PLTW Computer Science Standards Connection
Computer Science Principles

Connections to Standards in Computer Science

PLTW curriculum is designed to empower students to thrive in an evolving world. As a part of the design process when developing and updating our curriculum, we focus on connections to a variety of standards. PLTW Computer Science Principles connects to standards in the following:

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Computing Systems

3A-CS-01

Explain how abstractions hide the underlying implementation details of computing systems embedded in everyday objects.

Unit 1			Unit 2			Unit 3			Unit 4		
1.1	1.2	1.3	2.1	2.2	2.3	3.1	3.2	3.3	4.1	4.2	4.3
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3A-CS-02

Compare levels of abstraction and interactions between application software, system software, and hardware layers.

Unit 1			Unit 2			Unit 3			Unit 4		
1.1	1.2	1.3	2.1	2.2	2.3	3.1	3.2	3.3	4.1	4.2	4.3
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3A-CS-03

Develop guidelines that convey systematic troubleshooting strategies that others can use to identify and fix errors.

Unit 1			Unit 2			Unit 3			Unit 4		
1.1	1.2	1.3	2.1	2.2	2.3	3.1	3.2	3.3	4.1	4.2	4.3
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Networks and the Internet

3A-NI-04

Evaluate the scalability and reliability of networks by describing the relationship between routers, switches, servers, topology, and addressing.

Unit 1			Unit 2			Unit 3			Unit 4		
1.1	1.2	1.3	2.1	2.2	2.3	3.1	3.2	3.3	4.1	4.2	4.3
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3A-NI-05

Give examples to illustrate how sensitive data can be affected by malware and other attacks.

Unit 1			Unit 2			Unit 3			Unit 4		
1.1	1.2	1.3	2.1	2.2	2.3	3.1	3.2	3.3	4.1	4.2	4.3
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3A-NI-06

Recommend security measures to address various scenarios based on factors such as efficiency, feasibility, and ethical impacts.

Unit 1			Unit 2			Unit 3			Unit 4		
1.1	1.2	1.3	2.1	2.2	2.3	3.1	3.2	3.3	4.1	4.2	4.3
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Data and Analysis

3A-DA-09

Translate between different bit representations of real-world phenomena, such as characters, numbers, and images.

Unit 1			Unit 2			Unit 3			Unit 4		
1.1	1.2	1.3	2.1	2.2	2.3	3.1	3.2	3.3	4.1	4.2	4.3
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3A-DA-10

Evaluate the trade-offs in how data elements are organized and where data is stored.

Unit 1			Unit 2			Unit 3			Unit 4		
1.1	1.2	1.3	2.1	2.2	2.3	3.1	3.2	3.3	4.1	4.2	4.3
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3A-DA-11

Create interactive data visualizations using software tools to help others better understand real-world phenomena.

Unit 1			Unit 2			Unit 3			Unit 4		
1.1	1.2	1.3	2.1	2.2	2.3	3.1	3.2	3.3	4.1	4.2	4.3
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3A-DA-12

Create computational models that represent the relationships among different elements of data collected from a phenomenon or process.

Unit 1			Unit 2			Unit 3			Unit 4		
1.1	1.2	1.3	2.1	2.2	2.3	3.1	3.2	3.3	4.1	4.2	4.3
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Algorithms and Programming

3A-AP-13

Create prototypes that use algorithms to solve computational problems by leveraging prior student knowledge and personal interests.

Unit 1			Unit 2			Unit 3			Unit 4		
1.1	1.2	1.3	2.1	2.2	2.3	3.1	3.2	3.3	4.1	4.2	4.3
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3A-AP-14

Use lists to simplify solutions, generalizing computational problems instead of repeated use of simple variables.

Unit 1			Unit 2			Unit 3			Unit 4		
1.1	1.2	1.3	2.1	2.2	2.3	3.1	3.2	3.3	4.1	4.2	4.3
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3A-AP-15

Justify the selection of specific control structures when trade-offs involve implementation, readability, and program performance, and explain the benefits and drawbacks of choices made.

Unit 1			Unit 2			Unit 3			Unit 4		
1.1	1.2	1.3	2.1	2.2	2.3	3.1	3.2	3.3	4.1	4.2	4.3
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3A-AP-16

Design and iteratively develop computational artifacts for practical intent, personal expression, or to address a societal issue by using events to initiate instructions.

Unit 1			Unit 2			Unit 3			Unit 4		
1.1	1.2	1.3	2.1	2.2	2.3	3.1	3.2	3.3	4.1	4.2	4.3
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3A-AP-17

Decompose problems into smaller components through systematic analysis, using constructs such as procedures, modules, and/or objects.

