Mississippi Computer Science

Grades K-2

Computing Systems

1A Conceptual understanding: People interact with a wide variety of computing devices that collect, store, analyze, and act upon information in ways that can affect human capabilities both positively and negatively. The physical components (hardware) and instructions (software) that make up a computing system communicate and process information in digital form. An understanding of hardware and software is useful when troubleshooting a computing system that does not work as intended. CS.1A

1 Select and operate appropriate software to perform a variety of tasks, and recognize that users have different needs and preferences for the technology they use. [DEVICES] (P1.1) CS.1A.1

a Students should be able to select the appropriate app/program to use for tasks they are required to complete. For example, if students are asked to draw a picture, they should be able to open and use a drawing app/program to complete this task, or if they are asked to create a presentation, they should be able to open and use presentation software. CS.1A.1A

b With teacher guidance, students should compare and discuss preferences for software with the same primary functionality. Students could compare different web browsers or word processing, presentation, or drawing programs CS.1A.1B

2 Use appropriate terminology in identifying and describing the function of common physical components of computing systems (hardware). [HARDWARE & SOFTWARE] (P7.2) A computing system is composed of hardware and software. Hardware consists of physical components. CS.1A.2

a Students should be able to identify and describe the function of external hardware, such as desktop computers, laptop computers, tablet devices, monitors, keyboards, mice, and printers. CS.1A.2A

3 Describe basic hardware and software problems using accurate terminology. [TROUBLESHOOTING] (P6.2, P7.2) CS.1A.3

a Students should be able to communicate a problem with accurate terminology (e.g., when an app or program is not working as expected, a device will not turn on, the sound does not work, etc.). Ideally, students would be able to use simple troubleshooting strategies, including turning a device off and on to reboot it, closing and reopening an app, turning on speakers, or plugging in headphones. These are, however, not specified in the standard, because these problems may not occur. CS.1A.3A

Networks and the Internet

1A Conceptual understanding: Computing devices typically do not operate in isolation. Networks connect computing devices to share information and resources and are an increasingly integral part of computing. Networks and communication systems provide greater connectivity in the computing world by providing fast, secure communication and facilitating innovation. NI.1A

1 Explain what passwords are and why we use them. [CYBERSECURITY] (P7.3) Learning to protect one's device or information from unwanted use by others is an essential first step in learning about cybersecurity. They should appropriately use and protect the passwords they are required to use. NI.1A.1

2 Students should understand that computers connect them to people, places, and things around the world. [NETWORK COMMUNICATION & ORGANIZATION] (P7.3) NI.1A.2

Data and Analysis

1A Conceptual understanding: Computing systems exist to process data. The amount of digital data generated in the world is rapidly expanding, so the need to process data effectively is increasingly important. Data is collected and stored so that it can be analyzed to better understand the world and make more accurate predictions. DA.1A

1 Store, copy, search, retrieve, modify, and delete information using a computing device and define the information stored as data. [STORAGE] (P4.2) All information stored and processed by a computing device is referred to as data. Data can be images, text documents, audio files, software programs or apps, video files, etc. DA.1A.1

a Students should be able to manipulate data through their use of software to complete tasks on a computing device. For example, saving a file, retrieving a file, deleting a file are all instances of manipulating data. DA.1A.1A

2 Collect and present the same data in various visual formats. [COLLECTION, VISUALIZATION, & TRANSFORMATION] (P7.1, P4.4) The collection and use of data about the world around them is a routine part of life and influences how people live. DA.1A.2

a Students should be able to collect data. For example, students could collect data on the weather, such as sunny days versus rainy days, the temperature at the beginning of the school day and end of the school day, or the inches of rain over the course of a storm. Students could count the number of pieces of each color of candy in a bag of candy, such as Skittles or M&Ms. Students could create surveys of things that interest them, such as favorite foods, pets, or TV shows, and collect answers to their surveys from their peers and others. DA.1A.2A

b Students should be able to present data in various visual formats. For example, the data collected could be organized into two or more visualizations, such as a bar graph, pie chart, or pictograph. DA.1A.2B

3 Identify and describe patterns in data visualizations, such as charts or graphs, to make predictions. [INFERENCEE & MODELS] (P4.1) All data can be used to make inferences or predictions about the world. DA.1A.3

a Students should be able to analyze data in visual formats. For example, students could analyze a graph or pie chart of the colors in a bag of candy or the averages for colors in multiple bags of candy. Students could analyze graphs of temperatures taken at the beginning of the school day and end of the school day. DA.1A.3A

b Students should be able to identify patterns and make predictions based on the patterns. For example, students could identify the patterns for which colors are most and least represented in bags of candy, and then make a prediction as to which colors will have most and least in a new bag of candy. Students could identify the patterns of when temperatures rise and fall, and predict if they think the temperature will rise or fall at a particular time of the day, based on the pattern observed. DA.1A.3B

Algorithms and Programming

1A Conceptual understanding: An algorithm is a sequence of steps designed to accomplish a specific task. Algorithms are translated into programs, or code, to provide instructions for computing devices. Algorithms and programming control all computing systems, empowering people to communicate with the world in new ways and solve compelling problems. The development process to create meaningful and efficient programs involves choosing which information to use and how to process and store it, breaking apart large problems into smaller ones, recombining existing solutions, and analyzing different solutions. AP.1A

1 Model daily processes by creating and following algorithms (sets of step-by-step instructions) to complete tasks. [ALGORITHMS] (P4.4) Composition is the combination of smaller tasks into more complex tasks. AP.1A.1

a Students should be able to create and follow algorithms. For example, students could create and follow algorithms for making simple foods, brushing their teeth, getting ready for school, participating in cleanup time. Students may demonstrate understanding visually, orally, or in writing. AP.1A.1A

