

Extension 9th-12th Grades

Network & Internet ES.NI

- 1 Examine the scalability and reliability of networks, by describing the relationship between routers, switches, servers, topology, and addressing. ES.NI.1
- 2 Explain how the characteristics of the Internet influence the systems developed on it. ES.NI.2
- 3 Develop solutions to security threats. (CYSEC) ES.NI.3
- 4 Give examples to illustrate how sensitive data can be affected by malware and other attacks. (CYSEC) ES.NI.4
- 5 Describe the issues that impact network functionality (e.g., bandwidth, load, delay, topology). ES.NI.5
- 6 Compare ways software developers protect devices and information from unauthorized access. (CYSEC) ES.NI.6

Hardware & Software ES.HS

- 1 Categorize and describe the different functions of operating system software. ES.HS.1
- 2 Categorize the roles of operating system software. ES.HS.2
- 3 Demonstrate familiarity and knowledge of the programming environment. ES.HS.3

Troubleshooting ES.T

- 1 Continued growth. ES.T.1

Algorithms & Programming ES.AP

- 1 Design algorithms to solve computational problems using a combination of original and existing algorithms. ES.AP.1
- 2 Implement searching and sorting algorithms to solve computational problems. ES.AP.2
- 3 Evaluate algorithms in terms of their efficiency. ES.AP.3
- 4 Evaluate key qualities of a program through a process, such as code review, program tracing, and/or critical data testing. ES.AP.4
- 5 Demonstrate knowledge of the different types of programming errors. ES.AP.5

6 Identify and correct different types of programming errors using a systematic approach. ES.AP.6

Variables ES.V

1 Use data structures to represent information. ES.V.1

2 Compare and contrast fundamental data structures and their uses. ES.V.2

Control Structures ES.CS

1 Design computational artifacts using single and multi-way conditional statements. ES.CS.1

2 Design computational artifacts using pretest and/or posttest repetitions. ES.CS.2

3 Design computational artifacts using fixed and/or variable length repetitions. ES.CS.3

4 Iteratively design and develop computational artifacts for practical intent, personal expression, or to address a societal issue. ES.CS.4

5 Justify the selection of specific control structures by identifying tradeoffs associated with implementation, readability, and performance. ES.CS.5

6 Demonstrate the flow of execution of a recursive algorithm. ES.CS.6

Modularity ES.M

1 Analyze a large-scale computational problem and identify generalizable patterns or problem components that can be applied to a solution. ES.M.1

2 Decompose problems into smaller subproblems through systematic analysis. ES.M.2

3 Construct solutions to problems using student-created components, such as procedures, modules, and/or objects. ES.M.3

4 Demonstrate code reuse by creating programming solutions using libraries or APIs. ES.M.4

Program Development ES.PD

1 Iteratively evaluate and refine a computational artifact to enhance its performance, reliability, usability, and/or accessibility. ES.PD.1

2 Document decisions made during the design process using text, graphics, presentations, and/or demonstrations in the development of complex programs. ES.PD.2

3 Develop and use a series of test cases to verify that a program performs according to its design specifications. ES.PD.3

4 Modify an existing program to add additional functionality and discuss intended and unintended implications. ES.PD.4

5 Explain security issues that might lead to compromised computer programs. ES.PD.5

6 Internally document coding structures. ES.PD.6

Access: Conduct basic searches to gather information from teacher provided digital sources. ES.A

1 Continued growth. ES.A.1

Evaluate: Evaluate information sources based on purpose. Recognize when the purpose of content is to inform or to influence actions. ES.E

1 Continued growth. ES.E.1

Create: Products are used to share information with others. ES.C

1 Evaluate the ability of models and simulations to test and support hypotheses. ES.C.1

Impacts of Computing: The past, present, and possible future impact of technology on society. People use many types of technologies in their daily work and personal lives. ES.IC

1 Continued growth. ES.IC.1

Social Interactions: Communication with peers, teachers, and others using technology. ES.SI

1 Continued growth. ES.SI.1

Safety, Law, and Ethics: Positive and negative social and ethical behaviors for using technology. ES.SLE

1 Evaluate computational artifacts to maximize their beneficial effects and minimize harmful effects on society. ES.SLE.1

Responsible Use: Safe and ethical behaviors in

1 Continued growth. ES.RU.1

the digital world. ES.RU

**Privacy: Personal
privacy concepts.** ES.P

1 Continued growth. ES.P.1