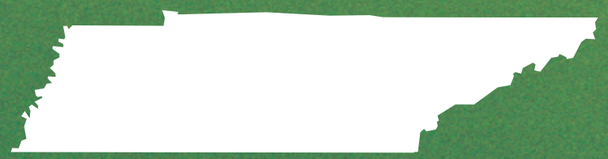
PLTW Launch Standards Guide

Tennessee Academic Standards for Science K-5



PLTW Launch (PreK-5) is designed to support your 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 Guides shows how each PLTW Launch module supports the Tennessee Academic Standards for Science K-5. 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.

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.

PLTW LAUNCH

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Kindergarten

		Performance Expectation	PLTW Launch Modules
K.PS1	Matter and Its Interactions	1) Plan and conduct an investigation to describe and classify different kinds of materials including wood, plastic, metal, cloth, and paper by their observable properties (color, texture, hardness, and flexibility) and whether they are natural or human-made.	This standard is not currently supported.
		2) Conduct investigations to understand that matter can exist in different states (solid and liquid) and has properties that can be observed and tested.	Matter: Floating and Sinking (PreK)
		3) Construct an evidence-based account of how an object made of a small set of pieces (blocks, snap cubes) can be disassembled and made into a new object.	This standard is not currently supported.
K.LS1	From Molecules to Organisms: Structures and Processes	1) Use information from observations to identify differences between plants and animals (locomotion, obtainment of food, and take in air/gasses).	Life Science: Living and Nonliving Things (PreK)
		2) Recognize differences between living organisms and non-living materials and sort them into groups by observable physical attributes.	Life Science: Living and Nonliving Things (PreK)
		3) Explain how humans use their five senses in making scientific findings.	Life Science: Living and Nonliving Things (PreK)
K.LS3.1	Heredity: Inheritance and Variation of Traits	Use observations to describe patterns of what plants and animals (including humans) need to survive.	Designs Inspired by Nature (1)
K.ESS2	Earth's Systems	1) Analyze and interpret weather data (precipitation, wind, temperature, cloud cover) to describe weather patterns that occur over time (hourly, daily) using simple graphs, pictorial weather symbols, and tools (thermometer, rain gauge).	Sunlight and Weather (K)
		2) Develop and use models to predict weather and identify patterns in spring, summer, autumn, and winter.	Sunlight and Weather (K)
K.ESS3:	Earth and Human Activity	1) Use a model to represent the relationship between the basic needs (shelter, food, water) of different plants and animals (including humans) and the places they live.	Living Things: Needs and Impacts (K)
		2) Explain the purpose of weather forecasting to prepare for, and respond to, severe weather in Tennessee.	Sunlight and Weather (K)
		3) Communicate solutions that will reduce the impact from humans on land, water, air, and other living things in the local environment.	Living Things: Needs and Impacts (K)
K.ETS1	Engineering Design	1) Ask and answer questions about the scientific world and gather information using the senses.	All kindergarten modules support this standard.
		2) Describe objects accurately by drawing and/or labeling pictures.	All kindergarten modules support this standard.
K.ETS2	Links Among Engineering, Technology, Science, and Society	1) Use appropriate tools (magnifying glass, rain gauge, basic balance scale) to make observations and answer testable scientific questions.	All kindergarten modules support this standard.

