison of data sets for consistency, and the use of models to generate and analyze data. ▪ Analyze data using tools, technologies, and/or models (e.g., computational, mathematical) in order to make valid and reliable scientific claims or determine an optimal design solution. (ES-ESS2-2) **Asking Questions and Defining Problems** Asking questions and defining problems in 9–12 builds on K–8 experiences and progresses to formulating, refining, and evaluating empirically testable questions and design problems using models and simulations. ▪ Analyze complex real-world problems by specifying criteria and constraints for successful solutions. (ES1-ETS1-1) **---** ***Connections to Nature of Science*** **Science Models, Laws, Mechanisms, and Theories Explain Natural Phenomena** ▪ A scientific theory is a substantiated explanation of some aspect of the natural world, based on a body of facts that have been repeatedly confirmed through observation and experiment and the science community validates each theory before it is accepted. If new evidence is discovered that the theory does not accommodate, the theory is generally modified in light of this new evidence. (ES-ESS1-6) ▪ Models, mechanisms, and explanations collectively serve as tools in the development of a scientific theory. (ES-ESS1-6)	decrease the original changes. (ES-ESS2-1, ES-ESS2-2) **ESS2.B: Plate Tectonics and Large-Scale System Interactions** ▪ Plate tectonics is the unifying theory that explains the past and current movements of the rocks at Earth's surface and provides a framework for understanding its geologic history. (ES-ESS1-5) **ESS2.D: Weather and Climate** ▪ The foundation for Earth's global climate systems is the electromagnetic radiation from the sun, as well as its reflection, absorption, storage, and redistribution among the atmosphere, ocean, and land systems, and this energy's re-radiation into space. (ES-ESS2-2) **PS1.C: Nuclear Processes** ▪ Spontaneous radioactive decays follow a characteristic exponential decay law. Nuclear lifetimes allow radiometric dating to be used to determine the ages of rocks and other materials. (HS-ESS1-5, ES-ESS1-6) **ETS1.A: Defining and Delimiting Engineering Problems** ▪ Criteria and constraints also include satisfying any requirements set by society, such as taking issues of risk mitigation into account, and they should be quantified to the extent possible and stated in such a way that one can tell if a given design meets them. (ES1-ETS1-1) ▪ Humanity faces major global challenges today, such as the need for supplies of clean water and food or for energy sources that minimize pollution, which can be addressed through engineering. These global challenges also may have manifestations in local communities. (ES1-ETS1-1)	**Influence of Engineering, Technology, and Science on Society and the Natural World** ▪ New technologies can have deep impacts on society and the environment, including some that were not anticipated. Analysis of costs and benefits is a critical aspect of decisions about technology. (ES-ESS2-2, ES1-ETS1-1)

Connections to the Arkansas Disciplinary Literacy Standards:

RST.11-12.1 Cite specific textual evidence to support analysis of science and technical texts, attending to important distinctions the author makes and to any gaps or inconsistencies in the account. (ES-ESS1-5, ES-ESS1-6)

RST.11-12.7	Integrate and evaluate multiple sources of information presented in diverse formats and media (e.g., quantitative data, video, multimedia) in order to address a question or solve a problem. (ES1-ETS1-1)
RST.11-12.8	Evaluate the hypotheses, data, analysis, and conclusions in a science or technical text, verifying the data when possible and corroborating or challenging conclusions with other sources of information. (ES-ESS1-5, ES-ESS1-6, ES1-ETS1-1)
RST.11-12.9	Synthesize information from a range of sources (e.g., texts, experiments, simulations) into a coherent understanding of a process, phenomenon, or concept, resolving conflicting information when possible. (ES1-ETS1-1)
WHST.9-12.1	Write arguments focused on discipline-specific content. (ES-ESS1-6)
WHST.9-12.2	Write informative/explanatory texts, including the narration of historical events, scientific procedures/ experiments, or technical processes. (ES-ESS1-5)
Connections to the Arkansas English Language Arts Standards:	
SL.11-12.5	Make strategic use of digital media (e.g., textual, graphical, audio, visual, and interactive elements) in presentations to enhance understanding of findings, reasoning, and evidence and to add interest. (ES-ESS2-1)
Connections to the Arkansas Mathematics Standards:	
MP.2	Reason abstractly and quantitatively. (ES-ESS1-5, ES-ESS1-6, ES-ESS2-1, ES1-ETS1-1)
MP.4	Model with mathematics. (ES-ESS2-1, ES1-ETS1-1)
HSN.Q.A.1	Use units as a way to understand problems and to guide the solution of multi-step problems; choose and interpret units consistently in formulas; choose and interpret the scale and the origin in graphs and data displays. (ES-ESS1-5, ES-ESS1-6, ES-ESS2-1)
HSN.Q.A.2	Define appropriate quantities for the purpose of descriptive modeling. (ES-ESS1-5, ES-ESS1-6, ES-ESS2-1)
HSN.Q.A.3	Choose a level of accuracy appropriate to limitations on measurement when reporting quantities. (ES-ESS1-5, ES-ESS1-6, ES-ESS2-1)
HSA.SSE.A.1	Interpret expressions that represent a quantity in terms of its context; interpret parts of an expression using appropriate vocabulary, such as terms, factors, and coefficients; interpret complicated expressions by viewing one or more of their parts of a single entity. (ES-ESS1-1, ES-ESS1-2, ES-ESS1-4)
HSF.IF.B.5	Relate the domain of a function to its graph; relate the domain of a function to the quantitative relationship it describes. (ES-ESS1-6)
HSS.ID.B.6	Represent data on two quantitative variables on a scatter plot, and describe how those variables are related; fit a function to the date; use functions fitted to data to solve problems in the context of the data; informally assess the fit of a function by plotting and analyzing residuals. (ES-ESS1-6)

Topic 2: Earth's Systems

Students who demonstrate understanding can:

ES-ESS2-2 Analyze geoscience data to make the claim that one change to Earth's surface can create feedbacks that cause changes to other Earth systems. [Clarification Statement: Examples could include climate feedbacks, such as how an increase in greenhouse gases causes a rise in global temperatures that melts glacial ice, which reduces the amount of sunlight reflected from Earth's surface, increasing surface temperatures and further reducing the amount of ice. Examples could also be taken from other system interactions, such as how the loss of ground vegetation causes an increase in water runoff and soil erosion; how dammed rivers increase groundwater recharge, decrease sediment transport, and increase coastal erosion; or how the loss of wetlands causes a decrease in local humidity that further reduces the wetland extent.]

ES-ESS2-3 Develop a model based on evidence of Earth's interior to describe the cycling of matter by thermal convection. [Clarification Statement: Emphasis is on both a one-dimensional model of Earth, with radial layers determined by density, and a three-dimensional model, which is controlled by mantle convection and the resulting plate tectonics. Examples of evidence include maps of Earth's three-dimensional structure obtained from seismic waves, records of the rate of change of Earth's magnetic field (as constraints on convection in the outer core), and identification of the composition of Earth's layers from high-pressure laboratory experiments.]

ES-ESS2-5 Plan and conduct an investigation of the properties of water and its effects on Earth materials and surface processes. [AR Clarification Statement: Emphasis is on conducting investigations involving weathering. Examples of investigations (mechanical) could include analyzing local stream transportation and deposition data, collecting erosion data on various soil types, and evaluating water systems distributions and quality (Google Earth Time lapse feature or USGS National Real time Stream Gaging and National Water Information System.) Examples of investigations (chemical) could include collecting/analyzing water quality data or accessing water quality data through public data sets (e.g., USGS). Arkansas examples include surface water (streams rivers and lakes), karst terrain (dissolution caverns such as Blanchard Caverns) and Mississippi rivers and its tributaries.]

ES-ESS2-6 Develop a quantitative model to describe the cycling of carbon among the hydrosphere, atmosphere, geosphere, and biosphere. [AR Clarification Statement: Emphasis is on modeling biogeochemical cycles that include the cycling of carbon through natural (peat bogs) and human engineered reservoirs (composting).

ES-ESS2-7 Construct an argument based on evidence about the simultaneous coevolution of Earth's systems and life on Earth. [AR Clarification Statement: Emphasis is on the dynamic causes, effects, and feedbacks between the biosphere and Earth's other systems, whereby geoscience factors control the evolution of life, which in turn continuously alters Earth's surface. Examples of evidence include Arkansas's geologic history that documents the existence of tropical plants (landmass equatorial paleo geographic position resulted in palm tree fossils on top of Petit Jean Mountain), fossiliferous limestones with biodiversity (corals, mollusks, brachiopods fossils in the Buffalo National River) and ocean coastal paleo environments (delta deposits of shales near Morrilton).

ES2-ETS1-1

Analyze a major global challenge to specify qualitative and quantitative criteria and constraints for solutions that account for societal needs and wants. [AR Clarification Statement: Examples of major global challenges for Earth's Systems could include the interrelationships between humans and urban/rural land use, mining practices, and deforestation.]

ES2-ETS1-3

Evaluate a solution to a complex real-world problem based on prioritized criteria and trade-offs that account for a range of constraints, including cost, safety, reliability, and aesthetics, as well as possible social, cultural, and environmental impacts. [AR Clarification Statement: Solutions to complex real world issues where realistic criteria and constraints are accounted for could include evaluating energy resources available on other planets, various building configurations/constraints, drip agriculture systems and solar powered fans.]

The performance expectations above were developed using the following elements from the NRC document *A Framework for K-12 Science Education*:

Science and Engineering Practices	Disciplinary Core Ideas	Crosscutting Concepts
Developing and Using Models Modeling in 9–12 builds on K–8 experiences and progresses to using, synthesizing, and developing models to predict and show relationships among variables between systems and their components in the natural and designed world(s). ▪ Develop a model based on evidence to illustrate the relationships between systems or between components of a system. ES-ESS2-3, ES-ESS2-6) **Planning and Carrying Out Investigations** Planning and carrying out investigations in 9-12 builds on K-8 experiences and progresses to include investigations that provide evidence for and test conceptual, mathematical, physical, and empirical models. ▪ Plan and conduct an investigation individually and collaboratively to produce data to serve as the basis for evidence, and in the design: decide on types, how much, and accuracy of data needed to produce reliable measurements and consider limitations on the precision of the data (e.g., number of trials, cost, risk, time), and refine the design accordingly. (ES-ESS2-5) **Analyzing and Interpreting Data** Analyzing data in 9–12 builds on K–8 experiences and progresses to introducing more detailed statistical analysis, the comparison of data sets for consistency, and the use of models to generate and analyze data. ▪ Analyze data using tools, technologies, and/or models (e.g., computational, mathematical) in order to make valid and reliable scientific claims or determine an optimal design solution. (ES-ESS2-2)	**ESS2.A: Earth Materials and Systems** ▪ Earth's systems, being dynamic and interacting, cause feedback effects that can increase or decrease the original changes. (ES-ESS2-2) ▪ Evidence from deep probes and seismic waves, reconstructions of historical changes in Earth's surface and its magnetic field, and an understanding of physical and chemical processes lead to a model of Earth with a hot but solid inner core, a liquid outer core, a solid mantle and crust. Motions of the mantle and its plates occur primarily through thermal convection, which involves the cycling of matter due to the outward flow of energy from Earth's interior and gravitational movement of denser materials toward the interior. (ES-ESS2-3) **ESS2.B: Plate Tectonics and Large-Scale System Interactions** ▪ The radioactive decay of unstable isotopes continually generates new energy within Earth's crust and mantle, providing the primary source of the heat that drives mantle convection. Plate tectonics can be viewed as the surface expression of mantle convection. (ES-ESS2-3) **ESS2.C: The Roles of Water in Earth's Surface Processes** ▪ The abundance of liquid water on Earth's surface and its unique combination of physical and chemical properties are central to the planet's dynamics. These properties include water's exceptional capacity to absorb, store, and release large amounts of energy, transmit sunlight, expand upon freezing, dissolve and transport materials, and lower the viscosities and melting points of rocks. (ES-ESS2-5) **ESS2.D: Weather and Climate** ▪ The foundation for Earth's global climate systems is the electromagnetic radiation from the sun, as well as its reflection, absorption, storage, and redistribution among the atmosphere, ocean, and land	**Energy and Matter** ▪ The total amount of energy and matter in closed systems is conserved. (ES-ESS2-6) ▪ Energy drives the cycling of matter within and between systems. (ES-ESS2-3) **Structure and Function** ▪ The functions and properties of natural and designed objects and systems can be inferred from their overall structure, the way their components are shaped and used, and the molecular substructures of its various materials. (ES-ESS2-5) **Stability and Change** ▪ Much of science deals with constructing explanations of how things change and how they remain stable. (ES-ESS2-7) ▪ Feedback (negative or positive) can stabilize or destabilize a system. (ES-ESS2-2) -- ***Connections to Engineering, Technology, and Applications of Science*** **Interdependence of Science, Engineering, and Technology** ▪ Science and engineering complement each other in the cycle known as research and development (R&D). Many R&D projects may involve scientists, engineers, and others with wide ranges of expertise. (ES-ESS2-3) **Influence of Engineering, Technology, and Science**

Engaging in Argument from Evidence Engaging in argument from evidence in 9–12 builds on K–8 experiences and progresses to using appropriate and sufficient evidence and scientific reasoning to defend and critique claims and explanations about the natural and designed world(s). Arguments may also come from current scientific or historical episodes in science. ▪ Construct an oral and written argument or counter-arguments based on data and evidence. (ES-ESS2-7) **Asking Questions and Defining Problems** Asking questions and defining problems in 9–12 builds on K–8 experiences and progresses to formulating, refining, and evaluating empirically testable questions and design problems using models and simulations. ▪ Analyze complex real-world problems by specifying criteria and constraints for successful solutions. (ES2-ETS1-1) **Constructing Explanations and Designing Solutions** Constructing explanations and designing solutions in 9–12 builds on K–8 experiences and progresses to explanations and designs that are supported by multiple and independent student-generated sources of evidence consistent with scientific ideas, principles and theories. ▪ Evaluate a solution to a complex real-world problem, based on scientific knowledge, student-generated sources of evidence, prioritized criteria, and tradeoff considerations. (ES2-ETS1-3) --- ***Connections to Nature of Science*** **Scientific Knowledge is Based on Empirical Evidence** ▪ Science knowledge is based on empirical evidence. (ES-ESS2-3)	systems, and this energy's re-radiation into space. (ES-ESS2-2) ▪ Gradual atmospheric changes were due to plants and other organisms that captured carbon dioxide and released oxygen. (ES-ESS2-6, ES-ESS2-7) ▪ Changes in the atmosphere due to human activity have increased carbon dioxide concentrations and thus affect climate. (ES-ESS2-6) **ESS2.E: Biogeology** ▪ The many dynamic and delicate feedbacks between the biosphere and other Earth systems cause a continual co-evolution of Earth's surface and the life that exists on it. (ES-ESS2-7) **PS4.A: Wave Properties** ▪ Geologists use seismic waves and their reflection at interfaces between layers to probe structures deep in the planet. (ES-ESS2-3) **ETS1.A: Defining and Delimiting Engineering Problems** ▪ Criteria and constraints also include satisfying any requirements set by society, such as taking issues of risk mitigation into account, and they should be quantified to the extent possible and stated in such a way that one can tell if a given design meets them. (ES2-ETS1-1) ▪ Humanity faces major global challenges today, such as the need for supplies of clean water and food or for energy sources that minimize pollution, which can be addressed through engineering. These global challenges also may have manifestations in local communities. (ES2-ETS1-1) **ETS1.B: Developing Possible Solutions** ▪ When evaluating solutions, it is important to take into account a range of constraints, including cost, safety, reliability, and aesthetics, and to consider social, cultural, and environmental impacts. (ES2-ETS1-3)	**on Society and the Natural World** ▪ New technologies can have deep impacts on society and the environment, including some that were not anticipated. Analysis of costs and benefits is a critical aspect of decisions about technology. (ES-ESS2-2, ES2-ETS1-1, ES2-ETS1-3)

▪ Science disciplines share common rules of evidence used to evaluate explanations about natural systems. (ES-ESS2-3) ▪ Science includes the process of coordinating patterns of evidence with current theory. (ES-ESS2-3)		

Connections to the Arkansas Disciplinary Literacy Standards:

RST.11-12.1 Cite specific textual evidence to support analysis of science and technical texts, attending to important distinctions the author makes and to any gaps or inconsistencies in the account. (ES-ESS2-2, ES-ESS2-3)

RST.11-12.2 Determine the central ideas or conclusions of a text; summarize complex concepts, processes, or information presented in a text by paraphrasing them in simpler but still accurate terms. (ES-ESS2-2)

RST.11-12.7 Integrate and evaluate multiple sources of information presented in diverse formats and media (e.g., quantitative data, video, multimedia) in order to address a question or solve a problem. (ES2-ETS1-1, ES2-ETS1-3)

RST.11-12.8 Evaluate the hypotheses, data, analysis, and conclusions in a science or technical text, verifying the data when possible and corroborating or challenging conclusions with other sources of information. (ES2-ETS1-1, ES2-ETS1-3)

RST.11-12.9 Synthesize information from a range of sources (e.g., texts, experiments, simulations) into a coherent understanding of a process, phenomenon, or concept, resolving conflicting information when possible. (ES2-ETS1-1, ES2-ETS1-3)

WHST.9-12.1 Write arguments focused on discipline-specific content. (ES-ESS2-7)

WHST.9-12.7 Conduct short as well as more sustained research projects to answer a question (including a self-generated question) or solve a problem; narrow or broaden the inquiry when appropriate; synthesize multiple sources on the subject, demonstrating understanding of the subject under investigation. (ES-ESS2-5)

Connections to the Arkansas English Language Arts Standards:

SL.11-12.5 Make strategic use of digital media (e.g., textual, graphical, audio, visual, and interactive elements) in presentations to enhance understanding of findings, reasoning, and evidence and to add interest. (ES-ESS2-3)

Connections to the Arkansas Mathematics Standards:

MP.2 Reason abstractly and quantitatively. (ES-ESS2-2, ES-ESS2-3, ES-ESS2-6, ES2-ETS1-1, ES2-ETS1-3)

MP.4 Model with mathematics.(ES-ESS2-3, ES-ESS2-6, ES2-ETS1-1, ES2-ETS1-3)

HSN.Q.A.1 Use units as a way to understand problems and to guide the solution of multi-step problems; choose and interpret units consistently in formulas; choose and interpret the scale and the origin in graphs and data displays. (ES-ESS2-2, ES-ESS2-3, ES-ESS2-6)

HSN.Q.A.2 Define appropriate quantities for the purpose of descriptive modeling. (ES-ESS2-3, ES-ESS2-6)

HSN.Q.A.3 Choose a level of accuracy appropriate to limitations on measurement when reporting quantities. (ES-ESS2-2, ES-ESS2-3, ES-ESS2-5, E5S-ESS2-6)

Topic 3: Human Sustainability
Students who demonstrate understanding can: **ES-ESS3-1 Construct an explanation based on evidence for how the availability of natural resources, occurrence of natural hazards, and changes in climate have influenced human activity.** [AR Clarification Statement: Examples of Arkansas-specific natural resources include diamonds, novaculite, natural gas, and bauxite-aluminum deposits. Examples of Arkansas-specific natural hazards could include sinkholes in karst terrain, pollution of groundwater aquifers, flashfloods, ice storms, and earthquakes.] **ES-ESS3-2 Evaluate competing design solutions for developing, managing, and utilizing energy and mineral resources based on cost-benefit ratios.*** [AR Clarification Statement: Arkansas-specific examples of solutions could include the natural gas industry, hydroelectric, wind farms, urban recycling programs, coal, and nuclear power (Arkansas Nuclear One).] **ES-ESS3-3 Create a computational simulation to illustrate the relationships among the management of natural resources, the sustainability of human populations, and biodiversity.** [AR Clarification Statement: Data on the management of natural resources could be obtained from the Arkansas Natural Resources Commission. Examples of factors that affect human sustainability include agricultural efficiency, natural resource management, levels of conservation, and urban planning.] **ES-ESS3-4 Evaluate or refine a technological solution that reduces impacts of human activities on natural systems.*** [AR Clarification Statement: Examples of data on the impacts of human activities could include pollutants released (silt and sediments), changes to biomass (clearcutting), and areal changes in land surface use (urban development, agriculture and livestock, earth materials mining). Examples for limiting future impacts could range from local efforts (recycling) to large-scale geoengineering design solutions (lock and dam system, state and national parks).] **ES-ESS3-6 Use a computational representation to illustrate the relationships among Earth systems and how those relationships are being modified due to human activity.** [AR Clarification Statement: Examples of Arkansas Earth Systems could include the roles water has played in the formation of Arkansas topography, geological change over time in Arkansas, and impacts of human activity on the landscape]. **ES3-ETS1-1** **Analyze a major global challenge to specify qualitative and quantitative criteria and constraints for solutions that account for societal needs and wants.** [AR Clarification Statement: Examples of major global challenges applied to human sustainability could include ground water depletion in Arkansas and its unique rock formations. Examples of solutions broken down into more manageable problems through engineering could include designing methods to solve complex problems by sustaining life on other planets, designing earthquake resistant homes with emphasis on Arkansas rock formations, designing better irrigation systems for plants, and designing flood mitigation prevention techniques.] **ES3-ETS1-2** **Design a solution to a complex real-world problem by breaking it down into smaller, more manageable problems that can be solved through engineering.** [AR Clarification Statement: Solutions to complex issues could include evaluating energy resources available on other planets, evaluating various building configurations, evaluating and implementing drip agriculture systems and solar powered fans.] **ES3-ETS1-4** **Use a computer simulation to model the impact of proposed solutions to a complex real-world problem with numerous criteria and constraints on interactions within and between systems relevant to the problem.** [AR Clarification Statement: Modeling complex problems using computer software could include the following investigations: future population growth with limited resources, viewing and predicting earthquake waveforms, water flow simulation through rock layers, and simulating how gas and particulate emissions affect Earth's temperature.]
The performance expectations above were developed using the following elements from the NRC document *A Framework for K-12 Science Education*:

Science and Engineering Practices

Using Mathematics and Computational Thinking

Mathematical and computational thinking in 9-12 builds on K-8 experiences and progresses to using algebraic thinking and analysis, a range of linear and nonlinear functions including trigonometric functions, exponentials and logarithms, and computational tools for statistical analysis to analyze, represent, and model data. Simple computational simulations are created and used based on mathematical models of basic assumptions.

- Create a computational model or simulation of a phenomenon, designed device, process, or system. (ES-ESS3-3)
- Use a computational representation of phenomena or design solutions to describe and/or support claims and/or explanations. (ES-ESS3-6)
- Use mathematical models and/or computer simulations to predict the effects of a design solution on systems and/or the interactions between systems. (ES3-ETS1-4)

Constructing Explanations and Designing Solutions

Constructing explanations and designing solutions in 9–12 builds on K–8 experiences and progresses to explanations and designs that are supported by multiple and independent student-generated sources of evidence consistent with scientific knowledge, principles, and theories.

- Construct an explanation based on valid and reliable evidence obtained from a variety of sources (including students' own investigations, models, theories, simulations, peer review) and the assumption that theories and laws that describe the natural world operate today as they did in the past and will continue to do so in the future. (ES-ESS3-1)
- Design or refine a solution to a complex real-world problem, based on scientific knowledge, student-generated sources of evidence,

Disciplinary Core Ideas

ESS2.D: Weather and Climate

- Current models predict that, although future regional climate changes will be complex and varied, average global temperatures will continue to rise. The outcomes predicted by global climate models strongly depend on the amounts of human-generated greenhouse gases added to the atmosphere each year and by the ways in which these gases are absorbed by the ocean and biosphere. (ES-ESS3-6)

ESS3.A: Natural Resources

- Resource availability has guided the development of human society. (ES-ESS3-1)
- All forms of energy production and other resource extraction have associated economic, social, environmental, and geopolitical costs and risks as well as benefits. New technologies and social regulations can change the balance of these factors. (ES-ESS3-2)

ESS3.B: Natural Hazards

- Natural hazards and other geologic events have shaped the course of human history; [they] have significantly altered the sizes of human populations and have driven human migrations. (ES-ESS3-1)

ESS3.C: Human Impacts on Earth Systems

- The sustainability of human societies and the biodiversity that supports them requires responsible management of natural resources. (ES-ESS3-3)
- Scientists and engineers can make major contributions by developing technologies that produce less pollution and waste and that preclude ecosystem degradation. (ES-ESS3-4)

ESS3.D: Global Climate Change

- Through computer simulations and other studies, important discoveries are still being made about how the ocean, the atmosphere, and the biosphere interact and are modified in response to human activities. (ES-ESS3-6)

Crosscutting Concepts

Cause and Effect

- Empirical evidence is required to differentiate between cause and correlation and make claims about specific causes and effects. (ES-ESS3-1)

Systems and System Models

- When investigating or describing a system, the boundaries and initial conditions of the system need to be defined and their inputs and outputs analyzed and described using models. (ES-ESS3-6)
- Models (e.g., physical, mathematical, computer models) can be used to simulate systems and interactions—including energy, matter, and information flows—within and between systems at different scales. (ES3-ETS1-4)

Stability and Change

- Change and rates of change can be quantified and modeled over very short or very long periods of time. Some system changes are irreversible. (ES-ESS3-3)
- Feedback (negative or positive) can stabilize or destabilize a system. (ES-ESS3-4)

Connections to Engineering, Technology, and Applications of Science

Influence of Engineering, Technology, and Science

prioritized criteria, and tradeoff considerations. (ES-ESS3-4) ▪ Design a solution to a complex real-world problem, based on scientific knowledge, student-generated sources of evidence, prioritized criteria, and tradeoff considerations. (ES3-ETS1-2) ▪ Evaluate a solution to a complex real-world problem, based on scientific knowledge, student-generated sources of evidence, prioritized criteria, and tradeoff considerations. (ES3-ETS1-3) **Engaging in Argument from Evidence** Engaging in argument from evidence in 9–12 builds on K–8 experiences and progresses to using appropriate and sufficient evidence and scientific reasoning to defend and critique claims and explanations about natural and designed world(s). Arguments may also come from current scientific or historical episodes in science. ▪ Evaluate competing design solutions to a real-world problem based on scientific ideas and principles, empirical evidence, and logical arguments regarding relevant factors (e.g. economic, societal, environmental, ethical considerations). (ES-ESS3-2) **Asking Questions and Defining Problems** Asking questions and defining problems in 9–12 builds on K–8 experiences and progresses to formulating, refining, and evaluating empirically testable questions and design problems using models and simulations. ▪ Analyze complex real-world problems by specifying criteria and constraints for successful solutions. (ES3-ETS1-1)	**ETS1.A: Defining and Delimiting Engineering Problems** ▪ Criteria and constraints also include satisfying any requirements set by society, such as taking issues of risk mitigation into account, and they should be quantified to the extent possible and stated in such a way that one can tell if a given design meets them. (ES3-ETS1-1) ▪ Humanity faces major global challenges today, such as the need for supplies of clean water and food or for energy sources that minimize pollution, which can be addressed through engineering. These global challenges also may have manifestations in local communities. (ES3-ETS1-1) **ETS1.B: Developing Possible Solutions** ▪ When evaluating solutions, it is important to take into account a range of constraints, including cost, safety, reliability, and aesthetics, and to consider social, cultural, and environmental impacts. (ES3-ETS1-3, ES-ESS3-2, ES-ESS3-4) ▪ Both physical models and computers can be used in various ways to aid in the engineering design process. Computers are useful for a variety of purposes, such as running simulations to test different ways of solving a problem or to see which one is most efficient or economical; and in making a persuasive presentation to a client about how a given design will meet his or her needs. (ES3-ETS1-4) **ETS1.C: Optimizing the Design Solution** ▪ Criteria may need to be broken down into simpler ones that can be approached systematically, and decisions about the priority of certain criteria over others (trade-offs) may be needed. (ES3-ETS1-2)	**on Society and the Natural World** ▪ Modern civilization depends on major technological systems. (HS-ESS3-1),(HS-ESS3-3) ▪ Engineers continuously modify these technological systems by applying scientific knowledge and engineering design practices to increase benefits while decreasing costs and risks. (ES-ESS3-2, ES-ESS3-4) ▪ New technologies can have deep impacts on society and the environment, including some that were not anticipated. (ES-ESS3-3, ES3-ETS1-1, ES3-ETS1-3) ▪ Analysis of costs and benefits is a critical aspect of decisions about technology. (ES-ESS3-2, ES3-ETS1-1, ES3-ETS1-3) ----------------------------------- ***Connections to Nature of Science*** **Science is a Human Endeavor** ▪ Science is a result of human endeavors, imagination, and creativity. (ES-ESS3-3) **Science Addresses Questions About the Natural and Material World** ▪ Science and technology may raise ethical issues for which science, by itself, does not provide

		answers and solutions. (ES-ESS3-2) ▪ Science knowledge indicates what can happen in natural systems—not what should happen. The latter involves ethics, values, and human decisions about the use of knowledge. (ES-ESS3-2) ▪ Many decisions are not made using science alone, but rely on social and cultural contexts to resolve issues. (ES-ESS3-2)

Connections to the Arkansas Disciplinary Literacy Standards:

RST.11-12.1 Cite specific textual evidence to support analysis of science and technical texts, attending to important distinctions the author makes and to any gaps or inconsistencies in the account. (ES-ESS3-1, ES-ESS3-2, ES-ESS3-4)

RST.11-12.7 Integrate and evaluate multiple sources of information presented in diverse formats and media (e.g., quantitative data, video, multimedia) in order to address a question or solve a problem. (ES3-ETS1-1, ES3-ETS1-3)

RST.11-12.8 Evaluate the hypotheses, data, analysis, and conclusions in a science or technical text, verifying the data when possible and corroborating or challenging conclusions with other sources of information. (ES-ESS3-2, ES-ESS3-4, ES3-ETS1-1, ES3-ETS1-3)

RST.11-12.9 Synthesize information from a range of sources (e.g., texts, experiments, simulations) into a coherent understanding of a process, phenomenon, or concept, resolving conflicting information when possible. (ES3-ETS1-1, ES3-ETS1-3)

WHST.9-12.2 Write informative/explanatory texts, including the narration of historical events, scientific procedures/ experiments, or technical processes. (ES-ESS3-1)

Connections to the Arkansas Mathematics Standards:

MP.2 Reason abstractly and quantitatively. (ES-ESS3-1, ES-ESS3-2, ES-ESS3-3, ES-ESS3-4, ES-ESS3-6, ES3-ETS1-1, ES3-ETS1-3, ES3-ETS1-4)

MP.4 Model with mathematics. (ES-ESS3-3, ES-ESS3-6, ES3-ETS1-1, ES3-ETS1-2, ES3-ETS1-3, ES3-ETS1-4)

HSN.Q.A.1 Use units as a way to understand problems and to guide the solution of multi-step problems; choose and interpret units consistently in formulas; choose and interpret the scale and the origin in graphs and data displays. (ES-ESS3-1, ES-ESS3-4, ES-ESS3-6)

HSN.Q.A.2 Define appropriate quantities for the purpose of descriptive modeling. (ES-ESS3-1, ES-ESS3-4, ES-ESS3-6)

HSN.Q.A.3 Choose a level of accuracy appropriate to limitations on measurement when reporting quantities. (ES-ESS3-1, ES-ESS3-4, ES-ESS3-6)

Topic 4: Weather and Climate

Students who demonstrate understanding can:

ES-ESS2-4 **Use a model to describe how variations in the flow of energy into and out of Earth's systems result in changes in climate.** [AR Clarification Statement: Emphasis is on the impacts of atmosphere/hydrosphere synergy (ocean currents, weather patterns) on the environment and human activity (farming, fishing). Examples of the causes of climate change differ by timescale, over 1-10 years (drought/non-drought trends), 10s-100s of years (consequences of industrialization and geological events such as volcanic eruptions and glacial changes resulting in solar reflectivity), 10s-100s of thousands of years (deep ocean circulation), and 10s-100s of millions of years (tectonic plate movement of the land masses).]

ES-ESS3-5 **Analyze geoscience data and the results from global climate models to make an evidence-based forecast of the current rate of global or regional climate change and associated future impacts to Earth's systems.** [AR Clarification Statement: Emphasis is on multiple examples of evidence, for both data and climate model outputs (NOAA, USGS, InTeGrate-SERC), for regional climate changes in relation to the hydrosphere, geosphere, atmosphere, biosphere and cryosphere, and their associated impacts (temperature, precipitation, sea level, and chemical composition of the atmosphere and ocean).] [Assessment Boundary: Assessment is limited to one example of a climate change and its associated impacts.]

ES4-ETS1-3

Evaluate a solution to a complex real-world problem based on prioritized criteria and tradeoffs that account for a range of constraints, including cost, safety, reliability, and aesthetics, as well as possible social, cultural, and environmental impacts. [AR Clarification Statement: Solutions to complex issues could include evaluating energy resources available on other planets, evaluating various building configurations, evaluating and implementing drip agriculture systems and solar powered fans.]

The performance expectations above were developed using the following elements from the NRC document *A Framework for K-12 Science Education*:

Science and Engineering Practices

Developing and Using Models

Modeling in 9–12 builds on K–8 experiences and progresses to using, synthesizing, and developing models to predict and show relationships among variables between systems and their components in the natural and designed world(s).

- Use a model to provide mechanistic accounts of phenomena. (ES-ESS2-4)

Analyzing and Interpreting Data

Analyzing data in 9–12 builds on K–8 experiences and progresses to introducing more detailed statistical analysis, the comparison of data sets for consistency, and the use of models to generate and analyze data.

- Analyze data using computational models in order to make valid and

Disciplinary Core Ideas

ESS1.B: Earth and the Solar System

- Cyclical changes in the shape of Earth's orbit around the sun, together with changes in the tilt of the planet's axis of rotation, both occurring over hundreds of thousands of years, have altered the intensity and distribution of sunlight falling on the earth. These phenomena cause a cycle of ice ages and other gradual climate changes. (ES-ESS2-4)

ESS2.A: Earth Materials and Systems

- The geological record shows that changes to global and regional climate can be caused by interactions among changes in the sun's energy output or Earth's orbit, tectonic events, ocean circulation, volcanic activity, glaciers, vegetation, and human activities. These changes can occur on a variety of time scales from sudden (e.g., volcanic ash clouds) to intermediate (ice ages) to very long-term tectonic cycles. (ES-ESS2-4)

ESS2.D: Weather and Climate

Crosscutting Concepts

Cause and Effect

- Empirical evidence is required to differentiate between cause and correlation and make claims about specific causes and effects. (ES-ESS2-4)

Stability and Change

- Change and rates of change can be quantified and modeled over very short or very long periods of time. Some system changes are irreversible. (ES-ESS3-5)

Connections to Engineering, Technology, and Applications of Science

reliable scientific claims. (HS-ESS3-5) **Constructing Explanations and Designing Solutions** Constructing explanations and designing solutions in 9–12 builds on K–8 experiences and progresses to explanations and designs that are supported by multiple and independent student-generated sources of evidence consistent with scientific ideas, principles and theories. ▪ Evaluate a solution to a complex real-world problem, based on scientific knowledge, student-generated sources of evidence, prioritized criteria, and tradeoff considerations. (ES4-ETS1-3) -- ***Connections to Nature of Science*** **Scientific Knowledge is Based on Empirical Evidence** ▪ Science arguments are strengthened by multiple lines of evidence supporting a single explanation. (ES-ESS2-4) **Scientific Investigations Use a Variety of Methods** ▪ Science investigations use diverse methods and do not always use the same set of procedures to obtain data. (ES-ESS3-5) ▪ New technologies advance scientific knowledge. (ES-ESS3-5) **Scientific Knowledge is Based on Empirical Evidence** ▪ Science knowledge is based on empirical evidence. (ES-ESS3-5) ▪ Science arguments are strengthened by multiple lines of evidence supporting a single explanation. (ES-ESS3-5)	▪ The foundation for Earth's global climate systems is the electromagnetic radiation from the sun, as well as its reflection, absorption, storage, and redistribution among the atmosphere, ocean, and land systems, and this energy's re-radiation into space. (ES-ESS2-4) ▪ Changes in the atmosphere due to human activity have increased carbon dioxide concentrations and thus affect climate. (ES-ESS2-4) **ESS3.D: Global Climate Change** ▪ Though the magnitudes of human impacts are greater than they have ever been, so too are human abilities to model, predict, and manage current and future impacts. (ES-ESS3-5) **ETS1.B: Developing Possible Solutions** ▪ When evaluating solutions, it is important to take into account a range of constraints, including cost, safety, reliability, and aesthetics, and to consider social, cultural, and environmental impacts. (ES4-ETS1-3)	**Influence of Science, Engineering, and Technology on Society and the Natural World** New technologies can have deep impacts on society and the environment, including some that were not anticipated. Analysis of costs and benefits is a critical aspect of decisions about technology. (ES4-ETS1-3)

Connections to the Arkansas Disciplinary Literacy Standards:

WHST.9-12.7	Conduct short as well as more sustained research projects to answer a question (including a self-generated question) or solve a problem; narrow or broaden the inquiry when appropriate; synthesize multiple sources on the subject, demonstrating understanding of the subject under investigation. (ES-ESS2-5)
SL.11-12.5	Make strategic use of digital media (e.g., textual, graphical, audio, visual, and interactive elements) in presentations to enhance understanding of findings, reasoning, and evidence and to add interest. (ES-ESS2-4)

RST.11-12.1	Cite specific textual evidence to support analysis of science and technical texts, attending to important distinctions the author makes and to any gaps or inconsistencies in the account. (ES-ESS3-5)
RST.11-12.2	Determine the central ideas or conclusions of a text; summarize complex concepts, processes, or information presented in a text by paraphrasing them in simpler but still accurate terms. (ES-ESS3-5)
RST.11-12.7	Integrate and evaluate multiple sources of information presented in diverse formats and media (e.g., quantitative data, video, multimedia) in order to address a question or solve a problem. (ES-ESS3-5, ES4-ETS1-3)
RST.11-12.8	Evaluate the hypotheses, data, analysis, and conclusions in a science or technical text, verifying the data when possible and corroborating or challenging conclusions with other sources of information. (ES4-ETS1-3)
RST.11-12.9	Synthesize information from a range of sources (e.g., texts, experiments, simulations) into a coherent understanding of a process, phenomenon, or concept, resolving conflicting information when possible. (ES4-ETS1-3)
Connections to the Arkansas Mathematics Standards:	
MP.2	Reason abstractly and quantitatively. (ES-ESS2-4, ES-ESS3-5, ES4-ETS1-3)
MP.4	Model with mathematics. (ES-ESS2-4),(HS-ETS1-3)
HSN.Q.A.1	Use units as a way to understand problems and to guide the solution of multi-step problems; choose and interpret units consistently in formulas; choose and interpret the scale and the origin in graphs and data displays. (ES-ESS2-4, ES-ESS3-5)
HSN.Q.A.2	Define appropriate quantities for the purpose of descriptive modeling. (ES-ESS2-4, ES-ESS3-5)
HSN.Q.A.3	Choose a level of accuracy appropriate to limitations on measurement when reporting quantities. (ES-ESS2-4, ES-ESS3-5)

Contributors

The following educators contributed to the development of this course:

Susan Allison – Benton School District	Rebecca Koelling – Highland School District
Katie Anderson – Little Rock School District	Karen Ladd – Nettleton School District
Dr. Katherine Auld - Northwest Arkansas Community College	Steven Long – Rogers School District
Dr. Daniel Barth - University of Arkansas at Fayetteville	Chris Lynch – Black River Technical College
Angela Bassham – Salem School District	Jacki Marlin – Perryville School District
Allison Belcher – Little Rock School District	Monica Meadows – Pulaski County Special School District
Debbie Bilyeu – Arkansas AIMS	Patti Meeks – Hamburg School District
Tami Blair – Texarkana School District	Melissa Miller – Farmington School District
Stephen Brodie – University of Arkansas at Fort Smith STEM Center	Dr. Jim Musser – Arkansas Tech University
Stephanie Brown – Quitman School District	Nanette Nichols – Wilbur D. Mills AR Education Cooperative
Cindy Bunch – Manila School District	Dennis Pevey – eSTEM Public Charter School
Cindy Cardwell – Bentonville School District	Tami Philyaw – Smackover – Norphlet School District
Larry Cooper – Springdale School District	Kathy Prislovsky – Stuttgart School District
Sarah Croswell – Virtual Arkansas Academy	Kathy Prophet – Springdale School District
Tami Eggensperger – Cabot School District	Rhonda Riggin – Booneville School District
Shelley Forbess – El Dorado School District	Will Squires – Caddo Hills School District
Kyla Gentry – Searcy School District	Tim Trawick – Conway School District
Jenna Gill – Siloam Springs School District	David Wentz – Pea Ridge School District
Douglas Hammon – Little Rock School District	Andrew Williams – University of Arkansas at Monticello
Keith Harris – University of Arkansas at Little Rock Partnership for STEM Education	Wendi J.W. Williams – Northwest Arkansas Community College
Leonda Holthoff – Star City School District	Cathy Wissehr – University of Arkansas at Fayetteville
Amanda Jones – Poyen School District	Diedra Young – Ridgway Christian High School, Pine Bluff

ARKANSAS

K-12 SCIENCE STANDARDS

EDUCATION FOR A NEW GENERATION

Environmental Science

2016

Table of Contents

Notes:

1. Student Performance Expectations (PEs) may be taught in any sequence or grouping within a grade level. Several PEs are described as being "partially addressed in this course" because the same PE is revisited in a subsequent course during which that PE is fully addressed.
2. An asterisk (*) indicates an engineering connection to a practice, core idea, or crosscutting concept.
3. The Clarification Statements are examples and additional guidance for the instructor. AR indicates Arkansas-specific Clarification Statements.
4. The Assessment Boundaries delineate content that may be taught but not assessed in large-scale assessments. AR indicates Arkansas-specific Assessment Boundaries.
5. The section entitled "foundation boxes" is reproduced verbatim from *A Framework for K-12 Science Education: Practices, Crosscutting Concepts, and Core Ideas*. Integrated and reprinted with permission from the National Academy of Sciences.
6. The examples given (e.g.,) are suggestions for the instructor.
7. Throughout this document, connections are provided to the nature of science as defined by *A Framework for K-12 Science Education* (NRC 2012).
8. Throughout this document, connections are provided to Engineering, Technology, and Applications of Science as defined by *A Framework for K-12 Science Education* (NRC 2012).
9. Each set of PEs lists connections to other disciplinary core ideas (DCIs) within the Arkansas K-12 Science Standards and to the Arkansas English Language Arts Standards, Arkansas Disciplinary Literacy Standards, and the Arkansas Mathematics Standards.

Arkansas K-12 Science Standards Overview

The Arkansas K-12 Science Standards are based on *A Framework for K-12 Science Education* (NRC 2012) and are meant to reflect a new vision for science education. The following conceptual shifts reflect what is new about these science standards. The Arkansas K-12 Science Standards

- reflect science as it is practiced and experienced in the real world,
- build logically from Kindergarten through Grade 12,
- focus on deeper understanding as well as application of content,
- integrate practices, crosscutting concepts, and core ideas, and
- make explicit connections to literacy and math.

As part of teaching the *Arkansas K-12 Science Standards*, it will be important to instruct and guide students in adopting appropriate safety precautions for their student-directed science investigations. Reducing risk and preventing accidents in science classrooms begin with planning. There are four recommended steps in carrying out a hazard and risk assessment for any planned lab investigation.

1) Identify all hazards. Hazards may be physical, chemical, health, or environmental.
2) Evaluate the type of risk associated with each hazard.
3) Write the procedure and all necessary safety precautions in such a way as to eliminate or reduce the risk associated with each hazard.
4) Prepare for any emergency that might arise in spite of all of the required safety precautions.

According to Arkansas Code Annotated § 6-10-113 (2012) for eye protection, every student and teacher in public schools participating in any chemical or combined chemical-physical laboratories involving caustic or explosive chemicals or hot liquids or solids is required to wear industrial-quality eye protective devices (eye goggles) at all times while participating in science investigations.

The Arkansas K-12 Science Standards outline the knowledge and science and engineering practices that all students should learn by the end of high school. The standards are three-dimensional because each student performance expectation engages students at the nexus of the following three dimensions.

- Dimension 1 describes scientific and engineering practices.
- Dimension 2 describes crosscutting concepts, overarching science concepts that apply across science disciplines.
- Dimension 3 describe core ideas in the science disciplines.

The Science and Engineering Practices

The eight practices describe the major practices that scientists use to investigate, build models and theories of the world around them or engineers use as they build and design systems. The practices are essential for all students to learn and are as follows:

1. Asking questions (for science) and defining problems (for engineering)
2. Developing and using models
3. Planning and carrying out investigations
4. Analyzing and interpreting data
5. Using mathematics and computational thinking
6. Constructing explanations (for science) and designing solutions (for engineering)
7. Engaging in argument from evidence
8. Obtaining, evaluating, and communicating information

Crosscutting Concepts

The seven crosscutting concepts bridge disciplinary boundaries and unit core ideas throughout the fields of science and engineering. Their purpose is to help students deepen their understanding of the disciplinary core ideas, and develop a coherent, and scientifically based view of the world. The seven crosscutting concepts are as follows:

1. *Patterns.* Observed patterns of forms and events guide organization and classification, and they prompt questions about relationships and the factors that influence them.

2. *Cause and effect: Mechanism and explanation*. Events have causes, sometimes simple, sometimes multifaceted. A major activity of science is investigating and explaining causal relationships and the mechanisms by which they are mediated. Such mechanisms can then be tested across given contexts and used to predict and explain events in new contexts.

3. *Scale, proportion, and quantity.* In considering phenomena, it is critical to recognize what is relevant at different measures of size, time, and energy and to recognize how changes in scale, proportion, or quantity affect a system's structure or performance.

4. *Systems and system models.* Defining the system under study—specifying its boundaries and making explicit a model of that system—provides tools for understanding and testing ideas that are applicable throughout science and engineering.

5. *Energy and matter: Flows, cycles, and conservation.* Tracking fluxes of energy and matter into, out of, and within systems helps one understand the systems' possibilities and limitations.

6. *Structure and function.* The way in which an object or living thing is shaped and its substructure determine many of its properties and functions.

7. *Stability and change.* For natural and built systems alike, conditions of stability and determinants of rates of change or evolution of a system are critical elements of study.

Disciplinary Core Ideas

The Disciplinary Core Ideas describe the content that occurs at each grade or course. The Arkansas K-12 Science Standards focus on a limited number of core ideas in science and engineering both within and across the disciplines and is built on the notion of learning as a developmental progression. The Disciplinary Core Ideas are grouped into the following domains:

- Physical Science (PS)
- Life Science (LS)
- Earth and Space Science (ESS)

- Engineering, Technology and Applications of Science (ETS)

Connections to the Arkansas English Language Arts Standards

Evidence-based reasoning is the foundation of good scientific practice. The Arkansas K-12 Science Standards incorporate reasoning skills used in language arts to help students improve mastery and understanding in all three disciplines. The Arkansas K-8 Science Committee made every effort to align grade-by-grade with the English language arts (ELA) standards so concepts support what students are learning in their entire curriculum. Connections to specific ELA standards are listed for each student performance expectation, giving teachers a blueprint for building comprehensive cross-disciplinary lessons.

The intersections between Arkansas K-12 Science Standards and Arkansas ELA Standards teach students to analyze data, model concepts, and strategically use tools through productive talk and shared activity. Reading in science requires an appreciation of the norms and conventions of the discipline of science, including understanding the nature of evidence used, an attention to precision and detail, and the capacity to make and assess intricate arguments, synthesize complex information, and follow detailed procedures and accounts of events and concepts. These practice-based standards help teachers foster a classroom culture where students think and reason together, connecting around the subject matter and core ideas.

Connections to the Arkansas Disciplinary Literacy Standards

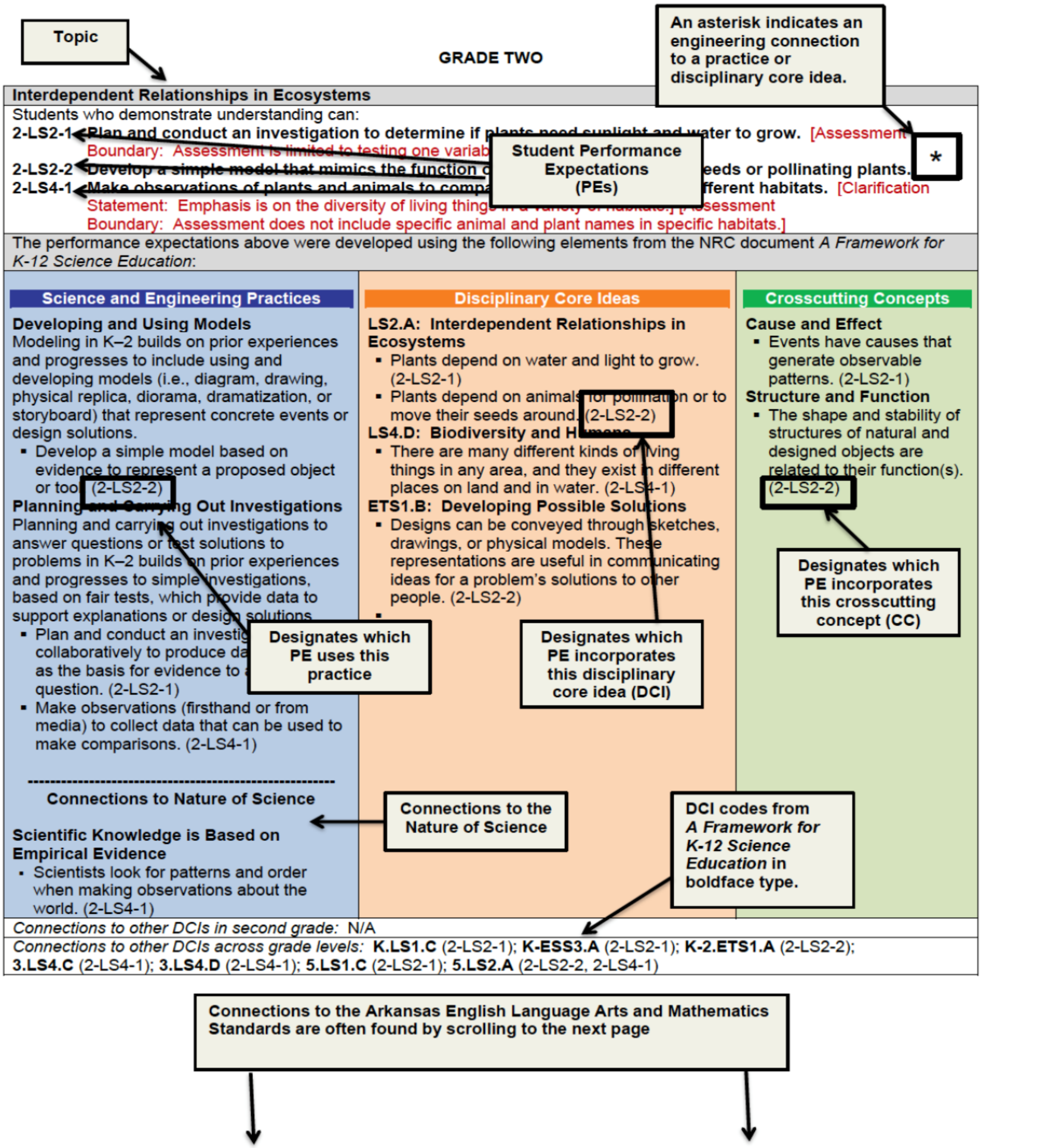
Reading is critical to building knowledge in science. College and career ready reading in science requires an appreciation of the norms and conventions of each discipline, such as the kinds of evidence used in science; an understanding of domain-specific words and phrases; an attention to precise details; and the capacity to evaluate intricate arguments, synthesize complex information, and follow detailed descriptions of events and concepts. When reading scientific and technical texts, students need to be able to gain knowledge from challenging texts that often make extensive use of elaborate diagrams and data to convey information and illustrate concepts. Students must be able to read complex informational texts in science with independence and confidence because the vast majority of reading in college and workforce training programs will be sophisticated nonfiction.

For students, writing is a key means of asserting and defending claims, showing what they know about a science, and conveying what they have experienced, imagined, thought, and felt. To be college and career ready writers, students must take task, purpose, and audience into careful consideration, choosing words, information, structures, and formats deliberately. They need to be able to use technology strategically when creating, refining, and collaborating on writing. They have to become adept at gathering information, evaluating sources, and citing material accurately, reporting finds from their research and analysis of sources in a clear and cogent manner. They must have the flexibility, concentration, and fluency to produce high-quality first-draft text under a tight deadline and the capacity to revisit and make improvements to a piece of writing over multiple drafts when circumstances encourage or require it.

Connections to the Arkansas Mathematics Standards

Science is a quantitative discipline, so it is important for educators to ensure that students' science learning coheres well with their understanding of mathematics. To achieve this alignment, the Arkansas K-12 Science Committee made every effort to ensure that the mathematics standards do not outpace or misalign to the grade-by-grade science standards. Connections to specific math standards are listed for each student performance expectation, giving teachers a blueprint for building comprehensive cross-disciplinary lessons.

How to Read
Arkansas K-12 Science



Environmental Science Learning Progression Chart

Topic 1: Systems	Topic 2: Energy	Topic 3: Populations	Topic 4: Sustainability
AR EVS-ESS2-2 AR EVS-ESS2-3 AR EVS-ESS2-5 AR EVS-ESS2-6 AR EVS-ESS2-7 AR EVS-ESS3-5 AR EVS1-ETS1-1	AR EVS-ESS2-4 AR EVS-PS3-1 AR EVS-PS3-2 AR EVS-PS3-3 AR EVS-PS3-4 AR EVS2-ETS1-2	AR EVS-LS2-1 AR EVS-LS2-2 AR EVS-LS2-6 AR EVS-LS2-8 AR EVS3-ETS1-3	AR EVS-LS4-6 AR EVS-LS2-7 AR EVS-ESS3-1 AR EVS-ESS3-2 AR EVS-ESS3-3 AR EVS-ESS3-4 AR EVS-ESS3-6 AR EVS4-ETS1-4

Arkansas Clarification Statements (AR)

Environmental Science Course Overview

Environmental science is an integrated science course that continues to develop conceptual understanding of the interactions in Earth science, physical science, and life science systems. The standards for environmental science engage students in the core ideas, scientific and engineering practices, and crosscutting concepts to support the development of knowledge that can be applied to understanding, explaining, and improving human interactions with Earth systems and resources. There are strong connections to mathematical practices of analyzing and interpreting data with creating mathematical and computational models. Teachers with any secondary science license (including an Earth science endorsement) are able to teach this course. Students will earn 1 Core requirement/career focus credit.

Students in environmental science develop understanding of key concepts that help them make sense of the interactions between Earth science, physical science, and life science. The ideas are building upon students' understanding of disciplinary ideas, science and engineering practices, and crosscutting concepts from earlier grades and previous high school science courses. There are four topics in environmental science: (1) Systems, (2) Energy, (3) Populations, and (4) Sustainability. The performance expectations environmental science blend core ideas with scientific and engineering practices and crosscutting concepts to support students in developing usable knowledge that can be applied to understanding, explaining, and improving human interactions with Earth systems and resources. The performance expectations reflect the aspects of environmental science with an emphasis on using engineering and technology concepts to design solutions to challenges facing human society. While the performance expectations indicate particular practices to address specific disciplinary core ideas, it is recommended that teachers include a variety of practices and strategies in their instruction.

Connections with other science disciplines help high school students develop these capabilities in various contexts. For example, in biology students design, evaluate, and refine a solutions for reducing human impact on the environment (BI-LS2-7) and to create or revise a simulation to test solutions for mitigating adverse impacts of human activity on biodiversity (BI-LS4-6). In Earth science students apply their engineering capabilities to reduce human impacts on Earth systems, and improve social and environmental cost-benefit ratios (E-ESS3-2, E-ESS3-4).

Additionally, it should be noted that the environmental science standards are not intended to be used as curriculum. Instead, the standards are the minimum that students should know and be able to do. Therefore, teachers should continue to differentiate for the needs of their students by adding depth and additional rigor.

Students in environmental science also continue their ability to develop possible solutions for major global problems with engineering design challenges. At the high school level, students are expected to engage with major global issues at the interface of science, technology, society and the environment, and to bring to light the kinds of analytical and strategic thinking that prior training and increased maturity make possible. As in prior levels, these capabilities can be thought of in three stages:

- **Defining the problem** at the high school level requires both qualitative and quantitative analysis. For example, the need to provide food and fresh water for future generations comes into sharp focus when considering the speed at which world population is growing and conditions in countries that have experienced famine. While high school students are not expected to solve these challenges, they are expected to begin thinking about them as problems that can be addressed, at least in part, through engineering.
- **Developing possible solutions** for major global problems begins by breaking them down into smaller problems that can be tackled with engineering methods. To evaluate potential solutions, students are expected to not only consider a wide range of criteria but to also recognize that criteria needs to be prioritized. For example, public safety or environmental protection may be more important than cost or even functionality. Decisions on priorities can then guide tradeoff choices.
- **Improving designs** at the high school level may involve sophisticated methods, such as using computer simulations to model proposed solutions. Students are expected to use such methods to take into

account a range of criteria and constraints, anticipate possible societal and environmental impacts, and test the validity of their simulations by comparison to the real world.

Environmental Science Topics Overview

The performance expectations in **Topic 1: Systems** help students formulate the answer to the question:

- How do Earth's major systems interact?

Students examine data to develop models to analyze and determine explanations for changes in Earth systems that took place in the past and are occurring in the present. Students will use this information/evidence to inform how Earth's systems interact and may undergo change in the future. Students investigate water including its properties, unique role in earth systems, and intricate support of various life forms. Students use quantitative models specifically to illustrate the cycling of carbon among the biosphere, atmosphere, hydrosphere, and geosphere. Students argue from evidence relating the simultaneous co-evolution of systems to life on our planet. Engineering and technology play a large role within this topic for obtaining and analyzing data as well as aiding in the development of models.

The performance expectations in **Topic 2: Energy** help students formulate answers to the question:

- How is energy transferred and conserved within Earth's systems?

Students design investigations to provide evidence of the transfer of energy in closed systems, develop models to illustrate and explain energy on a macroscopic level and how this energy is associated with both the motion and position of particles. Students create computational models to calculate the changes in the energy of a system when selected components are manipulated. Students engage in the engineering process to design, build, and refine a device that, given constraints, converts one form of energy into another form of energy. Technology plays a role in obtaining data and applying evidence to the development of models that explain the phenomena associated with energy.

The performance expectations in **Topic 3: Populations** help students formulate answers to the question:

- How do organisms interact with living and nonliving environments to obtain matter and energy?

Students engage in the use of mathematical or computational representations to support and revise explanations based on evidence regarding factors that affect carrying capacity, biodiversity, and populations of ecosystems at different scales. Students evaluate evidence to understand the role of group behavior on individual and species ability to survive and reproduce. Following the example of professional scientists, students evaluate claims, evidence, and reasoning regarding the complexities of the interactions that occur in ecosystems. Students explore how any change in conditions can impact an ecosystem. Engineering and technology play a role in obtaining relevant data and creating mathematical and computational representations to support scientific arguments.

The performance expectations in **Topic 4: Sustainability** help students formulate answers to the questions:

- How do Earth's surface processes and human activities affect each other?
- How do humans depend on Earth's resources?

Students construct explanations based on evidence for how the availability of natural resources, the existence of natural hazards, and changes in climate have influenced human activity. Students evaluate competing design solutions related to the management and utilization of natural resources and energy. Students use or create computational simulations to illustrate the relationships among Earth's systems and to determine how relationships are being modified due to human activity. Students explore and analyze the management of natural resources, the sustainability of the human populations, and biodiversity. Students design, evaluate, and refine solutions for reducing the impacts of human activities on the environment and biodiversity.

Topic 1: Systems

Students who demonstrate understanding can:

EVS-ESS2-2. Analyze geoscience data to make the claim that one change to Earth's surface can create feedbacks that cause changes to other Earth systems. [AR Clarification Statement: Emphasis is on organizing Arkansas-specific geoscience data indicating impacts on wildlife and humans as a result of hurricanes, Polar jet stream activity, wildfires, and sinkholes.]

EVS-ESS2-3. Develop a model based on evidence of Earth's interior to describe the cycling of matter by thermal convection. [AR Clarification Statement: Emphasis is on multi-dimensional models of Earth systems, which are associated with plate tectonics processes affecting near Earth surface and interactions among Earth's spheres (bio-, hydro-, atmo-, geo-). Examples of plate tectonics on modern land formation could include heated water in Hot Springs, AR; the Hawaii volcanic chemical and particulate air pollution (vog); rock formations represent paleo-environments and are mined resources in Arkansas.]

EVS-ESS2-5. Plan and conduct an investigation of the properties of water and its effects on Earth materials and surface processes. [AR Clarification Statement: Emphasis is on mechanical and chemical investigations with water and a variety of solid materials to provide the evidence for connections between the hydrologic cycle and system interactions commonly known as the rock cycle. Examples of mechanical investigations could include stream transportation and deposition, erosion rates vary related to soil composition and moisture content, or freeze/thaw cycle. Examples of chemical investigations could include chemical weathering and recrystallization by testing the solubility of different materials, and collecting/analyzing water quality data through public data sets (USGS). Arkansas specific investigations could include karst terrain (Blanchard Caverns) and Mississippi River and its tributaries (river channel shape and river water pollution).]

EVS-ESS2-6. Develop a quantitative model to describe the cycling of carbon among the hydrosphere, atmosphere, geosphere, and biosphere. [AR Clarification Statement: Emphasis is on modeling biogeochemical cycles that include the cycling of carbon through the ocean, atmosphere, rock cycle, and biosphere. Arkansas topics could include agriculture (burning of hydrocarbons, use of natural resources), and energy-related industries including transportation.]

EVS-ESS3-5. Analyze geoscience data and the results from global climate models to make an evidence-based forecast of the current rate of global or regional climate change and associated future impacts to Earth systems. [AR Clarification Statement: Examples of evidence, for both data and climate model outputs, are for climate changes (precipitation and temperature) and their associated impacts (sea level, glacial ice volumes, or atmosphere and ocean composition).] [Assessment Boundary: Assessment is limited to one example of a climate change and its associated impacts.]

EVS1-ETS1-1.

Analyze a major global challenge to specify qualitative and quantitative criteria and constraints for solutions that account for societal needs and wants. [AR Clarification Statement: Qualitative and quantitative constraints can be used to analyze a major global challenge could include water quality with relation to biosphere, atmosphere, cryosphere, and geosphere.]

The performance expectations above were developed using the following elements from the NRC document *A Framework for K-12 Science Education*:

Science and Engineering Practices	Disciplinary Core Ideas	Crosscutting Concepts
Developing and Using Models Modeling in 9–12 builds on K–8 experiences and progresses to using, synthesizing, and developing models to predict and show	**ESS2.A: Earth Materials and Systems** ▪ Earth's systems, being dynamic and interacting, cause feedback effects that can increase or decrease the original changes. (EVS-ESS2-2)	**Energy and Matter** The total amount of energy and matter in closed systems is conserved. (EVS-ESS2-6)

relationships among variables between systems and their components in the natural and designed world(s). ▪ Develop a model based on evidence to illustrate the relationships between systems or between components of a system. (EVS-ESS2-3, EVS-ESS2-6) **Planning and Carrying Out Investigations** Planning and carrying out investigations in 9-12 builds on K-8 experiences and progresses to include investigations that provide evidence for and test conceptual, mathematical, physical, and empirical models. ▪ Plan and conduct an investigation individually and collaboratively to produce data to serve as the basis for evidence, and in the design: decide on types, how much, and accuracy of data needed to produce reliable measurements and consider limitations on the precision of the data (e.g., number of trials, cost, risk, time), and refine the design accordingly. (EVS-ESS2-5) **Analyzing and Interpreting Data** Analyzing data in 9–12 builds on K–8 experiences and progresses to introducing more detailed statistical analysis, the comparison of data sets for consistency, and the use of models to generate and analyze data. ▪ Analyze data using tools, technologies, and/or models (e.g., computational, mathematical) in order to make valid and reliable scientific claims or determine an optimal design solution. (EVS-ESS2-2) **Asking Questions and Defining Problems** Asking questions and defining problems in 9–12 builds on K–8 experiences and progresses to formulating, refining, and evaluating empirically testable questions and	▪ Evidence from deep probes and seismic waves, reconstructions of historical changes in Earth's surface and its magnetic field, and an understanding of physical and chemical processes lead to a model of Earth with a hot but solid inner core, a liquid outer core, a solid mantle and crust. Motions of the mantle and its plates occur primarily through thermal convection, which involves the cycling of matter due to the outward flow of energy from Earth's interior and gravitational movement of denser materials toward the interior. (EVS-ESS2-3) **ESS2.B: Plate Tectonics and Large-Scale System Interactions** ▪ The radioactive decay of unstable isotopes continually generates new energy within Earth's crust and mantle, providing the primary source of the heat that drives mantle convection. Plate tectonics can be viewed as the surface expression of mantle convection. (EVS-ESS2-3) **ESS2.C: The Roles of Water in Earth's Surface Processes** ▪ The abundance of liquid water on Earth's surface and its unique combination of physical and chemical properties are central to the planet's dynamics. These properties include water's exceptional capacity to absorb, store, and release large amounts of energy, transmit sunlight, expand upon freezing, dissolve and transport materials, and lower the viscosities and melting points of rocks. (EVS-ESS2-5) **ESS2.D: Weather and Climate** ▪ The foundation for Earth's global climate systems is the electromagnetic radiation from the sun, as well as its reflection, absorption, storage, and redistribution among the atmosphere, ocean, and land systems, and this energy's re-radiation into space. (EVS-ESS2-2)	▪ Energy drives the cycling of matter within and between systems. (EVS-ESS2-3) **Structure and Function** ▪ The functions and properties of natural and designed objects and systems can be inferred from their overall structure, the way their components are shaped and used, and the molecular substructures of its various materials. (EVS-ESS2-5) **Stability and Change** ▪ Feedback (negative or positive) can stabilize or destabilize a system. (EVS-ESS2-2) --------------------------------------- ***Connections to Engineering, Technology, and Applications of Science*** **Interdependence of Science, Engineering, and Technology** ▪ Science and engineering complement each other in the cycle known as research and development (R&D). Many R&D projects may involve scientists, engineers, and others with wide ranges of expertise. (EVS-ESS2-3) **Influence of Engineering, Technology, and Science on Society and the Natural World** ▪ New technologies can have deep impacts on society and the environment, including some that were not anticipated. Analysis of costs and benefits is a critical aspect of decisions about technology. (EVS-ESS2-2, EVS1-ETS1-1, EVS1-ETS1-3)

design problems using models and simulations. ▪ Analyze complex real-world problems by specifying criteria and constraints for successful solutions. (EVS1-ETS1-1) **Constructing Explanations and Designing Solutions** Constructing explanations and designing solutions in 9–12 builds on K–8 experiences and progresses to explanations and designs that are supported by multiple and independent student-generated sources of evidence consistent with scientific ideas, principles and theories. ▪ Evaluate a solution to a complex real-world problem, based on scientific knowledge, student-generated sources of evidence, prioritized criteria, and tradeoff considerations. (EVS1-ETS1-3) --- ***Connections to Nature of Science*** **Scientific Knowledge is Based on Empirical Evidence** ▪ Science knowledge is based on empirical evidence. (EVS-ESS2-3) ▪ Science disciplines share common rules of evidence used to evaluate explanations about natural systems. (EVS-ESS2-3) ▪ Science includes the process of coordinating patterns of evidence with current theory. (EVS-ESS2-3)	▪ Gradual atmospheric changes were due to plants and other organisms that captured carbon dioxide and released oxygen. (EVS-ESS2-6) ▪ Changes in the atmosphere due to human activity have increased carbon dioxide concentrations and thus affect climate. (EVS-ESS2-6) **PS4.A: Wave Properties** ▪ Geologists use seismic waves and their reflection at interfaces between layers to probe structures deep in the planet. (EVS-ESS2-3) **ETS1.A: Defining and Delimiting Engineering Problems** ▪ Criteria and constraints also include satisfying any requirements set by society, such as taking issues of risk mitigation into account, and they should be quantified to the extent possible and stated in such a way that one can tell if a given design meets them. (EVS1-ETS1-1) ▪ Humanity faces major global challenges today, such as the need for supplies of clean water and food or for energy sources that minimize pollution, which can be addressed through engineering. These global challenges also may have manifestations in local communities. (EVS1-ETS1-1) **ETS1.B: Developing Possible Solutions** ▪ When evaluating solutions, it is important to take into account a range of constraints, including cost, safety, reliability, and aesthetics, and to consider social, cultural, and environmental impacts. (EVS1-ETS1-3)	

Connections to the Arkansas Disciplinary Literacy Standards:

RST.11-12.1 Cite specific textual evidence to support analysis of science and technical texts, attending to important distinctions the author makes and to any gaps or inconsistencies in the account. (EVS-ESS2-2, EVS-ESS2-3)

RST.11-12.2	Determine the central ideas or conclusions of a text; summarize complex concepts, processes, or information presented in a text by paraphrasing them in simpler but still accurate terms. (EVS-ESS2-2)
RST.11-12.7	Integrate and evaluate multiple sources of information presented in diverse formats and media (e.g., quantitative data, video, multimedia) in order to address a question or solve a problem. (EVS1-ETS1-1, EVS1-ETS1-3)
RST.11-12.8	Evaluate the hypotheses, data, analysis, and conclusions in a science or technical text, verifying the data when possible and corroborating or challenging conclusions with other sources of information. (EVS1-ETS1-1, EVS1-ETS1-3)
RST.11-12.9	Synthesize information from a range of sources (e.g., texts, experiments, simulations) into a coherent understanding of a process, phenomenon, or concept, resolving conflicting information when possible. (EVS1-ETS1-1, EVS1-ETS1-3)
WHST.9-12.7	Conduct short as well as more sustained research projects to answer a question (including a self-generated question) or solve a problem; narrow or broaden the inquiry when appropriate; synthesize multiple sources on the subject, demonstrating understanding of the subject under investigation. (EVS-ESS2-5)
SL.11-12.5	Make strategic use of digital media (e.g., textual, graphical, audio, visual, and interactive elements) in presentations to enhance understanding of findings, reasoning, and evidence and to add interest. (EVS-ESS2-3)

Connections to the Arkansas Mathematics Standards:

MP.2	Reason abstractly and quantitatively. (EVS-ESS2-2, EVS-ESS2-3, EVS-ESS2-6, EVS1-ETS1-1, EVS-ETS1-3)
MP.4	Model with mathematics.(EVS-ESS2-3, EVS-ESS2-6, EVS1-ETS1-1, EVS1-ETS1-3)
HSN.Q.A.1	Use units as a way to understand problems and to guide the solution of multi-step problems; choose and interpret units consistently in formulas; choose and interpret the scale and the origin in graphs and data displays. (EVS-ESS2-2, EVS-ESS2-3, EVS-ESS2-6)
HSN.Q.A.2	Define appropriate quantities for the purpose of descriptive modeling. (EVS-ESS2-3, EVS-ESS2-6)
HSN.Q.A.3	Choose a level of accuracy appropriate to limitations on measurement when reporting quantities. (EVS-ESS2-2, EVS-ESS2-3, EVS-ESS2-5, EVS-ESS2-6)

Topic 2: Energy
Students who demonstrate understanding can: **EVS-PS3-1. Create a computational model to calculate the change in the energy of one component in a system when the change in energy of the other component(s) and energy flows in and out of the system are known.** [AR Clarification Statement: Examples of the use of mathematical expressions could be modeling of thermal energy (heat flow in aquatic systems) and gravitational energy (sediment-related pollutants such as turbidity).] **EVS-PS3-2. Develop and use models to illustrate that energy at the macroscopic scale can be accounted for as a combination of energy associated with the motions of particles (objects) and energy associated with the relative positions of particles (objects).** [AR Clarification Statement: Examples of phenomena at the macroscopic scale could include any fluid (wind, water) interacting with an engineered or natural surface, biomass and air masses as they relate to weather patterns. Models could include diagrams, drawings, descriptions, and computer simulations.] **EVS-PS3-3. Design, build, and refine a device that works within given constraints to convert one form of energy into another form of energy.*** [AR Clarification Statement: Emphasis is on both qualitative and quantitative evaluations of devices. Examples of devices could include wind turbines and biomass composting. Constraints could include efficiency of potential societal impact, engineering parameters, and economic feasibility.] **EVS-PS3-4. Plan and conduct an investigation to provide evidence that the transfer of thermal energy when two components of different temperature are combined within a closed system results in a more uniform energy distribution among the components in the system (second law of thermodynamics).** [AR Clarification Statement: Emphasis is on analyzing data from student investigations and using mathematical thinking to describe the energy changes both quantitatively and conceptually. Examples of investigations could include balancing thermal input and output from systems such as coal-fueled power plants, natural gas mining, cooling towers, and insulating factors.] **EVS-ESS2-4. Use a model to describe how variations in the flow of energy into and out of Earth's systems result in changes in climate.** [AR Clarification Statement: Emphasis is on the interactions between atmosphere and hydrosphere (ocean currents, weather patterns) on human activity and the environment. Examples of the causes of climate change differ by timescale, over 1-10 years: drought/non-drought trends (NOAA data); 10-100s of years: consequences of industrialization and geological events such as volcanic eruptions and glacial changes resulting in solar reflectivity; 1-100s of thousands of years: deep ocean circulation; 1-100s of millions of years: tectonic plate movement of the land masses.] **EVS2-ETS1-2.** **Design a solution to a complex real-world problem by breaking it down into smaller, more manageable problems that can be solved through engineering.** [AR Clarification Statement: Examples of solutions could include, designing and refining solutions using solar cells and energy recovery from waste practices. Examples of constraints could include use of renewable energy forms and efficiency modeling.]
The performance expectations above were developed using the following elements from the NRC document *A Framework for K-12 Science Education*:

Science and Engineering Practices	Disciplinary Core Ideas	Crosscutting Concepts
Using Mathematics and Computational Thinking Mathematical and computational thinking at the 9–12 level builds on K–8 and progresses to using algebraic thinking and analysis, a range of linear and nonlinear functions including trigonometric functions, exponentials and logarithms, and computational tools for statistical analysis to analyze, represent, and model data. Simple computational simulations are created and used based on mathematical models of basic assumptions. • Create a computational model or simulation of a phenomenon, designed device, process, or system. (EVS-PS3-1) **Developing and Using Models** Modeling in 9–12 builds on K–8 and progresses to using, synthesizing, and developing models to predict and show relationships among variables between systems and their components in the natural and designed worlds. • Develop and use a model based on evidence to illustrate the relationships between systems or between components of a system. (EVS-PS3-2) **Constructing Explanations and Designing Solutions** Constructing explanations and designing solutions in 9–12 builds on K–8 experiences and progresses to explanations and designs that are supported by multiple and independent student-generated sources of evidence consistent with scientific ideas, principles, and theories. • Design, evaluate, and/or refine a solution to a complex real-world problem, based on scientific knowledge, student-generated sources of evidence, prioritized	**PS3.A: Definitions of Energy** • Energy is a quantitative property of a system that depends on the motion and interactions of matter and radiation within that system. That there is a single quantity called energy is due to the fact that a system's total energy is conserved, even as, within the system, energy is continually transferred from one object to another and between its various possible forms. (EVS-PS3-1, EVS-PS3-2) • At the macroscopic scale, energy manifests itself in multiple ways, such as in motion, sound, light, and thermal energy. (EVS-PS3-2, EVS-PS3-3) • These relationships are better understood at the microscopic scale, at which all of the different manifestations of energy can be modeled as a combination of energy associated with the motion of particles and energy associated with the configuration (relative position of the particles). In some cases the relative position energy can be thought of as stored in fields (which mediate interactions between particles). This last concept includes radiation, a phenomenon in which energy stored in fields moves across space. (EVS-PS3-2) **PS3.B: Conservation of Energy and Energy Transfer** • Conservation of energy means that the total change of energy in any system is always equal to the total energy transferred into or out of the system. • Energy cannot be created or destroyed, but it can be transported from one place to another and transferred between systems. • Mathematical expressions, which quantify how the stored energy in a system depends on its configuration (e.g. relative positions of charged particles, compression of a spring)	**Systems and System Models** • Models can be used to predict the behavior of a system, but these predictions have limited precision and reliability due to the assumptions and approximations inherent in models. (EVS-PS3-1) • When investigating or describing a system, the boundaries and initial conditions of the system need to be defined and their inputs and outputs analyzed and described using models. (EVS-PS3-4) - ***Connections to Nature of Science*** **Scientific Knowledge Assumes an Order and Consistency in Natural Systems** • Science assumes the universe is a vast single system in which basic laws are consistent. (EVS-PS3-1) **Energy and Matter** • Energy cannot be created or destroyed—only moves between one place and another place, between objects and/or fields, or between systems. (EVS-PS3-2) • Changes of energy and matter in a system can be described in terms of energy and matter flows into, out of, and within that system. (EVS-PS3-3)

criteria, and tradeoff considerations. (EVS-PS3-3, EVS2-ETS1-2) **Planning and Carrying Out Investigations** Planning and carrying out investigations to answer questions or test solutions to problems in 9–12 builds on K–8 experiences and progresses to include investigations that provide evidence for and test conceptual, mathematical, physical, and empirical models. • Plan and conduct an investigation individually and collaboratively to produce data to serve as the basis for evidence, and in the design: decide on types, how much, and accuracy of data needed to produce reliable measurements and consider limitations on the precision of the data (e.g., number of trials, cost, risk, time), and refine the design accordingly. (EVS-PS3-4)	and how kinetic energy depends on mass and speed, allow the concept of conservation of energy to be used to predict and describe system behavior. • The availability of energy limits what can occur in any system. (EVS-PS3-1) • Energy cannot be created or destroyed, but it can be transported from one place to another and transferred between systems. (EVS-PS3-4) • Uncontrolled systems always evolve toward more stable states—that is, toward more uniform energy distribution (e.g., water flows downhill, objects hotter than their surrounding environment cool down). (EVS-PS3-4) **PS3.D: Energy in Chemical Processes** • Although energy cannot be destroyed, it can be converted to less useful forms—for example, to thermal energy in the surrounding environment. (EVS-PS3-3, EVS-PS3-4) **ETS1.A: Defining and Delimiting an Engineering Problem** • Criteria and constraints also include satisfying any requirements set by society, such as taking issues of risk mitigation into account, and they should be quantified to the extent possible and stated in such a way that one can tell if a given design meets them. (EVS-PS3-3) **ETS1.C: Optimizing the Design Solution** • Criteria may need to be broken down into simpler ones that can be approached systematically, and decisions about the priority of certain criteria over others (trade-offs) may be needed. (EVS2-ETS1-2)	- ***Connections to Engineering, Technology, and Applications of Science*** **Influence of Science, Engineering and Technology on Society and the Natural World** • Modern civilization depends on major technological systems. Engineers continuously modify these technological systems by applying scientific knowledge and engineering design practices to increase benefits while decreasing costs and risks. (EVS-PS3-3)

Connections to the Arkansas Disciplinary Literacy Standards:

WHST.9-12.7 Conduct short as well as more sustained research projects to answer a question (including a self-generated question) or solve a problem; narrow or broaden the inquiry when appropriate; synthesize multiple sources on the subject, demonstrating understanding of the subject under investigation. (EVS-PS3-3)

WHST.11-12.8 Gather relevant information from multiple authoritative print and digital sources, using advanced searches effectively; assess the strengths and limitations of each source in terms of the specific task, purpose, and audience; integrate information into the text selectively to maintain the flow of

ideas, avoiding plagiarism and overreliance on any one source and following a standard format for citation. (EVS-PS3-4)

WHST.9-12.9 Draw evidence from informational texts to support analysis, reflection, and research. (EVS-PS3-4)

RST.11-12.1 Cite specific textual evidence to support analysis of science and technical texts, attending to important distinctions the author makes and to any gaps or inconsistencies in the account. (EVS-PS3-4)

Connections to Arkansas English Language Arts Standards:

SL.11-12.5 Make strategic use of digital media (e.g., textual, graphical, audio, visual, and interactive elements) in presentations to enhance understanding of findings, reasoning, and evidence and to add interest. (EVS-PS3-1, EVS-PS3-2)

Connections to the Arkansas Mathematics Standards:

MP.2 Reason abstractly and quantitatively. (EVS-PS3-1, EVS-PS3-2, EVS-PS3-3, EVS-PS3-4)

MP.4 Model with mathematics. (EVS-PS3-1, EVS-PS3-2, EVS-PS3-3, EVS-PS3-4, EVS2-ETS1-2)

HSN.Q.A.1 Use units as a way to understand problems and to guide the solution of multi-step problems; choose and interpret units consistently in formulas; choose and interpret the scale and the origin in graphs and data displays. (EVS-PS3-1, EVS-PS3-3)

HSN.Q.A.2 Define appropriate quantities for the purpose of descriptive modeling. (EVS-PS3-1, EVS-PS3-3)

HSN.Q.A.3 Choose a level of accuracy appropriate to limitations on measurement when reporting quantities. (EVS-PS3-1, EVS-PS3-3)

Topic 3: Populations
Students who demonstrate understanding can: **EVS-LS2-1. Use mathematical and/or computational representations to support explanations of factors that affect carrying capacity of ecosystems at different scales.** [AR Clarification Statement: Emphasis is on Arkansas-specific biodiversity and nonbiodiversity, water habitats, and native vegetation. Evaluation techniques include the use of quantitative analyses and comparison of the relationships among interdependent factors including boundaries, resources, climate, and competition. Arkansas examples could include predator/prey relationships (bass/feeder fish), biodiversity (cave systems and endangered species such as the Ozark Big-Eared bat), producer/consumer relationship (pine tree/Japanese beetle).] **EVS-LS2-2. Use mathematical representations to support and revise explanations based on evidence about factors affecting biodiversity and populations in ecosystems of different scales.** [AR Clarification Statement: Examples of mathematical representations include finding the average, determining trends, and using graphical comparisons of multiple sets of data (Arkansas macroinvertebrates stream data).] [Assessment Boundary: Assessment is limited to provided data.] **EVS-ESS3-6. Evaluate claims, evidence, and reasoning that the complex interactions in ecosystems maintain relatively consistent numbers and types of organisms in stable conditions, but changing conditions may result in a new ecosystem.*** [AR Clarification Statement: Emphasis is on both ancient and modern conditions. Examples of changes in ecosystem conditions could include Arkansas habitat loss and its impact on the bobwhite population or fossil evidence of exosystems (leaf-margin analyses).] **EVS-ESS3-8. Evaluate evidence for the role of group behavior on individual and species' chances to survive and reproduce.** [AR Clarification Statement: Emphasis is on the relationship of human activity with the environment: (1) distinguishing between group and individual behavior, (2) identifying evidence supporting the outcomes of group behavior, and (3) developing logical and reasonable arguments based on evidence. Examples of group behaviors could include human population dynamics, ant or bee colonies, and copperhead mating behaviors.] **EVS3-ETS1-3. Evaluate a solution to a complex real-world problem based on prioritized criteria and tradeoffs that account for a range of constraints, including cost, safety, reliability, and aesthetics as well as possible social, cultural, and environmental impacts.** [AR Clarification Statement: Solutions to complex real world issues could include Arkansas wildlife management practices and river management programs susceptible to natural hazards (e.g., erosion, flooding, tornadoes, and earthquakes).]
The performance expectations above were developed using the following elements from the NRC document *A Framework for K-12 Science Education*:

Science and Engineering Practices	Disciplinary Core Ideas	Crosscutting Concepts
Using Mathematics and Computational Thinking Mathematical and computational thinking at the 9–12 level builds on K–8 and progresses to using algebraic thinking and analysis, a range of linear and nonlinear functions including trigonometric functions, exponentials and logarithms, and computational tools for statistical analysis to analyze, represent, and model data. Simple	**LS2.A: Interdependent Relationships in Ecosystems** • Ecosystems have carrying capacities, which are limits to the numbers of organisms and populations they can support. These limits result from such factors as the availability of living and nonliving resources and from such challenges such as predation, competition, and disease. Organisms would have the capacity to produce populations of great size were it not for	**Scale, Proportion, and Quantity** • The significance of a phenomenon is dependent on the scale, proportion, and quantity at which it occurs. (EVS-LS2-2) **Stability and Change** • Much of science deals with constructing explanations of how

computational simulations are created and used based on mathematical models of basic assumptions. • Use mathematical and/or computational representations of phenomena or design solutions to support and revise explanations. (EVS-LS2-1, EVS-LS2-2) **Engaging in Argument from Evidence** Engaging in argument from evidence in 9–12 builds on K–8 experiences and progresses to using appropriate and sufficient evidence and scientific reasoning to defend and critique claims and explanations about the natural and designed world(s). Arguments may also come from current scientific or historical episodes in science. • Evaluate the claims, evidence, and reasoning behind currently accepted explanations or solutions to determine the merits of arguments. (EVS-LS2-6, EVS-LS2-8) - ***Connections to Nature of Science*** **Scientific Knowledge is Open to Revision in Light of New Evidence** • Most scientific knowledge is quite durable, but is, in principle, subject to change based on new evidence and/or reinterpretation of existing evidence. (EVS-LS2-2) • Scientific argumentation is a mode of logical discourse used to clarify the strength of relationships between ideas and evidence that may result in revision of an explanation. (EVS-LS2-6, EVS-LS2-8)	the fact that environments and resources are finite. This fundamental tension affects the abundance (number of individuals) of species in any given ecosystem. (EVS-LS2-1, EVS-LS2-2) **LS2.C: Ecosystem Dynamics, Functioning, and Resilience** • A complex set of interactions within an ecosystem can keep its numbers and types of organisms relatively constant over long periods of time under stable conditions. If a modest biological or physical disturbance to an ecosystem occurs, it may return to its more or less original status (i.e., the ecosystem is resilient), as opposed to becoming a very different ecosystem. Extreme fluctuations in conditions or the size of any population, however, can challenge the functioning of ecosystems in terms of resources and habitat availability. (EVS-LS2-2, EVS-LS2-6) **LS2.D: Social Interactions and Group Behavior** • Group behavior has evolved because membership can increase the chances of survival for individuals and their genetic relatives. (EVS-LS2-8) **ETS1.A: Defining and Delimiting an Engineering Problem** • Criteria and constraints also include satisfying any requirements set by society, such as taking issues of risk mitigation into account, and they should be quantified to the extent possible and stated in such a way that one can tell if a given design meets them. *(secondary)* (EVS-PS3-3)	things change and how they remain stable. (EVS-LS2-6) **Cause and Effect** • Empirical evidence is required to differentiate between cause and correlation and make claims about specific causes and effects. (EVS-LS2-8) - ***Connections to Engineering, Technology, and Applications of Science*** **Influence of Science, Engineering and Technology on Society and the Natural World** • Modern civilization depends on major technological systems. Engineers continuously modify these technological systems by applying scientific knowledge and engineering design practices to increase benefits while decreasing costs and risks. (EVS-PS3-3)
Connections to the Arkansas Disciplinary Literacy Standards: **RST.9 10.8** Assess the extent to which the reasoning and evidence in a text support the author's claim or a recommendation for solving a scientific or technical problem. (EVS-LS2-6, EVS-LS2-8)		

RST.11-12.1	Cite specific textual evidence to support analysis of science and technical texts, attending to important distinctions the author makes and to any gaps or inconsistencies in the account. (EVS-LS2-1, EVS-LS2-2, EVS-LS2-8)
RST.11.12.7	Integrate and evaluate multiple sources of information presented in diverse formats and media (e.g. quantitative data, video, multimedia) in order to address a question or solve a problem. (EVS-LS2-6, EVS-LS2-8, EVS3-ETS1-3)
RST.11.12.8	Evaluate the hypotheses, data, analysis, and conclusions in a science or technical text, verifying the data when possible and corroborating or challenging conclusions with other sources of information. (EVS-LS2-6, EVS-LS2-8, EVS3-ETS1-3) Synthesize information from a range of sources (e.g. texts, experiments, simulations) into a coherent understanding of a process, phenomenon, or concept, resolving conflicting information when possible. (EVS3-ETS1-3)
WHST.9-12.2	Write informative/explanatory texts, including the narrations of historical events, scientific procedures/experiments, or technical processes. (EVS-LS2-1, EVS-LS2-2)
Connections to the Arkansas Mathematics Standards:	
MP.2	Reason abstractly and quantitatively. (EVS-LS2-1, EVS-LS2-2, EVS-LS2-6, EVS3-ETS1-3)
MP.4	Model with mathematics. (EVS-LS2-1, EVS-LS2-2, EVS3-ETS1-3)
HSN.Q.A.1	Use units as a way to understand problems and to guide the solution of multi-step problems; choose and interpret units consistently in formulas; choose and interpret the scale and the origin in graphs and data displays. (EVS-LS2-1, EVS-LS2-2)
HSN.Q.A.2	Define appropriate quantities for the purpose of descriptive modeling. (EVS-LS2-1)
HSN.Q.A.3	Choose a level of accuracy appropriate to limitations on measurement when reporting quantities. (EVS-LS2-1)
HSS.ID.A.1	Represent data with plots on the real number line. (EVS-LS2-6)
HSS.IC.A.1	Understand statistics as a process for making inferences about population parameters based on a random sample from that population. (EVS-LS2-6)
HSS.IC.B.6	Evaluate reports based on data. (EVS-LS2-6)

Topic 4: Sustainability

Students who demonstrate understanding can:

EVS-ESS3-1. Construct an explanation based on evidence for how the availability of natural resources, occurrences of natural hazards, and changes in climate have influenced human activity. [AR Clarification Statement: Emphasis is on sustainability of natural resources, extracting natural resources, and how human societies are economically impacted by these phenomena.]

