



PLTW Launch Modules Overview K-5 NGSS

This curriculum guide provides standards connections for 4 bodies of standards:

1. Next Generation Science Standards (NGSS)
2. Common Core State Standards ELA (CCSS)
3. Common Core State Standards Math (CCSS)
4. Computer Science Teachers Association (CSTA) K-12 Computer Science Standards

Each PLTW Launch Module integrates science performance expectations (PEs) with science and engineering practices (SEPs), disciplinary core ideas (DCIs), and crosscutting concepts (CCCs), while focusing on engineering, computer science, or one of the three areas of science outlined in the NGSS:

- Physical Science
- Life Science
- Earth and Space Science

More information can be found in the *Teacher's Guide*, including module specific standards connections and the Curriculum Framework. The framework offers a big-picture view of the module that includes the desired results of student learning, an overview of the module's scaffolded approach to learning, and assessment opportunities found in each activity, project, and problem.



PLTW Computer Science














PLTW Engineering



 **PLTW**

LAUNCH K-5 Modules Overview

	Physical Science 	Life Science 	Earth and Space Science 	Engineering 	Computer Science 		
K	Pushes and Pulls	Living Things: Needs and Impacts	Sunlight and Weather	Structure and Function: Exploring Design	Structure and Function: Human Body	Animals and Algorithms	
1	Light and Sound	Designs Inspired by Nature	Animal Adaptations	Light: Observing the Sun, Moon, and Stars		Animated Storytelling	
2	Materials Science: Properties of Matter	Materials Science: Form and Function	Living Things: Diversity of Life	The Changing Earth		Grids and Games	
3	Stability and Motion: Forces and Interactions	Stability and Motion: Science of Flight	Variation of Traits	Environmental Changes	Life Cycles and Survival	Weather: Factors and Hazards	Programming Patterns
4	Energy Exploration	Waves and the Properties of Light	Organisms: Structure and Function	Input/Output: Human Brain	Earth: Past, Present, and Future	Earth: Human Impact and Natural Disasters	Input/Output: Computer Systems
5	Matter: Properties and Reactions	Ecosystems: Flow of Matter and Energy	Patterns in the Universe	Earth’s Water and Interconnected Systems	Robotics and Automation: Infection: Detection	Robotics and Automation: Challenge	Infection: Modeling and Simulation

		Essential Questions	NGSS Science Standard Connections	NGSS Engineering Design Standard Connections	Common Core ELA Connections	Common Core Math Connections	CSTA	
	Pushes and Pulls	In what ways do forces impact your daily life? How are pushes and pulls related? How can a step-by-step process help you design or improve a solution to a problem?	K-PS2-1 K-PS2-2	K-2-ETS1-1 K-2-ETS1-2 K-2-ETS1-3	W.K.2 SL.K.1.a SL.K.1.b SL.K.2	SL.K.3 SL.K.4 SL.K.5	K.CC.A.3 K.MD.A.2 K.MD.B.3 Math Practices 1, 3, 5	1A-IC-17 1A-IC-18
	Living Things: Needs and Impacts	How can plants and animals impact their natural environment to meet their needs? How can humans lessen their negative impact on the natural environment? How can a step-by-step process help you design or improve a solution to a problem?	K-LS1-1 K-ESS2-2 K-ESS3-1 K-ESS3-3	K-2-ETS1-1 K-2-ETS1-2 K-2-ETS1-3	RL.K.3 RI.K.1 RI.K.2	W.K.2 W.K.7 SL.K.1 SL.K.2 SL.K.4 SL.K.5	K.CC.A.1 K.CC.A.3 K.CC.B.5 K.MD.B.3 Math Practices 1, 3	1A-IC-17 1A-IC-18
	Sunlight and Weather	How does the Sun affect Earth? How does weather affect our lives? How can a step-by-step process help you design or improve a solution to a problem?	K-PS3-1 K-PS3-2 K-ESS2-1 K-ESS3-2	K-2-ETS1-1 K-2-ETS1-2 K-2-ETS1-3	RL.K.1 RL.K.3 RL.K.10	RI.K.1 RI.K.2 RI.K.10	K.CC.A.3 K.MD.A.2 Math Practices 1-3	1A-DA-06, 07 1A-IC-17, 18
	Animals and Algorithms	How do you use algorithms in your daily life? How can you use computer programming to complete a task? How can a step-by-step process help you design or improve a solution to a problem?	K-ESS3-1	K-2-ETS1-1 K-2-ETS1-2 K-2-ETS1-3	RL.K.3 W.K.3 W.K.6	SL.K.1.a SL.K.1.b SL.K.5	K.CC.A.1 K.CC.B.4 K.CC.B.5 K.G.A.1 Math Practices 1-3	1A-CS-01 1A-AP-09 → 12 1A-AP-14, 15 1A-AP-17, 18
	Structure and Function: Exploring Design	How can a step-by-step process help you design or improve a solution to a problem? How do materials impact the structure and function of an object? How does the structure of an object impact its function?		K-2-ETS1-1 K-2-ETS1-2 K-2-ETS1-3	RL.K.1 RL.K.2 RL.K.3	SL.K.1.a SL.K.1.b	K.CC.A.3 → 5 K.MD.A.2 K.G.A.2 Math Practices 1-5	1A-IC-17 1A-IC-18
	Structure and Function: Human Body	How are structure and function related? How would we function if our bodies were structured differently? How can a step-by-step process help you design or improve a solution to a problem?		K-2-ETS1-1 K-2-ETS1-2 K-2-ETS1-3	RL.K.1 RL.K.2 RL.K.3	SL.K.1.a SL.K.1.b	K.CC.A.3 → 6 Math Practices 1-5	1A-IC-17 1A-IC-18

