PLTW Launch Standards Connection

Programming Patterns

Connections to Standards in PLTW Launch

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. This PLTW Launch module connects to standards in the following:

Next Generation Science Standards

Engineering Design

3-5-ETS1-1

Define a simple design problem reflecting a need or a want that includes specified criteria for success and constraints on materials, time, or cost.

3-5-ETS1-2

Generate and compare multiple possible solutions to a problem based on how well each is likely to meet the criteria and constraints of the problem.

3-5-ETS1-3

Plan and carry out fair tests in which variables are controlled and failure points are considered to identify aspects of a model or prototype that can be improved.

Science and Engineering Practices: Asking Questions and Defining Problems

Asking questions and defining problems in 3–5 builds on K–2 experiences and progresses to specifying qualitative relationships.

Science and Engineering Practices: Developing and Using Models

Modeling in 3–5 builds on K–2 experiences and progresses to building and revising simple models and using models to represent events and design solutions.

Science and Engineering Practices: Planning and Carrying Out Investigations

Planning and carrying out investigations to answer questions or test solutions to problems in 3–5 builds on K–2 experiences and progresses to include investigations that control variables and provide evidence to support explanations or design solutions.

Science and Engineering Practices: Analyzing and Interpreting Data

Analyzing data in 3–5 builds on K–2 experiences and progresses to introducing quantitative approaches to collecting data and conducting multiple trials of qualitative observations. When possible and feasible, digital tools should be used.

Science and Engineering Practices: Using Mathematics and Computational Thinking

Mathematical and computational thinking in 3–5 builds on K–2 experiences and progresses to extending quantitative measurements to a variety of physical properties and using computation and mathematics to analyze data and compare alternative design solutions.

Next Generation Science Standards

Science and Engineering Practices: Constructing Explanations and Designing Solutions

Constructing explanations and designing solutions in 3–5 builds on K–2 experiences and progresses to the use of evidence in constructing explanations that specify variables that describe and predict phenomena and in designing multiple solutions to design problems.

Science and Engineering Practices: Engaging in Argument from Evidence

Engaging in argument from evidence in 3–5 builds on K–2 experiences and progresses to critiquing the scientific explanations or solutions proposed by peers by citing relevant evidence about the natural and designed world(s).

Science and Engineering Practices: Obtaining, Evaluating, and Communicating Information

Obtaining, evaluating, and communicating information in 3–5 builds on K–2 experiences and progresses to evaluating the merit and accuracy of ideas and methods.

Disciplinary Core Ideas (3-5)

Engineering, Technology, and Applications of Science

ETS1.A Defining and Delimiting Engineering Problems

• Possible solutions to a problem are limited by available materials and resources (constraints). The success of a designed solution is determined by considering the desired features of a solution (criteria). Different proposals for solutions can be compared on the basis of how well each one meets the specified criteria for success or how well each takes the constraints into account.

ETS1.B Developing Possible Solutions

• Research on a problem should be carried out before beginning to design a solution.

ETS1.B Developing Possible Solutions

• At whatever stage, communicating with peers about proposed solutions is an important part of the design process, and shared ideas can lead to improved designs.

ETS1.B Developing Possible Solutions

• Tests are often designed to identify failure points or difficulties, which suggest the elements of the design that need to be improved.

ETS1.C Optimizing the Design Solution

• Different solutions need to be tested in order to determine which of them best solves the problem, given the criteria and the constraints.

Next Generation Science Standards

Crosscutting Concepts (3-5)

Patterns – Observed patterns in nature guide organization and classification and prompt questions about relationships and causes underlying them.

- Patterns of change can be used to make predictions.

Cause and Effect: Mechanism and Prediction – Events have causes, sometimes simple, sometimes multifaceted. Deciphering causal relationships, and the mechanisms by which they are mediated, is a major activity of science and engineering.

- Cause and effect relationships are routinely identified, tested, and used to explain change.

Connections to Engineering, Technology, and Applications of Science (3-5)

Influence of Science, Engineering, and Technology on Society and the Natural World

- People’s needs and wants change over time, as do their demands for new and improved technologies.

- Engineers improve existing technologies or develop new ones to increase their benefits, to decrease known risks, and to meet societal demands.

