PLTW Launch Standards Guide

Alabama Course of Study - 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 Alabama Course of study Science Standards. 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.

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Please note: The information included in this document is subject to change. As with all course materials, we will continue to update as more information becomes available.

Kindergarten

	Performance Expectation	PLTW Launch Modules
Motion and Stability: Forces and Interactions	Investigate the resulting motion of objects when forces of different strengths and directions act upon them (e.g., object being pushed, object being pulled, two objects colliding).	Pushes and Pulls
	Use observations and data from investigations to determine if a design solution (e.g., designing a ramp to increase the speed of an object in order to move a stationary object) solves the problem of using force to change the speed or direction of an object.	Pushes and Pulls
Ecosystems: Interactions, Energy, and Dynamics	Distinguish between living and nonliving things and verify what living things need to survive (e.g., animals needing food, water, and air; plants needing nutrients, water, sunlight, and air).	Life Science: Living and Nonliving Things (PreK) Living Things: Needs and Impacts
	Gather evidence to support how plants and animals provide for their needs by altering their environment (e.g., tree roots breaking a sidewalk to provide space, red fox burrowing to create a den to raise young, humans growing gardens for food and building roads for transportation).	Living Things: Needs and Impacts
	Construct a model of a natural habitat (e.g., terrarium, ant farm, diorama) conducive to meeting the needs of plants and animals native to Alabama.	Animals and Algorithms Living Things: Needs and Impacts
	Identify and plan possible solutions (e.g., reducing, reusing, recycling) to lessen the human impact on the local environment.	Living Things: Needs and Impacts
Earth's Systems	Observe and describe the effects of sunlight on Earth's surface (e.g., heat from the sun causing evaporation of water or increased temperature of soil, rocks, sand, and water).	Sunlight and Weather
	Design and construct a device (e.g., hat, canopy, umbrella, tent) to reduce the effects of sunlight.	Sunlight and Weather
	Observe, record, and share findings of local weather patterns over a period of time (e.g., increase in daily temperature from morning to afternoon, typical rain and storm patterns from season to season).	Sunlight and Weather
Earth and Human Activity	Ask questions to obtain information about the purpose of weather forecasts in planning for, preparing for, and responding to severe weather.	Sunlight and Weather

First Grade

	Performance Expectation	PLTW Launch Modules
Waves and Their Applications in Technologies for Information Transfer	Conduct experiments to provide evidence that vibrations of matter can create sound (e.g., striking a tuning fork, plucking a guitar string) and sound can make matter vibrate (e.g., holding a piece of paper near a sound system speaker, touching your throat while speaking).	Light and Sound
	Construct explanations from observations that objects can be seen only when light is available to illuminate them (e.g., moon being illuminated by the sun, colors and patterns in a kaleidoscope being illuminated when held toward a light).	Light and Sound
	Investigate materials to determine which types allow light to pass through (e.g., transparent materials such as clear plastic wrap), allow only partial light to pass through (e.g., translucent materials such as wax paper), block light (e.g., opaque materials such as construction paper), or reflect light (e.g., shiny materials such as aluminum foil).	Light and Sound
	Design and construct a device that uses light or sound to send a communication signal over a distance (e.g., using a flashlight and a piece of cardboard to simulate a signal lamp for sending a coded message to a classmate, using a paper cup and string to simulate a telephone for talking to a classmate).*	Light and Sound
From Molecules to Organisms: Structures and Processes	Design a solution to a human problem by using materials to imitate how plants and/or animals use their external parts to help them survive, grow, and meet their needs (e.g., outerwear imitating animal furs for insulation, gear mimicking tree bark or shells for protection).	Animal Adaptations Designs Inspired by Nature
	Obtain information to provide evidence that parents and their offspring engage in patterns of behavior that help the offspring survive (e.g., crying of offspring indicating need for feeding, quacking or barking by parents indicating protection of young).	Designs Inspired by Nature
Heredity: Inheritance and Variation of Traits	Make observations to identify the similarities and differences of offspring to their parents and to other members of the same species (e.g., flowers from the same kind of plant being the same shape, but differing in size; dog being same breed as parent, but differing in fur color or pattern).	Designs Inspired by Nature
Earth's Place in the Universe	Observe, describe, and predict patterns of the sun, moon, and stars as they appear in the sky (e.g., sun and moon appearing to rise in one part of the sky, move across the sky, and set; stars other than our sun being visible at night, but not during the day).	Light: Observing the Sun, Moon, and Stars
	Observe seasonal patterns of sunrise and sunset to describe the relationship between the number of hours of daylight and the time of year (e.g., more hours of daylight during summer as compared to winter).	Light: Observing the Sun, Moon, and Stars