Essential Questions

NGSS
Science
Standard

NGSS
Engineering
Design
Standard
Connections

Common Core
ELA
Connections

Common
Core Math
Connections

CSTA



Light and Sound

How do light and sound affect your life?
Why is understanding cause and effect important to your life?
How can collaboration help you solve problems?

1-PS4-1
1-PS4-2
1-PS4-3
1-PS4-4

K-2-ETS1-1
K-2-ETS1-2
K-2-ETS1-3

RL.1.1
RL.1.2
RL.1.3
RI.1.1
RI.1.2
W.1.8
SL.1.1
SL.1.2
SL.1.5

Math Practices
1, 3, 5

1A-AP-11
1A-IC-17
1A-IC-18



Designs Inspired by Nature

Why do animals communicate as they do?
How can nature inspire solutions to human problems?
How can a step-by-step process help you design or improve a solution to a problem?

1-LS1-1
1-LS1-2
1-LS3-1

K-2-ETS1-1
K-2-ETS1-2
K-2-ETS1-3

RI.1.1
RI.1.2
RI.1.10
W.1.7
W.1.8
SL.1.1
SL.1.2
SL.1.5

1.G.A.1
1.G.A.2
Math Practices
1, 3, 5

1A-AP-11
1A-IC-17
1A-IC-18

Animal Adaptations

How do plants and animals adapt to their environments?
How can nature inspire solutions to human problems?
How can a step-by-step process help you design or improve a solution to a problem?

1-LS1-1

K-2-ETS1-1
K-2-ETS1-2
K-2-ETS1-3

RL.1.1
RI.1.1
W.1.8
SL.1.2
SL.1.5
SL.1.6

1.NBT.C.4
1.MD.C.4
Math Practices
1-6

1A-DA-07
1A-AP-11
1A-IC-17
1A-IC-18



Light: Observing the Sun, Moon, and Stars

How does the Sun affect your life?
Why is understanding cause and effect important to your life?
What is the relationship between patterns and natural phenomena?

1-PS4-2
1-ESS1-1
1-ESS1-2

K-2-ETS1-1
K-2-ETS1-2
K-2-ETS1-3

RL.1.1
RI.1.1
W.1.8
SL.1.1.C
SL.1.5
SL.1.6

1.MD.A.1
1.MD.B.3
1.MD.C.4
Math Practices
1-6

1A-DA-07
1A-AP-11
1A-IC-17
1A-IC-18



Animated Storytelling





In what ways can stories be told using different tools?
How does technology impact our lives?
How can collaboration help you design or improve a solution to a problem?






