**Arkansas Computer Science and Computing Standards for**

**Grades K-8**

5-8 Standards Document

2020

**Arkansas Computer Science and Computing Standards for Grades K-8**

**Introduction**

The Arkansas Computer Science and Computing Standards for Grades K-8 provide an introduction to computing concepts which are to be embedded across content areas and are intended to support existing classroom learning activities. The standards support critical thinking through the essential skills of computational thinking and algorithmic problem solving. The course strands, content clusters, and content standards are to be taught in an integrated manner, not in isolation. Integration of basic computer science skills and knowledge through practical classroom experiences promote connections to all subject areas and to the real world. When appropriate, educators should determine and implement the most beneficial student collaboration strategies (e.g., pairs, small group, whole group) for optimal learning. Formal assessment of these standards is not required.

Implementation of the Arkansas Computer Science and Computing Standards for Grades K-8 begins during the 2021-2022 school year.

**Computer Science and Computing Practices**

**Students exhibit proficiency in computer science and computing through:**

**Communication -** Students effectively communicate, using accurate and appropriate terminology, when explaining the task completion or problem solving strategies used. They recognize that creating good documentation is an ongoing and important part of the communication process.

**Collaboration -** Students productively work with others while ensuring multiple voices are heard and considered. They understand that diverse thoughts may lead to creative solutions and that some problems may be best solved collaboratively.

**Storytelling -** Students creatively combine multimedia tools, such as graphics, animations, and videos with research, writing, and oral presentations to create ethical, data-driven stories.

**Professionalism -** Students embrace professionalism by demonstrating skills and behaviors necessary for success in technical careers.

**Ethics and Impact -** Students comprehend the ramifications of actions prior to taking them. They are aware of their own digital and cyber presence and its impact on other individuals and society.

**Inclusion -** Students encourage diversity in the field of computer science and computing regardless of race, ethnicity, gender, or other differences.

**Learning by Failure -** Students reflect upon and critique their work while embracing a willingness to seek feedback and constructive instruction from teachers and peers. They utilize the feedback to continually improve current projects, educational experiences, knowledge, and confidence.

**Perseverance -** Students expect difficulties and persist in overcoming challenges that occur when completing tasks. They recognize making and correcting mistakes is necessary for the learning process while problem solving.

**Understanding -** Students recognize patterns, utilize tools, and apply problem solving strategies to build understanding, find solutions, and successfully deliver high-quality work.

**Patterns -** Students understand and utilize the logical structure of information through identifying patterns and creating conceptual models. They decompose complex problems into simpler modules and patterns.

**Problem Solving -** Students exhibit proficiency through the process of identifying and systematically solving problems. They recognize problem solving is an ongoing process.

**Research -** Students purposefully gather information and seek to expand their knowledge through various methods and mediums. They embrace the practice of gaining knowledge to develop novel approaches for solving problems and addressing issues they have not previously encountered, in addition to merely searching for answers.

**Tools -** Students evaluate and select tools to be used when completing tasks and solving problems. They understand that appropriate tools may include, but are not limited to, their mind, pencil and paper, manipulatives, software applications, programming languages, or appropriate computing devices.

**Arkansas Computer Science and Computing Standards for Grades K-8**

Strand Content Cluster

|  |  |
| --- | --- |
| Computational Thinking and Problem Solving | |
|  | 1. Students will analyze and utilize problem-solving strategies. |
|  | 2. Students will analyze and utilize connections between concepts of mathematics and computer science. |
| Data, Information, and Security | |
|  | 3. Students will analyze and utilize data through the use of computing devices. |
|  | 4. Students will analyze and utilize concepts of cybersecurity. |
| Algorithms and Programs | |
|  | 5. Students will create, evaluate, and modify algorithms. |
|  | 6. Students will create programs to solve problems. |
| Computers and Communications | |
|  | 7. Students will analyze the utilization of computers within industry. |
|  | 8. Students will analyze communication methods and systems used to transmit information among computing devices. |
|  | 9. Students will utilize appropriate hardware and software. |
| Professionalism and Impacts of Computing | |
|  | 10. Students will analyze the impacts of technology and professionalism within the computing community. |
|  | 11. Students will demonstrate understanding of storytelling with data and appropriately communicate about technical information. |

