Florida Computer Science

Grades 9-12

Communication and Collaboration Strand

1 Formulate artifacts using collaboration. SC.912.CC.1

1. Evaluate digital modes of communication and collaboration. SC.912.CC.1.1
2. Utilize tools within a project environment to communicate. SC.912.CC.1.2
3. Present information and data using presentation software. SC.912.CC.1.3
4. Create a digital artifact utilizing collaboration, reflection, analysis and iteration. SC.912.CC.1.4

2 Defend the use of collaboration to create artifacts. SC.912.CC.2

1. Collaborate to publish information and data for a variety of audiences using digital tools and media-rich resources. SC.912.CC.2.1
2. Assess how collaboration influences the design and development of software artifacts. SC.912.CC.2.2
3. Evaluate program designs and implementations for readability and usability. SC.912.CC.2.3
4. Critique the strengths and weaknesses of the collaborative process when creating digital products. SC.912.CC.2.4

Personal Health and Safety Strand

1 Design a personalized plan for Internet practices. SC.912.HS.1

1. Identify potential dangers to an individual's safety and security online. SC.912.HS.1.1
2. Evaluate the consequences of cyberbullying. SC.912.HS.1.2
3. Determine the consequences of inaction when witnessing unsafe Internet practices. SC.912.HS.1.3
4. Examine the positive outcomes when someone reports suspicious behavior on the Internet. SC.912.HS.1.4
5. Evaluate the risks to personal information while accessing the Internet. Example: John was on a new questionable website the previous night playing video games. When he woke up the following morning, he discovered that his email address had 30 new spam emails advertising various products. John noticed that his checking account also had $20 missing from unauthorized charges. What do you think happened and what should his following steps be? SC.912.HS.1.5
6. Describe the impact of permissible privacy and security. SC.912.HS.1.6
7. Construct strategies to combat cyberbullying or online harassment. SC.912.HS.1.7

2 **Research and revise the effects of digital device use.** SC.912.HS.2

1 Prioritize regulating screen time and the use of electronic devices for mental and physical well-being. SC.912.HS.2.1

2 Investigate the correlation between sedentary behavior and digital device use. SC.912.HS.2.2

3 Assess the role of digital health trackers in promoting healthy behaviors. SC.912.HS.2.3

4 Analyze the relationship between eye strain related to use of technology and exposure to increased blue light. SC.912.HS.2.4

5 Research the consequences associated with Nature Deficit Disorder (NDD). SC.912.HS.2.5

3 **Assess digital footprints.** SC.912.HS.3

1 Discuss the permanency of data on the Internet. SC.912.HS.3.1

2 Analyze how social media influences the digital footprint of individuals, communities and cultures. SC.912.HS.3.2

Computing Components Strand

1 **Reflect mastery of foundational computer literacy skills.** SC.912.CO.1

1 Describe the efficiency and effectiveness of digital tools or resources used for real-world tasks. SC.912.CO.1.1

2 Identify and select the file format based on trade-offs. SC.912.CO.1.2

3 Select and use the correct file type for specific tasks. SC.912.CO.1.3

4 Describe the relationship between drivers, hardware and operating systems. SC.912.CO.1.4

5 Describe the organization of a computer and its principal components. SC.912.CO.1.5

6 Develop and evaluate criteria for purchasing or upgrading computer system hardware. SC.912.CO.1.6

7 Describe the process of protecting computer hardware from exploitation. SC.912.CO.1.7

8 Describe how the Internet facilitates global communication. SC.912.CO.1.8

9 Evaluate the accuracy, relevance, comprehensiveness and bias of electronic information resources. SC.912.CO.1.9

2 **Construct varying hardware configurations.** SC.912.CO.2

1 Explore the function of Basic Input/Output System (BIOS) and Unified Extensible Firmware Interface (UEFI) in a computer. SC.912.CO.2.1