K-2-ETS1-1
K-2-ETS1-2
K-2-ETS1-3





RL.1.1
RL.1.2
RL.1.3
W.1.3
W.1.6
SL.1.1.a
SL.1.2
SL.1.4





Math Practices
1-8

1A-CS-01 → 03
1A-NI-04
1A-DA-05
1A-AP-08 → 15
1A-IC-16 → 18

		Essential Questions	NGSS Science Standard	NGSS Engineering Design Standard	Common Core ELA Connections	Common Core Math Connections	CSTA
	Materials Science: Properties of Matter	What properties of materials do you need to consider when designing a product? How can we identify when something is (or is not) a solution to a problem?	2-PS1-1 2-PS1-2 2-PS1-3 2-PS1-4	K-2-ETS1-1 K-2-ETS1-2 K-2-ETS1-3	RI.2.1 RI.2.3 W.2.7 W.2.8	2.MD.D.10 Math Practices 1, 3-6	1A-DA-06 1A-DA-07 1A-AP-11 1A-IC-17 1A-IC-18
	Materials Science: Form and Function	How does the function of an object influence its form? How does nature influence design? How can a step-by-step process help you design or improve a solution to a problem?	2-PS1-2 2-PS1-3 2-LS2-2	K-2-ETS1-1 K-2-ETS1-2 K-2-ETS1-3	RL.2.1 RI.2.1 RI.2.3 W.2.8 SL.2.1 SL.2.2	Math Practices 1, 3-5	1A-AP-11 1A-IC-17 1A-IC-18
	Living Things: Diversity of Life	How do scientists learn about the world? How do diverse habitats meet the needs of organisms? How can a step-by-step process help you design or improve a solution to a problem?	2-LS2-1 2-LS4-1	K-2-ETS1-1 K-2-ETS1-2 K-2-ETS1-3	W.2.7 W.2.8	2.MD.A.1 2.MD.D.10 Math Practices 1-6	1A-DA-06 1A-DA-07 1A-AP-11 1A-IC-17 1A-IC-18
	The Changing Earth	How can something appear stable when it is actually changing? How are system models used to predict and understand real-world situations or scientific phenomena? How can a step-by-step process help you design or improve a solution to a problem?	2-ESS1-1 2-ESS2-1 2-ESS2-2 2-ESS2-3	K-2-ETS1-1 K-2-ETS1-2 K-2-ETS1-3	RL.2.1 RI.2.1 RI.2.3 W.2.7 W.2.8 SL.2.1 SL.2.2	Math Practices 1-6	1A-DA-06 1A-DA-07 1A-AP-11 1A-IC-17 1A-IC-18
	Grids and Games	How can learning from others help you design or improve a solution to a problem? In what ways can computer science impact our lives?		K-2-ETS1-1 K-2-ETS1-2	RL.2.1 RL.2.7 SL.2.1 SL.2.2	2.OA.B.2 2.NBT.B.5 Math Practices 1-4, 6	1A-CS-01 → 03 1A-NI-04 1A-DA-05 1A-AP-09 → 15 1A-IC-16 → 18

