PLTW

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

Matter and Its Interactions

5-PS1-1

Develop a model to describe that matter is made of particles too small to be seen.

5-PS1-2

Measure and graph quantities to provide evidence that regardless of the type of change that occurs when heating, cooling, or mixing substances, the total weight of matter is conserved.

5-PS1-3

Make observations and measurements to identify materials based on their properties.

5-PS1-4

Conduct an investigation to determine whether the mixing of two or more substances results in new substances.

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.

• Define a simple design problem that can be solved through the development of an object, tool, process, or system and includes several criteria for success and constraints on materials, time, or cost.

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.

• Develop and/or use models to describe and/or predict phenomena.

Next Generation Science Standards

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.

- Plan and conduct an investigation collaboratively to produce data to serve as the basis for evidence, using fair tests in which variables are controlled and the number of trials considered.

- Make observations and/or measurements to produce data to serve as the basis for evidence for an explanation of a phenomenon or test a design solution.

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.

- Represent data in tables and/or various graphical displays (bar graphs, pictographs and/or pie charts) to reveal patterns that indicate relationships.

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.

- Describe, measure, estimate, and/or graph quantities (e.g., area, volume, weight, time) to address scientific and engineering questions and problems.

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.

- Generate and compare multiple solutions to a problem based on how well they meet the criteria and constraints of the design solution.

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).

- Make a claim about the merit of a solution to a problem by citing relevant evidence about how it meets the criteria and constraints of the problem.

Next Generation Science Standards

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.

• Obtain and combine information from books and/or other reliable media to explain phenomena or solutions to a design problem.

Disciplinary Core Ideas (3-5)

Physical Science

PS1.A Structure and Properties of Matter

• Matter of any type can be subdivided into particles that are too small to see, but even then the matter still exists and can be detected by other means. A model shows that gases are made from matter particles that are too small to see and are moving freely around in space can explain many observations, including the inflation and shape of a balloon and the effects of air on larger particles or objects.

PS1.A Structure and Properties of Matter

• The amount (weight) of matter is conserved when it changes form, even in transitions in which it seems to vanish.

PS1.A Structure and Properties of Matter

• Measurements of a variety of properties can be used to identify materials.

PS1.B Chemical Reactions

• When two or more different substances are mixed, a new substance with different properties may be formed.

PS1.B Chemical Reactions

• No matter what reaction or change in properties occurs, the total weight of the substances does not change.

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.

Next Generation Science Standards

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.

Crosscutting Concepts (3-5)

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.

Scale, Proportion, and Quantity – In considering phenomena, it is critical to recognize what is relevant at different size, time, and energy scales, and to recognize proportional relationships between different quantities as scales change.

• Natural objects and/or observable phenomena exist from very short to very long time periods.

• Standard units are used to measure and describe physical quantities such as weight, time, temperature, and volume.

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.

Connections to the Nature of Science (3-5)

Scientific Knowledge Assumes an Order and Consistency in Natural Systems

• Science assumes consistent patterns in natural systems.

Scientific Investigations Use a Variety of Methods

• Science investigations use a variety of methods, tools, and techniques.

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

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.

Common Core State Standards English Language Arts - Fifth Grade

Reading Informational Text Standards

Integration of Knowledge and Ideas

CCSS.ELA-LITERACY.RI.5.7

Draw on information from multiple print or digital sources, demonstrating the ability to locate an answer to a question quickly or to solve a problem efficiently.

Writing Standards

Research to Build and Present Knowledge

CCSS.ELA-LITERACY.W.5.8

Recall relevant information from experiences or gather relevant information from print and digital sources; summarize or paraphrase information in notes and finished work, and provide a list of sources.

CCSS.ELA-LITERACY.W.5.9

Draw evidence from literary or informational texts to support analysis, reflection, and research.

Speaking and Listening Standards

Comprehension and Collaboration

CCSS.ELA-LITERACY.SL.5.1

Engage effectively in a range of collaborative discussions (one-on-one, in groups, and teacher-led) with diverse partners on grade 5 topics and texts, building on others' ideas and expressing their own clearly.

CCSS.ELA-LITERACY.SL.5.2

Summarize a written text read aloud or information presented in diverse media and formats, including visually, quantitatively, and orally.

CCSS.ELA-LITERACY.SL.5.4

Report on a topic or text or present an opinion, sequencing ideas logically and using appropriate facts and relevant, descriptive details to support main ideas or themes; speak clearly at an understandable pace.

Common Core State Standards Mathematics - Fifth Grade

Measurement and Data

Geometric measurement: understand concepts of volume and relate volume to multiplication and to addition.

CCSS.MATH.CONTENT.5.MD.C.3

Recognize volume as an attribute of solid figures and understand concepts of volume measurement.

CCSS.MATH.CONTENT.5.MD.C.4

Measure volumes by counting unit cubes, using cubic cm, cubic in, cubic ft, and improvised units.

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.MP4

Model with mathematics.

CCSS.MATH.PRACTICE.MP5

Use appropriate tools strategically.

CCSS.MATH.PRACTICE.MP6

Attend to precision.

Common Core State Standards Mathematics - Fifth Grade

Included in Optional Extensions

Number and Operations in Base Ten

Perform operations with multi-digit whole numbers and with decimals to hundredths.

CCSS.MATH.CONTENT.5.NBT.B.5

Fluently multiply multi-digit whole numbers using the standard algorithm.

CCSS.MATH.CONTENT.5.NBT.B.6

Find whole-number quotients of whole numbers with up to four-digit dividends and two-digit divisors, using strategies based on place value, the properties of operations, and/or the relationship between multiplication and division. Illustrate and expl

Number and Operations—Fractions

Use equivalent fractions as a strategy to add and subtract fractions.

CCSS.MATH.CONTENT.5.NF.A.2

Solve word problems involving addition and subtraction of fractions referring to the same whole, including cases of unlike denominators, e.g., by using visual fraction models or equations to represent the problem. Use benchmark fractions and number s

Apply and extend previous understandings of multiplication and division to multiply and divide fractions.

CCSS.MATH.CONTENT.5.NF.B.4

Apply and extend previous understandings of multiplication to multiply a fraction or whole number by a fraction.

CCSS.MATH.CONTENT.5.NF.B.6

Solve real world problems involving multiplication of fractions and mixed numbers, e.g., by using visual fraction models or equations to represent the problem.

Measurement and Data

Convert like measurement units within a given measurement system.

CCSS.MATH.CONTENT.5.MD.A.1

Convert among different-sized standard measurement units within a given measurement system (e.g., convert 5 cm to 0.05 m), and use these conversions in solving multi-step, real world problems.

Geometry

Graph points on the coordinate plane to solve real-world and mathematical problems.

CCSS.MATH.CONTENT.5.G.A.1

Use a pair of perpendicular number lines, called axes, to define a coordinate system, with the intersection of the lines (the origin) arranged to coincide with the 0 on each line and a given point in the plane located by using an ordered pair of numb

Common Core State Standards Mathematics - Fifth Grade

Mathematical Practices

CCSS.MATH.PRACTICE.MP7

Look for and make use of structure.

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

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