Unit 1			Unit 2			Unit 3			Unit 4		
1.1	1.2	1.3	2.1	2.2	2.3	3.1	3.2	3.3	4.1	4.2	4.3
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3A-AP-18

Create artifacts by using procedures within a program, combinations of data and procedures, or independent but interrelated programs.

Unit 1			Unit 2			Unit 3			Unit 4		
1.1	1.2	1.3	2.1	2.2	2.3	3.1	3.2	3.3	4.1	4.2	4.3
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3A-AP-21

Evaluate and refine computational artifacts to make them more usable and accessible.

Unit 1			Unit 2			Unit 3			Unit 4		
1.1	1.2	1.3	2.1	2.2	2.3	3.1	3.2	3.3	4.1	4.2	4.3
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3A-AP-22

Design and develop computational artifacts working in team roles using collaborative tools.

Unit 1			Unit 2			Unit 3			Unit 4		
1.1	1.2	1.3	2.1	2.2	2.3	3.1	3.2	3.3	4.1	4.2	4.3
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3A-AP-23

Document design decisions using text, graphics, presentations, and/or demonstrations in the development of complex programs.

Unit 1			Unit 2			Unit 3			Unit 4		
1.1	1.2	1.3	2.1	2.2	2.3	3.1	3.2	3.3	4.1	4.2	4.3
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Impacts of Computing

3A-IC-24

Evaluate the ways computing impacts personal, ethical, social, economic, and cultural practices.

Unit 1			Unit 2			Unit 3			Unit 4		
1.1	1.2	1.3	2.1	2.2	2.3	3.1	3.2	3.3	4.1	4.2	4.3
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3A-IC-26

Demonstrate ways a given algorithm applies to problems across disciplines.

Unit 1			Unit 2			Unit 3			Unit 4		
1.1	1.2	1.3	2.1	2.2	2.3	3.1	3.2	3.3	4.1	4.2	4.3
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3A-IC-28

Explain the beneficial and harmful effects that intellectual property laws can have on innovation.

Unit 1			Unit 2			Unit 3			Unit 4		
1.1	1.2	1.3	2.1	2.2	2.3	3.1	3.2	3.3	4.1	4.2	4.3
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3A-IC-29

Explain the privacy concerns related to the collection and generation of data through automated processes that may not be evident to users.

Unit 1			Unit 2			Unit 3			Unit 4		
1.1	1.2	1.3	2.1	2.2	2.3	3.1	3.2	3.3	4.1	4.2	4.3
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3A-IC-30

Evaluate the social and economic implications of privacy in the context of safety, law, or ethics.

Unit 1			Unit 2			Unit 3			Unit 4		
1.1	1.2	1.3	2.1	2.2	2.3	3.1	3.2	3.3	4.1	4.2	4.3
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Computing Systems

3B-CS-02

Illustrate ways computing systems implement logic, input, and output through hardware components.

Unit 1			Unit 2			Unit 3			Unit 4		
1.1	1.2	1.3	2.1	2.2	2.3	3.1	3.2	3.3	4.1	4.2	4.3
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Networks and the Internet

3B-NI-03

Describe the issues that impact network functionality (e.g., bandwidth, load, delay, topology).

Unit 1			Unit 2			Unit 3			Unit 4		
1.1	1.2	1.3	2.1	2.2	2.3	3.1	3.2	3.3	4.1	4.2	4.3
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Data and Analysis

3B-DA-05

Use data analysis tools and techniques to identify patterns in data representing complex systems.

Unit 1			Unit 2			Unit 3			Unit 4		
1.1	1.2	1.3	2.1	2.2	2.3	3.1	3.2	3.3	4.1	4.2	4.3
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3B-DA-06

Select data collection tools and techniques to generate data sets that support a claim or communicate information.

Unit 1			Unit 2			Unit 3			Unit 4		
1.1	1.2	1.3	2.1	2.2	2.3	3.1	3.2	3.3	4.1	4.2	4.3
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3B-DA-07

Evaluate the ability of models and simulations to test and support the refinement of hypotheses.

Unit 1			Unit 2			Unit 3			Unit 4		
1.1	1.2	1.3	2.1	2.2	2.3	3.1	3.2	3.3	4.1	4.2	4.3
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Algorithms and Programming

3B-AP-08

Describe how artificial intelligence drives many software and physical systems.

