



# PLTW Launch Standards Guide

Missouri Learning Standards:  
Grade-Level Expectations



PLTW Launch (PreK-5) is designed to support your science learning needs. The modules are developed to ensure an unmatched experience, combining three-dimensional learning; unique, problem-based instructional approach; real-world applied learning; as well as Spanish language options – all in one program.

This Standards Guide shows how each PLTW Launch module supports the Missouri Learning Standards: Grade-Level Expectations. Because schools need the flexibility to implement the curriculum in the way that best meets their students' needs, PLTW Launch is designed to support a wide range of implementations. Whether the modules are offered in all classrooms, as a specials rotation, as grade level rotations, as an after-school program, or even as a summer learning implementation, PLTW Launch offers the flexibility to meet your needs.

The module charts below provide a single-grade, up or down shift in the grade level recommendations to represent the range of school needs across the country.

Use this Standards Guide in combination with the [Module Descriptions PDF](#) as planning tools to explore how you can implement PLTW Launch as your elementary learning solution.





		PS1 - Matter and Its Interactions					
		Grade K	Grade 1	Grade 2	Grade 3	Grade 4	Grade 5
A	Structure and Properties of Matter	K.PS1.A.1 Make qualitative observations of the physical properties of objects (i.e., size, shape, color, mass).		2. PS1.A.1 Plan and conduct an investigation to describe and classify different kinds of materials by their observable properties.	3.PS1.A.1 Predict and investigate that water can change from a liquid to a solid (freeze), and back again (melt), or from a liquid to a gas (evaporation), and back again (condensation) as the result of temperature changes.		5. PS1.A.1 Develop a model to describe that matter is made of particles too small to be seen.
		Matter: Floating and Sinking (Pre-K)		Materials Science: Properties of Matter (2)	Standard not currently supported		Matter: Properties and Reactions (5)
				2.PS1.A.2 Analyze data obtained from testing different materials to determine which materials have the properties that are best suited for an intended purpose.			5. PS1.A.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.
				Materials Science: Properties of Matter (2)			Matter: Properties and Reactions (5)
				Materials Science: Form and Function (2)			
B	Types of Interactions of Matter				3.PS1.B.1 Construct an argument with evidence that some changes caused by heating or cooling can be reversed and some cannot.		5. PS1.B.1 Plan and conduct investigations to separate the components of a mixture/solution by their physical properties (i.e., sorting, filtration, magnets, screening). Standard not currently supported
					Materials Science: Properties of Matter (2)		Standard not currently supported
							5. PS1.B.2 Conduct an investigation to determine whether the combining of two or more substances results in new substances
							Matter: Properties and Reactions (5)

		PS2 - Motion and Stability: Forces and Interactions					
		Grade K	Grade 1	Grade 2	Grade 3	Grade 4	Grade 5
A		K.PS2.A.1 Plan and conduct an investigation to compare the effects of different strengths or different directions of pushes and pulls on the motion of an object.		2.PS2.A.1 Analyze data to determine how the motion of an object changed by an applied force or the mass of an object.		4.PS2.A.1 Make observations and/or measurements of an object’s motion to provide evidence that a pattern can be used to predict future motion.	
Forces and Motion		Pushes and Pulls (K)		Stability and Motion: Science of Flight (3)		Stability and Motion: Science of Flight (3)	
		K.PS2.A.2 Describe ways to change the motion of an object (i.e., how to cause an object to go slower, go faster, go farther, change direction, stop).		Stability and Motion: Forces and Interactions (3)		Stability and Motion: Forces and Interactions (3)	
		Pushes and Pulls (K)				4.PS2.A.2 Plan and conduct an investigation to provide evidence of the effects of balanced and unbalanced forces on the motion of an object.	
						Stability and Motion: Science of Flight (3)	
						Stability and Motion: Forces and Interactions (3)	
B					3.PS2.B.1 Plan and conduct investigations to determine the cause and effect relationship of electric or magnetic interactions between two objects not in contact with each other.	4.PS2.B.1 Plan and conduct a fair test to compare and contrast the forces (measured by a spring scale in Newtons) required to overcome friction when an object moves over different surfaces (i.e., rough/smooth).	5. PS2.B.1
Types of Interaction					Stability and Motion: Forces and Interactions (3)	Standard not currently supported	Support an argument that the gravitational force exerted by Earth on objects is directed toward the planet’s center.
						4.PS2.B.2 Predict how changes in either the amount of force applied to an object or the mass of the object affects the motion (speed and direction) of the object.	Earth’s Water and Interconnected Systems (5)
						Energy Exploration (4)	