EVS-ESS3-2. Evaluate competing design solutions for developing, managing, and utilizing energy and mineral resources based on cost-benefit ratios.* [AR Clarification Statement: Emphasis is on conservation, sustainability (e.g., recycling and reuse of resources), and minimizing impacts (e.g., Low Impact Design).]

EVS-ESS3-3. Create a computational simulation to illustrate the relationships among the management of natural resources, the sustainability of human populations, and biodiversity. [AR Clarification Statement: Emphasis is on Arkansas-specific management and conservation of, costs of implementation and regulation of, and land use of (agriculture, mining, recreation, and urbanization) natural resources.]

EVS-ESS3-4. Evaluate or refine a technological solution that reduces impacts of human activities on natural systems.* [AR Clarification Statement: Examples of data on the impacts of human activities could include the sequencing of traffic lights, adding lanes to main traffic arteries, docking and dredging of waterways, transportation of goods to market, use of drones, and use of alternative energies.]

EVS-ESS3-6. Use a computational representation to illustrate the relationships among Earth systems and how those relationships are being modified due to human activity. [AR Clarification Statement: Examples of evidence for both data and climate model outputs for climate changes and their associated impacts can be found at NOAA, National Weather Service and United States Geological Survey.]

EVS-LS4-6. Create or revise a simulation to test a solution to mitigate adverse impacts of human activity on biodiversity.* [AR Clarification Statement: Emphasis is on designing solutions for a proposed problem (e.g., microbead pollution, invasive species, effects of sedimentation on the Arkansas fatmucket, White-nose Syndrome affecting bat populations, and environmental pollution from hormones and antibiotics).]

EVS4-ETS1-3.
Evaluate a solution to a complex real-world problem based on prioritized criteria and tradeoffs that account for a range of constraints, including cost, safety, reliability, and aesthetics, as well as possible social, cultural, and environmental impacts. [AR Clarification Statement: Modeling complex real world problems using computer software could include simulating future population growth in terms of limited resources or evaluating water flow through different Earth and geoengineered materials.]

The performance expectations above were developed using the following elements from the NRC document *A Framework for K-12 Science Education*:

Science and Engineering Practices	Disciplinary Core Ideas	Crosscutting Concepts
Constructing Explanations and Designing Solutions Constructing explanations and designing solutions in 9–12 builds on K–8 experiences and progresses to explanations and designs that are supported by multiple and independent student-generated	**LS2.C: Ecosystem Dynamics, Functioning, and Resilience** • Moreover, anthropogenic changes (induced by human activity) in the environment—including habitat destruction, pollution, introduction of invasive species, overexploitation, and climate change—can disrupt an	**Cause and Effect** • Empirical evidence is required to differentiate between cause and correlation and make claims about specific causes and effects. (EVS-ESS3-1, EVS-LS4-6)

sources of evidence consistent with scientific knowledge, principles, and theories. • Construct an explanation based on valid and reliable evidence obtained from a variety of sources (including students' own investigations, models, theories, simulations, peer review) and the assumption that theories and laws that describe the natural world operate today as they did in the past and will continue to do so in the future. (EVS-ESS3-1) • Design or refine a solution to a complex real-world problem, based on scientific knowledge, student-generated sources of evidence, prioritized criteria, and tradeoff considerations. (EVS-ESS3-4, EVS-LS2-7) **Engaging in Argument from Evidence** Engaging in argument from evidence in 9–12 builds on K–8 experiences and progresses to using appropriate and sufficient evidence and scientific reasoning to defend and critique claims and explanations about natural and designed world(s). Arguments may also come from current scientific or historical episodes in science. • Evaluate competing design solutions to a real-world problem based on scientific ideas and principles, empirical evidence, and logical arguments regarding relevant factors (e.g. economic, societal, environmental, ethical considerations). (EVS-ESS3-2) **Using Mathematics and Computational Thinking** Mathematical and computational thinking in 9-12 builds on K-8 experiences and progresses to using algebraic thinking and analysis, a range of linear and nonlinear functions including trigonometric functions, exponentials and logarithms, and computational tools for statistical analysis to analyze,	ecosystem and threaten the survival of some species. (EVS-LS2-7) **LS4.C: Adaptation** • Changes in the physical environment, whether naturally occurring or human induced, have thus contributed to the expansion of some species, the emergence of new distinct species as populations diverge under different conditions, and the decline–and sometimes the extinction–of some species. (EVS-LS4-6)) **LS4.D: Biodiversity and Humans** • Biodiversity is increased by the formation of new species (speciation) and decreased by the loss of species (extinction). *(secondary)* (EVS-LS2-7) • Humans depend on the living world for the resources and other benefits provided by biodiversity. But human activity is also having adverse impacts on biodiversity through overpopulation, overexploitation, habitat destruction, pollution, introduction of invasive species, and climate change. Thus sustaining biodiversity so that ecosystem functioning and productivity are maintained is essential to supporting and enhancing life on Earth. Sustaining biodiversity also aids humanity by preserving landscapes of recreational or inspirational value. *(*EVS-LS2-7, EVS-LS4-6) **ESS2.D: Weather and Climate** • Current models predict that, although future regional climate changes will be complex and varied, average global temperatures will continue to rise. The outcomes predicted by global climate models strongly depend on the amounts of human-generated greenhouse gases added to the atmosphere each year and by the ways in which these gases are absorbed by the ocean and biosphere. (EVS-ESS3-6) **ESS3.A: Natural Resources** • Resource availability has guided the development of human society. (EVS-ESS3-1, EVS-ESS3-2)	**Stability and Change** • Change and rates of change can be quantified and modeled over very short or very long periods of time. Some system changes are irreversible. (EVS-ESS3-3, EVS-ESS3-4) • Much of science deals with constructing explanations of how things change and how they remain stable. (EVS-LS2-7) **Systems and System Models** • When investigating or describing a system, the boundaries and initial conditions of the system need to be defined and their inputs and outputs analyzed and described using models. (EVS-ESS3-6) - ***Connections to Engineering, Technology, and Applications of Science*** **Influence of Science, Engineering, and Technology on Society and the Natural World** • Modern civilization depends on major technological systems. (EVS-ESS3-1, EVS-ESS3-3) • Engineers continuously modify these technological systems by applying scientific knowledge and engineering design practices to increase benefits while decreasing costs and risks. (EVS-ESS3-2) • Analysis of costs and benefits is a critical aspect of decisions about technology. (EVS-ESS3-2)

represent, and model data. Simple computational simulations are created and used based on mathematical models of basic assumptions. • Create a computational model or simulation of a phenomenon, designed device, process, or system. (EVS-ESS3-3) • Use a computational representation of phenomena or design solutions to describe and/or support claims and/or explanations. (EVS-ESS3-6) • Create or revise a simulation of a phenomenon, designed device, process, or system. (EVS-LS4-6)	**ESS3.B: Natural Hazards** • Natural hazards and other geologic events have shaped the course of human history; [they] have significantly altered the sizes of human populations and have driven human migrations. (EVS-ESS3-1) **ESS3.C: Human Impacts on Earth Systems** • Scientists and engineers can make major contributions by developing technologies that produce less pollution and waste and that preclude ecosystem degradation. (EVS-ESS3-3, EVS-ESS3-4) **ESS3.D: Global Climate Change** • Through computer simulations and other studies, important discoveries are still being made about how the ocean, the atmosphere, and the biosphere interact and are modified in response to human activities. (EVS-ESS3-6) **ETS1.B: Developing Possible Solutions** • When evaluating solutions, it is important to take into account a range of constraints, including cost, safety, reliability, and aesthetics, and to consider social, cultural, and environmental impacts. (EVS-ESS3-2, EVS-ESS3-4, EVS-LS4-6, EVS-LS2-7) • Both physical models and computers can be used in various ways to aid in the engineering design process. Computers are useful for a variety of purposes, such as running simulations to test different ways of solving a problem or to see which one is most efficient or economical; and in making a persuasive presentation to a client about how a given design will meet his or her needs. (EVS-LS4-6)	• New technologies can have deep impacts on society and the environment, including some that were not anticipated. (EVS-ESS3-3) • Engineers continuously modify these technological systems by applying scientific knowledge and engineering design practices to increase benefits while decreasing costs and risks. (EVS-ESS3-4) - ***Connections to Nature of Science*** **Science Addresses Questions About the Natural and Material World** • Science and technology may raise ethical issues for which science, by itself, does not provide answers and solutions. • Science knowledge indicates what can happen in natural systems—not what should happen. The latter involves ethics, values, and human decisions about the use of knowledge. • Many decisions are not made using science alone, but rely on social and cultural contexts to resolve issues. (EVS-ESS3-2) **Science is a Human Endeavor** • Science is a result of human endeavors, imagination, and creativity. (EVS-ESS3-3)

Connections to the Arkansas Disciplinary Literacy Standards:

RST.9-10.8 Assess the extent to which the reasoning and evidence in a text support the author's claim or a recommendation for solving a scientific or technical problem. (EVS-LS2-7)

RST.11-12.7 Integrate and evaluate multiple sources of information presented in diverse formats and media (e.g. quantitative data, video, multimedia) in order to address a question or solve a problem. (EVS-LS2-7)

RST.11-12.1 Cite specific textual evidence to support analysis of science and technical texts, attending to important distinctions the author makes and to any gaps or inconsistencies in the account. (EVS-ESS3-1, EVS-ESS3-4)

RST.11-12.8 Evaluate the hypotheses, data, analysis, and conclusions in a science or technical text, verifying the data when possible and corroborating or challenging conclusions with other sources of information. (EVS-ESS3-2, EVS-ESS3-4, EVS-LS2-7)

WHST.9-12.2 Write informative/explanatory texts, including the narrations of historical events, scientific procedures/experiments, or technical processes. (EVS-ESS3-1)

WHST.9-12.5 Develop and strengthen writing as needed by planning, revising, editing, rewriting, or trying a new approach, focusing on addressing what is most significant for a specific purpose and audience. (EVS-LS4-6)

WHST.9-12.7 Conduct short as well as more sustained research projects to answer a question (including a self-generated question) or solve a problem; narrow or broaden the inquiry when appropriate; synthesize multiple sources on the subject, demonstrating understanding of the subject under investigation. (EVS-LS4-6, EVS-LS2-7)

Connections to the Arkansas Mathematics Standards:

MP.2 Reason abstractly and quantitatively. (EVS-ESS3-1, EVS-ESS3-2, EVS-ESS3-3, EVS-ESS3-4, EVS-ESS3-6, EVS-LS2-7)

MP.4 Model with mathematics. (EVS-ESS3-3, EVS-ESS3-6)

HSN.Q.A.1 Use units as a way to understand problems and to guide the solution of multi-step problems; choose and interpret units consistently in formulas; choose and interpret the scale and the origin in graphs and data displays. (EVS-ESS3-1, EVS-ESS3-4, EVS-ESS3-6, EVS-LS2-7)

HSN.Q.A.2 Define appropriate quantities for the purpose of descriptive modeling. (EVS-ESS3-1, EVS-ESS3-4, EVS-ESS3-6, EVS-LS2-7)

HSN.Q.A.3 Choose a level of accuracy appropriate to limitations on measurement when reporting quantities. (EVS-ESS3-1, EVS-ESS3-4, EVS-ESS3-6, EVS-LS2-7)

Contributors

The following educators contributed to the development of this course:

Susan Allison – Benton School District	Rebecca Koelling – Highland School District
Katie Anderson – Little Rock School District	Karen Ladd – Nettleton School District
Dr. Katherine Auld - Northwest Arkansas Community College	Steven Long – Rogers School District
Dr. Daniel Barth - University of Arkansas at Fayetteville	Chris Lynch – Black River Technical College
Angela Bassham – Salem School District	Jacki Marlin – Perryville School District
Allison Belcher – Little Rock School District	Monica Meadows – Pulaski County Special School District
Debbie Bilyeu – Arkansas AIMS	Patti Meeks – Hamburg School District
Tami Blair – Texarkana School District	Melissa Miller – Farmington School District
Stephen Brodie – University of Arkansas at Fort Smith STEM Center	Dr. Jim Musser – Arkansas Tech University
Stephanie Brown – Quitman School District	Nanette Nichols – Wilbur D. Mills AR Education Cooperative
Cindy Bunch – Manila School District	Dennis Pevey – eSTEM Public Charter School
Cindy Cardwell – Bentonville School District	Tami Philyaw – Smackover – Norphlet School District
Larry Cooper – Springdale School District	Kathy Prislovsky – Stuttgart School District
Sarah Croswell – Virtual Arkansas Academy	Kathy Prophet – Springdale School District
Tami Eggensperger – Cabot School District	Rhonda Riggin – Booneville School District
Shelley Forbess – El Dorado School District	Will Squires – Caddo Hills School District
Kyla Gentry – Searcy School District	Tim Trawick – Conway School District
Jenna Gill – Siloam Springs School District	David Wentz – Pea Ridge School District
Douglas Hammon – Little Rock School District	Andrew Williams – University of Arkansas at Monticello
Keith Harris – University of Arkansas at Little Rock Partnership for STEM Education	Wendi J.W. Williams – Northwest Arkansas Community College
Leonda Holthoff – Star City School District	Cathy Wissehr – University of Arkansas at Fayetteville
Amanda Jones – Poyen School District	Diedra Young – Ridgway Christian High School, Pine Bluff

ARKANSAS
K-12 SCIENCE STANDARDS
EDUCATION FOR A NEW GENERATION

Human Anatomy and Physiology

2016

Table of Contents

Notes:

1. Student Performance Expectations (PEs) may be taught in any sequence or grouping within a grade level. Several PEs are described as being "partially addressed in this course" because the same PE is revisited in a subsequent course during which that PE is fully addressed.
2. An asterisk (*) indicates an engineering connection to a practice, core idea, or crosscutting concept.
3. The Performance Expectation codes ending in AR indicate Arkansas-specific standards.
4. The Clarification Statements are examples and additional guidance for the instructor. AR indicates Arkansas-specific Clarification Statements.
5. The Assessment Boundaries delineate content that may be taught but not assessed in large-scale assessments. AR indicates Arkansas-specific Assessment Boundaries.
6. The section entitled "foundation boxes" is reproduced verbatim from *A Framework for K-12 Science Education: Practices, Crosscutting Concepts, and Core Ideas*. Integrated and reprinted with permission from the National Academy of Sciences.
7. The examples given (e.g.,) are suggestions for the instructor.
8. Throughout this document, connections are provided to the nature of science as defined by *A Framework for K-12 Science Education* (NRC 2012).
9. Throughout this document, connections are provided to Engineering, Technology, and Applications of Science as defined by *A Framework for K-12 Science Education* (NRC 2012).
10. Each set of PEs lists connections to other disciplinary core ideas (DCIs) within the Arkansas K-12 Science Standards and to the Arkansas English Language Arts Standards, Arkansas Disciplinary Literacy Standards, and the Arkansas Mathematics Standards.

Arkansas K-12 Science Standards Overview

The Arkansas K-12 Science Standards are based on *A Framework for K-12 Science Education* (NRC 2012) and are meant to reflect a new vision for science education. The following conceptual shifts reflect what is new about these science standards. The Arkansas K-12 Science Standards

- reflect science as it is practiced and experienced in the real world,
- build logically from Kindergarten through Grade 12,
- focus on deeper understanding as well as application of content,
- integrate practices, crosscutting concepts, and core ideas, and
- make explicit connections to literacy and math.

As part of teaching the *Arkansas K-12 Science Standards*, it will be important to instruct and guide students in adopting appropriate safety precautions for their student-directed science investigations. Reducing risk and preventing accidents in science classrooms begin with planning. There are four recommended steps in carrying out a hazard and risk assessment for any planned lab investigation.

1) Identify all hazards. Hazards may be physical, chemical, health, or environmental.
2) Evaluate the type of risk associated with each hazard.
3) Write the procedure and all necessary safety precautions in such a way as to eliminate or reduce the risk associated with each hazard.
4) Prepare for any emergency that might arise in spite of all of the required safety precautions.

According to Arkansas Code Annotated § 6-10-113 (2012) for eye protection, every student and teacher in public schools participating in any chemical or combined chemical-physical laboratories involving caustic or explosive chemicals or hot liquids or solids is required to wear industrial-quality eye protective devices (eye goggles) at all times while participating in science investigations.

The Arkansas K-12 Science Standards outline the knowledge and science and engineering practices that all students should learn by the end of high school. The standards are three-dimensional because each student performance expectation engages students at the nexus of the following three dimensions.

- Dimension 1 describes scientific and engineering practices.
- Dimension 2 describes crosscutting concepts, overarching science concepts that apply across science disciplines.
- Dimension 3 describe core ideas in the science disciplines.

The Science and Engineering Practices

The eight practices describe the major practices that scientists use to investigate, build models and theories of the world around them or engineers use as they build and design systems. The practices are essential for all students to learn and are as follows:

1. Asking questions (for science) and defining problems (for engineering)
2. Developing and using models
3. Planning and carrying out investigations
4. Analyzing and interpreting data
5. Using mathematics and computational thinking
6. Constructing explanations (for science) and designing solutions (for engineering)
7. Engaging in argument from evidence
8. Obtaining, evaluating, and communicating information

Crosscutting Concepts

The seven crosscutting concepts bridge disciplinary boundaries and unit core ideas throughout the fields of science and engineering. Their purpose is to help students deepen their understanding of the disciplinary core ideas, and develop a coherent, and scientifically based view of the world. The seven crosscutting concepts are as follows:

1. *Patterns.* Observed patterns of forms and events guide organization and classification, and they prompt questions about relationships and the factors that influence them.

2. *Cause and effect: Mechanism and explanation*. Events have causes, sometimes simple, sometimes multifaceted. A major activity of science is investigating and explaining causal relationships and the mechanisms by which they are mediated. Such mechanisms can then be tested across given contexts and used to predict and explain events in new contexts.

3. *Scale, proportion, and quantity.* In considering phenomena, it is critical to recognize what is relevant at different measures of size, time, and energy and to recognize how changes in scale, proportion, or quantity affect a system's structure or performance.

4. *Systems and system models.* Defining the system under study—specifying its boundaries and making explicit a model of that system—provides tools for understanding and testing ideas that are applicable throughout science and engineering.

5. *Energy and matter: Flows, cycles, and conservation.* Tracking fluxes of energy and matter into, out of, and within systems helps one understand the systems' possibilities and limitations.

6. *Structure and function.* The way in which an object or living thing is shaped and its substructure determine many of its properties and functions.

7. *Stability and change.* For natural and built systems alike, conditions of stability and determinants of rates of change or evolution of a system are critical elements of study.

Disciplinary Core Ideas

The Disciplinary Core Ideas describe the content that occurs at each grade or course. The Arkansas K-12 Science Standards focus on a limited number of core ideas in science and engineering both within and across the disciplines and is built on the notion of learning as a developmental progression. The Disciplinary Core Ideas are grouped into the following domains:

- Physical Science (PS)
- Life Science (LS)
- Earth and Space Science (ESS)
- Engineering, Technology and Applications of Science (ETS)

Connections to the Arkansas English Language Arts Standards

Evidence-based reasoning is the foundation of good scientific practice. The Arkansas K-12 Science Standards incorporate reasoning skills used in language arts to help students improve mastery and understanding in all three disciplines. The Arkansas K-8 Science Committee made every effort to align grade-by-grade with the English language arts (ELA) standards so concepts support what students are learning in their entire curriculum. Connections to specific ELA standards are listed for each student performance expectation, giving teachers a blueprint for building comprehensive cross-disciplinary lessons.

The intersections between Arkansas K-12 Science Standards and Arkansas ELA Standards teach students to analyze data, model concepts, and strategically use tools through productive talk and shared activity. Reading in science requires an appreciation of the norms and conventions of the discipline of science, including understanding the nature of evidence used, an attention to precision and detail, and the capacity to make and assess intricate arguments, synthesize complex information, and follow detailed procedures and accounts of events and concepts. These practice-based standards help teachers foster a classroom culture where students think and reason together, connecting around the subject matter and core ideas.

Connections to the Arkansas Disciplinary Literacy Standards

Reading is critical to building knowledge in science. College and career ready reading in science requires an appreciation of the norms and conventions of each discipline, such as the kinds of evidence used in science; an understanding of domain-specific words and phrases; an attention to precise details; and the capacity to evaluate intricate arguments, synthesize complex information, and follow detailed descriptions of events and concepts. When reading scientific and technical texts, students need to be able to gain knowledge from challenging texts that often make extensive use of elaborate diagrams and data to convey information and illustrate concepts. Students must be able to read complex informational texts in science with independence and confidence because the vast majority of reading in college and workforce training programs will be sophisticated nonfiction.

For students, writing is a key means of asserting and defending claims, showing what they know about a science, and conveying what they have experienced, imagined, thought, and felt. To be college and career ready writers, students must take task, purpose, and audience into careful consideration, choosing words, information, structures, and formats deliberately. They need to be able to use technology strategically when creating, refining, and collaborating on writing. They have to become adept at gathering information, evaluating sources, and citing material accurately, reporting finds from their research and analysis of sources in a clear and cogent manner. They must have the flexibility, concentration, and fluency to produce high-quality first-draft text under a tight deadline and the capacity to revisit and make improvements to a piece of writing over multiple drafts when circumstances encourage or require it.

Connections to the Arkansas Mathematics Standards

Science is a quantitative discipline, so it is important for educators to ensure that students' science learning coheres well with their understanding of mathematics. To achieve this alignment, the Arkansas K-12 Science Committee made every effort to ensure that the mathematics standards do not outpace or misalign to the grade-by-grade science standards. Connections to specific math standards are listed for each student performance expectation, giving teachers a blueprint for building comprehensive cross-disciplinary lessons.

How to Read
Arkansas K-12 Science

Topic

An asterisk indicates an engineering connection to a practice or disciplinary core idea.

GRADE TWO

Interdependent Relationships in Ecosystems

Students who demonstrate understanding can:

2-LS2-1. Plan and conduct an investigation to determine if plants need sunlight and water to grow. [Assessment Boundary: Assessment is limited to testing one variab...]

2-LS2-2. Develop a simple model that mimics the function o... eeds or pollinating plants. *

2-LS4-1. Make observations of plants and animals to compa... fferent habitats. [Clarification Statement: Emphasis is on the diversity of living thing... [Assessment Boundary: Assessment does not include specific animal and plant names in specific habitats.]

Student Performance Expectations (PEs)

The performance expectations above were developed using the following elements from the NRC document *A Framework for K-12 Science Education*:

Science and Engineering Practices	Disciplinary Core Ideas	Crosscutting Concepts
Developing and Using Models Modeling in K–2 builds on prior experiences and progresses to include using and developing models (i.e., diagram, drawing, physical replica, diorama, dramatization, or storyboard) that represent concrete events or design solutions. ▪ Develop a simple model based on evidence to represent a proposed object or tool. (2-LS2-2) **Planning and Carrying Out Investigations** Planning and carrying out investigations to answer questions or test solutions to problems in K–2 builds on prior experiences and progresses to simple investigations, based on fair tests, which provide data to support explanations or design solutions. ▪ Plan and conduct an investig... collaboratively to produce da... as the basis for evidence to ... question. (2-LS2-1) ▪ Make observations (firsthand or from media) to collect data that can be used to make comparisons. (2-LS4-1) --- **Connections to Nature of Science** **Scientific Knowledge is Based on Empirical Evidence** ▪ Scientists look for patterns and order when making observations about the world. (2-LS4-1)	**LS2.A: Interdependent Relationships in Ecosystems** ▪ Plants depend on water and light to grow. (2-LS2-1) ▪ Plants depend on animals for pollination or to move their seeds around. (2-LS2-2) **LS4.D: Biodiversity and Humans** ▪ There are many different kinds of living things in any area, and they exist in different places on land and in water. (2-LS4-1) **ETS1.B: Developing Possible Solutions** ▪ Designs can be conveyed through sketches, drawings, or physical models. These representations are useful in communicating ideas for a problem's solutions to other people. (2-LS2-2) ▪	**Cause and Effect** ▪ Events have causes that generate observable patterns. (2-LS2-1) **Structure and Function** ▪ The shape and stability of structures of natural and designed objects are related to their function(s). (2-LS2-2)

Designates which PE uses this practice

Designates which PE incorporates this disciplinary core idea (DCI)

Designates which PE incorporates this crosscutting concept (CC)

Connections to the Nature of Science

DCI codes from *A Framework for K-12 Science Education* in boldface type.

Connections to other DCIs in second grade: N/A

Connections to other DCIs across grade levels: **K.LS1.C** (2-LS2-1); **K-ESS3.A** (2-LS2-1); **K-2.ETS1.A** (2-LS2-2); **3.LS4.C** (2-LS4-1); **3.LS4.D** (2-LS4-1); **5.LS1.C** (2-LS2-1); **5.LS2.A** (2-LS2-2, 2-LS4-1)

Connections to the Arkansas English Language Arts and Mathematics Standards are often found by scrolling to the next page

Human Anatomy and Physiology Course Learning Progression Chart

Topic 1: Patterns	HAP-LS1-1AR
Topic 2: Structure and Function	HAP-LS2-1AR
Topic 3: Scale, Proportion, and Quantity	HAP-LS3-1AR
Topic 4: Stability and Change	HAP-LS4-1AR
Topic 5: Cause and Effect	HAP-LS5-1AR
Topic 6: Energy and Matter	HAP-LS6-1AR
Topic 7: Systems and System Models	HAP-LS7-1AR
Topic 8: Career Exploration with Engineering Practices	HAP-8-1AR HAP-8-2AR HAP-8-3AR

Arkansas Performance Expectations (AR)

Human Anatomy and Physiology Course Overview

The Arkansas K-12 Science Standards for human anatomy and physiology is a science course that continues to develop conceptual understanding of the core ideas, science and engineering practices, and crosscutting concepts in Biology. Teachers with a biology, life/Earth, life science license (including 611 and 625 technical permits) or others as approved by ADE are able to teach this course. Students will earn 1 Core requirement/career focus credit.

The Arkansas K-12 Science Standards course on human anatomy and physiology is a curriculum framework of high school student performance expectations based on the core ideas of the life sciences (LS) *A Framework for K-12 Science Education* (NRC 2012). This is a career-focused course for students interested in medical professions and related fields. The performance expectations build logically from the high school biology course and could be taken concurrently or following principles of chemistry and physics.

The performance expectations clarify what students need to know and be able to do at the end of the course. Student performance expectations consist of three dimensions: science and engineering practices, disciplinary core ideas, and crosscutting concepts. Engineering practices are meant to be integrated into science instruction to support the learning of science phenomena at all levels from Kindergarten to Grade 12.

The structure of the human anatomy and physiology course is guided by the crosscutting concepts identified in the *Framework* that bridge disciplinary boundaries, uniting core ideas throughout the fields of science and engineering. The purpose is to help students understand the disciplinary core ideas and develop a coherent and scientifically based view of the world. Students in human anatomy and physiology develop understanding of key concepts that help them make sense of the interactions among the eleven human body systems. These include:

- Integumentary System
- Skeletal System
- Muscular System
- Respiratory System
- Circulatory System
- Digestive System
- Nervous System
- Endocrine System
- Lymphatic System
- Urinary System
- Reproductive System

Additionally, it should be noted that the human anatomy and physiology standards are not intended to be used as curriculum. Instead, the standards are the minimum that students should know and be able to do. Therefore, teachers should continue to differentiate for the needs of their students by adding depth and additional rigor.

Human Anatomy and Physiology Topics Overview

Students in human anatomy and physiology develop understanding of key concepts that help them make sense of the interactions among systems within the human body. The ideas build upon student understanding of the disciplinary core ideas, science and engineering practices, and crosscutting concepts from earlier grades. There are eight topics in human anatomy and physiology: (1) Patterns, (2) Structure and Function, (3) Scale, Proportion, and Quantity, (4) Stability and Change, (5) Cause and Effect, (6) Energy and Matter, (7) Systems and System Models, and (8) Career Exploration with Engineering Practices. While the performance expectations indicate particular practices to address specific disciplinary core ideas, it is recommended that teachers include a variety of practices and strategies in their instruction.

The performance expectations in **Topic 1: Patterns** help students formulate an answer the question:

- How is the body organized?

Students construct explanations based on evidence obtained from a variety of sources for the pattern of hierarchical organization of each body system. Explanations may include student investigations, models, simulations, and scientific texts.

The performance expectations in **Topic 2: Structure and Function** help students formulate an answer to the question:

- How do the structures that comprise each system enable the human body to function?

Students develop and use models to identify and describe the structures and physiological processes of each body system. Emphasis is on organs and their component tissues.

The performance expectations in **Topic 3**: **Scale, Proportion, and Quantity** help students formulate an answer to the question:

- How can data be used to support explanations of body functions?

Students use mathematical and/or computational representations to support explanations of body system function(s). Emphasis is on quantitative analysis and comparison of the relationships among interdependent factors that may include blood pressure, body mass index, surface area, ratios, etc. Examples of mathematical comparisons could include graphs, charts, or histograms formulated from data sets.

The performance expectations in **Topic 4: Stability and Change** help students formulate an answer to the question:

- How is homeostasis maintained in a dynamic environment?

Students plan and conduct investigations to provide evidence that feedback mechanisms maintain homeostasis. Investigations may relate to heart rate, temperature, blood sugar, and hormone levels.

The performance expectations in **Topic 5: Cause and Effect** help students formulate an answer to the question:

- How can genetic and environmental factors disrupt functions of the body?

Students make and defend claims based on evidence to examine the relationship between dysfunction(s) in each body system and the mechanism by which it is caused. Emphasis is on using data to support arguments on topics such as disease, disorder, or injury.

The performance expectations in **Topic 6: Energy and Matter** help students formulate an answer to the question:

- How do energy and matter flow throughout the human body?

Students construct and revise explanations based on evidence for the cycling of matter and flow of energy among body systems and their associated processes. Examples could include respiration, digestion, absorption, circulation, and filtration.

The performance expectations in **Topic 7: System and System Models** help students formulate an answer to the question:

- How does the interaction between body systems contribute to the function of the human body?

Students develop and use models to illustrate the interactions of systems that control or affect specific functions within the human body. Emphasis is on functions at the body system level such as nutrient uptake, water delivery, and movement in response to neural stimuli.

The performance expectations in **Topic 8: Career Exploration with Engineering Practices** help students formulate answers to the questions:

- How can students prepare for current and emerging careers related to human health?
- How can engineering practices address real-world challenges related to human health?

Students obtain, evaluate, and communicate information related to health science professions. Students design a solution to a complex real-world problem affecting body systems that can be solved through engineering. Students evaluate solutions to a complex real-world human health problem based on prioritized criteria and trade-offs that account for a range of constraints, including cost, safety, reliability, and aesthetics as well as possible social, cultural, and environmental impacts.

Human Anatomy and Physiology

Topic 1: Patterns

Students who demonstrate understanding can:

HAP-LS1-1AR **Construct an explanation based on evidence obtained from a variety of sources for the pattern of hierarchical organization of each body system:**

- **Integumentary System**
- **Skeletal System**
- **Muscular System**
- **Respiratory System**
- **Circulatory System**
- **Digestive System**
- **Nervous System**
- **Endocrine System**
- **Lymphatic System**
- **Urinary System**
- **Reproductive Systems**

[Clarification Statement: Evidence for explanations could be gathered from student investigations, models, simulations, and scientific texts.]

The performance expectations above were developed using the following elements from the NRC document *A Framework for K-12 Science Education*:

Science and Engineering Practices

Developing and Using Models

Modeling in 9–12 builds on K–8 experiences and progresses to using, synthesizing, and developing models to predict and show relationships among variables between systems and their components in the natural and designed worlds.

- Use a model based on evidence to illustrate the relationships between systems or between components of a system. (HAP-LS1-1AR)
- Develop a model based on evidence to illustrate the relationships between systems or between components of a system. (HAP-LS1-1AR)

Constructing Explanations and Designing Solutions

Constructing explanations and designing solutions in 9–12 builds on K–8 experiences and progresses to explanations and designs that are supported by multiple and independent student-generated sources of evidence consistent with scientific ideas, principles, and theories.

- Construct and revise an explanation based on valid and reliable evidence obtained from a variety of sources (including students' own investigations, models, theories,

Disciplinary Core Ideas

LS1.A: Structure and Function

- Systems of specialized cells within organisms help them perform the essential functions of life. ()
- All cells contain genetic information in the form of DNA molecules. Genes are regions in the DNA that contain the instructions that code for the formation of proteins, which carry out most of the work of cells. (HAP-LS1-1AR)
- Multicellular organisms have a hierarchical structural organization, in which any one system is made up of numerous parts and is itself a component of the next level. (HAP-LS1-1AR)
- Feedback mechanisms maintain a living system's internal conditions within certain limits and mediate behaviors, allowing it to remain alive and functional even as external conditions change within some range. Feedback mechanisms can encourage (through positive feedback) or discourage (negative feedback) what is going on inside the living system. (HAP-LS1-1AR)

Crosscutting Concepts

Systems and System Models

- Models (e.g., physical, mathematical, computer models) can be used to simulate systems and interactions—including energy, matter, and information flows—within and between systems at different scales. (HAP-LS1-1AR)

Structure and Function

- Investigating or designing new systems or structures requires a detailed examination of the properties of different materials, the structures of different components, and connections of components to reveal its function and/or solve a problem.

  (HAP-LS1-1AR)

Cause and Effect

- Empirical evidence is required to differentiate between cause and correlation and make

simulations, peer review) and the assumption that theories and laws that describe the natural world operate today as they did in the past and will continue to do so in the future. (HAP-LS1-1AR) **Planning and Carrying Out Investigations** Planning and carrying out investigations in 9-12 builds on K-8 experiences and progresses to include investigations that provide evidence for and test conceptual, mathematical, physical, and empirical models. ▪ Plan and conduct an investigation individually and collaboratively to produce data to serve as the basis for evidence, and in the design: decide on types, how much, and accuracy of data needed to produce reliable measurements and consider limitations on the precision of the data (e.g., number of trials, cost, risk, time), and refine the design accordingly. (HAP-LS1-1AR)		claims about specific causes and effects. (HAP-LS1-1AR) **Patterns** ▪ Different patterns may be observed at each of the scales at which a system is studied and can provide evidence for causality in explanations of phenomena. (HAP-LS1-1AR)

Connections to the Arkansas Disciplinary Literacy Standards:

RST.11-12.1 Cite specific textual evidence to support analysis of science and technical texts, attending to important distinctions the author makes and to any gaps or inconsistencies in the account. ()

WHST.9-12.2 Write informative/explanatory texts, including the narration of historical events, scientific procedures/ experiments, or technical processes. ()

WHST.9-12.5 Develop and strengthen writing as needed by planning, revising, editing, rewriting, or trying a new approach, focusing on addressing what is most significant for a specific purpose and audience. ()

WHST.9-12.9 Draw evidence from informational texts to support analysis, reflection, and research. ()

Connections to the Arkansas English Language Arts Standards:

SL.11-12.5 Make strategic use of digital media (e.g., textual, graphical, auditory, visual, and interactive elements) in presentations to enhance understanding of findings, reasoning, and evidence and to add interest. *()*

Connections to the Arkansas Mathematics Standards:

MP.2 Reason abstractly and quantitatively. ()

MP.4 Model with mathematics. *()*

HSN-Q.A.1 Use units as a way to understand problems and to guide the solution of multi-step problems; choose and interpret units consistently in formulas; choose and interpret the scale and the origin in graphs and data displays. ()

HSN-Q.A.2 Define appropriate quantities for the purpose of descriptive modeling. *()*

HSN-Q.A.3 Choose a level of accuracy appropriate to limitations on measurement when reporting quantities. ()

Topic 2: Structure and Function

Students who demonstrate understanding can:

HAP-LS2-1AR Develop and use a model to identify and describe the relationship between the structures and physiological processes of each body system:

- **Integumentary System**
- **Skeletal System**
- **Muscular System**
- **Respiratory System**
- **Circulatory System**
- **Digestive System**
- **Nervous System**
- **Endocrine System**
- **Lymphatic System**
- **Urinary System**
- **Reproductive Systems**

[Clarification Statement: Emphasis is on the structure and function relationships between organs and the component tissues of each system.]

The performance expectations above were developed using the following elements from the NRC document *A Framework for K-12 Science Education*:

Science and Engineering Practices	Disciplinary Core Ideas	Crosscutting Concepts
Developing and Using Models Modeling in 9–12 builds on K–8 experiences and progresses to using, synthesizing, and developing models to predict and show relationships among variables between systems and their components in the natural and designed worlds. ▪ Develop and use a model based on evidence to illustrate the relationships between systems or between components of a system. (HAP-LS2-1AR) **Planning and Carrying Out Investigations** Planning and carrying out in 9-12 builds on K-8 experiences and progresses to include investigations that provide evidence for and test conceptual, mathematical, physical, and empirical models. ▪ Plan and conduct an investigation individually and collaboratively to produce data to serve as the basis for evidence, and in the design: decide on types, how much, and accuracy of data needed to produce reliable measurements and consider limitations on the precision of the data (e.g., number of trials, cost, risk, time), and refine the design accordingly.	**LS1.A: Structure and Function** ▪ Systems of specialized cells within organisms help them perform the essential functions of life. (HAP-LS2-1AR) ▪ All cells contain genetic information in the form of DNA molecules. Genes are regions in the DNA that contain the instructions that code for the formation of proteins, which carry out most of the work of cells. (HAP-LS2-1AR) ▪ Multicellular organisms have a hierarchical structural organization, in which any one system is made up of numerous parts and is itself a component of the next level. (HAP-LS2-1AR) ▪ Feedback mechanisms maintain a living system's internal conditions within certain limits and mediate behaviors, allowing it to remain alive and functional even as external conditions change within some range. Feedback mechanisms can encourage (through positive feedback) or discourage (negative feedback) what is going on inside the living system. (HAP-LS2-1AR)	**Systems and System Models** Models (e.g., physical, mathematical, computer models) can be used to simulate systems and interactions—including energy, matter, and information flows—within and between systems at different scales. (HAP-LS2-1AR) **Structure and Function** Investigating or designing new systems or structures requires a detailed examination of the properties of different materials, the structures of different components, and connections of components to reveal its function and/or solve a problem. (HAP-LS2-1AR) **Cause and Effect** ▪ Empirical evidence is required to differentiate between cause and correlation and make claims about specific causes and effects.

(HAP-LS2-1AR)

Asking Questions and Defining Problems

Asking questions and defining problems in 9-12 builds on K-8 experiences and progresses to formulating, refining, and evaluating empirically testable questions and design problems using models and simulations.

- Ask questions that arise from examining models or a theory to clarify relationships. (HAP-LS2-1AR)

Connections to Nature of Science

Scientific Investigations Use a Variety of Methods

Scientific inquiry is characterized by a common set of values that include: logical thinking, precision, open-mindedness, objectivity, skepticism, replicability of results, and honest and ethical reporting of findings. (HAP-LS2-1AR)

LS1.B: Growth and Development of Organisms

In multicellular organisms individual cells grow and then divide via a process called mitosis, thereby allowing the organism to grow. The organism begins as a single cell (fertilized egg) that divides successively to produce many cells, with each parent cell passing identical genetic material (two variants of each chromosome pair) to both daughter cells. Cellular division and differentiation produce and maintain a complex organism, composed of systems of tissues and organs that work together to meet the needs of the whole organism. (HAP-LS2-1AR)

LS1.C: Organization for Matter and Energy Flow in Organisms

- The process of photosynthesis converts light energy to stored chemical energy by converting carbon dioxide plus water into sugars plus released oxygen. (HAP-LS2-1AR)
  The sugar molecules thus formed contain carbon, hydrogen, and oxygen: their hydrocarbon backbones are used to make amino acids and other carbon-based molecules that can be assembled into larger molecules (such as proteins or DNA), used for example to form new cells. (HAP-LS2-1AR)
- As matter and energy flow through different organizational levels of living systems, chemical elements are recombined in different ways to form different products. (HAP-LS2-1AR)
  As a result of these chemical reactions, energy is transferred from one system of interacting molecules to another. Cellular respiration is a chemical process in which the bonds of food molecules and oxygen molecules are broken and new compounds are formed that can transport energy to muscles. Cellular respiration also releases the energy needed to maintain body

(HAP-LS2-1AR)

Patterns

- Different patterns may be observed at each of the scales at which a system is studied and can provide evidence for causality in explanations of phenomena. (HAP-LS2-1AR)

Stability and Change

- Feedback (negative or positive) can stabilize or destabilize a system. (HAP-LS2-1AR)

Energy and Matter

- Changes of energy and matter in a system can be described in terms of energy and matter flows into, out of, and within that system. (HAP-LS2-1AR)
- Energy cannot be created or destroyed—it only moves between one place and another place, between objects and/or fields, or between systems. (HAP-LS2-1AR)
- The total amount of energy and matter in closed systems is conserved. (HAP-LS2-1AR)
  Energy drives the cycling of matter within and between systems. (HAP-LS2-1AR)

	temperature despite ongoing energy transfer to the surrounding environment. (HAP-LS2-1AR) **LS1.D: Information Processing** Each sense receptor responds to different inputs (electromagnetic, mechanical, chemical), transmitting them as signals that travel along nerve cells to the brain. The signals are then processed in the brain, resulting in immediate behaviors or memories. (HAP-LS2-1AR)	

Connections to the Arkansas Disciplinary Literacy Standards:

Connections to the Arkansas English Language Arts Standards:

Connections to the Arkansas Mathematics Standards:

Topic 3: Scale, Proportion, and Quantity

Students who demonstrate understanding can:

HAP-LS3-1AR **Use mathematics and computational thinking to support explanations for physiological processes in body systems.** [Clarification Statement: Emphasis is on quantitative analysis and comparison of the relationships among interdependent factors that may include blood pressure, body mass index, surface area ratios. Examples of mathematical models could include graphs, charts, or histograms.]

The performance expectations above were developed using the following elements from the NRC document *A Framework for K-12 Science Education*:

Science and Engineering Practices	Disciplinary Core Ideas	Crosscutting Concepts
Using Mathematics and Computational Thinking Mathematical and computational thinking in 9-12 builds on K-8 experiences and progresses to using algebraic thinking and analysis, a range of linear and nonlinear functions including trigonometric functions, exponentials and logarithms, and computational tools for statistical analysis to analyze, represent, and model data. Simple computational simulations are created and used based on mathematical models of basic assumptions. ▪ Use mathematical and/or computational representations of phenomena or design solutions to support explanations. (HAP-LS3-1AR) ▪ Use mathematical representations of phenomena or design solutions to support and revise explanations. (HAP-LS3-1AR) Create or revise a simulation of a phenomenon, designed device, process, or system. (HAP-LS3-1AR) Use mathematical models and/or computer simulations to predict the effects of a design solution on systems and/or the interactions between systems. (HAP-LS3-1AR) **Developing and Using Models** Modeling in 9–12 builds on K–8 experiences and progresses to using, synthesizing, and developing models to predict and show relationships among variables between systems	**LS1.A: Structure and Function** Systems of specialized cells within organisms help them perform the essential functions of life. (HAP-LS3-1AR) All cells contain genetic information in the form of DNA molecules. Genes are regions in the DNA that contain the instructions that code for the formation of proteins, which carry out most of the work of cells. (HAP-LS3-1AR) Multicellular organisms have a hierarchical structural organization, in which any one system is made up of numerous parts and is itself a component of the next level. (HAP-LS3-1AR) Feedback mechanisms maintain a living system's internal conditions within certain limits and mediate behaviors, allowing it to remain alive and functional even as external conditions change within some range. Feedback mechanisms can encourage (through positive feedback) or discourage (negative feedback) what is going on inside the living system. (HAP-LS3-1AR) **LS1.B: Growth and Development of Organisms** ▪ In multicellular organisms individual cells grow and then divide via a process called mitosis, thereby allowing the organism to grow. The organism begins as a single cell (fertilized egg) that divides successively to produce many cells, with each parent cell passing identical genetic material (two variants of each chromosome pair) to both daughter cells. Cellular division and differentiation produce and maintain a complex organism, composed of systems of tissues and organs that work together to meet the needs of the whole organism. (HAP-LS3-1AR)	**Cause and Effect** ▪ Empirical evidence is required to differentiate between cause and correlation and make claims about specific causes and effects. (HAP-LS3-1AR) **Scale, Proportion, and Quantity** The significance of a phenomenon is dependent on the scale, proportion, and quantity at which it occurs. (HAP-LS3-1AR) Using the concept of orders of magnitude allows one to understand how a model at one scale relates to a model at another scale. (HAP-LS3-1AR) **Systems and System Models** ▪ Models (e.g., physical, mathematical, computer models) can be used to simulate systems and interactions—including energy, matter, and information flows— within and between systems at different scales. (HAP-LS3-1AR)

and their components in the natural and designed worlds. Develop and use a model based on evidence to illustrate the relationships between systems or between components of a system. (HAP-LS3-1AR) **Analyzing and Interpreting Data** Analyzing data in 9-12 builds on K-8 experiences and progresses to introducing more detailed statistical analysis, the comparison of data sets for consistency, and the use of models to generate and analyze data. Apply concepts of statistics and probability (including determining function fits to data, slope, intercept, and correlation coefficient for linear fits) to scientific and engineering questions and problems, using digital tools when feasible. (HAP-LS3-1AR) **Obtaining, Evaluating, and Communicating Information** Obtaining, evaluating, and communicating information in 9–12 builds on K–8 experiences and progresses to evaluating the validity and reliability of the claims, methods, and designs. Communicate scientific information (e.g., about phenomena and/or the process of development and the design and performance of a proposed process or system) in multiple formats (including orally, graphically, textually, and mathematically). (HAP-LS3-1AR) -- **Connections to Nature of Science** **Scientific Knowledge is Open to Revision in Light of New Evidence** ▪ Scientific argumentation is a mode of logical discourse used to clarify the strength of relationships between ideas and evidence that may result in revision of an explanation. (HAP-LS3-1AR)	**LS1.C: Organization for Matter and Energy Flow in Organisms** ▪ The process of photosynthesis converts light energy to stored chemical energy by converting carbon dioxide plus water into sugars plus released oxygen. (HAP-LS3-1AR) The sugar molecules thus formed contain carbon, hydrogen, and oxygen: their hydrocarbon backbones are used to make amino acids and other carbon-based molecules that can be assembled into larger molecules (such as proteins or DNA), used for example to form new cells. (HAP-LS3-1AR) ▪ As matter and energy flow through different organizational levels of living systems, chemical elements are recombined in different ways to form different products. (HAP-LS3-1AR) As a result of these chemical reactions, energy is transferred from one system of interacting molecules to another. Cellular respiration is a chemical process in which the bonds of food molecules and oxygen molecules are broken and new compounds are formed that can transport energy to muscles. Cellular respiration also releases the energy needed to maintain body temperature despite ongoing energy transfer to the surrounding environment. (HAP-LS3-1AR) **LS1.D: Information Processing** Each sense receptor responds to different inputs (electromagnetic, mechanical, chemical), transmitting them as signals that travel along nerve cells to the brain. The signals are then processed in the brain, resulting in immediate behaviors or memories. (HAP-LS3-1AR)	
Connections to the Arkansas Disciplinary Literacy Standards:		

Connections to the Arkansas English Language Arts Standards:

Connections to the Arkansas Mathematics Standards:

Topic 4: Stability and Change

Students who demonstrate understanding can:

HAP-LS4-1AR Plan and conduct an investigation to provide evidence that feedback mechanisms maintain homeostasis. [Clarification Statement: Examples of factors to investigate could include heart rate, temperature, blood sugar, and hormone levels.]

The performance expectations above were developed using the following elements from the NRC document *A Framework for K-12 Science Education*:

Science and Engineering Practices

Asking Questions and Defining Problems

Asking questions and defining problems in 9-12 builds on K-8 experiences and progresses to formulating, refining, and evaluating empirically testable questions and design problems using models and simulations.

- Ask questions that arise from examining models or a theory to clarify relationships. (HAP-LS4-1AR)

Analyzing and Interpreting Data

Analyzing data in 9-12 builds on K-8 experiences and progresses to introducing more detailed statistical analysis, the comparison of data sets for consistency, and the use of models to generate and analyze data.

Apply concepts of statistics and probability (including determining function fits to data, slope, intercept, and correlation coefficient for linear fits) to scientific and engineering questions and problems, using digital tools when feasible. (HAP-LS4-1AR)

Engaging in Argument from Evidence

Engaging in argument from evidence in 9-12 builds on K-8 experiences and progresses to using appropriate and sufficient evidence and scientific reasoning to defend and critique claims and explanations about the natural and designed world(s). Arguments may also come from current scientific or historical episodes in science.

- Make and defend a claim based on evidence about the natural world that reflects scientific knowledge, and student-generated evidence. (HAP-LS4-1AR)

Planning and Carrying Out Investigations

Planning and carrying out in 9-12 builds on K-8 experiences and progresses to include investigations that provide evidence for and test conceptual, mathematical, physical, and empirical models.

- Plan and conduct an investigation individually and collaboratively to produce

Disciplinary Core Ideas

LS1.A: Structure and Function

- All cells contain genetic information in Systems of specialized cells within organisms help them perform the essential functions of life. (HAP-LS4-1AR)
- All cells contain genetic information in the form of DNA molecules. Genes are regions in the DNA that contain the instructions that code for the formation of proteins, which carry out most of the work of cells. (HAP-LS4-1AR)
- Multicellular organisms have a hierarchical structural organization, in which any one system is made up of numerous parts and is itself a component of the next level. (HAP-LS4-1AR)

Feedback mechanisms maintain a living system's internal conditions within certain limits and mediate behaviors, allowing it to remain alive and functional even as external conditions change within some range. Feedback mechanisms can encourage (through positive feedback) or discourage (negative feedback) what is going on inside the living system. (HAP-LS4-1AR)

LS3.A: Inheritance of Traits

- Each chromosome consists of a single very long DNA molecule, and each gene on the chromosome is a particular segment of that DNA. The instructions for forming species' characteristics are carried in DNA. All cells in an organism have the same genetic content, but the genes used (expressed) by the cell may be regulated in different ways. Not all DNA codes for a

Crosscutting Concepts

Systems and System Models

- Models (e.g., physical, mathematical, computer models) can be used to simulate systems and interactions—including energy, matter, and information flows—within and between systems at different scales. (HAP-LS4-1AR)

Cause and Effect

- Empirical evidence is required to differentiate between cause and correlation and make claims about specific causes and effects. (HAP-LS4-1AR)

Stability and Change

- Feedback (negative or positive) can stabilize or destabilize a system. (HAP-LS4-1AR)

Connections to Nature of Science

Science is a Human Endeavor

- Technological advances have influenced the progress of science and science has influenced advances in technology. (HAP-LS4-1AR)
- Science and engineering are influenced by society and society is influenced by science and engineering. (HAP-LS4-1AR)

data to serve as the basis for evidence, and in the design: decide on types, how much, and accuracy of data needed to produce reliable measurements and consider limitations on the precision of the data (e.g., number of trials, cost, risk, time), and refine the design accordingly. (HAP-LS4-1AR)	protein; some segments of DNA are involved in regulatory or structural functions, and some have no as-yet known function. (HAP-LS4-1AR)	

Connections to the Arkansas Disciplinary Literacy Standards:

Connections to the Arkansas English Language Arts Standards:

Connections to the Arkansas Mathematics Standards:

Topic 5: Cause and Effect

Students who demonstrate understanding can:

HAP-LS5-1AR Argue from evidence the cause(s) for a dysfunction in a body system and the mechanisms by which it occurred. [Clarification Statement: Emphasis is on using data to support arguments for cause and effect relationships (diseases, disorders including genetic, or injuries).]

The performance expectations above were developed using the following elements from the NRC document *A Framework for K-12 Science Education*:

Science and Engineering Practices

Analyzing and Interpreting Data

Analyzing data in 9–12 builds on K–8 experiences and progresses to introducing more detailed statistical analysis, the comparison of data sets for consistency, and the use of models to generate and analyze data.

- Apply concepts of statistics and probability (including determining function fits to data, slope, intercept, and correlation coefficient for linear fits) to scientific and engineering questions and problems, using digital tools when feasible. (HAP-LS5-1AR)

Engaging in Argument from Evidence

Engaging in argument from evidence in 9-12 builds on K-8 experiences and progresses to using appropriate and sufficient evidence and scientific reasoning to defend and critique claims and explanations about the natural and designed world(s). Arguments may also come from current or historical episodes in science.

- Evaluate the evidence behind currently accepted explanations or solutions to determine the merits of arguments. (HAP-LS5-1AR)
- Construct an oral and written argument or counter-arguments based on data and evidence.

Obtaining, Evaluating, and Communicating Information

Obtaining, evaluating, and communicating information in 9–12 builds on K–8 experiences and progresses to evaluating the validity and reliability of the claims, methods, and designs.

- Communicate scientific information (e.g., about phenomena and/or the process of development and the design and performance of a proposed process or system) in multiple formats

Disciplinary Core Ideas

LS1.A: Structure and Function

- Systems of specialized cells within organisms help them perform the essential functions of life. (HAP-LS5-1AR)
- All cells contain genetic information in the form of DNA molecules. Genes are regions in the DNA that contain the instructions that code for the formation of proteins, which carry out most of the work of cells. (HAP-LS5-1AR)
- Multicellular organisms have a hierarchical structural organization, in which any one system is made up of numerous parts and is itself a component of the next level. (HAP-LS5-1AR)
- Feedback mechanisms maintain a living system's internal conditions within certain limits and mediate behaviors, allowing it to remain alive and functional even as external conditions change within some range. Feedback mechanisms can encourage (through positive feedback) or discourage (negative feedback) what is going on inside the living system. (HAP-LS5-1AR)

LS1.B: Growth and Development of Organisms

- In multicellular organisms individual cells grow and then divide via a process called mitosis, thereby allowing the organism to grow. The organism begins as a single cell (fertilized egg) that divides successively to produce many cells, with each parent cell passing identical genetic material (two variants of each chromosome pair) to both daughter cells. Cellular division and differentiation produce and maintain a complex organism, composed of systems of tissues and organs that work

Crosscutting Concepts

Patterns

- Different patterns may be observed at each of the scales at which a system is studied and can provide evidence for causality in explanations of phenomena. (HAP-LS5-1AR)

Cause and Effect

- Empirical evidence is required to differentiate between cause and correlation and make claims about specific causes and effects. (HAP-LS5-1AR)

Stability and Change

- Much of science deals with constructing explanations of how things change and how they remain stable. (HAP-LS5-1AR)

Connections to Nature of Science

Scientific Knowledge Assumes an Order and Consistency in Natural Systems

- Scientific knowledge is based on the assumption that natural laws operate today as they did in the past and they will continue to do so in the future. (HAP-LS5-1AR)

(including orally, graphically, textually, and mathematically). (HAP-LS5-1AR) -- **Connections to Nature of Science** **Science Models, Laws, Mechanisms, and Theories Explain Natural Phenomena** ▪ A scientific theory is a substantiated explanation of some aspect of the natural world, based on a body of facts that have been repeatedly confirmed through observation and experiment and the science community validates each theory before it is accepted. If new evidence is discovered that the theory does not accommodate, the theory is generally modified in light of this new evidence. (HAP-LS5-1AR)	together to meet the needs of the whole organism. (HAP-LS5-1AR) **LS1.D: Information Processing** ▪ Each sense receptor responds to different inputs (electromagnetic, mechanical, chemical), transmitting them as signals that travel along nerve cells to the brain. The signals are then processed in the brain, resulting in immediate behaviors or memories. (HAP-LS5-1AR) **LS4.A: Evidence of Common Ancestry and Diversity** ▪ Genetic information provides evidence of evolution. DNA sequences vary among species, but there are many overlaps; in fact, the ongoing branching that produces multiple lines of descent can be inferred by comparing the DNA sequences of different organisms. Such information is also derivable from the similarities and differences in amino acid sequences and from anatomical and embryological evidence. (HAP-LS5-1AR) **LS4.C: Adaptation** ▪ Evolution is a consequence of the interaction of four factors: (1) the potential for a species to increase in number, (2) the genetic variation of individuals in a species due to mutation and sexual reproduction, (3) competition for an environment's limited supply of the resources that individuals need in order to survive and reproduce, and (4) the ensuing proliferation of those organisms that are better able to survive and reproduce in that environment. (HAP-LS5-1AR) ▪ Natural selection leads to adaptation, that is, to a population dominated by organisms that are anatomically, behaviorally, and physiologically well suited to survive and reproduce in a specific environment. That is, the differential survival and reproduction of organisms in a population that have an advantageous heritable trait leads to an increase in the proportion of individuals in future generations that have the trait and to a decrease in the proportion of individuals that do not. (HAP-LS5-1AR)	

	▪ Adaptation also means that the distribution of traits in a population can change when conditions change. (HAP-LS5-1AR)	

Connections to the Arkansas Disciplinary Literacy Standards:

Connections to the Arkansas English Language Arts Standards:

Connections to the Arkansas Mathematics Standards:

Topic 6: Energy and Matter

Students who demonstrate understanding can:

HAP-LS6-1AR **Construct and revise an explanation based on evidence for the cycling of matter and flow of energy among body systems and their associated processes.**
[Clarification Statement: Examples of processes could include respiration, digestion, absorption, circulation, and filtration.]

The performance expectations above were developed using the following elements from the NRC document *A Framework for K-12 Science Education*:

Science and Engineering Practices

Developing and Using Models
Modeling in 9–12 builds on K–8 experiences and progresses to using, synthesizing, and developing models to predict and show relationships among variables between systems and their components in the natural and designed world(s).

- Use a model to provide mechanistic accounts of phenomena. (HAP-LS6-1AR)

Analyzing and Interpreting Data
Analyzing data in 9–12 builds on K–8 experiences and progresses to introducing more detailed statistical analysis, the comparison of data sets for consistency, and the use of models to generate and analyze data.

- Analyze data using tools, technologies, and/or models (e.g., computational, mathematical) in order to make valid and reliable scientific claims or determine an optimal design solution. (HAP-LS6-1AR)
- Analyze data using computational models in order to make valid and reliable scientific claims. (HAP-LS6-1AR)

Constructing Explanations and Designing Solutions
Constructing explanations and designing solutions in 9–12 builds on K–8 experiences and progresses to explanations and designs that are supported by multiple and independent student-generated sources of evidence consistent with scientific ideas, principles and

Disciplinary Core Ideas

LS1.C: Organization for Matter and Energy Flow in Organisms
The sugar molecules thus formed contain carbon, hydrogen, and oxygen: their hydrocarbon backbones are used to make amino acids and other carbon-based molecules that can be assembled into larger molecules (such as proteins or DNA), used for example to form new cells. (HAP-LS6-1AR)

- As matter and energy flow through different organizational levels of living systems, chemical elements are recombined in different ways to form different products. (HAP-LS6-1AR)
- As a result of these chemical reactions, energy is transferred from one system of interacting molecules to another. Cellular respiration is a chemical process in which the bonds of food molecules and oxygen molecules are broken and new compounds are formed that can transport energy to muscles. Cellular respiration also releases the energy needed to maintain body temperature despite ongoing energy transfer to the surrounding environment. (HAP-LS6-1AR)

Crosscutting Concepts

Cause and Effect

- Empirical evidence is required to differentiate between cause and correlation and make claims about specific causes and effects. (HAP-LS6-1AR)

Stability and Change

- Feedback (negative or positive) can stabilize or destabilize a system. (HAP-LS6-1AR)
  Change and rates of change can be quantified and modeled over very short or very long periods of time. Some system changes are irreversible. (HAP-LS6-1AR)

Energy and Matter

- Changes of energy and matter in a system can be described in terms of energy and matter flows into, out of, and within that system. (HAP-LS6-1AR)
- Energy cannot be created or destroyed—it only moves between one place and another place, between objects and/or fields, or between systems. (HAP-LS6-1AR)
- The total amount of energy and matter in closed systems is conserved. (HAP-LS6-1AR)

theories. ▪ Design a solution to a complex real-world problem, based on scientific knowledge, student-generated sources of evidence, prioritized criteria, and tradeoff considerations. (HAP-LS6-1AR) ▪ Evaluate a solution to a complex real-world problem, based on scientific knowledge, student-generated sources of evidence, prioritized criteria, and tradeoff considerations. (HAP-LS6-1AR) **Obtaining, Evaluating, and Communicating Information** Obtaining, evaluating, and communicating information in 9–12 builds on K–8 experiences and progresses to evaluating the validity and reliability of the claims, methods, and designs. ▪ Communicate scientific information (e.g., about phenomena and/or the process of development and the design and performance of a proposed process or system) in multiple formats (including orally, graphically, textually, and mathematically). (HAP-LS6-1AR) -- **Connections to Nature of Science** **Scientific Investigations Use a Variety of Methods** Science investigations use diverse methods and do not always use the same set of procedures to obtain data. (HAP-LS6-1AR) ▪ New technologies advance scientific knowledge. (HAP-LS6-1AR) **Scientific Knowledge is Based on Empirical Evidence** ▪ Science knowledge is based on empirical evidence. (HAP-LS6-1AR) ▪ Science arguments are strengthened by multiple lines of evidence supporting a single explanation. (HAP-LS6-1AR)		▪ Energy drives the cycling of matter within and between systems. (HAP-LS6-1AR)

Connections to the Arkansas Disciplinary Literacy Standards:

Connections to the Arkansas English Language Arts Standards:

Connections to the Arkansas Mathematics Standards:

Topic 7: Systems and System Models

Students who demonstrate understanding can:

HAP-LS7-1AR **Develop and use a model to illustrate the interactions between systems that control or affect specific functions within the human body.** [Clarification Statement: Emphasis is on functions at the body system level such as nutrient uptake, water delivery, and movement in response to neural stimuli. An example of interaction between systems in nutrient uptake and absorption involves interactions between the digestive, circulation, and nervous systems.]

The performance expectations above were developed using the following elements from the NRC document *A Framework for K-12 Science Education*:

Science and Engineering Practices

Asking Questions and Defining Problems

Asking questions and defining problems in 9–12 builds on K–8 experiences and progresses to formulating, refining, and evaluating empirically testable questions and design problems using models and simulations.

Analyze complex real-world problems by specifying criteria and constraints for successful solutions. (HAP-LS7-1AR)

Obtaining, Evaluating, and Communicating Information

Obtaining, evaluating, and communicating information in 9–12 builds on K–8 experiences and progresses to evaluating the validity and reliability of the claims, methods, and designs.

Communicate scientific information (e.g., about phenomena and/or the process of development and the design and performance of a proposed process or system) in multiple formats (including orally, graphically, textually, and mathematically). (HAP-LS7-1AR)

Developing and Using Models

Modeling in 9–12 builds on K–8 experiences and progresses to using, synthesizing, and developing models to predict and show relationships among variables between systems and their components in the natural and designed world(s).

- Use a model to provide mechanistic accounts of phenomena. (HAP-LS7-1AR)

Disciplinary Core Ideas

LS1.A: Structure and Function

- Systems of specialized cells within organisms help them perform the essential functions of life. (HAP-LS7-1AR)
  All cells contain genetic information in the form of DNA molecules. Genes are regions in the DNA that contain the instructions that code for the formation of proteins, which carry out most of the work of cells. (HAP-LS7-1AR)
- Multicellular organisms have a hierarchical structural organization, in which any one system is made up of numerous parts and is itself a component of the next level. (HAP-LS7-1AR)
- Feedback mechanisms maintain a living system's internal conditions within certain limits and mediate behaviors, allowing it to remain alive and functional even as external conditions change within some range. Feedback mechanisms can encourage (through positive feedback) or discourage (negative feedback) what is going on inside the living system. (HAP-LS7-1AR)

LS1.D: Information Processing

- Each sense receptor responds to different inputs (electromagnetic, mechanical, chemical), transmitting them as signals that travel along nerve cells to the brain. The signals are then processed in the brain, resulting in immediate behaviors or memories. (HAP-LS7-1AR)

Crosscutting Concepts

Cause and Effect

- Empirical evidence is required to differentiate between cause and correlation and make claims about specific causes and effects. (HAP-LS7-1AR)

Systems and System Models

- When investigating or describing a system, the boundaries and initial conditions of the system need to be defined and their inputs and outputs analyzed and described using models. (HAP-LS7-1AR)
- Models (e.g., physical, mathematical, computer models) can be used to simulate systems and interactions—including energy, matter, and information flows—within and between systems at different scales. (HAP-LS7-1AR)

Energy and Matter

- Changes of energy and matter in a system can be described in terms of energy and matter flows into, out of, and within that system. (HAP-LS7-1AR)
- Energy cannot be created or destroyed—it only moves between one

Using Mathematics and Computational Thinking Mathematical and computational thinking in 9-12 builds on K-8 experiences and progresses to using algebraic thinking and analysis, a range of linear and nonlinear functions including trigonometric functions, exponentials and logarithms, and computational tools for statistical analysis to analyze, represent, and model data. Simple computational simulations are created and used based on mathematical models of basic assumptions. Create a computational model or simulation of a phenomenon, designed device, process, or system. (HAP-LS7-1AR) Use a computational representation of phenomena or design solutions to describe and/or support claims and/or explanations. (HAP-LS7-1AR) ▪ Use mathematical models and/or computer simulations to predict the effects of a design solution on systems and/or the interactions between systems. (HAP-LS7-1AR)		place and another place, between objects and/or fields, or between systems. (HAP-LS7-1AR) ▪ The total amount of energy and matter in closed systems is conserved. (HAP-LS7-1AR) ▪ Energy drives the cycling of matter within and between systems. (HAP-LS7-1AR) **Structure and Function** ▪ Investigating or designing new systems or structures requires a detailed examination of the properties of different materials, the structures of different components, and connections of components to reveal its function and/or solve a problem. (HAP-LS7-1AR) ------------------------------------ **Connections to Nature of Science** **Science is a Human Endeavor** ▪ Science is a result of human endeavors, imagination, and creativity. (HAP-LS7-1AR) **Science Addresses Questions About the Natural and Material World** ▪ Science and technology may raise ethical issues for which science, by itself, does not provide answers and solutions. (HAP-LS7-1AR) ▪ Science knowledge indicates what can happen in natural systems—not what should happen. The latter involves ethics,

		values, and human decisions about the use of knowledge. (HAP-LS7-1AR) ▪ Many decisions are not made using science alone, but rely on social and cultural contexts to resolve issues. (HAP-LS7-1AR)
Connections to the Arkansas Disciplinary Literacy Standards: *Connections to the Arkansas English Language Arts Standards:* *Connections to the Arkansas Mathematics Standards:*		

Topic 8: Career Exploration with Engineering Practices

Students who demonstrate understanding can:

HAP-8-1AR Obtain, evaluate, and communicate information related to health science professions. [Clarification Statement: Professions could include researcher, engineer, medical professional, technician, manufacturer and distributor, administrator, and data storage and security professional.]

HAP-8-2AR Design a solution to a complex real-world problem affecting body systems that can be solved through engineering. * [Clarification Statement: Solutions could include prosthetics, mobility enhancement, engineered body parts, treatment processes, and disease control.]

HAP-8-3AR Evaluate a solution to a complex real-world human health problem based on prioritized criteria and trade-offs that account for a range of constraints, including cost, safety, reliability, and aesthetics as well as possible social, cultural, and environmental impacts. * [Clarification Statement: Solutions could include the effects on the human body.]

The performance expectations above were developed using the following elements from the NRC document *A Framework for K-12 Science Education*:

Science and Engineering Practices

Constructing Explanations and Designing Solutions

Constructing explanations and designing solutions in 9–12 builds on K–8 experiences and progresses to explanations and designs that are supported by multiple and independent student-generated sources of evidence consistent with scientific knowledge, principles, and theories.

- Construct an explanation based on valid and reliable evidence obtained from a variety of sources (including students' own investigations, models, theories, simulations, peer review) and the assumption that theories and laws that describe the natural world operate today as they did in the past and will continue to do so in the future. (HAP-8-2AR, HAP-8-3AR)
- Design or refine a solution to a complex real-world problem, based on scientific knowledge, student-generated sources of evidence, prioritized criteria, and tradeoff considerations. (HAP-8-2AR, HAP-8-3AR)
- **Asking Questions and Defining Problems**

Asking questions and defining problems in 9–12 builds on K–8 experiences and progresses to formulating, refining, and evaluating empirically testable questions and design problems using models and simulations.

Disciplinary Core Ideas

ETS1.A: Defining and Delimiting Engineering Problems

- Criteria and constraints also include satisfying any requirements set by society, such as taking issues of risk mitigation into account, and they should be quantified to the extent possible and stated in such a way that one can tell if a given design meets them. (HAP-8-2AR, HAP-8-3AR)
- Humanity faces major global challenges today, such as the need for supplies of clean water and food or for energy sources that minimize pollution, which can be addressed through engineering. These global challenges also may have manifestations in local communities. (HAP-8-2AR, HAP-8-3AR)

ETS1.B: Developing Possible Solutions

- When evaluating solutions, it is important to take into account a range of constraints, including cost, safety, reliability, and aesthetics, and to consider social, cultural, and environmental impacts. (HAP-8-2AR, HAP-8-3AR)
- Both physical models and computers can be used in various ways to aid in the engineering design process. Computers are useful for a variety of purposes, such as running simulations to test different ways of solving a problem or to see which one is most efficient or economical; and in making

Connections to Nature of Science

Science is a Human Endeavor

Science is a result of human endeavors, imagination, and creativity. (HAP-8-1AR)

Science Addresses Questions About the Natural and Material World

- Science and technology may raise ethical issues for which science, by itself, does not provide answers and solutions. (HAP-8-1AR)
- Science knowledge indicates what can happen in natural systems—not what should happen. The latter involves ethics, values, and human decisions about the use of knowledge. (HAP-8-1AR)
- Many decisions are not made using science alone, but rely on social and cultural contexts to resolve issues. (HAP-8-1AR)

▪ Analyze complex real-world problems by specifying criteria and constraints for successful solutions (HAP-8-2AR, HAP-8-3AR) **Obtaining, Evaluating, and Communicating Information** Obtaining, evaluating, and communicating information in 9–12 builds on K–8 experiences and progresses to evaluating the validity and reliability of the claims, methods, and designs. ▪ Communicate scientific information (e.g., about phenomena and/or the process of development and the design and performance of a proposed process or system) in multiple formats (including orally, graphically, textually, and mathematically). (HAP-8-1AR)	a persuasive presentation to a client about how a given design will meet his or her needs. (HAP-8-2AR, HAP-8-3AR)	
Connections to the Arkansas Disciplinary Literacy Standards: *Connections to the Arkansas English Language Arts Standards:* *Connections to the Arkansas Mathematics Standards:*		

Contributors

The following educators contributed to the development of this course:

Susan Allison – Benton School District	Rebecca Koelling – Highland School District
Katie Anderson – Little Rock School District	Karen Ladd – Nettleton School District
Dr. Katherine Auld - Northwest Arkansas Community College	Steven Long – Rogers School District
Dr. Daniel Barth - University of Arkansas at Fayetteville	Chris Lynch – Black River Technical College
Angela Bassham – Salem School District	Jacki Marlin – Perryville School District
Allison Belcher – Little Rock School District	Monica Meadows – Pulaski County Special School District
Debbie Bilyeu – Arkansas AIMS	Patti Meeks – Hamburg School District
Tami Blair – Texarkana School District	Melissa Miller – Farmington School District
Stephen Brodie – University of Arkansas at Fort Smith STEM Center	Dr. Jim Musser – Arkansas Tech University
Stephanie Brown – Quitman School District	Nanette Nichols – Wilbur D. Mills AR Education Cooperative
Cindy Bunch – Manila School District	Dennis Pevey – eSTEM Public Charter School
Cindy Cardwell – Bentonville School District	Tami Philyaw – Smackover – Norphlet School District
Larry Cooper – Springdale School District	Kathy Prislovsky – Stuttgart School District
Sarah Croswell – Virtual Arkansas Academy	Kathy Prophet – Springdale School District
Tami Eggensperger – Cabot School District	Rhonda Riggin – Booneville School District
Shelley Forbess – El Dorado School District	Will Squires – Caddo Hills School District
Kyla Gentry – Searcy School District	Tim Trawick – Conway School District
Jenna Gill – Siloam Springs School District	David Wentz – Pea Ridge School District
Douglas Hammon – Little Rock School District	Andrew Williams – University of Arkansas at Monticello
Keith Harris – University of Arkansas at Little Rock Partnership for STEM Education	Wendi J.W. Williams – Northwest Arkansas Community College
Leonda Holthoff – Star City School District	Cathy Wissehr – University of Arkansas at Fayetteville
Amanda Jones – Poyen School District	Diedra Young – Ridgway Christian High School, Pine Bluff

ARKANSAS
K-12 SCIENCE STANDARDS
EDUCATION FOR A NEW GENERATION

Physical Science - Integrated

2016

Table of Contents

Notes:

1. Student Performance Expectations (PEs) may be taught in any sequence or grouping within a grade level. Several PEs are described as being "partially addressed in this course" because the same PE is revisited in a subsequent course during which that PE is fully addressed.
2. An asterisk (*) indicates an engineering connection to a practice, core idea, or crosscutting concept.
3. The Clarification Statements are examples and additional guidance for the instructor. AR indicates Arkansas-specific Clarification Statements.
4. The Assessment Boundaries delineate content that may be taught but not assessed in large-scale assessments. AR indicates Arkansas-specific Assessment Boundaries.
5. The section entitled "foundation boxes" is reproduced verbatim from *A Framework for K-12 Science Education: Practices, Crosscutting Concepts, and Core Ideas*. Integrated and reprinted with permission from the National Academy of Sciences.
6. The examples given (e.g.,) are suggestions for the instructor.
7. Throughout this document, connections are provided to the nature of science as defined by *A Framework for K-12 Science Education* (NRC 2012).
8. Throughout this document, connections are provided to Engineering, Technology, and Applications of Science as defined by *A Framework for K-12 Science Education* (NRC 2012).
9. Each set of PEs lists connections to other disciplinary core ideas (DCIs) within the Arkansas K-12 Science Standards and to the Arkansas English Language Arts Standards, Arkansas Disciplinary Literacy Standards, and the Arkansas Mathematics Standards.