**Understanding the Arkansas Computer Science and Computing Standards Documents:**

* This Arkansas Department of Education curriculum standards document is intended to assist in district curriculum development, unit design, and to provide a uniform, comprehensive guide for instruction.
* The goal for each student is proficiency in all academic standards for the course/year in which the student is enrolled.
* The Practice Standards are intended to be habits of mind for all students and were written broadly in order to apply to all grades/levels. The Practice Standards are not content standards and are not intended to be formally assessed.
* Notes (NOTE:) and examples given (e.g.,) found within the document are not mandated by the Arkansas State Board of Education, but are provided for clarification of the standards by the Arkansas Department of Education and/or the standards drafting committee. The notes and examples given are subject to change as understandings of the standards evolve.
* Within the high school documents, the numbering for standards is read as: Course Abbreviation - Year - Content Cluster - Standard. Example: “CSPG.Y1.2.3” would be Computer Science Programming - Year 1 - Content Cluster 2 - Standard 3.
* Within the Coding Block document, the numbering for standards is read as: Course Abbreviation - Content Cluster - Standard. Example: “CSCB.1.2” would be Coding Block, Content Cluster 1, Standard 2.
* Within the K-8 Computer Science Standards documents, the numbering for standards is read as: Course Abbreviation - Grade - Content Cluster - Standard. Example: “CSK8.G1.2.3” would be K-8, Grade 1, Content Cluster 2, Standard 3.
* Ancillary documents and supporting information may be released to assist in further understanding of the standards with possible classroom implementation strategies included.

**“Research” and Learning**

The Arkansas Department of Education Office of Computer Science recognizes that the use of the term “research” as an action verb within academic standards is not mainstream, though not unheard of, and exists as a measurable objective within other Arkansas K-12 academic standards. The members of the internal team, composed of the State Director of Computer Science and nine state-wide Computer Science Specialists, discussed this at length amongst ourselves and with many committee members. While there existed varying opinions for various reasons, the internal team opted to keep “research” as an action verb within the standards for the following reasons:

1. The internal team believes that this use of “research” and the skill-building activities students will undertake while performing said research will produce students that have a skillset which industry representatives have identified as missing from workers entering technical job fields.
2. As the field of Computer Science and Computing is ever changing and growing, professionals and students within this field must conduct informal research on an almost daily basis to maintain relevant knowledge and skills.
3. The use of “research” within this document does not determine classroom implementation; however, it is used to indicate that the student should take individual and active efforts to seek out knowledge to develop novel approaches for solving problems and addressing issues they have not previously encountered, in addition to merely searching for answers.
4. The use of “research” should not infer that a student should be required to do an extensive qualitative or quantitative research project from the use of “research” anywhere in this document; however, a more formal research project is not prohibited if the teacher feels it is appropriate.

**Strand:** Computational Thinking and Problem Solving

**Content Cluster 1:** Students will analyze and utilize problem-solving strategies.

|  |  |  |  |
| --- | --- | --- | --- |
| **Grade 5** | **Grade 6** | **Grade 7** | **Grade 8** |
| CSK8.G5.1.1  Identify and utilize level-appropriate, algorithmic problem-solving strategies | CSK8.G6.1.1  Identify and utilize level-appropriate, algorithmic problem-solving strategies | CSK8.G7.1.1  Identify and utilize level-appropriate, algorithmic problem-solving strategies | CSK8.G8.1.1  Identify and utilize level-appropriate, algorithmic problem-solving strategies |
| NOTE:  Problem solving steps may include, but are not limited to, identifying, stating, and exploring a problem; decomposing a problem into subproblems; examination of sample instances; and solution design, implementation, and testing. | | | |
| CSK8.G5.1.2  Examine visual representations of problem-solving logic (e.g., flowcharts) to solve problems of level-appropriate complexity | CSK8.G6.1.2  Utilize visual representations of problem-solving logic (e.g., flowcharts) to solve problems of level-appropriate complexity | CSK8.G7.1.2  Utilize visual representations of problem-solving logic (e.g., flowcharts) to solve problems of level-appropriate complexity | CSK8.G8.1.2  Utilize visual representations of problem-solving logic (e.g., flowcharts) to solve problems of level-appropriate complexity |
| CSK8.G5.1.3  Evaluate effective ways that collaboration can support problem solving and innovation | CSK8.G6.1.3  Analyze appropriate collaborative behaviors (e.g., accepting multiple perspectives, integrating feedback, providing useful feedback, understanding and using socialization) to solve problems | CSK8.G7.1.3  Demonstrate appropriate collaborative behaviors (e.g., accepting multiple perspectives, integrating feedback, providing useful feedback, understanding and using socialization) to solve problems | CSK8.G8.1.3  Demonstrate appropriate collaborative behaviors (e.g., accepting multiple perspectives, integrating feedback, providing useful feedback, understanding and using socialization) to solve problems |
| NOTE:  Utilization of a computer-based program is not a requirement for this standard. | | | |
| CSK8.G5.1.4  Apply strategies for solving simple hardware and software problems that may occur during use | CSK8.G6.1.4  Apply strategies for solving simple hardware and software problems that may occur during use | CSK8.G7.1.4  Apply strategies for identifying and solving routine hardware and software problems that occur during everyday computer use | CSK8.G8.1.4  Apply strategies for identifying and solving routine hardware and software problems that occur in everyday computer use |
| NOTE:  Strategies for solving simple hardware/software problems may include, but are not limited to, checking cable connections, refreshing a webpage, and restarting a device. | | | |

