Disciplinary Literacy Part 1
Objectives

• Review the structure of the Common Core State Standards for English Language Arts & Literacy in History/Social Studies, Science and Technical Subjects.

• Define and develop a working knowledge of disciplinary literacy and its effect on content instruction.

• Apply examples of instructional shifts to classroom practice.
COMMON CORE
STATE STANDARDS FOR

English Language Arts
&
Literacy in History/Social Studies,
Science, and Technical Subjects

http://www.corestandards.org/ELA-Literacy/
CCR Anchor Standards

A set of College and Career Readiness standards anchor the document and define general, cross-disciplinary expectations necessary for postsecondary success.
Organization of the Literacy Standards

College and Career Readiness Anchor Standards translated into age-appropriate benchmarks in the grade-specific standards below

Grade-Specific Standards

<table>
<thead>
<tr>
<th>Sections</th>
<th>Strands</th>
</tr>
</thead>
<tbody>
<tr>
<td>K-5 ELA Comprehensive</td>
<td>Reading Writing Speaking &amp; Listening Language</td>
</tr>
<tr>
<td>6-12 ELA</td>
<td>Reading Writing</td>
</tr>
<tr>
<td>6-12 Literacy in Content Subjects</td>
<td></td>
</tr>
</tbody>
</table>
Sample Nomenclature

RH.6.7

• Strand: Reading History
• Grade: 6
• Standard 7: Integrate visual information (e.g., in charts, graphs, photographs, videos, or maps) with other information in print and digital texts.
Conceptual Organizers: Reading

1. Key Ideas and Details
2. Craft and Structure
3. Integration of Knowledge and Ideas
4. Range of Reading and Level of Text Complexity
Conceptual Organizers: Writing

1. Text Types and Purposes
2. Production and Distribution of Writing
3. Research to Build and Present Knowledge
4. Range of Writing
Grade-Level Standards

Using the Writing Standards for Literacy in History/Social Studies, Science, and Technical Subjects (WHST), work with a partner to:

✧ Choose a grade band (6-8, 9-10, 11-12).
✧ Select a conceptual organizer.
✧ Create a list of verbs found in the standards.
✧ Discuss the skills a student must have to meet the expectations in the standards.
✧ Share.
Arkansas’ Big Shifts

- Appropriate Text Complexity
- Increased Reading of Informational Texts

✓ **Disciplinary Literacy**
- Close Reading
- Text-Dependent Questions
- General Academic and Domain-Specific Vocabulary
- Argumentative Writing
- Short and Sustained Research Projects

http://ideas.aetn.org/commoncore/strategic-plan
“The idea of what it takes to be considered literate today is not the same as it was even ten years ago. The view of literacy is continually changing because the skills students must develop to thrive in society are constantly expanding and becoming more complex.”

Jennifer Altieri, 2011
Capacities of a Literate Individual

- Demonstrate Independence
- Build strong content knowledge
- Respond to varying demands
- Understand other perspectives and cultures
- Comprehend and critique
- Value evidence
- Use technology and digital media
What is Disciplinary Literacy?

Disciplinary literacy is the application of discipline-specific practices as a way to access, comprehend, synthesize, and communicate knowledge.
What Does Disciplinary Literacy Involve?

• Specialized ways of knowing and communicating in the different disciplines (Shanahan)
• Giving access to the tools of knowledge, production, and critique; and giving students access to how a discipline is written so that they can ask better questions (Moje)
Why is Disciplinary Literacy Important?

Each discipline has specialized

- habits of mind or ways of thinking.
- language and vocabulary.
- text types to comprehend.
- ways of communicating in writing.
- career requirements.
What Does Disciplinary Literacy Require?

• All teachers must be experts in their disciplines.

• All teachers must share responsibility for literacy.
“Asking a teacher to become a reading teacher is distinctly different from asking a teacher to help students master texts within the teacher’s own field. In fact, subject-area teachers are best qualified to help their students master texts in each course. Subject-area teachers should not be expected to teach basic reading skills, but they can help students develop critical strategies and skills for reading texts in each subject.”

Southern Regional Education Board, 2009 Policy Statement, page 5
What Does Disciplinary Reading Involve?

- strategic examination of information presented in various ways
- awareness of discipline-specific nuances
- reading both text and context
Measuring Text Complexity

- Levels of meaning
- Structure
- Background knowledge
- Motivation
- Word frequency
- Sentence length

CCSS, Appendix A
How do members of your discipline use language?