Arkansas K-12 Science Standards Overview

The Arkansas K-12 Science Standards are based on *A Framework for K-12 Science Education* (NRC 2012) and are meant to reflect a new vision for science education. The following conceptual shifts reflect what is new about these science standards. The Arkansas K-12 Science Standards

- reflect science as it is practiced and experienced in the real world,
- build logically from Kindergarten through Grade 12,
- focus on deeper understanding as well as application of content,
- integrate practices, crosscutting concepts, and core ideas, and
- make explicit connections to literacy and math.

As part of teaching the Arkansas K-12 Science Standards, it will be important to instruct and guide students in adopting appropriate safety precautions for their student-directed science investigations. Reducing risk and preventing accidents in science classrooms begin with planning. There are four recommended steps in carrying out a hazard and risk assessment for any planned lab investigation.

1) Identify all hazards. Hazards may be physical, chemical, health, or environmental.
2) Evaluate the type of risk associated with each hazard.
3) Write the procedure and all necessary safety precautions in such a way as to eliminate or reduce the risk associated with each hazard.
4) Prepare for any emergency that might arise in spite of all of the required safety precautions.

According to Arkansas Code Annotated § 6-10-113 (2012) for eye protection, every student and teacher in public schools participating in any chemical or combined chemical-physical laboratories involving caustic or explosive chemicals or hot liquids or solids is required to wear industrial-quality eye protective devices (eye goggles) at all times while participating in science investigations.

The Arkansas K-12 Science Standards outline the knowledge and science and engineering practices that all students should learn by the end of high school. The standards are three-dimensional because each student performance expectation engages students at the nexus of the following three dimensions.

- Dimension 1 describes scientific and engineering practices.
- Dimension 2 describes crosscutting concepts, overarching science concepts that apply across science disciplines.
- Dimension 3 describe core ideas in the science disciplines.

The Science and Engineering Practices

The eight practices describe the major practices that scientists use to investigate, build models and theories of the world around them or engineers use as they build and design systems. The practices are essential for all students to learn and are as follows:

1. Asking questions (for science) and defining problems (for engineering)
2. Developing and using models
3. Planning and carrying out investigations
4. Analyzing and interpreting data
5. Using mathematics and computational thinking
6. Constructing explanations (for science) and designing solutions (for engineering)
7. Engaging in argument from evidence
8. Obtaining, evaluating, and communicating information

Crosscutting Concepts

The seven crosscutting concepts bridge disciplinary boundaries and unit core ideas throughout the fields of science and engineering. Their purpose is to help students deepen their understanding of the disciplinary core ideas, and develop a coherent, and scientifically based view of the world. The seven crosscutting concepts are as follows:

1. *Patterns.* Observed patterns of forms and events guide organization and classification, and they prompt questions about relationships and the factors that influence them.

2. *Cause and effect: Mechanism and explanation*. Events have causes, sometimes simple, sometimes multifaceted. A major activity of science is investigating and explaining causal relationships and the mechanisms by which they are mediated. Such mechanisms can then be tested across given contexts and used to predict and explain events in new contexts.

3. *Scale, proportion, and quantity.* In considering phenomena, it is critical to recognize what is relevant at different measures of size, time, and energy and to recognize how changes in scale, proportion, or quantity affect a system's structure or performance.

4. *Systems and system models.* Defining the system under study—specifying its boundaries and making explicit a model of that system—provides tools for understanding and testing ideas that are applicable throughout science and engineering.

5. *Energy and matter: Flows, cycles, and conservation.* Tracking fluxes of energy and matter into, out of, and within systems helps one understand the systems' possibilities and limitations.

6. *Structure and function.* The way in which an object or living thing is shaped and its substructure determine many of its properties and functions.

7. *Stability and change.* For natural and built systems alike, conditions of stability and determinants of rates of change or evolution of a system are critical elements of study.

Disciplinary Core Ideas

The Disciplinary Core Ideas describe the content that occurs at each grade or course. The Arkansas K-12 Science Standards focus on a limited number of core ideas in science and engineering both within and across the disciplines and is built on the notion of learning as a developmental progression. The Disciplinary Core Ideas are grouped into the following domains:

- Physical Science (PS)
- Life Science (LS)
- Earth and Space Science (ESS)
- Engineering, Technology and Applications of Science (ETS)

Connections to the Arkansas English Language Arts Standards

Evidence-based reasoning is the foundation of good scientific practice. The Arkansas K-12 Science Standards incorporate reasoning skills used in language arts to help students improve mastery and understanding in all three disciplines. The Arkansas K-8 Science Committee made every effort to align grade-by-grade with the English language arts (ELA) standards so concepts support what students are learning in their entire curriculum. Connections to specific ELA standards are listed for each student performance expectation, giving teachers a blueprint for building comprehensive cross-disciplinary lessons.

The intersections between Arkansas K-12 Science Standards and Arkansas ELA Standards teach students to analyze data, model concepts, and strategically use tools through productive talk and shared activity. Reading in science requires an appreciation of the norms and conventions of the discipline of science, including understanding the nature of evidence used, an attention to precision and detail, and the capacity to make and assess intricate arguments, synthesize complex information, and follow detailed procedures and accounts of events and concepts. These practice-based standards help teachers foster a classroom culture where students think and reason together, connecting around the subject matter and core ideas.

Connections to the Arkansas Disciplinary Literacy Standards

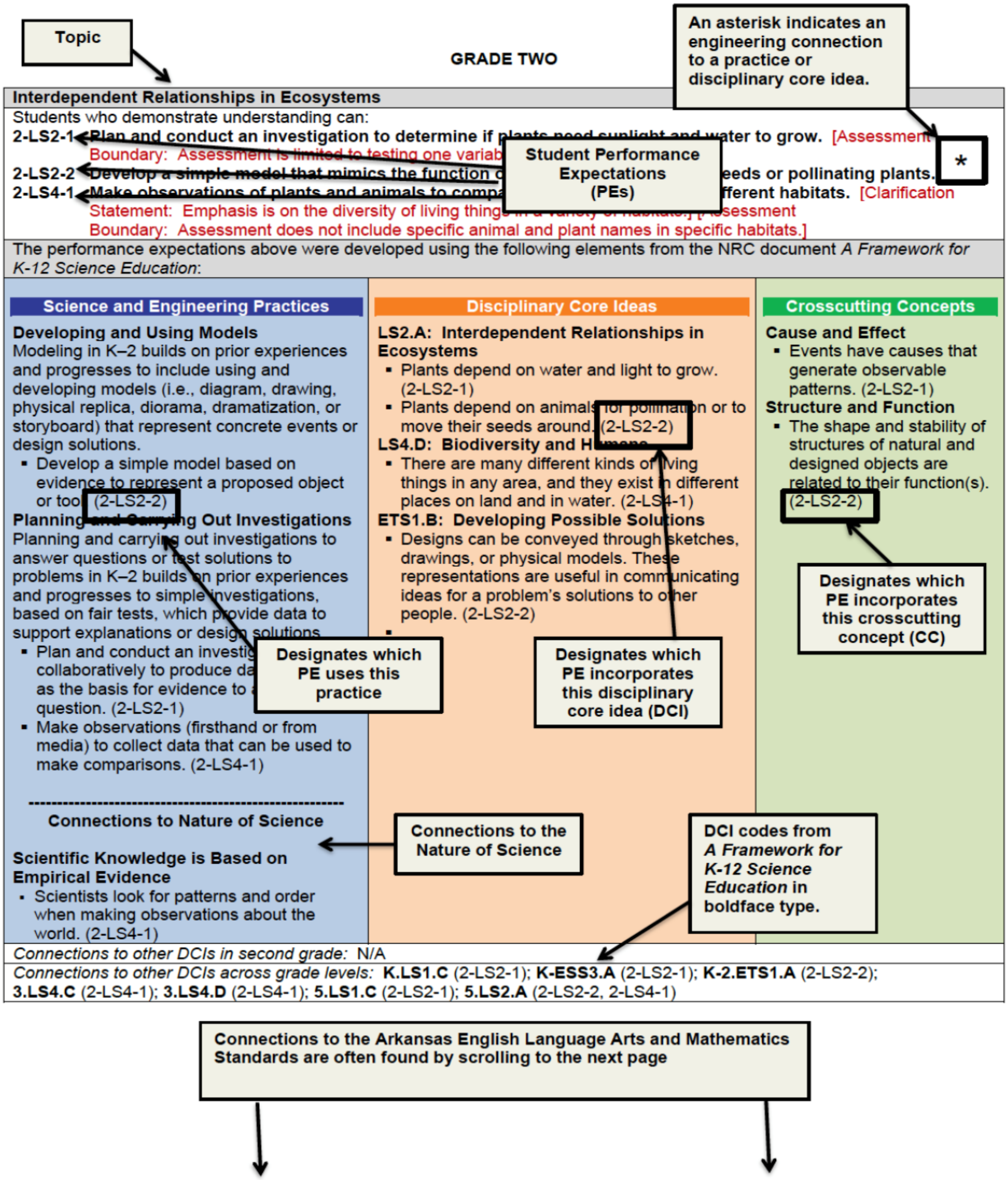
Reading is critical to building knowledge in science. College and career ready reading in science requires an appreciation of the norms and conventions of each discipline, such as the kinds of evidence used in science; an understanding of domain-specific words and phrases; an attention to precise details; and the capacity to evaluate intricate arguments, synthesize complex information, and follow detailed descriptions of events and concepts. When reading scientific and technical texts, students need to be able to gain knowledge from challenging texts that often make extensive use of elaborate diagrams and data to convey information and illustrate concepts. Students must be able to read complex informational texts in science with independence and confidence because the vast majority of reading in college and workforce training programs will be sophisticated nonfiction.

For students, writing is a key means of asserting and defending claims, showing what they know about a science, and conveying what they have experienced, imagined, thought, and felt. To be college and career ready writers, students must take task, purpose, and audience into careful consideration, choosing words, information, structures, and formats deliberately. They need to be able to use technology strategically when creating, refining, and collaborating on writing. They have to become adept at gathering information, evaluating sources, and citing material accurately, reporting finds from their research and analysis of sources in a clear and cogent manner. They must have the flexibility, concentration, and fluency to produce high-quality first-draft text under a tight deadline and the capacity to revisit and make improvements to a piece of writing over multiple drafts when circumstances encourage or require it.

Connections to the Arkansas Mathematics Standards

Science is a quantitative discipline, so it is important for educators to ensure that students' science learning coheres well with their understanding of mathematics. To achieve this alignment, the Arkansas K-12 Science Committee made every effort to ensure that the mathematics standards do not outpace or misalign to the grade-by-grade science standards. Connections to specific math standards are listed for each student performance expectation, giving teachers a blueprint for building comprehensive cross-disciplinary lessons.

How to Read
Arkansas K-12 Science



Physical Science - Integrated Course Learning Progression Chart

Topic 1: Elements, Matter, and Interactions	Topic 2: Matter in Organisms	Topic 3: Forces and Motion	Topic 4: Energy	Topic 5: Waves	Topic 6: Interactions of Humans and the Environment
AR PSI-PS1-1	PSI-LS1-5	AR PSII-PS2-1	AR PSI-PS3-1	AR PSI-PS4-1	AR PSI-LS2-7
AR PSI-PS1-2	AR PSI-LS1-7	PSI-PS2-3	AR PSI-PS3-2	PSI-PS4-2	AR PSI-LS4-5
AR PSI-PS1-3	AR PSI-LS2-4	PSI-PS2-5	PSI-PS3-3	AR PSI5-ETS1-2	AR PSI-ESS2-1
PSI-PS1-4	AR PSI2-ETS1-2	PSI-PS2-6	PSI-PS3-4		AR PSI-ESS3-1
AR PSI-PS1-7		AR PSI-ESS1-5	AR PSI4-ETS1-3		AR PSI-ESS3-2
AR PSI-ESS2-7		AR PSI3-ETS1-1			AR PSI6-ETS1-1
					AR PSI6-ETS1-2
					AR PSI6-ETS1-3
					AR PSI6-ETS1-4

Arkansas Clarification Statement/Assessment Boundary (AR)

Physical Science - Integrated Course Overview

The Arkansas K-12 Science Standards for physical science is an integrated science course that focuses on conceptual understanding of foundational core ideas, science and engineering practices, and crosscutting concepts, and is composed of physical science, Earth and space science, life science, and engineering design standards. Students will earn 1 unit of Smart Core/physical science credit for graduation. It is recommended that students be enrolled in Algebra I concurrently with this course. Teachers with Chemistry, Physics, Physical Science, Physical/Earth, and Physics/Math licenses are qualified to teach this course.

Students in Physical Science - Integrated continue to develop their understanding of the core ideas in the physical, life, and earth and space sciences learned in middle school. These ideas include the most fundamental concepts from chemistry, physics, biology, and Earth and space science but are intended to leave room for expanded study in upper-level high school courses. The high school performance expectations in physical science build on the middle school ideas and skills and allow high school students to explain more in-depth phenomena central not only to the physical sciences, but to life and earth and space sciences as well. There are six topics in Physical Science - Integrated: (1) Elements, Matter, and Interactions, (2) Matter in Organisms, (3) Forces and Motion, (4) Energy, (5) Waves, and (6) Interactions of Humans and the Environment.

The performance expectations (standards) for Physical Science - Integrated blend physical science, life science, and Earth and space science core ideas with scientific and engineering practices and crosscutting concepts to support students in developing useable knowledge to explain ideas across the science disciplines. Students are also expected to demonstrate understanding of several engineering practices, including design and evaluation. Connections with other science disciplines help high school students develop these capabilities in various contexts. For example, in the life sciences students are expected to design, evaluate, and refine a solution for reducing human impact on the environment (PSI-LS2-7). In the physical sciences students solve problems by applying their engineering capabilities along with their knowledge of conditions for forces during collisions (PS-PS2-3) and conversion of energy from one form to another (PSI-PS3-3). In the Earth and space sciences students apply their engineering capabilities to reduce human impacts on Earth systems, and improve social and environmental cost-benefit ratios (PSI-ESS3-2).

Additionally, it should be noted the physical science - integrated standards are not intended to be used as curriculum. Instead, the standards are the minimum that students should know and be able to do. Therefore, teachers should continue to differentiate for the needs of their students by adding depth and additional rigor.

Students in Physical science - Integrated also continue their ability to develop possible solutions for major global problems with engineering design challenges. At the high school level, students are expected to engage with major global issues at the interface of science, technology, society and the environment, and to bring to light the kinds of analytical and strategic thinking that prior training and increased maturity make possible. As in prior levels, these capabilities can be thought of in three stages:

- **Defining the problem** at the high school level requires both qualitative and quantitative analysis. For example, the need to provide food and fresh water for future generations comes into sharp focus when considering the speed at which world population is growing and conditions in countries that have experienced famine. While high school students are not expected to solve these challenges, they are expected to begin thinking about them as problems that can be addressed, at least in part, through engineering.
- **Developing possible solutions** for major global problems begins by breaking them down into smaller problems that can be tackled with engineering methods. To evaluate potential solutions, students are expected to not only consider a wide range of criteria but to also recognize that criteria

needs to be prioritized. For example, public safety or environmental protection may be more important than cost or even functionality. Decisions on priorities can then guide tradeoff choices.

- **Improving designs** at the high school level may involve sophisticated methods, such as using computer simulations to model proposed solutions. Students are expected to use such methods to take into account a range of criteria and constraints, anticipate possible societal and environmental impacts, and test the validity of their simulations by comparison to the real world.

Physical Science - Integrated Topics Overview

The performance expectations in the **Topic 1: Elements, Matter, and Interactions** help students formulate an answer to the questions:

- How can one explain the structure and properties of matter?
- How do substances combine or change (react) to make new substances?
- How does one characterize and explain these reactions and make predictions about them?

Students are expected to develop understanding of the substructure of atoms and provide more mechanistic explanations of the properties of substances. Students are able to use the periodic table as a tool to explain and predict the properties of elements. Phenomena involving nuclei are also important to understand, as they explain the formation and abundance of the elements. The crosscutting concepts of patterns, and energy and matter are called out as organizing concepts for these disciplinary core ideas. Chemical reactions, including rates of reactions and energy changes, can be understood by students at this level in terms of the collisions of molecules and the rearrangements of atoms. Using this expanded knowledge of chemical reactions, students are able to explain important biological and geophysical phenomena. In these performance expectations, students are expected to demonstrate proficiency in developing and using models, planning and conducting investigations, and communicating scientific and technical information, and to use these practices to demonstrate understanding of the core ideas.

The performance expectations in the **Topic 2: Matter in Organisms** help students answer the questions:

- How do organisms obtain and use energy they need to live and grow?
- How do matter and energy move through ecosystems?

High school students can construct explanations for the role of energy in the cycling of matter in organisms and ecosystems. They can apply mathematical concepts to develop evidence to support explanations of the interactions of photosynthesis and cellular respiration and develop models to communicate these explanations. They can relate the nature of science to how explanations may change in light of new evidence and the implications for our understanding of the tentative nature of science. Students understand organisms' interactions with each other and their physical environment, how organisms obtain resources, change the environment, and how these changes affect both organisms and ecosystems. In addition, students can utilize the crosscutting concepts of matter and energy to make sense of ecosystem dynamics.

The performance expectations in the **Topic 3: Forces and Motion** supports students' understanding of ideas related to why some objects will keep moving, why objects fall to the ground, and why some materials are attracted to each other while others are not. Students should be able to answer the question:

- How can one explain and predict interactions between objects and within systems of objects?

The disciplinary core idea is broken down into the sub ideas of Forces and Motion and Types of Interactions. The performance expectations focus on students building understanding of forces and interactions and Newton's Second Law. Students also develop understanding that the total momentum of a system of objects is conserved when there is no net force on the system. Students are able to use Newton's Law of Gravitation and Coulomb's Law to describe and predict the gravitational and electrostatic forces between objects. Students are able to apply scientific and engineering ideas to design, evaluate, and refine a device that minimizes the force on a macroscopic object during a collision. Students are expected to demonstrate proficiency in planning and conducting investigations, analyzing data and using math to support claims, and applying scientific ideas to solve design problems, and to use these practices to demonstrate understanding of the core ideas. The crosscutting concepts of cause and effect and structure and function are called out as organizing concepts for these disciplinary core ideas.

The performance expectations in the **Topic 4: Energy** help students answer the question:

- How do forces and energy affect matter?

Students develop a computational model to calculate the change in energy within components of a system. Students are able to use models to illustrate energy at a macroscopic scale. In the PS3 performance expectations, students are expected to demonstrate proficiency in developing and using models, planning and conducting investigations, and using math to support claims, and applying scientific ideas to solve design problems, and to use these practices to demonstrate understanding of the core ideas. The crosscutting concepts of systems and system models and energy and matter are called out as organizing concepts for these disciplinary core ideas.

The performance expectations in the **Topic 5: Waves** are critical to understand how many new technologies work. As such, this disciplinary core idea helps students answer the question:

- How are waves used to transfer energy and send and store information?

Students are able to apply understanding of how wave properties and the interactions of electromagnetic radiation with matter can transfer information across long distances, store information, and investigate nature on many scales. Students understand that combining waves of different frequencies can make a wide variety of patterns and thereby encode and transmit information. Students also demonstrate their understanding of engineering ideas by presenting information about how technological devices use the principles of wave behavior and wave interactions with matter to transmit and capture information and energy. Students are expected to demonstrate proficiency in asking questions and using mathematical thinking to demonstrate understanding of the core ideas. The crosscutting concepts of cause and effect and stability and change are highlighted as organizing concepts for these disciplinary core ideas.

The performance expectations in the **Topic 6: Interactions of Humans and the Environment** help students formulate answers to the questions:

- How do humans depend on Earth's resources?
- How do people model and predict the effects of human activities on Earth's climate?

There are strong connections to mathematical practices of analyzing and interpreting data. The performance expectations strongly reflect the many societally relevant aspects of Earth and space science (resources, hazards, and environmental impacts) with an emphasis on using engineering and technology concepts to design solutions to challenges facing human society. Students understand the complex and significant interdependencies between humans and the rest of Earth's systems through the impacts of natural hazards, our dependencies on natural resources, and the environmental impacts of human activities. In the life science performance expectations, students are expected to demonstrate proficiency in the use of computer simulation models and engaging in argument from evidence; and to use these practices to demonstrate understanding of the core ideas. The crosscutting concepts of stability and change; cause and effect; and systems and system models are called out as organizing concepts for these disciplinary core ideas. While the performance expectations couple particular practices with specific disciplinary core ideas, instructional decisions should include use of many practices that lead to the performance expectations.

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Physical Science - Integrated

Topic 1: Elements, Matter, and Interactions

Students who demonstrate understanding can:

PSI-PS1-1 **Use the periodic table as a model to predict the relative properties of elements based on the patterns of electrons in the outermost energy level of atoms.** [AR Clarification Statement: This PE is partially addressed in this course. Examples of properties that could be predicted from patterns could include types of bonds (ionic & covalent) formed, numbers of bonds formed, and hydrogen bonds in water.] [Assessment Boundary: Assessment is limited to main group elements.]

PSI-PS1-2 **Construct and revise an explanation for the outcome of a simple chemical reaction based on the outermost electron states of atoms, trends in the periodic table, and knowledge of the patterns of chemical properties.** [AR Clarification Statement: This PE is partially addressed in this course. Examples could include recognizing patterns to identify types of chemical reactions, such as, combustion, single replacement, double replacement, decomposition and synthesis.] [Assessment Boundary: Assessment does not include predicting chemical products.]

PSI-PS1-3 **Plan and conduct an investigation to gather evidence to compare the structure of substances at the bulk scale to infer the strength of electrical forces between particles.** [AR Clarification Statement: This PE is partially addressed in this course. Emphasis is on understanding of the strengths of forces between particles including hydrogen bonding in water. Examples of particles could include ions, atoms, molecules, and networked materials (such as graphite). Examples of bulk properties of substances could include the melting point and boiling point, vapor pressure, and surface tension.] [AR Assessment Boundary: Assessment limited to materials of same states of matter.]

PSI-PS1-4 **Develop a model to illustrate that the release or absorption of energy from a chemical reaction system depends upon the changes in total bond energy.** [Clarification Statement: This PE is partially addressed in this course. Emphasis is on the idea that a chemical reaction is a system that affects the energy change. Examples of models could include molecular-level drawings and diagrams of reactions, graphs showing the relative energies of reactants and products, and representations showing energy is conserved.] [Assessment Boundary: Assessment does not include calculating the total bond energy changes during a chemical reaction from the bond energies of reactants and products.]

PSI-PS1-7 **Use mathematical representations to support the claim that atoms, and therefore mass, are conserved during a chemical reaction.** [AR Clarification Statement: This PE is partially addressed in this course. Emphasis is on demonstrating conservation of atoms through balancing chemical equations and assessing students' use of mathematical thinking, not on memorization and rote application of problem-solving techniques.] [Assessment Boundary: Assessment does not include the mole concept or complex chemical reactions.]

PSI-ESS2-7 **Construct an argument based on evidence about the simultaneous coevolution of Earth's systems and life on Earth.** [AR Clarification Statement: This PE is partially addressed in this course. Emphasis in this course is on identifying and describing the evidence for simultaneous co-evolution and the causes, effects, and feedbacks between the biosphere and Earth's other systems. Geoscience factors control the evolution of life, which in turn continuously alters Earth's surface. Examples include how photosynthetic life altered the atmosphere through the production of oxygen, which in turn increased weathering rates and allowed for the evolution of animal life; how microbial life on land increased the formation of soil which in turn allowed for the evolution of land plants; or how the evolution of corals created reefs that altered patterns of erosion and deposition along coastlines and provided habitats for the evolution of life forms.] [Assessment Boundary: Assessment does not include a comprehensive understanding of the mechanisms of how the biosphere interacts with all of Earth's other systems.]

The performance expectations above were developed using the following elements from the NRC document *A Framework for K-12 Science Education*:

Science and Engineering Practices	Disciplinary Core Ideas	Crosscutting Concepts

Developing and Using Models Modeling in 9–12 builds on K–8 and progresses to using, synthesizing, and developing models to predict and show relationships among variables between systems and their components in the natural and designed worlds. ▪ Develop a model based on evidence to illustrate the relationships between systems or between components of a system. (PSI-PS1-4) ▪ Use a model to predict the relationships between systems or between components of a system. (PSI-PS1-1) **Planning and Carrying Out Investigations** Planning and carrying out investigations in 9-12 builds on K-8 experiences and progresses to include investigations that provide evidence for and test conceptual, mathematical, physical, and empirical models. ▪ Plan and conduct an investigation individually and collaboratively to produce data to serve as the basis for evidence, and in the design: decide on types, how much, and accuracy of data needed to produce reliable measurements and consider limitations on the precision of the data (e.g., number of trials, cost, risk, time), and refine the design accordingly. (PSI-PS1-3) **Using Mathematics and Computational Thinking** Mathematical and computational thinking at the 9–12 level builds on K–8 and progresses to using algebraic thinking and analysis, a range of linear and nonlinear functions including trigonometric functions, exponentials and logarithms, and computational tools for statistical analysis to analyze, represent, and model data. Simple computational simulations are created and used based on mathematical models of basic assumptions. ▪ Use mathematical representations of phenomena to support claims. (PSI-PS1-7) **Constructing Explanations and Designing Solutions**	**PS1.A: Structure and Properties of Matter** ▪ Each atom has a charged substructure consisting of a nucleus, which is made of protons and neutrons, surrounded by electrons. (PSI-PS1-1) ▪ The periodic table orders elements horizontally by the number of protons in the atom's nucleus and places those with similar chemical properties in columns. The repeating patterns of this table reflect patterns of outer electron states. (PSI-PS1-1,PS-PS1-2) ▪ The structure and interactions of matter at the bulk scale are determined by electrical forces within and between atoms. (PSI-PS1-3,PSI-PS2-6) ▪ A stable molecule has less energy than the same set of atoms separated; one must provide at least this energy in order to take the molecule apart. (PSI-PS1-4) **PS1.B: Chemical Reactions** ▪ Chemical processes, their rates, and whether or not energy is stored or released can be understood in terms of the collisions of molecules and the rearrangements of atoms into new molecules, with consequent changes in the sum of all bond energies in the set of molecules that are matched by changes in kinetic energy. (PSI-PS1-4) ▪ The fact that atoms are conserved, together with knowledge of the chemical properties of the elements involved, can be used to describe and predict chemical reactions. (PSI-PS1-2, PSI-PS1-7) **PS2.B: Types of Interactions** ▪ Attraction and repulsion between electric charges at the atomic scale explain the structure, properties, and transformations of matter, as well as the contact forces between material objects. (PSI-PS1-1, PSI-PS1-3) **ESS2.D: Weather and Climate**	**Patterns** ▪ Different patterns may be observed at each of the scales at which a system is studied and can provide evidence for causality in explanations of phenomena. (PSI-PS1-1,PSI-PS1-2, PSI -PS1-3) **Energy and Matter** ▪ The total amount of energy and matter in closed systems is conserved. (PSI-PS1-7) ▪ Changes of energy and matter in a system can be described in terms of energy and matter flows into, out of, and within that system. (PSI-PS1-4) -- **Connections to Nature of Science** **Scientific Knowledge Assumes an Order and Consistency in Natural Systems** ▪ Science assumes the universe is a vast single system in which basic laws are consistent. (PSI-PS1-7)

Constructing explanations and designing solutions in 9–12 builds on K–8 experiences and progresses to explanations and designs that are supported by multiple and independent student-generated sources of evidence consistent with scientific ideas, principles, and theories. ▪ Construct and revise an explanation based on valid and reliable evidence obtained from a variety of sources (including students' own investigations, models, theories, simulations, peer review) and the assumption that theories and laws that describe the natural world operate today as they did in the past and will continue to do so in the future. (PSI-PS1-2)	▪ Gradual atmospheric changes were due to plants and other organisms that captured carbon dioxide and released oxygen. (PSI-ESS2-7) **ESS2.E: Biogeology** ▪ The many dynamic and delicate feedbacks between the biosphere and other Earth systems cause a continual co-evolution of Earth's surface and the life that exists on it. (PSI-ESS2-7)	

Connections to other DCIs in this course: **PSI.PS3.A** (PSI-PS1-4,PSI-PS1-8); **PSI.PS3.B** (PSI-PS1-4,PSI-PS1-7); **PSI.PS3.D** (PSI-PS1-4); **PSI.LS1.C** (PSI-PS1-1,PSI-PS1-2,PSI-PS1-4,PSI-PS1-7); **PSI.LS2.B** (PSI-PS1-7)

Connections to DCIs across grade-bands: **7.PS1.A** (PSI-PS1-1,PSI-PS1-2,PSI-PS1-3,PSI-PS1-4,PSI-PS1-7); **7.PS1.B** (PSI-PS1-1,PSI-PS1-2,PSI-PS1-4,PSI-PS1-7); **8.PS2.B** (PSI-PS1-3,PSI-PS1-4); **8.PS3.C** (PSI-PS1-4); **7.LS1.C** (PSI-PS1-4,PSI-PS1-7); **7.LS2.B** (PSI-PS1-7); **7.ESS2.A** (PSI-PS1-7)

Connections to the Arkansas Disciplinary Literacy Standards:

RST.9-10.7 Translate quantitative or technical information expressed in words in a text into visual form (e.g., a table or chart) and translate information expressed visually or mathematically (e.g., in an equation) into words. (PSI-PS1-1)

RST.11-12.1 Cite specific textual evidence to support analysis of science and technical texts, attending to important distinctions the author makes and to any gaps or inconsistencies in the account. (PSI-PS1-3)

WHST.9-12.2 Write informative/explanatory texts, including the narration of historical events, scientific procedures/ experiments, or technical processes. (PSI-PS1-2)

WHST.9-12.5 Develop and strengthen writing as needed by planning, revising, editing, rewriting, or trying a new approach, focusing on addressing what is most significant for a specific purpose and audience. (PSI-PS1-2)

WHST.9-12.7 Conduct short as well as more sustained research projects to answer a question (including a self-generated question) or solve a problem; narrow or broaden the inquiry when appropriate; synthesize multiple sources on the subject, demonstrating understanding of the subject under investigation. (PSI-PS1-3)

WHST.11-12.8 Gather relevant information from multiple authoritative print and digital sources, using advanced searches effectively; assess the strengths and limitations of each source in terms of the specific task, purpose, and audience; integrate information into the text selectively to maintain the flow of ideas, avoiding plagiarism and overreliance on any one source and following a standard format for citation. (PSI-PS1-3)

WHST.9-12.9 Draw evidence from informational texts to support analysis, reflection, and research. (PSI-PS1-3)

Connections to the Arkansas English Language Arts Standards:

SL.11-12.5 Make strategic use of digital media (e.g., textual, graphical, auditory, visual, and interactive elements) in presentations to enhance understanding of findings, reasoning, and evidence and to add interest. (PSI-PS1-4)

Connections to the Arkansas Mathematics Standards:

MP.2 Reason abstractly and quantitatively. (PSI-PS1-7)

MP.4 Model with mathematics. (PSI-PS1-4)

HSN.Q.A.1	Use units as a way to understand problems and to guide the solution of multi-step problems; choose and interpret units consistently in formulas; choose and interpret the scale and the origin in graphs and data displays. (PSI-PS1-2,PSI-PS1-3,PSI-PS1-4,PSI-PS1-7)
HSN.Q.A.2	Define appropriate quantities for the purpose of descriptive modeling. (PSI-PS1-4,PSI-PS1-7)
HSN.Q.A.3	Choose a level of accuracy appropriate to limitations on measurement when reporting quantities. (PSI-PS1-2,PSI-PS1-3,PSI-PS1-4,PSI-PS1-7)

Topic 2: Matter in Organisms

Students who demonstrate understanding can:

PSI-LS1-5 **Use a model to illustrate how photosynthesis transforms light energy into stored chemical energy.** [AR Clarification Statement: This PE is partially addressed in this course. Emphasis is on using photosynthesis as an example of a chemical reaction including energy transfer. Examples of models could include diagrams, chemical equations, and conceptual models.] [Assessment Boundary: Assessment does not include specific biochemical steps.]

PSI-LS1-7 **Use a model to illustrate that cellular respiration is a chemical process whereby the bonds of food molecules and oxygen molecules are broken and the bonds in new compounds are formed resulting in a net transfer of energy.** [AR Clarification Statement: This PE is partially addressed in this course. Emphasis is on using physical systems as examples of chemical reactions such as cellular respiration and photosynthesis. Examples of models could include diagrams, chemical equations, and conceptual models.] [Assessment Boundary: Assessment should not include specific biochemical steps.]

PSI-LS2-4 **Use mathematical representations to support claims for the cycling of matter and flow of energy among organisms in an ecosystem.** [AR Clarification Statement: This PE is partially addressed in this course. Emphasis is on atoms and molecules such as carbon, oxygen, hydrogen and nitrogen being conserved as they move through an ecosystem.] [Assessment Boundary: Assessment is limited to proportional reasoning to describe the cycling of matter and flow of energy.]

PSI2-ETS1-2
Design a solution to a complex real-world problem by breaking it down into smaller, more manageable problems that can be solved through engineering. [AR Clarification Statement: Examples could focus on researching then designing one aspect at a time, e.g., health advantages and disadvantages of using polystyrene vs. polyethylene for constructing a water bottle.]

The performance expectations above were developed using the following elements from the NRC document *A Framework for K-12 Science Education*:

Science and Engineering Practices

Developing and Using Models
Modeling in 9–12 builds on K–8 experiences and progresses to using, synthesizing, and developing models to predict and show relationships among variables between systems and their components in the natural and designed worlds.
- Use a model based on evidence to illustrate the relationships between systems or between components of a system. (PSI-LS1-5,PSI-LS1-7)

Using Mathematics and Computational Thinking
Mathematical and computational thinking in 9-12 builds on K-8 experiences and progresses to using algebraic thinking and analysis, a range of linear and nonlinear functions including trigonometric functions, exponentials and logarithms, and computational tools for statistical analysis to analyze, represent, and model data. Simple computational simulations are created and used based

Disciplinary Core Ideas

LS1.C: Organization for Matter and Energy Flow in Organisms
- The process of photosynthesis converts light energy to stored chemical energy by converting carbon dioxide plus water into sugars plus released oxygen. (PSI-LS1-5)
- As matter and energy flow through different organizational levels of living systems, chemical elements are recombined in different ways to form different products. (PSI-LS1-7)
- As a result of these chemical reactions, energy is transferred from one system of interacting molecules to another. Cellular respiration is a chemical process in which the bonds of food molecules and oxygen molecules are broken and new compounds are formed that can transport energy to muscles. Cellular respiration also releases the energy needed to maintain body

Crosscutting Concepts

Energy and Matter
- Changes of energy and matter in a system can be described in terms of energy and matter flows into, out of, and within that system. (PSI-LS1-5)
- Energy cannot be created or destroyed—it only moves between one place and another place, between objects and/or fields, or between systems. (PSI-LS1-7)

Energy and Matter
- Energy cannot be created or destroyed—it only moves between one place and another place, between objects and/or fields, or between systems. (PSI-LS2-4)

on mathematical models of basic assumptions. ▪ Use mathematical representations of phenomena or design solutions to support claims. (PSI-LS2-4) **Constructing Explanations and Designing Solutions** Constructing explanations and designing solutions in 9–12 builds on K–8 experiences and progresses to explanations and designs that are supported by multiple and independent student-generated sources of evidence consistent with scientific ideas, principles and theories. ▪ Design a solution to a complex real-world problem, based on scientific knowledge, student-generated sources of evidence, prioritized criteria, and tradeoff considerations. (PSI2-ETS1-2)	temperature despite ongoing energy transfer to the surrounding environment. (PSI-LS1-7) **LS2.B: Cycles of Matter and Energy Transfer in Ecosystems** ▪ Plants or algae form the lowest level of the food web. At each link upward in a food web, only a small fraction of the matter consumed at the lower level is transferred upward, to produce growth and release energy in cellular respiration at the higher level. Given this inefficiency, there are generally fewer organisms at higher levels of a food web. Some matter reacts to release energy for life functions, some matter is stored in newly made structures, and much is discarded. The chemical elements that make up the molecules of organisms pass through food webs and into and out of the atmosphere and soil, and they are combined and recombined in different ways. At each link in an ecosystem, matter and energy are conserved. (PSI-LS2-4) **ETS1.C: Optimizing the Design Solution** ▪ Criteria may need to be broken down into simpler ones that can be approached systematically, and decisions about the priority of certain criteria over others (trade-offs) may be needed. (PSI2-ETS1-2)	

Connections to other DCIs in this course: **PSI.PS1.B** (PSI-LS1-5,PSI-LS1-7); **PSI.PS2.B** (PSI-LS1-7); **PSI.PS3.B** (PSI-LS1-5,PSI-LS1-7,PSI-LS2-4)

Connections to DCIs across grade-bands: **7.PS1.B** (PSI-LS1-5,PSI-LS1-7); **6.PS3.C** (PSI-LS1-5,PSI-LS1-7, PSI-LS2-4)**; 7.LS1.C** (PSI-LS1-5,PSI-LS1-7,PSI-LS2-4); **7.LS2.B** (PSI-LS1-5,PSI-LS1-7,PSI-LS2-4); **6-8.ETS1.A** (PSI2-ETS1-2); **6-8.ETS1.B** (PSI2-ETS1-2); **6-8.ETS1.C** (PSI2-ETS1-2)

Connections to the Arkansas English Language Arts Standards:

SL.11-12.5 Make strategic use of digital media (e.g., textual, graphical, auditory, visual, and interactive elements) in presentations to enhance understanding of findings, reasoning, and evidence and to add interest. (PSI-LS1-5,PSI-LS1-7)

Connections to the Arkansas Mathematics Standards:

MP.2 Reason abstractly and quantitatively. (PSI-LS2-4)

MP.4 Model with mathematics. (PSI-LS2-4, PS2-ETS1-2)

HSN.Q.A.1 Use units as a way to understand problems and to guide the solution of multi-step problems; choose and interpret units consistently in formulas; choose and interpret the scale and the origin in graphs and data displays. (PSI-LS2-4)

HSN.Q.A.2 Define appropriate quantities for the purpose of descriptive modeling. (PSI-LS2-4)

HSN.Q.A.3 Choose a level of accuracy appropriate to limitations on measurement when reporting quantities. (PSI-LS2-4)

Topic 3: Forces and Motion

Students who demonstrate understanding can:

PSI-PS2-1 Analyze data to support the claim that Newton's second law of motion describes the mathematical relationship among the net force on a macroscopic object, its mass, and its acceleration. [AR Clarification Statement: This PE is partially addressed in this course. Emphasis on qualitative analysis of data. Examples of data could include tables or graphs of position or velocity as a function of time for objects subject to a net unbalanced force, such as a falling object, an object rolling down a ramp, or a moving object being pulled by a constant force.] [AR Assessment Boundary: Assessment is limited to qualitative analysis of one-dimensional motion and to macroscopic objects moving at non-relativistic speeds.]

PSI-PS2-3 Apply scientific and engineering ideas to design, evaluate, and refine a device that minimizes the force on a macroscopic object during a collision.* [Clarification Statement: Examples of evaluation and refinement could include determining the success of the device at protecting an object from damage and modifying the design to improve it. Examples of a device could include a football helmet or a parachute.] [Assessment Boundary: Assessment is limited to qualitative evaluations and/or algebraic manipulations.]

PSI-PS2-5 Plan and conduct an investigation to provide evidence that an electric current can produce a magnetic field and that a changing magnetic field can produce an electric current. [Assessment Boundary: Assessment is limited to designing and conducting investigations with provided materials and tools.]

PSI-PS2-6 Communicate scientific and technical information about why the molecular-level structure is important in the functioning of designed materials.* [Clarification Statement: Emphasis is on the attractive and repulsive forces that determine the functioning of the material. Examples could include why electrically conductive materials are often made of metal, flexible but durable materials are made up of long chained molecules, and pharmaceuticals are designed to interact with specific receptors.] [Assessment Boundary: Assessment is limited to provided molecular structures of specific designed materials.]

PSI-ESS1-5 Evaluate evidence of the past and current movements of continental and oceanic crust and the theory of plate tectonics to explain the ages of crustal rocks. [AR Clarification Statement: Emphasis is on the ability of plate tectonics to explain the ages of crustal (continental and oceanic) rocks. Examples could include evidence of the ages of oceanic crust (lithosphere that includes crust and upper mantle and the asthenosphere) increasing with distance from mid-ocean ridges (a result of divergent boundaries/plate spreading) and the ages of North American continental crust increasing with distance away from a central ancient core (a result of past plate interactions).]

PSI3-ETS1-1
Analyze a major global challenge to specify qualitative and quantitative criteria and constraints for solutions that account for societal needs and wants. [AR Clarification Statement: Examples of global challenges could be energy distribution, protective sports equipment, and transportation safety designs (automobile safety and shipping/packing materials).]

The performance expectations above were developed using the following elements from the NRC document *A Framework for K-12 Science Education*:

Science and Engineering Practices	Disciplinary Core Ideas	Crosscutting Concepts
Planning and Carrying Out Investigations Planning and carrying out investigations to answer questions or test solutions to problems in 9–12 builds on K–8 experiences and progresses to include investigations that provide evidence for	**PS1.A: Structure and Properties of Matter** ▪ The structure and interactions of matter at the bulk scale are determined by electrical forces within and between atoms. (PSI-PS2-6) **PS2.A: Forces and Motion**	**Cause and Effect** ▪ Empirical evidence is required to differentiate between cause and correlation and make claims about specific causes and effects.

and test conceptual, mathematical, physical and empirical models. ▪ Plan and conduct an investigation individually and collaboratively to produce data to serve as the basis for evidence, and in the design: decide on types, how much, and accuracy of data needed to produce reliable measurements and consider limitations on the precision of the data (e.g., number of trials, cost, risk, time), and refine the design accordingly. (PSI-PS2-5) **Analyzing and Interpreting Data** Analyzing data in 9–12 builds on K–8 and progresses to introducing more detailed statistical analysis, the comparison of data sets for consistency, and the use of models to generate and analyze data. ▪ Analyze data using tools, technologies, and/or models (e.g., computational, mathematical) in order to make valid and reliable scientific claims or determine an optimal design solution. (PSI-PS2-1) **Constructing Explanations and Designing Solutions** Constructing explanations and designing solutions in 9–12 builds on K–8 experiences and progresses to explanations and designs that are supported by multiple and independent student-generated sources of evidence consistent with scientific ideas, principles, and theories. ▪ Apply scientific ideas to solve a design problem, taking into account possible unanticipated effects. (PSI-PS2-3) **Obtaining, Evaluating, and Communicating Information** Obtaining, evaluating, and communicating information in 9–12 builds on K–8 and progresses to evaluating the validity and reliability of the claims, methods, and designs. ▪ Communicate scientific and technical information (e.g. about the process of development and the design and performance of a proposed process or system) in multiple formats (including orally, graphically, textually, and mathematically). (PSI-PS2-6) **Engaging in Argument from Evidence**	▪ Newton's second law accurately predicts changes in the motion of macroscopic objects. (PSI-PS2-1) ▪ If a system interacts with objects outside itself, the total momentum of the system can change; however, any such change is balanced by changes in the momentum of objects outside the system. (PSI-PS2-3) **PS2.B: Types of Interactions** ▪ Forces at a distance are explained by fields (gravitational, electric, and magnetic) permeating space that can transfer energy through space. Magnets or electric currents cause magnetic fields; electric charges or changing magnetic fields cause electric fields. (PSI-PS2-5) ▪ Attraction and repulsion between electric charges at the atomic scale explain the structure, properties, and transformations of matter, as well as the contact forces between material objects. (PSI-PS2-6) **PS3.A: Definitions of Energy** ▪ "Electrical energy" may mean energy stored in a battery or energy transmitted by electric currents. (PSI-PS2-5) **ESS1.C: The History of Planet Earth** Continental rocks, which can be older than 4 billion years, are generally much older than the rocks of the ocean floor, which are less than 200 million years old. (PSI-ESS1-5) **ESS2.B: Plate Tectonics and Large-Scale System Interactions** ▪ Plate tectonics is the unifying theory that explains the past and current movements of the rocks at Earth's surface and provides a framework for understanding its geologic history. (PSI-ESS1-5) **ETS1.A: Defining and Delimiting Engineering Problems** ▪ Criteria and constraints also include satisfying any requirements set by society, such as taking issues of risk mitigation into account, and they should be quantified to the extent possible and stated in such a way that one can tell if a given design meets them. (PSI-PS2-3) **ETS1.C: Optimizing the Design Solution** ▪ Criteria may need to be broken down into simpler ones that can be approached systematically, and decisions about the	(PSI-PS2-1, PSI-PS2-5) ▪ Systems can be designed to cause a desired effect. (PSI-PS2-3) **Structure and Function** ▪ Investigating or designing new systems or structures requires a detailed examination of the properties of different materials, the structures of different components, and connections of components to reveal its function and/or solve a problem. (PSI-PS2-6) **Patterns** ▪ Empirical evidence is needed to identify patterns. (PSI-ESS1-5) ---------------------------------- **Connections to Engineering, Technology, and Applications of Science** **Influence of Science, Engineering, and Technology on Society and the Natural World** New technologies can have deep impacts on society and the environment, including some that were not anticipated. Analysis of costs and benefits is a critical aspect of decisions about technology. (PSI3-ETS1-1)

Engaging in argument from evidence in 9–12 builds on K–8 experiences and progresses to using appropriate and sufficient evidence and scientific reasoning to defend and critique claims and explanations about the natural and designed world(s). Arguments may also come from current scientific or historical episodes in science. ▪ Evaluate evidence behind currently accepted explanations or solutions to determine the merits of arguments. (PSI-ESS1-5) **Asking Questions and Defining Problems** Asking questions and defining problems in 9–12 builds on K–8 experiences and progresses to formulating, refining, and evaluating empirically testable questions and design problems using models and simulations. ▪ Analyze complex real-world problems by specifying criteria and constraints for successful solutions. (PSI3-ETS1-1) **---** **Connections to Nature of Science** **Science Models, Laws, Mechanisms, and Theories Explain Natural Phenomena** ▪ Theories and laws provide explanations in science. (PSI-PS2-1) ▪ Laws are statements or descriptions of the relationships among observable phenomena. (PSI-PS2-1)	priority of certain criteria over others (trade-offs) may be needed. (PSI-PS2-3) **ETS1.A: Defining and Delimiting Engineering Problems** ▪ Criteria and constraints also include satisfying any requirements set by society, such as taking issues of risk mitigation into account, and they should be quantified to the extent possible and stated in such a way that one can tell if a given design meets them. (PSI3-ETS1-1) ▪ Humanity faces major global challenges today, such as the need for supplies of clean water and food or for energy sources that minimize pollution, which can be addressed through engineering. These global challenges also may have manifestations in local communities. (PSI3-ETS1-1)	

Connections to other DCIs in this course: **PSI.PS3.A** (PSI-PS2-5); **PSI.ESS2.A** (PSI-PS2-5); **PSI.ESS3.A** (PSI-PS2-5); **PSI.ESS2.A** (PSI-ESS1-5); **PSI.PS3.B** (PSI-ESS1-5)

Connections to DCIs across grade-bands: **7.PS1.A** (PSI-PS2-6); **8.PS2.A** (PSI-PS2-1,PS-PS2-3); **8.PS2.B** (PSI-PS2-5,PSI-PS2-6); **8.PS3.C** (PSI-PS2-1,PSI-PS2-3); **8.ESS1.B** (PSI-PS2-5); **6-8.ETS1.A** (PSI3-ETS1-1); **7.ESS2.A** (PSI-ESS1-5); **8.ESS1.C** (PSI-ESS1-5)

Connections to the Arkansas Disciplinary Literacy Standards:

RST.11-12.1 Cite specific textual evidence to support analysis of science and technical texts, attending to important distinctions the author makes and to any gaps or inconsistencies in the account. (PSI-PS2-1,PSI-PS2-6)

RST.11-12.7 Integrate and evaluate multiple sources of information presented in diverse formats and media (e.g., quantitative data, video, multimedia) in order to address a question or solve a problem. (PSI-PS2-1),(PSI3-ETS1-1)

RST.11-12.8 Evaluate the hypotheses, data, analysis, and conclusions in a science or technical text, verifying the data when possible and corroborating or challenging conclusions with other sources of information. (PSI-ESS1-5, PSI3-ETS1-1)

RST.11-12.9	Synthesize information from a range of sources (e.g., texts, experiments, simulations) into a coherent understanding of a process, phenomenon, or concept, resolving conflicting information when possible. (PSI3-ETS1-1)
WHST.9-12.2	Write informative/explanatory texts, including the narration of historical events, scientific procedures/ experiments, or technical processes. (PS-ESS1-5, PS-PS2-6)
WHST.9-12.7	Conduct short as well as more sustained research projects to answer a question (including a self-generated question) or solve a problem; narrow or broaden the inquiry when appropriate; synthesize multiple sources on the subject, demonstrating understanding of the subject under investigation. (PSI-PS2-3,PSI-PS2-5)
WHST.11-12.8	Gather relevant information from multiple authoritative print and digital sources, using advanced searches effectively; assess the strengths and limitations of each source in terms of the specific task, purpose, and audience; integrate information into the text selectively to maintain the flow of ideas, avoiding plagiarism and overreliance on any one source and following a standard format for citation. (PSI-PS2-5)
WHST.9-12.9	Draw evidence from informational texts to support analysis, reflection, and research. (PSI-PS2-1,PSI-PS2-5)
Connections to the Arkansas Mathematics Standards:	
MP.2	Reason abstractly and quantitatively. (PSI-PS2-1,PSI3-ETS1-1)
MP.4	Model with mathematics. (PSI-PS2-1,PSI3-ETS1-1)
HSN.Q.A.1	Use units as a way to understand problems and to guide the solution of multi-step problems; choose and interpret units consistently in formulas; choose and interpret the scale and the origin in graphs and data displays. (PSI-PS2-1,PSI-PS2-5,PSI-PS2-6)
HSN.Q.A.2	Define appropriate quantities for the purpose of descriptive modeling. (PSI-PS2-1,PSI-PS2-5,PSI-PS2-6)
HSN.Q.A.3	Choose a level of accuracy appropriate to limitations on measurement when reporting quantities. (PSI-PS2-1,PSI-PS2-5,PSI-PS2-6)
HSA.SSE.A.1	Interpret expressions that represent a quantity in terms of its context; interpret parts of an expression using appropriate vocabulary, such as terms, factors, and coefficients; interpret complicated expressions by viewing one or more of their parts as a single entity. (PSI-PS2-1)
HSA.SSE.B.3	Choose and produce an equivalent form of an expression to reveal and explain properties of the quantity represented by the expression. (PSI-PS2-1)
HSA.CED.A.1	Create equations and inequalities in one variable and use them to solve problems. (PSI-PS2-1)
HSA.CED.A.2	Create equations in two or more variables to represent relationships between quantities; graph equations, in two variables, on a coordinate plane. (PSI-PS2-1)
HSA.CED.A.4	Rearrange literal equations using the properties of equality. (PSI-PS2-1)
HSF.IF.C.7	Graph functions expressed symbolically and show key features of the graph, with and without technology; graph linear and quadratic functions and, when applicable, show intercepts, maxima and minima; graph square root, cube root, and piecewise-defined functions, including step functions and absolute value functions; graph polynomial functions, identifying zeros when suitable factorizations are available, and showing end behavior; graph rational functions, identifying zeros and asymptotes when suitable factorizations are available, and showing end behavior; graph exponential and logarithmic functions, showing intercepts and end behavior; graph trigonometric functions, showing period, midline, and amplitude. (PSI-PS2-1)
HSS.ID.A.1	Represent data with plots on the real number line (dot plots, histograms, and box plots). (PSI-PS2-1)

Topic 4: Energy

Students who demonstrate understanding can:

PSI-PS3-1 Create a computational model to calculate the change in the energy of one component in a system when the change in energy of the other component(s) and energy flows in and out of the system are known. [AR Clarification Statement: This PE is partially addressed in this course. Emphasis is on explaining the meaning of mathematical expressions used in the model. Models could include spreadsheet analysis or other computer interfaces] [AR Assessment Boundary: Assessment is limited to basic algebraic expressions or computations.

PSI-PS3-2 Develop and use models to illustrate that energy at the macroscopic scale can be accounted for as a combination of energy associated with the motions of particles (objects) and energy associated with the relative position of particles (objects). [Clarification Statement: Examples of phenomena at the macroscopic scale could include the conversion of kinetic energy to thermal energy, the energy stored due to position of an object above the earth, and the energy stored between two electrically-charged plates. Examples of models could include diagrams, drawings, descriptions, and computer simulations.] [AR Assessment Boundary: Assessment is limited to mechanical energy.]

PSI-PS3-3 Design, build, and refine a device that works within given constraints to convert one form of energy into another form of energy.* [Clarification Statement: Emphasis is on both qualitative and quantitative evaluations of devices. Examples of devices could include Rube Goldberg devices, wind turbines, solar cells, solar ovens, and generators. Examples of constraints could include use of renewable energy forms and efficiency.] [Assessment Boundary: Assessment for quantitative evaluations is limited to total output for a given input. Assessment is limited to devices constructed with materials provided to students.]

PSI-PS3-4 Plan and conduct an investigation to provide evidence that the transfer of thermal energy when two components of different temperature are combined within a closed system results in a more uniform energy distribution among the components in the system (second law of thermodynamics). [Clarification Statement: Emphasis is on analyzing data from student investigations and using mathematical thinking to describe the energy changes both quantitatively and conceptually. Examples of investigations could include mixing liquids at different initial temperatures or adding objects at different temperatures to water.] [Assessment Boundary: Assessment is limited to investigations based on materials and tools provided to students.]

PSI4-ETS1-3
Evaluate a solution to a complex real-world problem based on prioritized criteria and trade-offs that account for a range of constraints, including cost, safety, reliability, and aesthetics, as well as possible social, cultural, and environmental impacts. [AR Clarification Statement: Examples could include building and evaluating wind turbines, solar cells, solar ovens, and generators.]

The performance expectations above were developed using the following elements from the NRC document *A Framework for K-12 Science Education*:

Science and Engineering Practices	Disciplinary Core Ideas	Crosscutting Concepts
Developing and Using Models Modeling in 9–12 builds on K–8 and progresses to using, synthesizing, and developing models to predict and show relationships among variables between systems and their components in the natural and designed worlds. ▪ Develop and use a model based on evidence to illustrate the relationships between systems	**PS3.A: Definitions of Energy** ▪ Energy is a quantitative property of a system that depends on the motion and interactions of matter and radiation within that system. That there is a single quantity called energy is due to the fact that a system's total energy is conserved, even as, within the system, energy is continually transferred from one object to another and between its various possible forms. (PSI-PS3-1, PS-PS3-2)	**Systems and System Models** ▪ When investigating or describing a system, the boundaries and initial conditions of the system need to be defined and their inputs and outputs analyzed and described using models. (PSI-PS3-4) ▪ Models can be used to predict the behavior of a system, but these predictions have limited precision and reliability due to the assumptions and

or between components of a system. (PS-PS3-2) **Planning and Carrying Out Investigations** Planning and carrying out investigations to answer questions or test solutions to problems in 9–12 builds on K–8 experiences and progresses to include investigations that provide evidence for and test conceptual, mathematical, physical, and empirical models. ▪ Plan and conduct an investigation individually and collaboratively to produce data to serve as the basis for evidence, and in the design: decide on types, how much, and accuracy of data needed to produce reliable measurements and consider limitations on the precision of the data (e.g., number of trials, cost, risk, time), and refine the design accordingly. (PSI-PS3-4) **Using Mathematics and Computational Thinking** Mathematical and computational thinking at the 9–12 level builds on K–8 and progresses to using algebraic thinking and analysis, a range of linear and nonlinear functions including trigonometric functions, exponentials and logarithms, and computational tools for statistical analysis to analyze, represent, and model data. Simple computational simulations are created and used based on mathematical models of basic assumptions. ▪ Create a computational model or simulation of a phenomenon, designed device, process, or system. (PSI-PS3-1) **Constructing Explanations and Designing Solutions** Constructing explanations and designing solutions in 9–12 builds on K–8 experiences and progresses to explanations and designs that are supported by multiple and independent student-generated sources of evidence	▪ At the macroscopic scale, energy manifests itself in multiple ways, such as in motion, sound, light, and thermal energy. (PSI-PS3-2, PSI-PS3-3) ▪ These relationships are better understood at the microscopic scale, at which all of the different manifestations of energy can be modeled as a combination of energy associated with the motion of particles and energy associated with the configuration (relative position of the particles). In some cases the relative position energy can be thought of as stored in fields (which mediate interactions between particles). This last concept includes radiation, a phenomenon in which energy stored in fields moves across space. (PSI-PS3-2) **PS3.B: Conservation of Energy and Energy Transfer** ▪ Conservation of energy means that the total change of energy in any system is always equal to the total energy transferred into or out of the system. (PSI-PS3-1) ▪ Energy cannot be created or destroyed, but it can be transported from one place to another and transferred between systems. (PSI-PS3-1,PSI-PS3-4) ▪ Mathematical expressions, which quantify how the stored energy in a system depends on its configuration (e.g. relative positions of charged particles, compression of a spring) and how kinetic energy depends on mass and speed, allow the concept of conservation of energy to be used to predict and describe system behavior. (PSI-PS3-1) ▪ The availability of energy limits what can occur in any system. (PSI-PS3-1) ▪ Uncontrolled systems always evolve toward more stable states—that is, toward more uniform energy distribution (e.g., water flows downhill, objects hotter than their surrounding environment cool down). (PSI-PS3-4) **PS3.D: Energy in Chemical Processes** ▪ Although energy cannot be destroyed, it can be converted to less useful forms—	approximations inherent in models. (PSI-PS3-1) **Energy and Matter** ▪ Changes of energy and matter in a system can be described in terms of energy and matter flows into, out of, and within that system. (PSI-PS3-3) ▪ Energy cannot be created or destroyed—only moves between one place and another place, between objects and/or fields, or between systems. (PSI-PS3-2) -- **Connections to Engineering, Technology, and Applications of Science** **Influence of Science, Engineering, and Technology on Society and the Natural World** ▪ Modern civilization depends on major technological systems. Engineers continuously modify these technological systems by applying scientific knowledge and engineering design practices to increase benefits while decreasing costs and risks. (PSI-PS3-3) ▪ New technologies can have deep impacts on society and the environment, including some that were not anticipated. Analysis of costs and benefits is a critical aspect of decisions about technology. (PSI4-ETS1-3) -- **Connections to Nature of Science** **Scientific Knowledge Assumes an Order and Consistency in Natural Systems**

consistent with scientific ideas, principles, and theories. ▪ Design, evaluate, and/or refine a solution to a complex real-world problem, based on scientific knowledge, student-generated sources of evidence, prioritized criteria, and tradeoff considerations. (PSI-PS3-3) ▪ Evaluate a solution to a complex real-world problem, based on scientific knowledge, student-generated sources of evidence, prioritized criteria, and tradeoff considerations. (PSI4-ETS1-3)	for example, to thermal energy in the surrounding environment. (PSI-PS3-3,PSI-PS3-4) **ETS1.A: Defining and Delimiting Engineering Problems** ▪ Criteria and constraints also include satisfying any requirements set by society, such as taking issues of risk mitigation into account, and they should be quantified to the extent possible and stated in such a way that one can tell if a given design meets them. (PSI-PS3-3) **ETS1.B: Developing Possible Solutions** ▪ When evaluating solutions, it is important to take into account a range of constraints, including cost, safety, reliability, and aesthetics, and to consider social, cultural, and environmental impacts. (PSI4-ETS1-3)	▪ Science assumes the universe is a vast single system in which basic laws are consistent. (PSI-PS3-1)

Connections to other DCIs in this course: **PSI.PS1.A** (PSI-PS3-2); **PSI.PS1.B** (PSI-PS3-1,PSI-PS3-2); **PSI.PS2.B** (PSI-PS3-2); **PSI.LS2.B** (PSI-PS3-1); **PSI.ESS2.D** (PSI-PS3-4); **PSI.ESS3.A** (PSI-PS3-3)

Connections to DCIs across grade-bands: **7.PS1.A** (PSI-PS3-2); **8.PS2.B** (PSI-PS3-2); **8.PS3.A** (PSI-PS3-1,PSI-PS3-2,PSI-PS3-3); **6.PS3.B** (PSI-PS3-1,PSI-PS3-3,PSI-PS3-4); **6.PS3.C** (PSI-PS3-2); **7.ESS2.A** (PSI-PS3-1,PSI-PS3-3); **6-8.ETS1.A** (PSI4-ETS1-3); **6-8.ETS1.B** (PSI4-ETS1-3)

Connections to the Arkansas Disciplinary Literacy Standards:

RST.11-12.1 Cite specific textual evidence to support analysis of science and technical texts, attending to important distinctions the author makes and to any gaps or inconsistencies in the account. (PSI-PS3-4)

RST.11-12.7 Integrate and evaluate multiple sources of information presented in diverse formats and media (e.g., quantitative data, video, multimedia) in order to address a question or solve a problem. (PSI4-ETS1-3)

RST.11-12.8 Evaluate the hypotheses, data, analysis, and conclusions in a science or technical text, verifying the data when possible and corroborating or challenging conclusions with other sources of information. (PSI4-ETS1-3)

RST.11-12.9 Synthesize information from a range of sources (e.g., texts, experiments, simulations) into a coherent understanding of a process, phenomenon, or concept, resolving conflicting information when possible. (PSI-ETS1-3)

WHST.9-12.7 Conduct short as well as more sustained research projects to answer a question (including a self-generated question) or solve a problem; narrow or broaden the inquiry when appropriate; synthesize multiple sources on the subject, demonstrating understanding of the subject under investigation. (PSI-PS3-3, PSI-PS3-4)

WHST.11-12.8 Gather relevant information from multiple authoritative print and digital sources, using advanced searches effectively; assess the strengths and limitations of each source in terms of the specific task, purpose, and audience; integrate information into the text selectively to maintain the flow of ideas, avoiding plagiarism and overreliance on any one source and following a standard format for citation. (PSI-PS3-4)

WHST.9-12.9 Draw evidence from informational texts to support analysis, reflection, and research. (PSI-PS3-4)

Connections to the Arkansas English Language Arts Standards:

SL.11-12.5 Make strategic use of digital media (e.g., textual, graphical, auditory, visual, and interactive elements) in presentations to enhance understanding of findings, reasoning, and evidence and to add interest. (PSI-PS3-1,PSI-PS3-2)

Connections to the Arkansas Mathematics Standards:

MP.2 Reason abstractly and quantitatively. (PSI-PS3-1,PSI-PS3-2,PSI-PS3-3,PSI-PS3-4,PSI4-ETS1-3)

MP.4	Model with mathematics. (PSI-PS3-1,PSI-PS3-2,PSI-PS3-3,PSI-PS3-4,PSI4-ETS1-3)
HSN.Q.A.1	Use units as a way to understand problems and to guide the solution of multi-step problems; choose and interpret units consistently in formulas; choose and interpret the scale and the origin in graphs and data displays. (PSI-PS3-1,PSI-PS3-3)
HSN.Q.A.2	Define appropriate quantities for the purpose of descriptive modeling. (PSI-PS3-1,PSI-PS3-3)
HSN.Q.A.3	Choose a level of accuracy appropriate to limitations on measurement when reporting quantities. (PSI-PS3-1,PSI-PS3-3)

Topic 5: Waves

Students who demonstrate understanding can:

PSI-PS4-1 Use mathematical representations to support a claim regarding relationships among the frequency, wavelength, and speed of waves traveling in various media. [AR Clarification Statement: This PE is partially addressed in this course. Examples of data could include seismic waves and sound waves traveling through air and water.] [AR Assessment Boundary: Assessment is limited to describing relationships qualitatively.]

PSI-PS4-2 Evaluate questions about the advantages of using a digital transmission and storage of information. [Clarification Statement: Examples of advantages could include that digital information is stable because it can be stored reliably in computer memory, transferred easily, and copied and shared rapidly. Disadvantages could include issues of easy deletion, security, and theft.]

PSI-5-ETS1-2
Design a solution to a complex real-world problem by breaking it down into smaller, more manageable problems that can be solved through engineering. [AR Clarification Statement: Examples of possible problems could be cell phone reception, emergency radio transmission, and earthquake notification.]

The performance expectations above were developed using the following elements from the NRC document *A Framework for K-12 Science Education*:

Science and Engineering Practices

Asking Questions and Defining Problems
Asking questions and defining problems in grades 9–12 builds from grades K–8 experiences and progresses to formulating, refining, and evaluating empirically testable questions and design problems using models and simulations.
- Evaluate questions that challenge the premise(s) of an argument, the interpretation of a data set, or the suitability of a design. (PSI-PS4-2)

Using Mathematics and Computational Thinking
Mathematical and computational thinking at the 9-12 level builds on K-8 and progresses to using algebraic thinking and analysis, a range of linear and nonlinear functions including trigonometric functions, exponentials and logarithms, and computational tools for statistical analysis to analyze, represent, and model data. Simple computational simulations are created and used based on mathematical models of basic assumptions.
- Use mathematical representations of phenomena or design solutions to describe and/or support claims and/or explanations. (PSI-PS4-1)

Constructing Explanations and Designing Solutions
Constructing explanations and designing solutions in 9–12 builds on K–8 experiences

Disciplinary Core Ideas

PS4.A: Wave Properties
- The wavelength and frequency of a wave are related to one another by the speed of travel of the wave, which depends on the type of wave and the medium through which it is passing. (PSI-PS4-1)
- Information can be digitized (e.g., a picture stored as the values of an array of pixels); in this form, it can be stored reliably in computer memory and sent over long distances as a series of wave pulses. (PSI-PS4-2)

ETS1.C: Optimizing the Design Solution
- Criteria may need to be broken down into simpler ones that can be approached systematically, and decisions about the priority of certain criteria over others (trade-offs) may be needed. (PSI5-ETS1-2)

Crosscutting Concepts

Cause and Effect
- Empirical evidence is required to differentiate between cause and correlation and make claims about specific causes and effects. (PSI-PS4-1)

Stability and Change
- Systems can be designed for greater or lesser stability. (PSI-PS4-2)

Connections to Engineering, Technology, and Applications of Science

Influence of Engineering, Technology, and Science on Society and the Natural World
- Modern civilization depends on major technological systems. (PSI-PS4-2)
- Engineers continuously modify these technological systems by applying scientific

and progresses to explanations and designs that are supported by multiple and independent student-generated sources of evidence consistent with scientific ideas, principles and theories. ▪ Design a solution to a complex real-world problem, based on scientific knowledge, student-generated sources of evidence, prioritized criteria, and tradeoff considerations. (PSI5-ETS1-2)		knowledge and engineering design practices to increase benefits while decreasing costs and risks. (PSI-PS4-2)

Connections to other DCIs in this course: N/A

Connections to DCIs across grade-bands: **8.PS4.A** (PSI-PS4-1,PSII-PS4-2); **8.PS4.B** (PS-PS4-1,PSI-PS4-2); **8.PS4.C** (PSI-PS4-2); **6-8.ETS1.A** (PSI5-ETS1-2); **6-8.ETS1.B** (PSI5-ETS1-2); **6-8.ETS1.C** (PSI5-ETS1-2);

Connections to the Arkansas Disciplinary Literacy Standards:

RST.9-10.8 Assess the extent to which the reasoning and evidence in a text support the author's claim or a recommendation for solving a scientific or technical problem. (PSI-PS4-2)

RST.11-12.1 Cite specific textual evidence to support analysis of science and technical texts, attending to important distinctions the author makes and to any gaps or inconsistencies in the account. (PSI-PS4-2)

RST.11-12.7 Integrate and evaluate multiple sources of information presented in diverse formats and media (e.g., quantitative data, video, multimedia) in order to address a question or solve a problem. (PS-PS4-1)

RST.11-12.8 Evaluate the hypotheses, data, analysis, and conclusions in a science or technical text, verifying the data when possible and corroborating or challenging conclusions with other sources of information. (PSI-PS4-2)

Connections to the Arkansas Mathematics Standards:

MP.2 Reason abstractly and quantitatively. (PSI-PS4-1)

MP.4 Model with mathematics. (PSI-PS4-1,PSI5-ETS1-2)

HSA.SSE.A.1 Interpret expressions that represent a quantity in terms of its context. (PSI-PS4-1)

HSA.SSE.B.3 Choose and produce an equivalent form of an expression to reveal and explain properties of the quantity represented by the expression; factor a quadratic expressions to reveal the zeros of the function it defines; complete the square in a quadratic expression to reveal the maximum and minimum value of the function it defines; use the properties of exponents to transform expressions for exponential functions. (PSI-PS4-1)

HSA.CED.A.4 Rearrange literal equations using properties of equality. (PSI-PS4-1)

Topic 6: Interactions of Humans and the Environment

Students who demonstrate understanding can:

PSI-LS2-7 Design, evaluate, and refine a solution for reducing the impacts of human activities on the environment and biodiversity.* [AR Clarification Statement: This PE is partially addressed in this course. Examples of human activities could include urbanization, fracking, greenhouse gases and dams. [AR Assessment Boundary: Assessment is to include student choice from multiple scenarios.]

PSI-LS4-5 Evaluate the evidence supporting claims that changes in environmental conditions may result in: (1) increases in the number of individuals of some species, (2) the emergence of new species over time, and (3) the extinction of other species. [AR Clarification Statement: This PE is partially addressed in this course. Emphasis is on physical changes to the environment (temperature change and acidification).]

PSI-ESS2-1 Develop a model to illustrate how Earth's internal and surface processes operate at different spatial and temporal scales to form continental and ocean-floor features. [AR Clarification Statement: Emphasis is on how the appearance of land features (mountains, valleys, and plateaus) and sea floor features (trenches, ridges, and seamounts) are a result of both constructive forces (volcanism, tectonic uplift, and orogeny) and destructive mechanisms (weathering, mass wasting, and coastal erosion).

PSI-ESS3-1 Construct an explanation based on evidence for how the availability of natural resources, occurrence of natural hazards, and changes in climate have influenced human activity. [AR Clarification Statement: This PE is partially addressed in this course. Emphasis in this course is on key natural resources. Examples could include access to fresh water (rivers, lakes, and groundwater), regions of fertile soils (river deltas) and high concentrations of minerals and fossil fuels. Examples of natural hazards could be from interior processes (volcanic eruptions), surface processes (tsunamis, mass wasting, and soil erosion), and severe weather (hurricanes, floods, and droughts). Examples of the results of changes in climate that could affect populations or drive mass migrations include changes to sea level and regional patterns of temperature and precipitation.]

PSI-ESS3-2 Evaluate competing design solutions for developing, managing, and utilizing energy and mineral resources based on cost-benefit ratios.* [AR Clarification Statement: This PE is partially addressed in this course. Emphasis in this course is on identifying possible problems to be solved (conservation, recycling, and on minimizing impacts).]

PSI6-ETS1-1
Analyze a major global challenge to specify qualitative and quantitative criteria and constraints for solutions that account for societal needs and wants. [AR Clarification Statement: Examples could include research and analysis of the spread of zebra mussels, decline of chestnut trees, and the impact of fracking.]

PSI6-ETS1-2
Design a solution to a complex real-world problem by breaking it down into smaller, more manageable problems that can be solved through engineering. [AR Clarification Statement: Examples of design challenges could include solving man-made erosion problems, reducing thermal/light pollution, and safe disposal of fracking waste fluids.]

PSI6-ETS1-3
Evaluate a solution to a complex real-world problem based on prioritized criteria and trade-offs that account for a range of constraints, including cost, safety, reliability, and aesthetics, as well as possible social, cultural, and environmental impacts. [AR Clarification Statement: Examples could be the environmental effects of certain plastics (cost, safety, biodegradability, and recyclability) and evaluating the tradeoffs for each source of energy production.]

PSI6-ETS1-4
Use a computer simulation to model the impact of proposed solutions to a complex real-world problem with numerous criteria and constraints on interactions within and between systems relevant to the problem. [AR Clarification Statement: Examples of possible simulations could include spreadsheet analysis or other computer interfaces. Examples of possible computer simulation resources could include PhET, ArcGIS, and InTeGrate-SERC.]