**Strand:** Computational Thinking and Problem Solving

**Content Cluster 2:** Students will analyze and utilize connections between elements of mathematics and computer science.

|  |  |  |  |
| --- | --- | --- | --- |
| **Grade 5** | **Grade 6** | **Grade 7** | **Grade 8** |
| CSK8.G5.2.1  Begins in Grade 6 | CSK8.G6.2.1  Describe subsets of a sample set identifying unions, intersections, and complements (e.g., describing information sorted with a Venn diagram) | CSK8.G7.2.1  Create compound statements that represent unions, intersections, and complements using OR, AND, and NOT (e.g., writing statements from information sorted with a Venn diagram) | CSK8.G8.2.1  Create subsets of a sample set by using logic (e.g., OR, AND, NOT, XOR) |
| CSK8.G5.2.2  Begins in Grade 6 | CSK8.G6.2.2  Explore how variables are used to represent data | CSK8.G7.2.2  Utilize variables to construct expressions and equations | CSK8.G8.2.2  Utilize variables in the creation of functions, methods, or similar constructs |
| CSK8.G5.2.3  Compare and contrast the relative positions of objects using ordered pairs within a program (e.g., battleships, block-based programming, treasure maps) | CSK8.G6.2.3  Compare and contrast the relative positions of objects using ordered pairs within a program (e.g., battleships, block-based programming, treasure maps) | CSK8.G7.2.3  Compare and contrast the relative positions of objects using ordered pairs within a program (e.g., battleships, block-based programming, treasure maps) | CSK8.G8.2.3  Compare and contrast the relative positions of objects using ordered pairs within a program (e.g., battleships, text-based programming, treasure maps) |
| NOTE:  Programming language editors may include, but are not limited to, Code.org, Pencil Code, and Scratch. | | | |
| CSK8.G5.2.4  Begins in Grade 6 | CSK8.G6.2.4  Discuss binary numbers, logic, sets, and functions and their application to computer science | CSK8.G7.2.4  Examine binary numbers, logic, sets, and functions and their application to computer science | CSK8.G8.2.4  Evaluate the relationship between binary and hexadecimal representations |

**Strand:** Data, Information, and Security

**Content Cluster 3:** Students will analyze and utilize data through the use of computing devices.

|  |  |  |  |
| --- | --- | --- | --- |
| **Grade 5** | **Grade 6** | **Grade 7** | **Grade 8** |
| CSK8.G5.3.1  Illustrate how different kinds of data can be represented | CSK8.G6.3.1  Represent a variety of data in multiple formats | CSK8.G7.3.1  Evaluate the effectiveness of visual representations of data | CSK8.G8.3.1  Create and analyze data representations of various artifacts |
| NOTE:  Data representations may include, but are not limited to, numbers, pictures, sounds, and text. | | | |
| CSK8.G5.3.2  Recognize that binary can represent data using only two options (e.g., on/off) | CSK8.G6.3.2  Discuss how and why binary can represent data in a computer | CSK8.G7.3.2  Discuss how American Standard Code for Information Interchange (ASCII) codes represent data in a computer | CSK8.G8.3.2  Discuss how and why hexadecimal codes are used to represent data in a computer |
| CSK8.G5.3.3  Explore various models and simulations (e.g., ecosystems, epidemics) to support research and data analysis | CSK8.G6.3.3  Compare problems that can be solved using models and simulations that utilize data analysis | CSK8.G7.3.3  Evaluate the effectiveness of models and simulations for problem solving and analyze data | CSK8.G8.3.3  Analyze the degree to which a computer model accurately represents an actual situation |
| CSK8.G5.3.4  Identify the characteristics (e.g., collection environment, input method, units of measure) of the collected data | CSK8.G6.3.4  Describe the characteristics (e.g., collection environment, input method, units of measure) of the collected data | CSK8.G7.3.4  Analyze the quality of collected data based on its characteristics (e.g., temperatures gathered at different scale) to determine the value provided to the user | CSK8.G8.3.4  Collect data to be used for quality analysis |
| CSK8.G5.3.5  Evaluate, select, and use level-appropriate tools to collect data | CSK8.G6.3.5  Collect and analyze data using a variety of level-appropriate tools (e.g., analog, digital) | CSK8.G7.3.5  Collect and analyze data from multiple sources using a variety of level-appropriate tools (e.g., analog, digital) | CSK8.G8.3.5  Collect, analyze, and present data from multiple sources using a variety of level-appropriate tools (e.g., analog, digital) |
| NOTE:  Data collection tools may include, but are not limited to, computer-generated graphs, paper, pencil, and sticky notes. | | | |
| CSK8.G5.3.6  Evaluate the most effective ways to arrange, collect, and visually represent data | CSK8.G6.3.6  Evaluate the most effective ways to arrange, collect, and visually represent data | CSK8.G7.3.6  Evaluate the most effective ways to arrange, collect, and visually represent data | CSK8.G8.3.6  Evaluate the most effective ways to arrange, collect, and visually represent data |

