Virginia Computer Science

Middle School Elective

Adopted 2017

6, 9, and 18-Week Module

Algorithms and Programming

1. The student will design and iteratively develop programs that combine control structures, including loops and conditionals. MSCSE.1
2. The student will investigate variables and data types, including simple operations on strings. MSCSE.2
3. The student will implement a program that accepts input values, stores them in appropriately named variables, and produces output. MSCSE.3
4. The student will document programs in order to make them easier to trace, test, and debug. MSCSE.4

Impacts of Computing

5. The student will discuss issues of bias and accessibility in the design of existing technologies. MSCSE.5
6. The student will describe and explain the history of computer science, including naming significant historical figures and describing their impact on the field. MSCSE.6

Algorithms and Programming

7. The student will use flowcharts and/or pseudo code to address complex problems as algorithms. MSCSE.7
8. The student will incorporate existing code, media, and libraries into original programs, and give attribution. MSCSE.8
9. The student will systematically test and refine programs using a range of test cases. MSCSE.9

Networks and the Internet

10. The student will model the role of protocols in transmitting data across networks and the Internet. MSCSE.10

Cybersecurity

11. The student will apply multiple methods of encryption to model the secure transmission of information. MSCSE.11
12. The student will explain how physical and digital security measures protect electronic information. MSCSE.12

Data and Analysis

13. The student will collect data using computational tools and transform the data to make it more useful and reliable. MSCSE.13
14. The student will refine computational models based on the data they have generated. MSCSE.14
15. The student will represent data using multiple encoding schemes. MSCSE.15

Impacts of Computing

16. The student will discuss issues of bias and accessibility in the design of existing technologies. MSCSE.16
17. The student will compare tradeoffs associated with computing technologies that affect people's everyday activities and career options. MSCSE.17
18. The student will collaborate with many contributors through strategies such as crowdsourcing or surveys when creating a computational artifact or visualization. MSCSE.18
19. The student will describe tradeoffs between allowing information to be public and keeping information private and secure. MSCSE.19

Computing Systems

20. The student will systematically identify and correct problems with computing devices and their components. MSCSE.20
21. The student will explore the relationship between hardware and software using the Internet of Things. MSCSE.21

36-Week Module

Algorithms and Programming

22. The student will MSCSE.22
    a. work in a team to distribute tasks; MSCSE.22.A
    b. maintain a timeline; and MSCSE.22.B
    c. use iterative design to solve problems, including peer review and feedback. MSCSE.22.C
23. The student will decompose problems and subproblems into parts to facilitate the design, implementation, and review of programs. MSCSE.23
24. The student will create procedures with parameters to organize code and make it easier to reuse. MSCSE.24

Computing Systems

25. The student will recommend improvements to the design of computing devices, based on an analysis of how users interact with the devices. MSCSE.25
26. The student will design projects that combine hardware and software components to collect and exchange data. MSCSE.26