PS3 - Energy						
	Grade K	Grade 1	Grade 2	Grade 3	Grade 4	Grade 5
A	Definitions of Energy	K.PS3.A.1 Make observations to determine the effect of sunlight on Earth's surface.	1.PS3.A.1 Identify the source of energy that causes an increase in the temperature of an object (e.g., sun, stove, flame, light bulb).		4.PS3.A.1 Use evidence to construct an explanation relating the speed of an object to the energy of that object.	
		Sunlight and Weather (K)				
		Standard not currently supported			Energy Exploration (4)	
B	Conservation of Energy and Energy Transfer	K.PS3.B.1 With prompting and support, use tools and materials to design and build a structure that will reduce the warming effect of sunlight on an area			4.PS3.B.1 Provide evidence to construct an explanation of an energy transformation(e.g. temperature change, light, sound, motion, and magnetic effects)	
		Sunlight and Weather (K)				
					Energy Exploration (4)	
					4.PS3.B.2 Apply scientific ideas to design, test, and refine a device that converts energy from one form to another.	
					Energy Exploration (4)	
C	Relationship Between Energy and Forces				4.PS3.C.1 Use models to explain that simple machines change the amount of effort force and/or direction of force.	
					Stability and Motion: Forces and Interactions (3)	
D	Energy in Chemical Process and Everyday					5. PS3.D.1 Use models to describe that energy stored in food (used for body repair, growth, motion, and to maintain body warmth) was once energy from the sun.
						Ecosystems: Flow of Matter and Energy (5)



PS4 - Waves and Their Applications in technologies for Information Transfer						
Grade K		Grade 1	Grade 2	Grade 3	Grade 4	Grade 5
A	Wave Properties	1.PS4.A.1 Plan and conduct investigations to provide evidence that vibrating materials can make sound and that sound can make materials vibrate.	2.PS4.A.1 Plan and conduct investigations to provide evidence that changes in vibration create change in sound.		4.PS4.A.1 Develop a model of waves to describe patterns in terms of amplitude or wavelength and that waves can cause objects to move.	5. PS4.A.1 Develop a model to describe that objects can be seen only when light is reflected off them or when they produce their own light.
		Light and Sound (1)	Light and Sound (1)		Waves and the Properties of Light (4)	Waves and the Properties of Light (4)
B	Electromagnetic Radiation					
C	Information Technologies and Instrumentation	1.PS4.C.1 Use tools and materials to design and build a device that uses light or sound to solve the problem of communicating over a distance.				
		Light and Sound (1)				

		LS1 - From Molecules to Organisms: Structure and Processes					
		Grade K	Grade 1	Grade 2	Grade 3	Grade 4	Grade 5
A	Structure and Function		1.LS1.A.1 Use materials to design a solution to a humanproblem by mimicking how plants and/or animals use their external parts to help them survive, grow, and meet their needs.			4.LS1.A.1 Construct an argument that plants and animals have internal and external structures that function to support survival, growth, behavior, and plant reproduction.	5. LS1.A.1 Compare and contrast the major organs/organ systems (e.g. support, reproductive, digestive, transport/circulatory, excretory, response) that perform similar functions for animals belonging to different vertebrate classes.
			Animal Adaptations (1)			Organisms: Structure and Function (4)	Standard not currently supported
			Designs Inspired by Nature (1)				
B	Growth and Development of Organisms			3.LS1.B.1 Develop a model to compare and contrast observations on the life cycle of different plants and animals.			
				Life Cycles and Survival (3)			
C	Organization for Matter and Energy Flow in Organisms	K.LS1.C.1 Use observations to describe patterns of what plants and animals (including humans) need to survive.					5. LS1.C.1 Support an argument that plants get the materials (i.e. carbon dioxide, water, sunlight) they need for growth chiefly from air and water. Ecosystems:
							Living Things: Needs and Impacts (K)
D	Information Processing					4.LS1.D.1 Use a model to describe that animals receive-different types of information through their senses, process the information in their brain, and respond to the information in different ways.	
						Organisms: Structure and Function (4)	

LS2 - Ecosystems: Interactions, Energy, and Dynamics						
	Grade K	Grade 1	Grade 2	Grade 3	Grade 4	Grade 5
A	Interdependent Relationships in Ecosystems		<p>2.LS2.A.1 Plan and conduct investigations on the growth of plants when growing conditions are altered (e.g., dark vs. light, water vs. no water).</p> <p><b>Living Things: Diversity of Life (2)</b></p> <p>2.LS2.A.2 Develop a simple model that mimics the function of an animal in dispersing seeds or pollinating plants.</p> <p><b>Materials Science: Form and Function (2)</b></p>			
B						
	Cycles of matter and Energy Transfer in Ecosystems					<p>5. LS2.B.1 Develop a model to describe the movement of matter among plants, animals, decomposers, and the environment.</p> <p><b>Ecosystems: Flow of Matter and Energy (5)</b></p>