The performance expectations above were developed using the following elements from the NRC document *A Framework for K-12 Science Education*:

Science and Engineering Practices	Disciplinary Core Ideas	Crosscutting Concepts
Engaging in Argument from Evidence Engaging in argument from evidence in 9-12 builds on K-8 experiences and progresses to using appropriate and sufficient evidence and scientific reasoning to defend and critique claims and explanations about the natural and designed world(s). Arguments may also come from current or historical episodes in science. ▪ Evaluate the evidence behind currently accepted explanations or solutions to determine the merits of arguments. (PSI-LS4-5) ▪ Evaluate competing design solutions to a real-world problem based on scientific ideas and principles, empirical evidence, and logical arguments regarding relevant factors (e.g. economic, societal, environmental, ethical considerations). (PSI-ESS3-2) **Asking Questions and Defining Problems** Asking questions and defining problems in 9–12 builds on K–8 experiences and progresses to formulating, refining, and evaluating empirically testable questions and design problems using models and simulations. ▪ Analyze complex real-world problems by specifying criteria and constraints for successful solutions. (PSI6-ETS1-1) **Using Mathematics and Computational Thinking** Mathematical and computational thinking in 9-12 builds on K-8 experiences and progresses to using algebraic thinking and analysis, a range of linear and nonlinear functions including trigonometric functions, exponentials and logarithms, and computational tools for statistical analysis to analyze, represent, and model data. Simple computational simulations are created and used based on mathematical models of basic	**LS2.C: Ecosystem Dynamics, Functioning, and Resilience** ▪ Moreover, anthropogenic changes (induced by human activity) in the environment—including habitat destruction, pollution, introduction of invasive species, overexploitation, and climate change—can disrupt an ecosystem and threaten the survival of some species. (PSI-LS2-7) **LS4.C: Adaptation** ▪ Changes in the physical environment, whether naturally occurring or human induced, have thus contributed to the expansion of some species, the emergence of new distinct species as populations diverge under different conditions, and the decline–and sometimes the extinction–of some species. (PSI-LS4-5) ▪ Species become extinct because they can no longer survive and reproduce in their altered environment. If members cannot adjust to change that is too fast or drastic, the opportunity for the species' evolution is lost. (PSI-LS4-5) **LS4.D: Biodiversity and Humans** ▪ Biodiversity is increased by the formation of new species (speciation) and decreased by the loss of species (extinction). (PSI-LS2-7) ▪ Humans depend on the living world for the resources and other benefits provided by biodiversity. But human activity is also having adverse impacts on biodiversity through overpopulation, overexploitation, habitat destruction, pollution, introduction of invasive species, and climate change. Thus sustaining biodiversity so that ecosystem functioning and productivity are maintained is essential to supporting and enhancing life on Earth. Sustaining biodiversity also aids humanity by preserving landscapes of recreational or inspirational value. (PSI-LS2-7) **ESS2.A: Earth Materials and Systems** ▪ Earth's systems, being dynamic and interacting, cause feedback effects	**Stability and Change** ▪ Much of science deals with constructing explanations of how things change and how they remain stable. (PSI-LS2-6) **Cause and Effect** ▪ Empirical evidence is required to differentiate between cause and correlation and make claims about specific causes and effects. (PSI-LS4-5, PSI-ESS3-1) **Systems and System Models** ▪ Models (e.g., physical, mathematical, computer models) can be used to simulate systems and interactions—including energy, matter, and information flows— within and between systems at different scales. (PSI6-ETS1-4) ------------------------------------- **Connections to Engineering, Technology, and Applications of Science** **Influence of Science, Engineering, and Technology on Society and the Natural World** ▪ Engineers continuously modify these technological systems by applying scientific knowledge and engineering design practices to increase benefits while decreasing costs and risks. (PSI-ESS3-2) ▪ Analysis of costs and benefits is a critical

assumptions. ▪ Use mathematical models and/or computer simulations to predict the effects of a design solution on systems and/or the interactions between systems. (PSI6-ETS1-4) **Constructing Explanations and Designing Solutions** Constructing explanations and designing solutions in 9–12 builds on K–8 experiences and progresses to explanations and designs that are supported by multiple and independent student-generated sources of evidence consistent with scientific ideas, principles and theories. ▪ Construct an explanation based on valid and reliable evidence obtained from a variety of sources (including students' own investigations, models, theories, simulations, peer review) and the assumption that theories and laws that describe the natural world operate today as they did in the past and will continue to do so in the future. (PSI-ESS3-1) ▪ Design, evaluate, and refine a solution to a complex real-world problem, based on scientific knowledge, student-generated sources of evidence, prioritized criteria, and tradeoff considerations. (PSI-LS2-7) ▪ Design a solution to a complex real-world problem, based on scientific knowledge, student-generated sources of evidence, prioritized criteria, and tradeoff considerations. (PSI6-ETS1-2) ▪ Evaluate a solution to a complex real-world problem, based on scientific knowledge, student-generated sources of evidence, prioritized criteria, and tradeoff considerations. (PSI6-ETS1-3)	that can increase or decrease the original changes. (PSI-ESS2-1) **ESS3.A: Natural Resources** ▪ Resource availability has guided the development of human society. (PSI-ESS3-1) ▪ All forms of energy production and other resource extraction have associated economic, social, environmental, and geopolitical costs and risks as well as benefits. New technologies and social regulations can change the balance of these factors. (PSI-ESS3-2) **ESS3.B: Natural Hazards** ▪ Natural hazards and other geologic events have shaped the course of human history; [they] have significantly altered the sizes of human populations and have driven human migrations. (PSI-ESS3-1) **ETS1.A: Defining and Delimiting Engineering Problems** ▪ Criteria and constraints also include satisfying any requirements set by society, such as taking issues of risk mitigation into account, and they should be quantified to the extent possible and stated in such a way that one can tell if a given design meets them. (PSI6-ETS1-1) ▪ Humanity faces major global challenges today, such as the need for supplies of clean water and food or for energy sources that minimize pollution, which can be addressed through engineering. These global challenges also may have manifestations in local communities. (PSI6-ETS1-1) **ETS1.B: Developing Possible Solutions** ▪ When evaluating solutions, it is important to take into account a range of constraints, including cost, safety, reliability, and aesthetics, and to consider social, cultural, and environmental impacts. (PSI-LS2-7, PSI-ESS3-2, PSI6-ETS1-3) ▪ Both physical models and computers can be used in various ways to aid in the engineering design process. Computers are useful for a variety of purposes, such as running simulations to test different ways of solving a problem or to see which one is most efficient or economical; and in making a persuasive presentation to a client about how a	aspect of decisions about technology. (PSI-ESS3-2) ▪ New technologies can have deep impacts on society and the environment, including some that were not anticipated. Analysis of costs and benefits is a critical aspect of decisions about technology. (PSI6-ETS1-1, PSI6-ETS1-3) ------------------------------------ **Connections to Nature of Science** **Science Addresses Questions About the Natural and Material World** ▪ Science and technology may raise ethical issues for which science, by itself, does not provide answers and solutions. (PSI-ESS3-2) ▪ Science knowledge indicates what can happen in natural systems—not what should happen. The latter involves ethics, values, and human decisions about the use of knowledge. (PSI-ESS3-2) Many decisions are not made using science alone, but rely on social and cultural contexts to resolve issues. (PSI-ESS3-2)

	given design will meet his or her needs. (PSI6-ETS1-4) **ETS1.C: Optimizing the Design Solution** ▪ Criteria may need to be broken down into simpler ones that can be approached systematically, and decisions about the priority of certain criteria over others (trade-offs) may be needed. (PSI6-ETS1-2)	

Connections to other DCIs in this course: **PSI.PS3.B** (PSI-ESS3-2); **PSI.PS3.D** (PSI-ESS3-2); **PSI.LS2.B** (PS-ESS3-2); **PSI.LS3.B** (PSI-LS4-5); **PSI.ESS2.D** (PSI-LS2-7); **PSI.ESS2.E** (PSI-LS2-7, PSI-LS4-5); **PSI.ESS3.A** (PSI-LS2-7, PSI-LS4-5)

Connections to DCIs across grade-bands: **6.PS3.D** (PSI-ESS3-2); **7.LS2.A** (PSI-LS4-5, PSI-ESS3-1, PSII-ESS3-2); **7.LS2.B** (PS-ESS3-2); **7.LS2.C** (PSI-LS2-7, PSI-LS4-5); **8.LS4.C** (PSI-LS4-5); **7.LS4.D** (PSI-ESS3-1, PSI-ESS3-2); **7.ESS2.A** (PSI-ESS3-1); **7.ESS3.A** (PSI-ESS3-1, PSI-ESS3-2); **7.ESS3.B** (PSI-ESS3-1); **6.ESS3.C** (PS-LS2-7, PSI-LS4-5, PSI-ESS3-2); **6.ESS3.D** (PSI-LS2-7); **6-8.ETS1.A** (PSI-ETS1-1, PSI6-ETS1-2, PSI6-ETS1-3, PSI6-ETS1-4);
6-8.ETS1.B (PSI6-ETS1-2, PSI6-ETS1-3, PSI6-ETS1-4); **6-8.ETS1.C** (PSI6-ETS1-2, PSI6-ETS1-4)

Connections to the Arkansas Disciplinary Literacy Standards:

RST.9-10.8 Assess the extent to which the reasoning and evidence in a text support the author's claim or a recommendation for solving a scientific or technical problem. (PSI-LS2-7)

RST.11-12.1 Cite specific textual evidence to support analysis of science and technical texts, attending to important distinctions the author makes and to any gaps or inconsistencies in the account. (PSI-ESS3-1,PSI-ESS3-2)

RST.11-12.7 Integrate and evaluate multiple sources of information presented in diverse formats and media (e.g., quantitative data, video, multimedia) in order to address a question or solve a problem. (PSI-LS2-7, PSI6-ETS1-1, PSI6-ETS1-3)

RST.11-12.8 Evaluate the hypotheses, data, analysis, and conclusions in a science or technical text, verifying the data when possible and corroborating or challenging conclusions with other sources of information. (PSI-LS2-7, PSI-LS4-5, PSI-ESS3-2, PSI6-ETS1-1, PSI6-ETS1-3)

RST.11-12.9 Synthesize information from a range of sources (e.g., texts, experiments, simulations) into a coherent understanding of a process, phenomenon, or concept, resolving conflicting information when possible. (PSI6-ETS1-1, PSI6-ETS1-3)

WHST.9-12.2 Write informative/explanatory texts, including the narration of historical events, scientific procedures/ experiments, or technical processes. (PSI-ESS3-1)

WHST.9-12.9 Draw evidence from informational texts to support analysis, reflection, and research. (PSI-LS4-5)

Connections to the Arkansas Mathematics Standards:

MP.2 Reason abstractly and quantitatively. (PSI-LS2-7), PSI-LS4-5, PSI-ESS3-1, PSI-ESS3-2, PSI6-ETS1-1, PSI6-ETS1-3, PSI6-ETS1-4)

MP.4 Model with mathematics. (PSI6-ETS1-1, PSI6-ETS1-2, PSI6-ETS1-3, PSI6-ETS1-4)

HSN.Q.A.1 Use units as a way to understand problems and to guide the solution of multi-step problems; choose and interpret units consistently in formulas; choose and interpret the scale and the origin in graphs and data displays. (PSI-LS2-7, PSI-ESS3-1)

HSN.Q.A.2 Define appropriate quantities for the purpose of descriptive modeling. (PSI-LS2-7, PSI-ESS3-1)

HSN.Q.A.3 Choose a level of accuracy appropriate to limitations on measurement when reporting quantities. (PSI-LS2-7, PSI-ESS3-1)

Contributors

The following educators contributed to the development of this course:

Susan Allison – Benton School District	Steven Long – Rogers School District
Angela Bassham – Salem School District	Brandon Lucius – Osceola School District
Allison Belcher – Little Rock School District	Matt Martin – Centerpoint School District
Debbie Bilyeu – Arkansas AIMS	Patti Meeks – Hamburg School District
Tami Blair – Texarkana School District	Melissa Miller – Farmington School District
Stephen Brodie – University of Arkansas at Fort Smith STEM Center	Jim Musser – Arkansas Tech University
Stephanie Brown – Quitman School District	Nanette Nichols – Wilbur D. Mills AR Education Cooperative
Sarah Croswell – Virtual Arkansas	John Nilz – North Little Rock School District
Tami Eggensperger – Cabot School District	Dennis Pevey – eSTEM Public Charter School
Jenna Gill – Siloam Springs School District	Tami Philyaw – Smackover – Norphlet School District
Douglas Hammon – Little Rock School District	Kathy Prophet – Springdale School District
Keith Harris – University of Arkansas at Little Rock Partnership for STEM Education	Carrie Shell – Highland School District
Lynne Hehr – University of Arkansas at Fayetteville STEM Center for Math and Science Education –	Will Squires – Caddo Hills School District
Leonda Holthoff – Star City School District	Eddie Tucker – Hamburg School District
Courtney Jones – Lincoln Consolidated School District	Jon White – Harding University
Rebecca Koelling – Highland School District	Andrew Williams – University of Arkansas at Monticello
Karen Ladd – Nettleton School District	Wendi J.W. Williams – Northwest Arkansas Community College
John Levy – North Arkansas College	Cathy Wissehr – University of Arkansas at Fayetteville

ARKANSAS
K-12 SCIENCE STANDARDS
EDUCATION FOR A NEW GENERATION

Physics

2016

Table of Contents

Notes:

1. Student Performance Expectations (PEs) may be taught in any sequence or grouping within a grade level. Several PEs are described as being "partially addressed in this course" because the same PE is revisited in a subsequent course during which that PE is fully addressed.
2. An asterisk (*) indicates an engineering connection to a practice, core idea, or crosscutting concept.
3. The Performance Expectation codes ending in AR indicate Arkansas-specific standards.
4. The Clarification Statements are examples and additional guidance for the instructor. AR indicates Arkansas-specific Clarification Statements.
5. The Assessment Boundaries delineate content that may be taught but not assessed in large-scale assessments. AR indicates Arkansas-specific Assessment Boundaries.
6. The section entitled "foundation boxes" is reproduced verbatim from *A Framework for K-12 Science Education: Practices, Crosscutting Concepts, and Core Ideas*. Integrated and reprinted with permission from the National Academy of Sciences.
7. The examples given (e.g.,) are suggestions for the instructor.
8. Throughout this document, connections are provided to the nature of science as defined by *A Framework for K-12 Science Education* (NRC 2012).
9. Throughout this document, connections are provided to Engineering, Technology, and Applications of Science as defined by *A Framework for K-12 Science Education* (NRC 2012).
10. Each set of PEs lists connections to other disciplinary core ideas (DCIs) within the Arkansas K-12 Science Standards and to the Arkansas English Language Arts Standards, Arkansas Disciplinary Literacy Standards, and the Arkansas Mathematics Standards.

Arkansas K-12 Science Standards Overview

The Arkansas K-12 Science Standards are based on *A Framework for K-12 Science Education* (NRC 2012) and are meant to reflect a new vision for science education. The following conceptual shifts reflect what is new about these science standards. The Arkansas K-12 Science Standards

- reflect science as it is practiced and experienced in the real world,
- build logically from Kindergarten through Grade 12,
- focus on deeper understanding as well as application of content,
- integrate practices, crosscutting concepts, and core ideas, and
- make explicit connections to literacy and math.

As part of teaching the *Arkansas K-12 Science Standards*, it will be important to instruct and guide students in adopting appropriate safety precautions for their student-directed science investigations. Reducing risk and preventing accidents in science classrooms begin with planning. There are four recommended steps in carrying out a hazard and risk assessment for any planned lab investigation.

1) Identify all hazards. Hazards may be physical, chemical, health, or environmental.
2) Evaluate the type of risk associated with each hazard.
3) Write the procedure and all necessary safety precautions in such a way as to eliminate or reduce the risk associated with each hazard.
4) Prepare for any emergency that might arise in spite of all of the required safety precautions.

According to Arkansas Code Annotated § 6-10-113 (2012) for eye protection, every student and teacher in public schools participating in any chemical or combined chemical-physical laboratories involving caustic or explosive chemicals or hot liquids or solids is required to wear industrial-quality eye protective devices (eye goggles) at all times while participating in science investigations.

The Arkansas K-12 Science Standards outline the knowledge and science and engineering practices that all students should learn by the end of high school. The standards are three-dimensional because each student performance expectation engages students at the nexus of the following three dimensions.

- Dimension 1 describes scientific and engineering practices.
- Dimension 2 describes crosscutting concepts, overarching science concepts that apply across science disciplines.
- Dimension 3 describe core ideas in the science disciplines.

The Science and Engineering Practices

The eight practices describe the major practices that scientists use to investigate, build models and theories of the world around them or engineers use as they build and design systems. The practices are essential for all students to learn and are as follows:

1. Asking questions (for science) and defining problems (for engineering)
2. Developing and using models
3. Planning and carrying out investigations
4. Analyzing and interpreting data
5. Using mathematics and computational thinking
6. Constructing explanations (for science) and designing solutions (for engineering)
7. Engaging in argument from evidence
8. Obtaining, evaluating, and communicating information

Crosscutting Concepts

The seven crosscutting concepts bridge disciplinary boundaries and unit core ideas throughout the fields of science and engineering. Their purpose is to help students deepen their understanding of the disciplinary core ideas, and develop a coherent, and scientifically based view of the world. The seven crosscutting concepts are as follows:
1. *Patterns.* Observed patterns of forms and events guide organization and classification, and they prompt questions about relationships and the factors that influence them.
2. *Cause and effect: Mechanism and explanation*. Events have causes, sometimes simple, sometimes multifaceted. A major activity of science is investigating and explaining causal relationships and the mechanisms by which they are mediated. Such mechanisms can then be tested across given contexts and used to predict and explain events in new contexts.
3. *Scale, proportion, and quantity.* In considering phenomena, it is critical to recognize what is relevant at different measures of size, time, and energy and to recognize how changes in scale, proportion, or quantity affect a system's structure or performance.
4. *Systems and system models.* Defining the system under study—specifying its boundaries and making explicit a model of that system—provides tools for understanding and testing ideas that are applicable throughout science and engineering.
5. *Energy and matter: Flows, cycles, and conservation.* Tracking fluxes of energy and matter into, out of, and within systems helps one understand the systems' possibilities and limitations.
6. *Structure and function.* The way in which an object or living thing is shaped and its substructure determine many of its properties and functions.
7. *Stability and change.* For natural and built systems alike, conditions of stability and determinants of rates of change or evolution of a system are critical elements of study.

Disciplinary Core Ideas

The Disciplinary Core Ideas describe the content that occurs at each grade or course. The Arkansas K-12 Science Standards focus on a limited number of core ideas in science and engineering both within and across the disciplines and is built on the notion of learning as a developmental progression. The Disciplinary Core Ideas are grouped into the following domains:

- Physical Science (PS)
- Life Science (LS)
- Earth and Space Science (ESS)
- Engineering, Technology and Applications of Science (ETS)

Connections to the Arkansas English Language Arts Standards

Evidence-based reasoning is the foundation of good scientific practice. The Arkansas K-12 Science Standards incorporate reasoning skills used in language arts to help students improve mastery and understanding in all three disciplines. The Arkansas K-8 Science Committee made every effort to align grade-by-grade with the English language arts (ELA) standards so concepts support what students are learning in their entire curriculum. Connections to specific ELA standards are listed for each student performance expectation, giving teachers a blueprint for building comprehensive cross-disciplinary lessons.
The intersections between Arkansas K-12 Science Standards and Arkansas ELA Standards teach students to analyze data, model concepts, and strategically use tools through productive talk and shared activity. Reading in science requires an appreciation of the norms and conventions of the discipline of

science, including understanding the nature of evidence used, an attention to precision and detail, and the capacity to make and assess intricate arguments, synthesize complex information, and follow detailed procedures and accounts of events and concepts. These practice-based standards help teachers foster a classroom culture where students think and reason together, connecting around the subject matter and core ideas.

Connections to the Arkansas Disciplinary Literacy Standards

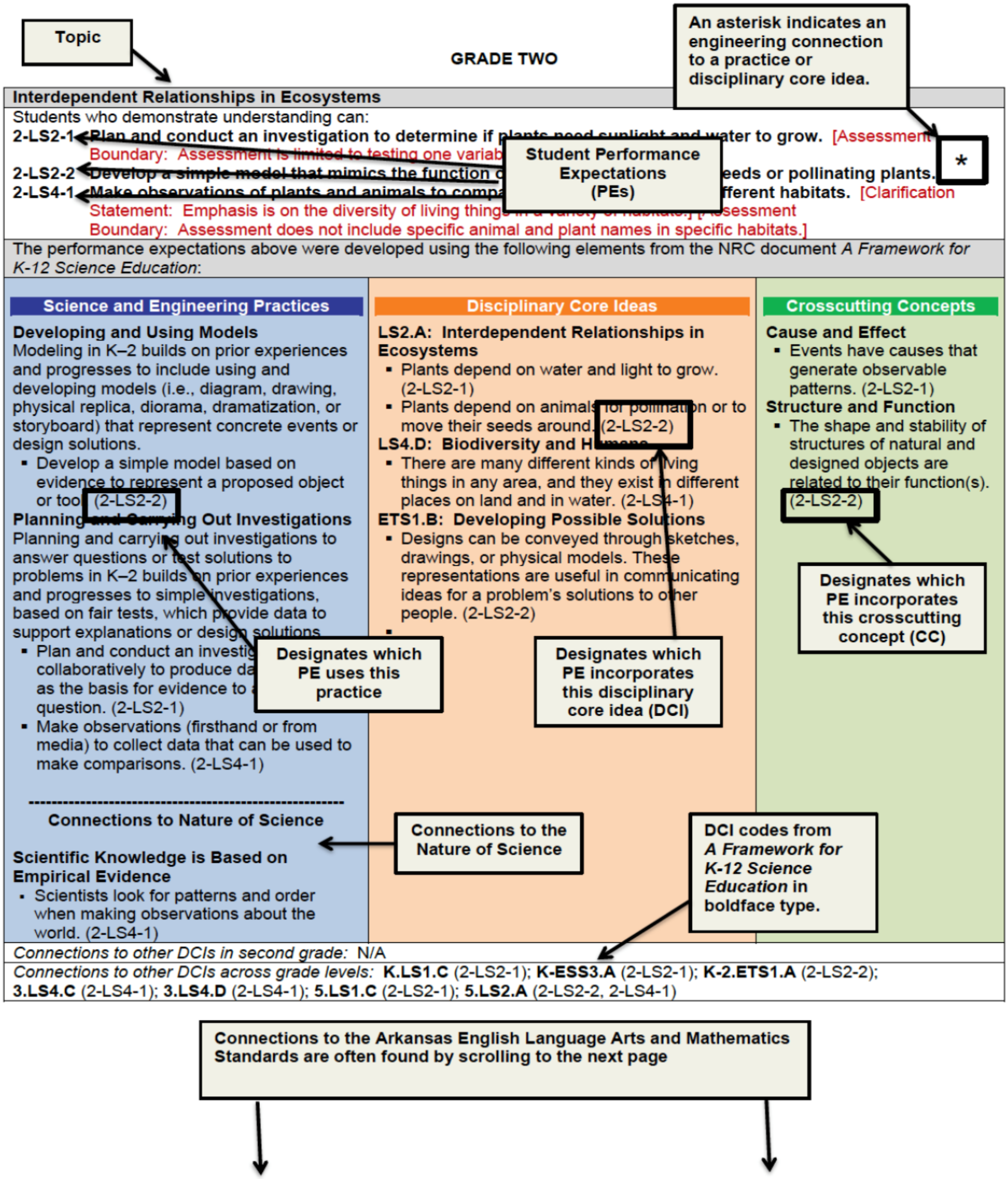
Reading is critical to building knowledge in science. College and career ready reading in science requires an appreciation of the norms and conventions of each discipline, such as the kinds of evidence used in science; an understanding of domain-specific words and phrases; an attention to precise details; and the capacity to evaluate intricate arguments, synthesize complex information, and follow detailed descriptions of events and concepts. When reading scientific and technical texts, students need to be able to gain knowledge from challenging texts that often make extensive use of elaborate diagrams and data to convey information and illustrate concepts. Students must be able to read complex informational texts in science with independence and confidence because the vast majority of reading in college and workforce training programs will be sophisticated nonfiction.

For students, writing is a key means of asserting and defending claims, showing what they know about a science, and conveying what they have experienced, imagined, thought, and felt. To be college and career ready writers, students must take task, purpose, and audience into careful consideration, choosing words, information, structures, and formats deliberately. They need to be able to use technology strategically when creating, refining, and collaborating on writing. They have to become adept at gathering information, evaluating sources, and citing material accurately, reporting finds from their research and analysis of sources in a clear and cogent manner. They must have the flexibility, concentration, and fluency to produce high-quality first-draft text under a tight deadline and the capacity to revisit and make improvements to a piece of writing over multiple drafts when circumstances encourage or require it.

Connections to the Arkansas Mathematics Standards

Science is a quantitative discipline, so it is important for educators to ensure that students' science learning coheres well with their understanding of mathematics. To achieve this alignment, the Arkansas K-12 Science Committee made every effort to ensure that the mathematics standards do not outpace or misalign to the grade-by-grade science standards. Connections to specific math standards are listed for each student performance expectation, giving teachers a blueprint for building comprehensive cross-disciplinary lessons.

How to Read
Arkansas K-12 Science



Physics Learning Progression Chart

Topic 1: Mechanical Physics	Topic 2: Work and Energy	Topic 3: Heat and Thermodynamics	Topic 4: Waves, Sound, and Simple Harmonic Motion	Topic 5: Electricity
P-PS1-1AR P-PS1-2AR AR P-PS2-1 AR P-PS2-2 AR P-ESS1-2 AR P-ESS1-4 AR P1-ETS1-2	P-PS2-1AR P-PS2-2AR P-PS2-3AR P-PS2-4AR P-PS2-5AR P-PS2-6AR AR P2-ETS1-3	AR P-PS3-1 P-PS3-1AR P-PS3-2AR P-PS3-3AR AR P-PS3-3 AR P-PS3-4 AR P3-ETS1-1 AR P3-ETS1-2 AR P3-ETS1-3 AR P3-ETS1-4	P-PS4-1AR P-PS4-2AR P-PS4-3AR AR P4-ETS1-4	AR P-PS2-4 AR P-PS2-5 AR P-PS3-2 P-PS5-1AR P-PS5-2AR P-PS5-3AR AR P5-ETS1-1

Arkansas Clarification Statements (AR)
Arkansas Performance Expectations (AR)

Physics Course Overview

Physics is a science course that continues to develop conceptual understanding of key concepts of physics. The concepts are building upon students' understanding of the core ideas, science and engineering practices, and crosscutting concepts in the chemistry - integrated course. The standards engage students in the investigation of physical laws and application of the principles of physics to address real world problems. Students should develop an understanding of physics as it applies to the world around them and be prepared to enter technical fields or continue their physics education at college level. Candidates for this course are students who have completed chemistry- integrated and are seeking a deeper understanding of physics concepts. Teachers with a physics, physical science, physical/earth, physics/math license or others as approved by ADE are able to teach this course. Students will earn 1 unit of career focus credit.

There are seven topics in physics: 1) Mechanical Physics, (2) Work and Energy, (3) Heat and Thermodynamics, (4) Waves, Sound, and Simple Harmonic Motion, and 5) Electricity.

It should be noted that the physics standards are not intended to be used as curriculum. Instead, the standards are the minimum that students should know and be able to do. Therefore, teachers should continue to differentiate for the needs of their students by adding depth and additional rigor.

Students in physics continue to develop possible solutions for major global problems with engineering design challenges. At the high school level, students are expected to engage with major global issues at the interface of science, technology, society and the environment, and to bring to light the kinds of analytical and strategic thinking that prior training and increased maturity make possible. As in prior levels, these capabilities can be thought of in three stages:

- **Defining the problem** at the high school level requires both qualitative and quantitative analysis. For example, the need to provide food and fresh water for future generations comes into sharp focus when considering the speed at which world population is growing and conditions in countries that have experienced famine. While high school students are not expected to solve these challenges, they are expected to begin thinking about them as problems that can be addressed, at least in part, through engineering.
- **Developing possible solutions** for major global problems begins by breaking them down into smaller problems that can be tackled with engineering methods. To evaluate potential solutions, students are expected to not only consider a wide range of criteria but to also recognize that criteria needs to be prioritized. For example, public safety or environmental protection may be more important than cost or even functionality. Decisions on priorities can then guide tradeoff choices.
- **Improving designs** at the high school level may involve sophisticated methods, such as using computer simulations to model proposed solutions. Students are expected to use such methods to take into account a range of criteria and constraints, anticipate possible societal and environmental impacts, and test the validity of their simulations by comparison to the real world.

Physics Topics Overview

The performance expectations in **Topic 1: Mechanical Physics** help students investigate:

- Vectors
- 1-D Motion
- 2-D Motion
- Rotational Motion
- Projectile Motion
- Newton's Law of Gravity

Students investigate concepts of motion and create models, including algebraic expressions and conceptual models.
.
The performance expectations in **Topic 2: Work and Energy** help students investigate:

- Conservation of Energy
- Work
- Energy
- Power
- Impulse

Students conduct investigations and use mathematical models to evaluate kinetic and potential energy of systems.

The performance expectations in **Topic 3**: **Heat and Thermodynamics** help students investigate:

- Kinetic Molecular Theory
- Law of Thermodynamics
- Pressure
- Fluid Dynamics

Students use computational models to investigate the conservation of energy and the total change of energy in a system.

The performance expectations in **Topic 4: Waves, Sound and Simple Harmonic Motion** help students investigate:

- Longitudinal/Transverse
- Light
- Optics

Students use data to analyze wave properties and create visual and mathematical representations for the propagation of light and sound. Students use principles of simple harmonic motion to relate periodic properties of waves to vibrations. The differences and similarities of mechanical waves and electromagnetic waves are investigated through experiments involving light and sound.

The performance expectations in **Topic 5: Electricity** help students investigate:

- Potential Difference
- DC Circuits
- Power Laws
- Current and Voltage

- Transmission of Electricity
- Magnetism
- Static Charge
- Safety

Students analyze data related to the interaction of electric and magnetic fields. By creating circuits and measuring electrical quantities, students investigate fundamental laws governing electricity and magnetism. Students use Ohm's law and the power law to analyze aspects of electrical circuits.

Physics

Topic 1: Mechanical Physics

Students who demonstrate understanding can:

P-PS1-1AR Create a model of motion and forces, including vectors graphed on the coordinate plane, to describe and predict the behavior of a system. [Clarification Statement: Emphasis is on vector addition for 1-D (frame of reference), 2-D motion (projectile, rotational motion), vectors applied to force diagrams, and vector direction for gravitational forces.]

P-PS1-2AR Use mathematical representations of Newton's Law of Gravitation and Coulomb's Law to describe and predict the gravitational and electrostatic forces between objects. [Clarification Statement: Emphasis is on both quantitative and conceptual descriptions of gravitational and electrical fields.]

P-PS2-1 Analyze data to support the claim that Newton's second law of motion describes the mathematical relationship among the net force on a macroscopic object, its mass, and its acceleration. [AR Clarification Statement: Examples of data could include tables and graphs of position or velocity as functions of time for objects subject to a net unbalanced force (falling object, object rolling down a ramp, moving object being pulled by a constant force.]

P-PS2-2 Plan an investigation to provide evidence that the change in an object's motion depends on the sum of the forces on the object and the mass of the object. [AR Clarification Statement: Emphasis is on balanced and unbalanced forces (Newton's first law) in a system, qualitative and quantitative comparisons of forces, mass and changes in motion (Newton's second law), frame of reference, and specification of units.] [Assessment Boundary: Assessment includes use of trigonometry.]

P-ESS1-2 Develop and use a model to describe the role of gravity in the motions within galaxies and the solar system. [AR Clarification Statement: Emphasis is on gravity as the force that holds the solar system and Milky Way galaxy together and controls orbital motions within them. Examples of models could be physical (analogy of distance along a football field, computer simulations of elliptical orbits) or conceptual (mathematical proportions relative to size of familiar objects).]

P-ESS1-4 Use mathematical or computational representations to predict the motion of orbiting objects in the solar system. [AR Clarification Statement: Emphasis is on Newtonian gravitational laws governing orbital motions as they apply to human-made satellites, planets, and moons.]

P1-ETS1-2

Design a solution to a complex real-world problem by breaking it down into smaller, more manageable problems that can be solved through engineering. [AR Clarification Statement: Problems could include acceleration factors (one-dimensional motion), vectors (two-dimensional motion), and gravity (Newton's laws).]

The performance expectations above were developed using the following elements from the NRC document *A Framework for K-12 Science Education*:

Science and Engineering Practices	Disciplinary Core Ideas	Crosscutting Concepts
Developing and Using Models Modeling in 9–12 builds on K–8 and progresses to using, synthesizing, and developing models to predict and show relationships among variables between systems and their components in the natural and designed worlds. ▪ Use a model to predict the relationships between systems or between components of a	**PS2.A: Forces and Motion** ▪ Newton's second law accurately predicts changes in the motion of macroscopic objects. (P-PS2-1, P-PS2-2, P-PS-1-1AR, P-ESS1-2, P-ESS1-4, P1-ETS1-2) **PS2.B: Types of Interactions** • Newton's law of universal gravitation and Coulomb's law provide the	**Patterns** ▪ Empirical evidence is needed to identify patterns. (P-ESS1-4) ▪ Different patterns may be observed at each of the scales at which a system is studied and can provide evidence for causality in explanations of phenomena. (P-ESS1-2 P-ESS1-4)

system. (P-PS1-1AR, P-ESS1-2) **Planning and Carrying Out Investigations** Planning and carrying out investigations in 9-12 builds on K-8 experiences and progresses to include investigations that provide evidence for and test conceptual, mathematical, physical, and empirical models. ▪ Plan and conduct an investigation individually and collaboratively to produce data to serve as the basis for evidence, and in the design: decide on types, how much, and accuracy of data needed to produce reliable measurements and consider limitations on the precision of the data (e.g., number of trials, cost, risk, time), and refine the design accordingly. (P-PS2-2) **Using Mathematics and Computational Thinking** Mathematical and computational thinking at the 9–12 level builds on K–8 and progresses to using algebraic thinking and analysis, a range of linear and nonlinear functions including trigonometric functions, exponentials and logarithms, and computational tools for statistical analysis to analyze, represent, and model data. Simple computational simulations are created and used based on mathematical models of basic assumptions. ▪ Use mathematical representations of phenomena to support claims. (P-PS1-2AR, P-ESS1-4) **Constructing Explanations and Designing Solutions** Constructing explanations and designing solutions in 9–12 builds on K–8 experiences and progresses to explanations and designs that are supported by multiple and	mathematical models to describe and predict the effects of gravitational and electrostatic forces between distant objects.(P-PS1-2AR, P-ESS1-2) **ETS1.C: Optimizing the Design Solution** Criteria may need to be broken down into simpler ones that can be approached systematically, and decisions about the priority of certain criteria over others (trade-offs) may be needed. P1-ETS1-2) **ETS1.C: Optimizing the Design Solution** Criteria may need to be broken down into simpler ones that can be approached systematically, and decisions about the priority of certain criteria over others (trade-offs) may be needed. (P1-ETS1-2)	**Cause and Effect** ▪ Empirical evidence is required to differentiate between cause and correlation and make claims about specific causes and effects. (P-PS1-2AR, P-PS2-2, P-ESS1-2) ▪ Systems can be designed to cause a desired effect. (P-PS1-2AR, P-PS2-2, P-ESS1-2) **Systems and System Models** ▪ When investigating or describing a system, the boundaries and initial conditions of the system need to be defined and their inputs and outputs analyzed and described using models. (P-PS1-1AR) ▪ Models can be used to predict the behavior of a system, but these predictions have limited precision and reliability due to the assumptions and approximations inherent in models. (P-PS1-1AR) **Structure and Function** ▪ Investigating or designing new systems or structures requires a detailed examination of the properties of different materials, the structures of different components, and connections of components to reveal its function and/or solve a problem. (P-PS2-1) ------------------------------------- **Connections to Nature of Science** **Scientific Knowledge Assumes an Order and Consistency in Natural Systems** ▪ Science assumes the universe is a vast single

independent student-generated sources of evidence consistent with scientific ideas, principles, and theories. ▪ Construct and revise an explanation based on valid and reliable evidence obtained from a variety of sources (including students' own investigations, models, theories, simulations, peer review) and the assumption that theories and laws that describe the natural world operate today as they did in the past and will continue to do so in the future. (P1-ETS1-2) Refine a solution to a complex real-world problem, based on scientific knowledge, student-generated sources of evidence, prioritized criteria, and tradeoff considerations. (P1-ETS1-2) ▪ Design a solution to a complex real-world problem, based on scientific knowledge, student-generated sources of evidence, prioritized criteria, and tradeoff considerations. (P1-ETS1-2) **Analyzing and Interpreting Data** Analyzing data in 9–12 builds on K–8 experiences and progresses to introducing more detailed statistical analysis, the comparison of data sets for consistency, and the use of models to generate and analyze data. ▪ Analyze data using tools, technologies, and/or models (e.g., computational, mathematical) in order to make valid and reliable scientific claims or determine an optimal design solution. (P-PS2-1) ▪ Analyze data using computational models in order		system in which basic laws are consistent. (P-PS1-2AR, P-ESS1-2) ▪ Scientific knowledge is based on the assumption that natural laws operate today as they did in the past and they will continue to do so in the future. (P-PS1-2AR, P-ESS1-2) --------------------------------------- **Connections to Engineering, Technology, and Applications of Science** **Interdependence of Science, Engineering, and Technology** ▪ Science and engineering complement each other in the cycle known as research and development (R&D). Many R&D projects may involve scientists, engineers, and others with wide ranges of expertise. (P1-ETS1-2) **Influence of Engineering, Technology, and Science on Society and the Natural World** ▪ Engineers continuously modify these technological systems by applying scientific knowledge and engineering design practices to increase benefits while decreasing costs and risks. (P1-ETS1-2) ▪ New technologies can have deep impacts on society and the environment, including some that were not anticipated. Analysis of costs and benefits is a critical aspect of decisions about technology. (P1-ETS1-2)

to make valid and reliable scientific claims. (P-PS2-1)		
Connections to the Arkansas Disciplinary Literacy Standards: Connections to the Arkansas English Language Arts Standards: Connections to the Arkansas Mathematics Standards:		

Topic 2: Work and Energy

Students who demonstrate understanding can:

P-PS2-1AR Develop computational and graphical models to calculate and illustrate the work done and changes in energy in a system. [Clarification Statement: Emphasis is on force vs. displacement graph.]

P-PS2-2AR Plan and conduct an investigation to provide evidence that work done equals energy stored in a conservative system. [Clarification Statement: An example of an investigation could include Hooke's law where energy is stored in a spring.]

P-PS2-3AR Plan and conduct an investigation to rate the power used in performing work on a system. [Clarification Statement: Emphasis is on the quantitative determination of power in interactions. Examples could include use of pulleys and electric motors.]

P-PS2-4AR Analyze data to demonstrate the relationship between rotational and linear motion, energy, and momentum. [Clarification Statement: Emphasis is on linear motion and angular motion, force and torque, linear momentum and angular momentum, and linear kinetic energy and rotational kinetic energy, mass and moment of inertia.]

P-PS2-5AR Use mathematical representations to support the claim that the change in kinetic energy of a system is equal to the net work performed upon the system. [Clarification Statement: Emphasis is on quantitative kinetic energy in interactions.]

P-PS2-6AR Use mathematical representations to support the claim that the total impulse on a system of objects is equal to the change in momentum of the system. [Clarification Statement: Emphasis is on quantitative conservation of momentum in interactions.]

P2-ETS1-3 Evaluate a solution to a complex real-world problem based on prioritized criteria and trade-offs that account for a range of constraints, including cost, safety, reliability, and aesthetics, as well as possible social, cultural, and environmental impacts. [AR Clarification Statement: Examples could include analysis of nuclear, coal, and hydro-electric power plants.]

The performance expectations above were developed using the following elements from the NRC document *A Framework for K-12 Science Education*:

Science and Engineering Practices	Disciplinary Core Ideas	Crosscutting Concepts
Developing and Using Models Modeling in 9–12 builds on K–8 experiences and progresses to using, synthesizing, and developing models to predict and show relationships among variables between systems and their components in the natural and designed world(s). ▪ Develop a model based on evidence to illustrate the relationships between systems or between components of a system. (P-PS2-1AR) **Constructing Explanations and Designing Solutions** Constructing explanations and designing solutions in 9–12 builds on K–8 experiences and progresses to explanations and designs that are supported by multiple and	**PS2.A: Forces and Motion** • Momentum is defined for a particular frame of reference; it is the mass times the velocity of the object. (P-PS2-6AR) • In any system, total momentum is always conserved. If a system interacts with objects outside itself, the total momentum of the system can change; however, any such change is balanced by changes in the momentum of objects outside the system. (P-PS2-6AR) **PS3.A: Definitions of Energy** • Energy is a quantitative property of a system that depends on the motion and	**Energy and Matter** ▪ The total amount of energy and matter in closed systems is conserved. (P-PS2-4AR, P-PS2-5AR) ▪ Changes of energy and matter in a system can be described in terms of energy and matter flows into, out of, and within that system. (P-PS2-4AR, P-PS2-5AR) ▪ Energy cannot be created or destroyed—it only moves between one place and another place, between objects and/or fields, or between systems. (P-PS2-4AR, P-PS2-5AR)

independent student-generated sources of evidence consistent with scientific ideas, principles, and theories. ▪ Apply scientific reasoning to link evidence to the claims to assess the extent to which the reasoning and data support the explanation or conclusion. (P2-ETS1-3) ▪ Design a solution to a complex real-world problem, based on scientific knowledge, student-generated sources of evidence, prioritized criteria, and tradeoff considerations. (P2-ETS1-3) ▪ Evaluate a solution to a complex real-world problem, based on scientific knowledge, student-generated sources of evidence, prioritized criteria, and tradeoff considerations. (P2-ETS1-3) **Using Mathematics and Computational Thinking** Mathematical and computational thinking in 9-12 builds on K-8 experiences and progresses to using algebraic thinking and analysis, a range of linear and nonlinear functions including trigonometric functions, exponentials and logarithms, and computational tools for statistical analysis to analyze, represent, and model data. Simple computational simulations are created and used based on mathematical models of basic assumptions. ▪ Use mathematical models and/or computer simulations to predict the effects of a design solution on systems and/or the interactions between systems. (P-PS2-5AR, P-PS2-6AR) **Planning and Carrying Out Investigations** Planning and carrying out investigations in 9-12 builds on K-8 experiences and progresses to include investigations that provide evidence for and test conceptual, mathematical, physical, and empirical models.	interactions of matter and radiation within that system. That there is a single quantity called energy is due to the fact that a system's *total* energy is conserved, even as, within the system, energy is continually transferred from one object to another and between its various possible forms. (P-PS2-2AR) **PS3.B: Conservation of Energy and Energy Transfer** • Conservation of energy means that the total change of energy in any system is always equal to the total energy transferred into or out of the system. Energy cannot be created or destroyed, but it can be transported from one place to another and transferred between systems. (P-PS2-2AR) • Mathematical expressions, which quantify how the stored energy in a system depends on its configuration (e.g., relative positions of charged particles, compression of a spring) and how kinetic energy depends on mass and speed, allow the concept of conservation of energy to be used to predict and describe system behavior. (P-PS2-2AR) **PS3.C: Relationship Between Energy and Forces** • When two objects interacting through a force field change relative position, the energy stored in the force field is changed. (P-PS2-1AR, P-PS2-3AR, P-PS2-5AR) **PS3.D: Energy in Chemical Processes** ▪ Although energy cannot be destroyed, it can be converted to less useful forms—for example, to thermal energy in the surrounding	**Cause and Effect** ▪ Empirical evidence is required to differentiate between cause and correlation and make claims about specific causes and effects. (P-PS2-6AR) ▪ Systems can be designed to cause a desired effect. (P-PS2-6AR) **Systems and System Models** ▪ When investigating or describing a system, the boundaries and initial conditions of the system need to be defined and their inputs and outputs analyzed and described using models. (P-PS2-1AR, P-PS2-2AR, P-PS2-3AR) ▪ Models can be used to predict the behavior of a system, but these predictions have limited precision and reliability due to the assumptions and approximations inherent in models. (P-PS2-1AR, P-PS2-2AR, P-PS2-3AR) ------------------------------------ **Connections to Engineering, Technology, and Applications of Science** **Influence of Science, Engineering, and Technology on Society and the Natural World** ▪ Modern civilization depends on major technological systems. Engineers continuously modify these technological systems by applying

- Plan and conduct an investigation individually and collaboratively to produce data to serve as the basis for evidence, and in the design: decide on types, how much, and accuracy of data needed to produce reliable measurements and consider limitations on the precision of the data (e.g., number of trials, cost, risk, time), and refine the design accordingly. (P-PS2-2AR, P-PS2-3AR)

Analyzing and Interpreting Data

Analyzing data in 9–12 builds on K–8 and progresses to introducing more detailed statistical analysis, the comparison of data sets for consistency, and the use of models to generate and analyze data.

- Analyze data using tools, technologies, and/or models (e.g., computational, mathematical) in order to make valid and reliable scientific claims or determine an optimal design solution. (P-PS2-4AR)

Connections to Nature of Science

Science Models, Laws, Mechanisms, and Theories Explain Natural Phenomena

- A scientific theory is a substantiated explanation of some aspect of the natural world, based on a body of facts that have been repeatedly confirmed through observation and experiment and the science community validates each theory before it is accepted. If new evidence is discovered that the theory does not accommodate, the theory is generally modified in light of this new evidence. (P-PS2-2AR, P-PS2-3AR)
- Models, mechanisms, and explanations collectively serve as tools in the development of a scientific theory. (P-PS2-2AR, P-PS2-3AR)

environment. Machines are judged as efficient or inefficient based on the amount of energy input needed to perform a particular useful task. Inefficient machines are those that produce more waste heat while performing a task and thus require more energy input. It is therefore important to design for high efficiency so as to reduce costs, waste materials, and many environmental impacts. (P2-ETS1-3)

ETS1.A: Defining and Delimiting Engineering Problems

Criteria and constraints also include satisfying any requirements set by society, such as taking issues of risk mitigation into account, and they should be quantified to the extent possible and stated in such a way that one can tell if a given design meets them. (P2-ETS1-3)

- Humanity faces major global challenges today, such as the need for supplies of clean water and food or for energy sources that minimize pollution, which can be addressed through engineering. These global challenges also may have manifestations in local communities. (P2-ETS1-3)

ETS1.B: Developing Possible Solutions

- When evaluating solutions, it is important to take into account a range of constraints, including cost, safety, reliability, and aesthetics, and to consider social, cultural, and environmental impacts. (P2-ETS1-3)
- Both physical models and computers can be used in various ways to aid in the engineering design process. Computers are useful for a variety of purposes, such as running simulations to test different ways of solving a problem or to see which one is most

scientific knowledge and engineering design practices to increase benefits while decreasing costs and risks. (P2-ETS1-3)

- New technologies can have deep impacts on society and the environment, including some that were not anticipated. Analysis of costs and benefits is a critical aspect of decisions about technology. (P2-ETS1-3)

Connections to Nature of Science

Scientific Knowledge Assumes an Order and Consistency in Natural Systems

- Science assumes the universe is a vast single system in which basic laws are consistent. (P-PS2-1AR, P-PS2-2AR, P-PS2-3AR)

	efficient or economical; and in making a persuasive presentation to a client about how a given design will meet his or her needs. (P2-ETS1-3) **ETS1.C: Optimizing the Design Solution** ▪ Criteria may need to be broken down into simpler ones that can be approached systematically, and decisions about the priority of certain criteria over others (trade-offs) may be needed. (P2-ETS1-3)	
Connections to the Arkansas Disciplinary Literacy Standards: Connections to the Arkansas English Language Arts Standards: Connections to the Arkansas Mathematics Standards:		

Topic 3: Heat and Thermodynamics		
Students who demonstrate understanding can: **P-PS3-1 Create a computational model to calculate the change in the energy of one component in a system when the change in energy of the other component(s) and energy flows in and out of the system are known.** [AR Clarification Statement: Emphasis is on systems of two or three components, thermal energy, kinetic energy, and energies in gravitational, magnetic, and electric fields.] **P-PS3-1AR Construct an explanation based on evidence of the relationships between heat, temperature, and the Kinetic Molecular Theory.** [Clarification Statement: Emphasis on planning and conducting experiments to collect then analyze data. An example could include measuring temperature changes related to phase change and specific heat.] **P-PS3-2AR Plan and conduct an investigation of the relationships between pressure, volume, temperature, and amount of gas.** [Clarification Statement: Emphasis is on use of gas law apparatuses.] **P-PS3-3AR Use mathematical representations to model the conservation of energy in fluids.** [Clarification Statement: Emphasis is on fluid dynamics as expressed in Bernoulli's equation and Pascal's principle.] **P-PS3-3 Design, build, and refine a device that works within given constraints to convert one form of energy into another form of energy.*** [AR Clarification Statement: Emphasis is on both qualitative and quantitative evaluations of devices. Examples of devices could include Rube Goldberg devices, wind turbines, solar cells, solar ovens, and generators. Examples of constraints could include use of renewable energy forms and efficiency.] **P-PS3-4 Plan and conduct an investigation to provide evidence that the transfer of thermal energy when two components of different temperature are combined within a closed system results in a more uniform energy distribution among the components in the system (second law of thermodynamics).** [AR Clarification Statement: Emphasis is on mathematical thinking to describe energy changes. Examples of investigations could include mixing liquids at different initial temperatures and adding objects at different temperatures to water.] **P3-ETS1-1 Analyze a major global challenge to specify qualitative and quantitative criteria and constraints for solutions that account for societal needs and wants.** [AR Clarification Statement: Examples could include use of wind and solar energy and total energy loss from homes.] **P3-ETS1-2 Design a solution to a complex real-world problem by breaking it down into smaller, more manageable problems that can be solved through engineering.** [AR Clarification Statement: Examples could include designing and building a machine, using schematics to break down an engine into major functional blocks, and designing improvements to reduce total energy loss from a home.] **P3-ETS1-3 Evaluate a solution to a complex real-world problem based on prioritized criteria and tradeoffs that account for a range of constraints, including cost, safety, reliability, and aesthetics, as well as possible social, cultural, and environmental impacts.** [AR Clarification Statement: Examples could include evaluating the different parts of a machine, the entire machine, and reducing energy loss in homes.] **P3-ETS1-4 Use a computer simulation to model the impact of proposed solutions to a complex real-world problem with numerous criteria and constraints on interactions within and between systems relevant to the problem.** [AR Clarification Statement: Examples could include analyzing potential and kinetic energy efficiency (windmills, roller coasters) and modeling energy loss in homes with and without proposed improvements.]		
The performance expectations above were developed using the following elements from the NRC document *A Framework for K-12 Science Education*:		
Science and Engineering Practices	**Disciplinary Core Ideas**	**Crosscutting Concepts**

Developing and Using Models Modeling in 9–12 builds on K–8 experiences and progresses to using, synthesizing, and developing models to predict and show relationships among variables between systems and their components in the natural and designed world(s). ▪ Develop a model based on evidence to illustrate the relationships between systems or between components of a system. (P-PS3-1, P3-ETS1-4) **Constructing Explanations and Designing Solutions** Constructing explanations and designing solutions in 9–12 builds on K–8 experiences and progresses to explanations and designs that are supported by multiple and independent student-generated sources of evidence consistent with scientific ideas, principles, and theories. ▪ Apply scientific reasoning to link evidence to the claims to assess the extent to which the reasoning and data support the explanation or conclusion. (P-PS3-1AR, P-PS3-3, P3-ETS1-2) ▪ Design a solution to a complex real-world problem, based on scientific knowledge, student-generated sources of evidence, prioritized criteria, and tradeoff considerations. (P-PS3-1AR, P-PS3-3, P3-ETS1-2) ▪ Evaluate a solution to a complex real-world problem, based on scientific knowledge, student-generated sources of evidence, prioritized criteria, and tradeoff considerations. (P-PS3-1AR, P-PS3-3, P3-ETS1-2) **Using Mathematics and Computational Thinking** Mathematical and computational thinking in 9-12 builds on K-8 experiences and progresses to using algebraic thinking and analysis, a range of linear and nonlinear functions including trigonometric functions, exponentials and logarithms, and computational tools for statistical	**PS2.C: Stability and Instability in Physical Systems** ▪ Systems often change in predictable ways; understanding the forces that drive the transformations and cycles within a system, as well as the forces imposed on the system from the outside, helps predict its behavior under a variety of conditions.(P-PS3-4) ▪ When a system has a great number of component pieces, one may not be able to predict much about its precise future. For such systems (e.g., with very many colliding molecules), one can often predict average but not detailed properties and behaviors (e.g., average temperature, motion, and rates of chemical change but not the trajectories or other changes of particular molecules). (P-PS3-4, P-PS3-1AR, P-PS3-2) **PS3.A: Definitions of Energy** ▪ Energy is a quantitative property of a system that depends on the motion and interactions of matter and radiation within that system. That there is a single quantity called energy is due to the fact that a system's *total* energy is conserved, even as, within the system, energy is continually transferred from one object to another and between its various possible forms. (P-PS3-1) **PS3.B: Conservation of Energy and Energy Transfer** ▪ Conservation of energy means that the total change of energy in any system is	**Energy and Matter** ▪ The total amount of energy and matter in closed systems is conserved. (P-PS3-3, P-PS3-4, P-PS3-3AR) ▪ Changes of energy and matter in a system can be described in terms of energy and matter flows into, out of, and within that system. (P-PS3-3, P-PS3-4, P-PS3-3AR) ▪ Energy cannot be created or destroyed—it only moves between one place and another place, between objects and/or fields, or between systems. (P-PS3-3, P-PS3-4, P-PS3-3AR) **Cause and Effect** ▪ Empirical evidence is required to differentiate between cause and correlation and make claims about specific causes and effects. (P-PS3-1, P-PS3-1AR, P-PS3-2AR) ▪ Systems can be designed to cause a desired effect. (P-PS3-1, P-PS3-1AR, P-PS3-2AR) ------------------------------------ **Connections to Nature of Science** **Scientific Knowledge Assumes an Order and Consistency in Natural Systems** ▪ Science assumes the universe is a vast single system in which basic laws are consistent.

analysis to analyze, represent, and model data. Simple computational simulations are created and used based on mathematical models of basic assumptions. ▪ Use mathematical models and/or computer simulations to predict the effects of a design solution on systems and/or the interactions between systems. (P-PS3-3AR) **Planning and Carrying Out Investigations** Planning and carrying out investigations in 9-12 builds on K-8 experiences and progresses to include investigations that provide evidence for and test conceptual, mathematical, physical, and empirical models. Plan and conduct an investigation individually and collaboratively to produce data to serve as the basis for evidence, and in the design: decide on types, how much, and accuracy of data needed to produce reliable measurements and consider limitations on the precision of the data (e.g., number of trials, cost, risk, time), and refine the design accordingly. (P-PS3-2AR, P-PS3-4) **Asking Questions and Defining Problems** Asking questions and defining problems in 9–12 builds on K–8 experiences and progresses to formulating, refining, and evaluating empirically testable questions and design problems using models and simulations. ▪ Analyze complex real-world problems by specifying criteria and constraints for successful solutions.	always equal to the total energy transferred into or out of the system. Energy cannot be created or destroyed, but it can be transported from one place to another and transferred between systems. (P-PS3-1AR, P-PS3-3) ▪ Uncontrolled systems always evolve toward more stable states—that is, toward more uniform energy distribution (e.g., water flows downhill, objects hotter than their surrounding environment cool down). Any object or system that can degrade with no added energy is unstable. Eventually it will do so, but if the energy releases throughout the transition are small, the process duration can be very long (e.g., long-lived radioactive isotopes). (P-PS3-4) **<u>PS3.D: Energy in Chemical Processes</u>** Although energy cannot be destroyed, it can be converted to less useful forms—for example, to thermal energy in the surrounding environment. Machines are judged as efficient or inefficient based on the amount of energy input needed to perform a particular useful task. Inefficient machines are those that produce more waste heat while performing a task and thus require more energy input. It is therefore important to design for high efficiency so as to reduce costs, waste materials, and many environmental impacts (P-PS3-3, P3-ETS1-1) **ETS1.A: Defining and Delimiting Engineering Problems** ▪ Criteria and constraints also include satisfying any requirements set by society,	(P-PS3-1AR, P-PS3-2AR, P-PS3-4) ▪ Scientific knowledge is based on the assumption that natural laws operate today as they did in the past and they will continue to do so in the future. (P-PS3-1AR, P-PS3-2AR, P-PS3-4) ------------------------------------- **Connections to Engineering, Technology, and Applications of Science** **Interdependence of Science, Engineering, and Technology** ▪ Science and engineering complement each other in the cycle known as research and development (R&D). Many R&D projects may involve scientists, engineers, and others with wide ranges of expertise. (P3-ETS1-1, P3-ETS1-2, P3-ETS1-3, P3-ETS1-4) **Influence of Engineering, Technology, and Science on Society and the Natural World** ▪ Engineers continuously modify these technological systems by applying scientific knowledge and engineering design practices to increase benefits while decreasing costs and risks. (P3-ETS1-1, P3-ETS1-2, P3-ETS1-3, P3-ETS1-4) ▪ New technologies can have deep impacts on

	such as taking issues of risk mitigation into account, and they should be quantified to the extent possible and stated in such a way that one can tell if a given design meets them. (P3-ETS1-1, P3-ETS1-3) ▪ Humanity faces major global challenges today, such as the need for supplies of clean water and food or for energy sources that minimize pollution, which can be addressed through engineering. These global challenges also may have manifestations in local communities. (P3-ETS1-1, P3-ETS1-3) **ETS1.B: Developing Possible Solutions** ▪ When evaluating solutions, it is important to take into account a range of constraints, including cost, safety, reliability, and aesthetics, and to consider social, cultural, and environmental impacts. (P3-ETS1-2, P3-ETS1-4)	society and the environment, including some that were not anticipated. Analysis of costs and benefits is a critical aspect of decisions about technology. (P3-ETS1-1, P3-ETS1-2, P3-ETS1-3, P3-ETS1-4)
Connections to the Arkansas Disciplinary Literacy Standards: Connections to the Arkansas English Language Arts Standards: Connections to the Arkansas Mathematics Standards:		

Physics

Topic 4: Waves, Sound, and Simple Harmonic Motion

Students who demonstrate understanding can:

P-PS4-1AR Use mathematical representations to support a claim regarding relationships among the frequency, wavelength, speed, and energy of waves traveling in various media. [Clarification Statement: Emphasis is on the dependence of wave speed upon media properties and the proportionality between the quantities (frequency and speed, wavelength and speed, frequency and wavelength, energy and wavelength).]

P-PS4-2AR Develop and use models to investigate longitudinal and transverse waves in various media. [Clarification Statement: Emphasis is on structure and function of waves.]

P-PS4-3AR Develop and use models to describe the interaction of light with matter. [Clarification Statement: Emphasis is on both geometric (ray diagrams) and algebraic models (mirror and thin lens equation, Snell's law).]

P4-ETS1-4 Use a computer simulation to model the impact of proposed solutions to a complex real-world problem with numerous criteria and constraints on interactions within and between systems relevant to the problem. [AR Clarification Statement: Emphasis is on solutions with various constraints and criteria. An example could include effect of wind resistance on structural integrity of a skyscraper as a function of its height.]

The performance expectations above were developed using the following elements from the NRC document *A Framework for K-12 Science Education*:

Science and Engineering Practices

Using Mathematics and Computational Thinking

Mathematical and computational thinking at the 9-12 level builds on K-8 and progresses to using algebraic thinking and analysis, a range of linear and nonlinear functions including trigonometric functions, exponentials and logarithms, and computational tools for statistical analysis to analyze, represent, and model data. Simple computational simulations are created and used based on mathematical models of basic assumptions.

- Use mathematical representations of phenomena or design solutions to describe and/or support claims and/or explanations. (P-PS4-1AR)
- Use mathematical models and/or computer simulations to predict the effects of a design solution on systems and/or the interactions between systems. (P4-ETS1-4)

Developing and Using Models

Modeling in 9–12 builds on K–8 and progresses to using, synthesizing, and developing models to predict and show relationships among variables between

Disciplinary Core Ideas

PS4.A: Wave Properties

- The wavelength and frequency of a wave are related to one another by the speed of travel of the wave, which depends on the type of wave and the medium through which it is passing.(P-PS4-1AR, P-PS4-2AR)
- The reflection, refraction, and transmission of waves at an interface between two media can be modeled on the basis of these properties.(P-PS4-3)
- Resonance is a phenomenon in which waves add up in phase in a structure, growing in amplitude due to energy input near the natural vibration frequency. Structures have particular frequencies at which they resonate. This phenomenon (e.g., waves in a stretched string, vibrating air in a pipe) is used in speech and in the design of all musical instruments. (P4-ETS1-4)

Crosscutting Concepts

Patterns

- Empirical evidence is needed to identify patterns. (P-PS4-1AR, P-PS4-3AR)
- Different patterns may be observed at each of the scales at which a system is studied and can provide evidence for causality in explanations of phenomena. (P-PS4-1AR, P-PS4-3AR)

Energy and Matter

- The total amount of energy and matter in closed systems is conserved. (P-PS4-1AR, P-PS4-3AR)
- Changes of energy and matter in a system can be described in terms of energy and matter flows into, out of, and within that system.

systems and their components in the natural and designed worlds. ▪ Use a model to predict the relationships between systems or between components of a system. (P-PS4-2AR, P-PS4-3AR, P4-ETS1-4) -- **Connections to Nature of Science** **Science Models, Laws, Mechanisms, and Theories Explain Natural Phenomena** A scientific theory is a substantiated explanation of some aspect of the natural world, based on a body of facts that have been repeatedly confirmed through observation and experiment and the science community validates each theory before it is accepted. If new evidence is discovered that the theory does not accommodate, the theory is generally modified in light of this new evidence. (P4-ETS1-4)	**ETS1.B: Developing Possible Solutions** Both physical models and computers can be used in various ways to aid in the engineering design process. Computers are useful for a variety of purposes, such as running simulations to test different ways of solving a problem or to see which one is most efficient or economical; and in making a persuasive presentation to a client about how a given design will meet his or her needs. (P4-ETS1-4)	(P-PS4-1AR, P-PS4-3AR) ▪ Energy cannot be created or destroyed—it only moves between one place and another place, between objects and/or fields, or between systems. (P-PS4-1AR, P-PS4-3AR) **Structure and Function** ▪ Investigating or designing new systems or structures requires a detailed examination of the properties of different materials, the structures of different components, and connections of components to reveal its function and/or solve a problem. (P-PS4-2AR) ---------------------------- **Connections to Engineering, Technology, and Applications of Science** **Interdependence of Science, Engineering, and Technology** ▪ Science and engineering complement each other in the cycle known as research and development (R&D). (P4-ETS1-4) **Influence of Engineering, Technology, and Science on Society and the Natural World** ▪ Modern civilization depends on major technological systems. (P4-ETS1-4)
Connections to the Arkansas Disciplinary Literacy Standards:		

Connections to the Arkansas English Language Arts Standards:

Connections to the Arkansas Mathematics Standards:

Topic 5: Electricity

Students who demonstrate understanding can:

P-PS2-4 Use mathematical representations of Newton's Law of Gravitation and Coulomb's Law to describe and predict the gravitational and electrostatic forces between objects. [AR Clarification Statement: Emphasis is on both quantitative and conceptual descriptions of forces between static electric charges.]

P-PS2-5 Plan and conduct an investigation to provide evidence that an electric current can produce a magnetic field and that a changing magnetic field can produce an electric current. [AR Clarification Statement: Examples of investigations could be to create electromagnets and manipulate bar magnets through a coil of wire connected to an ammeter.]

P-PS3-2 Develop and use models to illustrate that energy at the macroscopic scale can be accounted for as a combination of energy associated with the motions of particles (objects) and energy associated with the relative position of particles (objects). [AR Clarification Statement: Emphasis is on electric potential difference.]

P-PS5-1AR Use mathematical representations and conduct investigations to provide evidence of the relationships between power, current, voltage, and resistance. [Clarification Statement: Emphasis is on insulators and conductors accounting for Ohm's Law, total resistance for combinations of resistors, and $P=IV$.]

P-PS5-2AR Evaluate competing design solutions for construction and use of electrical consumer products.* [Clarification Statement: Examples could include efficiency of light bulbs (visible intensity vs. power) and thermal energy limits of wire.]

P-PS5-3AR Obtain and combine information on alternating and direct current circuits in various applications. [Clarification Statement: Examples could include why public utilities use AC while many devices use DC and energy loss in transmission of electricity.]

P5-ETS1-1 Analyze a major global challenge to specify qualitative and quantitative criteria and constraints for solutions that account for societal needs and wants. [AR Clarification Statement: Examples could include analysis of renewable energy systems for electricity generation and the effect of autonomous electric cars on the economy, society, and the environment.]

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Science and Engineering Practices	Disciplinary Core Ideas	Crosscutting Concepts
Developing and Using Models Modeling in 9–12 builds on K–8 experiences and progresses to using, synthesizing, and developing models to predict and show relationships among variables between systems and their components in the natural and designed world(s). ▪ Develop a model based on evidence to illustrate the relationships between systems or between components of a system. (P-PS3-2) **Constructing Explanations and Designing Solutions** Constructing explanations and designing solutions in 9–12 builds on K–8 experiences and progresses to	**PS2.B: Types of Interactions** • Newton's law of universal gravitation and Coulomb's law provide the mathematical models to describe and predict the effects of gravitational and electrostatic forces between distant objects. (P-PS2-4) **PS3.A: Definitions of Energy** • Energy is a quantitative property of a system that depends on the motion and interactions of matter and radiation within that system. That there is a single quantity called energy is due to the fact that a system's *total* energy is conserved, even as, within the	**Systems and System Models** ▪ When investigating or describing a system, the boundaries and initial conditions of the system need to be defined and their inputs and outputs analyzed and described using models. (P-PS5-1AR, P-PS5-2AR)

explanations and designs that are supported by multiple and independent student-generated sources of evidence consistent with scientific ideas, principles, and theories. ▪ Apply scientific reasoning to link evidence to the claims to assess the extent to which the reasoning and data support the explanation or conclusion. (P-PS5-1AR, P5-ETS1-1) ▪ Design a solution to a complex real-world problem, based on scientific knowledge, student-generated sources of evidence, prioritized criteria, and tradeoff considerations. (P-PS5-1AR, P5-ETS1-1) ▪ Evaluate a solution to a complex real-world problem, based on scientific knowledge, student-generated sources of evidence, prioritized criteria, and tradeoff considerations. (P-PS5-1AR, P-PS5-2AR, P5-ETS1-1) **Using Mathematics and Computational Thinking** Mathematical and computational thinking in 9-12 builds on K-8 experiences and progresses to using algebraic thinking and analysis, a range of linear and nonlinear functions including trigonometric functions, exponentials and logarithms, and computational tools for statistical analysis to analyze, represent, and model data. Simple computational simulations are created and used based on mathematical models of basic assumptions. ▪ Use mathematical models and/or computer simulations to predict the effects of a design solution on systems and/or the interactions between systems. (P-PS2-4, P-PS5-1AR) **Planning and Carrying Out Investigations** Planning and carrying out investigations in 9-12 builds on K-8 experiences and progresses to include investigations that provide evidence for and test conceptual, mathematical, physical, and empirical models. ▪ Plan and conduct an investigation individually and collaboratively to	system, energy is continually transferred from one object to another and between its various possible forms. (P-PS5-1AR) **<u>PS3.B: Conservation of Energy and Energy Transfer</u>** • Conservation of energy means that the total change of energy in any system is always equal to the total energy transferred into or out of the system. Energy cannot be created or destroyed, but it can be transported from one place to another and transferred between systems.(P-PS2-5) • Mathematical expressions, which quantify how the stored energy in a system depends on its configuration (e.g., relative positions of charged particles, compression of a spring) and how kinetic energy depends on mass and speed, allow the concept of conservation of energy to be used to predict and describe system behavior.(P-PS2-5) **<u>PS3.C: Relationship Between Energy and Forces</u>** • When two objects interacting through a force field change relative position, the energy stored in the force field is changed.(P-PS3-2) **<u>PS3.D: Energy in Chemical Processes</u>** • All forms of electricity generation and transportation fuels have associated economic, social, and environmental costs and benefits, both short and long term. (P-PS5-2AR, P-PS5-3AR) • Although energy cannot be destroyed, it can be converted to less useful forms—for example, to thermal energy in the surrounding environment. Machines are judged as efficient or inefficient based on the amount of energy input needed to perform a particular useful task. Inefficient machines are those that produce more waste heat while performing	▪ Models (e.g., physical, mathematical, computer models) can be used to simulate systems and interactions—including energy, matter, and information flows—within and between systems at different scales. (P-PS5-1AR, P-PS5-2AR) **Cause and Effect** ▪ Empirical evidence is required to differentiate between cause and correlation and make claims about specific causes and effects. (P-PS2-4, P-PS2-5) ▪ Cause and effect relationships can be suggested and predicted for complex natural and human designed systems by examining what is known about smaller scale mechanisms within the system. (P-PS2-4, P-PS2-5) **Scale, Proportion, and Quantity** • Algebraic thinking is used to examine scientific data and predict the effect of a change in one variable on another (e.g., linear growth vs. exponential growth). (P-PS3-2) ------------------------------- **Connections to Engineering, Technology,**

produce data to serve as the basis for evidence, and in the design: decide on types, how much, and accuracy of data needed to produce reliable measurements and consider limitations on the precision of the data (e.g., number of trials, cost, risk, time), and refine the design accordingly. (P-PS2-5, P-PS5-1AR) **Obtaining, Evaluating, and Communicating Information** Obtaining, evaluating, and communicating information in 9–12 builds on K–8 experiences and progresses to evaluating the validity and reliability of the claims, methods, and designs. ▪ Communicate scientific ideas (e.g. about phenomena and/or the process of development and the design and performance of a proposed process or system) in multiple formats (including orally, graphically, textually, and mathematically). (P-PS5-3AR) -- **Connections to Nature of Science** **Science Models, Laws, Mechanisms, and Theories Explain Natural Phenomena** ▪ Theories and laws provide explanations in science. (P-PS2-4) ▪ Laws are statements or descriptions of the relationships among observable phenomena. (P-PS2-4, P-PS5-1AR)	a task and thus require more energy input. It is therefore important to design for high efficiency so as to reduce costs, waste materials, and many environmental impacts. (P-PS5-2AR, P-PS5-3AR) **<u>PS4.C: Information Technologies and Instrumentation</u>** • Multiple technologies based on the understanding of waves and their interactions with matter are part of everyday experiences in the modern world (e.g., medical imaging, communications, and scanners) and in scientific research. They are essential tools for producing, transmitting, and capturing signals and for storing and interpreting the information contained in them. Knowledge of quantum physics enabled the development of semiconductors, computer chips, and lasers, all of which are now essential components of modern imaging, communications, and information technologies. (Boundary: Details of quantum physics are not formally taught at this grade level.) (P-PS5-3AR) **ETS1.C: Optimizing the Design Solution** • Criteria may need to be broken down into simpler ones that can be approached systematically, and decisions about the priority of certain criteria over others (trade-offs) may be needed. (P5-ETS1-1)	**and Applications of Science** **Interdependence of Science, Engineering, and Technology** • Science and engineering complement each other in the cycle known as research and development (R&D). Many R&D projects may involve scientists, engineers, and others with wide ranges of expertise. (P-PS5-2AR, P5-ETS1-1)
Connections to the Arkansas Disciplinary Literacy Standards: Connections to the Arkansas English Language Arts Standards: Connections to the Arkansas Mathematics Standards:		

Contributors

The following educators contributed to the development of this course:

Susan Allison – Benton School District	Rebecca Koelling – Highland School District
Katie Anderson – Little Rock School District	Karen Ladd – Nettleton School District
Dr. Katherine Auld - Northwest Arkansas Community College	Steven Long – Rogers School District
Dr. Daniel Barth - University of Arkansas at Fayetteville	Chris Lynch – Black River Technical College
Angela Bassham – Salem School District	Jacki Marlin – Perryville School District
Allison Belcher – Little Rock School District	Monica Meadows – Pulaski County Special School District
Debbie Bilyeu – Arkansas AIMS	Patti Meeks – Hamburg School District
Tami Blair – Texarkana School District	Melissa Miller – Farmington School District
Stephen Brodie – University of Arkansas at Fort Smith STEM Center	Jim Musser – Arkansas Tech University
Stephanie Brown – Quitman School District	Nanette Nichols – Wilbur D. Mills AR Education Cooperative
Cindy Bunch – Manila School District	Dennis Pevey – eSTEM Public Charter School
Cindy Cardwell – Bentonville School District	Tami Philyaw – Smackover – Norphlet School District
Larry Cooper – Springdale School District	Kathy Prislovsky – Stuttgart School District
Sarah Croswell – Virtual Arkansas Academy	Kathy Prophet – Springdale School District
Tami Eggensperger – Cabot School District	Rhonda Riggin – Booneville School District
Shelley Forbess – El Dorado School District	Will Squires – Caddo Hills School District
Kyla Gentry – Searcy School District	Tim Trawick – Conway School District
Jenna Gill – Siloam Springs School District	David Wentz – Pea Ridge School District
Douglas Hammon – Little Rock School District	Andrew Williams – University of Arkansas at Monticello
Keith Harris – University of Arkansas at Little Rock Partnership for STEM Education	Wendi J.W. Williams – Northwest Arkansas Community College
Leonda Holthoff – Star City School District	Cathy Wissehr – University of Arkansas at Fayetteville
Amanda Jones – Poyen School District	Diedra Young – Ridgeway Christian High School, Pine Bluff

ARKANSAS DEPARTMENT OF EDUCATION

Arkansas Professional Pathway to Educator Licensure (APPEL) Participant Handbook

This document contains a course description for the 2017Arkansas Department of Education's APPEL program .

Arkansas Department of Education #4 Capitol Mall, Room 107-A Little Rock, AR 72201

Table of Contents

Introduction

The Arkansas Professional Pathway to Educator Licensure (APPEL) is an alternate route to obtaining an Arkansas teaching license for college graduates holding at least a four-year degree. The program is administered under the auspices of the Arkansas Department of Education (ADE) and is monitored by the ADE Office of Educator Preparation.

Participants may be employed as a part-time or full-time classroom teacher in an Arkansas school while completing requirements for a Standard Arkansas teaching license. Qualifying participants receive a current, valid, two-year Arkansas Provisional Teaching License to work as teacher of record, earning a salary with benefits, while completing the program. Those completing all program and licensure requirements receive the final, Arkansas Standard Teaching License.

The program is a two-year preparation track that includes Instructional Modules, appropriate employment as a classroom teacher, assessments, and on-the-job professional learning. Participants are mentored for two years and receive focused feedback and evaluation via the state's mentoring and teacher evaluation models. The program's capstone experience is a submission to edTPA©. edTPA© is a pre-service teacher assessment process which includes a review of a teacher candidate's authentic teaching materials as the culmination of a teaching and learning process that documents and demonstrates each candidate's ability to effectively teach his/her subject matter to all students.

For two years, APPEL Instructional Modules are offered at satellite sites throughout the state for a total of fifteen days each summer and eight monthly modules each school year. All face-to-face modules for both years are delivered at the regional site. The final five days of each summer's instruction is designed specifically for teaching in the content/subject area. Four of the monthly modules each year are delivered completely on-line.

Two or more, highly qualified facilitators direct each site. Skilled practitioners who offer valuable insight into current, research-based best practices in teaching and learning deliver instruction for APPEL participants. This is a technology-rich program and requires skills related to using a computer or mobile-device, software applications, and the Internet. Program administrators are dedicated to the focus of providing rigor and relevance in teacher preparation.

APPEL Mission and Vision

MISSION

The mission of the APPEL program is to prepare outstanding teachers to fill vacancies in Arkansas classrooms. To accomplish this mission the APPEL Program:

1. Incorporates a blended learning approach with both face-to-face and online components.
2. Provides a total of 360 clock hours of instruction with two years of mentoring support for guidance and professional growth.
3. Consistently updates curriculum to align with standards adopted by the State Board, the Arkansas Teaching Standards, Universal Design for Learning, and the Danielson Framework for Teaching model used for teacher mentoring and evaluation.
4. Prepares educators to effectively teach and enhance the learning environment and outcomes for diverse learners.
5. Promotes a commitment to understanding and working effectively with children in geographically and culturally diverse settings.
6. Promotes a commitment to recruit participants to help fill hard-to-staff subject and geographical shortage area positions.
7. Employs practitioners as facilitators and instructors who demonstrate excellence in teaching, scholarship, and service.
8. Establishes a professional environment conducive to participant growth and development.

To help achieve this mission, program administrators are committed to working collaboratively with schools, institutions of higher education, other state agency programs, and other public and private groups to address educational issues. Administrators and presenters are actively involved with organizations at the local, state, regional, and national levels, with schools, and with human service agencies.

Vision

Program administrators, facilitators and presenters share a vision for the APPEL Program. This vision is to help future educators understand what accomplished beginning teaching looks like in a classroom and, more importantly, to demonstrate how effective teachers design lessons, provide instruction, build classroom communities, and utilize assessments to facilitate student learning. The program seeks to prepare learner-ready teachers. The program defines a learner-ready teacher as one who is ready on day one of his or her career, to model and develop in students, the knowledge and skills they need to succeed today including the ability to:

- think critically and creatively,
- apply content to solving real world problems,
- be literate across the curriculum,
- collaborate and work in teams, and take ownership of their own continuous learning

More specifically, learner-ready teachers:

- have deep knowledge of their content and how to teach it,
- understand the differing needs of their students,
- hold students to high expectations,
- personalize learning to ensure each learner is challenged,
- care about, motivate and actively engage students in learning,
- collect interpret, and use student assessment data to monitor progress and adjust instruction,
- systematically reflect, continuously improve, and collaboratively problem solve,
- demonstrate leadership and shared responsibility for the learning of all students

The APPEL program is approved through the State Board of Education at the Arkansas Department of Education. Program completers typically perform well on examinations of professional preparation. As part of the Title II Teacher Education Report Card, the assessment pass rate for each academic year is published. The pass rate is available to the public and may be accessed online at https://title2.ed.gov choose Arkansas on the map, then choose Arkansas Department of Education- Arkansas Professional Pathway to Educator Licensure. In addition, APPEL works with the state's Department of Education to report data via the Educator Preparation Provider Report (EPPR). This report is available to the public and may be accessed online at https://adedata.arkansas.gov/eppr/docs/PublicUniversities/2016_7031_APPEL.pdf

Quick Glance Overview of APPEL Two-Year Track

Quick Glance Overview of APPEL Two-Year Program Track

WHAT?	**Application and Orientation**	**Year 1**	**Year 2**	**Completion**	**Year 3 (if necessary)**
WHAT TO DO AND EXPECT?	• Meet minimum requirements for application • Submit online application and send in packet • Receive email verification of acceptance or denial • Upon acceptance, register for APPEL Orientation • If denied, send documents by deadline • If accepted, start applying for open teaching positions	• Attend 15 days of summer instruction at assigned site • Enroll into Moodle classroom (at site on first day) • Complete Orientation Module in Moodle • Successfully complete each Instructional Module • Continue to apply for open teaching positions • Upon hire confirm employment form received by ADE	• Apply via online application for Year 2 and pay Year 2 program fee • Attend 15 days of summer instruction at assigned site • Enroll into Moodle classroom (at site on first day) • Successfully complete each Instructional Module • If employment has changed, then confirm employment status with ADE	• Successfully complete all teaching and instructional modules for both years of program • Successfully complete all mentoring requirements • Take and pass the appropriate and required pedagogical assessment to exit the program	• If on hold either year, participants are allowed a third year in the program • Participants have one year on "hold" status and must return by October 1 of the following year with employment confirmed • Participants are allowed a third year under certain other conditions determined as valid upon review
WHEN AND WHERE?	**Attend APPEL Orientation in Little Rock**	**Attend APPEL Yr. 1 Summer Academy at assigned site in June**	**Attend APPEL Yr. 2 Summer Academy at assigned site in June**	**Program Completion- after completing second semester of second year of teaching**	**Attend APPEL summer or monthly modules at assigned site and/or complete missing requirements**
WHAT HAPPENS NEXT?	• Decide to continue or withdraw application • Verify and leave Orientation w site assignment and information • If continuing, pay program fee thru online process	• If not hired, on "hold" in program, won't attend modules after September • If hired, licensed and start teaching position in August • Attend monthly modules Sept.-Apr. • Successfully complete Yr. 1	• If not hired for Yr. 2, on "hold", won't attend monthly modules • If hired, licensed and start teaching position in August • Attend monthly modules Sept.-Apr. • Successfully complete Yr. 2	• Upon meeting all requirements for completion, apply and pay fee for Standard teaching license • Receive Five-Year Standard Arkansas Teaching License	• Receive third Provisional license (if qualified) • Upon meeting all requirements for completion, apply and pay fee for Standard teaching license and receive Standard license
GENERAL TIMELINE	Applications accepted mid-Feb to end of third week of May each year	Summer Academy for Yr. 1 held in June each year, monthly modules Sept-April each year	Summer Academy for Yr. 2 held in June each year, monthly modules Sept-April each year	If completion requirements are not met, then proceed to Year 3 track (if qualified)	Participants must complete two years of teaching within three consecutive years

Current APPEL Administration

This page will update in February each year.

Ann Crosser, APPEL Program Advisor, Arkansas Department of Education-Ann.Crosser@arkansas.gov

Current 2016 APPEL Site Locations and Staff:

NORTHWEST:

- Bentonville Site, Northwest Arkansas Community College: Ms. Angela Richardson and Dr. AJ Shirey

- Van Buren Site, Van Buren High School: Ms. Karen Allen and Ms. Renee Risley

NORTHEAST:

- Walnut Ridge Site, Williams Baptist College and Northeast Arkansas Education Cooperative: Mr. and Mrs. J.M. Edington

SOUTHWEST:

- Hot Springs /Arkadelphia Site, Lakeside Hot Springs High School and Dawson Education Cooperative: Ms. Debbie Knowles and Ms. Vandy Nash

SOUTHEAST:

- Monticello Site, Southeast Arkansas Education Cooperative: Ms. Rhonda Mullikin and Ms. Renee Treadwell

CENTRAL:

- Little Rock/North Little Rock Site, Pulaski Technical College: Ms. Shannon Holeyfield and Ms. Casey Prock

- Searcy Site, Southwest Middle School: Ms. Karm Prock

APPEL Admission and Provisional Licensure Requirements

IMPORTANT NOTES:

Full admission to APPEL is required for all candidates expecting to be eligible for licensure.

An applicant who is not a U.S. citizen shall provide evidence satisfactory to the Arkansas Department of Education that the applicant meets the criteria of an exception under U.S.C.§1261 for Arkansas to issue a professional license.

Annual enrollment in the APPEL program may be limited by:

- Licensure requirements,
- Licensure area and level of candidates (shortage areas may be given preference), and
- Program capacity (in which case applications will not be accepted after capacity is reached).

If a candidate has been dismissed from another teacher preparation program, they may appeal to be admitted to APPEL. However, candidates who have failed the previous program due to poor attendance or scholarship, or unprofessionalism may not be admitted to APPEL.

ATTENTION:

A minimum overall GPA of 2.70 or higher at graduation or a 2.90 in the last 60 hours of coursework completed is required for admission to APPEL.

ATTENTION: Certain participants in APPEL will be required to complete additional courses while working to complete the program. Those participants who teach in the areas of Elementary Education K-6, Middle Childhood 4-8 or Social Studies 7-12 must successfully complete the requirements for Arkansas History and/or Teaching Reading courses as outlined in the *Arkansas Department of Education Rules Governing Educator Licensure* before completion of the APPEL program. See specific information under Additional Required Coursework.

Year I Admission: Candidates seeking Year I admission must meet the following minimum criteria in advance of application for admission:

- Bachelor's degree from a nationally or regionally accredited institution of higher education
- Documented cumulative undergraduate or graduate grade point average (GPA) of 2.70 or higher OR a minimum GPA of 2.90 on the last 60 credit hours of coursework completed
- Passing scores on specific required Praxis tests (based on license area sought)
- Proof of initiating required criminal background checks
- Submission of completed APPEL online application

Candidates seeking admission to APPEL will initiate the process for admission through ADE upon completion of minimum requirements mandated by the rules governing the program.

Full admission will not be granted to candidates who have not passed all required Praxis exams, and fully cleared all required background checks.

The following documents are required in the application packet:

A. Transcript Requirements

- Official transcript(s) documenting an awarded four-year college bachelor's degree or higher from an institution of higher education that is regionally or nationally accredited by an accrediting organization recognized by the U.S. Department of Education or the Council for Higher Education Accreditation.
- ALL transcripts showing ALL coursework are required.
- For out-of-country candidates, an official college transcript evaluation from a Private Credential Evaluation Agency is required.
- All transcripts and evaluations (see Out of Country Transcripts and Evaluations below) must be submitted unopened to the APPEL office with admission documents.
- Electronic Transcripts with a password -protected code can be emailed directly from the college/university to the APPEL Program Advisor OR online transcripts submitted directly from the college/university to the ADE Office of Educator Licensure through the SPEEDE server (ADE-LIC) are acceptable. These are the

ONLY online services from which a transcript is considered official. Photocopies or faxed or scanned and emailed copies of documents will NOT be accepted.

Out of country transcripts must be evaluated by an ADE approved Private Credential Evaluation Agency and must be documented as being equal to a Bachelor's degree or higher from an accredited U.S. college/university. This must be a course-by-course evaluation, prepared in English, with GPA reflected. Include the unopened and sealed correspondence with the application packet.

B: GPA Requirements

- Candidates must hold a bachelor's degree with a minimum cumulative GPA of 2.70 upon graduation or 2.90 in the last 60 hours of completed coursework.
- If the 60th hour falls in the middle of a semester, then the entire semester will be counted. This means that a GPA may be calculated on more than 60 hours.
- If a candidate holds a masters and/or doctorate degree, and if the GPA on one of these degrees meets the cumulative GPA of 2.70 or higher upon graduation, then the candidate meets the GPA requirement.

To aide in APPEL's mission of recruiting a more diverse pool of teachers into the teaching force and to assist districts with staffing hard-to-staff schools, candidates for the APPEL program may be conditionally admitted. Specifically, candidates who do not meet the grade point requirements may be admitted conditionally. Test scores, grades in the undergraduate or graduate major, or other pertinent data must indicate the student will perform satisfactorily in the program. Candidates may be admitted conditionally if they:

- Complete all other APPEL admission requirements, including passing scores on specific required Praxis tests (based on license area sought); and
- Have two (2) professional letters of recommendation submitted by references to the Office of Educator Preparation; and
- If deemed necessary, complete an in-person interview with Office of Educator Preparation staff; and
- Complete each Year One APPEL Summer Academy module with a grade of 90% or better

The conditional status will be converted to regular admission only when the above conditions have been met. Regardless of whether the candidate satisfies one or more conditions, candidates who are on probation or otherwise not in good standing will not be admitted.

C: Testing Requirements

Programs in Arkansas that lead to licensure relating to K-12 schools require a passing score on the appropriate Praxis exam(s) and satisfactory completion of all key assessments identified by the individual subject area/grade level.

It is required that certain Praxis exams are completed, meeting the state minimum required cut score, in advance of making application to APPEL. Upon registration, if Praxis scores are reported to ADE (7031) by ETS, then scores should upload to the AELS system. However, there are times when scores do not upload. Applicants should always save a copy of the online score report they receive directly from the password protected ETS account showing passing scores on all required exams in the case that these must be submitted as part of the application packet.

Tests must be passed before applying to the program. Testing on or before May 1st helps to ensure that a score report will be available by the June deadline for admission. The Principles of Learning and Teaching (PLT) exam is NOT required in advance of application but is required to exit the program. See information below for Praxis exam details.