What kinds of texts do they turn to or produce as part of their work?

How are interactions with members of the discipline shaped or governed by texts?
What does Disciplinary Writing involve?

• choosing words, information, formats, and structures deliberately
• using technology strategically to create, refine, and collaborate on writing
• gathering information, evaluating sources, and citing material accurately
What terminology is specific to your discipline?

What types of writing are used in your discipline?

Who are the primary audiences for written work in your discipline?
Literacy Design Collaborative

• An instructional system for developing students’ literacy skills
• Recommended by ADE as a tool for implementing CCSS in Arkansas
• Information available at local educational cooperatives
• www.literacydesigncollaborative.org
Questions for Discussion

• What does it mean to read, write, and think through a disciplinary lens?

• How do students navigate texts in a variety of distinct disciplines?
Research and Resources

- Jennifer L. Altieri, 2011
- Classroom Strategies for Interactive Learning, Buehl, Doug
- CCSS Appendix A [http://www.corestandards.org/assets/Appendix_A.pdf](http://www.corestandards.org/assets/Appendix_A.pdf)
- Achieve the Core- Literacy Instructional Guides [www.achievethecore.org](http://www.achievethecore.org)
- Arkansas IDEAS- Disciplinary Literacy Modules
- [http://www.parcconline.org/parcc-content-frameworks](http://www.parcconline.org/parcc-content-frameworks)
- [http://dpi.wi.gov/standards/disciplinaryliteracy.html](http://dpi.wi.gov/standards/disciplinaryliteracy.html)
Disciplinary Literacy Part II
Linking the Common Core State Standards to Science Instruction
We will ....

- Identify the links between the CCSS ELA Literacy in Science, and the NGSS Science and Engineering Practices
- Consider the deepening of student understanding when CCSS (Capacities) and NGSS (Practices) are linked
- Use instructional planning tools, rubrics, and resources
- Identify artifacts for TESS
Science Standards Timeline

2013
- AR Became NGSS Lead State: 2011
- NGSS Released April 2013

2014
- SBE Endorses NGSS April 2014
- Framework for K-12 Science Education PD
- AR Science Assessments Continue

2015
- Provide School-level Support/Tools
- Implement Communication Plan
- Course Revision Committee Fall 2014

2016
- Implementation Grades K-4 August 2016
- Continue Communication Plan
- PD to Support New Standards and Assessments

2017
- Implementation Grades 5-8 August 2017
- 2017
- 2018
- Implement Science Assessment Revision Plan

2018
- Implementation High School August 2018

2019

Curriculum and Instruction
- Aligned to AR Framework

Assessment
- AR Science Assessments Continue

Professional Development
- Communication Plan
- School-level Support/Tools
- New Standards and Assessments

Timeline:
- 2012 Framework for K-12 Science Education PD
- 2013 Curriculum and Instruction
- 2014 NGSS Review Committee June 2013
Practices + Crosscutting Concepts + Core Ideas

www.nextgenscience.org
Science and Engineering Practices for K-12 Classrooms

1. Asking questions (science) and defining problems (engineering)
2. Design and using models
3. Planning and carrying out investigations
4. Analyzing and interpreting data
5. Using mathematics and computational thinking
6. Developing explanations (science) and designing solutions (engineering)
7. Engaging in argument
8. Obtaining, evaluating, and communicating information
Relationships found in the CCSS in Math (practices) ELA/Literacy (capacities) and Science (practices)
Science teachers can incorporate and make use of literacy techniques to increase student understanding and achievement in middle and high school science instruction.

Beauchamp et al
Science teachers teach literacy too.

- ELA CCSS: read, write, and research across the curriculum, including science and technical subjects

ELA Text Type and Purposes: Middle School

• Fold the CCSS Example A (7th Grade) in half so that the left side is facing up

• Review the ELA standards for text types and purposes
  – #1 Argument
  – #2 Informative
  – #3 Narrative
Content Literacy in Science

Grades 6-12

• Unfold the paper
• Review the Content

Literacy in Science

• What do you notice?