LS3 - Heredity: Inheritance and Variation of Traits						
	Grade K	Grade 1	Grade 2	Grade 3	Grade 4	Grade 5
A		1.LS3.A.1 Make observations to construct an evidence-based account that young plants and animals are like, but not exactly like, their parents.		3.LS3.A.1 Construct scientific arguments to support claims that some characteristics of organisms are inherited from parents and some are influenced by the environment.		
Inheritance of Traits		Designs Inspired by Nature (1)		Variation of Traits (3)		
B				3.LS3.B.1 Use evidence to construct an explanation for how the variations in characteristics among individuals of the same species may provide advantages in surviving and finding mates.		
Natural Selection				Variation of Traits (3)		
C				3.LS3.C.1 Construct an argument with evidence that in a particular ecosystem some organisms -- based on structural adaptations or behaviors -- can survive well, some survive less well, and some cannot.		
Adaptation				Environmental Changes (3)		
D				3.LS3.D.1 Make a claim about the merit of a solution to a problem caused when the environment changes and the types of plants and animals that live there may change.		
Biodiversity and Humans				Environmental Changes (3)		



ESS1 - Earth's Place in the Universe						
	Grade K	Grade 1	Grade 2	Grade 3	Grade 4	Grade 5
A	The Universe and its Stars	1.ESS1.A.1 Describe the presence of the sun, moon, and stars in the sky over time.  <b>Light: Observing the Sun, Moon, and Stars (1)</b>  1.ESS1.A.2 Use observations of the sun, moon, and stars to describe patterns that can be predicted. in the sky over time.  <b>Light: Observing the Sun, Moon, and Stars (1)</b>				5. ESS1.A.1  Support an argument that relative distances from Earth affects the apparent brightness of the sun compared to other stars.  <b>Patterns in the Universe (5)</b>
B						
	Earth and the Solar System	K.ESS1.B.1 Make observations during different seasons to relate the amount of daylight to the time of year.  <b>Sunlight and Weather (K)</b>				5. ESS1.B.1 Make observations during different seasons to relate the amount of daylight to the time of year.  <b>Standard not currently supported</b>  5. ESS1.B.2 Represent data in graphical displays to reveal patterns of daily changes in length and direction of shadows, day and night, and the seasonal appearance of some stars in the night sky.  <b>Patterns in the Universe (5)</b>
C	The History of Planet Earth		2.ESS1.C.1 Use information from several sources to provide evidence that Earth events can occur quickly or slowly.  <b>The Changing Earth (2)</b>		4.ESS1.C.1 Identify evidence from patterns in rock formations and fossils in rock layers to support an explanation for changes in a landscape over time.  <b>Earth: Past, Present, and Future (4)</b>	

ESS2 - Earth’s Systems						
Grade K		Grade 1	Grade 2	Grade 3	Grade 4	Grade 5
A	Earth Materials and Systems		2.ESS2.A.1 Compare multiple solutions designed to slow or prevent wind or water from changing the shape of the land.  <b>The Changing Earth (2)</b>		4.ESS2.A.1 Plan and conduct scientific investigations or simulations to provide evidence how natural processes (e.g. weathering and erosion) shape Earth’s surfaces.  <b>Earth: Past, Present, and Future (4)</b>	5. ESS2.A.1 Develop a model using an example to describe ways the geosphere, biosphere, hydrosphere, and/or atmosphere interact.  <b>Earth’s Water and Interconnected Systems (5)</b>
B						
	Plate Tectonics and Large-Scale Systems		2.ESS2.B.1 Develop a model to represent the shapes and kinds of land and bodies of water in an area  <b>The Changing Earth (2)</b>		4.ESS2.B.1 Analyze and interpret data from maps to describe patterns of Earth’s features.  <b>Earth: Past, Present, and Future (4)</b>	
C	The Role of Water in Earth’s Surface Processes		2.ESS2.C.1 Obtain information to identify where water is found on Earth and that it can be solid or liquid  <b>The Changing Earth (2)</b>			5. ESS2.C.1 Describe and graph the amounts and percentages of water and fresh water in various reservoirs to provide evidence about the distribution of water on Earth.  <b>Earth’s Water and Interconnected Systems (5)</b>
D						
	Weather and Climate	K.ESS2.D.1 Use and share observations of local weather conditions to describe patterns over time  <b>Sunlight and Weather (K)</b>	1.ESS2.D.1 Identify patterns indicating relationships between observed weather data and weather phenomena (e.g., temperature and types of precipitation, clouds and amounts of precipitation).  <b>Sunlight and Weather (K)</b>	3.ESS2.D.1 Represent data in tables and graphical displays to describe typical weather conditions expected during a particular season.  <b>Weather: Factors and Hazards (3)</b>  3.ESS2.D.2 Obtain and combine information to describe climates in different regions of the world  <b>Weather: Factors and Hazards (3)</b>		
E	Biogeology	K.ESS2.E.1 With prompting and support, construct an argument using evidence for how plants and animals (including but not limited to humans) can change the environment to meet their needs.  <b>Living Things: Needs and Impacts (K)</b>				