Praxis CORE exams are required for entry into the APPEL Program. All three parts (Reading, Writing and Math) must be taken and passed prior to making application to the program. See exception below.

Exception: Applicants who have taken the certain exams and made certain scores may at the time of application substitute equivalent scores in lieu of Praxis CORE. Applicants do not need to hold an advanced degree to substitute the scores. Scores may not be over ten (10) years old to qualify. Contact the APPEL office for more details.

Praxis Subject Assessment®: Content/License Area Assessments-Required for entry into the APPEL Program. Candidates must pass the Praxis Subject Assessment® content specific license area exam(s) for the particular grade level and/or subject area the candidate plans to teach prior to making application to the program.

If seeking licensure in Middle Childhood 4-8 applicants must take and pass at least two of the four available Praxis middle school subject exams prior to making application to the program.

ATTENTION: There are tests that change from time to time. Either a new test is adopted or a cut score for an existing test changes. Keep in mind that Praxis test scores are good for up to three years after a new test goes into effect or a required test score changes.

See the www.ets.org website click Praxis, click State Requirements, choose Arkansas and click on Testing Requirements for details. If unsure whether tests taken previous to the new test would still qualify contact a supervisor in the ADE Office of Educator Licensure or the APPEL Program Advisor.

IMPORTANT:

- APPEL accepts candidates for K-12 regular classroom teaching only.
- APPEL does NOT accept candidates for Special Education, School Counselor or Library Media Specialist.
- APPEL accepts Elementary K-6 (certain sites), Middle Childhood 4-8 and Secondary 7-12 candidates and the K-12 licensure areas.
- Applicants for APPEL may take any Praxis Subject Assessment(s) in any area(s) for which a license is being sought and for which the program accepts applicants. This makes the candidate more marketable as a teacher.
- After initial admission to the program, areas can be added to eligibility as tests are passed and the scores are submitted to APPEL.
- Participants can license on any one level (K-6, 4-8, 7-12 or K-12).
- Participants for 7-12 or K-12 can license in any two subject areas for which the tests have been passed and the participant is hired to teach.
- If a 4-8 participant passes three or all four subject tests and is hired to teach in all four subject areas, then the license can be issued in all four subject areas.
- ALWAYS make sure that registration for a test is for the specific test required for Arkansas licensure.
- When registering report scores to ADE (7031) Arkansas Department of Education and select APPEL (7032) Arkansas Professional Pathway to Educator Licensure as the attending institution.
- Keep in mind that Praxis Subject Assessments are based on a college/university program of study in that particular discipline.
- It is advised that applicants seek out information on each test provided on the ETS website in the Store before deciding to register and pay.

D: Additional Required Coursework

For certain APPEL participants to complete APPEL and receive the Arkansas Standard Teaching License additional courses must be completed BEFORE the end of the participant's second year in the program.

Arkansas IDEAS:

APPEL participants, once provisionally licensed, can establish an account in Arkansas IDEAS. This is the professional development portal for all Arkansas teachers. Once an account is established the teacher can complete most professional development offerings free of charge.

All Elementary K-6 AND Middle Childhood 4-8 participants for any of the content areas (math, science, English, Social Studies) must submit a syllabus and transcript showing completion or provide an Arkansas IDEAS certificate of completion (when appropriate) for:

Six credit hours of ADE-approved Teaching Reading Courses at an accredited college/university

- The six(6) college credit-hours of instruction in reading must include, at a minimum, theories and strategies for teaching reading, diagnosis of reading difficulties, and intervention strategies for struggling readers, and may include Disciplinary Literacy.
- The Reading courses must be completed with a "B" or better and a transcript showing completion submitted to APPEL no later than June of the year of completion of APPEL.
- The Reading courses may be all online, all face to face or blended delivery of instruction with syllabi submitted to APPEL

Disciplinary Literacy must be proven as part of the above six hour requirement OR either a 3-hour course in Disciplinary Literacy at a college/university must be completed with a "B" or better OR a 45-hour professional development piece in Disciplinary Literacy through Arkansas IDEAS must be completed.

Three credit-hours of Arkansas History at an accredited college/university OR 45-hrs of Arkansas History modules offered free of charge in Arkansas IDEAS

- The Arkansas History course must be completed with a "C" or better and a transcript showing completion OR the 45-hrs in Arkansas IDEAS must be completed with the transcript OR IDEAS certificate of completion submitted to APPEL no later than June of the year of completion of APPEL.

All <u>Social Studies</u> 7-12 participants must submit a transcript showing completion or provide an Arkansas IDEAS certificate of completion for:

Three credit-hours of Arkansas History at an accredited college/university OR 45-hrs of Arkansas History modules offered free of charge in Arkansas IDEAS

- The Arkansas History course must be completed with a "C" or better and a transcript showing completion OR the 45-hrs in Arkansas IDEAS must be completed with the transcript OR IDEAS certificate of completion submitted to APPEL no later than June of the year of completion of APPEL.

E: Background Check Requirements

Before a candidate may enter a public school classroom, the candidate shall apply for and successfully complete the required background checks by the Child Maltreatment Central Registry, Arkansas State Police and the Federal Bureau of Investigation as required by Ark. Code Ann.§ 6-17-410. Proof of initiating the process for completion of the mandatory State, FBI and Department of Human Services (DHS) Central Registry background checks is required.

The state of Arkansas requires all applicants for a teacher's license to be fingerprinted and to undergo a successful background check from the FBI, Arkansas State Police, and the Arkansas Child Maltreatment Central Registry within one year of making application for a teaching license.

Questions about this procedure and/or the impact of the outcome upon a candidate should be directed to the ADE Office of Educator Licensure. Refer to http://www.arkansased.org click Educator Licensure, click Background Check Requirements for details. If evidence, as the result of mentioned background checks becomes known that would render the candidate ineligible to receive a teaching license in the state of Arkansas, then this information may be grounds to refuse admission or retention in APPEL.

Background checks must be done for licensed positions.

- DO NOT complete the forms for classified or non-licensed district personnel
- Previous background checks done, including for substitute teachers, will not be accepted. New background checks are required.

NOTE: Please be aware that the Arkansas Department of Education has access to and must consider any background check reflecting a conviction (pleading guilty or nolo contendere (no contest) or being found guilty by a jury or judge for any offense listed in Ark. Code Ann. & 6 17-410 as well as any felony involving physical or sexual injury, mistreatment, or abuse against another, including records that have been expunged, sealed or subject to a pardon.

F: Online Application

The APPEL online application will be available from mid-February through the end of the first week of June each year. Candidates should return to http://www.arkansased.gov on the APPEL page during the application window to complete and submit an electronic application.

Transmittal of the application without submission of ALL of the above-required documentation may cause an application to be delayed or denied. The application process includes completing the online application AND submission of all required documents.

The ADE APPEL Program Office will observe the following general deadlines for the Year I application process. Candidates are encouraged to submit all requirements for admission prior to the established deadlines.

Mid-February each year	Online application window opens
End of first week of May each year	Recommended date for which all Praxis testing should be completed for admission to the program by the June deadline
End of first week of June each year	Online application window closes
End of second week of June each year	APPEL Orientation, Fee Payment and Site Assignment
Orientation day to first day of June start date	Payment window for online fee payment. This is the final step for full admission to start the fifteen days of summer instruction in June.
June each year	Fifteen days of APPEL Summer Academy on Monday-Friday, 8am-4pm daily at assigned site
August 1 each year	All background checks should be cleared by this date for a license to be issued upon hire and starting in the teaching position.

Year 1 applicants are considered fully admitted participants based on the following:

- Admission to APPEL with receipt of acceptance letter and Year 1 Employment Eligibility Form
- Documented attendance at orientation
- Payment in full of the program fee
- Cleared for a definite site assignment (will receive via email)
- Cleared all required background checks for license to be issued

There are two (2) tracks in the APPEL program: a one-year program and a two-year program.

- Participants with a four-year degree who have completed a teacher preparation program (completion of all coursework with the exception of Student Teaching) may be eligible to complete a one-year program if their degree was awarded within five (5) years of the date of application.
- Participants with a four-year degree, who have not completed a teacher preparation program (completion of all coursework with the exception of Student Teaching) or who completed a teacher preparation program more than five (5) years before the date of application, must complete a two-year program.
- Participants admitted to APPEL for Year 1 must provide, in writing no later than the June start date, a request of consideration for the one-year program. Participants must provide official transcripts and a letter from the college/university Licensure Officer documenting completion of a teacher preparation program (all coursework with the exception of Student Teaching).
- If upon review of documentation the one-year program is approved, then the participant is notified and will be placed in Year 2 of the program.

Requirements for the APPEL Provisional Teaching License

Requirements for the provisional teaching license include:

- Unconditional admission into APPEL
- Successful completion of the APPEL Summer Academy
- Documentation of appropriate employment via the completed and signed Employment Eligibility Form (EEF) that must be returned to the APPEL office for the license to be processed
- Submission of completed and signed application for a teaching license
- Clearance of the required State, Federal and DHS background checks

The license is effective as of August 1 and is active for two years. To maintain the Provisional Teaching License, the participant must:

- continue in, and successfully complete the monthly modules for Year 1, and
- be fully admitted for Year 2, and
- successfully complete Year 2 APPEL Summer Academy, and
- continue in and successfully complete the monthly modules for Year 2, and
- maintain a teacher-of- record position during Year 2

If the participant fails to successfully matriculate through APPEL or does not maintain the teaching position the Provisional license will be rescinded.

Note: An applicant for a Provisional Teaching License under APPEL shall adhere to and abide by all the policies and procedures as outlined in the published APPEL Participant Handbook for the year of admission. Failure to adhere to these policies and procedures may result in dismissal from the program and the license being rescinded.

Note: If employment is not secured by October 1, in the year of admission to APPEL, the participant shall be placed on "hold" for a period not to exceed one year. Participants are given three consecutive years in which to teach for two years in the program. A participant on "hold" will not be issued a license. The participant should continue to search for employment during the on "hold" year.

Note: If a participant is granted "conditional admission" status, all conditions must be met. If these conditions not met, the participant will be administratively withdrawn from the program without refund of fees and will not be licensed as a teacher of record through the APPEL program.

Post- Application, Orientation, Fees, and Site Assignment

Post –Application Process

- Upon receipt of items (A-C, E) and the online application (F), candidates (within 7-10 business days) will receive an email. The email will detail whether the applicant has been accepted or whether there is a deficiency in the application.
- The APPEL acceptance letter and an Employment Eligibility Form (EEF) will be sent via email to the applicant. The acceptance letter and EEF allow a candidate to begin actively applying for open positions with school districts.
- All deficiencies must be cleared by the June application deadline for Year 1 admission to the program. If and when the deficiency is cleared, then the applicant will receive the acceptance email.
- Accepted applicants register for orientation as instructed in the acceptance email.

APPEL Orientation

- Accepted applicants will register to attend the mandatory orientation meeting scheduled for June each year.
- The applicant will attend orientation and decide whether to continue with the program. Details on orientation are included in the acceptance letter.
- Applicants must attend the mandatory orientation meeting to be held in Little Rock.
- Site facilitators attend this meeting and are available to answer questions and distribute site-specific information.
- There are two identical orientation sessions on that day. Participants should only attend one session.

APPEL Fee Payment

- After receipt of acceptance documents and attending orientation with a tentative site assignment, program fees are to be paid during the fee payment window. Details on how to pay are covered at orientation.
- The fee covers the cost of the culminating assessment, books, instructors, and supplies.
- The first year program fee is required to be paid in full for a definite site assignment to be made and before the candidate can begin attending summer instruction. Candidates do not pay the program fee until they are certain they will participate in the program.
- If electronic payment is unavailable, payment may be submitted via cashier's check or money order. Do NOT send a personal check. All personal checks will be returned and the application process halted until proper form of payment is received. Payment made by cashier's check or money order must be received in the APPEL office by the deadline.

- A refund of program fee (minus $50 for processing) may be provided if the participant informs the APPEL office in writing of the refund request by July 1 of the current program year and has attended NO portion of ANY instructional module. Refunds can take 4-6 weeks to be issued.

IMPORTANT NOTE: The program fee will be incrementally increased over the next few years. This is to accommodate for the increasing costs of assessments, books and program materials.

- 2017-18- $1400 per year

- 2018-19- $1500 per year

APPEL Site Assignments

- Tentative site assignments are made when the applicant is accepted to the program.

- The applicant receives an email with detailed information about the site.

- The applicant meets the site facilitators and picks up specific information at orientation.

- A permanent site assignment is made once the applicant has paid the program fee in full.

- The participant would then begin summer instruction in June at the assigned site. The fifteen days of summer instruction (M-F, 8am-4:30pm) are held at the assigned site.

- Every effort is made to assign participants to the first choice indicated upon the application. However, due to size limitations of facilities, some adjustment may be necessary. In that case, the second choice would be assigned.

APPEL Year 1 Eligibility, Drop and Hold Policies

Year 1 applicants are considered fully admitted participants and eligible for licensure based on the following:

- Admission to the program with receipt of acceptance letter and Year 1 Employment Eligibility Form
- Documented attendance at orientation
- Payment in full of the program fee
- Cleared for a permanent site assignment (will receive via email)
- Attend and successfully complete all fifteen days of APPEL Summer Academy at the assigned site

Drop

- If the participant pays the fee but drops the program prior to attending on the first day of summer modules, then upon request in writing by July 1, the fee (minus a $50 processing charge), is refundable.
- If the participant pays and attends any portion the first module there is no refund of the program fee.
- The participant who drops during the summer modules after attending the first day will remain in the program on inactive status for one full year. This means the participant is no longer attending modules and is not eligible for licensure in the current year.
- The participant must continue the program the following year or the participant will be administratively withdrawn from the program with forfeiture of the program fee.

Hold

- If a fully admitted participant successfully completes all fifteen days of summer instruction, but fails to secure appropriate employment by October 1 of the current year, then that participant is automatically placed on "hold" status in the program.
- The participant is allowed to attend the September monthly module but must secure appropriate employment by October 1 or the participant will no longer attend any further monthly modules.
- The participant is still eligible to look for and take a teaching position no later than January of the spring semester of the first year in the program. The Provisional license will be issued upon confirmation of employment and the participant will resume attending modules. Arrangements will be made to make up missed modules.
- The participant has one full year, until October 1 of the immediately following year, to secure appropriate employment and re-enter the program to be eligible for licensure.
- The program allows a participant three consecutive years in which to teach for two years in the program.

APPEL Year One Late Summer Academy

The Arkansas Department of Education offers a late Summer Academy. This Late Cohort is offered to meet school districts' needs in critical academic shortage areas and high need geographic areas. Instruction is held during three weeks of July at a central Arkansas location TBD. This cohort is limited to 60 candidates on a content-specific availability and first come, first-served basis. Eligible candidates must have been offered a teaching position in an Arkansas school. A Commissioner's Memo is issued each year to inform district hiring officials of this opportunity.

Candidates applying for the Late Cohort must be recommended by a district hiring official by letter, on official district letterhead, for a specified position open in the immediate, upcoming school year. APPEL must receive this letter from the hiring official no later than close of business on Friday before instruction begins on Monday. Late Cohort accepts applicants for licensure levels of: Elementary K-6, Middle Childhood 4-8 (any one or more subject areas), K-12 subject areas and 7-12 subject areas. Late Cohort does not accept candidates for Special Education

- Praxis exams are **NOT** required to be passed before admission to the Late Cohort:
  - Candidates MUST meet all other acceptance criteria, including GPA or Conditional Admission requirements
  - Candidates will submit all passing score reports for previously passed tests,
  - If no tests have been passed, then registration for July/August/September testing window must be submitted with the application.

- Admission for Late Cohort **does not** automatically yield a Provisional license,
  - If all tests are not passed upon application, then candidates will receive a Conditional Enrollment Agreement (CEA). The testing conditions must be met before a teaching license will be issued for the current school year.
  - CEA must be signed by the school district hiring official and the participant,
  - CEA must be returned and on file in the APPEL office by the instruction start date,
  - If all tests are not passed by the time school begins in August, then the candidate may only be employed as a substitute or long-term substitute (waiver must be approved by Office of Educator Licensure),
  - ALL exams must be taken and passed by October 1st and all background checks must clear BEFORE a license will be issued,
  - If CEA conditions are NOT met by October 1, the candidate is administratively withdrawn from APPEL and will not be eligible for licensure through APPEL for the current school year

Year 1 Instructional Modules

Year I APPEL Modules (each 7 clock hours of instruction, except where *noted)

Updated April each year. Subject to change.

- Y1D1: Overview and Framework for Teaching
- Y1D2: Framework Domains 1 and 2
- Y1D3: Framework Domains 3 and 4
- Y1D4:Engaging Students/Reflecting on Teaching
- Y1D5: Human Growth and Development
- Y1D6: Arkansas Standards
- Y1D7: Lesson Planning
- Y1D8: Special Education (Teaching Students with Disabilities)
- Y1D9: Classroom Climate, Safety, and Bullying
- Y1D10: Teaching with Poverty in Mind
- Y1D11: Student-Centered Classroom: Content Specific: Classroom Management and Time Management
- Y1D12: Student-Centered Classroom: Content Specific: Assessment
- Y1D13: Student-Centered Classroom: Excellent Professional Practice and Professional Planning for School
- Y1D14: Student-Centered Classroom: Content Specific: Differentiated Instruction
- Y1D15: Student-Centered Classroom: Content Specific: Disciplinary Literacy
- Y1D16: Classroom Management and Parent Communication (3.5 hours each)
- Y1D17: Online: Special Education in Practice
- Y1D18: High Yield Strategies
- Y1D19: Online: Inviting Students to Learn
- Y1D20: Online: Classroom Management by Engaging Students in Learning and Assessment
- Y1D21: Classroom Management by Engaging Students in Learning and Assessment
- Y1D22: Online: Classroom Management: Domain C: “Managing Classroom Procedures” Video and Self-Assessment
- Y1D23: Classroom Management: Domain C: “Managing Classroom Procedures” Evaluation

APPEL Year 1 Instructional Module Descriptions

Y1, Orientation: An online session where teachers learn about Arkansas IDEAS as a resource of professional development and complete required professional development hours for teacher licensure.

Y1D1: Overview and Framework for Teaching: Introduction of the Danielson Framework for Teaching.

Y1D2: Framework Domains 1 and 2: In depth study of the Danielson Framework for Teaching Domains 1 and 2.

Y1D3: Framework Domains 3 and 4: In depth study of the Danielson Framework for Teaching Domains 3 and 4.

Y1D4: Engaging Students/Reflecting on Teaching: With a special emphasis on Domain 3c, this module will define student engagement and provide participates with the strategies needed to engage all students in their classrooms.

Y1D5: Human Growth and Development: Participants will examine child development and foundational child development theory, provide a statement of teaching style based on research findings about human growth and development, relate theories of human development to creating developmentally appropriate learning experiences and create learning experiences that differentiate for learning styles.

Y1D6: Arkansas Standards: This module will introduce participants to the Arkansas State Standards. Upon completion, they will understand the importance of standards based curriculum in the classroom.

Y1D7: Lesson Planning: Best practices in how to plan instruction, including understanding the importance of knowing students, content, and pedagogy before planning lessons, how to design activities, assignments, and assessments that engage students in constructing important knowledge, and understanding that lesson planning is about developing and deepening student understanding of big ideas and transferring their learning to new situations.

Y1D8: Special Education (Teaching Students with Disabilities): Provides beginning teachers with the fundamental knowledge required to provide a free appropriate public education to students with disabilities in the least restrictive environment- the general education classroom.

Y1D9: Classroom Climate, Safety, Bullying: Participants will identify types of bullying, learn how to analyze, evaluate, and practice with curriculum resources that can be used in the classroom, and articulate their understanding that all students possess a basic need to "fit in" and be a part of a safe and positive learning environment.

Y1D10: Teaching with Poverty in Mind: Introduction to an awareness of how poverty affects the brain. Strategies will be explored to combat an impoverished brain and develop empathy for students who face multiple barriers to learning.

Y1D11: Student-Centered Classroom: Content Specific: Classroom Management and Time Management: Participants will develop a personal classroom management philosophy, discover the connection between effective classroom management and teacher effectiveness, discover the importance of time management and its effect on classroom management, and create a proactive classroom management plan.

Y1D12: Student-Centered Classroom: Content Specific: Assessment: Participants will learn to distinguish between the types and purposes of assessment, develop formative assessments that are tied to goals, incorporate the use of rubrics into assessment and student inclusion in the assessment process, determine if a student is falling behind and make appropriate interventions, communicate with families the results of all types of assessment, including standardized tests, and the rationale and philosophy of how the educator grades effort vs. achievement.

Y1D13: Student-Centered Classroom: Content Specific: Excellent Professional Practice and Professional Planning for School: Participants will possess a clear understanding of excellent professional practice and prepare for the first weeks of school and embrace the culture of being a teacher in a school.

Y1D14: Student-Centered Classroom: Content Specific: Differentiated Instruction: Participants will learn to enhance teaching and learning by planning and designing lessons, delivering instruction and measuring progress utilizing differentiated instruction in the content area meeting the needs of all learners.

Y1D15: Student-Centered Classroom: Content Specific: Disciplinary Literacy: This module will introduce participants to the concept of disciplinary literacy. Participants will work with other content area teachers to develop grade appropriate close reading lessons and performance tasks.

Y1D16: Classroom Management and Parent Communication: Participants will analyze their personal classroom management philosophy and their classroom management plan to determine its effectiveness, and make a connection of effective teaching and effective classroom management according to *TESS*.

Y1D17: Online Module: Special Education in Practice: The purpose of this module is to provide participants with the practice necessary to understand free appropriate education (FAPE) provided to students with disabilities in the least restrictive environment (LRE)- the general education classroom. This module includes basic understanding of laws related to educating children with disabilities and identifying characteristics of learners who are identified in the disability categories recognized by Arkansas.

Y1D18: High Yield Strategies: The purpose of this module is to develop participants' understanding of the origin and structure of Marzano's nine high yield strategies and how to identify the high yield strategies in a classroom setting.

Y1D19: Online Module: Inviting Students to Learn: The goal of this module will learn to improve rapport and encourage students to work towards their goals. This module teaches the importance of expressing caring in schools, modeling effective communication skills, and inviting students to learn.

Y1D20: Online Module: Inviting Students to Learn: The goal of this module is to train educators to send inviting messages to students to help them realize they are capable and can learn. Teachers will be intentional in every conversation and choose words to use with students to help them feel strong, thus enabling them to be successful in what they are doing.

Y1D21: Classroom Management by Engaging Students in Learning and Assessment: In this module participants will understand that in a highly engaged classroom, student behavior is more easily managed. They will plan effective lessons including strategies to engage learners and compare and contrast the fixed theory and growth theory of intelligence. They will determine how continuous assessment can facilitate learning in an effective classroom and use strategies of student engagement to create a student centered classroom.

Y1D22: Online Module: Classroom Management: "Managing Classroom Procedures" Video Self-Assessment: Participants will evaluate their practice as a teaching professional, and create a plan of action based on the Charlotte Danielson design to maximize their effectiveness.

Y1D23: Classroom Management: "Managing Classroom Procedures" Video Evaluation: Participants will evaluate their peers, and help them to create a plan of action based on the Charlotte Danielson design to maximize their effectiveness.

APPEL Year 2 Admission and Post Application

Year 2 Admission

Admission Requirements for Year 2:

- Successful completion of first year of teaching
- Evidence of mentoring during the first year
- Successful completion of all first year Instructional Modules
- Submission of Year 2 online application
- Full payment of Year 2 program fee

APPEL teachers who have successfully completed the first year must apply to the second year of the program. The Year 2 APPEL online application will be available from mid-February through end of the first week of June each year.

To apply eligible participants should:

- Go to www.arkansased.org click “A”, click the APPEL link and under related links click APPEL Online Application.
- Complete the fields available for Year 2 applicants.
- Upon completion of the online application click on Proceed to Payment for details on how to submit payment for the second year program fee.
- If electronic payment is unavailable, payment may be submitted via cashier’s check or money order. DO NOT send personal checks or cash. All personal checks will be returned and application process halted until proper form of payment is received.
- Payment may be made by cashier’s check or money order and must be received by the APPEL office NO LATER THAN the first day of June instruction.

Year 2 Post Application

- Within 7-10 business days of receipt of the on-line application and the payment participants will receive an email verifying acceptance for Year 2, to include the Second Year Employment Eligibility Form.

Year 2 Site Assignment and Teaching License

Site Assignment

Second year participants should continue to attend modules at the same site attended in the first year. However, if circumstances are such that a move must be made, then participants will be assigned to a new site. The participant will request via email to the APPEL Program Advisor to be moved, clearly explaining the reasons why they must move, then if approved, arrangements will be made.

Requirements for Maintaining License for APPEL Year 2

- Unconditional admission to Year 2 of APPEL
- Successful completion of the Year 2 Summer Academy
- Documentation of appropriate employment by submission of the completed and signed Year 2 Employment Eligibility Form
- Continue in a Teacher of Record position for Year 2
- Continue mentoring/induction for Year 2

Year 2 Instructional Modules

Year II APPEL Modules (each 7 clock hours of instruction, except where *noted)

Updated in April each year. Subject to change.

- Y2D1: Focused Instructional Strategies to Increase Rigor and Relevance
- Y2D2: Inspiring the Best in Students
- Y2D3: Brain Power- Teaching with the Brain in Mind
- Y2D4: The Differentiated Classroom
- Y2D5: Formative Assessment
- Y2D6: Extending Thinking
- Y2D7: Data-Driven Decision Making
- Y2D8: Closing the Achievement Gap
- Y2D9: Questioning and Vocabulary Building
- Y2D10: Engaging Classroom/Parental Involvement
- Y2D11: edTPA Boot Camp: Basic Training
- Y2D12: edTPA Boot Camp: Academic Language
- Y2D13: edTPA Boot Camp: Task One: Planning for Instruction and Assessment
- Y2D14: edTPA Boot Camp: Task Two: Instructing and Engaging Students in Learning
- Y2D15: edTPA Boot Camp: Task Three: Assessing Student Learning
- Y2D16: Getting Started with edTPA
- Y2D17: Online: Task One: Planning Commentary
- Y2D18: Task Two: Instruction Commentary
- Y2D19: Online: Task Three: Assessment Commentary
- Y2D20: Online: Wrapping Up Your edTPA Portfolio
- Y2D21: edTPA Review Day
- Y2D22: Online: edTPA Submission
- Y2D23: APPEL Graduation

APPEL Year 2 Instructional Module Descriptions

- Y2D1: Focused Instructional Strategies to Increase Rigor and Relevance: This module introduces the Rigor and Relevance Framework which was developed by The International Center for Leadership in Education. Lesson plan development using this framework in conjunction with Marzano's instructional strategies will produce higher level thinking skills in all students.
- Y2D2: Inspiring the Best in Students: In this session teachers will collaborate to produce methods and resources to address a four-step process in inspiring ALL students.
- Y2D3: Brain Power-Teaching with the Brain in Mind: In this session teachers will deepen their understanding about the implications of brain research on our brains and students' lives.
- Y2D4: The Differentiated Classroom: In this session teachers will explore differentiation and instructional strategies that can be used to differentiate instruction including using technology to provide differentiated instruction.
- Y2D5: Formative Assessment: In this session teachers will recognize the use of formative assessment for planning differentiated instruction, identify a variety of formative assessment strategies, examine and practice the qualities of effective feedback and examine their current formative assessment practices.
- Y2D6: Extending Thinking: In this session teachers will outline ways to identify students' needs, interests and knowledge, examine instructional strategies for differentiation and provide examples of how these strategies can be used to extend student thinking, and identify characteristics of gifted students and describe particular instructional strategies to effectively meet their needs.
- Y2D7: Data Driven Decision Making: In this session teachers will develop an understanding of the common vocabulary and key concepts of PLC's, understand that the implementation of PLC concepts will benefit students and educators alike, become familiar with data using Root Cause analysis, explain how data driven decision-making produces favorable results in a PLC, and assess the current reality of their school district's successes in implementing PLC's and in using data driven decision-making.
- Y2D8: Closing the Achievement Gap: In this session teachers will identify teaching and learning factors that help face the achievement gap and close it. Participants will identify personal biases that affect teaching and reflect on practice that improves implicit bias.
- Y2D9: Questioning and Vocabulary Building: In this session teachers will understand that questioning is an effective way to promote thought and inspire inquiry in students. Teachers will understand how to use questioning to help students generate information about different types of terms and become familiar with the tools needed to facilitate vocabulary study.

- Y2D10: The Engaging Classroom/Parental Involvement: In this session teachers will identify strategies to connect students to the learning, identify relevant rules and regulations regarding parental involvement and design strategies that could be used to foster and support active parental involvement.
- Y2D11: edTPA Boot camp: Basic Training: edTPA is a performance assessment of readiness to teach. The portfolio assessment is designed with a focus on student learning. As a performance-based assessment, edTPA is designed to engage teacher candidates in demonstrating their understanding of teaching and student learning.
- Y2D12: edTPA Boot camp: Academic Language: edTPA is a performance assessment of readiness to teach. The portfolio assessment is designed with a focus on student learning. As a performance-based assessment, edTPA is designed to engage teacher candidates in demonstrating their understanding of teaching and student learning.
- Y2D13: edTPA Boot camp: Planning for Instruction and Assessment: edTPA is a performance assessment of readiness to teach. The portfolio assessment is designed with a focus on student learning. As a performance-based assessment, edTPA is designed to engage teacher candidates in demonstrating their understanding of teaching and student learning.
- Y2D14: edTPA Boot camp: Task Two: Instructing and Engaging Students in Learning: edTPA is a performance assessment of readiness to teach. The portfolio assessment is designed with a focus on student learning. As a performance-based assessment, edTPA is designed to engage teacher candidates in demonstrating their understanding of teaching and student learning.
- Y2D15: edTPA Boot Camp: Task Three: Assessing Student Learning: edTPA is a performance assessment of readiness to teach. The portfolio assessment is designed with a focus on student learning. As a performance-based assessment, edTPA is designed to engage teacher candidates in demonstrating their understanding of teaching and student learning.
- Y2D16: Getting Started with edTPA: edTPA is a performance assessment of readiness to teach. The portfolio assessment is designed with a focus on student learning. As a performance-based assessment, edTPA is designed to engage teacher candidates in demonstrating their understanding of teaching and student learning.
- Y2D17 Online: Task One: Planning Commentary: edTPA is a performance assessment of readiness to teach. The portfolio assessment is designed with a focus on student learning. As a performance-based assessment, edTPA is designed to engage teacher candidates in demonstrating their understanding of teaching and student learning.

- Y2D18: Task Two: Instruction Commentary: edTPA is a performance assessment of readiness to teach. The portfolio assessment is designed with a focus on student learning. As a performance-based assessment, edTPA is designed to engage teacher candidates in demonstrating their understanding of teaching and student learning.

- Y2D19 Online: Task Three: Assessment Commentary: edTPA is a performance assessment of readiness to teach. The portfolio assessment is designed with a focus on student learning. As a performance-based assessment, edTPA is designed to engage teacher candidates in demonstrating their understanding of teaching and student learning.

- Y2D20: Online: Wrapping Up Your edTPA Portfolio: edTPA is a performance assessment of readiness to teach. The portfolio assessment is designed with a focus on student learning. As a performance-based assessment, edTPA is designed to engage teacher candidates in demonstrating their understanding of teaching and student learning.

- Y2D21: edTPA Review Day: edTPA is a performance assessment of readiness to teach. The portfolio assessment is designed with a focus on student learning. As a performance-based assessment, edTPA is designed to engage teacher candidates in demonstrating their understanding of teaching and student learning.

- Y2D22: Online: edTPA Submission: edTPA is a performance assessment of readiness to teach. The portfolio assessment is designed with a focus on student learning. As a performance-based assessment, edTPA is designed to engage teacher candidates in demonstrating their understanding of teaching and student learning.

- Y2D23: Graduation

APPEL Teaching Assignment Requirements

Teaching Assignment Requirements

APPEL teachers must secure appropriate employment as teacher-of-record to continue in the program beyond summer instruction. To be eligible to receive the two-year Provisional license and attend monthly modules during the school year, participants must be employed:

- as a classroom teacher of record, teaching in the licensure area/level for which they are eligible to license,
- for a minimum of three (3) hours per day (part-time or full-time),
- in a traditional classroom setting in an Arkansas public school, charter school, or education service cooperative paired with a certified mentor approved by the ADE, or
- in a private school setting where the private school is accredited and the participant can be paired with a certified mentor approved by the ADE

IMPORTANT:

- Participants may not change levels of licensure and must teach in the same licensure level Elementary (K-6), Middle Childhood (4-8), or Secondary (7-12) for the duration of the two-year program.
- Middle Childhood (4-8) teachers must be licensed to teach in two (2) areas or more of the four (4) middle school content areas.
- Middle Childhood (4-8) teachers may add one career permit or endorsement area to the license if all requirements for the permit or endorsement have been met. The teacher must have a teaching assignment in the permit or endorsement area.
- Secondary (7-12) teachers may be assigned to teach in any two areas of licensure for which they qualify. All state-mandated assessments for both areas must be passed and must have a teaching assignment in both areas.
- Secondary teachers may add one career permit or endorsement area to one area of licensure if all requirements for the permit or endorsement have been met and if the teacher has a teaching assignment in the permit or endorsement area.
- A Coaching endorsement may be added as the second area of licensure to any license area if the required program of study for Coaching and the appropriate licensure assessment are successfully completed and documented. OR, a coaching certificate may be obtained through the Arkansas Activities Association (AAA) upon completion of meeting certain requirements.
- APPEL participants may not file an Additional Licensure Plan (ALP) or teach in an out-of-licensure area while enrolled in the APPEL program.

Participants are to notify the APPEL Program Advisor of any change in teaching position status. Losing a position through no fault of the participant may result in the participant going on hold. Participants are reminded that should they sign a contract they are responsible for fulfilling their agreement. Changing from one school district to another after school has begun is not permissible, except under certain extenuating circumstances, and on a case by case basis.

APPEL Teacher Induction/Mentoring

An individual who holds a provisional license in the APPEL Program must participate in two years (four semesters) of mentoring as required for novice teachers under the Department's Rules Governing Educator Mentoring Programs.

- Each APPEL teacher is considered a novice teacher and must participate in mentoring.

- Mentoring for an APPEL teacher shall consist of a certified mentor providing support and focused feedback with regard to instructional skills, classroom management, and professional behaviors.

- The school district's Mentoring Project Director will assign the mentor within three weeks of the teacher's first contract day of the school year.

- An APPEL teacher shall complete all modules, observations, and professional growth targets required by the APPEL program.

- The Department must approve unfunded participation in a mentoring program by an APPEL teacher who is employed at a private school under certain conditions.

- If there is a change of mentor or if the assigned mentor is not working with the APPEL teacher, it is the responsibility of the APPEL participant to notify the APPEL Program Advisor as soon as possible so that the issue is resolved in a timely manner.

- Each APPEL teacher receives mentoring for the duration of their provisional licensure period (two years) and must prove four semesters of documented mentoring to complete program requirements and receive the five-year Arkansas Standard Teaching License.

APPEL Program Completion Requirements

Recommendation is made by APPEL to the Office of Educator Licensure for the two-year Provisional Arkansas Teaching License to convert to the five-year Arkansas Standard Teaching License when the following conditions are met and verified by the APPEL office:

1. Successful completion of two years of teaching experience as teacher of record.
2. Successful completion of all APPEL Instructional Modules, including in class and out of class assignments, and any outstanding assignments.
3. Completion of the final culminating assessment.
4. Passing score on the required Praxis: Principles of Learning and Teaching (PLT) directly corresponding to the licensure grade level (i.e., K-6, 4-8 or 7-12) during the provisional licensure period or the specific Praxis pedagogical assessment (i.e., World Language Pedagogy) for the particular subject area taught during the provisional licensure period. OR, passing score on the culminating Performance Assessment as approved by the State Board of Education.
5. Completion of all required additional coursework with a syllabus and transcript and/or certificate of completion submitted to the APPEL office.
6. Documentation of successful completion of four semesters of novice teacher mentoring.
7. Documentation of completion of the required professional development through the Arkansas IDEAS Portal as indicated in the ADE Rules Governing Educator Licensure.
8. Official license application for the Standard Arkansas Teaching License completed, and signed, and submitted by the applicant to the APPEL office.
9. Proof of licensure fee payment with receipt submitted to the APPEL office by the applicant with the accompanying license application.

NOTE: A third Provisional Teaching License may become available under certain conditions. Please contact the APPEL Program Advisor for details.

NOTE: If the appropriate state-mandated pedagogical assessment is not successfully completed within the APPEL program period, the Provisional Teaching License will be revoked. The participant will be allowed to attend Department-scheduled remedial sessions for one (1) year, during which time the participant may attempt to pass the assessment and, if successful, will be issued a Standard Teaching License.

NOTE: If the pedagogical assessment is not successfully completed within the remedial year as provided under Section 5-2.03 of the Rules Governing Educator Licensure, the participant will be administratively withdrawn from the program.

APPEL Grant Awards for High Priority Areas

As funds are available, state-supported grants (maximum $500) are awarded to APPEL participants who teach in high priority subject areas or school buildings based either on the ADE-designated Critical Shortage Subject Areas report and/or a Needs Improvement Priority designation on the current year's ESEA School Status report. APPEL high priority grants are awarded in the spring semester of Year 1. Participants receive an invitation to apply for a grant, and are notified of their grant status through their online Moodle account.

APPEL Retention, Disciplinary, Attendance and Appeals Policies

Retention in APPEL Program

Following acceptance to the APPEL program, a participant's good standing will be periodically reviewed during and upon completion of Year 1 and during and upon completion of Year II and possibly revoked if:

- the participant fails to exhibit responsible and professional behavior in all classes, within the teaching position, and interactions with peers and faculty, as judged by the program staff, mentor teachers, and other school personnel.
- the participant violates the rules and or policies governing the program, the Code of Ethics for Arkansas Educators or criminal law.
- the participant submits all work in the required format and receives 60-69 percent of the possible points for the work completed, the participant will be placed on probation. Participants who are placed on probation will be given the opportunity to resubmit the required work as outlined in the grading comments submitted by the site facilitator.
- the participant scores 59 percent or lower on the daily assignments/assessments overall and fails the Summer Academy they will be dismissed from the program and ineligible for licensure.
- the participant scores 59 percent or less overall on monthly assignments/assessments the participant will be dismissed from the program and the license will be rescinded.
- the participant is suspected of having presented non-original work or has shared their work with other participants (outside of the group work assignments) the participant is at risk of being dismissed from the program. Academic honesty is taken seriously and APPEL reserves the right to request additional information and conduct an investigation regarding any suspicious materials presented by an APPEL participant. Please be advised that the site facilitators may elect to use an electronic plagiarism checker if they suspect work is not original.
- the participant is suspected of presenting non-original work, the process for investigation of suspicious work will include, but is not limited to, requesting additional materials regarding the suspect work from the APPEL participant. The APPEL Program Advisor may require participants to attend a meeting in Little Rock where they will be expected to answer additional questions regarding their work. If the participant’s work is found to be non-original, the individual will be dismissed from APPEL. Decisions regarding suspicious work may be appealed to the Unit Coordinator, Office of Educator Effectiveness.
- the participant has excessive absences over the allowable time, which could result in the participant having to repeat the entire program, being dismissed from the APPEL, and/or a rescinding of the teaching license.

- the participant's knowledge, skills, and dispositions are judged by two or more program site facilitators and/or the mentor teacher or an evaluator to be unsatisfactory. Program Advisors will conduct a review. An unsatisfactory review yielding documentation by two or more of the above-mentioned persons will result in the participant attending a counseling meeting in Little Rock, which might include the facilitators, mentor, or evaluator which could result in dismissal from the program. Decisions regarding dismissal may be appealed to the Unit Coordinator, Office of Educator Effectiveness.

Disciplinary Policy

APPEL participants will receive information regarding expectations related to professionalism and disposition during all training components. Participants who do not adhere to these policies are at risk of being dismissed from APPEL. Participants who do not conduct themselves as professionals will receive one demerit for each incident. Site facilitators will keep a record of infractions, and demerits will be issued as explained in the following section. When a total of five demerits is reached (for any combination of infractions) a “red card” disciplinary form will be issued. Expectations include, but are not limited to, those listed below:

1. When a total of five demerits are reached a “red card” disciplinary form will be issued.
2. Site facilitators will counsel with the participant and work out an improvement plan. This form and plan will be on file with ADE.
3. If a second form is issued, the participant will be required to meet with program officials at ADE for a disciplinary hearing.
4. As a result of this hearing, the participant may be dismissed from the program and will not be allowed to reapply.
5. Participants who have had their license revoked or who have breached a contract will not be allowed to continue or be readmitted to the APPEL program.
6. Non-renewal for any reason other than reduction in force will result in dismissal from the program and the participant will not be allowed to reapply.
7. If a participant is placed on an improvement plan and no improvement is made as documented by the site facilitators and/or the school administrator, the participant will be dismissed from the program and will not be allowed to reapply.

Tardiness and Leaving Early

- Participants are expected to arrive for all training sessions in adequate time to be checked in and in their seats at the time indicated on the schedule.
- Participants are expected to remain in the training session until dismissed. This includes the first session of the day, after breaks, lunch, and following the transition between whole group and small group activities.
- Participants who are more than five minutes late will be considered tardy.
- Participants who do not adhere to the tardiness/leaving early rules will receive one demerit for each incident.

Professionalism

Participants are expected to present themselves as teaching professionals. This professionalism should be apparent in how participants:

- Dress in business casual attire
- Maintain a positive demeanor
- Treat peers as professionals, recognizing the diverse backgrounds of other members
- Welcome the participation of fellow participants
- Refrain from using profane or sexually harassing language
- Respectful behavior toward presenters and facilitators
- Participants are required to complete online ethics training provided through an account provided by the program before beginning the teaching position in August
- Participants who do not present themselves as professionals will receive one demerit for each incident.

Job Action (Strike)

In the event of a job action (strike) by teachers at the employing district, the APPEL participant is required to report to work as usual. Failure to report to work due to participating in a job action will result in administrative withdrawal from APPEL with loss of fees and the teaching license will be rescinded.

Please refer to the ADE rules for the "Code of Ethics for Arkansas Educators" for information regarding loss of teaching position for violation of the code. Participants are responsible for adhering to the Code of Ethics for Arkansas Educators. If an APPEL participant is found to have violated one of these standards, he/she may be administratively withdrawn and his/her license will be rescinded.

Attendance Policy

Since APPEL is an accelerated teacher-training program, attendance at all training sessions is required. Participants may be absent for a maximum of one day, during the Summer Academy or monthly face-to-face sessions, for valid reasons other than illness or emergency.

If absent for the maximum one day, then the participant must complete an additional assignment given by the Site Facilitator which will be a minimum of seven clock hours equivalent on the missed module topic. This assignment could be through professional development portal or taken from mentoring resources and is left to the discretion of the Site Facilitator.

If a second absence is requested, then an absence request must be submitted in writing to the APPEL Program Advisor and the APPEL Site Facilitator. A half-day (four hours) absence may be granted under the following circumstances:

- If the absence is during Summer Academy due to an interview, then the participant must return to class the next day with a signed interview form, or an email of support from the interviewer or email from the school district human resources administrator or immediate supervisor.
- If the absence is during a monthly face-to-face module, a letter/email of support from the employing school district human resources administrator or immediate supervisor and any supporting documentation must be submitted.
- An absence request for the Summer Academy or monthly sessions must be submitted as soon as the participant knows of a date conflict. If another site is available during the monthly sessions, the participant will attend the alternate site.
- If approved, the participant will be responsible for all regular assignments in addition to a make-up assignment, if deemed necessary, assigned by the site facilitator.

In case of an emergency or illness that leads to an absence during the Summer Academy or monthly sessions, the participant must:

- Submit a written explanation along with the appropriate documentation.
- The written documentation should be submitted to the APPEL Program Advisor no later than three (3) days following the emergency or illness.
- If approved, the participant will be responsible for the regular assignments in addition to any make-up assignments designated by the site facilitator.
- The absence may not exceed two days. The APPEL office reserves the right to send a participant to another site for regular assignments.

- If a participant has a medical reason supported by medical documentation that leads to missing more than the four allowable hours of the regular Summer Academy, he/she can request up to a two day medical leave. This request must include a letter outlining the reason for missing the session and must include medical documentation. If approved, the participant will be required to make-up the missed sessions in the late summer group.

- Should this occur during a monthly module, the participant will be required to attend the module at another site.

- If all monthly sessions for that month have been completed, the participant may be required to attend a make-up session in May.

- In addition, the APPEL participant must complete a prescribed course through Arkansas IDEAS in order to maintain eligibility.

Any absence over the allowable time outlined above during the Summer Academy or monthly modules, no matter the reason, will not be approved. This could result in the participant having to repeat the entire program, being dismissed from APPEL, and/or rescinding of the teaching license. Any participant who misses a module and the required make-up session will be dismissed from the program.

Every candidate may not be suited for a teaching position. APPEL reserves the right to dismiss candidates who do not possess the dispositions necessary to work with children. It is expected that all participants will agree to and abide by the guidelines set forth in this catalog.

Appeals of any decisions regarding any participant are to be made in writing. The first level of appeal is to the APPEL Program Advisor. If the participant does not agree with the decision rendered, then the second level of appeal is to the Office of Educator Preparation, Unit Coordinator. If the participant does not agree with the decision rendered, then the third and final level of appeal is to the Assistant Commissioner, Educator Effectiveness and Licensure. Appeals should not be directed to any other ADE personnel, nor should any level be skipped.

APPEL Instructional Sites Policies

APPEL instructional sites are regionally located throughout the state of Arkansas. Participants are assigned to a site based upon the preferences indicated on the application. However, if a preferred site is full, the participant may be assigned to an alternate site determined by the APPEL Office.

Participants are notified of their site assignment at orientation. Requests for change in site assignment must include a valid reason, and must be made in writing within seven (7) days of Orientation. Changes will not be made at Orientation. If the preferred site is full, a change will not be made.

If a participant does not receive a site assignment, he/she should e-mail the program advisor immediately after the Orientation so that the appropriate assignment may be made. No changes to site assignments will be made at the Orientation.

The following policies are in place and are monitored and enforced by the facilitators at each site.

Once a participant begins Instructional Modules (IM) at an assigned site, he/she must continue to attend modules at that site for the duration of the program.

Codes, rules and by-laws of the host institution are enforced and are to be adhered to. This includes no smoking at any Arkansas public school or Institution of Higher Education.

Participants will:

- Arrive on time for each IM.
- Be present for the entire IM each day.
- Actively engage in all IMs.
- Conduct themselves professionally at all times.
- Restrict the use of cell phones to before/after class and during planned breaks ONLY.

Participants will not:

- Bring children to IM sessions.
- Read, chat, text, listen to headphones, grade papers, etc. during IMs.

If a participant is asked to surrender a cell phone for the remainder of the day, he/she should do so willingly. Failure to follow the request of the site facilitator will result in a red form citation.

Participants are expected to demonstrate a positive attitude toward their students, the APPEL program, site facilitators and the teaching profession.

Other APPEL Policies

Accommodations

If any member of the cohort has a documented disability and needs special accommodations, the site facilitator will work with the student and ADE to provide reasonable accommodation to ensure the student a fair opportunity to perform in this program. In order to plan for optimum success, please advise the ADE Program Advisor and the APPEL Site Facilitator of the disability and the desired accommodation(s) as soon as possible. Participants are strongly encouraged to notify these persons before the first week of classes. Without ample planning/preparation time, the program cannot assure the availability of needed accommodations in a timely manner.

Academic Honesty

The policy regarding "Academic Honesty" as stated in the APPEL Handbook will be fully adhered to in this program. Appropriate citation is critical. Participants caught cheating or plagiarizing work may receive a "F" for the assignment and/or for the module. The participant must keep assignments on record. If a copy of outside work becomes lost or misplaced, the burden of proof is on the participant. **Academic dishonesty is a serious offense. It can result in module failure and/or expulsion from the APPEL program.**

Cheating

Cheating involves obtaining grades fraudulently. It includes, but is not limited to: copying, or allowing another to copy, answers during an examination; giving or receiving test answers by signal; copying someone else's assignments; writing an assignment for someone or having one written for you; Plagiarism.

Plagiarism

Webster's Encyclopedia Unabridged Dictionary of the English Language defines plagiarism as "*The appropriation or imitation of the language, ideas and thoughts of another and representing them as one's original work."* To avoid plagiarism you must provide a citation whenever you use:

Someone else's actual spoken or written words or paraphrases thereof;

Someone else's graphs, charts, tables, or other illustrations;

Someone else's thought, conclusion, or premise;

Facts that are not common knowledge;

Materials found on or copied from the Internet, whether or not they are posted for public use.

If the originality of your work is questioned, you will be required to produce working documents (notes, outlines, rough drafts, photocopies, etc.) that confirm authorship. You also must demonstrate detailed knowledge when quizzed.

Participation

In order for a learning community to be effective we all must be responsible for helping one another understand module concepts. Effective participation in collaborative learning

assignments, doing one's fair share of the work, and providing helpful feedback to peers are all important behaviors in this program.

In addition to mastery of module objectives, students will be assessed on their ability to express themselves effectively in both oral and written forms, on their ability to work collegially with their peers, and on their ability to contribute positively to the work of their group. Class participation is thought of in terms of attendance, relevant questions and comments to stimulate discussion, and willingness to listen and respond to others thoughtfully. Participation can take many forms (listening, speaking, reflecting, supporting) in various formats (small groups, large group, pairs). Please be respectful of other students' opinions and questions. Also be aware of how your non-verbal behavior influences the quality of interactions from your peers. Participants will be evaluated and participants will self-evaluate based on the provided rubric.

Evidence of positive and successful contributions include attendance, preparedness, participation, Moodle posts, performance on exams, completion of graded and homework assignments, etc.

Assessment Rubric for Requirement #1
Contributions to Learning Community

Highly Effective Contributor	Active Contributor	Minimal Contributor	Unacceptable
Attended every class session, and some optional sessions such as test reviews, speakers, workshops, etc.	Attended all class sessions or missed one session but with acceptable, documented reason. Notified instructor ahead of time and/or made up missed work.	Missed 1 or 2 class sessions. In each case notified instructor and made up work.	Missed more than 2 class sessions, or missed 1 or 2 sessions and failed to notify instructor or make up work.
Always Punctual and Prepared.	Late or unprepared 1 time.	Late or unprepared, or leaves class early, 2 times.	Late for 3 or more class sessions, or unprepared 3 or more times.
Positive approach and "claims" education.	Positive approach and "receives" education.	Approach neither positive nor negative.	Unprofessional attitude.

All work prepared thoroughly and thoughtfully, handed in on time.	All work handed in on time.	One or two assignments handed in late, or poorly done.	More than two assignments late, or poorly done.
Actively engaged during class. Contributions add greatly to quality of class sessions.	Often engaged during class. Contributes ideas freely and willingly.	Sometimes engaged. Infrequent sharing of ideas, etc.	Little engagement with class activities, rarely volunteers ideas, contributions unrelated to topics, complains rather than problem-solves.
Able to accept and act upon constructive criticism in reflecting, revising work, and seeking growth.	Often able to accept constructive criticism but does not fully implement recommendations for growth.	Sometimes accepts constructive criticism and/or may not be able to see how to use constructive criticism for growth.	Does not accept or act upon constructive criticism in reflecting, revising work, and seeking growth.
Provides leadership in collaborative work and does more than a fair share of the work. Provides helpful feedback to peers.	Works well with others. Does fair share of work.	Meets and works with group. Does what is assigned, no more or less.	Does not work well with group members. Conflicts are not resolved in positive fashion. Does less than fair share of work.
• 90-100 points	• 80-89	• 70-79	• below 70 points

This will have the effect of lowering your final grade by one full grade (i.e., a "B" becomes a "C", an "A-" becomes a "B-", etc., no matter what the other categories are rated.)

Class Evaluation

In addition to an opportunity for discussion/discourse during class time, the participant will be given an opportunity to evaluate the instruction and module content at the end of each module.

Glossary

Administrative withdrawal – automatic dismissal from APPEL as a result of noncompliance with the Rules Governing Educator Licensure or as a result of violation(s) of the policies in the APPEL Participant Handbook. Under this condition the teaching license is revoked and all program fees are forfeited.

Appropriate employment - employment as teacher-of-record, teaching a minimum of three hours per day (part-time or full-time) in the appropriate licensure area(s):

- in a traditional classroom setting in an Arkansas public school, charter school, or education service cooperative, and paired with a certified mentor approved by the ADE, or
- in a traditional classroom setting in an Arkansas private school (under certain conditions), and paired with a certified mentor approved by the ADE

Note: Teaching in an environment that is 100% computer-based instruction is NOT considered appropriate employment for APPEL. A teaching position in, or related to, Special Education is NOT appropriate employment for APPEL.

Certified mentor - a person who:

- Holds a current Arkansas teaching or administrator's license, unless the person is employed where the law does not require a license or the legal requirement for a teaching license is waived in the charter of a charter school; and
- Is certified by the Department's Office of Educator Effectiveness as trained in the state-adopted mentoring model.

Code of Ethics – the Code of Ethics for Arkansas Educators established by the Professional Licensure Standards Board under Ark. Code. Ann. 6-17-422.

Conditional enrollment – Any situation that exists that prevents acceptance into the program without contingent situations. A participant on conditional enrollment must satisfy all contingencies by the specified date in order to satisfy enrollment requirements. Should the contingencies not be resolved by the date agreed upon, the participant will be administratively withdrawn from the program.

Dispositions – are the values, commitments, and professional ethics that influence behaviors toward students, families, colleagues and communities and affect student learning, motivation and development as well as the educator's own professional growth. Dispositions are guided by

beliefs and attitudes related to values such as caring, fairness, honesty, responsibility and social justice.

Mentoring - the acts of a certified mentor providing support and focused feedback to a novice teacher (according to the state-adopted mentoring model) with the goal of enhancing instructional skills, classroom management, and professional behavior.

On hold – Temporary, (not to exceed one year), separation from APPEL due to necessary extended absence or the inability to secure appropriate employment. If an APPEL participant attends any summer Instructional Modules but does not secure appropriate employment (or requires extended absence) he/she may be released from the program until the following year, or until appropriate employment is secured. Fees are not refunded but are carried over to the next year. A participant "on hold" is not issued a license.

Passing Score- for a state-mandated basic-skills, pedagogical, or content-area assessment means the cut score on the assessment approved by the State Board. A passing score on a basic-skills, pedagogical, or content-area assessment approved by the State Board before the currently approved version of an assessment will be accepted for three (3) years after the date the State Board discontinued or replaced the assessment provided the passing score was achieved before the date the assessment was discontinued or replaced.

Provisional License -a temporary license issued by the State Board that allows the license holder to teach or work in Arkansas public schools. In the nontraditional licensure context, a provisional license is available to nontraditional licensure candidates who have not completed all requirements for a Standard Arkansas teaching license is subject to revocation for failure to complete annual requirements for the applicable nontraditional licensure program.

Red Form Citation – a formal, written, documented reprimand for such infractions as (but not limited to) insubordination, late assignments, excessive tardiness, inappropriate behavior, or any violation of the Arkansas Standards of Professional Conduct. Red Form Citations result in review by APPEL. Two red form citations will result in administrative review with possible withdrawal from the program (with a loss of fees) and the teaching license will be rescinded.

Standard License -a five-year renewable license, issued by the State Board, which allows the license holder to perform professional education services for the licensure content area and licensure level specified on the license.

Teacher of Record - an individual (or individuals in co-teaching assignments) who has been assigned the lead responsibility for a student's learning in a subject/course with aligned performance measures.

Code of Ethics for Arkansas Educators

The Code of Ethics for Arkansas Educators defines minimum standards of ethical conduct for all licensed educators. The State Board of Education approved the standards on September 1, 2008. The ADE Rules Governing the Code of Ethics for Arkansas Educators further define these standards and provides a process for investigating alleged violations. Arkansas law mandates that every person with a valid Arkansas teaching license is required to abide by the Code of Ethics for Arkansas Educators.

What is expected of Arkansas Educators?

Standard 1 An educator maintains a professional relationship with each student, both in and outside the classroom.

Standard 2 An educator maintains competence regarding his or her professional practice inclusive of skills, knowledge, dispositions, and responsibilities relating to his or her organizational position.

Standard 3 An educator honestly fulfills reporting obligations associated with professional practices.

Standard 4 An educator entrusted with public funds and property, including school sponsored activity funds, honors that trust with honest, responsible stewardship.

Standard 5 An educator maintains integrity regarding the acceptance of any gratuity, gift, compensation or favor that might impair or appear to influence professional decisions or actions and shall refrain from using the educator’s position for personal gain.

Standard 6 An educator keeps in confidence secure standardized test materials and results, and maintains integrity regarding test administration procedures.

Standard 7 An educator maintains the confidentiality of information about students and colleagues obtained in the course of the educator's professional services that is protected under state law or regulations, federal law or regulations, or the written policies of the educator's school district, unless disclosure serves a professional purpose as allowed or required by law or regulations.

Standard 8 An educator refrains from using, possessing and/or being under the influence of alcohol or unauthorized drugs/substances and/or possessing items prohibited by law, or possessing or using tobacco or tobacco-related products while on school premises or at school-sponsored activities involving students.

Consideration of State Board of Education Approval of Arkansas Professional Pathway to Educator Licensure (APPEL) Program Handbook

In 1988, through an action of the Arkansas State Board of Education, the Arkansas Department of Education was authorized to implement an alternative certification pilot project. This project was designed to attract and train qualified individuals to address the growing teacher shortage. In the past ten years, this program, now referred to as APPEL, has produced over 3,300 new teachers state-wide. The program specifically recruits candidates to teach in critical shortage subject areas and in hard-to-staff districts and schools. APPEL expands the new teacher pipeline in the state by providing a pathway for aspiring teachers to earn their license while teaching. The majority of participants are 30-35 years old and come from professions outside of education.

APPEL is a two-year preparation track that includes instructional modules, appropriate employment as a classroom teacher, assessments, and on-the-job professional learning. APPEL teachers are assigned a mentor while working and earning a full teacher salary from the school where they are employed. After two years of instruction, teaching, and mentoring, and upon passing either edTPA or the Praxis pedagogy exam, APPEL teachers are eligible for a standard license.

Prior to October 2015, APPEL was governed by a set of rules from 2012 titled, *ADE Rules Governing the Non-Traditional Licensure Program.* In October 2015, the State Board approved the *Arkansas Department of Education Rules Governing Educator Licensure* and incorporated the previous rules under *Chapter 5: Nontraditional Licensure*. Section *5-2.0 ARKANSAS PROFESSIONAL PATHWAY TO EDUCATOR LICENSURE (APPEL)* states that an applicant for a provisional teaching licensure under APPEL shall adhere to and abide by all the policies and procedures as outlined in the published APPEL Program Handbook for the year of admission. It is our understanding that substantive changes to the APPEL Program Handbook should be approved by the State Board of Education as rules for APPEL had been previously approved.

School Improvement Unit

Background and Support Needs for Second Quarter

2016-2017

Arkansas Department of Education - School Improvement Unit

Helena-West Helena School District

Kristi McIntosh and Ted Beck

December 2016

Overview and Background

A team of educators from the Arkansas Department of Education (ADE) visited all schools that were designated as Academic Distress in order to gain insights into the schools' circumstances that led to the academic distress classification. Following these visits, the ADE School Improvement Unit (SIU) developed recommendations that were designed to assist schools in their efforts to be removed from academic distress. Three overarching goals were developed and these goals serve as the foundation for the recommendations. The goals are:

1. The School Improvement Leadership Team will develop a clear and shared academic focus that will lead to removal from Academic Distress.

2. The School Improvement Leadership Team in conjunction with all stakeholders will develop a positive school culture conducive to learning and staff professional growth.

3. The School Improvement Leadership Team in conjunction with the District Improvement Leadership Team will develop a culture of continuous improvement.

In April 2016, Central High School in the Helena-West Helena School District was classified as Academic Distress due to the district level of student proficiency (48.517%). Prior to the Academic Distress classification, in 2010 the State Board of Education voted to place the Helena-West Helena School District in Fiscal Distress. However, In March 2016, the state board voted to remove the Helena-West Helena School district from fiscal distress and state control pending the election of a local school board. The following details about the school district are considered pertinent:

- The current principal is operating in his second year in the position of instructional leader. The high school principal previously served as the building's assistant principal at Central High School prior to being promoted as the current building principal.
- The local school improvement specialist, hired in August 2016, provides support to Central High School in their efforts in school improvement. The school improvement specialist attended the Locally-Hired School Improvement Specialist Overview Workshop held at the Arkansas Department of Education (ADE). In addition, she attended the 2016 Beegle Poverty Institute funded by the Arkansas Department of Education, and is now a registered and certified poverty trainer. The locally hired SIS also has 7 years of experience as a high school principal and 4 years of experience as an assistant principal, with one year being the assistant at Central High School.
- Central High School was initially classified in Academic Distress during the 2013-2014 school year and was re-classified in Academic Distress in June 2016.
- The high school campus serves grades seven through twelve.

- Two instructional facilitators were hired to assist teachers in lesson planning, best teaching practices and data analysis.
- Central High School has implemented the AVID (Advancement Via Individual Determination) program to prepare and increase student enrollment in post-secondary education. AVID’s mission is to close the achievement gap by preparing all students for college readiness and success in a global society.
- At Central High School, the start of the 2016-2017 school year reflected high teacher turnover. There are currently 12 new teachers: 4 certified, 2 Teach For America, 5 waivers and 1 long term substitute.

Areas for Arkansas Department of Education (ADE) Support

The Department will continue to guide, assist and closely monitor HWH SILT in the following areas:

- Developing a process to evaluate and ensure that the designated written curriculum is aligned to Arkansas State Standards and is effectively being utilized to address the needs of the learner.
- Designing a systematic process to ensure that pre/post assessment data accurately measures content area instruction and student performance.
- Establishing an effective system to ensure that all staff and stakeholders (i.e. students, parents, teachers, partners in education) know the academic focus and their role in accomplishing the focus as related to student achievement and school improvement.
- Utilizing school wide data to inform and document school improvement leadership team decisions related to the alignment of expenditures (*i.e.* 1003a supplemental grant funds) to address the shared academic focus.
- Analyzing specific data points (*i.e.* discipline data, attendance data, assessment data, and survey data) consistently and deeply to identify trends and construct meaningful decisions for school improvement in order to drive instruction and promote continuous changes in adult behavior.
- Strengthening and improving the process in establishing progressive and productive parent and community relationships that positively contributes to student growth and achievement.
- Extending and advancing the analysis of school-wide data to asses, support and improve school climate and student achievement.
- Utilizing Indistar agenda and minute’s system to effectively and efficiently document explicit data discussed; clearly define discussions so that the system can function as both a behavioral record and communication device for staff.
- Assisting in the development of job-embedded support for assisting new and returning teachers with daily challenges.

Areas for Arkansas Department of Education (ADE) Support

The Department will continue to guide, assist and closely monitor HWH DILT in the following areas

Quarter 2:

- Establishing district norms for SIS Weekly reports, agendas and minutes, and continuously analyzing, and using the 45-day Progress Report to reflect meaningful decisions and systematic process towards school improvement
- Defining the process to ensure that the written curriculum is the taught curriculum and that instructional units are aligned with classroom instruction and state standards
- Developing and defining a shared understanding of good instruction to ensure that quality instruction takes place daily.
- Communicating a system of shared beliefs, accountability, and high expectations for improved outcomes for students.
- Using data as evidence to monitor results for accountability and for making instructional and resource allocation.

Quarter 3:

- Monitoring to ensure alignment of district initiatives/goals to school initiatives/goals.
- Communicating and establishing clear expectations, a shared and clear vision for the turnaround initiative that results in a collaborative effort toward student success.
- Ensuring that professional learning communities and vertical teams are developed and supported to build teacher knowledge and skills to change instruction across the system.

Quarter 4:

- Defining the expected outcomes for each component of instructional leadership professional developments and provide ongoing support in becoming an accomplished turnaround principal.
- Coordinating and ensuring professional development is provided continually to prepare teachers to meet high expectations for their performance in the classroom.

Summary:

Although, the Helena-West Helena School District and Central High School Improvement teams are working to improve student performance and are showing some development in the school improvement process, the progression of the process has been slow in nature. In their efforts, they have narrowed their academic focus to include teacher development, curriculum alignment, and RTI. With continued guidance

and support in these areas as well as support in data analysis, establishing a positive school climate and culture, the Helena-West Helena School District and Central High School can advance in their works to meet the recommendations and expectations outlined by the ADE School Improvement Unit.

DISTRICT: HELENA-WEST HELENA SCHOOL DISTRICT SUPERINTENDENT: JOHN HOY
SCHOOL: CENTRAL HIGH SCHOOL PRINCIPAL: EARNEST SIMPSON III
STATUS: PRIORITY
SITE-BASED SIS: ADRIAN WATKINS
EXTERNAL PROVIDER: EQUIPPED CONSULTANTS, E2E
ADE SCHOOL IMPROVEMENT SPECIALIST TEAM: KRISTI MCINTOSH AND TED BECK

45-DAY Priority School Progress Report: Secondary

1st QUARTER

2016-2017 School Year

Revised 8/22/16

SCHOOL IMPROVEMENT LEADERSHIP TEAM REPORT

Annual Student Achievement Goal(s)

What student growth goal(s) has/have been established for the current school year? (Please present in SMART goal format based upon a deep analysis of Aspire results.)
By the end of May 2017, the average percentage of students in grades 7-10 meeting the readiness benchmark in English will increase by 10% based on the ACT Aspire Spring Assessment (Current Avg. Percentage: 49.25%) By the end of May 2017, the average percentage of students in grades 7-10 meeting the readiness benchmark in Reading will increase by 10% based on the ACT Aspire Spring Assessment (Current Avg. Percentage: 19.25%) By the end of May 2017, the average percentage of students in grades 7-10 meeting the readiness benchmark in Writing will increase by 10% based on the ACT Aspire Spring Assessment (Current Avg. Percentage: 17.075%) By the end of May 2017, the average percentage of students in grades 7-10 meeting the readiness benchmark in math will increase by 10% based on the ACT Aspire Spring Assessment (Current Avg. Percentage: 15.5%) By the end of May 2017, the average percentage of students in grades 7-10 meeting the readiness benchmark in science will increase by 10% based on the ACT Aspire Spring Assessment (Current Avg. Percentage: 10.1%) By the end of May 2017, the average school ACT score for grade 11 will increase by one (1) point based on the Spring ACT Assessment. (Current Avg. ACT: 15)

SCHOOL IMPROVEMENT LEADERSHIP TEAM REPORT

Principal's Narrative Report

Tell the State Board of Education what progress you and your team have made in improving student learning or teacher skills/processes this quarter. As appropriate, highlight supports you have received; challenges your school has faced; challenges that your team was able to overcome related to your identified progress.
Quarter 1: **Professional Development** ● The Helena-West Helena School District has implemented an instructional focus on student engagement. Teachers have received professional development on student engagement on days leading up to the beginning of school. Ongoing professional development is being provided throughout the year during PLCs. Central High School has adopted the following site based goal that is included in each teacher's Professional Growth Plan: To create and implement research based lessons that foster high levels of student engagement. ● Teachers have also received professional development on classroom management, lesson planning, and the instructional cycle. **Improving Student Learning** ● Two instructional facilitators were hired to assist teachers in lesson planning, best teaching practices, and data analysis. ● In an effort to improve student performance on the ACT exam, Central High School has added an ACT Prep class to the master schedule. This class is implemented through the John Baylor ACT Prep online course. The John Baylor ACT Prep program also has an ACT Aspire component that is being implemented in the 7th and 8th grade Math and Reading Labs.

• Central High School has implemented the AVID program to increase the number of students who enroll and persist in four-year colleges and universities. Teachers will use instructional strategies that focuses on writing, inquiry, collaboration, organization, and reading. **Support** • Equipped Consultants has supported Central High School by providing professional development in the areas of lesson planning, classroom management, and the instructional cycle. Equipped has observed classrooms, modeled lessons, and provided feedback to teachers. Equipped has provided curriculum support in all core areas. • Elbow to Elbow Consultants provide support to the Special Education department by assisting teachers with modifications, interventions, and co-teaching. Elbow to Elbow also provided professional development on Pre and Post Tests. • The Helena-West Helena School District has submitted a plan of support that addresses support for the principal in becoming a turnaround principal, state and federal categorical funding, ACT Aspire interim assessment support, teacher retention, curriculum support, and parent engagement support. **Challenges** • Central High School had to replace teachers in all core areas due to resignation and retirement. We were able to fill those position by using Teach for America and waivers. • New teachers are receiving on going support in the areas of lesson planning, the instructional cycle, and classroom management.
Quarter 2:
Quarter 3:

Quarter 4:

SCHOOL IMPROVEMENT LEADERSHIP TEAM REPORT

School Improvement Leadership Team's Narrative Report

What meaningful decisions have been made by the school improvement leadership team this quarter? Explain why the team considers the decisions meaningful. (Documented within team minutes.)
Quarter 1: • Chose an AP commitment form for parent collaboration and set a date for a mandatory parent meeting scheduled for 8-25-26. This was a meaningful decision to increase and differentiate parental involvement between proficient and non-proficient parents • Agreed upon school-wide instructional practices to include: lesson plans easily accessible for CWTs, objective posted daily, agenda posted daily, keeping a data notebook, having a word wall, and having rules/consequences posted. This decision was made to have consistent classroom teacher expectations. • Agreed to conduct a PLC from the results of the Focus Walk done during the first week of school on the Instructional Cycle with the focus on exit tickets. This decision was made because the focus walk showed that only 19% of the teachers were using an exit procedure. • Set the dates for PLCs to be held on the 2nd and 4th Wednesdays and department meetings/instructional team meetings to be held on the 1st and 3rd Wednesdays. This decision was made to support teaching and learning and to increase collaboration among teachers. • Agreed that there needed to be a standardized curriculum and Mr. Rotundo, the newly hired curriculum director would spearhead the task. • Reviewed the 45-Day Priority School Progress report to see what data needed to be collected for the SI Unit. • Agreed, after reviewing the ACT Aspire data and from getting a report that the district was expecting an overall 5% increase in test scores for each test and grade that the school's goal would be set at a 10% increase in all areas. • Reviewed the ACT Aspire data and wrote out the shared academic focus goals for ACT Aspire and for the 11th grade ACT exam. These goals were set from reviewing the test scores and reviewing the district guidelines for improvement.

• Agreed upon the wording for student AIPs in ASIS and who would teach after school and agreed upon the start date of the program. These were meaningful decisions because the team collectively discussed the need for intervention for our Tier II and Tier III and how the program would be organized. • Answered questions on how to spend the 1003a money and to use the ACT Aspire scores and 11th grade ACT scores as the main evaluation of the ACT program, which will be funded by 1003a. These were meaningful decisions because of the need to increase ACT scores and to prepare students for college readiness. • Agreed to use the ASBA 5.4-School Improvement Teams plan as the guideline for writing the school's policy on team structure. This was a meaningful decision because it will help the SILT in fully implementing ID01 in Indistar.
Quarter 2:
Quarter 3:
Quarter 4:
What modifications to the school improvement efforts will be made for the next quarter based on your analysis of the data reported? Explain the team's rationale for changing or sustaining improvement efforts.
Quarter 1: • The SILT will increase collaboration with the district and will be asking for help in finding professional development in working effectively as a team. • The SILT will identify and discuss clear roles and responsibilities of each designee. • The SILT will outline specific plans and a timeline to address creating and aligning curriculum to standards, student engagement, and teacher development.
Quarter 2:

Quarter 3:
Quarter 4:

SCHOOL IMPROVEMENT LEADERSHIP TEAM REPORT

Enrollment/Discipline Data

Grade Level	Number of Students Enrolled				SWD Percent of Total Student Population	EL Percent of Total Student Population	Total Number of Discipline Referrals (Include <u>all</u> discipline referrals)				Number of Students with 5 or more Discipline Referrals (*Cumulative)			
	1Q	2Q	3Q	4Q	As of 10/01/16	As of 10/01/16	1Q	2Q	3Q	4Q	1Q	2Q	3Q	4Q
5														
6														
7	97				8.7%	0	36				0			
8	92				12.88%	0	63				0			

9	119				16.66%	0	39				0			
10	118				15.34%	o	75				3			
11	102				12.24%	0	89				3			
12	106				6.36%	0	29				0			

SWD-Students with Disabilities

EL-English Language Students

Comments/Clarifications:

SCHOOL IMPROVEMENT LEADERSHIP TEAM REPORT

Teacher Attendance Data

Grade Span	Total Teachers Per Grade Span	Total Teacher Days Absent for Illness & Personal	Total Teacher Days Absent for School Sponsored Events or Professional Development	Percent of Core Teachers (Math, Science, Social Studies, ELA, Special Education) absent 5 or more days for any reason Enter Percent of Core Teachers who were absent 10 or more days per semester for any reason

	1Q	2Q	3Q	4Q	1Q	2Q	3Q	4Q	1Q	2Q	3Q	4Q	1Q	2Q	Semester 1	3Q	4Q	Semester 2
7-8	16				74.5				3				7%					
9-10	16				33.5				15				6%					
11-12	17				19				8.5				0%					

Specific Grade Levels and /or Spans may be modified according to your building

Comments/Clarifications*: In the 7-8 grade span there is a teacher who is out on FMLA.*

SCHOOL IMPROVEMENT LEADERSHIP TEAM REPORT

Student Attendance Data

Grade Level	Average Daily Attendance (%)				Number of Students Absent 5 or more Days Per Quarter Number of Students Absent 10 or more Days Per Semester					
	1Q	**2Q**	**3Q**	**4Q**	**1Q**	**2Q**	**Semester 1**	**3Q**	**4Q**	**Semester 2**
5										
6										
7	90.53				15					
8	81.93				19					
9	107.03				10					
10	103.12				21					
11	93.34				24					
12	97.96				22					

Comments/Clarifications:

Math Data

Math Data by quarter Grades 5-10

Grade Level	Number of students enrolled this quarter	Number of Students with F in Math 2014-15 prior to summer school	Number of Students with F in Math 2015-16 prior to summer school	Number of Students with D or F in Math by Grading Period				Upper Case Letters: Report total number of grades entered on each post-unit assessment for the current quarter Lower Case Letters: Report the number of D and F grades on each post-unit assessment								Percent of D or F grades on all unit assessments administered each quarter a+b+c+d A+B+C+D *X 100*			
								A	a	B	b	C	c	D	d				
				1Q	2Q	3Q	4Q	Unit 1	Unit 1 D&F	Unit 2	Unit 2 D&F	Unit 3	Unit 3 D&F	Unit 4	Unit 4 D&F	1Q	2Q	3Q	4Q
5																			
6																			
7	83	21	22	17				80	12	81	10					14 %			
8	76	24	16	27				74	12	76	30					28 %			
Alg 1 8	19		0	0				19	0	19	0					0%			
Alg 1 9	79	36	11	37				79	53	79	44					61 %			
Geo 9	19	0	1	1				19	8	19	3					29 %			
Geo 10	86	23	25	29				86	48	86	50					57 %			
Alg 2	103	10	12	38				103	18	103	31	18	4	18	8	25 %			

Comments/Clarifications:

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SCHOOL IMPROVEMENT LEADERSHIP TEAM REPORT

English/Language Arts Data

ELA Data by quarter Grades 5-10

Grade Level	Number of students enrolled this quarter	Number of Students with F in ELA 2014-15 prior to summer school	Number of Students with F in ELA 2015-16 prior to summer school	Number of Students with D or F in ELA by Grading Period				Upper Case Letters: Report total number of grades entered on each post-unit assessment for the current quarter Lower Case Letters: Report the number of D and F grades on each post-unit assessment								Percent of D or F grades on all unit assessments administered each quarter a+b+c+d A+B+C+D *X 100*			
				1Q	2Q	3Q	4Q	A Unit 1	a Unit 1 D&F	B Unit 2	b Unit 2 D&F	C Unit 3	c Unit 3 D&F	D Unit 4	d Unit 4 D&F	1Q	2Q	3Q	4Q
5																			
6																			
7		24	28	28				100	91							91			
8		11	12	20				91	26							29			
9		13	18	13				90	14							16			
10		19	4	6				87	16							18			

Comments/Clarifications:

SCHOOL IMPROVEMENT LEADERSHIP TEAM REPORT

School Summary of Interim Assessments

Interim Test	Date Range	English Proficiency (%)	Reading Proficiency (%)	Science Proficiency (%)	Math Proficiency (%)
Interim I	**Oct. 24-28**				
Interim II					
Interim III					
Interim IV					

***Any interim other than ACT Aspire must be approved by ADE School Improvement Unit and reported in a similar format.**

Comments/Clarifications: **The first ACT Aspire Interim Assessments will be given during the week of October 24.**

SCHOOL IMPROVEMENT LEADERSHIP TEAM REPORT

Student Screening Data

Grade Level	Percent of students 3 or more years below grade level in math as determined by STAR MATH (assessment tool used)		Percent of students 3 or more years below grade level in ELA as determined by STAR READING (assessment tool used)	
	Beginning of Year	End of Year	Beginning of Year	End of Year
5				
6				
7	38.7%		55.4%	
8	26.3%		60.1%	
9	42.8%		72%	
10	72.4%		88.2%	
11	67.5%		95.4%	
12	67.9%		90.5%	

Comments/Clarifications:

SCHOOL IMPROVEMENT LEADERSHIP TEAM REPORT

Summary of Educator/Student School Climate Survey Data

Survey Results on a 1-4 Scale

(Survey aggregate average)

	First Quarter	Second Quarter	Third Quarter	Fourth Quarter
Educator Results	**2.84**			

Student Results	**2.92**			

****Attach Copy of Survey Instrument if NOT using ADE provided survey**

Comments/Clarifications:

SCHOOL IMPROVEMENT LEADERSHIP TEAM REPORT

Optional Data

Do you have other data sources that support and/or identify that you are making gains in student outcomes? *You may include a chart to describe your data, but do not include raw data or student names.*

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Johnny Key
Commissioner

Process for Review of Schools Classified in Academic Distress by the State Board of Education

The process for schools and districts classified in Academic Distress to report progress in the implementation of the ADE Site Review Team Recommendations at the State Board of Education meeting is as follows:

1. Principals will be asked to submit a written report on the three goals established in Recommendation 1.

   A. GOAL 1 The School Improvement Leadership Team will develop a clear and shared academic focus that will lead to removal from Academic Distress.

   B. GOAL 2 The School Improvement Leadership Team in conjunction with all stakeholders will develop a positive school culture conducive to learning and staff professional development.

   C. GOAL 3 The School Improvement Leadership Team in conjunction with the District Improvement Leadership Team will develop a culture of continuous improvement.

2. Dr. Wilde from the ADE School Improvement Unit will present the goal as a question and then function as time keeper. The questions will be presented one at a time, with each principal responding to the first question before the second question is presented. This process will repeat for the three questions.

   A. What steps has the leadership team taken to create a clear academic focus that will lead your school to the removal from Academic Distress? What were your successes and/or challenges, if any, in attaining stakeholder buy-in for this focus?

   B. What steps has the leadership team taken to improve the culture of the school? What successes and/or challenges have you had in attaining an improved culture?

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(501) 682-4475
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C. What steps has the leadership team taken to develop a culture of continuous improvement?

3. The district superintendent representative will be asked to report on Recommendation 3.

   Recommendation 3: District will clarify support to be provided (full recommendation attached)

4. Dr. Wilde will present the district representative with three questions.

   A. What are the key actions in the professional development plan for the principal?

   B. What is the district doing to identify effective teachers and then maintain these teachers?

   C. What steps or actions is the district taking to ensure the curriculum is aligned (written, taught, assessed)?

5. Following the presentation of responses by the principals, Dr. Wilde from the ADE School Improvement Unit will provide a summary statement based on:

   A. The 45-Day Progress Report submitted

   B. Locally-Hired School Improvement Specialist reports submitted in the Indistar platform

   C. The School Leadership Team Agendas and Minutes as reported in the Indistar platform

6. The Superintendent, Principals, Locally-Hired School Improvement Specialists and the ADE School Improvement Specialists will be available to respond to any questions the State Board members may have.

