

By the end of 12th Grade

Computing Systems CS

D. Devices D

Not addressed at this level

HS. Hardware & Software HS

- 1 Identify, categorize, and illustrate the roles of operating systems to include memory management, data storage/retrieval, process management, and access control. 12.CS.HS.01

T. Troubleshooting T

Not addressed at this level

Networks and the Internet NI

NCO. Network Communication & Organization NCO

- 1 Evaluate the scalability and reliability of networks by identifying and describing the relationship between routers, switches, servers, topology, protocols, and addressing. 12.NI.NCO.01

Not addressed at this level

C. Cybersecurity C

- 1 Compare and refine ways software developers protect devices and information from unauthorized access including complex encryption algorithms such as public key encryption. 12.NI.C.01

Not addressed at this level

Not addressed at this level

Not addressed at this level

Not addressed at this level

Data Analysis DA

S. Storage S

Not addressed at this level

CVT. Collection, Visualization & Transformation CVT

- 1 Use data analysis tools and techniques to identify patterns in data representing complex systems. 12.DA.CVT.01
- 2 Use a variety of robust data collection techniques and tools to generate data sets that support a claim or communicate information. 12.DA.CVT.02

IM. Inference & Models IM

- 1 Evaluate the ability of models and simulations to test and support refinement of hypotheses. 12.DA.IM.01
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Algorithms and Programming AP**A. Algorithms** A

- 1 Describe how artificial intelligence drives many software and physical systems (e.g., autonomous robots, computer vision, pattern recognition, test analysis). 12.AP.A.01
 - 2 Design and implement an algorithm to play a game against a human opponent or solve a problem. 12.AP.A.02
 - 3 Design and implement encryption algorithms to securely store and retrieve information. 12.AP.A.03
 - 4 Analyze and refine classic algorithms to solve problems. 12.AP.A.04
 - 5 Evaluate algorithms (e.g., searching, sorting) in terms of their efficiency, correctness, and clarity. 12.AP.A.05
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V. Variables V

- 1 Compare and contrast foundational data structures and their primary functions. 12.AP.V.01
- Not addressed at this level
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C. Control C

- 1 Illustrate the flow of execution of a recursive algorithm 12.AP.C.01
- Not addressed at this level
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M. Modularity M

- 1 Construct solutions to problems using student-created components, such as procedures, modules, and objects to implement abstractions. 12.AP.M.01
- 2 Analyze a large-scaled computational problem and identify generalizable patterns that can be applied to a solution 12.AP.M.02
- 3 Create programming solutions using libraries and APIs through the application of code reuse. 12.AP.M.03

PD. Program Development PD

- 1 Utilize a software lifecycle process that considers security, to plan and develop programs for all types of users. 12.AP.PD.01
 - 2 Explain security issues that might lead to comprised computer programs. 12.AP.PD.02
 - 3 Develop different programs for various computing platforms (e.g., desktop, web, mobile). 12.AP.PD.03
 - 4 Design software collaboratively using integrated development environments (IDEs), with version control and collaboration systems. 12.AP.PD.04
 - 5 Develop and use a series of test cases to verify that a program performs according to its design specifications. 12.AP.PD.05
 - 6 Modify an existing program to add additional functionality and discuss intended and unintended implications (e.g., breaking other functionality). 12.AP.PD.06
 - 7 Compare multiple programming languages or libraries and discuss how their features make them suitable for solving different types of problems. 12.AP.PD.07
 - 8 Evaluate key qualities of a program through a process such as code review. 12.AP.PD.08
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Impacts of Computing IC**C. Culture and Diversity** C

- 1 Evaluate the positive and negative implications computational artifacts have on society 12.IC.C.01
 - 2 Evaluate the impact of equity, access, and influence on the distribution of computing resources in the global society. 12.IC.C.02
 - 3 Predict evolutionary trends of computational innovations that have revolutionized aspects of global society. 12.IC.C.03
 - 4 Predict how computational innovations may revolutionize aspects of global society 12.IC.C.04
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SI. Social Interactions SI

- 1 Debate the laws and regulations that govern and impact the development of computing innovations and policies. 12.IC.SI.01
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Safety, Law & Ethics

- 1 Investigate reasons new technologies require evaluation of existing laws and regulations and the creation of new legislation. 12.IC.SLE.01
- 2 Explain the privacy concerns related to the collection, generation, and analysis of large-scaled data that may not be evident to users. 12.IC.SLE.02
- 3 Evaluate the social and economic implications of privacy in the context of safety, law, and ethics. 12.IC.SLE.03