		Essential Questions	NGSS Science Standard	NGSS Engineering Design Standard	Common Core ELA Connections	Common Core Math Connections	CSTA
	Stability and Motion: Forces and Interactions	In what ways do forces impact your daily life? How do machines make life easier? How can a step-by-step process help you design or improve a solution to a problem?	3-PS2-1 3-PS2-2 3-PS2-3 3-PS2-4	3-5-ETS1-1 3-5-ETS1-2 3-5-ETS1-3	RI.3.1 W.3.7 RI.3.3 W.3.8	Math Practices 1, 3, 5	1B-CS-03 1B-NI-05
	Stability and Motion: Science of Flight	In what ways do forces impact our world? How do balanced and unbalanced forces affect aircraft flight? How can a step-by-step process help you design or improve a solution to a problem?	3-PS2-1 3-PS2-2	3-5-ETS1-1 3-5-ETS1-2 3-5-ETS1-3	RI.3.1 W.3.7 RI.3.3 W.3.8 SL.3.1	3.MD.B.4 Math Practices 1-3, 5-6	1B-CS-03 1B-NI-05 1B-DA-06, 07
	Variation of Traits	Why do some offspring look like their parents while others do not? How are traits of one generation passed to the next? How can a step-by-step process help you design or improve a solution to a problem?	3-LS3-1 3-LS3-2 3-LS4-2	3-5-ETS1-1 3-5-ETS1-2	RI.3.1 W.3.8 RI.3.2 SL.3.1 RI.3.3 SL.3.2 RI.3.4	3.MD.B.3 Math Practices 1-7	1B-CS-03 1B-NI-05 1B-DA-06, 07
	Life Cycles and Survival	Why are life cycles of organisms important for life on Earth? How do bees impact our world? How can a step-by-step process help you design or improve a solution to a problem?	3-LS1-1 3-LS2-1	3-5-ETS1-1 3-5-ETS1-2	RI.3.1 W.3.7 RI.3.2 W.3.8 RI.3.3 SL.3.1 RI.3.4	Math Practices 1-3	1B-CS-03 1B-NI-05 1B-DA-07
	Environmental Changes	How does an animal's habitat affect its survival? How do environmental changes affect organisms? How can a step-by-step process help you design or improve a solution to a problem?	3-LS4-1 3-LS4-3 3-LS4-4 3-ESS2-2	3-5-ETS1-1 3-5-ETS1-2	RI.3.1 W.3.2 RI.3.2 W.3.7 RI.3.3 W.3.8 RI.3.4 SL.3.1 SL.3.4	Math Practices 1-5	1B-CS-03 1B-NI-05 1B-DA-06, 07
	Weather: Factors and Hazards	How does weather affect our lives? How can a step-by-step process help you design or improve a solution to a problem?	3-ESS2-1 3-ESS2-2 3-ESS3-1	3-5-ETS1-1 3-5-ETS1-2 3-5-ETS1-3	RI.3.1 W.3.7 RI.3.2 W.3.8 RI.3.3 SL.3.1 RI.3.4	3.MD.A.2 Math Practices 1-3, 5-6	1B-CS-03 1B-NI-05 1B-DA-06, 07
	Programming Patterns	How does technology impact our lives? How can a step-by-step process help you design or improve a solution to a problem?		3-5-ETS1-1 3-5-ETS1-2 3-5-ETS1-3	RI.3.1 SL3.1 RI.3.2 SL.3.2 RI.3.3 L.3.1.A W.3.3 W.3.6	Math Practices 1-3, 5-6, 8	1B-CS-02, 03 1B-NI-05 1B-AP-08 1B-AP-10, 11 1B-AP-13 1B-AP-15 → 17