First Grade

	Standard	Performance Expectation	PLTW Launch Modules
1.PS3	Energy	1) Make observations to determine how sunlight warms Earth's surfaces (sand, soil, rocks, and water).	Sunlight and Weather (K)
1.PS4	Waves and Their Application in Technologies for Information Transfer	1) Use a model to describe how light is required to make objects visible. Summarize how Illumination could be from an external light source or by an object giving off its own light.	Light and Sound (1)
		2) Determine the effect of placing objects made with different materials (transparent, translucent, opaque, and reflective) in the path of a beam of light.	Light and Sound (1)
1.LS1	From Molecules to Organisms: Structures and Processes	1) Recognize the structure of plants (roots, stems, leaves, flowers, fruits) and describe the function of the parts (taking in water and air, producing food, making new plants).	Designs Inspired by Nature (1)
		2) Illustrate and summarize the life cycle of plants.	This standard is not currently supported.
		3) Analyze and interpret data from observations to describe how changes in the environment cause plants to respond in different ways.	Living Things: Diversity of Life (2)
1.LS2	Ecosystems: Interactions, Energy, and Dynamics	1) Conduct an experiment to show how plants depend on air, water, minerals from soil, and light to grow and thrive.	Living Things: Diversity of Life (2)
		2) Obtain and communicate information to classify plants by where they grow (water, land) and the plant's physical characteristics.	This standard is not currently supported.
		3) Recognize how plants depend on their surroundings and other living things to meet their needs in the places they live.	Living Things: Diversity of Life (2)
1.ESS1	Earth's Place in the Universe	1) Use observations or models of the sun, moon, and stars to describe patterns that can be predicted.	Light: Observing the Sun, Moon, and Stars (1)
		2) Observe natural objects in the sky that can be seen from Earth with the naked eye and recognize that a telescope, used as a tool, can provide greater detail of objects in the sky.	Light: Observing the Sun, Moon, and Stars (1)
		3) Analyze data to predict patterns between sunrise and sunset, and the change of seasons.	Light: Observing the Sun, Moon, and Stars (1)
1.ETS1	Engineering Design	1) Solve scientific problems by asking testable questions, making short-term and long-term observations, and gathering information.	All first grade modules support this standard.
1.ETS2	Links Among Engineering, Technology, Science, and Society	1) Use appropriate tools (magnifying glass, basic balance scale) to make observations and answer testable scientific questions.	All first grade modules support this standard.

Second Grade

	Standard	Performance Expectation	PLTW Launch Modules
2.PS2:	Motion and Stability: Forces and Interactions	1) Analyze the push or the pull that occurs when objects collide or are connected.	This standard is not currently supported.
		2) Evaluate the effects of different strengths and directions of a push or a pull on the motion of an object.	This standard is not currently supported.
		3) Recognize the effect of multiple pushes and pulls on an object's movement or non-movement.	This standard is not currently supported.
2.PS3	Energy	1) Demonstrate how a stronger push or pull makes things go faster and how faster speeds during a collision can cause a bigger change in the shape of the colliding objects.	This standard is not currently supported.
		2) Make observations and conduct experiments to provide evidence that friction produces heat and reduces or increases the motion of an object.	This standard is not currently supported.
2.PS4	Waves and Their Applications in Technologies for Information Transfer	1) Plan and conduct investigations to demonstrate the cause and effect relationship between vibrating materials (tuning forks, water, bells) and sound.	Light and Sound (1)
		2) Use tools and materials to design and build a device to understand that light and sound travel in waves and can send signals over a distance.	Light and Sound (1)
		3) Observe and demonstrate that waves move in regular patterns of motion by disturbing the surface of shallow and deep water.	This standard is not currently supported.
2.LS1	From Molecules to Organisms: Structures and Processes	1) Use evidence and observations to explain that many animals use their body parts and senses in different ways to see, hear, grasp objects, protect themselves, move from place to place, and seek, find, and take in food, water, and air.	Designs Inspired by Nature (1)
		2) Obtain and communicate information to classify animals (vertebrates-mammals, birds, amphibians, reptiles, fish, invertebrates-insects) based on their physical characteristics.	This standard is not currently supported.
		3) Use simple graphical representations to show that species have unique and diverse life cycles.	Life Cycles and Survival (3)
2.LS2	Ecosystems: Interactions, Energy, and Dynamics	1) Develop and use models to compare how animals depend on their surroundings and other living things to meet their needs in the places they live.	Living Things: Diversity of Life (2) Environmental Changes (3)
		2) Predict what happens to animals when the environment changes (temperature, cutting down trees, wildfires, pollution, salinity, drought, land preservation).	Environmental Changes (3)
2.LS3	Heredity: Inheritance and Variation of Traits	1) Use evidence to explain that living things have physical traits inherited from parents and that variations of these traits exist in groups of similar organisms.	Variation of Traits (3)

Second Grade Cont.

