

# Grades 11-12

## Computing Systems

- 1 Devices: Compare the characteristics and uses of traditional and emerging computing devices and systems.** 11-12.CS.01
- 2 Hardware and Software: Categorize the roles of operating system software.** 11-12.CS.02
- 3 Troubleshooting: Illustrate ways computing systems implement logic, input, and output through hardware components.** 11-12.CS.03

## Networks and the Internet

- 4 Network Communication and Organization: Describe the issues that impact network functionality (e.g., bandwidth, load, delay, topology).** 11-12.NI.04
- 5 Cybersecurity: Compare ways software developers protect devices and information from unauthorized access.** 11-12.NI.05

## Data and Analysis

- 6 Collection, Visualization, and Transformation: Use data analysis tools and techniques to identify patterns in data representing complex systems.** 11-12.DA.06
- 7 Collection, Visualization, and Transformation: Select data collection tools and techniques to generate data sets that support a claim or communicate information.** 11-12.DA.07
- 8 Collection, Visualization, and Transformation: Analyze the ways in which automated data collection is utilized in society.** 11-12.DA.08
- 9 Interference and Models: Evaluate the ability of models and simulations to test and support the refinement of hypotheses.** 11-12.DA.09

## Algorithms and Programming

- 10 Algorithms: Describe how artificial intelligence drives many software and physical systems.** 11-12.AP.10
- 11 Algorithms: Implement an artificial intelligence algorithm to play a game against a human opponent or solve a problem.** 11-12.AP.11
- 12 Algorithms: Use and adapt classic algorithms to solve computational problems.** 11-12.AP.12
- 13 Algorithms: Evaluate algorithms in terms of their efficiency, correctness, and clarity.** 11-12.AP.13

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- 14 Variables: Compare and contrast fundamental data structures and their uses.** 11-12.AP.14
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- 15 Control: Illustrate the flow of execution of a recursive algorithm.** 11-12.AP.15
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- 16 Modularity: Construct solutions to problems using student-created components, such as procedures, modules, or objects.** 11-12.AP.16
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- 17 Modularity: Analyze a large-scale computational problem and identify generalizable patterns that can be applied to a solution.** 11-12.AP.17
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- 18 Modularity: Demonstrate code reuse by creating programming solutions using libraries and application programming interfaces.** 11-12.AP.18
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- 19 Program Development: Plan and develop programs for broad audiences using a software life cycle process.** 11-12.AP.19
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- 20 Program Development: Demonstrate conversion of source code into machine code using compilers or interpreters.** 11-12.AP.20
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- 21 Program Development: Explain security issues that might lead to compromised computer programs.** 11-12.AP.21
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- 22 Program Development: Develop programs for multiple computing platforms.** 11-12.AP.22
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- 23 Program Development: Use version control systems, integrated development environments, and collaborative tools and practices (code documentation) in a group software project.** 11-12.AP.23
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- 24 Program Development: Develop and use a series of test cases to verify that a program performs according to its design specifications.** 11-12.AP.24
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- 25 Program Development: Discuss social, economic, and ethical consequences of malfunctioning software and software updates.** 11-12.AP.25
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- 26 Program Development: Modify an existing program to add additional functionality and discuss intended and unintended implications (e.g., breaking other functionality).** 11-12.AP.26
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- 27 Program Development: Evaluate key qualities of a program through a process such as a code review.** 11-12.AP.27
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- 28 Program Development: Compare multiple programming languages and discuss how their features make them suitable for solving different types of problems.** 11-12.AP.28
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- 29 Culture: Evaluate computational artifacts to maximize their beneficial effects and minimize harmful effects on society.** 11-12.IC.29

## Impacts of Computing

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**30 Culture: Evaluate the impact of equity, access, and influence on the distribution of computing resources in a global society.** 11-12.IC.30

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**31 Culture: Predict how computational innovations that have revolutionized aspects of our culture might evolve.** 11-12.IC.31

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**32 Safety Law and Ethics: Debate laws and regulations that impact the development and use of software.** 11-12.IC.32

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**Emerging and Future Technologies**

**A Explain that the field of emerging technologies will be evolving and rapidly growing.** 11-12.ET.A

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**B Compare existing and emerging technologies, ideas, and concepts.** 11-12.ET.B

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**C Describe how emerging technologies are influencing current events at a local and global scale.** 11-12.ET.C

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**D Predict the positive and negative societal, cultural, and economic impacts that emerging and future technologies may generate.** 11-12.ET.D

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**E Create new or original work by applying emerging technologies.** 11-12.ET.E

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