**Strand:** Data, Information, and Security

**Content Cluster 4:** Students will analyze and utilize concepts of cybersecurity.

|  |  |  |  |
| --- | --- | --- | --- |
| **Grade 5** | **Grade 6** | **Grade 7** | **Grade 8** |
| CSK8.G5.4.1  Identify real-world cybersecurity problems (e.g., malicious hacking) and apply strategies for protecting and securing personal digital information | CSK8.G6.4.1  Identify real-world cybersecurity problems (e.g., malicious hacking) as they relate to personal cybersecurity, and how to apply strategies for protecting and securing personal digital information | CSK8.G7.4.1  Research and describe real-world cybersecurity problems (e.g., identity theft) as they relate to personal cybersecurity and how to apply digital and physical methods for protecting and securing personal information | CSK8.G8.4.1  Research and describe real-world cybersecurity problems (e.g., identity theft) as they relate to personal cybersecurity and how to apply digital and physical methods for protecting and securing personal information |
| NOTE:  Methods used to maintain digital privacy and security may include, but are not limited to, awareness of data collection through website tracking, consequences of identity theft, and personal cybersecurity threats.  Strategies for securing personal information may include, but not are not limited to, reducing information shared on social media, resetting passwords, restricting access to online profiles, and setting permissions. | | | |
| CSK8.G5.4.2  Discuss issues related to the use of technology, acceptable use policies, and codes of conduct and the consequences of inappropriate use | CSK8.G6.4.2  Discuss the difference between appropriate, legal, and ethical uses of technology, acceptable use policies, and codes of conduct and the consequences of inappropriate use | CSK8.G7.4.2  Demonstrate an understanding between appropriate, legal, and ethical uses of technology, acceptable use policies, and codes of conduct and the consequences of inappropriate use | CSK8.G8.4.2  Analyze the difference between appropriate, legal, and ethical uses of technology, acceptable use policies, and codes of conduct and the consequences of inappropriate use |
| NOTE:  Issues may include, but are not limited to, cyber bullying, cyber presence, netiquette, online safety, protecting personal information, and the purpose of acceptable use policies and codes of conduct. | | | |
| CSK8.G5.4.3  Identify individual digital footprint (e.g., game profiles, other online accounts, and shares on social media) and the responsibilities and opportunities of living, learning, and working in a digitally connected world | CSK8.G6.4.3  Apply strategies to protect personal digital footprints (e.g., game profiles, other online accounts, and shares on social media) and the responsibilities and opportunities of living, learning, and working in a digitally connected world | CSK8.G7.4.3  Apply strategies to protect personal digital footprints (e.g., game profiles, other online accounts, and shares on social media) and the responsibilities and opportunities of living, learning, and working in a digitally connected world | CSK8.G8.4.3  Apply strategies to protect personal digital footprints (e.g., game profiles, other online accounts, and shares on social media) and the responsibilities and opportunities of living, learning, and working in a digitally connected world |

**Strand:** Algorithms and Programs

**Content Cluster 5:** Students will create, evaluate, and modify algorithms.

|  |  |  |  |
| --- | --- | --- | --- |
| **Grade 5** | **Grade 6** | **Grade 7** | **Grade 8** |
| CSK8.G5.5.1  Create algorithms to solve problems and evaluate effectiveness | CSK8.G6.5.1  Create algorithms to solve problems and evaluate effectiveness | CSK8.G7.5.1  Create algorithms using constraints to solve problems and evaluate effectiveness | CSK8.G8.5.1  Create algorithms using constraints to solve problems and evaluate effectiveness |
| CSK8.G5.5.2  Design and test algorithms collaboratively using technology | CSK8.G6.5.2  Design and test algorithms collaboratively using technology | CSK8.G7.5.2  Design and test algorithms using technology | CSK8.G8.5.2  Design and test algorithms using technology |
| CSK8.G5.5.3  Compare and refine algorithms | CSK8.G6.5.3  Compare and refine algorithms | CSK8.G7.5.3  Compare and refine algorithms | CSK8.G8.5.3  Compare and refine algorithms |
| CSK8.G5.5.4  Identify and correct multiple errors within a level-appropriate algorithm | CSK8.G6.5.4  Identify and correct errors within multiple level-appropriate algorithms | CSK8.G7.5.4  Identify and correct multiple errors within a level-appropriate program | CSK8.G8.5.4  Identify and correct multiple errors within a level-appropriate program |
| NOTE:  “Algorithm” in this standard refers to a sequence of steps followed when completing a particular task. | | | |