ESS3 - Earth and Human Activity						
	Grade K	Grade 1	Grade 2	Grade 3	Grade 4	Grade 5
A	Natural Resources				4.ESS3.A.1 Generate and compare multiple solutions to reduce the impacts of natural Earth processes on humans.  Earth: Human Impact and Natural Disasters (4)	
B	Natural Hazards			3.ESS3.B.1 Make a claim about the merit of an existing design solution (e.g. levies, tornado shelters, sea walls, etc.) that reduces the impacts of a weather-related hazard.  Weather: Factors and Hazards (3)		
C	Human Impacts on Earth's Systems					5. ESS3.C.1 Obtain and combine information about ways individual communities use science ideas to protect the Earth's resources and environment.  Earth's Water and Interconnected Systems (5)

ETS1 - Engineering Design						
	Grade K	Grade 1	Grade 2	Grade 3	Grade 4	Grade 5
A  Defining and Delimiting Engineering Problems	K.ETS1.A.1 Ask questions, make observations, and gather information about a situation people want to change to define a simple problem that can be solved through the development of anew or improved object or tool.	1.ETS1.A.1 Ask questions, make observations, and gather information about a situation people want to change to define a simple problem that can be solved through the development of a new or improved object or tool.	2.ETS1.A.1 Ask questions, make observations, and gather information about a situation people want to change to define a simple problem that can be solved through the development of a new or improved object or tool.	3.ETS1.A.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.	4.ETS1.A.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.	5.ETS1.A.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.
	All K-2nd grade PLTW Launch modules support this standard			All 3rd-5th grade PLTW Launch modules support this standard		
B  Developing Possible Solutions	K.ETS1.B.1 Develop a simple sketch, drawing, or physical model to illustrate how the shape of an object helps it function as needed to solve a given problem.	1.ETS1.B.1 Develop a simple sketch, drawing, or physical model to illustrate how the shape of an object helps it function as needed to solve a given problem.	2.ETS1.B.1 Develop a simple sketch, drawing, or physical model to illustrate how the shape of an object helps it function as needed to solve a given problem.	3.ETS1.B.1 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.	4.ETS1.B.1 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.	5.ETS1.B.1 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.
	All K-2nd grade PLTW Launch modules support this standard			All 3rd-5th grade PLTW Launch modules support this standard		
C  Optimizing the Solution Process	K.ETS1.C.1 Analyze data from tests of two objects de- signed to solve the same problem to compare the strengths and weaknesses of how each performs.	1.ETS1.C.1 Analyze data from tests of two objects de- signed to solve the same problem to compare the strengths and weaknesses of how each performs.	2.ETS1.C.1 Analyze data from tests of two objects de- signed to solve the same problem to compare the strengths and weaknesses of how each performs.	3.ETS1.C.1 Plan and carry out fair tests in which variables are controlled and failure points are consid- ered to identify aspects of a model or proto- type that can be improved.	4.ETS1.C.1 Plan and carry out fair tests in which variables are controlled and failure points are consid- ered to identify aspects of a model or proto- type that can be improved.	5.ETS1.C.1 Plan and carry out fair tests in which variables are controlled and failure points are consid- ered to identify aspects of a model or proto- type that can be improved.
	All K-2nd grade PLTW Launch modules support this standard			Programming Patterns (3)	Energy Exploration (4)	Earth's Water and Interconnected Systems (5)
				Stability and Motion: Forces and Interactions (3)	Energy Exploration (4)	Ecosystems: Flow of Matter and Energy (5)
				Stability and Motion: Science of Flight (3)	Input/Output: Computer Systems (4)	Infection: Modeling and Simulation (5)
				Weather: Factors and Hazards (3)	Waves and the Properties of Light (4)	Matter: Properties and Reactions (5)
						Patterns in the Universe (5)
						Robotics and Automation (5)
						Robotics and Automation: Challenge (5)