	Standard	Performance Expectation	PLTW Launch Modules
2.ESS1	Earth's Place in the Universe	1) Recognize that some of Earth's natural processes are cyclical, while others have a beginning and an end. Some events happen quickly, while others occur slowly over time.	The Changing Earth (2)
2.ESS2	Earth's Systems	1) Compare the effectiveness of multiple solutions designed to slow or prevent wind or water from changing the shape of the land.	The Changing Earth (2)
		2) Observe and analyze how blowing wind and flowing water can move Earth materials (soil, rocks) from one place to another, changing the shape of a landform and affecting the habitats of living things.	The Changing Earth (2)
		3) Compare simple maps of different land areas to observe the shapes and kinds of land (rock, soil, sand) and water (river, stream, lake, pond).	The Changing Earth (2)
		4) Use information obtained from reliable sources to explain that water is found in the ocean, rivers, streams, lakes, and ponds, and may be solid or liquid.	The Changing Earth (2)
2.ETS1	Engineering Design	1) Define a simple problem that can be solved through the development of a new or improved object or tool by asking questions, making observations, and gather accurate information about a situation people want to change.	All second grade modules support this standard.
		2) Develop a simple sketch, drawing, or physical model that communicates solutions to others.	All second grade modules support this standard.
		3) Recognize that to solve a problem, one may need to break the problem into parts, address each part, and then bring the parts back together	All second grade modules support this standard.
		4) Compare and contrast solutions to a design problem by using evidence to point out strengths and weaknesses of the design.	All second grade modules support this standard.
2.ETS2	Links Among Engineering, Technology, Science, and Society	1) Use appropriate tools to make observations, record data, and refine design ideas.	All second grade modules support this standard.
		2) Predict and explain how human life and the natural world would be different without current technologies.	This standard is not currently supported.

Third Grade

	Standard	Performance Expectation	PLTW Launch Modules
3.PS1	Matter and Its Interactions	1) Describe the properties of solids, liquids, and gases and identify that matter is made up of particles too small to be seen.	Material Sciences: Properties of Matter (2)
		2) Differentiate between changes caused by heating or cooling that can be reversed and that cannot.	Material Sciences: Properties of Matter (2)
		3) Describe and compare the physical properties of matter including color, texture, shape, length, mass, temperature, volume, state, hardness, and flexibility.	Material Sciences: Properties of Matter (2)
3.PS2	Motion and Stability: Forces and Interactions	1) Explain the cause and effect relationship of magnets.	Stability and Motion: Forces and Interactions (3)
		2) Solve a problem by applying the use of the interactions between two magnets.	Stability and Motion: Forces and Interactions (3)
3.PS3	Energy	1) Recognize that energy is present when objects move; describe the effects of energy transfer from one object to another.	Energy Exploration (4)
		2) Apply scientific ideas to design, test, and refine a device that converts electrical energy to another form of energy, using open or closed simple circuits.	Energy Explorations (4)
		3) Evaluate how magnets cause changes in the motion and position of objects, even when the objects are not touching the magnet.	Stability and Motion: Forces and Interactions (3)
3.LS1	From Molecules to Organisms: Structures and Processes	1) Analyze the internal and external structures that aquatic and land animals and plants have to support survival, growth, behavior, and reproduction.	Organisms: Structure and Function (4)
3.LS2	Ecosystems: Interactions, Energy, and Dynamics	1) Construct an argument to explain why some animals benefit from forming groups.	Life Cycles and Survival (3)
3.LS4	Biological Change: Unity and Diversity	1) Explain the cause and effect relationship between a naturally changing environment and an organism's ability to survive.	Environmental Changes (3)
		2) Infer that plant and animal adaptations help them survive in land and aquatic biomes.	Life Cycles and Survival (3) Environmental Changes (3) Organisms: Structure and Function (4)
		3) Explain how changes to an environment's biodiversity influence human resources.	Earth: Human Impact and Natural Disasters (4)

Third Grade Cont.