Unit 1			Unit 2			Unit 3			Unit 4		
1.1	1.2	1.3	2.1	2.2	2.3	3.1	3.2	3.3	4.1	4.2	4.3
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3B-AP-10

Use and adapt classic algorithms to solve computational problems.

Unit 1			Unit 2			Unit 3			Unit 4		
1.1	1.2	1.3	2.1	2.2	2.3	3.1	3.2	3.3	4.1	4.2	4.3
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3B-AP-11

Evaluate algorithms in terms of their efficiency, correctness, and clarity.

Unit 1			Unit 2			Unit 3			Unit 4		
1.1	1.2	1.3	2.1	2.2	2.3	3.1	3.2	3.3	4.1	4.2	4.3
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3B-AP-14

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

Unit 1			Unit 2			Unit 3			Unit 4		
1.1	1.2	1.3	2.1	2.2	2.3	3.1	3.2	3.3	4.1	4.2	4.3
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3B-AP-15

Analyze a large-scale computational problem and identify generalizable patterns that can be applied to a solution.

Unit 1			Unit 2			Unit 3			Unit 4		
1.1	1.2	1.3	2.1	2.2	2.3	3.1	3.2	3.3	4.1	4.2	4.3
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3B-AP-16

Demonstrate code reuse by creating programming solutions using libraries and APIs.

Unit 1			Unit 2			Unit 3			Unit 4		
1.1	1.2	1.3	2.1	2.2	2.3	3.1	3.2	3.3	4.1	4.2	4.3
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3B-AP-17

Plan and develop programs for broad audiences using a software life cycle process.

Unit 1			Unit 2			Unit 3			Unit 4		
1.1	1.2	1.3	2.1	2.2	2.3	3.1	3.2	3.3	4.1	4.2	4.3
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3B-AP-18

Explain security issues that might lead to compromised computer programs.

Unit 1			Unit 2			Unit 3			Unit 4		
1.1	1.2	1.3	2.1	2.2	2.3	3.1	3.2	3.3	4.1	4.2	4.3
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3B-AP-20

Use version control systems, integrated development environments (IDEs), and collaborative tools and practices (code documentation) in a group software project.

Unit 1			Unit 2			Unit 3			Unit 4		
1.1	1.2	1.3	2.1	2.2	2.3	3.1	3.2	3.3	4.1	4.2	4.3
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3B-AP-21

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

Unit 1			Unit 2			Unit 3			Unit 4		
1.1	1.2	1.3	2.1	2.2	2.3	3.1	3.2	3.3	4.1	4.2	4.3
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3B-AP-22

Modify an existing program to add additional functionality and discuss intended and unintended implications (e.g., breaking other functionality).

Unit 1			Unit 2			Unit 3			Unit 4		
1.1	1.2	1.3	2.1	2.2	2.3	3.1	3.2	3.3	4.1	4.2	4.3
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3B-AP-23

Evaluate key qualities of a program through a process such as a code review.

Unit 1			Unit 2			Unit 3			Unit 4		
1.1	1.2	1.3	2.1	2.2	2.3	3.1	3.2	3.3	4.1	4.2	4.3
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3B-AP-24

Compare multiple programming languages and discuss how their features make them suitable for solving different types of problems.

Unit 1			Unit 2			Unit 3			Unit 4		
1.1	1.2	1.3	2.1	2.2	2.3	3.1	3.2	3.3	4.1	4.2	4.3
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Impacts of Computing

3B-IC-25

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

Unit 1			Unit 2			Unit 3			Unit 4		
1.1	1.2	1.3	2.1	2.2	2.3	3.1	3.2	3.3	4.1	4.2	4.3
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3B-IC-26

Evaluate the impact of equity, access, and influence on the distribution of computing resources in a global society.

Unit 1			Unit 2			Unit 3			Unit 4		
1.1	1.2	1.3	2.1	2.2	2.3	3.1	3.2	3.3	4.1	4.2	4.3
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3B-IC-27

Predict how computational innovations that have revolutionized aspects of our culture might evolve.

Unit 1			Unit 2			Unit 3			Unit 4		
1.1	1.2	1.3	2.1	2.2	2.3	3.1	3.2	3.3	4.1	4.2	4.3
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STEL 1 Nature and Characteristics of Technology and Engineering

STEL-1Q

Conduct research to inform intentional inventions and innovations that address specific needs and wants.