		Essential Questions	NGSS Science Standard Connections	NGSS Engineering Design Standard Connections	Common Core ELA Connections	Common Core Math Connections	CSTA
	Energy Exploration	Why is energy necessary? How does energy transfer affect your life? How can a step-by-step process help you construct an explanation or design a solution to a problem?	4-PS3-1 4-PS3-2 4-PS3-3 4-PS3-4	3-5-ETS1-1 3-5-ETS1-2 3-5-ETS1-3	RI.4.1 RI.4.2 RI.4.3 RI.4.4 RI.4.7 W.4.2 W.4.7 W.4.9 SL.4.1 SL.4.3 SL.4.4 SL.4.5	Math Practices 1, 3, 5-6	1B-CS-03 1B-NI-05 1B-DA-06, 07
	Input/Output: Computer Systems	How does technology impact our lives? In what ways do computing systems work together to accomplish tasks? How can a step-by-step process help you design or improve a solution to a problem?	4-PS4-3	3-5-ETS1-1 3-5-ETS1-2 3-5-ETS1-3	RI.4.3 RI.4.4 W.4.2 W.4.4 SL.4.1 SL.4.2	Math Practices 1-5, 8	1B-CS-01 → 03 1B-NI-04, 05 1B-DA-06, 07 1B-AP-08 → 17 1B-AP-19, 20
	Waves and the Properties of Light	How are waves used to predict results and solve problems? How do the properties of light allow us to see? How can we use patterns to make sense of the world? How can a step-by-step process help you design or improve a solution to a problem?	4-PS4-1 4-PS4-2	3-5-ETS1-1 3-5-ETS1-2 3-5-ETS1-3	SL.4.5	4.MD.C.5 4.MD.C.6 4.G.A.1 Math Practices 1-6	1B-CS-03 1B-NI-05 1B-DA-06, 07
	Organisms: Structure and Function	How are organisms structured to support and sustain life? How do scientists and engineers understand the world around them? How can a step-by-step process help you design or improve a solution to a problem?	4-LS1-1 4-LS1-2	3-5-ETS1-1 3-5-ETS1-2	RI.4.2 RI.4.3 RI.4.4 W.4.1.B W.4.2.D W.4.8 SL.4.1 SL.4.2 SL.4.4 SL.4.5	Math Practices 1, 3, 5-6	1B-CS-03 1B-NI-05
	Input/Output: Human Brain	How does technology impact our lives? In what ways do computing systems work together to accomplish tasks? How can a step-by-step process help you design or improve a solution to a problem?	4-LS1-2	3-5-ETS1-1 3-5-ETS1-2	RI.4.1 RI.4.2 RI.4.3 RI.4.4 RI.4.7 W.4.2 W.4.7 W.4.9 SL.4.1 SL.4.3 SL.4.4 SL.4.5	Math Practices 1,3, 5-6	1B-CS-03 1B-NI-05 1B-DA-06, 07
	Earth: Past, Present, and Future	How has Earth changed over time? Why is Earth constantly changing? How can a step-by-step process help you design or improve a solution to a problem?	4-ESS1-1 4-ESS2-1 4-ESS2-2	3-5-ETS1-1 3-5-ETS1-2 3-5-ETS1-3	RI.4.3 RI.4.4 RI.4.7 W.4.2 W.4.7 W.4.8 W.4.9 SL.4.4 SL.4.5	Math Practices 1, 3, 5-6	1B-CS-03 1B-NI-05 1B-DA-06, 07 1B-IC-21
	Earth: Human Impact and Natural Disasters	In what ways do human interactions impact Earth? How do natural hazards impact Earth? How can a step-by-step process help you design or improve a solution to a problem?	4-ESS3-1 4-ESS3-2	3-5-ETS1-1 3-5-ETS1-2	RI.4.1 RI.4.3 RI.4.4 RI.4.9 W.4.2 W.4.7 W.4.8 W.4.9 SL.4.1 SL.4.4	Math Practices 1-4	1B-CS-03 1B-NI-05 1B-DA-07