**Strand:** Algorithms and Programs

**Content Cluster 6:** Students will create programs to solve problems.

|  |  |  |  |
| --- | --- | --- | --- |
| **Grade 5** | **Grade 6** | **Grade 7** | **Grade 8** |
| CSK8.G5.6.1  Use a visual block-based or text-based programming language individually and collaboratively to solve level-appropriate problems | CSK8.G6.6.1  Use a visual block-based or text-based programming language individually and collaboratively to solve level-appropriate problems | CSK8.G7.6.1  Use a visual block-based or text-based programming language individually and collaboratively to solve level-appropriate problems | CSK8.G8.6.1  Create a level-appropriate program individually and collaboratively using a text-based programming language |
| NOTE:  Block-based programming editors may include, but are not limited to, Blockly, Code.org, and Scratch Jr.  Text-based programming editors may include, but are not limited to, App Lab, MakeCode, and Pencil Code. | | | |
| CSK8.G5.6.2  Discuss and apply best practices of documentation (e.g., comments, descriptive variable names, program headers) | CSK8.G6.6.2  Discuss and apply best practices of documentation (e.g., comments, descriptive variable names, program headers) | CSK8.G7.6.2  Utilize best practices of documentation (e.g., comments, descriptive variable names, program headers) | CSK8.G8.6.2  Utilize best practices of documentation (e.g., comments, descriptive variable names, program headers) |
| CSK8.G5.6.3  Improve or remix existing block-based and/or text-based programs | CSK8.G6.6.3  Improve or remix existing block-based and/or text-based programs | CSK8.G7.6.3  Improve or remix existing block-based and/or text-based programs | CSK8.G8.6.3  Improve or remix existing text-based programs |

**Strand:** Computers and Communications

**Content Cluster 7:** Students will analyze the utilization of computers within industry.

|  |  |  |  |
| --- | --- | --- | --- |
| **Grade 5** | **Grade 6** | **Grade 7** | **Grade 8** |
| CSK8.G5.7.1  Discuss ways that humans create input for a desired output through a device (e.g., changing device settings, texting) | CSK8.G6.7.1  Identify what distinguishes humans from machines, including focusing on human intelligence versus machine intelligence (e.g., computer vision, language understanding, robot motion, speech) | CSK8.G7.7.1  Describe ways in which computers use models of intelligent behavior (e.g., computer vision, language understanding, robot motion, speech) | CSK8.G8.7.1  Compare and contrast human intelligence and computer intelligence (e.g., common sense, emotional decisions, literal versus abstract) |
| CSK8.G5.7.2  Recognize the expense of computer equipment and how care and protection of the computers can prolong use and save the cost of purchasing new equipment | CSK8.G6.7.2  Recognize the expense of computer equipment and how care and protection of the computers can prolong use and save the cost of purchasing new equipment | CSK8.G7.7.2  Recognize the expense of computer equipment and how care and protection of the computers can prolong use and save the cost of purchasing new equipment | CSK8.G8.7.2  Recognize the expense of computer equipment and how care and protection of the computers can prolong use and save the cost of purchasing new equipment |
| NOTE:  Proper care may include, but is not limited to, using clean hands and keeping food, drink, and magnets away from computers. | | | |

**Strand:** Computers and Communications

**Content Cluster 8**: Students will analyze communication methods and systems used to transmit information among computing devices.

|  |  |  |  |
| --- | --- | --- | --- |
| **Grade 5** | **Grade 6** | **Grade 7** | **Grade 8** |
| CSK8.G5.8.1  Describe how information can be transmitted using computing devices via a network | CSK8.G6.8.1  Describe how information can be transmitted using computing devices via a network | CSK8.G7.8.1  Identify major components and functions of computer systems and networks | CSK8.G8.8.1  Describe major components and functions of computer systems and networks |
| NOTE:  Networked computing devices may include, but are not limited to, cellular devices, Wi-Fi devices, and wired devices.  Major networking components may include, but are not limited to, modems, network cards, routers, switches, and wireless access points. | | | |
| CSK8.G5.8.2  Demonstrate touch typing techniques while increasing speed and maintaining accuracy | CSK8.G6.8.2  Demonstrate touch typing techniques while increasing speed and maintaining accuracy | CSK8.G7.8.2  Demonstrate touch typing techniques while increasing speed and maintaining accuracy | CSK8.G8.8.2  Demonstrate touch typing techniques while increasing speed and maintaining accuracy |
| CSK8.G5.8.3  Practice proper keyboarding technique:   * body centered in front of keyboard * elbows down * eyes focused on the screen * proper posture | CSK8.G6.8.3  Practice proper keyboarding technique   * body centered in front of keyboard * elbows down * eyes focused on the screen * proper posture | CSK8.G7.8.3  Practice proper keyboarding technique   * body centered in front of keyboard * elbows down * eyes focused on the screen * proper posture | CSK8.G8.8.3  Practice proper keyboarding technique   * body centered in front of keyboard * elbows down * eyes focused on the screen * proper posture |