	Standard	Performance Expectation	PLTW Launch Modules
3.ESS1	Earth's Place in the Universe	1) Use data to categorize the planets in the solar system as inner or outer planets according to their physical properties.	This standard is not currently supported.
3.ESS2:	Earth's Systems	1) Explain the cycle of water on Earth	This standard is not currently supported.
		2) Associate major cloud types (cumulus, cumulonimbus, cirrus, stratus, nimbostratus) with weather conditions.	This standard is not currently supported.
		3) Use tables, graphs, and tools to describe precipitation, temperature, and wind (direction and speed) to determine local weather and climate.	Weather: Factors and Hazards (3)
		4) Incorporate weather data to describe major climates (polar, temperate, tropical) in different regions of the world.	Weather: Factors and Hazards (3)
3.ESS3	Earth and Human Activity	1) Explain how natural hazards (fires, landslides, earthquakes, volcanic eruptions, floods) impact humans and the environment.	Weather: Factors and Hazards (3)
		2) Design solutions to reduce the impact of natural hazards (fires, landslides, earthquakes, volcanic eruptions, floods) on the environment.	Weather: Factors and Hazards (3)
3.ETS1	Engineering Design	1) Design a solution to a real-world problem that includes specified criteria for constraints.	All third grade modules support this standard.
		2) Apply evidence or research to support a design solution.	All third grade modules support this standard.
3.ETS2	Links Among Engineering, Technology, Science, and Society	1) Identify and demonstrate how technology can be used for different purposes.	Programming Patterns (3) Waves and the Properties of Light (4) Input/Output: Computer Systems (4) Robotics and Automation (5) Robotics and Automation: Challenge (5) Infection: Modeling and Simulation (5)

Fourth Grade

	Standard	Performance Expectation	PLTW Launch Modules
4.PS3	Energy	1) Use evidence to explain the cause and effect relationship between the speed of an object and the energy of an object.	Energy Exploration (4)
		2) Observe and explain the relationship between potential energy and kinetic energy.	Energy Exploration (4)
		3) Describe how stored energy can be converted into another form for practical use.	Energy Exploration (4)
4.PS4	Waves and their Application in Technologies for Information Transfer	1) Use a model of a simple wave to explain regular patterns of amplitude, wavelength, and direction.	Waves and the Properties of Light (4)
		2) Describe how the colors of available light sources and the bending of light waves determine what we see.	Waves and the Properties of Light (4)
		3) Investigate how lenses and digital devices like computers or cell phones use waves to enhance human senses.	This standard is not currently supported.
4.LS2	Ecosystems: Interactions, Energy, and Dynamics	1) Support an argument with evidence that plants get the materials they need for growth and reproduction chiefly through a process in which they use carbon dioxide from the air, water, and energy from the sun to produce sugars, plant materials, and waste (oxygen); and that this process is called photosynthesis.	Ecosystems: Flow of Matter and Energy (5)
		2) Develop models of terrestrial and aquatic food chains to describe the movement of energy among producers, herbivores, carnivores, omnivores, and decomposers.	Ecosystems: Flow of Matter and Energy (5)
		3) Using information about the roles of organisms (producers, consumers, decomposers), evaluate how those roles in food chains are interconnected in a food web, and communicate how the organisms are continuously able to meet their needs in a stable food web.	Ecosystems: Flow of Matter and Energy (5)
		4) Develop and use models to determine the effects of introducing a species to, or removing a species from, an ecosystem and how either one can damage the balance of an ecosystem.	Ecosystems: Flow of Matter and Energy (5)
		5) Analyze and interpret data about changes (land characteristics, water distribution, temperature, food, and other organisms) in the environment and describe what mechanisms organisms can use to affect their ability to survive and reproduce.	Ecosystems: Flow of Matter and Energy (5)
4.LS4	Biological Change: Unity and Diversity	1) Obtain information about what a fossil is and ways a fossil can provide information about the past.	Organisms: Structure and Function (4) Environmental Changes (3)

Fourth Grade Cont.