2 Explore motherboard variations. SC.912.CO.2.2

3 Discuss the central processing unit (CPU). SC.912.CO.2.3

4 Explore the role of a power supply unit (PSU) in relation to a computer system. SC.912.CO.2.4

5 Analyze the purpose of various random-access memory (RAM) speeds and storage sizes. SC.912.CO.2.5

6 Analyze hardware compatibility issues between industry specific devices. SC.912.CO.2.6

7 Evaluate various forms of input and output (IO). SC.912.CO.2.7

8 Evaluate the basic components of wired computer networks. SC.912.CO.2.8

9 Evaluate the basic components of wireless computer networks. SC.912.CO.2.9

10 Explore the components of a data packet. SC.912.CO.2.10

11 Investigate the issues that impact network functionality. SC.912.CO.2.11

12 Describe common network protocols. SC.912.CO.2.12

13 Discern how common network protocols are applied by client-server and peer-to-peer networks. SC.912.CO.2.13

14 Explore the role of dynamic host control protocol (DHCP) in a networking system. SC.912.CO.2.14

15 Analyze the importance of subnetting. Example: Ruby is a network technician at a hospital in Ft. Pierce. Her hospital has over 100 computers active on the internet at one time. Ruby would like to reduce bandwidth lag on the outgoing internet traffic. How can Ruby utilize subnetting to solve the hospital's problem? SC.912.CO.2.15

16 Describe how devices are identified on a network. SC.912.CO.2.16

17 Identify similarities and differences between Internet protocol versions. SC.912.CO.2.17

18 Examine 2.4 gigahertz (GHz) and 5 gigahertz (GHz) wireless networks. SC.912.CO.2.18

3 Utilize various software components to create computational artifacts. SC.912.CO.3

1. Analyze various operating systems. SC.912.CO.3.1
2. Develop criteria for selecting software when solving a specific real-world problem. SC.912.CO.3.2
3. Examine the difference between operating system (OS) software and application software. SC.912.CO.3.3
4. Explain how automated software testing can reduce the cost of the testing effort. SC.912.CO.3.4

Programming and Software Engineering Strand

1 **Create, implement and analyze programs that include sequencing, selection and iteration.** SC.912.PE.1

1 Write code segments. SC.912.PE.1.1

2 Create iterative and non-iterative structures within a program. SC.912.PE.1.2

3 Create selection structures within a program. SC.912.PE.1.3

4 Write a void function that does not return a value. SC.912.PE.1.4

5 Write a non-void function that will return a value. SC.912.PE.1.5

6 Create a nested array to aggregate data. Example: Beth has written a code segment for her programming class. She has created a list but needs her list to begin with 1 instead of 0. Create a nested array that assigns an alternative value to the numbers in her original list. SC.912.PE.1.6

7 Define multiple variables to the same value while utilizing aliasing. SC.912.PE.1.7

8 Define a class to store data attributes. SC.912.PE.1.8

9 Create methods that a class can inherit. SC.912.PE.1.9

10 Write programs that validate user input. SC.912.PE.1.10

11 Compare the differences in execution of interpreted and compiled languages. SC.912.PE.1.11

12 Classify programming languages. SC.912.PE.1.12

13 Describe and identify types of programming errors. SC.912.PE.1.13

14 Design and implement variables in a program using global and local scope. SC.912.PE.1.14

15 Implement a program using an integrated development environment (IDE) commonly used. SC.912.PE.1.15

16 Explain the distinction between a programming language's standard library and the Application Programming Interface (API). SC.912.PE.1.16

17 Examine the building blocks of algorithms. SC.912.PE.1.17

18 Develop a computer program. SC.912.PE.1.18

19 Review a computer program to verify program functionality, programming styles, program usability and adherence to common programming standards. SC.912.PE.1.19

20 Write programs that use standard logic operators. SC.912.PE.1.20

21 Use Boolean logic to perform logical operations. SC.912.PE.1.21

22 Explain structures and their uses within a program. SC.912.PE.1.22

23 Compile, run, test and debug a digital artifact. SC.912.PE.1.23

2 **Create and analyze data to solve real-world problems.** SC.912.PE.2

1 Create a matrix from connected lists. SC.912.PE.2.1

2 Evaluate the purpose of sublist indexing. SC.912.PE.2.2

3 Compare techniques for analyzing massive data collections. SC.912.PE.2.3

3 **Apply computational thinking to real-world problems.** SC.912.PE.3

1 Evaluate arithmetic expressions using operator precedence. SC.912.PE.3.1

2 Decompose a problem by defining new code segments. SC.912.PE.3.2

3 Design and implement a simple simulation that is representative of a natural phenomenon. SC.912.PE.3.3

4 Evaluate algorithms by their efficiency, correctness and clarity. SC.912.PE.3.4

5 Differentiate automated testing platforms and their uses. SC.912.PE.3.5

6 Explain the different types of testing that can be performed in a complex software system. SC.912.PE.3.6

7 Introduce complex problems and understand that these problems may be computationally unsolvable. SC.912.PE.3.7

8 Describe the concept of parallel processing as a strategy to solve large problems. SC.912.PE.3.8

9 Demonstrate concurrency by separating processes into threads of execution and dividing data into parallel streams. SC.912.PE.3.9