**Strand:** Computers and Communications

**Content Cluster 9:** Students will utilize appropriate hardware and software.

|  |  |  |  |
| --- | --- | --- | --- |
| **Grade 5** | **Grade 6** | **Grade 7** | **Grade 8** |
| CSK8.G5.9.1  Begins in Grade 7 | CSK8.G6.9.1  Begins in Grade 7 | CSK8.G7.9.1  Compare and contrast examples of high-level and low-level programming languages | CSK8.G8.9.1  Research the hierarchy in computing including high-level languages, instruction sets, logic circuits, and translations |
| NOTE:  Low-level languages (e.g., assembly, machine code) are understood by a computing device with little or no translation, while high-level languages (e.g., C++, Java, Javascript, Python) are easier for humans to read and must be converted into machine code before execution. | | | |
| CSK8.G5.9.2  Demonstrate level-appropriate proficiency with keyboards and other input/output devices | CSK8.G6.9.2  Demonstrate level-appropriate proficiency with keyboards and other input/output devices. | CSK8.G7.9.2  Demonstrate level-appropriate proficiency with keyboards and other input/output devices. | CSK8.G8.9.2  Demonstrate level-appropriate proficiency with keyboards and other input/output devices. |
| NOTE:  Input/output devices may include, but are not limited to, interactive boards, mice, microphones, monitors, speakers, touchscreens, and touchpads. | | | |
| CSK8.G5.9.3  Use and evaluate productivity technology tools for effectiveness in writing, communication, and publishing activities | CSK8.G6.9.3  Apply productivity/multimedia tools to support communication throughout the curriculum | CSK8.G7.9.3  Apply productivity/multimedia tools to support communication throughout the curriculum | CSK8.G8.9.3  Design, develop, and publish/present products (e.g., podcasts, videos, websites) using technology resources that demonstrate and communicate curriculum concepts |
| NOTE:  Productivity technology tools include, but are not limited to, email systems, file sharing services, presentation software, short message service, spreadsheet applications, video conferencing systems, and word processing software. | | | |

**Strand:** Professionalism and Impacts of Computing

**Content Cluster 10:** Students will analyze the impacts of technology and professionalism within the computing community.

|  |  |  |  |
| --- | --- | --- | --- |
| **Grade 5** | **Grade 6** | **Grade 7** | **Grade 8** |
| CSK8.G5.10.1  Identify the dangers of social media and other online engagement platforms, and strategies to address these dangers | CSK8.G6.10.1  Identify the dangers of social media and other online engagement platforms, and strategies to address these dangers | CSK8.G7.10.1  Identify the dangers of social media and other online engagement platforms, and strategies to address these dangers | CSK8.G8.10.1  Identify the dangers of social media and other online engagement platforms, and strategies to address these dangers |
| NOTE:  Dangers of social media include, but are not limited to, cyberbullying, echo chambers, impersonation, mood manipulation, population manipulation, and social media induced depression. | | | |
| CSK8.G5.10.2  Discuss the impact of access to computing resources | CSK8.G6.10.2  Demonstrate an understanding of the impact of access to computing resources | CSK8.G7.10.2  Demonstrate an understanding of the impact of access to computing resources on a global economy | CSK8.G8.10.2  Analyze the impact of the availability to computing resources on accessing critical information |
| CSK8.G5.10.3  Classify different types of relationships (e.g., parents, trusted adults, friends, strangers, anonymous users) and how they affect what information should be shared | CSK8.G6.10.3  Identify the potential outcomes of oversharing information with otherwise trusted parties and how to minimize the effects | CSK8.G7.10.3  Research and discuss potential outcomes of oversharing information with otherwise trusted parties and how to minimize the effects | CSK8.G8.10.3  Research and discuss potential outcomes of oversharing information with otherwise trusted parties and how to minimize the effects |
| CSK8.G5.10.4  Research the history of computers and technology | CSK8.G6.10.4  Research the history of computers and technology | CSK8.G7.10.4  Research the history of computers and technology | CSK8.G8.10.4  Research the history of computers and technology |
| CSK8.G5.10.5  Examine the range and types of careers that require computing and technology | CSK8.G6.10.5  Investigate a career that requires computing and technology | CSK8.G7.10.5  Describe how computer science enhances other career fields | CSK8.G8.10.5  Predict the role of computer science in future careers |
| CSK8.G5.10.6  Explain positive and negative impacts of technology on the daily life of individuals and society | CSK8.G6.10.6  Demonstrate an understanding of positive and negative impacts of technology on the daily life of individuals and society | CSK8.G7.10.6  Analyze changes in technology through time and the effects those changes have on the daily life of individuals and society | CSK8.G8.10.6  Analyze positive and negative impacts of technology on aspects of the world (e.g., culture, economy, education, environment, workforce) |
| NOTE:  Technology may include, but is not limited to, digital security, mobile computing and communication, virtualization, and web technologies. | | | |
| CSK8.G5.10.7  Demonstrate an understanding of ethical issues in copyright laws, fair use exemptions, and intellectual property rights in various media | CSK8.G6.10.7  Demonstrate ethical uses of copyright laws, fair use exemptions, and intellectual property in various media | CSK8.G7.10.7  Demonstrate ethical uses of copyright laws, fair use exemptions, and intellectual property in various media | CSK8.G8.10.7  Analyze ethical issues that relate to copyright laws, fair use exemptions, and intellectual property in various media |