### ELA

<table>
<thead>
<tr>
<th>Text Type and Purposes</th>
<th>Literacy in Science</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Write arguments to support claims with clear reasons and relevant evidence.</td>
<td>1. Write arguments focused on discipline-specific content.</td>
</tr>
<tr>
<td>a. Introduce claim(s), acknowledge and address alternative or opposing claims, and organize the reasons and evidence logically.</td>
<td>a. Introduce claim(s) about a topic or issue, acknowledge and distinguish the claim(s) from alternative or opposing claims, and organize the reasons and evidence logically.</td>
</tr>
<tr>
<td>b. Support claim(s) or counterarguments with logical reasoning and relevant evidence, using accurate, credible sources and demonstrating an understanding of the topic or text.</td>
<td>b. Support claim(s) with logical reasoning and relevant, accurate data and evidence, that demonstrate an understanding of the topic or text, using credible sources.</td>
</tr>
<tr>
<td>c. Use words, phrases, and clauses to create cohesion and clarify the relationships among claim(s), reasons, and evidence.</td>
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</tr>
<tr>
<td>d. Establish and maintain a formal style.</td>
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</tr>
<tr>
<td>e. Provide a concluding statement or section that follows from and supports the argument presented.</td>
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</table>

2. Write informative/explanatory texts to examine a topic and convey ideas, concepts, and information through the selection, organization, and analysis of relevant content.

| a. Introduce a topic or thesis statement; clearly previewing what is to follow; organize ideas, concepts, and information, using strategies such as definition, classification, comparison/contrast, and cause/effect; include formatting (e.g., headings), graphics (e.g., charts, tables), and multimedia when useful to aiding comprehension. | a. Introduce a topic clearly; previewing what is to follow; organize ideas, concepts, and information into broader categories as appropriate to achieving purpose; include formatting (e.g., headings), graphics (e.g., charts, tables), and multimedia when useful to aiding comprehension. |
| b. Develop the topic with relevant facts, definitions, concrete details, quotations, or other information and examples. | b. Develop the topic with relevant facts, well-chosen facts, concrete details, quotations, or other information and examples. |
| c. Use appropriate transitions to create cohesion and clarify the relationships among ideas and concepts. | c. Use appropriate and varied transitions to create cohesion and clarify the relationships among ideas and concepts. |
| d. Use precise language and domain specific vocabulary to inform about or explain the topic. | d. Use precise language and domain specific vocabulary to inform about or explain the topic. |
| e. Establish and maintain a formal style. | e. Establish and maintain a formal style and objective tone. |
| f. Provide a concluding statement or section that follows from the information or explanation presented. | f. Provide a concluding statement or section that follows from and supports the information or explanation presented. |

3. Write narratives to develop real or imagined experiences or events using effective technique, relevant descriptive details, and well-structured event sequence.

| a. Engage and orient the reader by establishing a context and point of view and introducing a narrator and/or characters; organize an event sequence that unfolds naturally and logically. | 3. (See note; not applicable as a separate requirement) |
| b. Use narrative techniques, such as dialogue, pacing, and description, to develop experiences, events, and/or characters. | Note: Students’ narrative skills continue to grow in these grades. The Standards require that students be able to incorporate narrative elements effectively in arguments and informative/explanatory texts. In science and technical subjects, students must be able to write precise enough descriptions of the step-by-step procedures they use in investigations or technical work so that others can replicate them (and possibly) reach the same results. |
| c. Use a variety of transition words, phrases, and clauses to convey sequence and signal shifts from one time frame or setting to another. | |
| d. Use precise words and phrases, relevant descriptive details, and sensory language to capture the action and convey experiences and events. | |
| e. Provide a conclusion that follows from the narrated experiences or events. | |
ELA Text Type and Purposes: What about elementary school?

- K-5 Literacy in Science Standards are embedded in the K-5 ELA Standards
- CCSS Anchor Standards are the same K-12
- Read the CCSS Anchor Standards for Reading
- How are these learning expectations different at elementary, middle, and high school?
Words can be confusing

ELA Literacy

• Argumentative Writing
• Informative/ Explanatory Text

Science and Engineering Practices

• Engaging in Argument from Evidence
• Constructing Explanations
• Obtaining, Evaluating, and Communicating Information
Text Type 1-Argumentation

CCSS

• Argumentative Writing

• Argumentative Writing

Science and Engineering Practices

• Engaging in Argument from Evidence

• Constructing Explanations
  + Engaging in Argument from Evidence
Communication

CCSS Text Type 1 - Argumentation
- Introduction
- Claim
- Evidence
- Counter Claim
- Conclusion