10 Simplify a complex problem by using abstraction to manage complexity using functions and parameters, classes and methods. SC.912.PE.3.10

11 Perform advanced searches to locate information and design a data-collection approach to gather original data. SC.912.PE.3.11

12 Explain how data analysis is used to enhance the understanding of complex natural and human systems. SC.912.PE.3.12

13 Create a computational model that utilizes data to analyze and enhance the understanding of complex natural and human systems. SC.912.PE.3.13

14 Analyze data by identifying patterns through modeling and simulation of realworld data. SC.912.PE.3.14

15 Test the accuracy of scientific hypotheses using computer models and simulations. SC.912.PE.3.15

16 Design a representation of a computer program. SC.912.PE.3.16

17 Summarize the differences between an array and an array list. SC.912.PE.3.17

18 Explain the principles of cryptography. SC.912.PE.3.18

19 Determine which encryption method is suitable for an intended task. SC.912.PE.3.19

4 **Apply the software development life cycle.** SC.912.PE.4

1. Explore software development cycles that can be used to solve problems at different software development stages. SC.912.PE.4.1
2. Develop a software artifact according to a common software development methodology. SC.912.PE.4.2
3. Identify the tools required to develop a program. SC.912.PE.4.3
4. Identify the software environment required to create a program within a specific language. Example: Johnny is given the assignment to create a simple addition program in his computer programming class. He decides to load a popular integrated development environment (IDE) to assist him with coding his program. Identify software environments that will aid Johnny with specific languages. SC.912.PE.4.4
5. Define user prompts for clarity and usability within a program. Example: Mrs. Jan has given her programming class the task of creating an age verification application. Paolo, a student in the class, initially runs into an issue where when a user enters their birth month out, the program crashes. Define a user prompt that will correct this issue. SC.912.PE.4.5
6. Write a program that utilizes both input and output. SC.912.PE.4.6
7. Use internal documentation to collaboratively design a program according to accepted standards. SC.912.PE.4.7
8. Create mobile computing applications and/or dynamic web pages using a variety of design and development tools, programming languages and mobile devices/emulators. SC.912.PE.4.8

Technological Impact Strand

1 **Assess the impact of technological advancements.** SC.912.TI.1

1 Analyze historical trends in hardware and software. SC.912.TI.1.1

2 Identify ways to use technology to support lifelong learning. SC.912.TI.1.2

3 Analyze the impact of digital media. SC.912.TI.1.3

4 Analyze the impact of digital media on culture and persona. SC.912.TI.1.4

5 Describe the impact of computing on business and commerce. SC.912.TI.1.5

6 Describe how technology impacts personal life. SC.912.TI.1.6

7 Evaluate ways in which technology may improve accessibility for the varying needs of learners, including students with disabilities (SWD). SC.912.TI.1.7

8 Explain how economic and societal factors are affected by access to critical information. SC.912.TI.1.8

9 Evaluate access and distribution of technology in a global society. SC.912.TI.1.9

10 Analyze technology-related career paths. SC.912.TI.1.10

11 Evaluate the benefits of technology regarding environmental concerns. SC.912.TI.1.11

12 Examine the history of networking devices. SC.912.TI.1.12

13 Examine the historical impact of social media. SC.912.TI.1.13

2 **Research and apply the use of tools for regulatory compliance.** SC.912.TI.2

1 Research how social media and technology can be used to distort, exaggerate or misrepresent information. SC.912.TI.2.1

2 Demonstrate knowledge of the Internet safety policy as it applies to state and district guidelines. SC.912.TI.2.2

3 Recognize the terms and policies associated with the use of public access points. SC.912.TI.2.3

4 Explore the legal ramifications of technology use. SC.912.TI.2.4

5 Describe and model the legal use of modern communication media and devices. SC.912.TI.2.5

6 Evaluate the impacts of the irresponsible use of information on collaborative projects. SC.912.TI.2.6

7 Describe differences between open source, freeware and proprietary software licenses and how they apply to different types of software. SC.912.TI.2.7