2015-2016 ACT Aspire Preliminary School Results

District Name	District LEA	School Name	School LEA	Grade	Math N	Math % Met Readiness Benchmark
HOT SPRINGS SCHOOL DISTRICT	2603000	SUMMIT SCHOOL	2603013	10	14	0.0%
BRINKLEY SCHOOL DISTRICT	4801000	BRINKLEY HIGH SCHOOL	4801003	10	37	0.0%
MARVELL-ELAINE SCHOOL DISTRICT	5404000	MARVELL-ELAINE HIGH SCHOOL	5404032	10	29	0.0%
SIATECH LITTLE ROCK CHARTER	6052700	SIATECH HIGH CHARTER	6052703	10	13	0.0%
RESPONSIVE ED SOLUTIONS PREMIER HS OF LITTLE ROCK	6053700	PREMIER HIGH SCHOOL OF LITTLE RO	6053703	10	19	0.0%
FORT SMITH SCHOOL DISTRICT	6601000	BELLE POINT ALTERNATIVE CENTER	6601005	10	19	0.0%
STRONG-HUTTIG SCHOOL DISTRICT	7009000	STRONG HIGH SCHOOL	7009049	10	24	0.0%
LITTLE ROCK SCHOOL DISTRICT	6001000	HALL HIGH SCHOOL	6001002	10	258	01.2%
HELENA/ WEST HELENA SCHOOL DISTRICT	5403000	CENTRAL HIGH SCHOOL	5403019	10	97	02.1%
OSCEOLA SCHOOL DISTRICT	4713000	OSCEOLA HIGH SCHOOL	4713051	10	84	02.4%
DOLLARWAY SCHOOL DISTRICT	3502000	DOLLARWAY HIGH SCHOOL	3502010	10	71	02.8%
CLARENDON SCHOOL DISTRICT	4802000	CLARENDON HIGH SCHOOL	4802010	10	36	02.8%
WONDERVIEW SCHOOL DISTRICT	1505000	WONDERVIEW HIGH SCHOOL	1505026	10	32	03.1%
MINERAL SPRINGS SCHOOL DISTRICT	3104000	MINERAL SPRINGS HIGH SCHOOL	3104006	10	30	03.3%
PINE BLUFF SCHOOL DISTRICT	3505000	PINE BLUFF HIGH SCHOOL	3505042	10	311	03.5%
LEE COUNTY SCHOOL DISTRICT	3904000	LEE HIGH SCHOOL	3904011	10	52	03.8%
LITTLE ROCK SCHOOL DISTRICT	6001000	J.A. FAIR HIGH SCHOOL	6001063	10	235	03.8%
RIVERVIEW SCHOOL DISTRICT	7307000	RIVERVIEW HIGH SCHOOL	7307032	10	98	04.1%
HOPE SCHOOL DISTRICT	2903000	HOPE HIGH SCHOOL	2903012	10	166	04.2%
TEXARKANA SCHOOL DISTRICT	4605000	WASHINGTON ACADEMY	4605703	10	24	04.2%
ENGLAND SCHOOL DISTRICT	4302000	ENGLAND HIGH SCHOOL	4302018	10	46	04.3%
LITTLE ROCK SCHOOL DISTRICT	6001000	MCCLELLAN MAGNET HIGH SCHOOL	6001064	10	156	05.1%
DECATUR SCHOOL DISTRICT	0402000	DECATUR HIGH SCHOOL	0402009	10	38	05.3%
EARLE SCHOOL DISTRICT	1802000	EARLE HIGH SCHOOL	1802007	10	37	05.4%
HAMPTON SCHOOL DISTRICT	0701000	HAMPTON HIGH SCHOOL	0701002	10	34	05.9%
MOUNTAIN VIEW SCHOOL DISTRICT	6901000	RURAL SPECIAL HIGH SCHOOL	6901012	10	17	05.9%
FORREST CITY SCHOOL DISTRICT	6201000	FORREST CITY HIGH SCHOOL	6201011	10	200	06.0%
BLYTHEVILLE SCHOOL DISTRICT	4702000	BLYTHEVILLE HIGH SCHOOL-A NEW TECH S	4702706	10	152	06.6%
WATSON CHAPEL SCHOOL DISTRICT	3509000	WATSON CHAPEL HIGH SCHOOL	3509067	10	219	06.8%
BARTON-LEXA SCHOOL DISTRICT	5401000	BARTON HIGH SCHOOL	5401003	10	59	06.8%
RECTOR SCHOOL DISTRICT	1106000	RECTOR HIGH SCHOOL	1106023	10	43	07.0%
BEARDEN SCHOOL DISTRICT	5201000	BEARDEN HIGH SCHOOL	5201002	10	42	07.1%
FOUKE SCHOOL DISTRICT	4603000	FOUKE HIGH SCHOOL	4603010	10	80	07.5%
MAMMOTH SPRING SCHOOL DISTRICT	2501000	MAMMOTH SPRING HIGH SCHOOL	2501002	10	39	07.7%

2015-2016 ACT Aspire Preliminary School Results

District Name	District LEA	School Name	School LEA	Grade	Math N	Math % Met Readiness Benchmark
SIATECH LITTLE ROCK CHARTER	6052700	SIATECH HIGH CHARTER	6052703	09	14	0.0%
ARK. SCHOOL FOR THE DEAF	6092000	ARK. SCHOOL FOR THE DEAF H.S.	6092002	09	11	0.0%
FORT SMITH SCHOOL DISTRICT	6601000	BELLE POINT ALTERNATIVE CENTER	6601005	09	19	0.0%
BEEBE SCHOOL DISTRICT	7302000	BADGER ACADEMY	7302703	09	10	0.0%
LEE COUNTY SCHOOL DISTRICT	3904000	LEE HIGH SCHOOL	3904011	09	55	01.8%
FORDYCE SCHOOL DISTRICT	2002000	FORDYCE HIGH SCHOOL	2002007	09	42	02.4%
CABOT SCHOOL DISTRICT	4304000	ACADEMIC CENTER FOR EXCELLENCE	4304703	09	37	02.7%
HELENA/ WEST HELENA SCHOOL DISTRICT	5403000	CENTRAL HIGH SCHOOL	5403019	09	104	02.9%
LITTLE ROCK SCHOOL DISTRICT	6001000	HALL HIGH SCHOOL	6001002	09	315	02.9%
STRONG-HUTTIG SCHOOL DISTRICT	7009000	STRONG HIGH SCHOOL	7009049	09	30	03.3%
HOPE SCHOOL DISTRICT	2903000	HOPE HIGH SCHOOL	2903012	09	174	03.4%
RESPONSIVE ED SOLUTIONS PREMIER HS OF LITTLE R	6053700	PREMIER HIGH SCHOOL OF LITTLE RO	6053703	09	29	03.4%
OSCEOLA SCHOOL DISTRICT	4713000	OSCEOLA HIGH SCHOOL	4713051	09	85	03.5%
LITTLE ROCK SCHOOL DISTRICT	6001000	MCCLELLAN MAGNET HIGH SCHOOL	6001064	09	184	03.8%
PULASKI COUNTY SPECIAL SCHOOL DISTRICT	6003000	JACKSONVILLE HIGH SCHOOL	6003123	09	249	04.4%
FORREST CITY SCHOOL DISTRICT	6201000	FORREST CITY HIGH SCHOOL	6201011	09	193	04.7%
LITTLE ROCK SCHOOL DISTRICT	6001000	J.A. FAIR HIGH SCHOOL	6001063	09	246	05.3%
RESPONSIVE ED SOLUTIONS QUEST MS OF PINE BLUF	3542700	QUEST MIDDLE SCHOOL OF PINE BLUFF	3542702	09	18	05.6%
PULASKI COUNTY SPECIAL SCHOOL DISTRICT	6003000	NORTH PULASKI HIGH SCHOOL	6003136	09	47	06.4%
NEVADA SCHOOL DISTRICT	5008000	NEVADA HIGH SCHOOL	5008014	09	30	06.7%
LAKESIDE SCHOOL DISTRICT (CHICOT COUNTY)	0903000	LAKESIDE HIGH SCHOOL	0903018	09	72	06.9%
WONDERVIEW SCHOOL DISTRICT	1505000	WONDERVIEW HIGH SCHOOL	1505026	09	29	06.9%
WEST MEMPHIS SCHOOL DISTRICT	1803000	EAST JUNIOR HIGH SCHOOL	1803033	09	97	07.2%
WEST MEMPHIS SCHOOL DISTRICT	1803000	WONDER JUNIOR HIGH SCHOOL	1803035	09	127	07.9%
PALESTINE-WHEATLEY SCH. DIST.	6205000	PALESTINE-WHEATLEY SENIOR HIGH	6205028	09	76	07.9%
DERMOTT SCHOOL DISTRICT	0901000	DERMOTT HIGH SCHOOL	0901003	09	25	08.0%
AUGUSTA SCHOOL DISTRICT	7401000	AUGUSTA HIGH SCHOOL	7401003	09	25	08.0%
MOUNTAIN PINE SCHOOL DISTRICT	2607000	MOUNTAIN PINE HIGH SCHOOL	2607047	09	37	08.1%
DOLLARWAY SCHOOL DISTRICT	3502000	DOLLARWAY HIGH SCHOOL	3502010	09	97	08.2%
OZARK MOUNTAIN SCHOOL DISTRICT	6505000	WESTERN GROVE HIGH SCHOOL	6505014	09	24	08.3%
WESTERN YELL CO. SCHOOL DISTRICT	7509000	WESTERN YELL CO. HIGH SCHOOL	7509033	09	34	08.8%
TEXARKANA SCHOOL DISTRICT	4605000	WASHINGTON ACADEMY	4605703	09	21	09.5%
PINE BLUFF SCHOOL DISTRICT	3505000	PINE BLUFF HIGH SCHOOL	3505042	09	258	09.7%
BLYTHEVILLE SCHOOL DISTRICT	4702000	BLYTHEVILLE HIGH SCHOOL-A NEW TECH SCHOOL	4702706	09	165	09.7%

2015-2016 ACT Aspire Preliminary School Results

District Name	District LEA	School Name	School LEA	Grade	Math N	Math % Met Readiness Benchmark
RESPONSIVE ED SOLUTIONS QUEST MS OF PINE BLUFF	3542700	QUEST MIDDLE SCHOOL OF PINE BLUFF	3542702	08	20	0.0%
STRONG-HUTTIG SCHOOL DISTRICT	7009000	STRONG HIGH SCHOOL	7009049	08	22	04.5%
FORT SMITH SCHOOL DISTRICT	6601000	BELLE POINT ALTERNATIVE CENTER	6601005	08	20	05.0%
PINE BLUFF LIGHTHOUSE ACADEMY	3541700	PINE BLUFF LIGHTHOUSE COLLEGE PREP ACADEMY HIGH	3541703	08	15	06.7%
COVENANTKEEPERS CHARTER SCHOOL	6044700	COVENANT KEEPERS CHARTER	6044702	08	60	06.7%
DOLLARWAY SCHOOL DISTRICT	3502000	ROBERT F MOREHEAD MIDDLE SCHOO	3502009	08	97	07.2%
HELENA/ WEST HELENA SCHOOL DISTRICT	5403000	CENTRAL HIGH SCHOOL	5403019	08	107	07.5%
HARMONY GROVE SCHOOL DISTRICT (OUACHITA COUNTY)	5205000	SPARKMAN HIGH SCHOOL	5205012	08	12	08.3%
PULASKI COUNTY SPECIAL SCHOOL DISTRICT	6003000	FULLER MIDDLE SCHOOL	6003120	08	156	08.3%
JUNCTION CITY SCHOOL DISTRICT	7003000	JUNCTION CITY HIGH SCHOOL	7003028	08	48	08.3%
CABOT SCHOOL DISTRICT	4304000	ACADEMIC CENTER FOR EXCELLENCE	4304703	08	23	08.7%
FORREST CITY SCHOOL DISTRICT	6201000	FORREST CITY JR. HIGH	6201010	08	179	08.9%
DECATUR SCHOOL DISTRICT	0402000	DECATUR MIDDLE SCHOOL	0402011	08	44	09.1%
HOPE SCHOOL DISTRICT	2903000	YERGER JUNIOR HIGH SCHOOL	2903011	08	160	10.0%
LITTLE ROCK SCHOOL DISTRICT	6001000	HENDERSON MIDDLE SCHOOL	6001013	08	266	10.2%
BLYTHEVILLE SCHOOL DISTRICT	4702000	BLYTHEVILLE MIDDLE SCHOOL	4702012	08	142	10.6%
LEE COUNTY SCHOOL DISTRICT	3904000	LEE HIGH SCHOOL	3904011	08	55	10.9%
EARLE SCHOOL DISTRICT	1802000	EARLE HIGH SCHOOL	1802007	08	50	12.0%
MARVELL-ELAINE SCHOOL DISTRICT	5404000	MARVELL-ELAINE HIGH SCHOOL	5404032	08	25	12.0%
HUNTSVILLE SCHOOL DISTRICT	4401000	ST. PAUL HIGH SCHOOL	4401012	08	16	12.5%
OSCEOLA SCHOOL DISTRICT	4713000	OSCEOLA STEM CHARTER	4713705	08	87	12.6%
LITTLE ROCK SCHOOL DISTRICT	6001000	MABELVALE MIDDLE SCHOOL	6001062	08	228	12.7%
LAWRENCE COUNTY SCHOOL DISTRICT	3810000	WALNUT RIDGE HIGH SCHOOL	3810027	08	78	12.8%
HERMITAGE SCHOOL DISTRICT	0601000	HERMITAGE HIGH SCHOOL	0601007	08	31	12.9%
PULASKI COUNTY SPECIAL SCHOOL DISTRICT	6003000	JACKSONVILLE MIDDLE SCHOOL	6003119	08	215	13.0%
LITTLE ROCK SCHOOL DISTRICT	6001000	CLOVERDALE AEROSPACE TECH CHAR	6001702	08	197	13.2%
RIVERVIEW SCHOOL DISTRICT	7307000	RIVERVIEW JUNIOR HIGH SCHOOL	7307033	08	106	13.2%
ENGLAND SCHOOL DISTRICT	4302000	ENGLAND HIGH SCHOOL	4302018	08	60	13.3%
WEST MEMPHIS SCHOOL DISTRICT	1803000	EAST JUNIOR HIGH SCHOOL	1803033	08	112	13.4%
MOUNTAIN PINE SCHOOL DISTRICT	2607000	MOUNTAIN PINE HIGH SCHOOL	2607047	08	36	13.9%
LITTLE ROCK SCHOOL DISTRICT	6001000	DUNBAR MAGNET MIDDLE SCHOOL	6001007	08	232	14.2%
DEER/MT. JUDEA SCHOOL DISTRICT	5106000	DEER HIGH SCHOOL	5106002	08	14	14.3%
AUGUSTA SCHOOL DISTRICT	7401000	AUGUSTA HIGH SCHOOL	7401003	08	28	14.3%
CEDAR RIDGE SCHOOL DISTRICT	3212000	CEDAR RIDGE HIGH SCHOOL	3212027	08	61	14.8%
WATSON CHAPEL SCHOOL DISTRICT	3509000	WATSON CHAPEL JR. HIGH SCHOOL	3509068	08	217	16.1%
BARTON-LEXA SCHOOL DISTRICT	5401000	BARTON HIGH SCHOOL	5401003	08	62	16.1%

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District Name	District LEA	School Name	School LEA	Grade	Math N	Math % Met Readiness Benchmark
MARVELL-ELAINE SCHOOL DISTRICT	5404000	MARVELL-ELAINE HIGH SCHOOL	5404032	07	29	03.4%
DEER/MT. JUDEA SCHOOL DISTRICT	5106000	MOUNT JUDEA HIGH SCHOOL	5106010	07	13	07.7%
DECATUR SCHOOL DISTRICT	0402000	DECATUR MIDDLE SCHOOL	0402011	07	38	07.9%
LITTLE ROCK SCHOOL DISTRICT	6001000	CLOVERDALE AEROSPACE TECH CHAR	6001702	07	183	10.9%
ROSE BUD SCHOOL DISTRICT	7310000	ROSE BUD HIGH SCHOOL	7310043	07	65	12.3%
DOLLARWAY SCHOOL DISTRICT	3502000	ROBERT F MOREHEAD MIDDLE SCHOO	3502009	07	87	12.6%
JUNCTION CITY SCHOOL DISTRICT	7003000	JUNCTION CITY HIGH SCHOOL	7003028	07	58	13.8%
LITTLE ROCK SCHOOL DISTRICT	6001000	HENDERSON MIDDLE SCHOOL	6001013	07	230	15.2%
NEVADA SCHOOL DISTRICT	5008000	NEVADA HIGH SCHOOL	5008014	07	37	16.2%
LEE COUNTY SCHOOL DISTRICT	3904000	LEE HIGH SCHOOL	3904011	07	67	16.4%
CLARENDON SCHOOL DISTRICT	4802000	CLARENDON HIGH SCHOOL	4802010	07	29	17.2%
LITTLE ROCK SCHOOL DISTRICT	6001000	MABELVALE MIDDLE SCHOOL	6001062	07	199	17.6%
HOPE SCHOOL DISTRICT	2903000	YERGER JUNIOR HIGH SCHOOL	2903011	07	163	17.8%
MIDLAND SCHOOL DISTRICT	3211000	MIDLAND HIGH SCHOOL	3211035	07	45	17.8%
HARMONY GROVE SCHOOL DISTRICT (OUACHITA COUNTY)	5205000	SPARKMAN HIGH SCHOOL	5205012	07	11	18.2%
OZARK MOUNTAIN SCHOOL DISTRICT	6505000	WESTERN GROVE HIGH SCHOOL	6505014	07	22	18.2%
PULASKI COUNTY SPECIAL SCHOOL DISTRICT	6003000	JACKSONVILLE MIDDLE SCHOOL	6003119	07	253	19.4%
WESTSIDE SCHOOL DISTRICT (JOHNSON COUNTY)	3606000	WESTSIDE HIGH SCHOOL	3606026	07	56	19.6%
COSSATOT RIVER SCHOOL DISTRICT	5707000	UMPIRE HIGH SCHOOL	5707017	07	10	20.0%
COVENANTKEEPERS CHARTER SCHOOL	6044700	COVENANT KEEPERS CHARTER	6044702	07	50	20.0%
MARMADUKE SCHOOL DISTRICT	2803000	MARMADUKE HIGH SCHOOL	2803017	07	59	20.3%
FORREST CITY SCHOOL DISTRICT	6201000	FORREST CITY JR. HIGH	6201010	07	169	20.7%
STRONG-HUTTIG SCHOOL DISTRICT	7009000	STRONG HIGH SCHOOL	7009049	07	19	21.1%
BEARDEN SCHOOL DISTRICT	5201000	BEARDEN HIGH SCHOOL	5201002	07	37	21.6%
PINE BLUFF SCHOOL DISTRICT	3505000	JACK ROBEY JR. HIGH SCHOOL	3505044	07	285	22.1%
BLYTHEVILLE SCHOOL DISTRICT	4702000	BLYTHEVILLE MIDDLE SCHOOL	4702012	07	136	22.1%
CORNING SCHOOL DISTRICT	1101000	CORNING HIGH SCHOOL	1101004	07	76	22.4%
CEDAR RIDGE SCHOOL DISTRICT	3212000	CEDAR RIDGE HIGH SCHOOL	3212027	07	58	22.4%
CAMDEN FAIRVIEW SCHOOL DISTRICT	5204000	CAMDEN FAIRVIEW MIDDLE SCHOOL	5204028	07	159	22.6%
WATSON CHAPEL SCHOOL DISTRICT	3509000	WATSON CHAPEL JR. HIGH SCHOOL	3509068	07	192	22.9%
RIVERVIEW SCHOOL DISTRICT	7307000	RIVERVIEW JUNIOR HIGH SCHOOL	7307033	07	91	23.1%
STAR CITY SCHOOL DISTRICT	4003000	STAR CITY MIDDLE SCHOOL	4003015	07	131	23.7%
CADDO HILLS SCHOOL DISTRICT	4901000	CADDO HILLS HIGH SCHOOL	4901003	07	53	24.5%
OSCEOLA SCHOOL DISTRICT	4713000	OSCEOLA STEM CHARTER	4713705	07	89	24.7%
WESTERN YELL CO. SCHOOL DISTRICT	7509000	WESTERN YELL CO. HIGH SCHOOL	7509033	07	32	25.0%
HOT SPRINGS SCHOOL DISTRICT	2603000	HOT SPRINGS MIDDLE SCHOOL	2603020	07	246	25.2%

MCGEHEE SCHOOL DISTRICT	2105000	MCGEHEE HIGH SCHOOL	2105028	07	83	25.3%
BARTON-LEXA SCHOOL DISTRICT	5401000	BARTON HIGH SCHOOL	5401003	07	75	25.3%
HAMPTON SCHOOL DISTRICT	0701000	HAMPTON HIGH SCHOOL	0701002	07	43	25.6%
NORTH LITTLE ROCK SCHOOL DISTRICT	6002000	NORTH LITTLE ROCK MIDDLE SCHOOL	6002070	07	573	25.8%
DERMOTT SCHOOL DISTRICT	0901000	DERMOTT HIGH SCHOOL	0901003	07	27	25.9%
HERMITAGE SCHOOL DISTRICT	0601000	HERMITAGE HIGH SCHOOL	0601007	07	38	26.3%
PULASKI COUNTY SPECIAL SCHOOL DISTRICT	6003000	FULLER MIDDLE SCHOOL	6003120	07	129	26.4%
MINERAL SPRINGS SCHOOL DISTRICT	3104000	MINERAL SPRINGS HIGH SCHOOL	3104006	07	34	26.5%
HUNTSVILLE SCHOOL DISTRICT	4401000	ST. PAUL HIGH SCHOOL	4401012	07	15	26.7%
EARLE SCHOOL DISTRICT	1802000	EARLE HIGH SCHOOL	1802007	07	41	26.8%
PIGGOTT SCHOOL DISTRICT	1104000	PIGGOTT HIGH SCHOOL	1104018	07	70	27.1%
RECTOR SCHOOL DISTRICT	1106000	RECTOR HIGH SCHOOL	1106023	07	48	27.1%
KIPP DELTA PUBLIC SCHOOLS	5440700	KIPP DELTA COLLEGE PREP SCHOOL	5440702	07	70	27.1%
FORT SMITH SCHOOL DISTRICT	6601000	DORA KIMMONS JR. HIGH SCHOOL	6601022	07	277	27.1%
LITTLE ROCK SCHOOL DISTRICT	6001000	DUNBAR MAGNET MIDDLE SCHOOL	6001007	07	216	27.3%
FLIPPIN SCHOOL DISTRICT	4501000	FLIPPIN MIDDLE SCHOOL	4501003	07	73	27.4%
JACKSONVILLE LIGHTHOUSE CHARTER	6050700	COLLEGE PREP ACADEMY	6050703	07	51	27.5%
ARKANSAS VIRTUAL ACADEMY	6043700	ARK VIRTUAL ACADEMY MIDDLE SCH	6043702	07	224	27.7%
RESPONSIVE ED SOLUTIONS QUEST MS OF PINE BLUFF	3542700	QUEST MIDDLE SCHOOL OF PINE BLUFF	3542702	07	18	27.8%
LITTLE ROCK PREPARATORY ACADEMY	6049700	LITTLE ROCK PREP ACADEMY	6049702	07	36	27.8%
PULASKI COUNTY SPECIAL SCHOOL DISTRICT	6003000	SYLVAN HILLS MIDDLE SCHOOL	6003122	07	396	28.0%
HELENA/ WEST HELENA SCHOOL DISTRICT	5403000	CENTRAL HIGH SCHOOL	5403019	07	96	28.1%
DUMAS SCHOOL DISTRICT	2104000	DUMAS JUNIOR HIGH SCHOOL	2104020	07	110	28.2%
FOREMAN SCHOOL DISTRICT	4102000	FOREMAN HIGH SCHOOL	4102010	07	46	28.3%
LITTLE ROCK SCHOOL DISTRICT	6001000	MANN MAGNET MIDDLE SCHOOL	6001003	07	274	28.5%
WEST MEMPHIS SCHOOL DISTRICT	1803000	EAST JUNIOR HIGH SCHOOL	1803033	07	101	28.7%
FORDYCE SCHOOL DISTRICT	2002000	FORDYCE HIGH SCHOOL	2002007	07	59	28.8%
MAGNOLIA SCHOOL DISTRICT	1402000	MAGNOLIA JR. HIGH SCHOOL	1402008	07	187	29.4%
WALDRON SCHOOL DISTRICT	6401000	WALDRON MIDDLE SCHOOL	6401004	07	102	29.4%
WEST MEMPHIS SCHOOL DISTRICT	1803000	WONDER JUNIOR HIGH SCHOOL	1803035	07	129	29.5%
MARION SCHOOL DISTRICT	1804000	MARION MIDDLE SCHOOL	1804016	07	310	30.0%
FORT SMITH SCHOOL DISTRICT	6601000	WILLIAM O. DARBY JR. HIGH SCH.	6601021	07	229	30.1%
WHITE CO. CENTRAL SCHOOL DISTRICT	7304000	WHITE CO. CENTRAL HIGH SCHOOL	7304019	07	53	30.2%
MOUNT IDA SCHOOL DISTRICT	4902000	MOUNT IDA HIGH SCHOOL	4902007	07	33	30.3%
COSSATOT RIVER SCHOOL DISTRICT	5707000	COSSATOT RIVER HIGH SCHOOL	5707023	07	76	30.3%
KIPP DELTA PUBLIC SCHOOLS	5440700	KIPP BLYTHEVILLE COLLEGE PREP	5440705	07	56	30.4%
DREW CENTRAL SCHOOL DISTRICT	2202000	DREW CENTRAL MIDDLE SCHOOL	2202007	07	95	30.5%
LONOKE SCHOOL DISTRICT	4301000	LONOKE MIDDLE SCHOOL	4301028	07	154	30.5%
PINE BLUFF LIGHTHOUSE ACADEMY	3541700	PINE BLUFF LIGHTHOUSE COLLEGE PREP ACADEMY HIGH	3541703	07	26	30.8%
HORATIO SCHOOL DISTRICT	6703000	HORATIO HIGH SCHOOL	6703013	07	90	31.1%
TEXARKANA SCHOOL DISTRICT	4605000	NORTH HEIGHTS JR. HIGH SCHOOL	4605025	07	285	31.2%

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District Name	District LEA	School Name	School LEA	Grade	Math N	Math % Met Readiness Benchmark
STRONG-HUTTIG SCHOOL DISTRICT	7009000	GARDNER-STRONG ELEM. SCHOOL	7009048	06	23	08.7%
MINERAL SPRINGS SCHOOL DISTRICT	3104000	MINERAL SPRINGS ELEM. SCHOOL	3104005	06	16	18.8%
RESPONSIVE ED SOLUTIONS QUEST MS OF PINE BLUFF	3542700	QUEST MIDDLE SCHOOL OF PINE BLUFF	3542702	06	16	18.8%
OZARK MOUNTAIN SCHOOL DISTRICT	6505000	WESTERN GROVE ELEM. SCHOOL	6505013	06	21	19.0%
PINE BLUFF LIGHTHOUSE ACADEMY	3541700	PINE BLUFF LIGHTHOUSE ELEMENTARY	3541701	06	31	19.4%
BLYTHEVILLE SCHOOL DISTRICT	4702000	BLYTHEVILLE MIDDLE SCHOOL	4702012	06	135	20.0%
WEST MEMPHIS SCHOOL DISTRICT	1803000	WEAVER ELEMENTARY SCHOOL	1803030	06	38	21.1%
LITTLE ROCK SCHOOL DISTRICT	6001000	CLOVERDALE AEROSPACE TECH CHAR	6001702	06	216	21.8%
HELENA/ WEST HELENA SCHOOL DISTRICT	5403000	ELIZA MILLER ELEMENTARY SCHOOL	5403021	06	95	22.1%
WEST MEMPHIS SCHOOL DISTRICT	1803000	JACKSON ELEMENTARY SCHOOL	1803027	06	44	25.0%
JASPER SCHOOL DISTRICT	5102000	JASPER ELEMENTARY SCHOOL	5102005	06	44	25.0%
MARION SCHOOL DISTRICT	1804000	MARION MIDDLE SCHOOL	1804016	06	317	26.2%
DOLLARWAY SCHOOL DISTRICT	3502000	ROBERT F MOREHEAD MIDDLE SCHOO	3502009	06	91	26.4%
WESTSIDE SCHOOL DISTRICT (JOHNSON COUNTY)	3606000	WESTSIDE ELEMENTARY SCHOOL	3606025	06	45	26.7%
LEAD HILL SCHOOL DISTRICT	0506000	LEAD HILL ELEMENTARY SCHOOL	0506031	06	26	26.9%
JONESBORO SCHOOL DISTRICT	1608000	MICROSOCIETY MAGNET SCHOOL	1608022	06	67	26.9%
FORREST CITY SCHOOL DISTRICT	6201000	LINCOLN ACADEMY	6201016	06	170	27.1%
DERMOTT SCHOOL DISTRICT	0901000	DERMOTT ELEMENTARY SCHOOL	0901001	06	29	27.6%
LITTLE ROCK SCHOOL DISTRICT	6001000	HENDERSON MIDDLE SCHOOL	6001013	06	259	27.8%
RIVERVIEW SCHOOL DISTRICT	7307000	JUDSONIA ELEMENTARY SCHOOL	7307026	06	36	27.8%
LITTLE ROCK PREPARATORY ACADEMY	6049700	LITTLE ROCK PREP ACADEMY	6049702	06	43	27.9%
WONDERVIEW SCHOOL DISTRICT	1505000	WONDERVIEW ELEMENTARY SCHOOL	1505025	06	39	28.2%
LITTLE ROCK SCHOOL DISTRICT	6001000	DUNBAR MAGNET MIDDLE SCHOOL	6001007	06	229	29.3%
CEDAR RIDGE SCHOOL DISTRICT	3212000	NEWARK ELEMENTARY SCHOOL	3212026	06	43	30.2%
SOUTH SIDE SCHOOL DISTRICT(VAN BUREN COUNTY)	7105000	SOUTH SIDE ELEMENTARY SCHOOL	7105018	06	33	30.3%
COVENANTKEEPERS CHARTER SCHOOL	6044700	COVENANT KEEPERS CHARTER	6044702	06	46	30.4%
LITTLE ROCK SCHOOL DISTRICT	6001000	MABELVALE MIDDLE SCHOOL	6001062	06	184	31.0%
JACKSONVILLE LIGHTHOUSE CHARTER	6050700	JACKSONVILLE LIGHTHOUSE CHARTE	6050701	06	54	31.5%
WEST MEMPHIS SCHOOL DISTRICT	1803000	FAULK ELEMENTARY SCHOOL	1803026	06	76	31.6%
FOUKE SCHOOL DISTRICT	4603000	PAULETTE SMITH MIDDLE SCHOOL	4603011	06	79	31.6%
FORT SMITH SCHOOL DISTRICT	6601000	SPRADLING ELEMENTARY SCHOOL	6601016	06	57	31.6%
LEE COUNTY SCHOOL DISTRICT	3904000	ANNA STRONG LEARNING ACADEMY	3904010	06	41	31.7%
NORTH LITTLE ROCK SCHOOL DISTRICT	6002000	NORTH LITTLE ROCK MIDDLE SCHOOL	6002070	06	622	31.8%
CAMDEN FAIRVIEW SCHOOL DISTRICT	5204000	CAMDEN FAIRVIEW MIDDLE SCHOOL	5204028	06	168	32.1%
MARVELL-ELAINE SCHOOL DISTRICT	5404000	MARVELL-ELAINE ELEMENTARY SCH	5404030	06	28	32.1%
BALD KNOB SCHOOL DISTRICT	7301000	BALD KNOB MIDDLE SCHOOL	7301004	06	103	33.0%

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					ELA	
District Name	District LEA	School Name	School LEA	Grade	ELA N	ELA % Met Readiness Benchmark
RESPONSIVE ED SOLUTIONS PREMIER HS OF LITTLE RO	6053700	PREMIER HIGH SCHOOL OF LITTLE RO	6053703	10	19	05.3%
FORT SMITH SCHOOL DISTRICT	6601000	BELLE POINT ALTERNATIVE CENTER	6601005	10	19	05.3%
HOT SPRINGS SCHOOL DISTRICT	2603000	SUMMIT SCHOOL	2603013	10	12	08.3%
TEXARKANA SCHOOL DISTRICT	4605000	WASHINGTON ACADEMY	4605703	10	24	08.3%
LITTLE ROCK SCHOOL DISTRICT	6001000	HALL HIGH SCHOOL	6001002	10	244	10.7%
MINERAL SPRINGS SCHOOL DISTRICT	3104000	MINERAL SPRINGS HIGH SCHOOL	3104006	10	30	13.3%
BEARDEN SCHOOL DISTRICT	5201000	BEARDEN HIGH SCHOOL	5201002	10	41	14.6%
HELENA/ WEST HELENA SCHOOL DISTRICT	5403000	CENTRAL HIGH SCHOOL	5403019	10	99	15.2%
OSCEOLA SCHOOL DISTRICT	4713000	OSCEOLA HIGH SCHOOL	4713051	10	82	17.1%
PINE BLUFF SCHOOL DISTRICT	3505000	PINE BLUFF HIGH SCHOOL	3505042	10	301	17.3%
LITTLE ROCK SCHOOL DISTRICT	6001000	J.A. FAIR HIGH SCHOOL	6001063	10	233	18.0%
FORREST CITY SCHOOL DISTRICT	6201000	FORREST CITY HIGH SCHOOL	6201011	10	192	18.8%
LEE COUNTY SCHOOL DISTRICT	3904000	LEE HIGH SCHOOL	3904011	10	53	18.9%
HOPE SCHOOL DISTRICT	2903000	HOPE HIGH SCHOOL	2903012	10	161	19.3%
HERMITAGE SCHOOL DISTRICT	0601000	HERMITAGE HIGH SCHOOL	0601007	10	30	20.0%
LITTLE ROCK SCHOOL DISTRICT	6001000	MCCLELLAN MAGNET HIGH SCHOOL	6001064	10	135	20.7%
STRONG-HUTTIG SCHOOL DISTRICT	7009000	STRONG HIGH SCHOOL	7009049	10	24	20.8%
PULASKI COUNTY SPECIAL SCHOOL DISTRICT	6003000	JACKSONVILLE HIGH SCHOOL	6003123	10	178	22.5%
GUY-PERKINS SCHOOL DISTRICT	2304000	GUY-PERKINS HIGH SCHOOL	2304022	10	31	22.6%
DOLLARWAY SCHOOL DISTRICT	3502000	DOLLARWAY HIGH SCHOOL	3502010	10	70	24.3%
HACKETT SCHOOL DISTRICT	6603000	HARTFORD HIGH SCHOOL	6603052	10	24	25.0%
MCGEHEE SCHOOL DISTRICT	2105000	MCGEHEE HIGH SCHOOL	2105028	10	78	25.6%
BLYTHEVILLE SCHOOL DISTRICT	4702000	BLYTHEVILLE HIGH SCHOOL-A NEW TECH SCHOOL	4702706	10	150	26.0%
POYEN SCHOOL DISTRICT	2703000	POYEN HIGH SCHOOL	2703010	10	53	26.4%
CLARENDON SCHOOL DISTRICT	4802000	CLARENDON HIGH SCHOOL	4802010	10	36	27.8%
WATSON CHAPEL SCHOOL DISTRICT	3509000	WATSON CHAPEL HIGH SCHOOL	3509067	10	217	28.1%
CAMDEN FAIRVIEW SCHOOL DISTRICT	5204000	CAMDEN FAIRVIEW HIGH SCHOOL	5204023	10	177	28.2%
RIVERCREST SCHOOL DISTRICT 57	4706000	RIVERCREST HIGH SCHOOL	4706066	10	89	29.2%
NEWPORT SCHOOL DISTRICT	3403000	NEWPORT HIGH SCHOOL	3403013	10	77	29.9%
DECATUR SCHOOL DISTRICT	0402000	DECATUR HIGH SCHOOL	0402009	10	39	30.8%
PERRYVILLE SCHOOL DISTRICT	5303000	PERRYVILLE HIGH SCHOOL	5303011	10	84	31.0%
MARVELL-ELAINE SCHOOL DISTRICT	5404000	MARVELL-ELAINE HIGH SCHOOL	5404032	10	29	31.0%

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					ELA	
District Name	District LEA	School Name	School LEA	Grade	ELA N	ELA % Met Readiness Benchmark
FORT SMITH SCHOOL DISTRICT	6601000	BELLE POINT ALTERNATIVE CENTER	6601005	09	18	11.1%
RESPONSIVE ED SOLUTIONS PREMIER HS OF LITTLE ROCK	6053700	PREMIER HIGH SCHOOL OF LITTLE RO	6053703	09	26	11.5%
LITTLE ROCK SCHOOL DISTRICT	6001000	HALL HIGH SCHOOL	6001002	09	276	13.0%
HELENA/ WEST HELENA SCHOOL DISTRICT	5403000	CENTRAL HIGH SCHOOL	5403019	09	103	14.6%
PULASKI COUNTY SPECIAL SCHOOL DISTRICT	6003000	JACKSONVILLE HIGH SCHOOL	6003123	09	240	15.4%
CABOT SCHOOL DISTRICT	4304000	ACADEMIC CENTER FOR EXCELLENCE	4304703	09	38	15.8%
FORREST CITY SCHOOL DISTRICT	6201000	FORREST CITY HIGH SCHOOL	6201011	09	188	16.0%
AUGUSTA SCHOOL DISTRICT	7401000	AUGUSTA HIGH SCHOOL	7401003	09	25	16.0%
HAMPTON SCHOOL DISTRICT	0701000	HAMPTON HIGH SCHOOL	0701002	09	43	16.3%
LEE COUNTY SCHOOL DISTRICT	3904000	LEE HIGH SCHOOL	3904011	09	55	16.4%
STRONG-HUTTIG SCHOOL DISTRICT	7009000	STRONG HIGH SCHOOL	7009049	09	30	16.7%
OSCEOLA SCHOOL DISTRICT	4713000	OSCEOLA HIGH SCHOOL	4713051	09	82	17.1%
HOPE SCHOOL DISTRICT	2903000	HOPE HIGH SCHOOL	2903012	09	172	18.0%
DOLLARWAY SCHOOL DISTRICT	3502000	DOLLARWAY HIGH SCHOOL	3502010	09	96	18.8%
MARVELL-ELAINE SCHOOL DISTRICT	5404000	MARVELL-ELAINE HIGH SCHOOL	5404032	09	26	19.2%
LITTLE ROCK SCHOOL DISTRICT	6001000	J.A. FAIR HIGH SCHOOL	6001063	09	243	19.8%
BEEBE SCHOOL DISTRICT	7302000	BADGER ACADEMY	7302703	09	10	20.0%
TRUMANN SCHOOL DISTRICT	5605000	TRUMANN HIGH SCHOOL	5605023	09	128	20.3%
PULASKI COUNTY SPECIAL SCHOOL DISTRICT	6003000	NORTH PULASKI HIGH SCHOOL	6003136	09	48	20.8%
EARLE SCHOOL DISTRICT	1802000	EARLE HIGH SCHOOL	1802007	09	60	21.7%
LAKESIDE SCHOOL DISTRICT (CHICOT COUNTY)	0903000	LAKESIDE HIGH SCHOOL	0903018	09	73	21.9%
PINE BLUFF SCHOOL DISTRICT	3505000	PINE BLUFF HIGH SCHOOL	3505042	09	243	22.2%
RESPONSIVE ED SOLUTIONS QUEST MS OF PINE BLUFF	3542700	QUEST MIDDLE SCHOOL OF PINE BLUFF	3542702	09	18	22.2%
DECATUR SCHOOL DISTRICT	0402000	DECATUR HIGH SCHOOL	0402009	09	44	22.7%
LITTLE ROCK SCHOOL DISTRICT	6001000	MCCLELLAN MAGNET HIGH SCHOOL	6001064	09	172	22.7%
PULASKI COUNTY SPECIAL SCHOOL DISTRICT	6003000	WILBUR D. MILLS HIGH SCHOOL	6003125	09	149	23.5%
MOUNTAIN PINE SCHOOL DISTRICT	2607000	MOUNTAIN PINE HIGH SCHOOL	2607047	09	37	24.3%
OZARK MOUNTAIN SCHOOL DISTRICT	6505000	WESTERN GROVE HIGH SCHOOL	6505014	09	24	25.0%
WEST MEMPHIS SCHOOL DISTRICT	1803000	WONDER JUNIOR HIGH SCHOOL	1803035	09	125	25.6%
WESTERN YELL CO. SCHOOL DISTRICT	7509000	WESTERN YELL CO. HIGH SCHOOL	7509033	09	34	26.5%
PALESTINE-WHEATLEY SCH. DIST.	6205000	PALESTINE-WHEATLEY SENIOR HIGH	6205028	09	75	26.7%
WEST MEMPHIS SCHOOL DISTRICT	1803000	EAST JUNIOR HIGH SCHOOL	1803033	09	97	26.8%

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					ELA	
District Name	District LEA	School Name	School LEA	Grade	ELA N	ELA % Met Readiness Benchmark
STRONG-HUTTIG SCHOOL DISTRICT	7009000	STRONG HIGH SCHOOL	7009049	08	21	09.5%
BLYTHEVILLE SCHOOL DISTRICT	4702000	BLYTHEVILLE MIDDLE SCHOOL	4702012	08	141	16.3%
LITTLE ROCK SCHOOL DISTRICT	6001000	CLOVERDALE AEROSPACE TECH CHAR	6001702	08	185	18.9%
FORT SMITH SCHOOL DISTRICT	6601000	BELLE POINT ALTERNATIVE CENTER	6601005	08	20	20.0%
LEE COUNTY SCHOOL DISTRICT	3904000	LEE HIGH SCHOOL	3904011	08	53	20.8%
FORREST CITY SCHOOL DISTRICT	6201000	FORREST CITY JR. HIGH	6201010	08	179	21.2%
DEER/MT. JUDEA SCHOOL DISTRICT	5106000	DEER HIGH SCHOOL	5106002	08	14	21.4%
MOUNTAIN VIEW SCHOOL DISTRICT	6901000	TIMBO HIGH SCHOOL	6901016	08	14	21.4%
AUGUSTA SCHOOL DISTRICT	7401000	AUGUSTA HIGH SCHOOL	7401003	08	28	21.4%
EARLE SCHOOL DISTRICT	1802000	EARLE HIGH SCHOOL	1802007	08	50	22.0%
DOLLARWAY SCHOOL DISTRICT	3502000	ROBERT F MOREHEAD MIDDLE SCHOO	3502009	08	95	22.1%
WATSON CHAPEL SCHOOL DISTRICT	3509000	WATSON CHAPEL JR. HIGH SCHOOL	3509068	08	216	22.2%
LITTLE ROCK SCHOOL DISTRICT	6001000	HENDERSON MIDDLE SCHOOL	6001013	08	251	22.3%
PULASKI COUNTY SPECIAL SCHOOL DISTRICT	6003000	FULLER MIDDLE SCHOOL	6003120	08	155	22.6%
DECATUR SCHOOL DISTRICT	0402000	DECATUR MIDDLE SCHOOL	0402011	08	44	22.7%
WEST MEMPHIS SCHOOL DISTRICT	1803000	EAST JUNIOR HIGH SCHOOL	1803033	08	112	23.2%
RESPONSIVE ED SOLUTIONS QUEST MS OF PINE BLUFF	3542700	QUEST MIDDLE SCHOOL OF PINE BLUFF	3542702	08	20	25.0%
HARMONY GROVE SCHOOL DISTRICT (OUACHITA COUNTY)	5205000	SPARKMAN HIGH SCHOOL	5205012	08	12	25.0%
STAR CITY SCHOOL DISTRICT	4003000	STAR CITY MIDDLE SCHOOL	4003015	08	127	25.2%
PULASKI COUNTY SPECIAL SCHOOL DISTRICT	6003000	JACKSONVILLE MIDDLE SCHOOL	6003119	08	212	25.5%
PINE BLUFF LIGHTHOUSE ACADEMY	3541700	PINE BLUFF LIGHTHOUSE COLLEGE PREP ACADEMY HI(	3541703	08	15	26.7%
CALICO ROCK SCHOOL DISTRICT	3301000	CALICO ROCK HIGH SCHOOL	3301002	08	37	27.0%
BRINKLEY SCHOOL DISTRICT	4801000	BRINKLEY HIGH SCHOOL	4801003	08	33	27.3%
COVENANTKEEPERS CHARTER SCHOOL	6044700	COVENANT KEEPERS CHARTER	6044702	08	58	27.6%
HOPE SCHOOL DISTRICT	2903000	YERGER JUNIOR HIGH SCHOOL	2903011	08	159	28.3%
PINE BLUFF SCHOOL DISTRICT	3505000	JACK ROBEY JR. HIGH SCHOOL	3505044	08	297	28.6%
WESTSIDE SCHOOL DISTRICT (JOHNSON COUNTY)	3606000	WESTSIDE HIGH SCHOOL	3606026	08	45	28.9%
MARVELL-ELAINE SCHOOL DISTRICT	5404000	MARVELL-ELAINE HIGH SCHOOL	5404032	08	24	29.2%
HACKETT SCHOOL DISTRICT	6603000	HARTFORD HIGH SCHOOL	6603052	08	17	29.4%
NORTH LITTLE ROCK SCHOOL DISTRICT	6002000	NORTH LITTLE ROCK MIDDLE SCHOOL	6002070	08	560	30.2%
WHITE CO. CENTRAL SCHOOL DISTRICT	7304000	WHITE CO. CENTRAL HIGH SCHOOL	7304019	08	56	30.4%
LITTLE ROCK SCHOOL DISTRICT	6001000	MABELVALE MIDDLE SCHOOL	6001062	08	228	30.7%
OSCEOLA SCHOOL DISTRICT	4713000	OSCEOLA STEM CHARTER	4713705	08	87	31.0%
MARMADUKE SCHOOL DISTRICT	2803000	MARMADUKE HIGH SCHOOL	2803017	08	54	31.5%

2015-2016 ACT Aspire Preliminary School Results

					ELA	
District Name	District LEA	School Name	School LEA	Grade	ELA N	ELA % Met Readiness Benchmark
EAST END SCHOOL DISTRICT	5301000	BIGELOW HIGH SCHOOL	5301002	08	44	31.8%
HERMITAGE SCHOOL DISTRICT	0601000	HERMITAGE HIGH SCHOOL	0601007	08	31	32.3%
LAKESIDE SCHOOL DISTRICT (CHICOT COUNTY)	0903000	LAKESIDE MIDDLE SCHOOL	0903017	08	65	32.3%
BARTON-LEXA SCHOOL DISTRICT	5401000	BARTON HIGH SCHOOL	5401003	08	62	32.3%
BLEVINS SCHOOL DISTRICT	2901000	BLEVINS HIGH SCHOOL	2901002	08	43	32.6%
LAFAYETTE COUNTY SCHOOL DISTRICT	3704000	LAFAYETTE COUNTY HIGH SCHOOL	3704013	08	48	33.3%
ENGLAND SCHOOL DISTRICT	4302000	ENGLAND HIGH SCHOOL	4302018	08	60	33.3%
CLARENDON SCHOOL DISTRICT	4802000	CLARENDON HIGH SCHOOL	4802010	08	32	34.4%
WESTERN YELL CO. SCHOOL DISTRICT	7509000	WESTERN YELL CO. HIGH SCHOOL	7509033	08	23	34.8%
FORT SMITH SCHOOL DISTRICT	6601000	WILLIAM O. DARBY JR. HIGH SCH.	6601021	08	218	34.9%
MAYNARD SCHOOL DISTRICT	6102000	MAYNARD HIGH SCHOOL	6102006	08	34	35.3%
LITTLE ROCK SCHOOL DISTRICT	6001000	DUNBAR MAGNET MIDDLE SCHOOL	6001007	08	229	35.4%
DUMAS SCHOOL DISTRICT	2104000	DUMAS JUNIOR HIGH SCHOOL	2104020	08	107	35.5%
GUY-PERKINS SCHOOL DISTRICT	2304000	GUY-PERKINS HIGH SCHOOL	2304022	08	33	36.4%
CADDO HILLS SCHOOL DISTRICT	4901000	CADDO HILLS HIGH SCHOOL	4901003	08	33	36.4%
DEER/MT. JUDEA SCHOOL DISTRICT	5106000	MOUNT JUDEA HIGH SCHOOL	5106010	08	11	36.4%
CAMDEN FAIRVIEW SCHOOL DISTRICT	5204000	CAMDEN FAIRVIEW MIDDLE SCHOOL	5204028	08	173	36.4%
LITTLE ROCK PREPARATORY ACADEMY	6049700	LITTLE ROCK PREP ACADEMY	6049702	08	33	36.4%
SHIRLEY SCHOOL DISTRICT	7104000	SHIRLEY HIGH SCHOOL	7104015	08	30	36.7%
WEST MEMPHIS SCHOOL DISTRICT	1803000	WONDER JUNIOR HIGH SCHOOL	1803035	08	150	37.3%
CROSSETT SCHOOL DISTRICT	0201000	CROSSETT MIDDLE SCHOOL	0201008	08	131	37.4%
MINERAL SPRINGS SCHOOL DISTRICT	3104000	MINERAL SPRINGS HIGH SCHOOL	3104006	08	24	37.5%
HUNTSVILLE SCHOOL DISTRICT	4401000	ST. PAUL HIGH SCHOOL	4401012	08	16	37.5%
CEDAR RIDGE SCHOOL DISTRICT	3212000	CEDAR RIDGE HIGH SCHOOL	3212027	08	61	37.7%
TWO RIVERS SCHOOL DISTRICT	7510000	TWO RIVERS HIGH SCHOOL	7510019	08	69	37.7%
FORDYCE SCHOOL DISTRICT	2002000	FORDYCE HIGH SCHOOL	2002007	08	60	38.3%
LONOKE SCHOOL DISTRICT	4301000	LONOKE MIDDLE SCHOOL	4301028	08	127	38.6%
FORT SMITH SCHOOL DISTRICT	6601000	DORA KIMMONS JR. HIGH SCHOOL	6601022	08	277	38.6%
HAMPTON SCHOOL DISTRICT	0701000	HAMPTON HIGH SCHOOL	0701002	08	41	39.0%
HELENA/ WEST HELENA SCHOOL DISTRICT	5403000	CENTRAL HIGH SCHOOL	5403019	08	105	39.0%
HACKETT SCHOOL DISTRICT	6603000	HACKETT HIGH SCHOOL	6603048	08	41	39.0%
NEWPORT SCHOOL DISTRICT	3403000	NEWPORT HIGH SCHOOL	3403013	08	87	39.1%
WARREN SCHOOL DISTRICT	0602000	WARREN MIDDLE SCHOOL	0602702	08	119	40.3%
SPRINGDALE SCHOOL DISTRICT	7207000	LAKESIDE JUNIOR HIGH SCHOOL	7207070	08	387	40.3%

2015-2016 ACT Aspire Preliminary School Results

					ELA	
District Name	District LEA	School Name	School LEA	Grade	ELA N	ELA % Met Readiness Benchmark
MARVELL-ELAINE SCHOOL DISTRICT	5404000	MARVELL-ELAINE HIGH SCHOOL	5404032	07	29	03.4%
STRONG-HUTTIG SCHOOL DISTRICT	7009000	STRONG HIGH SCHOOL	7009049	07	19	10.5%
LEE COUNTY SCHOOL DISTRICT	3904000	LEE HIGH SCHOOL	3904011	07	64	17.2%
JUNCTION CITY SCHOOL DISTRICT	7003000	JUNCTION CITY HIGH SCHOOL	7003028	07	57	17.5%
DOLLARWAY SCHOOL DISTRICT	3502000	ROBERT F MOREHEAD MIDDLE SCHOO	3502009	07	87	19.5%
COVENANTKEEPERS CHARTER SCHOOL	6044700	COVENANT KEEPERS CHARTER	6044702	07	46	19.6%
RESPONSIVE ED SOLUTIONS QUEST MS OF PINE BLUFF	3542700	QUEST MIDDLE SCHOOL OF PINE BLUFF	3542702	07	18	22.2%
LITTLE ROCK SCHOOL DISTRICT	6001000	CLOVERDALE AEROSPACE TECH CHAR	6001702	07	174	22.4%
EARLE SCHOOL DISTRICT	1802000	EARLE HIGH SCHOOL	1802007	07	39	23.1%
PINE BLUFF LIGHTHOUSE ACADEMY	3541700	PINE BLUFF LIGHTHOUSE COLLEGE PREP ACADEMY HI(	3541703	07	26	23.1%
LITTLE ROCK SCHOOL DISTRICT	6001000	MABELVALE MIDDLE SCHOOL	6001062	07	195	23.1%
MARMADUKE SCHOOL DISTRICT	2803000	MARMADUKE HIGH SCHOOL	2803017	07	56	23.2%
RIVERCREST SCHOOL DISTRICT 57	4706000	RIVERCREST HIGH SCHOOL	4706066	07	94	24.5%
CADDO HILLS SCHOOL DISTRICT	4901000	CADDO HILLS HIGH SCHOOL	4901003	07	53	24.5%
LITTLE ROCK SCHOOL DISTRICT	6001000	HENDERSON MIDDLE SCHOOL	6001013	07	221	25.3%
LAFAYETTE COUNTY SCHOOL DISTRICT	3704000	LAFAYETTE COUNTY HIGH SCHOOL	3704013	07	50	26.0%
MINERAL SPRINGS SCHOOL DISTRICT	3104000	MINERAL SPRINGS HIGH SCHOOL	3104006	07	34	26.5%
HUNTSVILLE SCHOOL DISTRICT	4401000	ST. PAUL HIGH SCHOOL	4401012	07	15	26.7%
BLYTHEVILLE SCHOOL DISTRICT	4702000	BLYTHEVILLE MIDDLE SCHOOL	4702012	07	135	26.7%
DEER/MT. JUDEA SCHOOL DISTRICT	5106000	DEER HIGH SCHOOL	5106002	07	15	26.7%
DECATUR SCHOOL DISTRICT	0402000	DECATUR MIDDLE SCHOOL	0402011	07	37	27.0%
HERMITAGE SCHOOL DISTRICT	0601000	HERMITAGE HIGH SCHOOL	0601007	07	37	27.0%
HARMONY GROVE SCHOOL DISTRICT (OUACHITA COUNTY)	5205000	SPARKMAN HIGH SCHOOL	5205012	07	11	27.3%
OZARK MOUNTAIN SCHOOL DISTRICT	6505000	WESTERN GROVE HIGH SCHOOL	6505014	07	22	27.3%
FORREST CITY SCHOOL DISTRICT	6201000	FORREST CITY JR. HIGH	6201010	07	167	27.5%
WATSON CHAPEL SCHOOL DISTRICT	3509000	WATSON CHAPEL JR. HIGH SCHOOL	3509068	07	188	27.7%
HACKETT SCHOOL DISTRICT	6603000	HARTFORD HIGH SCHOOL	6603052	07	18	27.8%
HOPE SCHOOL DISTRICT	2903000	YERGER JUNIOR HIGH SCHOOL	2903011	07	161	28.0%
WESTSIDE SCHOOL DISTRICT (JOHNSON COUNTY)	3606000	WESTSIDE HIGH SCHOOL	3606026	07	56	28.6%
FORDYCE SCHOOL DISTRICT	2002000	FORDYCE HIGH SCHOOL	2002007	07	59	28.8%
WHITE CO. CENTRAL SCHOOL DISTRICT	7304000	WHITE CO. CENTRAL HIGH SCHOOL	7304019	07	52	28.8%
NEWPORT SCHOOL DISTRICT	3403000	NEWPORT HIGH SCHOOL	3403013	07	86	29.1%
DERMOTT SCHOOL DISTRICT	0901000	DERMOTT HIGH SCHOOL	0901003	07	27	29.6%
PINE BLUFF SCHOOL DISTRICT	3505000	JACK ROBEY JR. HIGH SCHOOL	3505044	07	280	29.6%

2015-2016 ACT Aspire Preliminary School Results

					ELA	
District Name	District LEA	School Name	School LEA	Grade	ELA N	ELA % Met Readiness Benchmark
STRONG-HUTTIG SCHOOL DISTRICT	7009000	GARDNER-STRONG ELEM. SCHOOL	7009048	06	21	09.5%
LEE COUNTY SCHOOL DISTRICT	3904000	ANNA STRONG LEARNING ACADEMY	3904010	06	38	10.5%
WEST MEMPHIS SCHOOL DISTRICT	1803000	WEAVER ELEMENTARY SCHOOL	1803030	06	36	19.4%
LITTLE ROCK SCHOOL DISTRICT	6001000	MABELVALE MIDDLE SCHOOL	6001062	06	181	21.5%
OZARK MOUNTAIN SCHOOL DISTRICT	6505000	WESTERN GROVE ELEM. SCHOOL	6505013	06	18	22.2%
HELENA/ WEST HELENA SCHOOL DISTRICT	5403000	ELIZA MILLER ELEMENTARY SCHOOL	5403021	06	93	22.6%
LITTLE ROCK SCHOOL DISTRICT	6001000	HENDERSON MIDDLE SCHOOL	6001013	06	252	25.4%
LITTLE ROCK SCHOOL DISTRICT	6001000	CLOVERDALE AEROSPACE TECH CHAR	6001702	06	204	27.5%
DERMOTT SCHOOL DISTRICT	0901000	DERMOTT ELEMENTARY SCHOOL	0901001	06	29	27.6%
WEST MEMPHIS SCHOOL DISTRICT	1803000	WONDER ELEMENTARY SCHOOL	1803032	06	32	28.1%
PINE BLUFF SCHOOL DISTRICT	3505000	BELAIR MIDDLE SCHOOL	3505025	06	241	28.2%
EARLE SCHOOL DISTRICT	1802000	EARLE ELEMENTARY SCHOOL	1802005	06	46	28.3%
FORREST CITY SCHOOL DISTRICT	6201000	LINCOLN ACADEMY	6201016	06	169	28.4%
BEARDEN SCHOOL DISTRICT	5201000	BEARDEN ELEMENTARY SCHOOL	5201001	06	34	29.4%
WESTSIDE SCHOOL DISTRICT (JOHNSON COUNTY)	3606000	WESTSIDE ELEMENTARY SCHOOL	3606025	06	44	29.5%
DOLLARWAY SCHOOL DISTRICT	3502000	ROBERT F MOREHEAD MIDDLE SCHOO	3502009	06	89	30.3%
MAYNARD SCHOOL DISTRICT	6102000	MAYNARD ELEMENTARY SCHOOL	6102005	06	41	31.7%
JACKSONVILLE LIGHTHOUSE CHARTER	6050700	JACKSONVILLE LIGHTHOUSE CHARTE	6050701	06	53	32.1%
PINE BLUFF LIGHTHOUSE ACADEMY	3541700	PINE BLUFF LIGHTHOUSE ELEMENTARY	3541701	06	31	32.3%
WEST MEMPHIS SCHOOL DISTRICT	1803000	JACKSON ELEMENTARY SCHOOL	1803027	06	40	32.5%
FORT SMITH SCHOOL DISTRICT	6601000	TRUSTY ELEMENTARY SCHOOL	6601019	06	46	32.6%
BLYTHEVILLE SCHOOL DISTRICT	4702000	BLYTHEVILLE MIDDLE SCHOOL	4702012	06	131	32.8%
JONESBORO SCHOOL DISTRICT	1608000	MICROSOCIETY MAGNET SCHOOL	1608022	06	66	33.3%
LITTLE ROCK SCHOOL DISTRICT	6001000	DUNBAR MAGNET MIDDLE SCHOOL	6001007	06	228	33.8%
CAMDEN FAIRVIEW SCHOOL DISTRICT	5204000	CAMDEN FAIRVIEW MIDDLE SCHOOL	5204028	06	168	33.9%
LEAD HILL SCHOOL DISTRICT	0506000	LEAD HILL ELEMENTARY SCHOOL	0506031	06	26	34.6%
FORT SMITH SCHOOL DISTRICT	6601000	HARRY C. MORRISON ELEM. SCHOOL	6601030	06	23	34.8%
CLEVELAND COUNTY SCHOOL DISTRICT	1305000	RISON HIGH SCHOOL	1305010	06	65	35.4%
HARMONY GROVE SCHOOL DISTRICT (OUACHITA COUNTY)	5205000	SPARKMAN ELEMENTARY SCHOOL	5205011	06	14	35.7%
COVENANTKEEPERS CHARTER SCHOOL	6044700	COVENANT KEEPERS CHARTER	6044702	06	44	36.4%
BRADFORD SCHOOL DISTRICT	7303000	BRADFORD ELEMENTARY SCHOOL	7303014	06	30	36.7%
KIPP DELTA PUBLIC SCHOOLS	5440700	KIPP BLYTHEVILLE COLLEGE PREP	5440705	06	46	37.0%
LITTLE ROCK PREPARATORY ACADEMY	6049700	LITTLE ROCK PREP ACADEMY	6049702	06	43	37.2%
MCGEHEE SCHOOL DISTRICT	2105000	MCGEHEE ELEMENTARY SCHOOL	2105026	06	91	37.4%

Recommendations 1 and 3

July 15, 2016

Submitted by

Division of Public School Accountability

School Improvement Unit

RECOMMENDATION # 1: PREVIOUSLY CLASSIFIED SCHOOLS

Because twenty of the schools were previously classified in Academic Distress, and two of the other four schools were classified as Priority, it was noted that they have goals and efforts currently in progress from prior ADE site reviews or technical assistance. Thus, the review team is recommending continuation of the Priority Improvement Plans established for school year 2015-16, but with modifications for greater clarity. ADE School Improvement Unit (SIU) staff will provide technical assistance to assist these twenty-two schools in integrating into their current plans three targeted goals that would be monitored monthly by the SIU. These overarching goals are:

1. The School Improvement Leadership Team will develop a clear and shared academic focus that will lead to removal from Academic Distress.
2. The School Improvement Leadership Team in conjunction with all stakeholders will develop a positive school culture conducive to learning and staff professional growth.
3. The School Improvement Leadership Team in conjunction with the District Improvement Leadership Team will develop a culture of continuous improvement.

These goals are attached and greater clarification of their meaning and purpose are provided (attachment C).

RECOMMENDATION 3: DISTRICT WILL CLARIFY SUPPORT TO BE PROVIDED

It was noted during the site reviews that schools varied in the level of district support. No school reviewed by the ADE teams had a written document that outlined the level of support that a school would receive from the district.

It is recommended that by September 15, 2016, the District Improvement Leadership Team, in consultation with the School Improvement Leadership Team and other stakeholders, will submit for State Board of Education review a plan of support for each school in Academic Distress. The plan will detail the types of support to be provided to each school and will be inclusive of, but not limited to:

- The professional development plan of activities that will support the principal in becoming an accomplished turnaround principal (identifying specific trainings, readings, mentors, and timelines for activities to occur and the expected

outcome of each component of the activities). This plan shall include observation calibration training for Teacher Excellence and Support System (TESS) along with training in the use of the BloomBoard Insight Reports. Further, district and school leaders will work with the ADE Educator Effectiveness Unit to align existing walk-through practices to be recorded as informal observations within the TESS (BloomBoard) process.

- A description of specific State and Federal Categorical (restricted funds) funding provided to the school. The funding description will clarify positions and programs purchased with categorical dollars; specify the amount of student improvement anticipated by the expenditure and how the effectiveness of the program or position will be evaluated in accordance with the anticipated student gains. The funds available and at the discretion of the School Improvement Leadership Team will be defined and the allowable use of the funds determined.
- The description of all assessments to be administered by the school and clear detail on how the assessments will be utilized by teachers, instructional teams, and the School Improvement Leadership Team. It is encouraged that the ACT Aspire Interim Assessments be used for progress monitoring. Post-unit assessments are to be developed by instructional teams specific to the units taught and may include both standards based questions and questions related to any foundational knowledge required as part of the units of instruction. Dates for assessments by grade level, expected levels of student achievement (SMART Goal), and clear use of each type of assessment will be detailed in the plan(s). It is encouraged that the school minimize assessment to Formative Assessments, Aspire Interims (or Aspire aligned interims), and Unit Assessments. Semester Exams may be substituted for the third Unit Assessment if all students at that grade level or subject area are administered the Semester Exam.
- The clarification of the decision making autonomy that each School Improvement Leadership Team will have, and the parameters within which the team must operate. Included will be a description of the discretionary money/resources available to the School Improvement Leadership Team to support teacher development as needs are identified.
- The description of how the district will attempt to retain effective teachers at the school, and how the district will support the building in recruiting qualified teachers when openings occur. This would include how teachers are incentivized to remain at the school as well as the monitoring of teachers for their “feelings or perceptions” of support on a quarterly basis (ADE developed instrument or ADE approved instrument).
- A description of the actions the district is taking to ensure that there is curriculum alignment in at least the areas of literacy and mathematics as assessed for accountability.
- The description of the supports to be provided to engage parents and community in the turnaround efforts. Specifically identify the activities that will

be offered, a timeline and how the school will maintain and analyze data related to parent participation. The analysis should contrast parents of proficient students in contrast to parents of non-proficient students with the intent of providing additional services and support to parents of non-proficient students.

- The description of the supports to be provided in creating a positive learning environment and positive school climate. It is encouraged that the district support the school in adopting a Positive Behavior Intervention System as well as other culture improvement strategies.

Recommendations are attached and greater clarification of their meaning and purpose are provided (attachment D).

Attachment C

SCHOOL GOALS

BACKGROUND
Campus teams did not clearly articulate the components of accountability that would lead to the removal from Academic Distress, including the steps that need to be taken to improve student outcomes.

GOAL 1
The School Improvement Leadership Team will develop a clear and shared academic focus that will lead to removal from Academic Distress.

CLARIFICATION
The School Improvement Leadership Team ensures the development of a clear and shared focus involving all stakeholders. All stakeholders know the focus and how achieving the focus will lead to increased achievement, long range commitment to continuous improvement and specifically removal from Academic Distress classification. All stakeholders can articulate their role, and the role of interventions/innovations/programs in accomplishing the focus. The focus will be foremost in decisions related to support expenditures. All faculty will clearly understand the evidence that identify progress throughout the year. The School Improvement Leadership Team will provide an update of progress to the local school board quarterly.

BACKGROUND
School staff interviewed as part of the site reviews communicated high turnover rates of teachers, difficulty recruiting qualified teachers, high number of discipline referrals, high teacher absenteeism, high failure rate and a high number of students entering secondary settings behind grade level.

GOAL 2
The School Improvement Leadership Team in conjunction with all stakeholders will develop a positive school culture conducive to learning and staff professional growth.

CLARIFICATION
The School Improvement Leadership Team ensures there is a sense that educating students extends beyond teachers and staff in schools to include all educational stakeholders. Parents, as well as businesses, social service agencies, and community colleges/universities all know their role in this effort. Teachers, staff, students and stakeholders believe that all students can learn and are able to articulate a personal vision of success. The school has a safe, caring,

healthy and intellectually stimulating learning environment where all students and staff feel welcomed, supported and valued. The social-emotional, behavior and academic needs of students are addressed using a research based multi-tiered approach. Instruction is student-focused; teachers have high expectations of student learning and believe they can teach all students. Teaching and learning are continually adjusted based on frequent monitoring of student progress and needs. Teachers determine needed support and professional development that aligns with the school and district's clear focus and high expectations. The School Improvement Leadership Team will regularly assess school culture by utilizing ADE provided or approved student and teacher surveys and provide an update to the state and local school board quarterly.

BACKGROUND

Campus teams did not articulate the plans and processes in place for creating a culture of continuous improvement. Various teams did not demonstrate an understanding of the comprehensive picture of a culture of continuous improvement.

GOAL 3

The School Improvement Leadership Team in conjunction with the District Improvement Leadership Team will develop a culture of continuous improvement.

CLARIFICATION

A culture of continuous improvement is one that involves assessing, planning and monitoring of school improvement indicators and making data-driven decisions toward achieving the shared and clear focus. All teams work collaboratively within and outside of their teams, have a clear and communicated written purpose, bylaws, and can articulate their role in achieving the focus.

The School Improvement Leadership Team has the autonomy to identify and attend necessary training to ensure they are capable of leading a turnaround effort. The School Improvement Leadership Team meets regularly and serves as a conduit of communication to all stakeholders in a way that enables the School Improvement Leadership Team to receive input. A schedule and description of all assessments to be administered will be created including detail of how the assessments will be utilized by teachers, instructional teams, and the School Improvement Leadership Team. It is recommended that the Aspire Interim Assessments and Aspire Classroom Assessments are used for progress monitoring as available. Post-Unit Assessments can be combined with Aspire Classroom Assessments to monitor both standards attainment and/or the learning of foundation knowledge. Dates for assessments by grade level, expected levels of student achievement (SMART Goal), and clear use of each type of assessment will be detailed in the plan(s). The School Improvement Leadership Team analyzes data in order to draw conclusions and make decisions about

school improvement and professional development. The School Improvement Leadership Team with support from the District Improvement Leadership Team seeks ways to retain effective teachers and how they will recruit and incentivize qualified teachers. This would include monitoring teachers for their “feelings or perceptions” of support on a quarterly basis.

The Instructional Improvement Team (otherwise referred to as PLC) works collaboratively with the empowerment to draw conclusions and make decisions based on data. Instructional Teams develop instructional units based on the curriculum standards and the local curriculum document. This unit typically encompasses three to six weeks of work. An assessment is administered prior to instruction to plan for differentiated instruction within the unit. Assessments will be administered following instruction in two to three week intervals to assess effectiveness of instruction and to identify students in need of instructional support or enhancement. The Instructional Improvement Teams use student data to assess strengths and weaknesses of the curriculum and instructional strategies. The Instructional Improvement Team reviews the results of assessments and uses the information to guide efforts to assure that every student masters the instructional standards taught in the instructional unit and reflect on personal effectiveness. The Instructional Improvement Teams use the results from multiple measures of data to plan for professional development, inform subsequent instructional unit plans and make adjustments to the curriculum.

Attachment D

DISTRICT RECOMMENDATIONS

BACKGROUND for recommendation 1**:**

The ADE Review Team did not find a clearly articulated plan to support the school's turnaround effort.

RECOMMENDATION 1: DISTRICT

It was noted during the site reviews that schools varied in the level of district support. No school reviewed by the ADE teams had a written document that outlined the level of support that a school would receive from the district.

It is recommended that by September 15, 2016, the District Improvement Leadership Team, in consultation with the School Improvement Leadership Team and other stakeholders, will submit for State Board of Education review, a plan of support for each school in Academic Distress. The plan will detail the types of support to be provided to each school and will be inclusive of, but not limited to:

- The professional development plan of activities that will support the principal in becoming an accomplished turnaround principal (identifying specific trainings, readings, mentors, and timelines for activities to occur and the expected outcome of each component of the activities). This plan shall include observation calibration training for Teacher Excellence and Support System (TESS) along with training in the use of the BloomBoard Insight Reports. Further, district and school leaders will work with the ADE Educator Effectiveness Unit to align existing walk-through practices to be recorded as informal observations within the TESS (BloomBoard) process.
- A description of specific State and Federal Categorical (restricted funds) funding provided to the school. The funding description will clarify positions and programs purchased with categorical dollars; specify the amount of student improvement anticipated by the expenditure and how the effectiveness of the program or position will be evaluated in accordance with the anticipated student gains. The funds available and at the discretion of the School Improvement Leadership Team will be defined and the allowable use of the funds determined.
- The description of all assessments to be administered by the school and clear detail on how the assessments will be utilized by teachers, instructional teams, and the School Improvement Leadership Team. It is encouraged that the ACT Aspire Interim Assessments be used for progress monitoring. Post-unit assessments are to be developed by instructional teams specific to the units taught and may include both standards based questions and questions related to any foundational knowledge required as part of the units of instruction. Dates for assessments by grade level, expected levels of student achievement

(SMART Goal), and clear use of each type of assessment will be detailed in the plan(s). It is encouraged that the school minimize assessment to Formative Assessments, Aspire Interims (or Aspire aligned interims), and Unit Assessments. Semester Exams may be substituted for the third Unit Assessment if all students at that grade level or subject area are administered the Semester Exam.

- The clarification of the decision making autonomy that each School Improvement Leadership Team will have, and the parameters within which the team must operate. Included will be a description of the discretionary money/resources available to the School Improvement Leadership Team to support teacher development as needs are identified.
- The description of how the district will attempt to retain effective teachers at the school, and how the district will support the building in recruiting qualified teachers when openings occur. This would include how teachers are incentivized to remain at the school as well as the monitoring of teachers for their “feelings or perceptions” of support on a quarterly basis (ADE developed instrument or ADE approved instrument).
- A description of the actions the district is taking to ensure that there is curriculum alignment in at least the areas of literacy and mathematics as assessed for accountability.
- The description of the supports to be provided to engage parents and community in the turnaround efforts. Specifically identify the activities that will be offered, a timeline and how the school will maintain and analyze data related to parent participation. The analysis should contrast parents of proficient students in contrast to parents of non-proficient students with the intent of providing additional services and support to parents of non-proficient students.
- The description of the supports to be provided in creating a positive learning environment and positive school climate. It is encouraged that the district support the school in adopting a Positive Behavior Intervention System as well as other culture improvement strategies.

<u>CLARIFICATION of the recommendation:</u>

The ADE will make Specialists available (upon request) to assist the district in the development of the plans. Specialists from Educator Effectiveness, School Improvement, Standards, Curriculum, Finance and Assessment may be accessed in July and August.

The turnaround principles are the basis of this recommendation:

- Providing strong leadership by ensuring the principal is capable of leading a turnaround effort; and Providing operational flexibility in the areas of scheduling, staffing, curriculum, and budget

- Using data to inform instruction and for continuous improvement, including providing time for collaboration on the use of classroom level data
- Establishing a school environment that improves safety and discipline as well as addressing other non-academic factors that impact student achievement such as social, emotional and health needs
- Incentivizing effective teachers to remain at the school and preventing the transfer or hire of ineffective teachers
- Increasing mechanisms for parent and community involvement

BACKGROUND for district recommendation 2:

There was evidence of the required reporting of progress to the local school board. There was not clear evidence that the local board was receiving training in how their actions and decisions could influence or support the school improvement process.

RECOMMENDATION 2 District:

In conjunction with the School Improvement Leadership Team, and the designated team from the Arkansas Department of Education, the District Improvement Leadership Team will present the school's required quarterly progress report to the local school board and discuss supports, actions, and or trainings in which the local school board can participate to further support the school or schools.

CLARIFICATION of the recommendation:

Each quarter following the submission of the quarterly progress report, the assigned ADE Team will meet with representatives from the district and school to develop and present a report of progress to the local school board. To the degree possible, report to the local board will highlight the decisions made that either supported the school's efforts or distracted from the school's efforts. The District Improvement Leadership Team and the assigned ADE support team would then assist the Local School Board in identifying any trainings that would assist in their efforts to become more effective.

The National School Boards Association has published articles related to eight characteristics of effective school boards. In addition, the Center for Public Education has both an executive summary and a full report on the characteristics of effective school boards. This can be easily accessed at http://www.centerforpubliceducation.org/Main-Menu/Public-education/Eight-characteristics-of-effective-school-boards.

Johnny Key
Commissioner

October 28, 2016

Mr. John Hoy, Superintendent
Helena-West Helena School District
305 Valley Drive
Helena, AR 72342

Dear Superintendent Hoy:

The Arkansas State Board of Education is committed to the academic success of all students in our state. To accomplish this goal, the State Board has established progress review dates with leadership from schools and districts classified in Academic Distress.

Given your district has one school classified in Academic Distress, the State Board of Education has scheduled your next review for Thursday, December 8, 2016.

As a reminder, the State Board of Education would like to hear a progress report specifically from the school principal. Following the principal's report, the Committee would like to hear from you (and other supporting administrators as appropriate) on how the district is supporting the school's efforts to increase student achievement. Please be prepared to discuss current year's progress for the following school:

Central High School (Academic Distress and Priority School)

Below you will find a list of documents you need to submit for the State Board of Education to review prior to the meeting. Please keep in mind that all documents submitted will be posted for public review and no documents should identify students or parents by name.

Please send this information to Glenda Cupples at glenda.cupples@arkansas.gov in PDF format as soon as possible, but no later than end of day on Thursday, November 10, 2016.

Four Capitol Mall
Little Rock, AR
72201-1019
(501) 682-4475
ArkansasEd.gov

The items requested for review include:

1. A summary report of external providers supporting school improvement and, if this is a continuing service from 2015-2016, the evaluation of the effectiveness of these services within your school district.
2. A summary report from the principal of the actions the specific school is taking to meet the Arkansas Department of Education's (ADE) recommendations specific to the three goals in Recommendation 1. This is not the 45-Day Progress Report.
3. The document that outlines the progress and next steps for supporting school(s) in meeting ADE's Recommendation 3 as outlined in your support plan and any supplemental material.
4. Any advisory minutes and agendas during the prior six months with topics related to school improvement highlighted.
5. Any additional information you consider relevant to your progress.
6. Please provide a document detailing any training needs for the newly elected school board related to school improvement that you would like ADE to provide.

The State Board of Education looks forward to reviewing your information and discussing your successes and challenges. For the specific process of the meeting, we have attached a copy of the meeting protocol. If you need any additional information or assistance, please contact Dr. Richard Wilde at 501-683-3434 or richard.wilde@arkansas.gov.

Respectfully submitted,

M. Annette Barnes
Assistant Commissioner
Public School Accountability
Arkansas Department of Education

cc: Dr. Richard Wilde, Public School Program Manager
Deborah Coffman, Chief of Staff
Elbert Harvey, Coordinator of School Improvement/Standards Assurance

Attachment: Process for Review

Process for Review of Schools Classified in Academic Distress by the State Board of Education

The process for schools and districts classified in Academic Distress reporting progress in the implementation of the ADE Site Review Team Recommendations at the November 2016 State Board of Education meeting:

1. Principals will be asked to report on the three goals established in Recommendation 1.

    a. GOAL 1 The School Improvement Leadership Team will develop a clear and shared academic focus that will lead to removal from Academic Distress.

    b. GOAL 2 The School Improvement Leadership Team in conjunction with all stakeholders will develop a positive school culture conducive to learning and staff professional growth.

    c. GOAL 3 The School Improvement Leadership Team in conjunction with the District Improvement Leadership Team will develop a culture of continuous improvement.

2. Dr. Wilde from the ADE School Improvement Unit will present the goal as a question and then function as time keeper. The questions will be presented one at a time, with each principal responding to first question before the second question is presented. This process will repeat for the three questions.

    a. What steps has the leadership team taken to create a clear academic focus that will lead your school to the removal from Academic Distress? What were your successes and/or challenges, if any, in attaining stakeholder buy-in for this focus?

    b. What steps has the leadership team taken to improve the culture of the school? What successes and/or challenges have you had in attaining an improved culture?

    c. What steps has the leadership team taken to develop a culture of continuous improvement?

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(501) 682-4475
ArkansasEd.gov

10-26-16

3. Following the presentation of responses by the principals, Dr. Wilde from the ADE School Improvement Unit will provide a summary statement based on: the 45 progress reports submitted, Locally-Hired SIS reports submitted in the Indistar platform and the School Leadership Team Agendas and Minutes as reported in the Indistar platform.

4. The Superintendent, Principals, Locally-Hired School Improvement Specialist and the ADE School Improvement Specialist will be available to respond to any questions the State Board members may have.

Helena-West Helena Central High School
Principal's Summary Report

Goal 1: The School Improvement Leadership Team will develop a clear and shared academic focus that will lead to removal from Academic Distress.

Central High School's academic focus that will lead to removal from Academic Distress consists of a focus in three areas: Teacher development/student engagement, curriculum development, and Response To Intervention.

Teacher Development

- Teachers are participating in professional development in the areas of student engagement, classroom management, instructional strategies (Gradual Release Model), and how to engage students in accountable talk. New teachers are provided ongoing support from consultants consisting of CWTs, modeling lessons, and providing instructional feedback.
- Teachers hold department meetings on 1st and 3rd Wednesdays to collaborate on lesson plans and analyze data. Department heads are in charge.
- PLCs are held on the 2nd and 4th Wednesdays to discuss instructional strategies and analyze data. Instructional Facilitators and School Improvement Specialist (SIS) conduct PLCs.
- Teachers have developed Professional Growth Plans.
- Teachers utilize Arkansas IDEAS and Bloomboard as a source of additional professional development.
- Administrators utilize the TESS evaluation system to conduct CWTs and observations.
- Instructional facilitators conduct daily CWTs and instructional support to teachers.

Curriculum Development

- New curriculum documents were created in Math, English, and Science by Equipped Consultants to enhance the old curriculum by infusing the new standards with new resources. A survey was administered to teachers in an effort to get teacher input on the development of curriculum documents for the third quarter. Teachers are providing input on the pacing and mapping.
- Curriculum meetings are held for teachers each Thursday after school in an effort to make teachers more familiar with the curriculum, plan lessons, and analyze data.

Response To Intervention

- Deficiencies were found in the areas of math and reading. The students have been identified for Tier II and Tier III interventions.
- The RTI team has been developed and interventions through pullouts occur in small group settings during 2nd period.

Goal 2: The School Improvement Leadership Team in conjunction with all stakeholders will develop a positive school culture conducive to learning and staff professional growth.

Parent Representative on the district ACSIP team

A parent of a CHS student serves on the HWHSD ACSIP team. The parent attends monthly meetings with the team and participates in decision making on School Improvement issues.

Parent Facilitator

The Parent Facilitator is a member of the faculty whose role is to partner with and support the work of the school parent-teacher organization, school leadership team, community groups and parent advisory councils. The Parent Facilitator coordinates all parent events on campus including: Open House parent-teacher conference, Thankful for Education, Literacy Night, Math Night, and etc.