Science Practice #6 - Constructing Explanations
- Claim
- Evidence
- Reasoning
- Counter Claim
Text Type 2-Explanation

CCSS
• Informative/ Explanatory Text
• Informative/ Explanatory Text
+ Research

Science and Engineering Practices
• Constructing Explanations
• Obtaining, Evaluating and Communicating Information
Communication

CCSS Text type 2-Information/Explanatory

• Scientific procedures/experiments
• Technical processes

CCSS Research
Conduct research projects to answer a question or solve a problem.

Science Practice #8-Obtaining, Evaluating, and Communicating

Produce scientific and technical text, tables, graphs, diagrams, interactive displays, and equations.
Science instruction that includes dialogue, reading, and writing helps students to be better communicators.

A Science Literacy Framework provides teachers with:

- tools for including dialogue in the classroom,
- techniques for designing engaging instruction,
- and methods for students to use in extracting information from text.
Science Literacy Framework

Engaging Science Experience
Interact with data – Hands-on – Phenomena – Inquiry

Purposeful Reading

Productive Dialogue

Meaningful Writing

Sacramento Area Science Project – Science Literacy Framework ©
Why do teachers need a science literacy framework?
In many classrooms, teachers are doing most of the intellectual work while students are passive observers.

Backward Design for Quality Student Work
1. What will students learn? Science and literacy skills.
2. How will students demonstrate their learning?
3. How will I facilitate their learning?
Two Minute Meeting

• Identify a partner, decide who is partner A and who is partner B
• Stand up
• You have 60 seconds to tell your partner about a writing task or technique you use with your students.
• Switch roles, partner B has 60 seconds
• Thank your partner
• Sit down
Anticipatory Set

• DNA and RNA
• Agree or Disagree to the statements on your handout
  • “A” if you Agree
  • “D” if you Disagree
Think Pair Share

• With your previous partner, discuss your responses to the Agree/Disagree statements.
Conducting an Investigation-DNA Combinations

• How many possible combinations were you able to make?

• Is there a mathematical way to calculate the different combinations of colors? How would you do this?

• Analyze the data.

• Write a summary statement of the data.

• What trends do you see?
Assessing Our Current Thinking

• Refer back to your agree/disagree statements.
• Are there any statements that you would like to modify your answer for?
Obtaining Information From Text

Use the Summary Protocol, where—
One person is chosen to keep the group on task.
Read one paragraph silently (leader makes sure all group members know where paragraph starts and ends).
After everyone in the group is finished reading the paragraph, the group discussed the main idea(s).
The group comes to consensus about one (or two) main idea(s).
Each group member writes down the main idea(s).
Repeat steps 2-6 for each paragraph.

Use your small group voice. 😊
Think Pair Share

• If your group finishes before others, take some time to discuss how you might use Summary Protocol in your classrooms.
• Be prepared to share your ideas with the whole group.
Scientific Explanation

• “Compose an email to a classmate who is absent today, explaining the structure of DNA and how DNA bases pair with one another.”

• Use evidence from your lab investigation, reading, and additional research to support your claim.
The Communication Triangle

- **Text/Format**: essay, news article, letter

  **Writer/Perspective**: Who is speaking?

  **Reader/Audience**: Who are you speaking to?
Novice to Expert response

1. Effort and motivation to persist is weak.
2. Careless in reasoning.
4. Focuses on individual details, and not on how details relate to concepts.
5. Formula-memorizing is a main strategy.
6. Often gets behind in learning, and then sequential learning is hampered.
7. Loss of confidence in ability to achieve due to lack of success.
The Communication Triangle

Text/Format: essay, news article, letter

Writer/Perspective: Who is speaking?

Reader/Audience: Who are you speaking to?
Applying the Communication Triangle Examples of Writing Prompts

• You are a geologist studying rocks to determine the direction of flow of an ancient glacier. What clues might help you determine the glacier’s direction of flow? Put your answer in the form of a “Do-It-Yourself” guide to determining glacial flow direction.

• You are an earthquake safety expert and on a radio program. A caller asks the question, “if you are in a car out in the open during an earthquake would you be safest staying in the car?” Write what you would say to the caller.
Generating Writing Prompts

Characteristics of a successful writing prompt require:
• students to reveal their thinking
• take a stance
• make use of evidence or generate a complex explanation/detailed description.