8 Evaluate the consequences of misrepresenting digital work as your own. SC.912.TI.2.8

9 Analyze how different categories of software licenses can be used to share and protect intellectual property. SC.912.TI.2.9

10 Analyze how access to information may not include the right to distribute the information. SC.912.TI.2.10

11 Utilize citation tools when using digital information. SC.912.TI.2.11

12 Describe legal regulations that govern Internet usage and interaction. SC.912.TI.2.12

Emerging Technology Strand

1 **Analyze the impact of emerging technologies on daily life.** SC.912.ET.1

1 Describe the emerging features of mobile devices, smart devices and vehicles. SC.912.ET.1.1

2 Describe the physical and cognitive challenges faced by users when learning to use computer interfaces. SC.912.ET.1.2

3 Analyze the process and design innovative software to support specialized forms of human-computer interaction. SC.912.ET.1.3

4 Examine device-to-device interactions that exclude human input. SC.912.ET.1.4

5 Explore the concepts of virtual and augmented reality. SC.912.ET.1.5

6 Analyze the impact on natural resources due to manufacturing of computer hardware components. SC.912.ET.1.6

7 Describe how technology has changed the way people build and manage organizations and how technology impacts personal life. SC.912.ET.1.7

2 **Analyze the impact of Artificial Intelligence (AI) and its applications.** SC.912.ET.2

1 Explore the history of Artificial Intelligence (AI). SC.912.ET.2.1

2 Describe the major branches of Artificial Intelligence (AI). SC.912.ET.2.2

3 Evaluate the application of algorithms to Artificial Intelligence (AI). SC.912.ET.2.3

4 Evaluate the Artificial Intelligence (AI) of computers to model human behaviors. SC.912.ET.2.4

5 Describe major applications of artificial intelligence (AI) and machine learning. SC.912.ET.2.5

6 Describe how predictive Artificial Intelligence (AI) can be used to solve problems. SC.912.ET.2.6

7 Describe common measurements of machine intelligence. SC.912.ET.2.7

3 **Analyze characteristics of robotics.** SC.912.ET.3

1 Describe the advancement of robotics. SC.912.ET.3.1

2 Examine how robotics are used to address human challenges. SC.912.ET.3.2

3 Evaluate how the natural world has influenced robotic designs. SC.912.ET.3.3

Cyber Security Strand

1 **Assess and apply physical security strategies.** SC.912.CS.1

1 Identify possible risks to maintaining data confidentiality. SC.912.CS.1.1

2 Describe computer security vulnerabilities. SC.912.CS.1.2

3 Evaluate computer security vulnerabilities. SC.912.CS.1.3

2 **Research and analyze network security impacts.** SC.912.CS.2

1 Analyze security and privacy issues that relate to computer networks and network connected devices. SC.912.CS.2.1

2 Describe security and privacy issues that relate to computer networks including the permanency of data on the Internet, online identity and privacy. SC.912.CS.2.2

3 Apply network security concepts and strategies to real-world simulations. SC.912.CS.2.3

3 **Reflect on the consequences of social engineering.** SC.912.CS.3

1 Investigate ransomware attacks. SC.912.CS.3.1

2 Explore access control rules. SC.912.CS.3.2

3 Analyze the limitations of a program's temporary storage and the security vulnerabilities. SC.912.CS.3.3

4 Trace the social engineering attack cycle. SC.912.CS.3.4

Digital Currencies and Financial Management Strand

1. **Analyze the history of cryptocurrency.** SC.912.DC.1
   1. Examine the history of digital currency and blockchain technologies. SC.912.DC.1.1
   2. Analyze the effects of digital currencies on the current financial market. SC.912.DC.1.2

2. **Examine the types of digital currencies.** SC.912.DC.2
   1. Differentiate between a digital currency and a security. SC.912.DC.2.1
   2. Discuss the risks associated with digital currencies. SC.912.DC.2.2
   3. Compare decentralized currencies to centralized currencies. SC.912.DC.2.3

3. **Evaluate and analyze digital tools used for financial management.** SC.912.DC.3
   1. Evaluate digital tools that aid in personal financial literacy and money management. SC.912.DC.3.1
   2. Analyze the opportunities created with digital stock portfolios. SC.912.DC.3.2