Parent-Teacher Organization

The PTO is active and serves to raise funds for various activities and projects on campus including the school yearbook and parent center. The PTO has also organized a School Board Candidates Forum prior to the school board election.

Parent Resource Room

The PTO will be organizing a Parent Resource Room on campus. This room will consist of technology, books, magazines, and other resources that will assist parents in supporting the academic needs of students.

Coffee for Cops

Coffee for Cops will serve as an on campus resource station for law enforcement in our city. Law enforcement will be able to stop on campus for refreshment while on duty during school hours. It will also provide police presence on campus to deter misbehavior.

Stakeholders Committee

A Stakeholders Committee is being developed that will consist of citizens of Helena-West Helena including business owners, parents, politicians, and alumni. This committee will be designed to address the needs of the school that will improve the culture.They will also serve as community partners to the school in efforts to enhance student awareness of various careers and opportunities.

Anti-Gun Violence Presentation

Colors for a Cause, a non-profit organization, made a presentation to the student body about the effects of gun violence on families. The presenter told her story of how she lost her son to gun violence and has now started this non-profit organization that focuses on speaking to youth

about the negative effects of gun violence. A Memphis police officer assisted in the presentation.

<u>EAST Lab Projects</u>

Students in the East Lab have developed several community oriented projects and programs at CHS. The following is a list of programs that have been planned for the school year:

- EAST Night Out
- Drug Free Week
- Salute to Veterans Program (Veterans Day)
- HIV/AIDS Awareness
- Women Empowerment

<u>AVID Class Partnership with Humane Society of the Delta</u>

The AVID classes at CHS has partnered with the Humane Society of the Delta by volunteering at the animal shelter. They have raised funds for the Humane Society by creating bracelets and other arts and crafts to be sold.

<u>Goal 3:</u> The School Improvement Leadership Team in conjunction with the District Improvement Leadership Team will develop a culture of continuous improvement.

<u>Data Notebook</u>

The data notebook will consist of STAR Reading and Math Test Data, pre and post test data and ACT Aspire Interim testing data per quarter.

<u>Analyze Data Found in 45 Day Plan</u>

The teachers will analyze data along with the SIS every 2nd and 4th Wednesday to determine the needs of the students and teaching strategies needed to help students meet mastery.

<u>Data Analysis Template</u>

A data analysis template has been developed for teachers to analyze test data and trends.

Plan of Support

School:	Central High School
District:	Helena-West Helena School District
Principal:	Earnest Simpson III

It is required that by September 15, 2016 the District Improvement Leadership Team, in consultation with the School Improvement Leadership Team and other stakeholders, will submit for State Board of Education review a plan of support for each school in Academic Distress. The plan will detail the types of support to be provided to each school and will be inclusive of, but not limited to:

- The professional development plan of activities that will support the principal in becoming an accomplished turnaround principal (identifying specific trainings, readings, mentors, and timelines for activities to occur in the expected outcome of each component of the activities). This plan shall include observation collaboration training for Teacher Excellence and Support System (TESS) along with training in the use of the BloomBoard Insight Reports. Further, district and school leaders will work with the ADE Educator Effectiveness Unit to align existing walk-through practices to be recorded as informal observations within the TESS (Bloom Board) process.

  Calibration training is required so should be included here. If ALA training is occurring, or has occurred, it would be included here. Participation in SI Summer Conference occurred, it would be included here. If reading books with others specific to data use, or school improvement, include here. If participating in ADE Quest Micro-credentials, include here. Do not include PD generic to being a principal. Include those activities that are to expand or refine attained principal skills.

  Response:

  Central High School was identified as a school in academic distress prior to the beginning of the 2014-15 school year. Beginning in the 2015-16 school year the district replaced the building principal. The new principal has now been in place one full year. The district would like it noted for the record, that during this initial year test scores improved and school culture improved

based on the most recent Arkansas Prevention Needs Assessment Survey.

On September 27, 2016 the high school principal will begin the Quest micro-credentialing professional development at Great Rivers Educational Co-op.

In June 2016 the principal, superintendent, and the Deputy Superintendent participated in the ADE school improvement conference.

The principal has been trained in TESS and Bloom Board, and the district has recently signed an agreement to participate in the Insight program. All principals and the superintendent will participate in Insight training.

- A description of specific State and Federal Categorical (restricted funds) funding provided to the school. The funding description will clarify positions and programs purchased with categorical dollars; specify the amount of student improvement anticipated by the expenditure and how the effectiveness of the program or position will be evaluated in accordance with the anticipated student gains. The funds available and the discretion of the School Improvement Leadership Team will be defined and the allowable use of the funds determined.

What is the Title I allocation for the school?

What is the NSLA allocation for the school?

What is being purchased and what is the purpose in the purchase?

How will you evaluate if the purpose was accomplished?

How will you determine if you will continue the purchase from 2016/17 to 2017/18?

How much of the allocation is available for building level decision making?

Response:

The Title I allocation for Central High school is $383,225.25

The NSLA allocation for Central High School is $741,911.09

Funds are used to purchase hardware such as Chrome books, desktops, IPADS for student use; reading and math software to increase students' reading and math competencies; materials and supplies to support reading, writing, math and science; consultants for reading/writing, math and science support; and external providers are contracted to improve the instructional practices of teachers.

Pre and posttests data results are used to determine if student gains have been made, reading and math software programs are analyzed to determine if the program(s) are improving the skills attainment of students, student performance on interim assessments and the ACT ASPIRE will be used to determine students' performance knowledge of the standards. Additionally, consultants are monitored through a survey given to teachers and administrators pertaining to contracted services provided by consultants and classroom walkthrough data is used to gauge instructional strategies implementation and use of technology/materials/supplies.

Using qualitative and quantitative data, the building principal collaborates with the school's Leadership Team and staff to determine if the purchases (programs, equipment, software, materials and supplies, consultants, and etc.) impacted student performance growth and teachers' instructional practices to guide in decision making purchases from the 2016 -17 school year to the 2017-18 school year.

One hundred percent of the school's Title I and NSLA allocations are available for building level decision making.

- The description of all assessments to be administered by the school and clear detail on how the assessments will be utilized by teachers, instructional teams, and the School Improvement Leadership Team. It is encouraged that the ACT Aspire Interim Assessments be used for progress monitoring. Post unit assessments are to be developed by instructional teams specific to the units taught and may include both standards-based questions and questions related to any foundation acknowledged required as part of the instant units of instruction. Dates for assessment by grade level, expected levels of student achievement (SMART Goal) and clear use of each type of assessment will be detailed in the plan(s). It is encouraged that the school minimize assessment to Formative Assessments, Aspire Interims (or Aspire aligned interims), and Unit Assessments. Semester exams may be substituted for the third Unit Assessment if all students at the grade level or subject area are administered the semester exam.

  Use an assessment inventory process to complete this section.

  http://www.achieve.org/assessmentinventory

Response:

The district will give the ACT Aspire Interim Assessments to measure student growth.

and to predict how they will perform on the ACT Aspire Summative Assessment.

1st Interim Assessment Oct. 24-27, 2016.

2nd Interim Assessment Jan. 17-20, 2017

3rd Interim Assessment April 3-6, 2017

Post unit assessments are to be developed by instructional teams specific to the units with dates to be determined by the instructional teams.

If the ADE School Improvement Unit approves school and district plans as submitted, the district will set aside time at the end of the school day for teachers to analyze assessment data. Reports will be made to school and district improvement teams.

The clarification of the decision making autonomy that each School Improvement Leadership Team will have, and the parameters in which the team must operate. Included will be a description of the discretionary money/resources available to the School Improvement Leadership Team to support teacher development as needed are identified. What specific actions can a school leadership take based on data analysis from classroom? Parameters are the limits of the autonomy. For example, the SILT cannot decide to add an interventionist without HR approval and posting the position and implementing hiring processes per district policy.

<u>Response:</u>

The school leadership team can acquire specific programs approved in the ACSIP plan. Additional staff including interventionist can be recommended to the district leadership team and would require appropriate HR process and board approval.

- The description of how the district will attempt to retain effective teachers at the school, and how the district will support the building in recruiting qualified teachers when openings occur. This would include how teachers are incentivize to remain at the school as well as the monitoring of teachers for their "feelings or perceptions" of support on a quarterly basis (ADE developed instrument or ADE approved instrument).

  The school will administer quarterly feeling tone surveys. Thus, one action would be for the

district to analyze the quarterly results and address any issues identified in the survey. Another action would be to award returning bonuses in hard to fill or critical positions (math, English, Special Education).

<u>Response:</u>

We attend the Career Fairs, we advertise locally, statewide newspaper, Administrators Association website. The district petitioned the state to receive waivers to hire qualified personnel to teach classes in shortage areas. The district uses Teach for America, Arkansas Teach Corps, and utilize university data bases of potential graduates.

The district is in the process of developing policies and procedures to provide signing bonuses and/or retention bonuses to incentivize acquiring and/or retaining teachers.

The district is using the Educator Climate Survey developed by the ADE to identify culture/climate issues identified.

- A description of the actions the district is taking to ensure that there is curriculum alignment in at least the areas of literacy and mathematics as assessed for accountability.

  Describe the process the district is using to ensure that there is a written curriculum, that the written curriculum is the taught curriculum, and that what is taught is included in state and local exams.

  <u>Response:</u>

  The district has hired a Curriculum Coordinator that coordinates district-wide weekly curriculum meetings - attendees include building and district level administrators. Topics discussed in curriculum meetings include the following: revision of current curriculum to reflect three instructional units per quarter, standardization of district curriculum templates, incorporation of ACT Aspire performance level descriptors, logistics on creating, analyzing, and continuously improving pre and post unit assessments across the district.

- The description of the supports to be provided to engage parents and community in the

turnaround efforts. Specifically identify the activities that will be offered, a timeline and how the school will maintain and analyze data related to parent participation. The analysis should contrast parents of proficient students in contrast to parents of non-proficient students with the intent of providing additional services and support to parents of non-proficient students.

What are the activities that are being conducted at the school or district level to engage parents? What are these activities expected to do? How is the participation level analyzed with an intent to impact parents of students not proficient in State Assessments?

Response:

Some of the activities conducted at the district/school to engage parents are the following:

Back to School Rally

Open House

Title I Informational

Thankful for Education

SchoolWide Department Showcase

FAFSA/Graduation Requirement Meeting

Academic Extravaganza

Arkansas Scholar Senior Banquet

Graduation Informational Meeting

Senior Banquet

Parent Conferences

PTO

These activities are expected to involve parents in decision making and to encourage parent participation through involvement in the student's academic program.

Parent interest surveys are analyzed to get information from parents concerning the activities they feel will be most beneficial in the efforts to support students academically. The school will use the results of the parent interest surveys to plan the parental involvement activities and to improve parent involvement for all students, including those students not scoring proficient.

- The description of the supports to be provided creating a positive learning environment and

positive school climate. It is encouraged that the district support the school in adopt an a Positive Behavior Intervention System as well as other culture improvements strategies.

Response:

The district is reviewing PBIS models for possible adoption. The ALE has been moved off campus and has been revamped philosophically to avoid expulsions and suspensions of students.

This plan was developed by the following name personnel:

John Hoy, Superintendent

Linda English, Deputy Superintendent

Joyce Anderson, Professional Development Coordinator

Amanda Fears, Gifted and Talented Coordinator/Teacher

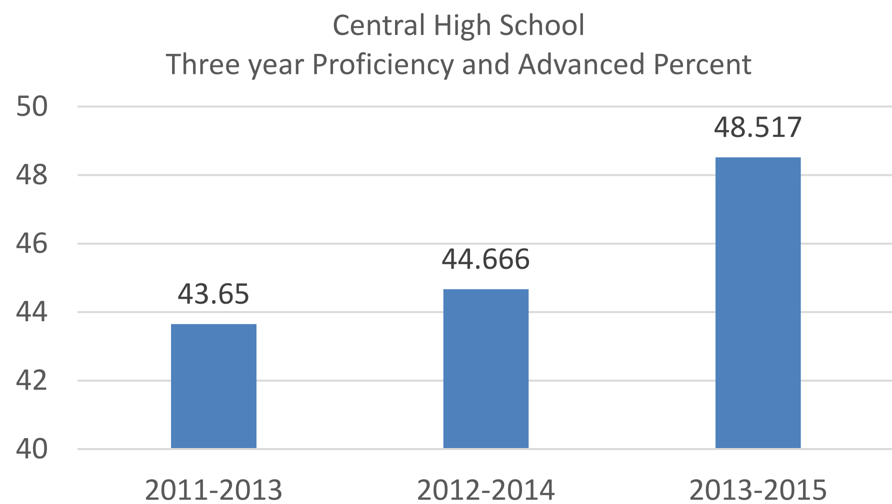
Randy Rotundo, Curriculum Coordinator/Assessment

Earnest Simpson, Principal

Adrian Watkins, School Improvement Specialist

In regards to the academic improvement efforts of Helena West Helena school District, I would like for the state board to take into consideration the following;

Realizing the importance of input and buy-in, the District Improvement Team has been meeting at least monthly for the past 2 1/2 years. Team members have always included a student from Central High School, parent representatives from the schools, district administrators, and a member of the advisory board. The advisory board member has always had the responsibility to report improvement activities, strategies, and data to the full advisory board during the board report portion of the agenda. We believe the conversations from these meetings have led, at least in part, to the results detailed below.



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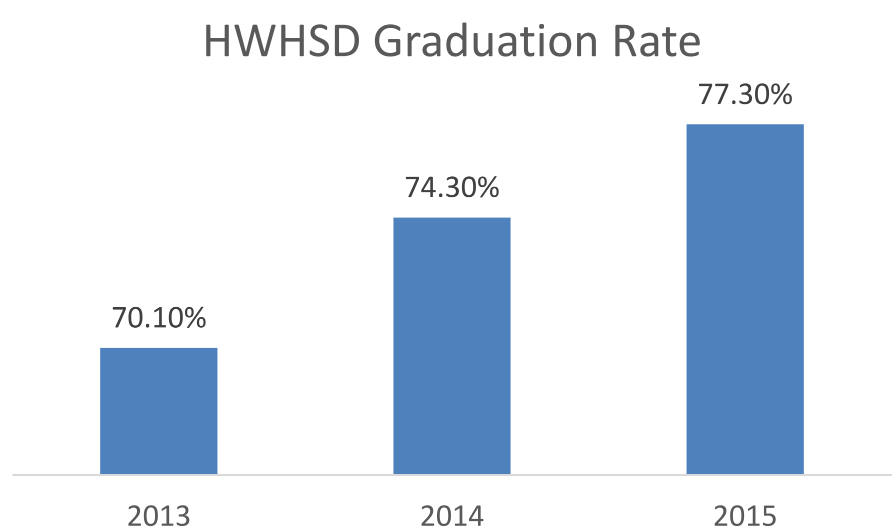
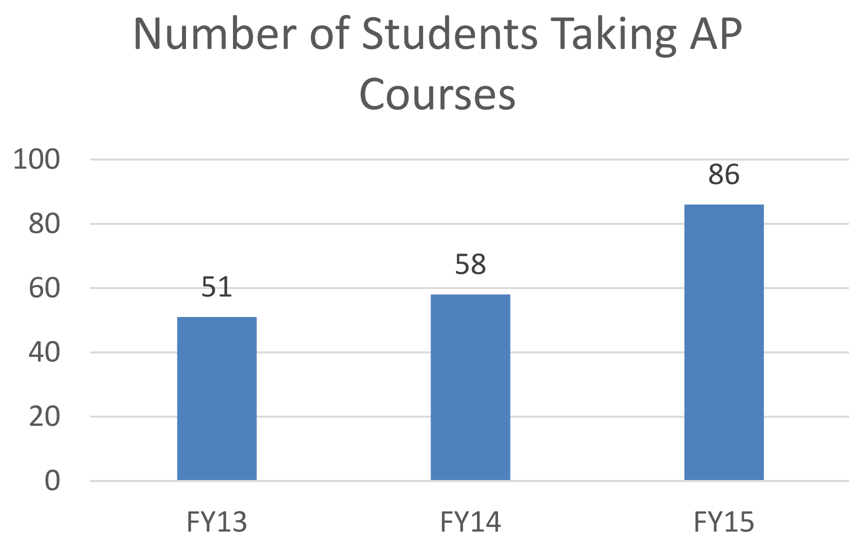




Number of Students Taking AP Courses
100
80
60
40
20
0
51
58
86
FY13
FY14
FY15

HELENA-WEST HELENA SCHOOL DISTRICT

Board Agenda Summary for
May 9, 2016

On June 20, 2011, The Arkansas Department of Education removed the Helena-West Helena School District Board of Education and Superintendent, Willie C. Williams and took control of the District. In 2014, the Arkansas Department of Education placed Mr. John Hoy as Superintendent. Commissioner of Education Mr. Johnny Key will serve instead of the board.

NEW BUSINESS:

Commissioner Approval for May 9, 2016 – Advisory Board Meeting

1. Student Expulsion Hearing – **APPROVED**
2. Approval to pay Equipped Educational Consultants - $33,000.00 - **APPROVED**
3. Approval to pay Achieve 3000 - $10,000 – **APPROVED**
4. Approval to pay PermaBound - $24,266.12 – **APPROVED**
5. Approval to pay Great Rivers Educational Cooperative - $40,000.00 - **APPROVED**
6. Approval to accept bid from Markham Restaurant Supply for Cafeteria Steamers at CHS - **APPROVED**
7. Approval to combine HR/Testing Coordinator Positions - **APPROVED**

CONSENT AGENDA:

1. Summary of District Operations for April - **APPROVED**
2. Financial Report - **APPROVED**
3. Fiscal Distress Report - **APPROVED**
4. Personnel - **APPROVED**

HELENA-WEST HELENA SCHOOL DISTRICT

Board Agenda Summary for
June 13, 2016

On June 20, 2011, The Arkansas Department of Education removed the Helena-West Helena School District Board of Education and Superintendent, Willie C. Williams and took control of the District. In 2014, the Arkansas Department of Education placed Mr. John Hoy as Superintendent. Commissioner of Education Mr. Johnny Key will serve instead of the board.

NEW BUSINESS:

1. Approval of 2016-2017 Milk Bid – **APPROVED**
2. Approval of 2016-2017 Bread Bid – **APPROVED**
3. Approval of 2016-2017 Food Bid – **APPROVED**
4. Approval to pay 2016-2017 Property Insurance - $166,298.35 – **APPROVED**
5. Approval to pay 2016-2017 Vehicle Insurance - $21,510.00 – **APPROVED**
6. Approval Delete/Retire Fixed Asset Items – **APPROVED**
7. Approval to pay Hawkins Educational Services – $21,990.56 – **APPROVED**
8. Approval of Extra Duty Pay for Coaches – **APPROVED**
9. Approval of Faculty/Staff Passes for Home Athletic Events – **APPROVED**
10. Approval for Supt. to have house at Central demolished – **APPROVED**
11. Approval of Wellness Policy 5.29 – **APPROVED**
12. Approval to pay Perma Bound - $15,901.00 – **APPROVED**
13. Approval of Policy 3.1 – Licensed Personnel Salary Schedule – **APPROVED**
14. Approval of Policy 8.1 – Non-Licensed Personnel Salary Schedule – **APPROVED**
15. Alternative Learning Environment – **APPROVED**
16. Disposition of the North End School Facility – **APPROVED**
17. Career & Technical Education Consortium Consideration – **APPROVED**
18. Approval of 2016-2017 Elementary Handbook – **APPROVED**
19. Approval of 2016-2017 Secondary Handbook – **APPROVED**
20. Approval to hire Classified Staff for 2016-2017 – **APPROVED**

CONSENT AGENDA:

1. Summary of District Operations – **APPROVED**
2. Personnel – **APPROVED**
3. Financial Report (Monthly Bills) – **APPROVED**
4. Fund Balances – **APPROVED**

HELENA-WEST HELENA SCHOOL DISTRICT

Board Agenda Summary for
July 11, 2016

On June 20, 2011, The Arkansas Department of Education removed the Helena-West Helena School District Board of Education and Superintendent, Willie C. Williams and took control of the District. In 2014, the Arkansas Department of Education placed Mr. John Hoy as Superintendent. Commissioner of Education Mr. Johnny Key will serve instead of the board.

NEW BUSINESS:

1. Approval of 2016-2017 AVID Agreement – **APPROVED**
2. Policy 7.12 Expense Reimbursement Amendment – **APPROVED**
3. Football Equipment – **APPROVED**
4. CTE Program of Studies Discontinuation – **APPROVED**
5. Purchase over $10,000 – Textbooks – **APPROVED**
6. APEX Learning Renewal – **APPROVED**
7. Renaissance Learning Renewal – **APPROVED**
8. Swivl Robotic Platform Purchase – **APPROVED**
9. Approval of 2016-2017 Athletic Handbook – **APPROVED**
10. Summer School Transportation – **APPROVED**
11. Approval of Cougar Band Handbook – **APPROVED**
12. Approval of 2016-2017 Carl Perkins Memorandum of Understanding – **APPROVED**

CONSENT AGENDA:

1. Summary of District Operations – **APPROVED**
2. Personnel – **APPROVED**
3. Financial Report (Monthly Bills) – **APPROVED**
4. Fund Balances – **APPROVED**

HELENA-WEST HELENA SCHOOL DISTRICT

Board Agenda Summary for
August 8, 2016

On June 20, 2011, The Arkansas Department of Education removed the Helena-West Helena School District Board of Education and Superintendent, Willie C. Williams and took control of the District. In 2014, the Arkansas Department of Education placed Mr. John Hoy as Superintendent. Commissioner of Education Mr. Johnny Key will serve instead of the board.

NEW BUSINESS:

1. Resolution in Anticipation of Building Construction FY 16-17 – **APPROVED**
2. Educational Consultants FY17 – Eliza Miller Elementary – **APPROVED**
3. Speech Language Pathologist – **APPROVED**
4. Margaret M. Bryan – Occupational Therapy Services – **APPROVED**
5. Disposition of Used School Buses – **APPROVED**
6. White River Services - $40,049.62 – **APPROVED**
7. Football Equipment – **APPROVED**
8. Educational Consultants FY17- Special Education – **APPROVED**
9. Substitute Calling System – **APPROVED**
10. Educational Consultants FY17 – Pre/Post Test PD – **APPROVED**
11. Resolution Naming the New Lower Elementary Building – **APPROVED**
12. September Board Meeting Date – **APPROVED**
13. Approval of Intercom System – J.F. Wahl – **APPROVED**
14. Approval of Band Equipment – Eliza Miller Elementary – **APPROVED**
15. Brooke Barnes – **APPROVED**

CONSENT AGENDA:

1. Summary of District Operations – **APPROVED**
2. Personnel – **APPROVED**
3. Financial Report (Monthly Bills) – **APPROVED**
4. Fund Balances – **APPROVED**

HELENA-WEST HELENA SCHOOL DISTRICT

Board Agenda Summary for
September 21, 2016

On June 20, 2011, The Arkansas Department of Education removed the Helena-West Helena School District Board of Education and Superintendent, Willie C. Williams and took control of the District. In 2014, the Arkansas Department of Education placed Mr. John Hoy as Superintendent. Commissioner of Education Mr. Johnny Key will serve instead of the board.

NEW BUSINESS:

1. Facilities Consultant (Chad Davidson) – **APPROVED**
2. Teach For America Contract FY 17 – **APPROVED**
3. HWHSD Mission & Goals – **APPROVED**
4. Renaissance Learning FY 17 – **APPROVED**
5. Arkansas Consolidated School Improvement Plan FY 17 – **APPROVED**
6. Arkansas Consolidated School Improvement Plan Assurances – **APPROVED**
7. Direct Instruction Professional Development – **APPROVED**
8. Educational Consultants FY 17 (Central High School) – **APPROVED**
9. Educational Consultants FY 17 (J.F. Wahl Primary) – **APPROVED**
10. White River Services $53,680.76 – **APPROVED**
11. Request for Lead Teacher at Alternative Learning Environment – **APPROVED**
12. Request for Special Education Teacher at Alternative Learning Environment – **APPROVED**
13. Secondary Science Textbooks - **APPROVED**

CONSENT AGENDA:

1. Summary of District Operations – **APPROVED**
2. Personnel – **APPROVED**
3. Financial Report (Monthly Bills) – **APPROVED**
4. Fund Balances – **APPROVED**

Helena-West Helena School District
Commissioner's Board Packet
October 12, 2016

CALL TO ORDER:

REPORTS:

Superintendent's Report
Students of the Month

Board Chair Report
a. Millage Campaign Update
b. Facilities Update

NEW BUSINESS:

1. Educators Book Depository of Arkansas, Inc - $32,714.25
2. Equipped Educational Consultants (Central High School) - $33,000
3. White River Services (2) - $51,684.86
4. Board and Commissioner Resolution (1)
5. Board and Commissioner Resolution (2)
6. College Preparatory Track for Grades 7-12
7. Approval of Minority Teacher and Administrator Recruitment Plan
8. Approval of Boys/Girls Basketball Bid
9. Sports Floors - $14,591.00
10. Policy 8.5(a) – Non-Licensed Personnel Incentive Plan
11. Policy 3.8(a) – Licensed Personnel Sick Leave Incentive Plan
12. Approval for Newly Elected Board Members to attend ASBA Conference on December 7-9, 2016.
13. Approval of Board Resolution Reviewing Salary Increases of 5% or more
14. Grievance Hearing – Larry Prowell
15. Grievance Hearing – Joyce Anderson
16. Equipped Educational Consultant Group, Inc. – 92,400.00

CONSENT AGENDA:

1. Summary of District Operations
2. Personnel
3. Financial Report (Monthly Bills)
4. Fund Balances

School Improvement Unit

Background and Support Needs for Second Quarter

2016-2017

Arkansas Department of Education – School Improvement Unit

Pulaski County Special School District

Lisa Knoedl

December 2016

Overview and Background

A team of educators from the Arkansas Department of Education (ADE) visited all schools that were designated as Academic Distress in order to gain insights into the schools' circumstances that led to the academic distress classification. Following these visits, the ADE School Improvement Unit (SIU) developed recommendations that were designed to assist schools in their efforts to be removed from academic distress. Three overarching goals were developed and these goals serve as the foundation for the recommendations. The goals are:

1. The School Improvement Leadership Team (SILT) will develop a clear and shared academic focus that will lead to removal from Academic Distress.

2. The School Improvement Leadership Team in conjunction with all stakeholders will develop a positive school culture conducive to learning and staff professional growth.

3. The School Improvement Leadership Team in conjunction with the District Improvement Leadership Team will develop a culture of continuous improvement.

On May 16, 2011, Pulaski County Special School District was classified as in Fiscal Distress. On June 20, 2011, the State Board of Education exercised authority pursuant to the Omnibus Education Act of 2003 allowing the state to take over operations of the Pulaski County Special School District ("the District"). Commissioner Kimbrell appointed Dr. Jerry Guess as superintendent to administratively operate the District under the supervision and approval of the Commissioner.

On May 13, 2013, the Fiscal Distress classification was extended for another 3-year period. On February 14, 2014, Wilbur D. Mills High School was classified as Academic Distress due to the school's level of student proficiency (45.017%). On March 10, 2016, PCSSD was removed from Fiscal Distress and, pending the election of a local school board, PCSSD will be removed from the Commissioner's oversight. The following details about the high school and district are considered pertinent:

- The principal at Wilbur D. Mills High School is in his 3rd year at this position. He also previously served at the administrative level for 6 years.
- Mills has a new locally-hired School Improvement Specialist. However, she previously served PCSSD for seven years as the Federal Programs Coordinator/Grant Writer.

- A Dean of Students position was created this school year to address student discipline needs. In addition, two assistant principals assist with discipline referrals, and discipline referral data is analyzed at every SILT meeting. As documented in e-School, Mills HS recorded 333 discipline referrals during the first quarter of 2016-2017. This is a decrease of approximately 100 discipline referrals, and it appears this is a result of increased staff visibility and data utilization.
- The high school campus serves grades nine through twelve and utilizes a college-type block schedule of alternating ninety-minute classes. Professional Development was provided this year for the entire math department on Block Scheduled Instruction. Significant staff figures include: 52 certified teachers, including 4 first-year teachers and 16 teachers new to the building.
- Wilbur D. Mills High School currently has a Scholars Program. This program, established in 1994, was established as part of the PCSSD's plan for desegregation with a primary goal of preparing gifted and talented students to meet the demands of selective colleges and universities throughout the United States. Approximately 26% of the students are presently enrolled in the Scholars Program.
- PCSSD has hired EdTech to provide additional support for teachers and administration on effective integration of technology in both mathematics and English. Ten days of Professional Development will be provided for teachers throughout the year for both subject areas.
- To further promote student involvement, the principal at Mills HS has established a Principal's Cabinet called "Students With a Goal" (SWAG). Students complete an application and are selectively chosen to represent their peers in making important school decisions.
- PCSSD and Mills HS officials met at UALR on November 4 to sign a Memorandum of Understanding for their concurrent enrollment partnership. Concurrent enrollment provides high school students the opportunity to take college-credit bearing courses taught by college-approved high school teachers.

Areas for ADE support:

Analysis of the 45-Day Priority School Progress Report, School Leadership Team Meeting minutes, and School Improvement Specialist weekly reports suggest further needed assistance:

Wilbur D. Mills High School –

- Verify that a process is in place to ensure that all stakeholders (i.e. students, parents, teachers, district personnel) know the academic focus and their role in accomplishing the focus as it relates to removal from Academic Distress.

- Assist in the clarification of goals that are realistic, attainable, and supportive for the communication of a clear and shared focus, and assist the schools in creating a logic flow to accomplish these goals.
- Monitor the continued evaluation of student data and post-unit assessments through the work of the School Improvement Leadership Team (SILT). These ongoing data collection systems should include discussions on data points every two to three weeks.
- Analyze the utilization of the Indistar agenda and minutes system effectively and efficiently to document specific data discussed; these discussions must be clearly defined so that the system can function as both a behavioral record and a communication device for staff.
- Assist in the identification of a clear strategy to continue the improvement of school climate based upon educator and student survey results.

District-

- Assure that the district continues to actively provide support to Wilbur D. Mills High School in the School Improvement process, as outlined in the 2016-2017 PCSSD District Improvement Leadership Team Plan of Support for Mills High School.
- Support the continued work with feeder pattern schools in identifying academic needs and better preparing prospective Mills High School students.
- Assure that the continued district engagement occurs with SIS weekly reports, SILT meeting agendas and minutes, and 45-day Progress Reports and reflects more detailed activities, processes and decisions towards school improvement.

Summary:

PCSSD and Wilbur D. Mills High School show progress in the school improvement process. The SILT has conducted more intense data analysis during regularly scheduled meetings and also has made improvements in the pre/post unit assessment process to better measure actual student comprehension of content knowledge. School administrators show continuous work with feeder pattern classroom walk-throughs and diligent efforts to improve school climate. By continuing to work together in providing a system of support, PCSSD and Wilbur D. Mills High School are striving to meet the recommendations and expectations outlined by the ADE School Improvement Unit.

DISTRICT: PULASKI COUNTY SPECIAL SCHOOL DISTRICT
SUPERINTENDENT: DR. JERRY GUESS
SCHOOL: MILLS UNIVERSITY STUDIES HIGH SCHOOL
PRINCIPAL: MR. DUANE CLAYTON
STATUS: PRIORITY SCHOOL IN ACADEMIC DISTRESS
SITE-BASED SIS: MRS. KATHY GOFF
EXTERNAL PROVIDER: N/A
ADE SCHOOL IMPROVEMENT SPECIALIST TEAM: MRS. LISA KNOEDL

45-DAY Priority School Progress Report: Secondary

1st QUARTER

2016-2017 School Year

Revised 8/22/16

SCHOOL IMPROVEMENT LEADERSHIP TEAM REPORT

Annual Student Achievement Goal(s)

What student growth goal(s) has/have been established for the current school year? (Please present in SMART goal format based upon a deep analysis of Aspire results.)
As stated in the Arkansas Review of Schools Classified in Academic Distress, the following goals will be used as the basis for our student growth goals established for the current school year: **Goal 1**: The School Improvement Leadership Team will develop a clear and shared academic focus that will lead to removal from Academic Distress. **The Language Arts Department's 1st Quarter SMART Goals: Student Goal:** Students will improve 5% on subject/verb and pronoun/antecedent post tests by the end of the 1st 9 weeks. **Teacher Goals:** 1) Display DATA WALLS showing the progress of students' scores on Pre and Post Tests (we have limited implementation). 2) Deconstruct ASPIRE, ACT, and AP writing prompts with students, offering strategies for organizational methods for the essays they will write (LIMITED implementation.) **The Math Department's 1st Quarter SMART Goal:** Twenty percent (20%) of this year's 9th and 10th grade students will move to the next level of achievement on the first ACT Aspire interim assessment in November. Students who were "In Need of Support" will move to "Close", students who were "Close" will move to "Ready", students who were "Ready" will move to "Exceeding". **The Special Education Department SMART Goal:** By May 30, 2017, 70% of students with IEPs will show growth by 1 to 2 reading levels in reading comprehension and fluency using MindPlay, an online program. The Special Education Department is receiving training on careers and transitions for the students with disabilities. **The Scholars Program SMART Goal for 1st & 2nd Quarter**: Reduce failing grades in Scholars classes by 50% by the end of the first semester. 4 Actions will address the goal: 1. The Scholars Program Seminar team has created an RTI strategy to help students whose grades show poor performance. We have met with ninth and tenth grade students who have three or more low grades for the interim in three or more Scholars Program classes. Meetings were held with each student in which they explained why his/her grade was low. We discussed with them what he/she thought could remedy the situation. Each student filled out an action plan of changes that he/she thought would improve his/her grades. We will check grades at the end of the quarter to see if there is improvement. We will then counsel with the students again if needed for further interventions or congratulations. We will gather data at the end of the semester to see if we have met our smart goal. 2. The same process will occur with eleventh and twelfth grade students at the end of the first quarter for initial intervention and then at mid-term of the second nine weeks for a reinforcement. We will gather data at the end of the semester to see if we have met our smart goal. 3. Another intervention that will be used to improve grades will be to provide after and before school tutoring by Program

teachers. Currently, eleven of the 14 teachers provide this reinforcement. We will continue this practice and document it by keeping a sign in sheet. In addition, we will hold review sessions after school and on selected Saturdays after spring break to help student prepare for AP exams.

4. AP teachers will implement the use of the on-line tool, Albert I.O., to reinforce and review for the AP Exams.

The Social Studies Department's SMART Goal for the 1st Nine Weeks (Continued through the 2nd & 3rd Nine Weeks): The Social Studies Department's goal is to increase the number of students scoring Ready or Exceeding on the ACT Aspire reading and writing sections by 10%. The baseline for this improvement will be the scores students receive on the ACT Aspire interim assessment.

In order to accomplish this goal, the Social Studies Department will examine the process of planning instruction (by year, unit, and daily) in order to increase rigor and incorporate instruction in critical thinking, reading and writing. The focus was selected based upon walk through data and the assessment data from the Administration about lesson plans submitted to the Administration.

During before school staff development this process was started when a variety of strategies were shared that can be used for instruction in writing. This process will be continued through departmental PLCs and to foster critical thinking skills. The focus on lesson planning will include the creation and critiquing of yearly plans, unit plans and daily lesson plans. Planning methods will be shared and discussed so that lessons become more rigorous and provide for effective instruction in critical thinking, reading, and writing skills as well as the content of the lesson. Strategies will be shared to incorporate into lessons. This will be an on-going process throughout the year.

The Science Department 1st Quarter SMART goals: 1.) Display student ACT Aspire data and help students understand their labeled academic ability level based on this data by the end of the first nine weeks. 2.) Encourage students to take ownership of their data and determine strategies to help students advance to higher performance levels on the ACT Aspire assessment, and local school, district, and individual teacher assessments by the end of the first nine weeks. 3.) Create lessons that will teach students and reinforce learning of how to investigate, interpret, and defend scientific investigations, conclusions and arguments (ongoing).

4) Create lessons that will teach students and reinforce learning of how to use data, logic, and analytical thinking as investigative tools and to formulate and revise scientific explanations and models using critical thinking and logic (ongoing). 5.) Increase student performance by 50% from pre to post assessments that are designed according to ACT Aspire Science standards which will increase by 15% the number of students scoring Ready or Exceeding on Interim assessments and the ACT Aspire by the end of the 2nd and 3rd nine weeks.

Goal 2: The School Improvement Leadership Team in conjunction with all stakeholders will develop a positive school culture conducive to learning and staff professional growth.

Credit Recovery is provided to help students reach their needed requirements for graduation. Tutoring is provided before and after school as a means of intervention.

The Principal has created a Principal's Cabinet, known as SWAG (Students With A Goal). The Cabinet meets twice a month to

discuss issues concerning MUSHS. Student Council and parent and community involvement activities continue to be an active part of high school life. A few Student Council activities among many are listed here: Homecoming for football and basketball, Red Ribbon Week, assisting with the Thanksgiving food drive and the Christmas Angel Tree and more. Parent and Community Involvement activities: Open House, Parent Teacher Conferences, a free Health Clinic prior to the start of school, Homecoming Tailgate Party for returning alumni, Senior Moms Tea, Senior Moms provide quarterly gift bags for all seniors.

Goal 3: The School Improvement Leadership Team in conjunction with the District Improvement Leadership will develop a culture of continuous improvement.

Mills High School will begin training in PBIS (Positive Behavior Intervention Systems) through a 3 year commitment with the Arkansas Department of Education.

This fall Mills Feeder Pattern was able to have customized math professional development with Dr. Cleaver and Mrs. Carr. During this training our staff received tools to implement the workshop model in their classes. In addition, the School Improvement Team has established academic incentives based on grade point average, ACT Aspire, and ACT results. Mills will also provide incentives to students who have no referrals for the first quarter.

The adult learners will receive professional development from Ed Tech that should equip them with tools to engage students in the classroom.

Staff and students school climate surveys were conducted so that the school can add concerns to the priority improvement plan.

SCHOOL IMPROVEMENT LEADERSHIP TEAM REPORT

Principal's Narrative Report

Tell the State Board of Education what progress you and your team have made in improving student learning or teacher skills/processes this quarter. As appropriate, highlight supports you have received; challenges your school has faced; challenges that your team was able to overcome related to your identified progress.
Quarter 1: During the first quarter, the school improvement leadership team monitored various forms of data including discipline, teacher observational data, student/teacher attendance, and student/staff survey data. Our finds have prompted Mills SILT to schedule TEAM, grade level PLCs and needed PD in Response to Intervention and Blooms for student engagement. In addition, each department has created a specific focus. The math department teachers have created intervention plans for students that are not at Ready or Exceeding on ACT Aspire. Some of these plans were shared in departmental PLCs. The social studies department has created a focus on writing while English Language Arts has worked on Pre/Post assessments for grammar while utilizing interventionists who have been helping to almost double the instruction for a vast number of students. The Science department is working on discipline management, planning, and labs to increase student inquiry. The instructional team of administrators have completed over 280 classroom visits to collect observational data and address professional development needs. In addition, informal observations have begun and professional growth plans have been started with at least 20 teachers. TEAM PLCs were designated to ensure that all teachers are knowledgeable of how to construct goals and align them to indicators as well as answer the TESS (Teacher Excellence Support System) questions to describe how goals will be accomplished. All teachers will incorporate Domain 1B Knowledge of Students as a goal. A principal's cabinet, SWAG-Students with A Goal, has been selected through an application process to implement a strong student voice at our school. In closing, training for writing across the curriculum took place in PLCs and faculty meetings. Our staff will teach how to decode prompts similar to the writing prompts on ACT Aspire. Support from the district has come in the form of the DILT, District Improvement Leadership Team, presenting a plan of support for the school that consists of a number of initiatives. We have challenges in the area of technology, but we have managed to test our students with the STAR360 Reading and Math exams to obtain baseline data to track and measure growth over time. Even though we have a new staff in the English department, Mills has managed to provide professional development and resources to ensure that students' needs are addressed with the necessary levels of curriculum and strategies.
Quarter 2:

Quarter 3:
Quarter 4:

5

SCHOOL IMPROVEMENT LEADERSHIP TEAM REPORT

School Improvement Leadership Team's Narrative Report

What meaningful decisions have been made by the school improvement leadership team this quarter? Explain why the team considers the decisions meaningful. (Documented within team minutes.)
Quarter 1: The SILT has determined the methods of administering student/teacher school climate surveys, the implementation of an incentive program for students who performed Ready and Exceeding on ACT Aspire and the ACT as well as class grades and grade point averages. In addition, we revisited the Team Charter to refocus on team roles and responsibilities. We looked closely and monitored indicators ID10, ID11, IH01, CL12, and IF02 to shift our focus to not just assessing our current reality but also to make changes in the tasks when student outcomes are not favorable. The SILT has decided that the staff will receive professional development on Blooms where the staff will work on starting at the higher levels of thinking. The Mills Department chairs share the School Improvement Leadership Team minutes with the other members of their departments to ensure that we take plans to scale.
Quarter 2:
Quarter 3:
Quarter 4:

6

What modifications to the school improvement efforts will be made for the next quarter based on your analysis of the data reported? Explain the team's rationale for changing or sustaining improvement efforts.
Quarter 1: We have shifted from just utilizing the CWT data observations tools for observing only Marzano's strategies to utilizing TESS Domains 2 and 3 on observations. In addition, the School Improvement Leadership Team decided to analyze data at least twice per month. We are looking at ways to increase the number of questions used on posttests to better reflect actual student comprehension of content knowledge.
Quarter 2:
Quarter 3:
Quarter 4:

SCHOOL IMPROVEMENT LEADERSHIP TEAM REPORT

Enrollment/Discipline Data

Grade Level	Number of Students Enrolled				SWD Percent of Total Student Population	EL Percent of Total Student Population	Total Number of Discipline Referrals (Include all discipline referrals)				Number of Students with 5 or more Discipline Referrals (*Cumulative)			
	1Q	2Q	3Q	4Q	As of 10/01/16	As of 10/01/16	1Q	2Q	3Q	4Q	1Q	2Q	3Q	4Q
9	185				12.76%	5.85%	110				2			
10	129				15.04%	8.27%	103				7			
11	153				9.03%	5.16%	47				0			
12	138				10%	1.43%	53				3			
9 ALC	3				0	0	9				1			
10 ALC	4				0	0	5				0			
11 ALC	2				0	0	0				0			
12 ALC	2				0	0	6				0			

***SWD-Students with Disabilities –** *SWD students are not placed in ALC*

***EL-English Language Students -** *EL students are not placed in ALC*

Comments/Clarifications: *Some students receive multiple discipline referrals.*

It was noted, in comparing the discipline reports from School Year 16 to School Year 17, discipline referrals decreased by over 100, showing an improvement in discipline across the building.

SCHOOL IMPROVEMENT LEADERSHIP TEAM REPORT

Teacher Attendance Data

Grade Span	Total Teachers Per Grade Span				Total Teacher Days Absent for Illness & Personal				Total Teacher Days Absent for School Sponsored Events or Professional Development				Percent of Core Teachers (Math, Science, Social Studies, ELA, Special Education) absent 5 or more days for any reason Enter Percent of Core Teachers who were absent 10 or more days per semester for any reason					
	1Q	2Q	3Q	4Q	1Q	2Q	3Q	4Q	1Q	2Q	3Q	4Q	1Q	2Q	Semester 1	3Q	4Q	Semester 2
9-12	52				80.5				27.5				8.8%					

Specific Grade Levels and /or Spans may be modified according to your building

***Comments/Clarifications**:*

Mills is a small high school with several teachers teaching across multiple grade levels so our grade span was combined. The school also uses block scheduling.

SCHOOL IMPROVEMENT LEADERSHIP TEAM REPORT

Student Attendance Data

Grade Level	Average Daily Attendance (%)				Number of Students Absent 5 or more Days Per Quarter Number of Students Absent 10 or more Days Per Semester					
	1Q	2Q	3Q	4Q	1Q	2Q	Semester 1	3Q	4Q	Semester 2
9	98%				89					
10	97%				56					
11	98%				71					
12	99.8%				85					
9 ALC	89%				2					
10 ALC	76%				2					
11 ALC	49%				0					
12 ALC	93%				2					

Comments/Clarifications:

The attendance report pulls the Mills High School Average Daily Attendance separately from the Mills High School ALC (Alternative Learning Classroom) Average Daily Attendance.

The ADA (Average Daily Attendance) listed above is not official. The official ADA will be submitted in the District's Cycle 3 report in November.

SCHOOL IMPROVEMENT LEADERSHIP TEAM REPORT

Math Data

Math Data by quarter Grades 9-10

Grade Level	Number of students enrolled this quarter	Number of Students with F in Math 2014-15 prior to summer school	Number of Students with D or F in Math 2015-16 prior to summer school	Number of Students with D or F in Math by Grading Period				Upper Case Letters: Report total number of grades entered on each post-unit assessment for the current quarter Lower Case Letters: Report the number of D and F grades on each post-unit assessment								Percent of D or F grades on all unit assessments administered each quarter $\frac{a+b+c+d}{A+B+C+D}$ *X 100*			
								A	a	B	b	C	c	D	d				
				1Q	2Q	3Q	4Q	Unit 1	Unit 1 D&F	Unit 2	Unit 2 D&F	Unit 3	Unit 3 D&F	Unit 4	Unit 4 D&F	1Q	2Q	3Q	4Q
9	**188**	**17**	**81**	**92**				**154**	**58**	**112**	**44**	**94**	**40**	**22**	**4**	**38**			
10	**133**	**61**	**85**	**62**				**109**	**57**	**99**	**67**	**64**	**22**			**54**			

Comments/Clarifications:

The 2014-2015 Math data report combined all grade-level Fs into one total

In 2015-2016 the 4th quarter Math data report requested Ds or Fs and all grade-level totals were combined.

For 2016-2017 we have combined Ds and Fs to show a true comparison to the previous year.

SCHOOL IMPROVEMENT LEADERSHIP TEAM REPORT

English/Language Arts Data

ELA Data by quarter Grades 9-10

Grade Level	Number of students enrolled this quarter	Number of Students with F in ELA 2014-15 prior to summer school	Number of Students with D or F in ELA 2015-16 prior to summer school	Number of Students with D or F in ELA by Grading Period				Upper Case Letters: Report total number of grades entered on each post-unit assessment for the current quarter Lower Case Letters: Report the number of D and F grades on each post-unit assessment								Percent of D or F grades on all unit assessments administered each quarter a+b+c+d / A+B+C+D *X 100*			
								A	a	B	b	C	c	D	d				
				1Q	2Q	3Q	4Q	Unit 1	Unit 1 D&F	Unit 2	Unit 2 D&F	Unit 3	Unit 3 D&F	Unit 4	Unit 4 D&F	1Q	2Q	3Q	4Q
9	**188**	**15**	**102**	**36**				**82**	**75**	**78**	**67**	**77**	**66**			**88**			
10	**133**	**51**	**109**	**78**				**132**	**118**	**129**	**100**	**131**	**102**			**82**			

Comments/Clarifications:

The 2014-2015 ELA data report combined all grade-level Fs into one total.

In 2015-2016 the 4th quarter ELA data report requested Ds or Fs and all grade-level totals were combined.

For 2016-2017 we have combined Ds and Fs to show a true comparison to the previous year

By increasing the number of questions used on posttests for the 2nd quarter, the percentages of D's & F's should improve as scores will better reflect actual student comprehension of content knowledge.

SCHOOL IMPROVEMENT LEADERSHIP TEAM REPORT

School Summary of Interim Assessments

Interim Test	Date Range	English Proficiency (%)	Reading Proficiency (%)	Science Proficiency (%)	Math Proficiency (%)
Interim I	Nov. 28-Dec. 9				
Interim II	January 17-27				
Interim III	March 6-17				
Interim IV					

***Any interim other than ACT Aspire must be approved by ADE School Improvement Unit and reported in a similar format.**

Comments/Clarifications:

SCHOOL IMPROVEMENT LEADERSHIP TEAM REPORT

Student Screening Data

Grade Level	Percent of students 3 or more years below grade level in math as determined by STAR 360 (assessment tool used)		Percent of students 3 or more years below grade level in ELA as determined by STAR 360 (assessment tool used)	
	Beginning of Year	**End of Year**	**Beginning of Year**	**End of Year**
9	**77%**		**87%**	
10	**73%**		**76%**	
11	**** 60%**		**64%**	
12	***** 70%**		**61%**	

Comments/Clarifications:

*** Only 26% of the 11^{th} grade **math** students were tested - 60% of those tested are 3 or more years below grade level*

****Only 7% of the 12^{th} grade **math** students were tested - 70% of those tested are 3 or more years below grade level*

It is noted that 9^{th} and 10^{th} grade showed the largest percentage below grade level. To address this problem three interventionists have been hired to work directly with the specific students in need.

SCHOOL IMPROVEMENT LEADERSHIP TEAM REPORT

Summary of Educator/Student School Climate Survey Data

Survey Results on a 1-4 Scale (Survey aggregate average)

	First Quarter	Second Quarter	Third Quarter	Fourth Quarter
Educator Results	**3.1**			
Student Results	**2.76**			

****Attach Copy of Survey Instrument if NOT using ADE provided survey**

Comments/Clarifications:

The student survey for the 1st quarter was provided through the free version from Surveymonkey.com which only allowed 10 questions. All remaining quarterly surveys, student and educator, will contain 20 questions.

The educator survey for the 1st quarter was provided through surveymonkey.com after upgrading to the survey package which allows all 20 questions.

Educator results: Strongly disagree - 1.6%; Disagree – 14.65%; Agree – 56.26%; Strongly Agree – 27.49%

Student results: Strongly disagree – 9.39%; Disagree – 22.62%; Agree – 50.40%; Strongly Agree – 17.59%

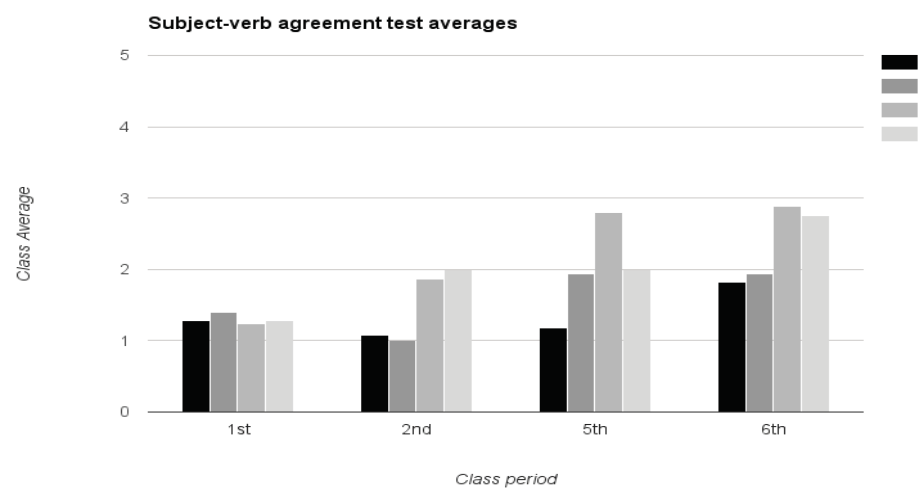
SCHOOL IMPROVEMENT LEADERSHIP TEAM REPORT

Optional Data

Do you have other data sources that support and/or identify that you are making gains in student outcomes? *You may include a chart to describe your data, but do not include raw data or student names.*

Yes. Teachers in Math, Algebra AB are charting student data based on assessments so that student can view their own levels of proficiency on STAR or Pearson exams. This gets students in the mind frame of knowing that they cannot stay in the red areas indicating need for support. In several classes, students have moved from Red to Blue which indicates growth.
Red=In need of support, Blue=Close, Green=Ready, Yellow=Exceeding.

See chart below from a literacy teacher: From left to right you will see pre-test (black), post 1, post 2, and post 3. As you can see on the graphs, my second period's class average increased with each post-test; first period increased from the 2nd to 3rd post-test; fifth and sixth period's averages increased from the pre-test through the 2nd post test.


Subject-verb agreement test averages
Class Average
Class period
1st
2nd
5th
6th
0
1
2
3
4
5

17

Process for Review of Schools Classified in Academic Distress by the State Board of Education

The process for schools and districts classified in Academic Distress to report progress in the implementation of the ADE Site Review Team Recommendations at the State Board of Education meeting is as follows:

1. Principals will be asked to submit a written report on the three goals established in Recommendation 1.

    A. GOAL 1 The School Improvement Leadership Team will develop a clear and shared academic focus that will lead to removal from Academic Distress.

    B. GOAL 2 The School Improvement Leadership Team in conjunction with all stakeholders will develop a positive school culture conducive to learning and staff professional development.

    C. GOAL 3 The School Improvement Leadership Team in conjunction with the District Improvement Leadership Team will develop a culture of continuous improvement.

2. Dr. Wilde from the ADE School Improvement Unit will present the goal as a question and then function as time keeper. The questions will be presented one at a time, with each principal responding to the first question before the second question is presented. This process will repeat for the three questions.

    A. What steps has the leadership team taken to create a clear academic focus that will lead your school to the removal from Academic Distress? What were your successes and/or challenges, if any, in attaining stakeholder buy-in for this focus?

    B. What steps has the leadership team taken to improve the culture of the school? What successes and/or challenges have you had in attaining an improved culture?

Four Capitol Mall
Little Rock, AR
72201-1019
(501) 682-4475
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   C. What steps has the leadership team taken to develop a culture of continuous improvement?

3. The district superintendent representative will be asked to report on Recommendation 3.

   Recommendation 3: District will clarify support to be provided (full recommendation attached)

4. Dr. Wilde will present the district representative with three questions.

   A. What are the key actions in the professional development plan for the principal?

   B. What is the district doing to identify effective teachers and then maintain these teachers?

   C. What steps or actions is the district taking to ensure the curriculum is aligned (written, taught, assessed)?

5. Following the presentation of responses by the principals, Dr. Wilde from the ADE School Improvement Unit will provide a summary statement based on:

   A. The 45-Day Progress Report submitted

   B. Locally-Hired School Improvement Specialist reports submitted in the Indistar platform

   C. The School Leadership Team Agendas and Minutes as reported in the Indistar platform

6. The Superintendent, Principals, Locally-Hired School Improvement Specialists and the ADE School Improvement Specialists will be available to respond to any questions the State Board members may have.

2015-2016 ACT Aspire Preliminary School Results

District Name	District LEA	School Name	School LEA	Grade	Math N	Math % Met Readiness Benchmark
HOT SPRINGS SCHOOL DISTRICT	2603000	SUMMIT SCHOOL	2603013	10	14	0.0%
BRINKLEY SCHOOL DISTRICT	4801000	BRINKLEY HIGH SCHOOL	4801003	10	37	0.0%
MARVELL-ELAINE SCHOOL DISTRICT	5404000	MARVELL-ELAINE HIGH SCHOOL	5404032	10	29	0.0%
SIATECH LITTLE ROCK CHARTER	6052700	SIATECH HIGH CHARTER	6052703	10	13	0.0%
RESPONSIVE ED SOLUTIONS PREMIER HS OF LITTLE ROCK	6053700	PREMIER HIGH SCHOOL OF LITTLE RO	6053703	10	19	0.0%
FORT SMITH SCHOOL DISTRICT	6601000	BELLE POINT ALTERNATIVE CENTER	6601005	10	19	0.0%
STRONG-HUTTIG SCHOOL DISTRICT	7009000	STRONG HIGH SCHOOL	7009049	10	24	0.0%
LITTLE ROCK SCHOOL DISTRICT	6001000	HALL HIGH SCHOOL	6001002	10	258	01.2%
HELENA/ WEST HELENA SCHOOL DISTRICT	5403000	CENTRAL HIGH SCHOOL	5403019	10	97	02.1%
OSCEOLA SCHOOL DISTRICT	4713000	OSCEOLA HIGH SCHOOL	4713051	10	84	02.4%
DOLLARWAY SCHOOL DISTRICT	3502000	DOLLARWAY HIGH SCHOOL	3502010	10	71	02.8%
CLARENDON SCHOOL DISTRICT	4802000	CLARENDON HIGH SCHOOL	4802010	10	36	02.8%
WONDERVIEW SCHOOL DISTRICT	1505000	WONDERVIEW HIGH SCHOOL	1505026	10	32	03.1%
MINERAL SPRINGS SCHOOL DISTRICT	3104000	MINERAL SPRINGS HIGH SCHOOL	3104006	10	30	03.3%
PINE BLUFF SCHOOL DISTRICT	3505000	PINE BLUFF HIGH SCHOOL	3505042	10	311	03.5%
LEE COUNTY SCHOOL DISTRICT	3904000	LEE HIGH SCHOOL	3904011	10	52	03.8%
LITTLE ROCK SCHOOL DISTRICT	6001000	J.A. FAIR HIGH SCHOOL	6001063	10	235	03.8%
RIVERVIEW SCHOOL DISTRICT	7307000	RIVERVIEW HIGH SCHOOL	7307032	10	98	04.1%
HOPE SCHOOL DISTRICT	2903000	HOPE HIGH SCHOOL	2903012	10	166	04.2%
TEXARKANA SCHOOL DISTRICT	4605000	WASHINGTON ACADEMY	4605703	10	24	04.2%
ENGLAND SCHOOL DISTRICT	4302000	ENGLAND HIGH SCHOOL	4302018	10	46	04.3%
LITTLE ROCK SCHOOL DISTRICT	6001000	MCCLELLAN MAGNET HIGH SCHOOL	6001064	10	156	05.1%
DECATUR SCHOOL DISTRICT	0402000	DECATUR HIGH SCHOOL	0402009	10	38	05.3%
EARLE SCHOOL DISTRICT	1802000	EARLE HIGH SCHOOL	1802007	10	37	05.4%
HAMPTON SCHOOL DISTRICT	0701000	HAMPTON HIGH SCHOOL	0701002	10	34	05.9%
MOUNTAIN VIEW SCHOOL DISTRICT	6901000	RURAL SPECIAL HIGH SCHOOL	6901012	10	17	05.9%
FORREST CITY SCHOOL DISTRICT	6201000	FORREST CITY HIGH SCHOOL	6201011	10	200	06.0%
BLYTHEVILLE SCHOOL DISTRICT	4702000	BLYTHEVILLE HIGH SCHOOL-A NEW TECH S	4702706	10	152	06.6%
WATSON CHAPEL SCHOOL DISTRICT	3509000	WATSON CHAPEL HIGH SCHOOL	3509067	10	219	06.8%
BARTON-LEXA SCHOOL DISTRICT	5401000	BARTON HIGH SCHOOL	5401003	10	59	06.8%
RECTOR SCHOOL DISTRICT	1106000	RECTOR HIGH SCHOOL	1106023	10	43	07.0%
BEARDEN SCHOOL DISTRICT	5201000	BEARDEN HIGH SCHOOL	5201002	10	42	07.1%
FOUKE SCHOOL DISTRICT	4603000	FOUKE HIGH SCHOOL	4603010	10	80	07.5%
MAMMOTH SPRING SCHOOL DISTRICT	2501000	MAMMOTH SPRING HIGH SCHOOL	2501002	10	39	07.7%

2015-2016 ACT Aspire Preliminary School Results

District Name	District LEA	School Name	School LEA	Grade	Math N	Math % Met Readiness Benchmark
SIATECH LITTLE ROCK CHARTER	6052700	SIATECH HIGH CHARTER	6052703	09	14	0.0%
ARK. SCHOOL FOR THE DEAF	6092000	ARK. SCHOOL FOR THE DEAF H.S.	6092002	09	11	0.0%
FORT SMITH SCHOOL DISTRICT	6601000	BELLE POINT ALTERNATIVE CENTER	6601005	09	19	0.0%
BEEBE SCHOOL DISTRICT	7302000	BADGER ACADEMY	7302703	09	10	0.0%
LEE COUNTY SCHOOL DISTRICT	3904000	LEE HIGH SCHOOL	3904011	09	55	01.8%
FORDYCE SCHOOL DISTRICT	2002000	FORDYCE HIGH SCHOOL	2002007	09	42	02.4%
CABOT SCHOOL DISTRICT	4304000	ACADEMIC CENTER FOR EXCELLENCE	4304703	09	37	02.7%
HELENA/ WEST HELENA SCHOOL DISTRICT	5403000	CENTRAL HIGH SCHOOL	5403019	09	104	02.9%
LITTLE ROCK SCHOOL DISTRICT	6001000	HALL HIGH SCHOOL	6001002	09	315	02.9%
STRONG-HUTTIG SCHOOL DISTRICT	7009000	STRONG HIGH SCHOOL	7009049	09	30	03.3%
HOPE SCHOOL DISTRICT	2903000	HOPE HIGH SCHOOL	2903012	09	174	03.4%
RESPONSIVE ED SOLUTIONS PREMIER HS OF LITTLE R	6053700	PREMIER HIGH SCHOOL OF LITTLE RO	6053703	09	29	03.4%
OSCEOLA SCHOOL DISTRICT	4713000	OSCEOLA HIGH SCHOOL	4713051	09	85	03.5%
LITTLE ROCK SCHOOL DISTRICT	6001000	MCCLELLAN MAGNET HIGH SCHOOL	6001064	09	184	03.8%
PULASKI COUNTY SPECIAL SCHOOL DISTRICT	6003000	JACKSONVILLE HIGH SCHOOL	6003123	09	249	04.4%
FORREST CITY SCHOOL DISTRICT	6201000	FORREST CITY HIGH SCHOOL	6201011	09	193	04.7%
LITTLE ROCK SCHOOL DISTRICT	6001000	J.A. FAIR HIGH SCHOOL	6001063	09	246	05.3%
RESPONSIVE ED SOLUTIONS QUEST MS OF PINE BLUF	3542700	QUEST MIDDLE SCHOOL OF PINE BLUFF	3542702	09	18	05.6%
PULASKI COUNTY SPECIAL SCHOOL DISTRICT	6003000	NORTH PULASKI HIGH SCHOOL	6003136	09	47	06.4%
NEVADA SCHOOL DISTRICT	5008000	NEVADA HIGH SCHOOL	5008014	09	30	06.7%
LAKESIDE SCHOOL DISTRICT (CHICOT COUNTY)	0903000	LAKESIDE HIGH SCHOOL	0903018	09	72	06.9%
WONDERVIEW SCHOOL DISTRICT	1505000	WONDERVIEW HIGH SCHOOL	1505026	09	29	06.9%
WEST MEMPHIS SCHOOL DISTRICT	1803000	EAST JUNIOR HIGH SCHOOL	1803033	09	97	07.2%
WEST MEMPHIS SCHOOL DISTRICT	1803000	WONDER JUNIOR HIGH SCHOOL	1803035	09	127	07.9%
PALESTINE-WHEATLEY SCH. DIST.	6205000	PALESTINE-WHEATLEY SENIOR HIGH	6205028	09	76	07.9%
DERMOTT SCHOOL DISTRICT	0901000	DERMOTT HIGH SCHOOL	0901003	09	25	08.0%
AUGUSTA SCHOOL DISTRICT	7401000	AUGUSTA HIGH SCHOOL	7401003	09	25	08.0%
MOUNTAIN PINE SCHOOL DISTRICT	2607000	MOUNTAIN PINE HIGH SCHOOL	2607047	09	37	08.1%
DOLLARWAY SCHOOL DISTRICT	3502000	DOLLARWAY HIGH SCHOOL	3502010	09	97	08.2%
OZARK MOUNTAIN SCHOOL DISTRICT	6505000	WESTERN GROVE HIGH SCHOOL	6505014	09	24	08.3%
WESTERN YELL CO. SCHOOL DISTRICT	7509000	WESTERN YELL CO. HIGH SCHOOL	7509033	09	34	08.8%
TEXARKANA SCHOOL DISTRICT	4605000	WASHINGTON ACADEMY	4605703	09	21	09.5%
PINE BLUFF SCHOOL DISTRICT	3505000	PINE BLUFF HIGH SCHOOL	3505042	09	258	09.7%
BLYTHEVILLE SCHOOL DISTRICT	4702000	BLYTHEVILLE HIGH SCHOOL-A NEW TECH SCHOOL	4702706	09	165	09.7%

2015-2016 ACT Aspire Preliminary School Results

District Name	District LEA	School Name	School LEA	Grade	Math N	Math % Met Readiness Benchmark
RESPONSIVE ED SOLUTIONS QUEST MS OF PINE BLUFF	3542700	QUEST MIDDLE SCHOOL OF PINE BLUFF	3542702	08	20	0.0%
STRONG-HUTTIG SCHOOL DISTRICT	7009000	STRONG HIGH SCHOOL	7009049	08	22	04.5%
FORT SMITH SCHOOL DISTRICT	6601000	BELLE POINT ALTERNATIVE CENTER	6601005	08	20	05.0%
PINE BLUFF LIGHTHOUSE ACADEMY	3541700	PINE BLUFF LIGHTHOUSE COLLEGE PREP ACADEMY HIGH	3541703	08	15	06.7%
COVENANTKEEPERS CHARTER SCHOOL	6044700	COVENANT KEEPERS CHARTER	6044702	08	60	06.7%
DOLLARWAY SCHOOL DISTRICT	3502000	ROBERT F MOREHEAD MIDDLE SCHOO	3502009	08	97	07.2%
HELENA/ WEST HELENA SCHOOL DISTRICT	5403000	CENTRAL HIGH SCHOOL	5403019	08	107	07.5%
HARMONY GROVE SCHOOL DISTRICT (OUACHITA COUNTY)	5205000	SPARKMAN HIGH SCHOOL	5205012	08	12	08.3%
PULASKI COUNTY SPECIAL SCHOOL DISTRICT	6003000	FULLER MIDDLE SCHOOL	6003120	08	156	08.3%
JUNCTION CITY SCHOOL DISTRICT	7003000	JUNCTION CITY HIGH SCHOOL	7003028	08	48	08.3%
CABOT SCHOOL DISTRICT	4304000	ACADEMIC CENTER FOR EXCELLENCE	4304703	08	23	08.7%
FORREST CITY SCHOOL DISTRICT	6201000	FORREST CITY JR. HIGH	6201010	08	179	08.9%
DECATUR SCHOOL DISTRICT	0402000	DECATUR MIDDLE SCHOOL	0402011	08	44	09.1%
HOPE SCHOOL DISTRICT	2903000	YERGER JUNIOR HIGH SCHOOL	2903011	08	160	10.0%
LITTLE ROCK SCHOOL DISTRICT	6001000	HENDERSON MIDDLE SCHOOL	6001013	08	266	10.2%
BLYTHEVILLE SCHOOL DISTRICT	4702000	BLYTHEVILLE MIDDLE SCHOOL	4702012	08	142	10.6%
LEE COUNTY SCHOOL DISTRICT	3904000	LEE HIGH SCHOOL	3904011	08	55	10.9%
EARLE SCHOOL DISTRICT	1802000	EARLE HIGH SCHOOL	1802007	08	50	12.0%
MARVELL-ELAINE SCHOOL DISTRICT	5404000	MARVELL-ELAINE HIGH SCHOOL	5404032	08	25	12.0%
HUNTSVILLE SCHOOL DISTRICT	4401000	ST. PAUL HIGH SCHOOL	4401012	08	16	12.5%
OSCEOLA SCHOOL DISTRICT	4713000	OSCEOLA STEM CHARTER	4713705	08	87	12.6%
LITTLE ROCK SCHOOL DISTRICT	6001000	MABELVALE MIDDLE SCHOOL	6001062	08	228	12.7%
LAWRENCE COUNTY SCHOOL DISTRICT	3810000	WALNUT RIDGE HIGH SCHOOL	3810027	08	78	12.8%
HERMITAGE SCHOOL DISTRICT	0601000	HERMITAGE HIGH SCHOOL	0601007	08	31	12.9%
PULASKI COUNTY SPECIAL SCHOOL DISTRICT	6003000	JACKSONVILLE MIDDLE SCHOOL	6003119	08	215	13.0%
LITTLE ROCK SCHOOL DISTRICT	6001000	CLOVERDALE AEROSPACE TECH CHAR	6001702	08	197	13.2%
RIVERVIEW SCHOOL DISTRICT	7307000	RIVERVIEW JUNIOR HIGH SCHOOL	7307033	08	106	13.2%
ENGLAND SCHOOL DISTRICT	4302000	ENGLAND HIGH SCHOOL	4302018	08	60	13.3%
WEST MEMPHIS SCHOOL DISTRICT	1803000	EAST JUNIOR HIGH SCHOOL	1803033	08	112	13.4%
MOUNTAIN PINE SCHOOL DISTRICT	2607000	MOUNTAIN PINE HIGH SCHOOL	2607047	08	36	13.9%
LITTLE ROCK SCHOOL DISTRICT	6001000	DUNBAR MAGNET MIDDLE SCHOOL	6001007	08	232	14.2%
DEER/MT. JUDEA SCHOOL DISTRICT	5106000	DEER HIGH SCHOOL	5106002	08	14	14.3%
AUGUSTA SCHOOL DISTRICT	7401000	AUGUSTA HIGH SCHOOL	7401003	08	28	14.3%
CEDAR RIDGE SCHOOL DISTRICT	3212000	CEDAR RIDGE HIGH SCHOOL	3212027	08	61	14.8%
WATSON CHAPEL SCHOOL DISTRICT	3509000	WATSON CHAPEL JR. HIGH SCHOOL	3509068	08	217	16.1%
BARTON-LEXA SCHOOL DISTRICT	5401000	BARTON HIGH SCHOOL	5401003	08	62	16.1%

2015-2016 ACT Aspire Preliminary School Results

District Name	District LEA	School Name	School LEA	Grade	Math N	Math % Met Readiness Benchmark
MARVELL-ELAINE SCHOOL DISTRICT	5404000	MARVELL-ELAINE HIGH SCHOOL	5404032	07	29	03.4%
DEER/MT. JUDEA SCHOOL DISTRICT	5106000	MOUNT JUDEA HIGH SCHOOL	5106010	07	13	07.7%
DECATUR SCHOOL DISTRICT	0402000	DECATUR MIDDLE SCHOOL	0402011	07	38	07.9%
LITTLE ROCK SCHOOL DISTRICT	6001000	CLOVERDALE AEROSPACE TECH CHAR	6001702	07	183	10.9%
ROSE BUD SCHOOL DISTRICT	7310000	ROSE BUD HIGH SCHOOL	7310043	07	65	12.3%
DOLLARWAY SCHOOL DISTRICT	3502000	ROBERT F MOREHEAD MIDDLE SCHOO	3502009	07	87	12.6%
JUNCTION CITY SCHOOL DISTRICT	7003000	JUNCTION CITY HIGH SCHOOL	7003028	07	58	13.8%
LITTLE ROCK SCHOOL DISTRICT	6001000	HENDERSON MIDDLE SCHOOL	6001013	07	230	15.2%
NEVADA SCHOOL DISTRICT	5008000	NEVADA HIGH SCHOOL	5008014	07	37	16.2%
LEE COUNTY SCHOOL DISTRICT	3904000	LEE HIGH SCHOOL	3904011	07	67	16.4%
CLARENDON SCHOOL DISTRICT	4802000	CLARENDON HIGH SCHOOL	4802010	07	29	17.2%
LITTLE ROCK SCHOOL DISTRICT	6001000	MABELVALE MIDDLE SCHOOL	6001062	07	199	17.6%
HOPE SCHOOL DISTRICT	2903000	YERGER JUNIOR HIGH SCHOOL	2903011	07	163	17.8%
MIDLAND SCHOOL DISTRICT	3211000	MIDLAND HIGH SCHOOL	3211035	07	45	17.8%
HARMONY GROVE SCHOOL DISTRICT (OUACHITA COUNTY)	5205000	SPARKMAN HIGH SCHOOL	5205012	07	11	18.2%
OZARK MOUNTAIN SCHOOL DISTRICT	6505000	WESTERN GROVE HIGH SCHOOL	6505014	07	22	18.2%
PULASKI COUNTY SPECIAL SCHOOL DISTRICT	6003000	JACKSONVILLE MIDDLE SCHOOL	6003119	07	253	19.4%
WESTSIDE SCHOOL DISTRICT (JOHNSON COUNTY)	3606000	WESTSIDE HIGH SCHOOL	3606026	07	56	19.6%
COSSATOT RIVER SCHOOL DISTRICT	5707000	UMPIRE HIGH SCHOOL	5707017	07	10	20.0%
COVENANTKEEPERS CHARTER SCHOOL	6044700	COVENANT KEEPERS CHARTER	6044702	07	50	20.0%
MARMADUKE SCHOOL DISTRICT	2803000	MARMADUKE HIGH SCHOOL	2803017	07	59	20.3%
FORREST CITY SCHOOL DISTRICT	6201000	FORREST CITY JR. HIGH	6201010	07	169	20.7%
STRONG-HUTTIG SCHOOL DISTRICT	7009000	STRONG HIGH SCHOOL	7009049	07	19	21.1%
BEARDEN SCHOOL DISTRICT	5201000	BEARDEN HIGH SCHOOL	5201002	07	37	21.6%
PINE BLUFF SCHOOL DISTRICT	3505000	JACK ROBEY JR. HIGH SCHOOL	3505044	07	285	22.1%
BLYTHEVILLE SCHOOL DISTRICT	4702000	BLYTHEVILLE MIDDLE SCHOOL	4702012	07	136	22.1%
CORNING SCHOOL DISTRICT	1101000	CORNING HIGH SCHOOL	1101004	07	76	22.4%
CEDAR RIDGE SCHOOL DISTRICT	3212000	CEDAR RIDGE HIGH SCHOOL	3212027	07	58	22.4%
CAMDEN FAIRVIEW SCHOOL DISTRICT	5204000	CAMDEN FAIRVIEW MIDDLE SCHOOL	5204028	07	159	22.6%
WATSON CHAPEL SCHOOL DISTRICT	3509000	WATSON CHAPEL JR. HIGH SCHOOL	3509068	07	192	22.9%
RIVERVIEW SCHOOL DISTRICT	7307000	RIVERVIEW JUNIOR HIGH SCHOOL	7307033	07	91	23.1%
STAR CITY SCHOOL DISTRICT	4003000	STAR CITY MIDDLE SCHOOL	4003015	07	131	23.7%
CADDO HILLS SCHOOL DISTRICT	4901000	CADDO HILLS HIGH SCHOOL	4901003	07	53	24.5%
OSCEOLA SCHOOL DISTRICT	4713000	OSCEOLA STEM CHARTER	4713705	07	89	24.7%
WESTERN YELL CO. SCHOOL DISTRICT	7509000	WESTERN YELL CO. HIGH SCHOOL	7509033	07	32	25.0%
HOT SPRINGS SCHOOL DISTRICT	2603000	HOT SPRINGS MIDDLE SCHOOL	2603020	07	246	25.2%

MCGEHEE SCHOOL DISTRICT	2105000	MCGEHEE HIGH SCHOOL	2105028	07	83	25.3%
BARTON-LEXA SCHOOL DISTRICT	5401000	BARTON HIGH SCHOOL	5401003	07	75	25.3%
HAMPTON SCHOOL DISTRICT	0701000	HAMPTON HIGH SCHOOL	0701002	07	43	25.6%
NORTH LITTLE ROCK SCHOOL DISTRICT	6002000	NORTH LITTLE ROCK MIDDLE SCHOOL	6002070	07	573	25.8%
DERMOTT SCHOOL DISTRICT	0901000	DERMOTT HIGH SCHOOL	0901003	07	27	25.9%
HERMITAGE SCHOOL DISTRICT	0601000	HERMITAGE HIGH SCHOOL	0601007	07	38	26.3%
PULASKI COUNTY SPECIAL SCHOOL DISTRICT	6003000	FULLER MIDDLE SCHOOL	6003120	07	129	26.4%
MINERAL SPRINGS SCHOOL DISTRICT	3104000	MINERAL SPRINGS HIGH SCHOOL	3104006	07	34	26.5%
HUNTSVILLE SCHOOL DISTRICT	4401000	ST. PAUL HIGH SCHOOL	4401012	07	15	26.7%
EARLE SCHOOL DISTRICT	1802000	EARLE HIGH SCHOOL	1802007	07	41	26.8%
PIGGOTT SCHOOL DISTRICT	1104000	PIGGOTT HIGH SCHOOL	1104018	07	70	27.1%
RECTOR SCHOOL DISTRICT	1106000	RECTOR HIGH SCHOOL	1106023	07	48	27.1%
KIPP DELTA PUBLIC SCHOOLS	5440700	KIPP DELTA COLLEGE PREP SCHOOL	5440702	07	70	27.1%
FORT SMITH SCHOOL DISTRICT	6601000	DORA KIMMONS JR. HIGH SCHOOL	6601022	07	277	27.1%
LITTLE ROCK SCHOOL DISTRICT	6001000	DUNBAR MAGNET MIDDLE SCHOOL	6001007	07	216	27.3%
FLIPPIN SCHOOL DISTRICT	4501000	FLIPPIN MIDDLE SCHOOL	4501003	07	73	27.4%
JACKSONVILLE LIGHTHOUSE CHARTER	6050700	COLLEGE PREP ACADEMY	6050703	07	51	27.5%
ARKANSAS VIRTUAL ACADEMY	6043700	ARK VIRTUAL ACADEMY MIDDLE SCH	6043702	07	224	27.7%
RESPONSIVE ED SOLUTIONS QUEST MS OF PINE BLUFF	3542700	QUEST MIDDLE SCHOOL OF PINE BLUFF	3542702	07	18	27.8%
LITTLE ROCK PREPARATORY ACADEMY	6049700	LITTLE ROCK PREP ACADEMY	6049702	07	36	27.8%
PULASKI COUNTY SPECIAL SCHOOL DISTRICT	6003000	SYLVAN HILLS MIDDLE SCHOOL	6003122	07	396	28.0%
HELENA/ WEST HELENA SCHOOL DISTRICT	5403000	CENTRAL HIGH SCHOOL	5403019	07	96	28.1%
DUMAS SCHOOL DISTRICT	2104000	DUMAS JUNIOR HIGH SCHOOL	2104020	07	110	28.2%
FOREMAN SCHOOL DISTRICT	4102000	FOREMAN HIGH SCHOOL	4102010	07	46	28.3%
LITTLE ROCK SCHOOL DISTRICT	6001000	MANN MAGNET MIDDLE SCHOOL	6001003	07	274	28.5%
WEST MEMPHIS SCHOOL DISTRICT	1803000	EAST JUNIOR HIGH SCHOOL	1803033	07	101	28.7%
FORDYCE SCHOOL DISTRICT	2002000	FORDYCE HIGH SCHOOL	2002007	07	59	28.8%
MAGNOLIA SCHOOL DISTRICT	1402000	MAGNOLIA JR. HIGH SCHOOL	1402008	07	187	29.4%
WALDRON SCHOOL DISTRICT	6401000	WALDRON MIDDLE SCHOOL	6401004	07	102	29.4%
WEST MEMPHIS SCHOOL DISTRICT	1803000	WONDER JUNIOR HIGH SCHOOL	1803035	07	129	29.5%
MARION SCHOOL DISTRICT	1804000	MARION MIDDLE SCHOOL	1804016	07	310	30.0%
FORT SMITH SCHOOL DISTRICT	6601000	WILLIAM O. DARBY JR. HIGH SCH.	6601021	07	229	30.1%
WHITE CO. CENTRAL SCHOOL DISTRICT	7304000	WHITE CO. CENTRAL HIGH SCHOOL	7304019	07	53	30.2%
MOUNT IDA SCHOOL DISTRICT	4902000	MOUNT IDA HIGH SCHOOL	4902007	07	33	30.3%
COSSATOT RIVER SCHOOL DISTRICT	5707000	COSSATOT RIVER HIGH SCHOOL	5707023	07	76	30.3%
KIPP DELTA PUBLIC SCHOOLS	5440700	KIPP BLYTHEVILLE COLLEGE PREP	5440705	07	56	30.4%
DREW CENTRAL SCHOOL DISTRICT	2202000	DREW CENTRAL MIDDLE SCHOOL	2202007	07	95	30.5%
LONOKE SCHOOL DISTRICT	4301000	LONOKE MIDDLE SCHOOL	4301028	07	154	30.5%
PINE BLUFF LIGHTHOUSE ACADEMY	3541700	PINE BLUFF LIGHTHOUSE COLLEGE PREP ACADEMY HIGH	3541703	07	26	30.8%
HORATIO SCHOOL DISTRICT	6703000	HORATIO HIGH SCHOOL	6703013	07	90	31.1%
TEXARKANA SCHOOL DISTRICT	4605000	NORTH HEIGHTS JR. HIGH SCHOOL	4605025	07	285	31.2%