Communication elements
• **Writer**-role of the student writer
• **Form**-form of writing
• **Audience**-who the writer is writing to
<table>
<thead>
<tr>
<th>Common Core</th>
<th>AR Science Framework &amp; NGSS</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Speaking and Listening:</strong></td>
<td><strong>Arkansas Science Curriculum Frameworks</strong></td>
</tr>
<tr>
<td>• Engage effectively in a range of collaborative discussions (one-on-one, in groups, and teacher-led) with diverse partners on topics and texts, building on others’ ideas and expressing their own clearly.</td>
<td>• Collect and interpret measurable empirical evidence in teams and as individuals</td>
</tr>
<tr>
<td><strong>Reading:</strong></td>
<td>• Formulate inferences based on scientific data</td>
</tr>
<tr>
<td>• Determine the central ideas or conclusions of text; summarize complex concepts, processes, or information from text by paraphrasing in simpler but still accurate terms.</td>
<td>• Communicate results and conclusions from scientific inquiry following peer review</td>
</tr>
<tr>
<td>• Quote accurately from a text when explaining what the text says.</td>
<td>• Describe the Watson and Crick double helix model of DNA using the base pairing rule</td>
</tr>
<tr>
<td><strong>Writing:</strong></td>
<td><strong>NGSS</strong></td>
</tr>
<tr>
<td>• Write opinion pieces on topics or texts, supporting a point of view with reasons.</td>
<td>• Ask questions about data</td>
</tr>
<tr>
<td>• Write arguments to support claims using valid reasoning and relevant and sufficient evidence.</td>
<td>• Analyze and Interpret data</td>
</tr>
<tr>
<td></td>
<td>• Construct an argument using evidence</td>
</tr>
<tr>
<td>Reasoning</td>
<td>Readability</td>
</tr>
<tr>
<td>--------------------------------------------------------------------------</td>
<td>---------------------------------------------------------</td>
</tr>
<tr>
<td>Clearly states a position</td>
<td>Proper grammar</td>
</tr>
<tr>
<td>Scientific approach with logical inferences and conclusions</td>
<td>Correct spelling and word usage</td>
</tr>
<tr>
<td>Argument based on evidence from multiple sources</td>
<td>Legibility</td>
</tr>
<tr>
<td>Demonstrates understanding</td>
<td>Flow: information is presented coherently and has</td>
</tr>
<tr>
<td>Applies scientific practices and principles</td>
<td>smooth transitions</td>
</tr>
<tr>
<td>Scientifically accurate</td>
<td>Engages the reader</td>
</tr>
</tbody>
</table>

**Rubric For Student Work**
Choose the content standards

1. Choose a grade band (6-8, 9-10, 11-12).
2. Select a science strand and a few content standards.
3. Create a list of the verbs found in the standards.
4. Discuss the skills (practices) a student must have to meet the expectations in these standards.
5. Create a guiding question students will answer.
Choose the literacy standards

Using the Reading and Writing Standards for Literacy in History/Social Studies, Science, and Technical Subjects (WHST), work with a partner to

1. Choose a grade band (6-8, 9-10, 11-12).
2. Select a conceptual organizer for reading and writing standards.
3. Create a list of the verbs found in the standards.
4. Discuss the skills a student must have to meet the expectations in these standards.
5. Share.
Plan a lesson using the literacy framework planning tools

- Based on the standards, create a science lesson that engages students in the science and engineering practices.
- Complete the planning pages to include reading, dialogue, and writing.
- Choose your text (NEWSELA.com), guiding question, dialogue strategies, and elements of communication.
Danielson’s Framework for Teaching

- Planning & Preparation
- Classroom Environment
- Professional Responsibilities
- Instruction
Artifacts for TESS

- Literacy Framework documents
- Rubrics
- Lesson plans
- Practice guides
- Formative assessments
Research and Resources

• Arkansas Department of Education. http://www.arkansased.org/
• Beauchamp, Arthur, Judi Kusmick, and Rick Mc Callum 2011. *Success in Science through Dialogue, Reading, and Writing. The Regent of the University of California, Davis Campus.*
• Common Core State Standards. http://www.corestandards.org/
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