**Strand:** Professionalism and Impacts of Computing

**Content Cluster 11:** Students will demonstrate understanding of storytelling with data and appropriately communicate about technical information.

|  |  |  |  |
| --- | --- | --- | --- |
| **Grade 5** | **Grade 6** | **Grade 7** | **Grade 8** |
| CSK8.G5.11.1  Communicate (e.g., present, report, verbalize) technical information using correct terminology | CSK8.G6.11.1  Communicate (e.g., present, report, verbalize) technical information using correct terminology | CSK8.G7.11.1  Communicate (e.g., present, report, verbalize) technical information using correct terminology | CSK8.G8.11.1  Communicate (e.g., present, report, verbalize) technical information using correct terminology |
| NOTE:  Technical information may include, but is not limited to, collecting or collected data, computing hardware, cyber hygiene, networking concepts, programming paradigms, and troubleshooting concepts. | | | |
| CSK8.G5.11.2  Utilize storytelling to explain program design and collected data | CSK8.G6.11.2  Utilize storytelling to explain program design and collected data | CSK8.G7.11.2  Utilize storytelling to explain program design and collected data | CSK8.G8.11.2  Utilize storytelling to explain program design and collected data |
| NOTE:  Storytelling concepts may include, but are not limited to, identifying the knowledge level of the intended audience; developing a compelling narrative; creating appealing visualizations appropriate for the intended audience and that enhance the narrative; remaining objective and avoiding biases; and avoiding the censoring of data. | | | |
| CSK8.G5.11.3  Compare the accuracy, bias, credibility, and relevance of electronic information sources | CSK8.G6.11.3  Demonstrate an understanding of the accuracy, age appropriateness, bias, comprehensiveness, credibility, and relevance of electronic information sources | CSK8.G7.11.3  Evaluate and discuss the accuracy, age appropriateness, bias, comprehensiveness, credibility, and relevance of electronic information sources concerning real-world problems | CSK8.G8.11.3  Apply strategies for determining the reliability of information found on the internet |
| CSK8.G5.11.4  Identify the concepts of causation  and correlation | CSK8.G6.11.4  Utilize data analysis to distinguish between causation and correlation | CSK8.G7.11.4  Utilize data analysis to distinguish between causation and correlation | CSK8.G8.11.4  Utilize data analysis to distinguish between causation and correlation |
| CSK8.G5.11.5  Create descriptions of, make connections between, and draw conclusions from collected data | CSK8.G6.11.5  Create descriptions of, make connections between, and draw conclusions from collected data | CSK8.G7.11.5  Create descriptions of, make connections between, and draw conclusions from collected data | CSK8.G8.11.5  Create descriptions of, make connections between, and draw conclusions from collected data |

**Contributors**

The following people contributed to the development of this document:

|  |  |
| --- | --- |
| **Dr. Stephen Addison** - Professor and CNSM Dean; University of Central Arkansas | **Mark McDougal** - K-12 Account Executive for Arkansas and Oklahoma; Apple Education |
| **Scott Anderson** - Executive Director; Forge Institute - Arkansas Cyber Alliance | **Mickey McFetridge** - Director of Federal Programs and Professional Learning; Fayetteville School District |
| **Josh Baugh** - Senior InfoSec Analyst; Entergy | **Dr. Josh McGee** - Chief Data Officer and Associate Director of Office for Education Policy; State of Arkansas and University of Arkansas |
| **Garin Bean** - Teacher; Cedarville Public Schools | **Ben Mcilmoyle** - Developer Advocate; Unity Technologies |
| **Kimberly Bertschy** - Program Coordinator, Networking and Cybersecurity; Northwest Arkansas Community College | **Deborah McMillan** - EAST Facilitator; Arkadelphia School District |
| **John Black** - Computer Specialist/Cyber Range Manager; University of Central Arkansas | **Eli McRae** - Statewide Computer Science Specialist; Arkansas Department of Education Office of Computer Science |
| **Sarah Burnett** - STEM Project Coordinator; Arkansas Tech University | **Alex Moeller** - Statewide Computer Science Specialist; Arkansas Department of Education Office of Computer Science |
| **Julia Cottrell** - K-8 STEM Coordinator; Van Buren School District | **Daniel Moix** - Director, STEM Pathways; Arkansas School for Mathematics, Sciences, and the Arts |
| **Dr. Miles Dyson** - Director of Special Projects; Cyberdyne Systems | **Adam Musto** - STEM Program Coordinator; Arkansas Division of Career and Technical Education |
| **Jake Farmer** - Teacher; Arkansas Arts Academy | **Allison Nicholas** - Director of Recruiting; Metova Inc. |
| **Carl Frank** - Teacher; Arkansas School for Mathematics, Sciences, and the Arts | **Anthony Owen** - State Director of Computer Science; Arkansas Department of Education Office of Computer Science |
| **Jim Furniss** - Statewide Computer Science Specialist; Arkansas Department of Education Office of Computer Science | **Dr. Elizabeth Parker** - Director of Financial and Statistical Analysis; Dillards |
| **Tammy Glass** - Statewide Computer Science Specialist; Arkansas Department of Education Office of Computer Science | **Kimberly Raup** - Teacher; Conway Public Schools |
| **Tommy Gober** - Curriculum Development Specialist; CYBER.ORG | **Ryan Raup** - Teacher; Conway Public Schools |
| **Keith Godlewski** - Teacher; Rogers Public Schools | **Stacy Reynolds** - Teacher; McGehee School District |
| **Sean Gray** - Teacher; Marion School District | **Mike Rogers** - Senior Director Maintenance and Refrigeration; Tyson Foods |
| **Kelly Griffin** - Statewide Computer Science Lead Specialist; Arkansas Department of Education Office of Computer Science | **Christy Ruffin** - Teacher; Lake Hamilton School District |
| **John Hart** - Statewide Computer Science Specialist; Arkansas Department of Education Office of Computer Science | **Jordan Sallis** - Cyber Intelligence Manager; GlaxoSmithKline |
| **John Hightower** - Department Head Computer Science and Engineering; University of Arkansas at Fort Smith | **Leslie Savell** - Statewide Computer Science Specialist; Arkansas Department of Education Office of Computer Science |
| **Philip Huff** - Assistant Professor of Cybersecurity and Director of Cybersecurity Research; University of Arkansas at Little Rock | **Dr. Karl Schubert** - Professor of Practice and Associate Director, Data Science Program; University of Arkansas |
| **Grant Hurst** - Teacher; North Little Rock School District | **Amanda Seidenzahl** - Director of Regional Workforce Grants; University of Arkansas at Fort Smith |
| **Chris Jennings** - Teacher; Valley View Public Schools | **Nicholas Seward** - Teacher; Arkansas School for Mathematics, Sciences, and the Arts |
| **Lori Kagebein** - Statewide Computer Science Specialist; Arkansas Department of Education Office of Computer Science | **Dr. Thilla Sivakumaran** - Vice Chancellor of Global Engagement and Outreach; Arkansas State University |
| **Michael Karr** - Makerspace Program Coordinator; National Park College | **Courtney Speer** - Technology Coach; Nettleton School District |
| **David Kersey** - Executive Director; PIXEL: A School for Media Arts | **Joel Spencer** - STEAM Magnet Coordinator; Little Rock School District |
| **Catherine Leach** - Associate Professor; Henderson State University | **Zackary Spink** - Statewide Computer Science Specialist; Arkansas Department of Education Office of Computer Science |
| **Sandra Leiterman** - Managing Director; UA Little Rock Cyber Gym | **Emily Torres** - Policy Development Coordinator; Arkansas Department of Education Office of Computer Science |
| **Rhaelene Lowther** - Associate Professor of Art: Game Art, Animation, and Simulation; Southern Arkansas University | **Morgan Warbington** - Program Advisor; Arkansas Department of Education Office of Computer Science |
| **Gerri McCann** - Teacher; Manila School District | **Bill Yoder** - Executive Director; Arkansas Center for Data Sciences |
| **Amy McClure** - Course Implementation Specialist; Virtual Arkansas | **Bradford Young** - Teacher; Mountain Home School District |