Computer Science Teachers Association K-12 Computer Science

In Spring 2023 PLTW submitted all necessary documentation required by the Computer Science Teachers Association (CSTA) for a crosswalk review of our Launch and Gateway curricula by the CSTA Standards Review Team. While we anticipate approval and validation by CSTA, the review is pending.

Computing Systems

Hardware & Software

1B-CS-02

Model how computer hardware and software work together as a system to accomplish tasks.

Troubleshooting

1B-CS-03

Determine potential solutions to solve simple hardware and software problems using common troubleshooting strategies.

Networks and the Internet

Cybersecurity

1B-NI-05

Discuss real-world cybersecurity problems and how personal information can be protected.

Algorithms and Programming

Algorithms

1B-AP-08

Compare and refine multiple algorithms for the same task and determine which is the most appropriate.

Control

1B-AP-10

Create programs that include sequences, events, loops, and conditionals.

Modularity

1B-AP-11

Decompose (break down) problems into smaller, manageable subproblems to facilitate the program development process.

Program Development

1B-AP-13

Use an iterative process to plan the development of a program by including others' perspectives and considering user preferences.

Computer Science Teachers Association K-12 Computer Science

Program Development

1B-AP-15

Test and debug (identify and fix errors) a program or algorithm to ensure it runs as intended.

Program Development

1B-AP-16

Take on varying roles, with teacher guidance, when collaborating with peers during the design, implementation, and review stages of program development.

Program Development

1B-AP-17

Describe choices made during program development using code comments, presentations, and demonstrations.

Common Core State Standards English Language Arts - Third Grade

Reading Informational Text Standards

Key Ideas and Details

CCSS.ELA-LITERACY.RI.3.1

Ask and answer questions to demonstrate understanding of a text, referring explicitly to the text as the basis for the answers.

CCSS.ELA-LITERACY.RI.3.2

Determine the main idea of a text; recount the key details and explain how they support the main idea.

CCSS.ELA-LITERACY.RI.3.3

Describe the relationship between a series of historical events, scientific ideas or concepts, or steps in technical procedures in a text, using language that pertains to time, sequence, and cause/effect.

Writing Standards

Text Types and Purposes

CCSS.ELA-LITERACY.W.3.3

Write narratives to develop real or imagined experiences or events using effective technique, descriptive details, and clear event sequences.

Production and Distribution of Writing

CCSS.ELA-LITERACY.W.3.6

With guidance and support from adults, use technology to produce and publish writing (using keyboarding skills) as well as to interact and collaborate with others.

Speaking and Listening Standards

Comprehension and Collaboration

CCSS.ELA-LITERACY.SL.3.1

Engage effectively in a range of collaborative discussions (one-on-one, in groups, and teacher-led) with diverse partners on grade 3 topics and texts, building on others' ideas and expressing their own clearly.

CCSS.ELA-LITERACY.SL.3.2

Determine the main ideas and supporting details of a text read aloud or information presented in diverse media and formats, including visually, quantitatively, and orally.

Language Standards

Conventions of Standard English

CCSS.ELA-LITERACY.L.3.1

Demonstrate command of the conventions of standard English grammar and usage when writing or speaking.

Common Core State Standards English Language Arts - Third Grade

CCSS.ELA-LITERACY.L.3.1.A

Explain the function of nouns, pronouns, verbs, adjectives, and adverbs in general and their functions in particular sentences.

Common Core State Standards Mathematics - Third Grade

Mathematical Practices

CCSS.MATH.PRACTICE.MP1

Make sense of problems and persevere in solving them.

CCSS.MATH.PRACTICE.MP2

Reason abstractly and quantitatively.

CCSS.MATH.PRACTICE.MP3

Construct viable arguments and critique the reasoning of others.

CCSS.MATH.PRACTICE.MP5

Use appropriate tools strategically.

CCSS.MATH.PRACTICE.MP6

Attend to precision.

CCSS.MATH.PRACTICE.MP8

Look for and express regularity in repeated reasoning.

References

Computer Science Teachers Association. (2017). *CSTA K-12 Computer Science Standards, revised 2017*. http://www.csteachers.org/standards

National Governors Association Center for Best Practices, & Council of Chief State School Officers. (2010). *Common Core State Standards.* National Governors Association Center for Best Practices, Council of Chief State School Officers.

NGSS Lead States. (2013). *Next Generation Science Standards: For states, by states.* National Academies Press.