	Standard	Performance Expectation	PLTW Launch Modules
4.ESS1	Earth's Place in the Universe	1) Generate and support a claim with evidence that over long periods of time, erosion (weathering and transportation) and deposition have changed landscapes and created new landforms.	Earth: Past, Present, and Future (4)
		2) Use a model to explain how the orbit of the Earth and sun cause observable patterns: a. day and night; b. changes in length and direction of shadows over a day.	Patterns in the Universe (5)
4.ESS2:	Earth's Systems	1) Collect and analyze data from observations to provide evidence that rocks, soils, and sediments are broken into smaller pieces through mechanical weathering (frost wedging, abrasion, tree root wedging) and are transported by water, ice, wind, gravity, and vegetation.	Earth: Past, Present, and Future (4)
		2) Interpret maps to determine that the location of mountain ranges, deep ocean trenches, volcanoes, and earthquakes occur in patterns.	Earth: Past, Present, and Future (4)
		3) Provide examples to support the claim that organisms affect the physical characteristics of their regions.	Earth: Past, Present, and Future (4)
		4) Analyze and interpret data on the four layers of the Earth, including thickness, composition, and physical states of these layers.	Earth: Past, Present, and Future (4)
4.ESS3:	Earth and Human Activity	1) Obtain and combine information to describe that energy and fuels are derived from natural resources and that some energy and fuel sources are renewable (sunlight, wind, water) and some are not (fossil fuels, minerals).	Earth: Human Impact and Natural Disasters (4)
		2) Create an argument, using evidence from research, that human activity (farming, mining, building) can affect the land and ocean in positive and/or negative ways.	Earth's Water and Interconnected Systems (5)
4.ETS1	Engineering Design	1) Categorize the effectiveness of design solutions by comparing them to specified criteria for constraints.	All fourth grade modules support this standard.
4.ETS2	Links Among Engineering, Technology, Science, and Society	1) Use appropriate tools and measurements to build a model.	All fourth grade modules support this standard.
		2) Determine the effectiveness of multiple solutions to a design problem given the criteria and the constraints.	All fourth grade modules support this standard.
		3) Explain how engineers have improved existing technologies to increase their benefits, to decrease known risks, and to meet societal demands (artificial limbs, seatbelts, cell phones).	Energy Exploration (4) Organisms: Structure and Function (4)

