South Carolina Computer Science and Digital Literacy Standards

Grade 8

Adopted 2017

Process Standards

1. **Foster an inclusive computing culture.**
   a. Recognize that equitable access to computing benefits society as a whole. 1.A
   b. Consider others' perspectives as well as one's own perspective when developing computational solutions. 1.B
   c. Consider the needs of a variety of end users regarding accessibility and usability. 1.C

2. **Collaborate around computing.**
   a. Select appropriate technological tools that can be used to collaborate on a project. 2.A
   b. Collaborate productively with individuals of varying perspectives, skills, and backgrounds. 2.B
   c. Set and implement equitable expectations and workloads when working in teams. 2.C
   d. Integrate constructive feedback while working in teams. 2.D

3. **Recognize, define, and analyze computational problems.**
   a. Recognize when it is appropriate to solve a problem computationally. 3.A
   b. Make sense of computational problems and persevere in solving them. 3.B
   c. Relate computational problems to prior knowledge. 3.C
   d. Recognize that there may be multiple approaches to solving a problem. 3.D
   e. Approach problem solving iteratively, using a cyclical process. 3.E

4. **Create, test, and refine computational artifacts.**
   a. Consider the purpose of computational artifacts for practical use, personal expression, and/or societal impact. 4.A
   b. Recognize when to use the same solution for multiple problems. 4.B
   c. Test computational artifacts systematically by considering multiple scenarios and using test cases. 4.C
   d. Approach troubleshooting systematically. 4.D
   e. Consider performance, reliability, usability, and accessibility when evaluating and refining computational artifacts. 4.E

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5. Communicate about computing.

a. Select and use appropriate technological tools to convey solutions to computing problems. 5.A

b. Communicate about computational processes and solutions using appropriate terminology consistent with the intended audience and purpose. 5.B

c. Articulate ideas responsibly by observing intellectual property rights and giving appropriate attribution. 5.C

Content Standards

DL. Digital Literacy 8.DL

1. Use software applications to collaborate and create authentic products. 8.DL.1
    1. Produce documents according to industry standards (e.g., citation styles, agendas, financial statements, resumes). 8.DL.1.1
    2. Identify and use tabs in a word processing document (i.e., left, right, center, decimal). 8.DL.1.2
    3. Identify and use appropriate file compression techniques to (e.g., zipping folders and files; image and file compression). 8.DL.1.3
2. Understand risks and responsibilities of being a digital citizen. 8.DL.2
    1. Explore legal and ethical issues of improper computer and internet use (e.g., music, video, and software piracy; cyberbullying). 8.DL.2.1
3. Understand issues associated with appropriate use of personal digital information. 8.DL.3
    1. Explore real-world examples of appropriate and inappropriate sharing of personal digital information. 8.DL.3.1
4. Demonstrate keyboarding speed and accuracy on a computing device. 8.DL.4
    1. Demonstrate proper keyboarding technique when keying letters, numbers, and symbols at a rate of 30 words per minute. 8.DL.4.1

CS. Computing Systems 8.CS

1. Analyze the use of computing to solve relevant problems. 8.CS.1
    1. Compare and contrast relevant problems and how they are solved using computer science and various types of computing devices (e.g., Global Positioning System (GPS) and online maps include different features, including real-time traffic, satellite images, construction and accident notifications). 8.CS.1.1
2. Examine how computing devices function. 8.CS.2
    1. Understand that computers receive and process data as a series of on and off signals (i.e., binary data). 8.CS.2.1
    2. Determine appropriate hardware, operating systems, and software based upon the needs of users in various career fields (e.g., computing devices used by professional video producers and students differ). 8.CS.2.2

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3. Evaluate various solutions to common hardware and software problems. 8.CS.3
    1. Understand computer hardware and software compatibility (e.g., applications designed for Android devices cannot run on iOS devices). 8.CS.3.1
    2. Identify appropriate resources for troubleshooting hardware and software problems (e.g., user manuals, online searches, technology support services). 8.CS.3.2

NI. Networks and the Internet 8.NI

1. Analyze various network structures and how data is transmitted. 8.NI.1
    1. Identify a protocol as a set of rules, and identify common protocols (e.g., Hypertext Transfer Protocol (HTTP), File Transfer Protocol (FTP), Internet Protocol (IP), Transmission Control Protocol (TCP)). 8.NI.1.1
    2. Diagram a small network using a switch and a router. 8.NI.1.2
    3. Identify the best network topology given a problem (e.g., mesh, tree, ring). 8.NI.1.3
2. Identify methods to protect data, information, and computing devices across networks. 8.NI.2
    1. Discuss and understand recent events and trends regarding cybercrimes (i.e., identity theft, hacking). 8.NI.2.1
    2. Discuss and understand the impact of computing copyright issues (i.e., music and software piracy; plagiarism). 8.NI.2.2