		Essential Questions	NGSS Science Standard Connections	NGSS Engineering Design Standard Connections	Common Core ELA Connections	Common Core Math Connections	CSTA	
	Matter: Properties and Reactions	How do the structures and properties of matter help us solve real-world problems? How do mechanical properties impact engineering design? How can a step-by-step process help you design or improve a solution to a problem?	5-PS1-1 5-PS1-2 5-PS1-3 5-PS1-4	3-5-ETS1-1 3-5-ETS1-2 3-5-ETS1-3	RI.5.7 W.5.8 W.5.9	SL.5.1 SL.5.2 SL.5.4	5.MD.C.3 5.MD.C.4 Math Practices 1-6	1B-CS-03 1B-NI-05
		Ecosystems: Flow of Matter and Energy	How do matter and energy flow through an ecosystem? How does a change in an ecosystem affect its balance? How can a step-by-step process help you design or improve a solution to a problem?	5-PS3-1 5-LS1-1 5-LS2-1 5-ESS3-1	3-5-ETS1-1 3-5-ETS1-2 3-5-ETS1-3	RI.5.1 RI.5.3 RI.5.4 RI.5.7 RI.5.9 W.5.2.D	W.5.7 W.5.8 W.5.9 SL.5.1 SL.5.2 SL.5.5	5.MD.B.2 Math Practices 1-6
	Patterns in the Universe	What is Earth’s place in the universe? How do the predictable patterns of Earth impact our lives? How can a step-by-step process help you design or improve a solution to a problem?	5-ESS1-1 5-ESS1-2	3-5-ETS1-1 3-5-ETS1-2 3-5-ETS1-3	RI.5.1 RI.5.4 RI.5.7 RI.5.8 RI.5.9 W.5.1	W.5.2 W.5.7 W.5.8 SL.5.1 SL.5.2 SL.5.4 SL.5.5	Math Practices 1-4, 6	1B-CS-03 1B-NI-05 1B-DA-06, 07 1B-IC-19, 21
	Earth’s Water and Interconnected Systems	How do Earth’s major systems interact? Is there enough fresh water on Earth? How can a step-by-step process help you design or improve a solution to a problem?	5-PS2-1 5-ESS2-1 5-ESS2-2 5-ESS3-1	3-5-ETS1-1 3-5-ETS1-2 3-5-ETS1-3	RI.5.3 RI.5.4 RI.5.7 RI.5.9 W.5.8	W.5.9 SL.5.1 SL.5.2 SL.5.4 SL.5.5	5.NBT.B.5 Math Practices 1-6	1B-CS-03 1B-NI-05 1B-DA-06, 07

Essential Questions

NGSS
Science
Standard
Connections

NGSS
Engineering
Design
Standard
Connections

Common
Core ELA
Connections

Common
Core Math
Connections

CSTA

Robotics and
Automation

How can automation and robotics be used to protect the Earth’s resources and environment?
How can the engineering design process be applied in daily life?

5-ESS3-1

3-5-ETS1-1
3-5-ETS1-2
3-5-ETS1-3

RI.5.1
RI.5.7
RI.5.9
W.5.7
W.5.8
W.5.9
SL.5.1
SL.5.4

Math Practices
1, 3, 5, 6

1B-CS-01 → 03
1B-NI-05
1B-DA-06, 07
1B-IC-18

Robotics and
Automation:
Challenge

How can autonomous robots be used to help people?
How can a step-by-step process help you design or improve a solution to a problem?

3-5-ETS1-1
3-5-ETS1-2
3-5-ETS1-3

RI.5.1
RI.5.7
RI.5.9
W.5.7
W.5.8
W.5.9
SL.5.1
SL.5.4

Math Practices
1, 3, 5, 6

1B-CS-01, 03
1B-NI-05
1B-AP-08, 10 → 13
1B-AP-15 → 17
1B-IC-18

Infection:
Detection

How can germs be spread from person to person?
How do medical professionals use cause and effect relationships to diagnose illnesses?
How can a step-by-step process help you design or improve a solution to a problem?

3-5-ETS1-1
3-5-ETS1-2
3-5-ETS1-3

RI.5.2
RI.5.3
RI.5.4
RI.5.7
RI.5.9
RI.5.10
W.5.2
W.5.4
W.5.9
SL.5.1
SL.5.4

5.NBT.A.2
Math Practices
1, 3, 6

1B-CS-03
1B-NI-05
1B-DA-06, 07

Infection:
Modeling and
Simulation

How do computer models and simulations help us make sense of scientific phenomena?
In what ways can computer models and simulations be used to predict outcomes?
How can a step-by-step process help you design or improve a solution to a problem?

3-5-ETS1-1
3-5-ETS1-2
3-5-ETS1-3

RI.5.2
RI.5.4
RI.5.7
RI.5.9
W.5.2
W.5.4
W.5.9
SL.5.1
SL.5.5

5.OA.A.1
5.NBT.A.3
5.NBT.A.4
5.NBT.B.6
Math Practices
1-6, 8

1B-CS-03
1B-NI-05
1B-DA-06, 07
1B-AP-08 → 17
1B-IC-20