Fifth Grade

	Standard	Performance Expectation	PLTW Launch Modules
5.PS1	Matter and Its Interactions	1) Analyze and interpret data from observations and measurements of the physical properties of matter to explain phase changes between a solid, liquid, or gas.	Matter: Properties and Reactions (5)
		2) Analyze and interpret data to show that the amount of matter is conserved even when it changes form, including transitions where matter seems to vanish.	Matter: Properties and Reactions (5)
		3) Design a process to measure how different variables (temperature, particle size, stirring) affect the rate of dissolving solids into liquids.	This standard is not currently supported.
		4) Evaluate the results of an experiment to determine whether the mixing of two or more substances result in a change of properties.	Matter: Properties and Reactions (5)
5.PS2	Motion and Stability: Forces and Interactions	1) Test the effects of balanced and unbalanced forces on the speed and direction of motion of objects.	This standard is not currently supported.
		2) Make observations and measurements of an object's motion to provide evidence that a pattern can be used to predict future motion.	This standard is not currently supported.
		3) Use evidence to support that the gravitational force exerted by Earth on objects is directed toward the Earth's center.	Earth's Water Interconnected Systems (5)
		4) Explain the cause and effect relationship of two factors (mass and distance) that affect gravity.	This standard is not currently supported.
		5) Explain how forces can create patterns within a system (moving in one direction, shifting back and forth, or moving in cycles), and describe conditions that affect how fast or slowly these patterns occur.	Earth's Water and Interconnected Systems (5) Earth: Past, Present, and Future (4)
5.LS1	From Molecules to Organisms: Structures and Processes	1) Compare and contrast animal responses that are instinctual versus those that that are gathered through the senses, processed, and stored as memories to guide their actions.	Organisms: Structure and Function (4)
5.LS3	Heredity: Inheritance and Variation of Traits	1) Distinguish between inherited characteristics and those characteristics that result from a direct interaction with the environment. Apply this concept by giving examples of characteristics of living organisms that are influenced by both inheritance and the environment.	This standard is not currently supported.
		2) Provide evidence and analyze data that plants and animals have traits inherited from parents and that variations of these traits exist in a group of similar organisms.	This standard is not currently supported.
5.LS4	Biological Change: Unity and Diversity	1) Analyze and interpret data from fossils to describe types of organisms and their environments that existed long ago. Compare similarities and differences of those to living organisms and their environments. Recognize that most kinds of animals (and plants) that once lived on Earth are now extinct.	This standard is not currently supported.
		2) Use evidence to construct an explanation for how variations in characteristics among individuals within the same species may provide advantages to these individuals in their survival and reproduction.	This standard is not currently supported.

Fifth Grade Cont.

	Standard	Performance Expectation	PLTW Launch Modules
5.ESS1	Earth's Place in the Universe	1) Explain that differences in the apparent brightness of the sun compared to other stars is due to their relative distances from the Earth.	Patterns in the Universe (5)
		2) Research and explain the position of the Earth and the solar system within the Milky Way galaxy, and compare the size and shape of the Milky Way to other galaxies in the universe.	Patterns in the Universe (5)
		3) Use data to categorize different bodies in our solar system including moons, asteroids, comets, and meteoroids according to their physical properties and motion.	Patterns in the Universe (5)
		4) Explain the cause and effect relationship between the positions of the sun, earth, and moon and resulting eclipses, position of constellations, and appearance of the moon.	Patterns in the Universe (5)
		5) Relate the tilt of the Earth's axis, as it revolves around the sun, to the varying intensities of sunlight at different latitudes. Evaluate how this causes changes in day-lengths and seasons.	Patterns in the Universe (5)
		6) Use tools to describe how stars and constellations appear to move from the Earth's perspective throughout the seasons.	Patterns in the Universe (5)
		7) Use evidence from the presence and location of fossils to determine the order in which rock strata were formed.	Earth: Past, Present, and Future (4)
5.ETS1	Engineering Design	1) Research, test, re-test, and communicate a design to solve a problem.	All fifth grade modules support this standard.
		2) Plan and carry out tests on one or more elements of a prototype in which variables are controlled and failure points are considered to identify which elements need to be improved. Apply the results of tests to redesign the prototype.	Robotics and Automation (5) Robotics and Automation: Challenge (5) Infection: Modeling and Simulation (5) Matter: Properties and Reactions (5) Ecosystems: Flow of Matter and Energy (5) Patterns in the Universe (5) Earth's Water and Interconnected Systems (5)
		3) Describe how failure provides valuable information toward finding a solution.	This standard is not currently supported.
5.ETS2	Links Among Engineering, Technology, Science, and Society	1) Use appropriate measuring tools, simple hand tools, and fasteners to construct a prototype of a new or improved technology.	All fifth grade modules support this standard.
		2) Describe how human beings have made tools and machines (X-ray cameras, microscopes, satellites, computers) to observe and do things that they could not otherwise sense or do at all, or as quickly or efficiently.	Infection: Modeling and Simulation (5)
		3) Identify how scientific discoveries lead to new and improved technologies.	This standard is not currently supported.