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STRONG-HUTTIG SCHOOL DISTRICT	7009000	GARDNER-STRONG ELEM. SCHOOL	7009048	06	23	08.7%
MINERAL SPRINGS SCHOOL DISTRICT	3104000	MINERAL SPRINGS ELEM. SCHOOL	3104005	06	16	18.8%
RESPONSIVE ED SOLUTIONS QUEST MS OF PINE BLUFF	3542700	QUEST MIDDLE SCHOOL OF PINE BLUFF	3542702	06	16	18.8%
OZARK MOUNTAIN SCHOOL DISTRICT	6505000	WESTERN GROVE ELEM. SCHOOL	6505013	06	21	19.0%
PINE BLUFF LIGHTHOUSE ACADEMY	3541700	PINE BLUFF LIGHTHOUSE ELEMENTARY	3541701	06	31	19.4%
BLYTHEVILLE SCHOOL DISTRICT	4702000	BLYTHEVILLE MIDDLE SCHOOL	4702012	06	135	20.0%
WEST MEMPHIS SCHOOL DISTRICT	1803000	WEAVER ELEMENTARY SCHOOL	1803030	06	38	21.1%
LITTLE ROCK SCHOOL DISTRICT	6001000	CLOVERDALE AEROSPACE TECH CHAR	6001702	06	216	21.8%
HELENA/ WEST HELENA SCHOOL DISTRICT	5403000	ELIZA MILLER ELEMENTARY SCHOOL	5403021	06	95	22.1%
WEST MEMPHIS SCHOOL DISTRICT	1803000	JACKSON ELEMENTARY SCHOOL	1803027	06	44	25.0%
JASPER SCHOOL DISTRICT	5102000	JASPER ELEMENTARY SCHOOL	5102005	06	44	25.0%
MARION SCHOOL DISTRICT	1804000	MARION MIDDLE SCHOOL	1804016	06	317	26.2%
DOLLARWAY SCHOOL DISTRICT	3502000	ROBERT F MOREHEAD MIDDLE SCHOO	3502009	06	91	26.4%
WESTSIDE SCHOOL DISTRICT (JOHNSON COUNTY)	3606000	WESTSIDE ELEMENTARY SCHOOL	3606025	06	45	26.7%
LEAD HILL SCHOOL DISTRICT	0506000	LEAD HILL ELEMENTARY SCHOOL	0506031	06	26	26.9%
JONESBORO SCHOOL DISTRICT	1608000	MICROSOCIETY MAGNET SCHOOL	1608022	06	67	26.9%
FORREST CITY SCHOOL DISTRICT	6201000	LINCOLN ACADEMY	6201016	06	170	27.1%
DERMOTT SCHOOL DISTRICT	0901000	DERMOTT ELEMENTARY SCHOOL	0901001	06	29	27.6%
LITTLE ROCK SCHOOL DISTRICT	6001000	HENDERSON MIDDLE SCHOOL	6001013	06	259	27.8%
RIVERVIEW SCHOOL DISTRICT	7307000	JUDSONIA ELEMENTARY SCHOOL	7307026	06	36	27.8%
LITTLE ROCK PREPARATORY ACADEMY	6049700	LITTLE ROCK PREP ACADEMY	6049702	06	43	27.9%
WONDERVIEW SCHOOL DISTRICT	1505000	WONDERVIEW ELEMENTARY SCHOOL	1505025	06	39	28.2%
LITTLE ROCK SCHOOL DISTRICT	6001000	DUNBAR MAGNET MIDDLE SCHOOL	6001007	06	229	29.3%
CEDAR RIDGE SCHOOL DISTRICT	3212000	NEWARK ELEMENTARY SCHOOL	3212026	06	43	30.2%
SOUTH SIDE SCHOOL DISTRICT(VAN BUREN COUNTY)	7105000	SOUTH SIDE ELEMENTARY SCHOOL	7105018	06	33	30.3%
COVENANTKEEPERS CHARTER SCHOOL	6044700	COVENANT KEEPERS CHARTER	6044702	06	46	30.4%
LITTLE ROCK SCHOOL DISTRICT	6001000	MABELVALE MIDDLE SCHOOL	6001062	06	184	31.0%
JACKSONVILLE LIGHTHOUSE CHARTER	6050700	JACKSONVILLE LIGHTHOUSE CHARTE	6050701	06	54	31.5%
WEST MEMPHIS SCHOOL DISTRICT	1803000	FAULK ELEMENTARY SCHOOL	1803026	06	76	31.6%
FOUKE SCHOOL DISTRICT	4603000	PAULETTE SMITH MIDDLE SCHOOL	4603011	06	79	31.6%
FORT SMITH SCHOOL DISTRICT	6601000	SPRADLING ELEMENTARY SCHOOL	6601016	06	57	31.6%
LEE COUNTY SCHOOL DISTRICT	3904000	ANNA STRONG LEARNING ACADEMY	3904010	06	41	31.7%
NORTH LITTLE ROCK SCHOOL DISTRICT	6002000	NORTH LITTLE ROCK MIDDLE SCHOOL	6002070	06	622	31.8%
CAMDEN FAIRVIEW SCHOOL DISTRICT	5204000	CAMDEN FAIRVIEW MIDDLE SCHOOL	5204028	06	168	32.1%
MARVELL-ELAINE SCHOOL DISTRICT	5404000	MARVELL-ELAINE ELEMENTARY SCH	5404030	06	28	32.1%
BALD KNOB SCHOOL DISTRICT	7301000	BALD KNOB MIDDLE SCHOOL	7301004	06	103	33.0%

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					ELA	
District Name	District LEA	School Name	School LEA	Grade	ELA N	ELA % Met Readiness Benchmark
RESPONSIVE ED SOLUTIONS PREMIER HS OF LITTLE RO	6053700	PREMIER HIGH SCHOOL OF LITTLE RO	6053703	10	19	05.3%
FORT SMITH SCHOOL DISTRICT	6601000	BELLE POINT ALTERNATIVE CENTER	6601005	10	19	05.3%
HOT SPRINGS SCHOOL DISTRICT	2603000	SUMMIT SCHOOL	2603013	10	12	08.3%
TEXARKANA SCHOOL DISTRICT	4605000	WASHINGTON ACADEMY	4605703	10	24	08.3%
LITTLE ROCK SCHOOL DISTRICT	6001000	HALL HIGH SCHOOL	6001002	10	244	10.7%
MINERAL SPRINGS SCHOOL DISTRICT	3104000	MINERAL SPRINGS HIGH SCHOOL	3104006	10	30	13.3%
BEARDEN SCHOOL DISTRICT	5201000	BEARDEN HIGH SCHOOL	5201002	10	41	14.6%
HELENA/ WEST HELENA SCHOOL DISTRICT	5403000	CENTRAL HIGH SCHOOL	5403019	10	99	15.2%
OSCEOLA SCHOOL DISTRICT	4713000	OSCEOLA HIGH SCHOOL	4713051	10	82	17.1%
PINE BLUFF SCHOOL DISTRICT	3505000	PINE BLUFF HIGH SCHOOL	3505042	10	301	17.3%
LITTLE ROCK SCHOOL DISTRICT	6001000	J.A. FAIR HIGH SCHOOL	6001063	10	233	18.0%
FORREST CITY SCHOOL DISTRICT	6201000	FORREST CITY HIGH SCHOOL	6201011	10	192	18.8%
LEE COUNTY SCHOOL DISTRICT	3904000	LEE HIGH SCHOOL	3904011	10	53	18.9%
HOPE SCHOOL DISTRICT	2903000	HOPE HIGH SCHOOL	2903012	10	161	19.3%
HERMITAGE SCHOOL DISTRICT	0601000	HERMITAGE HIGH SCHOOL	0601007	10	30	20.0%
LITTLE ROCK SCHOOL DISTRICT	6001000	MCCLELLAN MAGNET HIGH SCHOOL	6001064	10	135	20.7%
STRONG-HUTTIG SCHOOL DISTRICT	7009000	STRONG HIGH SCHOOL	7009049	10	24	20.8%
PULASKI COUNTY SPECIAL SCHOOL DISTRICT	6003000	JACKSONVILLE HIGH SCHOOL	6003123	10	178	22.5%
GUY-PERKINS SCHOOL DISTRICT	2304000	GUY-PERKINS HIGH SCHOOL	2304022	10	31	22.6%
DOLLARWAY SCHOOL DISTRICT	3502000	DOLLARWAY HIGH SCHOOL	3502010	10	70	24.3%
HACKETT SCHOOL DISTRICT	6603000	HARTFORD HIGH SCHOOL	6603052	10	24	25.0%
MCGEHEE SCHOOL DISTRICT	2105000	MCGEHEE HIGH SCHOOL	2105028	10	78	25.6%
BLYTHEVILLE SCHOOL DISTRICT	4702000	BLYTHEVILLE HIGH SCHOOL-A NEW TECH SCHOOL	4702706	10	150	26.0%
POYEN SCHOOL DISTRICT	2703000	POYEN HIGH SCHOOL	2703010	10	53	26.4%
CLARENDON SCHOOL DISTRICT	4802000	CLARENDON HIGH SCHOOL	4802010	10	36	27.8%
WATSON CHAPEL SCHOOL DISTRICT	3509000	WATSON CHAPEL HIGH SCHOOL	3509067	10	217	28.1%
CAMDEN FAIRVIEW SCHOOL DISTRICT	5204000	CAMDEN FAIRVIEW HIGH SCHOOL	5204023	10	177	28.2%
RIVERCREST SCHOOL DISTRICT 57	4706000	RIVERCREST HIGH SCHOOL	4706066	10	89	29.2%
NEWPORT SCHOOL DISTRICT	3403000	NEWPORT HIGH SCHOOL	3403013	10	77	29.9%
DECATUR SCHOOL DISTRICT	0402000	DECATUR HIGH SCHOOL	0402009	10	39	30.8%
PERRYVILLE SCHOOL DISTRICT	5303000	PERRYVILLE HIGH SCHOOL	5303011	10	84	31.0%
MARVELL-ELAINE SCHOOL DISTRICT	5404000	MARVELL-ELAINE HIGH SCHOOL	5404032	10	29	31.0%

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District Name	District LEA	School Name	School LEA	Grade	ELA N	ELA % Met Readiness Benchmark
FORT SMITH SCHOOL DISTRICT	6601000	BELLE POINT ALTERNATIVE CENTER	6601005	09	18	11.1%
RESPONSIVE ED SOLUTIONS PREMIER HS OF LITTLE ROCK	6053700	PREMIER HIGH SCHOOL OF LITTLE RO	6053703	09	26	11.5%
LITTLE ROCK SCHOOL DISTRICT	6001000	HALL HIGH SCHOOL	6001002	09	276	13.0%
HELENA/ WEST HELENA SCHOOL DISTRICT	5403000	CENTRAL HIGH SCHOOL	5403019	09	103	14.6%
PULASKI COUNTY SPECIAL SCHOOL DISTRICT	6003000	JACKSONVILLE HIGH SCHOOL	6003123	09	240	15.4%
CABOT SCHOOL DISTRICT	4304000	ACADEMIC CENTER FOR EXCELLENCE	4304703	09	38	15.8%
FORREST CITY SCHOOL DISTRICT	6201000	FORREST CITY HIGH SCHOOL	6201011	09	188	16.0%
AUGUSTA SCHOOL DISTRICT	7401000	AUGUSTA HIGH SCHOOL	7401003	09	25	16.0%
HAMPTON SCHOOL DISTRICT	0701000	HAMPTON HIGH SCHOOL	0701002	09	43	16.3%
LEE COUNTY SCHOOL DISTRICT	3904000	LEE HIGH SCHOOL	3904011	09	55	16.4%
STRONG-HUTTIG SCHOOL DISTRICT	7009000	STRONG HIGH SCHOOL	7009049	09	30	16.7%
OSCEOLA SCHOOL DISTRICT	4713000	OSCEOLA HIGH SCHOOL	4713051	09	82	17.1%
HOPE SCHOOL DISTRICT	2903000	HOPE HIGH SCHOOL	2903012	09	172	18.0%
DOLLARWAY SCHOOL DISTRICT	3502000	DOLLARWAY HIGH SCHOOL	3502010	09	96	18.8%
MARVELL-ELAINE SCHOOL DISTRICT	5404000	MARVELL-ELAINE HIGH SCHOOL	5404032	09	26	19.2%
LITTLE ROCK SCHOOL DISTRICT	6001000	J.A. FAIR HIGH SCHOOL	6001063	09	243	19.8%
BEEBE SCHOOL DISTRICT	7302000	BADGER ACADEMY	7302703	09	10	20.0%
TRUMANN SCHOOL DISTRICT	5605000	TRUMANN HIGH SCHOOL	5605023	09	128	20.3%
PULASKI COUNTY SPECIAL SCHOOL DISTRICT	6003000	NORTH PULASKI HIGH SCHOOL	6003136	09	48	20.8%
EARLE SCHOOL DISTRICT	1802000	EARLE HIGH SCHOOL	1802007	09	60	21.7%
LAKESIDE SCHOOL DISTRICT (CHICOT COUNTY)	0903000	LAKESIDE HIGH SCHOOL	0903018	09	73	21.9%
PINE BLUFF SCHOOL DISTRICT	3505000	PINE BLUFF HIGH SCHOOL	3505042	09	243	22.2%
RESPONSIVE ED SOLUTIONS QUEST MS OF PINE BLUFF	3542700	QUEST MIDDLE SCHOOL OF PINE BLUFF	3542702	09	18	22.2%
DECATUR SCHOOL DISTRICT	0402000	DECATUR HIGH SCHOOL	0402009	09	44	22.7%
LITTLE ROCK SCHOOL DISTRICT	6001000	MCCLELLAN MAGNET HIGH SCHOOL	6001064	09	172	22.7%
PULASKI COUNTY SPECIAL SCHOOL DISTRICT	6003000	WILBUR D. MILLS HIGH SCHOOL	6003125	09	149	23.5%
MOUNTAIN PINE SCHOOL DISTRICT	2607000	MOUNTAIN PINE HIGH SCHOOL	2607047	09	37	24.3%
OZARK MOUNTAIN SCHOOL DISTRICT	6505000	WESTERN GROVE HIGH SCHOOL	6505014	09	24	25.0%
WEST MEMPHIS SCHOOL DISTRICT	1803000	WONDER JUNIOR HIGH SCHOOL	1803035	09	125	25.6%
WESTERN YELL CO. SCHOOL DISTRICT	7509000	WESTERN YELL CO. HIGH SCHOOL	7509033	09	34	26.5%
PALESTINE-WHEATLEY SCH. DIST.	6205000	PALESTINE-WHEATLEY SENIOR HIGH	6205028	09	75	26.7%
WEST MEMPHIS SCHOOL DISTRICT	1803000	EAST JUNIOR HIGH SCHOOL	1803033	09	97	26.8%

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District Name	District LEA	School Name	School LEA	Grade	ELA N	ELA % Met Readiness Benchmark
STRONG-HUTTIG SCHOOL DISTRICT	7009000	STRONG HIGH SCHOOL	7009049	08	21	09.5%
BLYTHEVILLE SCHOOL DISTRICT	4702000	BLYTHEVILLE MIDDLE SCHOOL	4702012	08	141	16.3%
LITTLE ROCK SCHOOL DISTRICT	6001000	CLOVERDALE AEROSPACE TECH CHAR	6001702	08	185	18.9%
FORT SMITH SCHOOL DISTRICT	6601000	BELLE POINT ALTERNATIVE CENTER	6601005	08	20	20.0%
LEE COUNTY SCHOOL DISTRICT	3904000	LEE HIGH SCHOOL	3904011	08	53	20.8%
FORREST CITY SCHOOL DISTRICT	6201000	FORREST CITY JR. HIGH	6201010	08	179	21.2%
DEER/MT. JUDEA SCHOOL DISTRICT	5106000	DEER HIGH SCHOOL	5106002	08	14	21.4%
MOUNTAIN VIEW SCHOOL DISTRICT	6901000	TIMBO HIGH SCHOOL	6901016	08	14	21.4%
AUGUSTA SCHOOL DISTRICT	7401000	AUGUSTA HIGH SCHOOL	7401003	08	28	21.4%
EARLE SCHOOL DISTRICT	1802000	EARLE HIGH SCHOOL	1802007	08	50	22.0%
DOLLARWAY SCHOOL DISTRICT	3502000	ROBERT F MOREHEAD MIDDLE SCHOO	3502009	08	95	22.1%
WATSON CHAPEL SCHOOL DISTRICT	3509000	WATSON CHAPEL JR. HIGH SCHOOL	3509068	08	216	22.2%
LITTLE ROCK SCHOOL DISTRICT	6001000	HENDERSON MIDDLE SCHOOL	6001013	08	251	22.3%
PULASKI COUNTY SPECIAL SCHOOL DISTRICT	6003000	FULLER MIDDLE SCHOOL	6003120	08	155	22.6%
DECATUR SCHOOL DISTRICT	0402000	DECATUR MIDDLE SCHOOL	0402011	08	44	22.7%
WEST MEMPHIS SCHOOL DISTRICT	1803000	EAST JUNIOR HIGH SCHOOL	1803033	08	112	23.2%
RESPONSIVE ED SOLUTIONS QUEST MS OF PINE BLUFF	3542700	QUEST MIDDLE SCHOOL OF PINE BLUFF	3542702	08	20	25.0%
HARMONY GROVE SCHOOL DISTRICT (OUACHITA COUNTY)	5205000	SPARKMAN HIGH SCHOOL	5205012	08	12	25.0%
STAR CITY SCHOOL DISTRICT	4003000	STAR CITY MIDDLE SCHOOL	4003015	08	127	25.2%
PULASKI COUNTY SPECIAL SCHOOL DISTRICT	6003000	JACKSONVILLE MIDDLE SCHOOL	6003119	08	212	25.5%
PINE BLUFF LIGHTHOUSE ACADEMY	3541700	PINE BLUFF LIGHTHOUSE COLLEGE PREP ACADEMY HI(	3541703	08	15	26.7%
CALICO ROCK SCHOOL DISTRICT	3301000	CALICO ROCK HIGH SCHOOL	3301002	08	37	27.0%
BRINKLEY SCHOOL DISTRICT	4801000	BRINKLEY HIGH SCHOOL	4801003	08	33	27.3%
COVENANTKEEPERS CHARTER SCHOOL	6044700	COVENANT KEEPERS CHARTER	6044702	08	58	27.6%
HOPE SCHOOL DISTRICT	2903000	YERGER JUNIOR HIGH SCHOOL	2903011	08	159	28.3%
PINE BLUFF SCHOOL DISTRICT	3505000	JACK ROBEY JR. HIGH SCHOOL	3505044	08	297	28.6%
WESTSIDE SCHOOL DISTRICT (JOHNSON COUNTY)	3606000	WESTSIDE HIGH SCHOOL	3606026	08	45	28.9%
MARVELL-ELAINE SCHOOL DISTRICT	5404000	MARVELL-ELAINE HIGH SCHOOL	5404032	08	24	29.2%
HACKETT SCHOOL DISTRICT	6603000	HARTFORD HIGH SCHOOL	6603052	08	17	29.4%
NORTH LITTLE ROCK SCHOOL DISTRICT	6002000	NORTH LITTLE ROCK MIDDLE SCHOOL	6002070	08	560	30.2%
WHITE CO. CENTRAL SCHOOL DISTRICT	7304000	WHITE CO. CENTRAL HIGH SCHOOL	7304019	08	56	30.4%
LITTLE ROCK SCHOOL DISTRICT	6001000	MABELVALE MIDDLE SCHOOL	6001062	08	228	30.7%
OSCEOLA SCHOOL DISTRICT	4713000	OSCEOLA STEM CHARTER	4713705	08	87	31.0%
MARMADUKE SCHOOL DISTRICT	2803000	MARMADUKE HIGH SCHOOL	2803017	08	54	31.5%

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District Name	District LEA	School Name	School LEA	Grade	ELA N	ELA % Met Readiness Benchmark
EAST END SCHOOL DISTRICT	5301000	BIGELOW HIGH SCHOOL	5301002	08	44	31.8%
HERMITAGE SCHOOL DISTRICT	0601000	HERMITAGE HIGH SCHOOL	0601007	08	31	32.3%
LAKESIDE SCHOOL DISTRICT (CHICOT COUNTY)	0903000	LAKESIDE MIDDLE SCHOOL	0903017	08	65	32.3%
BARTON-LEXA SCHOOL DISTRICT	5401000	BARTON HIGH SCHOOL	5401003	08	62	32.3%
BLEVINS SCHOOL DISTRICT	2901000	BLEVINS HIGH SCHOOL	2901002	08	43	32.6%
LAFAYETTE COUNTY SCHOOL DISTRICT	3704000	LAFAYETTE COUNTY HIGH SCHOOL	3704013	08	48	33.3%
ENGLAND SCHOOL DISTRICT	4302000	ENGLAND HIGH SCHOOL	4302018	08	60	33.3%
CLARENDON SCHOOL DISTRICT	4802000	CLARENDON HIGH SCHOOL	4802010	08	32	34.4%
WESTERN YELL CO. SCHOOL DISTRICT	7509000	WESTERN YELL CO. HIGH SCHOOL	7509033	08	23	34.8%
FORT SMITH SCHOOL DISTRICT	6601000	WILLIAM O. DARBY JR. HIGH SCH.	6601021	08	218	34.9%
MAYNARD SCHOOL DISTRICT	6102000	MAYNARD HIGH SCHOOL	6102006	08	34	35.3%
LITTLE ROCK SCHOOL DISTRICT	6001000	DUNBAR MAGNET MIDDLE SCHOOL	6001007	08	229	35.4%
DUMAS SCHOOL DISTRICT	2104000	DUMAS JUNIOR HIGH SCHOOL	2104020	08	107	35.5%
GUY-PERKINS SCHOOL DISTRICT	2304000	GUY-PERKINS HIGH SCHOOL	2304022	08	33	36.4%
CADDO HILLS SCHOOL DISTRICT	4901000	CADDO HILLS HIGH SCHOOL	4901003	08	33	36.4%
DEER/MT. JUDEA SCHOOL DISTRICT	5106000	MOUNT JUDEA HIGH SCHOOL	5106010	08	11	36.4%
CAMDEN FAIRVIEW SCHOOL DISTRICT	5204000	CAMDEN FAIRVIEW MIDDLE SCHOOL	5204028	08	173	36.4%
LITTLE ROCK PREPARATORY ACADEMY	6049700	LITTLE ROCK PREP ACADEMY	6049702	08	33	36.4%
SHIRLEY SCHOOL DISTRICT	7104000	SHIRLEY HIGH SCHOOL	7104015	08	30	36.7%
WEST MEMPHIS SCHOOL DISTRICT	1803000	WONDER JUNIOR HIGH SCHOOL	1803035	08	150	37.3%
CROSSETT SCHOOL DISTRICT	0201000	CROSSETT MIDDLE SCHOOL	0201008	08	131	37.4%
MINERAL SPRINGS SCHOOL DISTRICT	3104000	MINERAL SPRINGS HIGH SCHOOL	3104006	08	24	37.5%
HUNTSVILLE SCHOOL DISTRICT	4401000	ST. PAUL HIGH SCHOOL	4401012	08	16	37.5%
CEDAR RIDGE SCHOOL DISTRICT	3212000	CEDAR RIDGE HIGH SCHOOL	3212027	08	61	37.7%
TWO RIVERS SCHOOL DISTRICT	7510000	TWO RIVERS HIGH SCHOOL	7510019	08	69	37.7%
FORDYCE SCHOOL DISTRICT	2002000	FORDYCE HIGH SCHOOL	2002007	08	60	38.3%
LONOKE SCHOOL DISTRICT	4301000	LONOKE MIDDLE SCHOOL	4301028	08	127	38.6%
FORT SMITH SCHOOL DISTRICT	6601000	DORA KIMMONS JR. HIGH SCHOOL	6601022	08	277	38.6%
HAMPTON SCHOOL DISTRICT	0701000	HAMPTON HIGH SCHOOL	0701002	08	41	39.0%
HELENA/ WEST HELENA SCHOOL DISTRICT	5403000	CENTRAL HIGH SCHOOL	5403019	08	105	39.0%
HACKETT SCHOOL DISTRICT	6603000	HACKETT HIGH SCHOOL	6603048	08	41	39.0%
NEWPORT SCHOOL DISTRICT	3403000	NEWPORT HIGH SCHOOL	3403013	08	87	39.1%
WARREN SCHOOL DISTRICT	0602000	WARREN MIDDLE SCHOOL	0602702	08	119	40.3%
SPRINGDALE SCHOOL DISTRICT	7207000	LAKESIDE JUNIOR HIGH SCHOOL	7207070	08	387	40.3%

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MARVELL-ELAINE SCHOOL DISTRICT	5404000	MARVELL-ELAINE HIGH SCHOOL	5404032	07	29	03.4%
STRONG-HUTTIG SCHOOL DISTRICT	7009000	STRONG HIGH SCHOOL	7009049	07	19	10.5%
LEE COUNTY SCHOOL DISTRICT	3904000	LEE HIGH SCHOOL	3904011	07	64	17.2%
JUNCTION CITY SCHOOL DISTRICT	7003000	JUNCTION CITY HIGH SCHOOL	7003028	07	57	17.5%
DOLLARWAY SCHOOL DISTRICT	3502000	ROBERT F MOREHEAD MIDDLE SCHOO	3502009	07	87	19.5%
COVENANTKEEPERS CHARTER SCHOOL	6044700	COVENANT KEEPERS CHARTER	6044702	07	46	19.6%
RESPONSIVE ED SOLUTIONS QUEST MS OF PINE BLUFF	3542700	QUEST MIDDLE SCHOOL OF PINE BLUFF	3542702	07	18	22.2%
LITTLE ROCK SCHOOL DISTRICT	6001000	CLOVERDALE AEROSPACE TECH CHAR	6001702	07	174	22.4%
EARLE SCHOOL DISTRICT	1802000	EARLE HIGH SCHOOL	1802007	07	39	23.1%
PINE BLUFF LIGHTHOUSE ACADEMY	3541700	PINE BLUFF LIGHTHOUSE COLLEGE PREP ACADEMY HI(	3541703	07	26	23.1%
LITTLE ROCK SCHOOL DISTRICT	6001000	MABELVALE MIDDLE SCHOOL	6001062	07	195	23.1%
MARMADUKE SCHOOL DISTRICT	2803000	MARMADUKE HIGH SCHOOL	2803017	07	56	23.2%
RIVERCREST SCHOOL DISTRICT 57	4706000	RIVERCREST HIGH SCHOOL	4706066	07	94	24.5%
CADDO HILLS SCHOOL DISTRICT	4901000	CADDO HILLS HIGH SCHOOL	4901003	07	53	24.5%
LITTLE ROCK SCHOOL DISTRICT	6001000	HENDERSON MIDDLE SCHOOL	6001013	07	221	25.3%
LAFAYETTE COUNTY SCHOOL DISTRICT	3704000	LAFAYETTE COUNTY HIGH SCHOOL	3704013	07	50	26.0%
MINERAL SPRINGS SCHOOL DISTRICT	3104000	MINERAL SPRINGS HIGH SCHOOL	3104006	07	34	26.5%
HUNTSVILLE SCHOOL DISTRICT	4401000	ST. PAUL HIGH SCHOOL	4401012	07	15	26.7%
BLYTHEVILLE SCHOOL DISTRICT	4702000	BLYTHEVILLE MIDDLE SCHOOL	4702012	07	135	26.7%
DEER/MT. JUDEA SCHOOL DISTRICT	5106000	DEER HIGH SCHOOL	5106002	07	15	26.7%
DECATUR SCHOOL DISTRICT	0402000	DECATUR MIDDLE SCHOOL	0402011	07	37	27.0%
HERMITAGE SCHOOL DISTRICT	0601000	HERMITAGE HIGH SCHOOL	0601007	07	37	27.0%
HARMONY GROVE SCHOOL DISTRICT (OUACHITA COUNTY)	5205000	SPARKMAN HIGH SCHOOL	5205012	07	11	27.3%
OZARK MOUNTAIN SCHOOL DISTRICT	6505000	WESTERN GROVE HIGH SCHOOL	6505014	07	22	27.3%
FORREST CITY SCHOOL DISTRICT	6201000	FORREST CITY JR. HIGH	6201010	07	167	27.5%
WATSON CHAPEL SCHOOL DISTRICT	3509000	WATSON CHAPEL JR. HIGH SCHOOL	3509068	07	188	27.7%
HACKETT SCHOOL DISTRICT	6603000	HARTFORD HIGH SCHOOL	6603052	07	18	27.8%
HOPE SCHOOL DISTRICT	2903000	YERGER JUNIOR HIGH SCHOOL	2903011	07	161	28.0%
WESTSIDE SCHOOL DISTRICT (JOHNSON COUNTY)	3606000	WESTSIDE HIGH SCHOOL	3606026	07	56	28.6%
FORDYCE SCHOOL DISTRICT	2002000	FORDYCE HIGH SCHOOL	2002007	07	59	28.8%
WHITE CO. CENTRAL SCHOOL DISTRICT	7304000	WHITE CO. CENTRAL HIGH SCHOOL	7304019	07	52	28.8%
NEWPORT SCHOOL DISTRICT	3403000	NEWPORT HIGH SCHOOL	3403013	07	86	29.1%
DERMOTT SCHOOL DISTRICT	0901000	DERMOTT HIGH SCHOOL	0901003	07	27	29.6%
PINE BLUFF SCHOOL DISTRICT	3505000	JACK ROBEY JR. HIGH SCHOOL	3505044	07	280	29.6%

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STRONG-HUTTIG SCHOOL DISTRICT	7009000	GARDNER-STRONG ELEM. SCHOOL	7009048	06	21	09.5%
LEE COUNTY SCHOOL DISTRICT	3904000	ANNA STRONG LEARNING ACADEMY	3904010	06	38	10.5%
WEST MEMPHIS SCHOOL DISTRICT	1803000	WEAVER ELEMENTARY SCHOOL	1803030	06	36	19.4%
LITTLE ROCK SCHOOL DISTRICT	6001000	MABELVALE MIDDLE SCHOOL	6001062	06	181	21.5%
OZARK MOUNTAIN SCHOOL DISTRICT	6505000	WESTERN GROVE ELEM. SCHOOL	6505013	06	18	22.2%
HELENA/ WEST HELENA SCHOOL DISTRICT	5403000	ELIZA MILLER ELEMENTARY SCHOOL	5403021	06	93	22.6%
LITTLE ROCK SCHOOL DISTRICT	6001000	HENDERSON MIDDLE SCHOOL	6001013	06	252	25.4%
LITTLE ROCK SCHOOL DISTRICT	6001000	CLOVERDALE AEROSPACE TECH CHAR	6001702	06	204	27.5%
DERMOTT SCHOOL DISTRICT	0901000	DERMOTT ELEMENTARY SCHOOL	0901001	06	29	27.6%
WEST MEMPHIS SCHOOL DISTRICT	1803000	WONDER ELEMENTARY SCHOOL	1803032	06	32	28.1%
PINE BLUFF SCHOOL DISTRICT	3505000	BELAIR MIDDLE SCHOOL	3505025	06	241	28.2%
EARLE SCHOOL DISTRICT	1802000	EARLE ELEMENTARY SCHOOL	1802005	06	46	28.3%
FORREST CITY SCHOOL DISTRICT	6201000	LINCOLN ACADEMY	6201016	06	169	28.4%
BEARDEN SCHOOL DISTRICT	5201000	BEARDEN ELEMENTARY SCHOOL	5201001	06	34	29.4%
WESTSIDE SCHOOL DISTRICT (JOHNSON COUNTY)	3606000	WESTSIDE ELEMENTARY SCHOOL	3606025	06	44	29.5%
DOLLARWAY SCHOOL DISTRICT	3502000	ROBERT F MOREHEAD MIDDLE SCHOO	3502009	06	89	30.3%
MAYNARD SCHOOL DISTRICT	6102000	MAYNARD ELEMENTARY SCHOOL	6102005	06	41	31.7%
JACKSONVILLE LIGHTHOUSE CHARTER	6050700	JACKSONVILLE LIGHTHOUSE CHARTE	6050701	06	53	32.1%
PINE BLUFF LIGHTHOUSE ACADEMY	3541700	PINE BLUFF LIGHTHOUSE ELEMENTARY	3541701	06	31	32.3%
WEST MEMPHIS SCHOOL DISTRICT	1803000	JACKSON ELEMENTARY SCHOOL	1803027	06	40	32.5%
FORT SMITH SCHOOL DISTRICT	6601000	TRUSTY ELEMENTARY SCHOOL	6601019	06	46	32.6%
BLYTHEVILLE SCHOOL DISTRICT	4702000	BLYTHEVILLE MIDDLE SCHOOL	4702012	06	131	32.8%
JONESBORO SCHOOL DISTRICT	1608000	MICROSOCIETY MAGNET SCHOOL	1608022	06	66	33.3%
LITTLE ROCK SCHOOL DISTRICT	6001000	DUNBAR MAGNET MIDDLE SCHOOL	6001007	06	228	33.8%
CAMDEN FAIRVIEW SCHOOL DISTRICT	5204000	CAMDEN FAIRVIEW MIDDLE SCHOOL	5204028	06	168	33.9%
LEAD HILL SCHOOL DISTRICT	0506000	LEAD HILL ELEMENTARY SCHOOL	0506031	06	26	34.6%
FORT SMITH SCHOOL DISTRICT	6601000	HARRY C. MORRISON ELEM. SCHOOL	6601030	06	23	34.8%
CLEVELAND COUNTY SCHOOL DISTRICT	1305000	RISON HIGH SCHOOL	1305010	06	65	35.4%
HARMONY GROVE SCHOOL DISTRICT (OUACHITA COUNTY)	5205000	SPARKMAN ELEMENTARY SCHOOL	5205011	06	14	35.7%
COVENANTKEEPERS CHARTER SCHOOL	6044700	COVENANT KEEPERS CHARTER	6044702	06	44	36.4%
BRADFORD SCHOOL DISTRICT	7303000	BRADFORD ELEMENTARY SCHOOL	7303014	06	30	36.7%
KIPP DELTA PUBLIC SCHOOLS	5440700	KIPP BLYTHEVILLE COLLEGE PREP	5440705	06	46	37.0%
LITTLE ROCK PREPARATORY ACADEMY	6049700	LITTLE ROCK PREP ACADEMY	6049702	06	43	37.2%
MCGEHEE SCHOOL DISTRICT	2105000	MCGEHEE ELEMENTARY SCHOOL	2105026	06	91	37.4%

Recommendations 1 and 3

July 15, 2016

Submitted by

Division of Public School Accountability

School Improvement Unit

RECOMMENDATION # 1: PREVIOUSLY CLASSIFIED SCHOOLS

Because twenty of the schools were previously classified in Academic Distress, and two of the other four schools were classified as Priority, it was noted that they have goals and efforts currently in progress from prior ADE site reviews or technical assistance. Thus, the review team is recommending continuation of the Priority Improvement Plans established for school year 2015-16, but with modifications for greater clarity. ADE School Improvement Unit (SIU) staff will provide technical assistance to assist these twenty-two schools in integrating into their current plans three targeted goals that would be monitored monthly by the SIU. These overarching goals are:

1. The School Improvement Leadership Team will develop a clear and shared academic focus that will lead to removal from Academic Distress.
2. The School Improvement Leadership Team in conjunction with all stakeholders will develop a positive school culture conducive to learning and staff professional growth.
3. The School Improvement Leadership Team in conjunction with the District Improvement Leadership Team will develop a culture of continuous improvement.

These goals are attached and greater clarification of their meaning and purpose are provided (attachment C).

RECOMMENDATION 3: DISTRICT WILL CLARIFY SUPPORT TO BE PROVIDED

It was noted during the site reviews that schools varied in the level of district support. No school reviewed by the ADE teams had a written document that outlined the level of support that a school would receive from the district.

It is recommended that by September 15, 2016, the District Improvement Leadership Team, in consultation with the School Improvement Leadership Team and other stakeholders, will submit for State Board of Education review a plan of support for each school in Academic Distress. The plan will detail the types of support to be provided to each school and will be inclusive of, but not limited to:

- The professional development plan of activities that will support the principal in becoming an accomplished turnaround principal (identifying specific trainings, readings, mentors, and timelines for activities to occur and the expected

outcome of each component of the activities). This plan shall include observation calibration training for Teacher Excellence and Support System (TESS) along with training in the use of the BloomBoard Insight Reports. Further, district and school leaders will work with the ADE Educator Effectiveness Unit to align existing walk-through practices to be recorded as informal observations within the TESS (BloomBoard) process.

- A description of specific State and Federal Categorical (restricted funds) funding provided to the school. The funding description will clarify positions and programs purchased with categorical dollars; specify the amount of student improvement anticipated by the expenditure and how the effectiveness of the program or position will be evaluated in accordance with the anticipated student gains. The funds available and at the discretion of the School Improvement Leadership Team will be defined and the allowable use of the funds determined.
- The description of all assessments to be administered by the school and clear detail on how the assessments will be utilized by teachers, instructional teams, and the School Improvement Leadership Team. It is encouraged that the ACT Aspire Interim Assessments be used for progress monitoring. Post-unit assessments are to be developed by instructional teams specific to the units taught and may include both standards based questions and questions related to any foundational knowledge required as part of the units of instruction. Dates for assessments by grade level, expected levels of student achievement (SMART Goal), and clear use of each type of assessment will be detailed in the plan(s). It is encouraged that the school minimize assessment to Formative Assessments, Aspire Interims (or Aspire aligned interims), and Unit Assessments. Semester Exams may be substituted for the third Unit Assessment if all students at that grade level or subject area are administered the Semester Exam.
- The clarification of the decision making autonomy that each School Improvement Leadership Team will have, and the parameters within which the team must operate. Included will be a description of the discretionary money/resources available to the School Improvement Leadership Team to support teacher development as needs are identified.
- The description of how the district will attempt to retain effective teachers at the school, and how the district will support the building in recruiting qualified teachers when openings occur. This would include how teachers are incentivized to remain at the school as well as the monitoring of teachers for their “feelings or perceptions” of support on a quarterly basis (ADE developed instrument or ADE approved instrument).
- A description of the actions the district is taking to ensure that there is curriculum alignment in at least the areas of literacy and mathematics as assessed for accountability.
- The description of the supports to be provided to engage parents and community in the turnaround efforts. Specifically identify the activities that will

be offered, a timeline and how the school will maintain and analyze data related to parent participation. The analysis should contrast parents of proficient students in contrast to parents of non-proficient students with the intent of providing additional services and support to parents of non-proficient students.

- The description of the supports to be provided in creating a positive learning environment and positive school climate. It is encouraged that the district support the school in adopting a Positive Behavior Intervention System as well as other culture improvement strategies.

Recommendations are attached and greater clarification of their meaning and purpose are provided (attachment D).

Attachment C

SCHOOL GOALS

BACKGROUND

Campus teams did not clearly articulate the components of accountability that would lead to the removal from Academic Distress, including the steps that need to be taken to improve student outcomes.

GOAL 1

The School Improvement Leadership Team will develop a clear and shared academic focus that will lead to removal from Academic Distress.

CLARIFICATION

The School Improvement Leadership Team ensures the development of a clear and shared focus involving all stakeholders. All stakeholders know the focus and how achieving the focus will lead to increased achievement, long range commitment to continuous improvement and specifically removal from Academic Distress classification. All stakeholders can articulate their role, and the role of interventions/innovations/programs in accomplishing the focus. The focus will be foremost in decisions related to support expenditures. All faculty will clearly understand the evidence that identify progress throughout the year. The School Improvement Leadership Team will provide an update of progress to the local school board quarterly.

BACKGROUND

School staff interviewed as part of the site reviews communicated high turnover rates of teachers, difficulty recruiting qualified teachers, high number of discipline referrals, high teacher absenteeism, high failure rate and a high number of students entering secondary settings behind grade level.

GOAL 2

The School Improvement Leadership Team in conjunction with all stakeholders will develop a positive school culture conducive to learning and staff professional growth.

CLARIFICATION

The School Improvement Leadership Team ensures there is a sense that educating students extends beyond teachers and staff in schools to include all educational stakeholders. Parents, as well as businesses, social service agencies, and community colleges/universities all know their role in this effort. Teachers, staff, students and stakeholders believe that all students can learn and are able to articulate a personal vision of success. The school has a safe, caring,

healthy and intellectually stimulating learning environment where all students and staff feel welcomed, supported and valued. The social-emotional, behavior and academic needs of students are addressed using a research based multi-tiered approach. Instruction is student-focused; teachers have high expectations of student learning and believe they can teach all students. Teaching and learning are continually adjusted based on frequent monitoring of student progress and needs. Teachers determine needed support and professional development that aligns with the school and district's clear focus and high expectations. The School Improvement Leadership Team will regularly assess school culture by utilizing ADE provided or approved student and teacher surveys and provide an update to the state and local school board quarterly.

BACKGROUND
Campus teams did not articulate the plans and processes in place for creating a culture of continuous improvement. Various teams did not demonstrate an understanding of the comprehensive picture of a culture of continuous improvement.

GOAL 3
The School Improvement Leadership Team in conjunction with the District Improvement Leadership Team will develop a culture of continuous improvement.

CLARIFICATION
A culture of continuous improvement is one that involves assessing, planning and monitoring of school improvement indicators and making data-driven decisions toward achieving the shared and clear focus. All teams work collaboratively within and outside of their teams, have a clear and communicated written purpose, bylaws, and can articulate their role in achieving the focus.

The School Improvement Leadership Team has the autonomy to identify and attend necessary training to ensure they are capable of leading a turnaround effort. The School Improvement Leadership Team meets regularly and serves as a conduit of communication to all stakeholders in a way that enables the School Improvement Leadership Team to receive input. A schedule and description of all assessments to be administered will be created including detail of how the assessments will be utilized by teachers, instructional teams, and the School Improvement Leadership Team. It is recommended that the Aspire Interim Assessments and Aspire Classroom Assessments are used for progress monitoring as available. Post-Unit Assessments can be combined with Aspire Classroom Assessments to monitor both standards attainment and/or the learning of foundation knowledge. Dates for assessments by grade level, expected levels of student achievement (SMART Goal), and clear use of each type of assessment will be detailed in the plan(s). The School Improvement Leadership Team analyzes data in order to draw conclusions and make decisions about

school improvement and professional development. The School Improvement Leadership Team with support from the District Improvement Leadership Team seeks ways to retain effective teachers and how they will recruit and incentivize qualified teachers. This would include monitoring teachers for their “feelings or perceptions” of support on a quarterly basis.

The Instructional Improvement Team (otherwise referred to as PLC) works collaboratively with the empowerment to draw conclusions and make decisions based on data. Instructional Teams develop instructional units based on the curriculum standards and the local curriculum document. This unit typically encompasses three to six weeks of work. An assessment is administered prior to instruction to plan for differentiated instruction within the unit. Assessments will be administered following instruction in two to three week intervals to assess effectiveness of instruction and to identify students in need of instructional support or enhancement. The Instructional Improvement Teams use student data to assess strengths and weaknesses of the curriculum and instructional strategies. The Instructional Improvement Team reviews the results of assessments and uses the information to guide efforts to assure that every student masters the instructional standards taught in the instructional unit and reflect on personal effectiveness. The Instructional Improvement Teams use the results from multiple measures of data to plan for professional development, inform subsequent instructional unit plans and make adjustments to the curriculum.

Attachment D

DISTRICT RECOMMENDATIONS

BACKGROUND for recommendation 1**:**

The ADE Review Team did not find a clearly articulated plan to support the school's turnaround effort.

RECOMMENDATION 1: DISTRICT

It was noted during the site reviews that schools varied in the level of district support. No school reviewed by the ADE teams had a written document that outlined the level of support that a school would receive from the district.

It is recommended that by September 15, 2016, the District Improvement Leadership Team, in consultation with the School Improvement Leadership Team and other stakeholders, will submit for State Board of Education review, a plan of support for each school in Academic Distress. The plan will detail the types of support to be provided to each school and will be inclusive of, but not limited to:

- The professional development plan of activities that will support the principal in becoming an accomplished turnaround principal (identifying specific trainings, readings, mentors, and timelines for activities to occur and the expected outcome of each component of the activities). This plan shall include observation calibration training for Teacher Excellence and Support System (TESS) along with training in the use of the BloomBoard Insight Reports. Further, district and school leaders will work with the ADE Educator Effectiveness Unit to align existing walk-through practices to be recorded as informal observations within the TESS (BloomBoard) process.
- A description of specific State and Federal Categorical (restricted funds) funding provided to the school. The funding description will clarify positions and programs purchased with categorical dollars; specify the amount of student improvement anticipated by the expenditure and how the effectiveness of the program or position will be evaluated in accordance with the anticipated student gains. The funds available and at the discretion of the School Improvement Leadership Team will be defined and the allowable use of the funds determined.
- The description of all assessments to be administered by the school and clear detail on how the assessments will be utilized by teachers, instructional teams, and the School lmprovement Leadership Team. It is encouraged that the ACT Aspire Interim Assessments be used for progress monitoring. Post-unit assessments are to be developed by instructional teams specific to the units taught and may include both standards based questions and questions related to any foundational knowledge required as part of the units of instruction. Dates for assessments by grade level, expected levels of student achievement

(SMART Goal), and clear use of each type of assessment will be detailed in the plan(s). It is encouraged that the school minimize assessment to Formative Assessments, Aspire Interims (or Aspire aligned interims), and Unit Assessments. Semester Exams may be substituted for the third Unit Assessment if all students at that grade level or subject area are administered the Semester Exam.

- The clarification of the decision making autonomy that each School Improvement Leadership Team will have, and the parameters within which the team must operate. Included will be a description of the discretionary money/resources available to the School Improvement Leadership Team to support teacher development as needs are identified.
- The description of how the district will attempt to retain effective teachers at the school, and how the district will support the building in recruiting qualified teachers when openings occur. This would include how teachers are incentivized to remain at the school as well as the monitoring of teachers for their "feelings or perceptions" of support on a quarterly basis (ADE developed instrument or ADE approved instrument).
- A description of the actions the district is taking to ensure that there is curriculum alignment in at least the areas of literacy and mathematics as assessed for accountability.
- The description of the supports to be provided to engage parents and community in the turnaround efforts. Specifically identify the activities that will be offered, a timeline and how the school will maintain and analyze data related to parent participation. The analysis should contrast parents of proficient students in contrast to parents of non-proficient students with the intent of providing additional services and support to parents of non-proficient students.
- The description of the supports to be provided in creating a positive learning environment and positive school climate. It is encouraged that the district support the school in adopting a Positive Behavior Intervention System as well as other culture improvement strategies.

<u>CLARIFICATION of the recommendation:</u>

The ADE will make Specialists available (upon request) to assist the district in the development of the plans. Specialists from Educator Effectiveness, School Improvement, Standards, Curriculum, Finance and Assessment may be accessed in July and August.

The turnaround principles are the basis of this recommendation:

- Providing strong leadership by ensuring the principal is capable of leading a turnaround effort; and Providing operational flexibility in the areas of scheduling, staffing, curriculum, and budget

- Using data to inform instruction and for continuous improvement, including providing time for collaboration on the use of classroom level data
- Establishing a school environment that improves safety and discipline as well as addressing other non-academic factors that impact student achievement such as social, emotional and health needs
- Incentivizing effective teachers to remain at the school and preventing the transfer or hire of ineffective teachers
- Increasing mechanisms for parent and community involvement

BACKGROUND for district recommendation 2:

There was evidence of the required reporting of progress to the local school board. There was not clear evidence that the local board was receiving training in how their actions and decisions could influence or support the school improvement process.

RECOMMENDATION 2 District:

In conjunction with the School Improvement Leadership Team, and the designated team from the Arkansas Department of Education, the District Improvement Leadership Team will present the school's required quarterly progress report to the local school board and discuss supports, actions, and or trainings in which the local school board can participate to further support the school or schools.

CLARIFICATION of the recommendation:

Each quarter following the submission of the quarterly progress report, the assigned ADE Team will meet with representatives from the district and school to develop and present a report of progress to the local school board. To the degree possible, report to the local board will highlight the decisions made that either supported the school's efforts or distracted from the school's efforts. The District Improvement Leadership Team and the assigned ADE support team would then assist the Local School Board in identifying any trainings that would assist in their efforts to become more effective.

The National School Boards Association has published articles related to eight characteristics of effective school boards. In addition, the Center for Public Education has both an executive summary and a full report on the characteristics of effective school boards. This can be easily accessed at http://www.centerforpubliceducation.org/Main-Menu/Public-education/Eight-characteristics-of-effective-school-boards.

Arkansas Department of Education

Transforming Arkansas to lead the nation in student-focused education

October 28, 2016

Dr. Jerry Guess, Superintendent
Pulaski County Special School District
925 East Dixon Road
Little Rock, AR 72206

Dear Superintendent Guess:

The Arkansas State Board of Education is committed to the academic success of all students in our state. To accomplish this goal, the State Board has established progress review dates with leadership from schools and districts classified in Academic Distress.

Given your district has one school classified in Academic Distress, the State Board of Education has scheduled your next review for Thursday, December 8, 2016.

As a reminder, the State Board of Education would like to hear a progress report specifically from the school principal. Following the principal's report, the Committee would like to hear from you (and other supporting administrators as appropriate) on how the district is supporting the school's efforts to increase student achievement. Please be prepared to discuss current year's progress for the following school:

Wilbur D. Mills High School (Academic Distress and Priority School)

Below you will find a list of documents you need to submit for the State Board of Education to review prior to the meeting. Please keep in mind that all documents submitted will be posted for public review and no documents should identify students or parents by name.

Please send this information to Glenda Cupples at glenda.cupples@arkansas.gov in PDF format as soon as possible, but no later than end of day on Thursday, November 10, 2016.

Four Capitol Mall
Little Rock, AR
72201-1019
(501) 682-4475
ArkansasEd.gov

The items requested for review include:

1. A summary report of external providers supporting school improvement and, if this is a continuing service from 2015-2016, the evaluation of the effectiveness of these services within your school district.
2. A summary report from the principal of the actions the specific school is taking to meet the Arkansas Department of Education's (ADE) recommendations specific to the three goals in Recommendation 1. This is not the 45-Day Progress Report.
3. The document that outlines the progress and next steps for supporting school(s) in meeting ADE's Recommendation 3 as outlined in your support plan and any supplemental material.
4. Any advisory minutes and agendas during the prior six months with topics related to school improvement highlighted.
5. Any additional information you consider relevant to your progress.
6. Please provide a document detailing any training needs for the newly elected school board related to school improvement that you would like ADE to provide.

The State Board of Education looks forward to reviewing your information and discussing your successes and challenges. For the specific process of the meeting, we have attached a copy of the meeting protocol. If you need any additional information or assistance, please contact Dr. Richard Wilde at 501-683-3434 or richard.wilde@arkansas.gov.

Respectfully submitted,

M. Annette Barnes
Assistant Commissioner
Public School Accountability
Arkansas Department of Education

cc: Dr. Richard Wilde, Public School Program Manager
Deborah Coffman, Chief of Staff
Elbert Harvey, Coordinator of School Improvement/Standards Assurance

Attachment: Process for Review

Arkansas Department of Education
Transforming Arkansas to lead the nation in student-focused education

Process for Review of Schools Classified in Academic Distress by the State Board of Education

The process for schools and districts classified in Academic Distress reporting progress in the implementation of the ADE Site Review Team Recommendations at the November 2016 State Board of Education meeting:

1. Principals will be asked to report on the three goals established in Recommendation 1.

    a. GOAL 1 The School Improvement Leadership Team will develop a clear and shared academic focus that will lead to removal from Academic Distress.

    b. GOAL 2 The School Improvement Leadership Team in conjunction with all stakeholders will develop a positive school culture conducive to learning and staff professional growth.

    c. GOAL 3 The School Improvement Leadership Team in conjunction with the District Improvement Leadership Team will develop a culture of continuous improvement.

2. Dr. Wilde from the ADE School Improvement Unit will present the goal as a question and then function as time keeper. The questions will be presented one at a time, with each principal responding to first question before the second question is presented. This process will repeat for the three questions.

    a. What steps has the leadership team taken to create a clear academic focus that will lead your school to the removal from Academic Distress? What were your successes and/or challenges, if any, in attaining stakeholder buy-in for this focus?

    b. What steps has the leadership team taken to improve the culture of the school? What successes and/or challenges have you had in attaining an improved culture?

    c. What steps has the leadership team taken to develop a culture of continuous improvement?

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Little Rock, AR
72201-1019
(501) 682-4475
ArkansasEd.gov

10-26-16

3. Following the presentation of responses by the principals, Dr. Wilde from the ADE School Improvement Unit will provide a summary statement based on: the 45 progress reports submitted, Locally-Hired SIS reports submitted in the Indistar platform and the School Leadership Team Agendas and Minutes as reported in the Indistar platform.

4. The Superintendent, Principals, Locally-Hired School Improvement Specialist and the ADE School Improvement Specialist will be available to respond to any questions the State Board members may have.

10-26-16

PCSSD Progress and Next Steps for Mills High School

Recommendation: The professional development plan of activities that will support the principal in becoming an accomplished turnaround principal (identifying specific trainings, readings, mentors, and timelines for activities to occur and the expected outcome of each component of the activities). This plan shall include observation calibration training for Teacher Excellence and Support System (TESS) along with training in the use of BloomBoard Insight Reports. Further, district and school leaders will work with the ADE Educator Effectiveness Unit to align existing walk-through practices to be recorded as informal observations within the TESS (BloomBoard) process.

PD for Improved Leadership: PCSSD will provide a certified Charlotte Danielson consultant to ensure alignment of feedback from TESS observations (T.P. 1.7); PCSSD will provide calibration training to ensure consistent practice in observations; Training in the use of the Strategic Instruction Model will be provided to the building principal; PCSSD will make site visits with the principal to schools practicing innovative strategies to improve student interest and performance; Principal has been assigned selected readings.

Progress

- **Executive Coach:** The Danielson consultant has been working with the building principal since October 2016. Visits have included modeling the effective use of TESS, debriefings with the principal, and recommendations on providing feedback to the teachers. Observations have reflected attention to specific research-based "look-fors" that demonstrate effective observer practice, such as student engagement.

- **Calibration Training:** TESS calibration was provided to the principal by Jim Johnson on Wednesday, November 2, 2016. The training will ensure that the principal accurately rates classroom observations and uses data to identify strengths and weaknesses.

- **Strategic Instruction Model:** Four SIM sessions have been scheduled with the principal and selected school personnel to provide research-based strategies to improve student performance. The first training was held Saturday, October 29, 2016.

- **School Visits:** Schools of Innovation Site Visits: District personnel and the principal visited the Springdale Public Schools Don Tyson School of Innovation on September 15, 2016, to identify evidence of personalized learning and project-based learning.

- **School Redesign Partnership:** On September 26, 2016, school district personnel and the principal attended the Education Innovation Summit in Little Rock to identify innovative practices and to determine the process for submitting an SOI application. In coordination with the Office of Innovative Education, PCSSD has scheduled another site

visit with the Mills principal on November 15-18 to Innovations High School in Salt Lake City, UT, to identify innovative practices.

- **Readings:** On September 21, PCSSD assigned five articles from the Office of Innovation for Education and the Center for Secondary School Redesign [Culture of Inquiry (CSSR), Shared Leadership (CSSR), Student Agency (CSSR), Student Driven Learning (CSSR), Getting the Right Fit is Key to Successful Innovation (OIE)]. On October 21, 2016, the Mills principal reported findings to the District Improvement Leadership Team.

Next Steps

- The Danielson consultant will provide feedback to district administration on the principal's progress toward more effective classroom observations and teacher feedback and the use of "Strengths and Opportunities in Bloomboard to identify the TESS areas of greatest need and provide targeted, job-embedded PD and support. The principal will revise his goals and PGP to reflect the inclusion of recommendations.

- The principal will monitor selected classrooms for the inclusion of SIM Content Enhancement Routines and provide feedback to teachers.

- The district and principal will work with the Office of Innovative Education and the ADE to submit an SOI application for implementation in the 2018-2019 school year. The district and building principal will ensure that ADE and OIE protocols and processes are followed throughout the planning stages.

Pulaski County School District
2016-2017 District Improvement Leadership Team Plan of Support
For
Mills High School

Area of Support	**District Support Action**	**Additional Information**
PD Support for the Principal 1. The professional development plan of activities that will support the principal in becoming an accomplished turnaround principal (identifying specific trainings, readings, mentors, and timelines for activities to occur and the expected outcome of each component of the activities). This plan shall include observation calibration training for Teacher Excellence and Support System (TESS) along with training in the use of BloomBoard Insight Reports. Further, district and school leaders will work with the ADE Educator Effectiveness Unit to align existing walk-through practices to be recorded as informal observations within the TESS (BloomBoard) process.	• TESS / Bloomboard Insight Reports - training at Arch Ford - October 20 • Linda Goodwin – Danielson consultant – will complete CWTs with admin to improve feedback to teachers • ADE Educator Effectiveness Unit - Quest with Rocci Malone • SIM – for SPED, ALE, Strategies for Learning teachers, and principal. • DILT will have work sessions with the SILT during the 4th week of each grading period • School site visits for principal to review practices of effective schools	**Outcomes** TESS: Ensure greater reliability for evaluation ratings to improve teacher performance (Turnaround Principle 1.1, 1.6, 1.7). Danielson Consultant: Provide support to better align feedback from observations to TESS rubric (T.P. 1.7). Quest Training (Rocci Malone): To enhance principal practice (1.4). SIM Training: Principal will learn the Content Enhancement Routines that will be used to improve student performance. His expectations of teacher performance will include the use of these research-based routines (1.5). DILT Work Sessions With Principal: Principal will be able to more effectively build the capacity of the SILT by working collaboratively with the DILT to set priorities. The first work session was September 7, 2016 (1.2). School Visits: Effective use of research-based practices to improve student performance and involve all stakeholders in student learning (1.10). Sites with similar

	• Co-teaching training for teams - September 22 • From the Heart Principal Training (July 31-August 3) • The IT department will meet with Mills every two weeks - beginning 9/12/16	demographics will be visited to identify best practices. Principal will attend professional development to focus on creating a school-wide culture of inclusion, while implementing an effective co-teaching program. Principal will gain practical ideas to address state standards through co-teaching, universal design for learning, interdisciplinary collaboration, and the use of technology to ensure the success of all students. Presenter is Dr. Lisa Dieker (1.2,1.5) From the Heart Principal Training: The principal will build a culture that nurtures all students for success, especially those students who are at-risk (low attendance, credit deficit, In Need of Support on Aspire) (1.1, 1.3). IT Principal Support Meetings (every two weeks): Increased principal expectations for teacher integration of 1:1 technology (1.4,1.5).
2. A description of specific State and Federal Categorical (restricted funds) funding provided to the school. The funding description will clarify positions and programs purchased with categorical dollars;specify the amount of student improvement anticipated by the expenditure and how the effectiveness of the program or position will be evaluated in accordance with the anticipated student gains. The funds available and at the discretion of the School Improvement Leadership Team	• NSLA- Literacy IF; Math IF; Summer Transition Camp; ChromeBooks for all students and teachers; Television set-ups with Chromecast; PD/Coaching on integrating technology with instruction;content, data disaggregation, and instructional strategies;academic interventionists; STAR 360 assessments; Accelerated Reading 360; Accelerated Math 2.0;	Instructional Facilitators/Consultants(NSLA District $148,800.69): Mills teachers will receive support on the effective use of data for improved teaching and learning (1.2, 1.4, 2.2, 3.2, 4.2, 5.3). Summer Transition Camp(NSLA School $15,353.60): Rising eighth grade students will receive support for academic success and effective assimilation into the high school environment (1.3, 2.2). Academic Interventionists(NSLA School

will be defined and the allowable use of the funds determined.	Discovery online units; and conference registrations/travel. ● PD- co-teaching, instructional strategy, classroom management, instructional technology team working individually with teachers and in PLCs as needed, SIM, PBIS. Title II-A, NSLA, and PD funds will be used to provide specific professional development for Mills. Professional development staff(salary/benefits paid by Title II-A funds) will provide support for Mills at lease twice weekly through classroom visits and attending PLCs.	$64,416): 1:1 Technology and Related Equipment(NSLA ChromeBooks District $65,734.17): All students and teachers will receive a ChromeBook and have access to classroom and educational resources 24 hours per day for improved learning. All core teachers will have the technology tools including 70 inch television set-ups(NSLA $26, 802.12) with Chromecast needed for effective integration of technology for school improvement. Document cameras were provided to all Mills High School Teachers(NSLA District Funds). (3.2, 3.5). PD from District IT and EdTech: To provide support for teachers and administration on the effective integration of 1:1 technology in mathematics and English for improved student performance. The district instructional team visits Mills HIgh at least twice a week and conducts classroom walk-throughs and attend PLCs to provide support/professional development on the integration of instruction and technology(3.2, 3.5, 5.3, 5.5). STAR 360(School NSLA $15,914): Teachers will use assessment data to improve teaching and learning and provide feedback to students for improvement (3.5, 4.2, 4.4, 4.5, 6.1). Discovery Units(District NSLA $3,500) : Teachers in Social Studies and Science classes will improve content delivery (4.1, 4.4).

	                   • ELL- tutors, interpreting • AL - AL classroom at Mills with a certified teacher and a para Quarterly reports will be submitted by the school to the leadership team and the board for review of improved student achievement through the use of programs, interventions, and professional development funded by state and federal funds.	PD(District NSLA $72,000): Mills will get out of Academic Distress as a result of the PD provided by the district, which is designed to meet the professional needs of administration and teachers for improved student performance. The EdTech will provide consultants who will provide PD sessions and coaching with a focus on content, instructional strategies, communication with students and leveraging technology in a 1:1 learning environment to increase student achievement and success. A total of 20 days for Mills High(10 literacy days and 10 math days) has been scheduled (5.3, 5.5). ELL: ELL students at Mills will demonstrate improved performance with instructional and tutoring support from qualified ELL teachers (3.2, 4.5). AL: AL students will improve academic performance and social skills as a result of the professional development provided to AL facilitators and teachers (3.2, 4.5) .

3. The description of all assessments to be administered by the school and clear detail on how the assessments will be utilized by teachers, instructional teams, and the School Improvement Leadership Team. It is encouraged that the ACT Aspire Interim Assessments be used for progress monitoring. Post-unit assessments are to be developed by instructional teams specific to the units taught and may include both standards based questions and questions related to any foundational knowledge required as part of the units of instruction. Dates for assessments by grade level, expected levels of student achievement (SMART Goal), and clear use of each type of assessment will be detailed in the plan (s). It is encouraged that the school minimize assessment to Formative Assessments, Aspire Interims (or Aspire aligned interims), and Unit Assessments. Semester exams may be substituted for the third Unit Assessment if all students as that grade level or subject area are administered the Semester Exam.	**http://tinyurl.com/zj33qmg** Screener Assessments: STAR Math, Reading, Writing Sample Progress Monitoring: Administer STAR every 5th week for a trend line. Informal Assessments: Ongoing assessment of student learning/ understanding during the teaching and learning process. Administering ACT Interim Assessments to Adjust instructional practices. Summative Assessments: ACT Aspire and ACT	Assessment Plan and Practices: Ninth and tenth grade students at Mills will show improved performance in mathematics, reading, writing, and English as a result of more effective use of data to differentiate teaching and learning to meets the diverse needs of all those students. Teachers will teach to student needs by planning, teaching, and assessing student learning that reflects student performance on formative, interim, and summative assessments. Students will improve by receiving frequent feedback on performance.
4. The clarification of the decision making autonomy that each School Improvement Leadership Team will have, and the parameters within which the team must operate. Included will be a description of the discretionary money/resources available to the School Improvement Leadership Team to support teacher development as needs are identified.	The school leadership team will meet a minimum of twice a month to assess indicators in Indistar to determine progress and to review student data to determine progress in increasing student achievement as well as the effectiveness of the initiatives funded with state and federal funds. Mills High School received $132,860 in NSLA funds to spend to	SILT Decision Making: The SILT will improve its capacity to operate and make decisions based on student-driven priorities by meeting every four weeks with the DILT to assess progress and develop priorities. Additional deseg and NSLA funds were allocated for Mills High that were not given to other schools.

	improve instruction and increase student achievement. In April of 2016, the school completed a budget summary allocating the NSLA funds. The budget summary was reviewed and approved by central office staff. As the school expends the NSLA funds, they complete a "ACSIP Expenditure Checklist" to submit with the purchase requisition as well as a copy of the ACSIP budget summary. Funds from the district's desegregation funds are allocated based on needs upon request. The district leadership team will conduct work sessions every four weeks and every nine weeks grading period to review tasks and progress.	
5. The description of how the district will attempt to retain effective teachers at the school, and how the district will support the building in recruiting qualified teachers when openings occur. This would include how teachers are incentivized to remain at the school as well as the monitoring of teachers for their feelings or "perceptions" of support on a quarterly basis (ADE developed instrument or ADE approved instrument).	The Human Resources Department holds job fairs to recruit teachers as well as works with the principal of Mills High School to recruit effective teachers. In an effort to retain effective teachers, the principals and assistant principals conduct informal observations and provide feedback to help improve instruction. Additionally, the literacy and math facilitators work with teachers providing modeling of effective lesson and strategies. The PD/IT department has scheduled twenty days of professional development(District NSLA $72,000) to provide professional development and coaching support to the math and literacy teachers. Sessions will focus on content,	Staffing: PCSSD will incentivize the current Mills teachers to obtain licensure in high need areas and tested areas through ALP's or graduate level classes. In return the teachers will agree to remain at Mills High for a minimum of two years. This will support the academic needs of the students and give administration flexibility when scheduling courses. Mills High School will use the ADE developed instruments to monitor teachers feelings or perceptions of support quarterly.

	instructional strategies, communication with students and leveraging technology in a 1:1 environment to increase student achievement.	
6. A description of the actions the district is taking to ensure that there is curriculum alignment in at least the areas of literacy and mathematics as assessed for accountability.	**http://tinyurl.com/gvbswe7** Program Evaluation Research Data Wall: Identified skill and knowledge deficits for Mills Feeder Alignment of transfer goals across content areas: Literacy, Mathematics, Science Revised curriculum document to align with Arkansas State Standards Personalized PD Plan for Mills Feeder Schedule of School Visitation by district leader literacy, math and science	Alignment of transfer goals in the content areas of Literacy, Mathematics and Science. Stakeholders will have a coherent set of expectations for the school year that can be assessed for accountability. Professional development plan aligned to support those specific goals. District School Visitation Forms will include summary to include numbers of teachers in pace with curriculum map.
7. The description of the supports to be provided to engage parents and community in the turnaround efforts. Specifically identify the activities that will be offered, a timeline and how the school will maintain and analyze data related to parent participation. The analysis should contrast parents of proficient students in contrast to parents	● Parent / Community Events for Mills: o Health Fair – screenings, free supplies, free backpacks, free physicals, food -held prior to school starting o Welcome Back Assembly (Counselors will explain how	In order to engage the parents and community in the turnaround efforts a partnership will be developed between school, parents, and community which will provide information on how to support students, increase their achievement, and support for the parents of non-proficient students. The sign-in sheets, agendas, and parent survey results will be analyzed to

of non-proficient students with the intent of providing additional services and support to parents of non-proficient students.	to read the ACT results, information given on what's new this year, HAC training and logins, Chromebook info) plus first Parent Awards after the meeting – September 19th ($500 refreshments for parents) (Test results were sent home with students as required however we are providing additional explanation and another copy of the results to parents upon request) o additional HAC training September 27th and October 4th from 6-7pm ($25) o Brochures and handouts at the gate during Homecoming to build community relations - Homecoming Tailgate party ($200) o Anti-bullying seminar - Security Officer Bowers to provide this for parents (help parents know what to look for) – November o Father – Daughter Dance ($300) (etiquette, role model, etc.) - January o Parent meetings about non-proficient students - o Investigating blended concurrent and AP courses through UALR o College Seminar for grades 9 - 12 ▪ Two seminars will be held (Fall & Spring) ▪ Workshops - Writing	help with providing additional services.

	college essays for students, Financial Aid, The ACT, The College Application Process, First Generation College Tips,	
8. The description of the supports to be provided in creating a positive learning environment and positive school climate. It is encouraged that the district support the school in adopting a Positive Behavior Intervention System as well as other culture improvement strategies.	• PBIS/RTI training • PCSSD RTI Coordinator Training in October • Incentives for students that rank Exceeding or Ready • Monitors to be mounted in Commons area and front entrance area to scroll announcements and school successes	Mills staff will utilize the statewide RTI literacy and behavior resources and tools to improve educators' ability to implement evidence based literacy and behavior support practices and, to improve literacy and behavior outcomes for all students, especially students with disabilities. To increase faculty knowledge of the RTI process for behavior and academic improvement for Mills.

ARKANSAS STATE BOARD OF EDUCATION
CALENDAR

January 2017 - December 2017

AGENDA ITEMS IDENTIFIED / ITEM DETAILS DRAFTED	ATTACHMENTS / MATERIALS TO BE POSTED ON Board Book AGENDA DUE	DATE OF SUBMISSION TO WEB	MEETING DATE 2nd Thursday & Friday
December 16, 2016	December 23, 2016	January 2, 2017	January 12-13, 2017
January 13, 2017	January 20, 2017	January 30, 2017	February 9-10, 2017
February 10, 2017	February 17, 2017	February 27, 2017	March 9-10, 2017
March 17, 2017	March 24, 2017	April 3, 2017	April 13-14, 2017
April 14, 2017	April 21, 2017	May 1, 2017	May 11-12, 2017
May 12, 2017	May 19, 2017	May 29, 2017	June 8-9, 2017
June 16, 2017	June 23, 2017	July 3, 2017	July 13-14, 2017
July 14, 2017	July 21, 2017	July 31, 2017	August 10-11, 2017
August 18, 2017	August 25, 2017	September 4, 2017	September 14-15, 2017
September 15, 2017	September 22, 2017	October 2, 2017	October 12-13, 2017
October 13, 2017	October 20, 2017	October 30, 2017	November 9, 2017 (only)
November 17, 2017	November 22, 2017	December 4, 2017	December 14-15, 2017

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Science Grant Manager and Appointment

Topic	Protocol
History of Committee	On April 10, 2014 State Board Chair Brenda Gullett appointed Dr. Jay Barth to apply for a NASBE grant and to work with the ADE Science team.
Committee Membership from State Board	Dr. Jay Barth
Timeline of Work	April 10, 2014 – grant funds are expended and science courses are adopted/approved
Reference Statute(s) or URL for additional information	http://www.arkansased.gov/divisions/learning-services/curriculum-and-instruction/arkansas-k-12-science-standards
Standard Operating Procedure	Dr. Jay Barth applied for the NASBE Science grant and ADE was awarded $4000. On November 13, 2014, the State Board conducted a work session with Dr. Francis Eberle. On December 10, 2014, the State Board conducted a work session with Dr. James Gates, Jr. On June 11, 2015, Dr. Jay Bath moved, seconded by Ms. Alice Mahony, to adopt the Arkansas K-12 Science Standards for Grades K-4 and 5-8. The motion carried unanimously. The grant sponsored additional science presentations and booths at organization meetings. Dr. Jay Barth provides grant reports to NASBE.
Process for Reporting to the State Board	ADE Science Specialist Ms. Michele Snyder provides reports that are included in the Learning Services Report to the State Board. Dr. Barth will include information during the Friday Reports.
Tenure	End of grant funding, final report to NASBE, and adoption/approval of science courses.

ForwARd Arkansas Liaison

Topic	Protocol
History of Committee	On December 11, 2014 State Board Chair Sam Ledbetter appointed Mr. Kim Davis to serve as the State Board liaison to the Arkansas Forward Initiative. On September 10, 2015, State Board Chair Toyce Newton appointed Dr. Jay Barth to serve as the State Board representative to the ForwARd Arkansas Steering Committee.
Committee Membership from State Board	Dr. Jay Barth
Timeline of Work	September 10, 2015 - ongoing
Reference Statute(s) or URL for additional information	http://forwardarkansas.org
Standard Operating Procedure	Dr. Jay Barth will participate in monthly steering committee meetings. Dr. Jay Barth will update the State Board of ongoing progress.
Process for Reporting to the State Board	Dr. Jay Barth will collaborate with Ms. Susan Harriman, Executive Director of Forward Arkansas, to provide quarterly reports to the State Board. Dr. Barth will include information during the Friday Reports.
Tenure	The State Board Chair will appoint a new liaison prior to last six months of the tenure of the State Board Member

Deeper Learning Grant Manager and Appointment

Topic	Protocol
History of Committee	On July 15, 2016, Chair Mireya Reith appointed Ms. Susan Chambers to serve with her on the NASBE Grant Committee for Deeper Learning.
Committee Membership from State Board	Ms. Mireya Reith and Ms. Susan Chambers
Timeline of Work	July 15, 2016 – grant funds are expended
Reference Statute(s) or URL for additional information	N/A
Standard Operating Procedure	Chair Mireya Reith applied for and the ADE received a grant of $9000. On September 8, 2016, the State Board will host a work session with Dr. Francis Eberle. Ms. Reith will provide an interim report by October 15 of each grant year and a yearly final report by March 15 of each grant year to NASBE.
Process for Reporting to the State Board	Materials for the September 8 work session will be posted to Board Book. Ms. Reith will include information during the Friday Reports.
Tenure	End of grant funding – December 31, 2017

ESSA Steering Committee Liaison

Topic	Protocol
History of Committee	On July 15, 2016, Commissioner Key requested and State Board Chair Mireya Reith approved the appointment of Ms. Ouida Newton to the ESSA Steering Committee.
Committee Membership from State Board	Ms. Ouida Newton
Timeline of Work	August 31, 2016 - ongoing
Reference Statute(s) or URL for additional information	http://www.arkansased.gov/divisions/public-school-accountability/every-student-succeeds-act-essa
Standard Operating Procedure	The ESSA Steering Committee will meet on the last Wednesday of each month from 9:30-11:30 am in the ADE Auditorium. The meeting is open to the public. The State Board will conduct work sessions on ESSA.
Process for Reporting to the State Board	ADE Special Projects Director Ms. Tina Smith will provide a monthly ESSA report to the State Board. The State Board will host a work session in October 2016.
Tenure	Rotation protocols of the ESSA Steering Committee or the last six months of the tenure of the State Board Member

Standing Committee on Academic Distress

Topic	Protocol
History of Committee	On March 28, 2014, State Board Chair Brenda Gullett formed the Special Committee on Academic Distress to study chronically underperforming school districts. She appointed Ms. Vicki Saviers, Ms. Toyce Newton, and Mr. Sam Ledbetter to serve on the special committee, with Ms. Vicki Saviers serving as chair of the committee. Commissioner Tom Kimbrell requested the committee initially focus on the academic distress districts. On May 13, 2016, State Board Chair Toyce Newton appointed Ms. Diane Zook, Mr. Brett Williamson, Ms. Charisse Dean and the 2016 ATOY, Ms. Meghan Ables, to the Special Committee on Academic Distress. Ms. Toyce Newton asked Ms. Ouida Newton to remain on the committee. Ms. Toyce Newton asked Ms. Diane Zook to serve as chair. Dr. Richard Wilde requested to schedule a year in advance for the special committee review of schools. The Board supported the recommendation. State Board Chair Mireya Reith joined the committee on July 15, 2016. On September 8, the Board added Mr. Joe Black to the committee. The Board also clarified the committee is a standing committee, as per the State Board Operating Procedure.
Committee Membership	Ms. Diane Zook, Chair; Ms. Ouida Newton; Mr. Brett Williamson; Ms. Charisse Dean; Ms. Meghan Ables; Mr. Joe Black; and Ms. Mireya Reith
Timeline of Work	3/28/14 -- ongoing
Reference Statute(s) or URL for additional information	A.C.A. § 6-15-428 to 6-15-431
Standard Operating Procedure	The Special Committee on Academic Distress will schedule meetings at least one month prior to the meeting date so that all appropriate schools, districts and board members may participate. A yearly schedule was approved but will be adjusted as needed. The ADE School Improvement Unit will submit appropriate notifications to the schools and district. All presenters will submit appropriate documents in a timely manner for inclusion in the agenda packet. The ADE School Improvement Unit will provide a presentation/report documenting the progress in meeting the school and district recommendations. When applicable, a fiscal and supplemental funding report will be provided to indicate how funds are being utilized in support of student achievement. Also when applicable, the Office of Intensive Support will provide a report of coordinated efforts and progress. Appropriate schools/districts staff will provide a presentation/report to the Special Committee documenting the progress in meeting the school and district recommendations from the ADE School Improvement Unit. If the committee has concerns and an additional meeting is scheduled to address the concerns, the school board will also be encouraged to attend and present information regarding the board's efforts to ensure student achievement. If concerns persist,

	the committee will request the State Board conduct a community work session. After the community work session the State Board will determine if the Board should conduct a hearing regarding which statutory action to take regarding the school district at a future date or should ask the Special Committee to continue to monitor the progress. The ADE Public School Accountability Office will submit appropriate notifications to the district.
Process for Reporting to the State Board	After each committee meeting, the Chair will submit a written report at the next regularly scheduled State Board meeting to update the full Board on the progress of each school and district to meet the recommendations from the ADE School Improvement Unit.
Tenure	The Chair of the Standing Committee is revisited annually. Membership shall be four members of the State Board with the State Board Chair and Arkansas Teacher of the Year serving as ex-offico members.

Little Rock Area Public Education Stakeholder Group Liaison

Topic	**Protocol**
History of Committee	On April 14, 2016, the State Board of Education directed the ADE to facilitate the engagement of a research facilitator to review the issues below, with the goal of producing non-binding recommendations that aid the board's decision-making, inform communication among all stakeholders, and identify opportunities for collaboration and coordination among charter schools and traditional schools. The recommendations should lay the groundwork for a multi-function model that can be adapted for use in other areas of the state.
Committee Membership from State Board	Dr. Jay Barth
Timeline of Work	April 14, 2016 – until recommendations are submitted to the State Board
Reference Statute(s) or URL for additional information	N/A
Standard Operating Procedure	The Little Rock Area Public Education Stakeholder Group meets in an open meeting to discuss the six questions presented by the State Board. All meetings are posted on the ADE website at https://v3.boardbook.org/Public/PublicHome.aspx?ak=1001636
Process for Reporting to the State Board	Quarterly reporting
Tenure	To be determined by the State Board

National Association of State Boards of Education (NASBE) Liaison

Topic	Protocol
History of Committee	Arkansas has been a member in good standing with NASBE for many years. State Board members attending the national conference. State Board members and ADE staff participate in NASBE webinars. Currently, Dr. Jay Barth serves as the NASBE Executive Committee Chair-Elect. Mireya Reith serves as the NASBE Executive Committee Jr. Southern Area Representative.
Committee Membership from State Board	Mireya Reith
Timeline of Work	ongoing
Reference Statute(s) or URL for additional information	N/A
Standard Operating Procedure	NASBE communication is sent to Deborah Coffman. All travel is sent to Teal Helton.
Process for Reporting to the State Board	periodically
Tenure	Term on State Board

Student Discipline Liaison

Topic	Protocol
History of Committee	State Board Chair Mireya Reith requested Dr. Fitz Hill serve as liaison for Student Discipline.
Committee Membership from State Board	Dr. Fitz Hill
Timeline of Work	ongoing
Reference Statute(s) or URL for additional information	Ark. Code Ann. § 6-18-516
Standard Operating Procedure	Collaborate with ADE and the Office of Education Policy (EOP).
Process for Reporting to the State Board	periodically
Tenure	Term on State Board

ForwARd

Working Together to Advance Education

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Arkansas State Board of Education
December 8, 2016

Mission

Becoming a leading state in education by improving student achievement at a historically ambitious yet achievable rate and closing the achievement gap within a generation.

Key Focus Areas

ForwARd | TEACHING & LEARNING

ForwARd | TEACHING PIPELINE

ForwARd | PRE-K

ForwARd | SUPPORT BEYOND THE CLASSROOM

ForwARd | LEADERSHIP

ForwARd | SYSTEM & POLICIES

Organizational

Arkansas State University System

Fiscal Agent

Corporate Board in Place

Sherece West-Scantlebury, Chair

Kathy Smith, Vice-Chair

Brett Powell, Treasurer

Partnership with ADE

ADE High-Functioning Group

Meeting regularly with representatives from each of ADE's divisions

- Stakeholder input on each Key Focus Area of ForwARd's Vision
  - Teaching & Learning
  - Teaching Pipeline
  - Leadership
  - System & Policies

Community-based Solutions

Each of the ForwARd Communities will play a pivotal role in shaping our understanding of the issues facing Arkansas schools, students, and their families.

Policy Advocacy

Ongoing Efforts to Positively Impact Education Policy in Arkansas:

- Community Eligibility Provision
- Data Management
- Rules & Regulations

ForwARd PRE-K

Major focus of 2017 General Assembly:

- **Ensure resources sufficient to maintain proven results of High-Quality, Voluntary Pre-K**
- **ForwARd is advocating for incremental increases in permanent funding for Pre-K over a five to ten year period beginning with $20 million increase in 2017**
  - Teacher pay
  - Licensing/credentials
  - Innovations that impact disadvantaged communities

ForwARd Communities

Recently held announcement events in each Community:

- Crossett
- Independence County
- Marianna
- Pea Ridge
- Springdale

Community-level strategic planning processes ongoing

Upcoming

Progress report on ForwARd's Vision coming in 2017