2 Model the way programs store and manipulate data by using numbers or other symbols to represent information. [VARIABLES] (P4.4) Information in the real world can be represented in computer programs. AP.1A.2

a Students should be able to model data storage and manipulation by using representative symbols. For example, students could use thumbs up/down as representations of yes/no, use arrows when writing algorithms to represent direction, or encode and decode words using numbers, pictographs, or other symbols to represent letters or words. AP.1A.2A

3 Develop programs with sequences and simple loops to express ideas or address a problem. [CONTROL] (P5.2) Programming is used as a tool to create products that reflect a wide range of interests. Control structures specify the order in which instructions are executed within a program. Sequences are the order of instructions in a program. For example, if dialogue is not sequenced correctly when programming a simple animated story, the story will not make sense. If the commands to program a robot are not in the correct order, the robot will not complete the task desired. Loops allow for the repetition of a sequence of code multiple times. For example, in a program to show the life cycle of a butterfly, a loop could be combined with move commands to allow continual but controlled movement of the character. AP.1A.3

a Students should be able to express ideas or address problems by developing programs with sequences and simple loops. AP.1A.3A

4 Decompose (break down) the steps needed to solve a problem into a precise sequence of instructions. [MODULARITY] (P3.2) Decomposition is the act of breaking down tasks into simpler tasks. AP.1A.4

a Students should be able to break down the steps needed to solve a problem into a precise sequence of instructions. For example, students could break down the steps needed to make a peanut butter and jelly sandwich, to brush their teeth, to draw a shape, to move a character across the screen, or to solve a level of a coding app. Students may demonstrate understanding visually, orally, or in writing. AP.1A.4A

5 Develop plans that describe a program's sequence of events, goals, and expected outcomes. [PROGRAM DEVELOPMENT] (P5.1, P7.2) Creating a plan for what a program will do clarifies the steps that will be needed to create a program and can be used to check if a program is correct. AP.1A.5

a Students should be able to develop and visually illustrate the plan for what a program will do. For example, students could create a planning document, such as a story map, a storyboard, or a sequential graphic organizer, to illustrate what their program will do. Students at this stage may complete the planning process with help from their teachers. AP.1A.5A

6 Give attribution when using the ideas and creations of others while developing programs. [PROGRAM DEVELOPMENT] (P7.3) Using computers comes with a level of responsibility. AP.1A.6

a Students should credit artifacts that were created by others, such as pictures, music, and code. Credit could be given orally, if presenting their work to the class, or in writing, if sharing work on a class blog or website. Proper attribution at this stage does not require a formal citation, such as in a bibliography or works cited document. AP.1A.6A

7 Debug (identify and fix) errors in an algorithm or program that includes sequences and simple loops. [PROGRAM DEVELOPMENT] (P6.2) Algorithms or programs may not always work correctly. AP.1A.7

a Students should be able to use various strategies, such as changing the sequence of the steps, following the algorithm in a step-by-step manner, or trial and error to fix problems in algorithms and programs. AP.1A.7A

8 Using correct terminology, describe steps taken and choices made during the iterative process of program development. [PROGRAM DEVELOPMENT] (P7.2) AP.1A.8

a Students should be able to talk or write about the goals and expected outcomes of the programs they create and the choices that they made when creating programs. This could be done using coding journals, discussions with a teacher, class presentations, or blogs. AP.1A.8A

Impacts of Computing

1A Conceptual understanding: Computing affects many aspects of the world in both positive and negative ways at local, national, and global levels. Individuals and communities influence computing through their behaviors and cultural and social interactions, and in turn, computing influences new cultural practices. An informed and responsible person should understand the social implications of the digital world, including equity and access to computing. IC.1A

1 Compare how people live and work before and after the implementation or adoption of new computing technology. [CULTURE] (P7.0) Computing technology has positively and negatively changed the way people live and work. In the past, if students wanted to read about a topic, they needed access to a library to find a book about it. Today, students can view and read information on the Internet about a topic or they can download e-books about it directly to a device. Such information may be available in more than one language and could be read to a student, allowing for great accessibility. IC.1A.1

a Students should be able to compare how people live and work before and after the implementation or adoption of new computing technology. IC.1A.1A

2 Work respectfully and responsibly with others online. [SOCIAL INTERACTIONS] (P2.1) Online communication facilitates positive interactions, such as sharing ideas with many people, but the public and anonymous nature of online communication also allows intimidating and inappropriate behavior in the form of cyberbullying. IC.1A.2

a Students should demonstrate understanding of how to work with others online in a respectful and responsible way. Students could share their work on blogs or in other collaborative spaces online, taking care to avoid sharing information that is inappropriate or that could personally identify them to others. IC.1A.2A

b Students should be able to identify cyberbullying. Students could provide feedback to others on their work in a kind and respectful manner and could tell an adult if others are sharing things they should not share or are treating others in an unkind or disrespectful manner on online collaborative spaces. IC.1A.2B

3 Keep login information private and log off of devices appropriately. [SAFETY, LAW, & ETHICS] (P7.3) People use computing technology in ways that can help or hurt themselves or others. Harmful behaviors, such as sharing private information and leaving public devices logged in, should be recognized and avoided. IC.1A.3

a Students should understand that some things like login details, their address, and other personally identifying information is private (secret). IC.1A.3A

b Students should know to always log off properly on any device used. IC.1A.3B