Unit 1			Unit 2			Unit 3			Unit 4		
1.1	1.2	1.3	2.1	2.2	2.3	3.1	3.2	3.3	4.1	4.2	4.3
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STEL-1R

Develop a plan that incorporates knowledge from science, mathematics, and other disciplines to design or improve a technological product or system.

Unit 1			Unit 2			Unit 3			Unit 4		
1.1	1.2	1.3	2.1	2.2	2.3	3.1	3.2	3.3	4.1	4.2	4.3
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STEL 4 Impacts of Technology

STEL-4P

Evaluate ways that technology can impact individuals, society, and the environment.

Unit 1			Unit 2			Unit 3			Unit 4		
1.1	1.2	1.3	2.1	2.2	2.3	3.1	3.2	3.3	4.1	4.2	4.3
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STEL-4S

Develop a solution to a technological problem that has the least negative environmental and social impact.

Unit 1			Unit 2			Unit 3			Unit 4		
1.1	1.2	1.3	2.1	2.2	2.3	3.1	3.2	3.3	4.1	4.2	4.3
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Standards for Technological and Engineering Literacy

STEL-4T

Evaluate how technologies alter human health and capabilities.

Unit 1			Unit 2			Unit 3			Unit 4		
1.1	1.2	1.3	2.1	2.2	2.3	3.1	3.2	3.3	4.1	4.2	4.3
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STEL 5 Influence of Society on Technological Development

STEL-5H

Evaluate a technological innovation that arose from a specific society's unique need or want.

Unit 1			Unit 2			Unit 3			Unit 4		
1.1	1.2	1.3	2.1	2.2	2.3	3.1	3.2	3.3	4.1	4.2	4.3
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STEL 6 History of Technology

STEL-6F

Relate how technological development has been evolutionary, often the result of a series of refinements to basic inventions or technological knowledge.

Unit 1			Unit 2			Unit 3			Unit 4		
1.1	1.2	1.3	2.1	2.2	2.3	3.1	3.2	3.3	4.1	4.2	4.3
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STEL-6G

Verify that the evolution of civilization has been directly affected by, and has in turn affected, the development and use of tools, materials and processes.

Unit 1			Unit 2			Unit 3			Unit 4		
1.1	1.2	1.3	2.1	2.2	2.3	3.1	3.2	3.3	4.1	4.2	4.3
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STEL-6H

Evaluate how technology has been a powerful force in reshaping the social, cultural, political, and economic landscapes throughout history.

Unit 1			Unit 2			Unit 3			Unit 4		
1.1	1.2	1.3	2.1	2.2	2.3	3.1	3.2	3.3	4.1	4.2	4.3
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STEL-6J

Investigate the widespread changes that have resulted from the Information Age, which has placed emphasis on the processing and exchange of information.

Unit 1			Unit 2			Unit 3			Unit 4		
1.1	1.2	1.3	2.1	2.2	2.3	3.1	3.2	3.3	4.1	4.2	4.3
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Standards for Technological and Engineering Literacy

STEL 7 Design in Technology and Engineering Education

STEL-7W

Determine the best approach by evaluating the purpose of the design.

Unit 1			Unit 2			Unit 3			Unit 4		
1.1	1.2	1.3	2.1	2.2	2.3	3.1	3.2	3.3	4.1	4.2	4.3
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STEL-7Y

Optimize a design by addressing desired qualities within criteria and constraints.

Unit 1			Unit 2			Unit 3			Unit 4		
1.1	1.2	1.3	2.1	2.2	2.3	3.1	3.2	3.3	4.1	4.2	4.3
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STEL-7AA

Illustrate principles, elements and factors of design.

Unit 1			Unit 2			Unit 3			Unit 4		
1.1	1.2	1.3	2.1	2.2	2.3	3.1	3.2	3.3	4.1	4.2	4.3
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STEL-7BB

Implement the best possible solution to a design.

Unit 1			Unit 2			Unit 3			Unit 4		
1.1	1.2	1.3	2.1	2.2	2.3	3.1	3.2	3.3	4.1	4.2	4.3
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STEL-7CC

Apply a broad range of design skills to their design process.

Unit 1			Unit 2			Unit 3			Unit 4		
1.1	1.2	1.3	2.1	2.2	2.3	3.1	3.2	3.3	4.1	4.2	4.3
☑	☑	☑	☑	☑	☑	☐	☑	☑	☑	☑	☑

STEL-7DD

Apply a broad range of making skills to their design process.

Unit 1			Unit 2			Unit 3			Unit 4		
1.1	1.2	1.3	2.1	2.2	2.3	3.1	3.2	3.3	4.1	4.2	4.3
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