DA. Data and Analysis 8.DA

1. Evaluate the storage and representation of data. 8.DA.1
    1. Discuss how text, images, and sounds are represented using binary numbers in computing devices. 8.DA.1.1
    2. Compare and contrast characteristics of a variety of file formats (e.g., software compatibility, file size, compressed and uncompressed files, transparency). 8.DA.1.2
    3. Compare and contrast current storage mediums and their uses (e.g., flash drives, hard drives, networks, cloud). 8.DA.1.3
2. Analyze how data is collected with both computational and non-computational tools and processes. 8.DA.2
    1. Compare and contrast computing devices that assist with data collection (i.e., thermometers, barcode scanners, biometrics, sensors, radio-frequency identification (RFID), wearable technology). 8.DA.2.1

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3. Analyze various ways to visually represent data. 8.DA.3
    1. Identify components of infographics that can be used to represent numerical data (e.g., scatterplots). 8.DA.3.1
    2. Make inferences based on collected data (e.g., online video watching history used to recommend new videos users may like). 8.DA.3.2
    3. Explain how models are used to predict specific behaviors and/or outcomes (e.g., weather data presented in a model used to predict future weather conditions and activity). 8.DA.3.3

AP. Algorithms and Programming 8.AP

1. Design, evaluate, and modify simple algorithms (e.g., steps to make a sandwich; steps to a popular dance; steps for sending an email). 8.AP.1
    1. Modify a sequence of instructions to solve problems. 8.AP.1.1
    2. Make changes to the sequence of instructions that can lead to the same result. 8.AP.1.2
    3. Write clear instructions using flowcharts. 8.AP.1.3
2. Use and compare simple coding control structures (e.g., if-then, loops). 8.AP.2
    1. Modify an algorithm using conditionals and iteration. 8.AP.2.1
3. Decompose problems into subproblems and write code to solve the subproblems (i.e., break down a problem into smaller parts). 8.AP.3
    1. Decompose a problem into functional parts. 8.AP.3.1
    2. Compose a program with multiple parts. 8.AP.3.2
4. Design and code programs to solve problems. 8.AP.4
    1. Use a beginner coding language (e.g., drag-and-drop, block-based) to design and code a complex program that solves a problem. 8.AP.4.1
5. Identify variables and compare the types of data stored as variables. 8.AP.5
    1. Compare and contrast variables that change or are constant. 8.AP.5.1
    2. Identify the variables needed to solve a given problem (i.e., information that needs to be tracked). 8.AP.5.2

IC. Impact of Computing 8.IC

1. Evaluate the tradeoffs of computing in everyday activities. 8.IC.1
    1. Justify how computer science is and can be used to solve problems in students' daily lives (e.g., mobile applications to accomplish tasks or solve problems in a neighborhood; remote traffic control). 8.IC.1.1
    2. Analyze positive and negative impacts of computing on society (e.g., personal, health, workforce, economy, education, culture, environment). 8.IC.1.2
2. Analyze various computing platforms used for communication. 8.IC.2
    1. Compare and contrast current communication methods and computing devices. 8.IC.2.1

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3. Evaluate the tradeoffs in what and how information is shared digitally. 8.IC.3
    1. Identify risks associated with sharing information digitally (e.g., phishing, identity theft, hacking). 8.IC.3.1
4. Evaluate how legal and ethical issues shape computing practices. 8.IC.4
    1. Investigate recent laws that have been created to govern computer use (e.g., privacy, piracy, censorship, intellectual property). 8.IC.4.1
5. Understand the importance of access and equity in computing. 8.IC.5
    1. Investigate historical and current trends of under-representation in computer science (e.g., race, ethnicity, gender, socioeconomic status). 8.IC.5.1
    2. Recognize computer scientists from under-represented populations who have advanced computing. 8.IC.5.2
    3. Explain how the lack of diverse perspectives and backgrounds restricts possible solutions to computational problems (e.g., first iteration of Google Maps included only driving directions, but later public transit and walking directions were added). 8.IC.5.3
6. Explore computer science and computing-intensive careers. 8.IC.6
    1. Identify traditional and non-traditional careers that use computer science (e.g., computer science in agriculture, medical, and public safety fields). 8.IC.6.1
    2. Relate the five disciplines of computing (i.e., computer science, software engineering, information technology, information systems, and computer engineering) to careers in various industries (e.g., advancements in healthcare, national security, and transportation). 8.IC.6.2
7. Evaluate the history of computers and computing. 8.IC.7
    1. Analyze the impact of computing and computer science over time (e.g., advantages such as faster, more efficient completion of tasks and access to the information; disadvantages such as fewer human jobs due to automation). 8.IC.7.1
    2. Understand the historical impact and future potential of exponential growth in computing (i.e., Moore's Law). 8.IC.7.2
    3. Identify and describe emerging technologies (e.g., virtual reality, biometrics, health monitoring systems). 8.IC.7.3