Second Grade

	Performance Expectation	PLTW Launch Modules
Matter and Its Interactions (PS1)	Conduct an investigation to describe and classify various substances according to physical properties (e.g., milk being a liquid, not clear in color, assuming shape of its container, mixing with water; mineral oil being a liquid, clear in color, taking shape of its container, floating in water; a brick being a solid, not clear in color, rough in texture, not taking the shape of its container, sinking in water).	Materials Science: Properties of Matter
	Collect and evaluate data to determine appropriate uses of materials based on their properties (e.g., strength, flexibility, hardness, texture, absorbency).	Materials Science: Properties of Matter Materials Science: Form and Function
	Demonstrate and explain how structures made from small pieces (e.g., linking cubes, blocks, building bricks, creative construction toys) can be disassembled and then rearranged to make new and different structures.	Materials Science: Properties of Matter Materials
	Provide evidence that some changes in matter caused by heating or cooling can be reversed (e.g., heating or freezing of water) and some changes are irreversible (e.g., baking a cake, boiling an egg).	Materials Science: Properties of Matter
Ecosystems: Interactions, Energy, and Dynamics (LS2)	Plan and carry out an investigation, using one variable at a time (e.g., water, light, soil, air), to determine the growth needs of plants.	Living Things: Diversity of Life
	Design and construct models to simulate how animals disperse seeds or pollinate plants (e.g., animals brushing fur against seed pods and seeds falling off in other areas, birds and bees extracting nectar from flowers and transferring pollen from one plant to another).	Materials Science: Form and Function
	Obtain information from literature and other media to illustrate that there are many different kinds of living things and that they exist in different places on land and in water (e.g., woodland, tundra, desert, rainforest, ocean, river).	Living Things: Diversity of Life
Earth's Systems	Make observations from media to obtain information about Earth's events that happen over a short period of time (e.g., tornados, volcanic explosions, earthquakes) or over a time period longer than one can observe (e.g., erosion of rocks, melting of glaciers).	Living Things: Diversity of Life
	Create models to identify physical features of Earth (e.g., mountains, valleys, plains, deserts, lakes, rivers, oceans).	The Changing Earth
	Collect and evaluate data to identify water found on Earth and determine whether it is a solid or a liquid (e.g., glaciers as solid forms of water; oceans, lakes, rivers, streams as liquid forms of water).	The Changing Earth
Earth and Human Activity	Use information from several sources to provide evidence that Earth events can occur rapidly or slowly.	The Changing Earth

Third Grade

	Performance Expectation	PLTW Launch Modules
Motion and Stability: Forces and Interactions	Plan and carry out an experiment to determine the effects of balanced and unbalanced forces on the motion of an object using one variable at a time, including number, size, direction, speed, position, friction, or air resistance (e.g., balanced forces pushing from both sides on an object, such as a box, producing no motion; unbalanced force on one side of an object, such as a ball, producing motion), and communicate these findings graphically.	Stability and Motion: Science of Flight Stability and Motion: Forces and Interactions
	Investigate, measure, and communicate in a graphical format how an observed pattern of motion (e.g., a child swinging in a swing, a ball rolling back and forth in a bowl, two children teetering on a see-saw, a model vehicle rolling down a ramp of varying heights, a pendulum swinging) can be used to predict the future motion of an object.	Stability and Motion: Science of Flight Stability and Motion: Forces and Interactions
	Explore objects that can be manipulated in order to determine cause-and-effect relationships (e.g., distance between objects affecting strength of a force, orientation of magnets affecting direction of a magnetic force) of electric interactions between two objects not in contact with one another (e.g., force on hair from an electrically charged balloon, electrical forces between a charged rod and pieces of paper) or magnetic interactions between two objects not in contact with one another (e.g., force between two permanent magnets or between an electromagnet and steel paperclips, force exerted by one magnet versus the force exerted by two magnets).	Stability and Motion: Forces and Interactions
	Apply scientific ideas about magnets to solve a problem through an engineering design project (e.g., constructing a latch to keep a door shut, creating a device to keep two moving objects from touching each other such as a maglev system).*	Stability and Motion: Forces and Interactions
From Molecules to Organisms: Structures and Processes	Obtain and combine information to describe that organisms are classified as living things, rather than nonliving things, based on their ability to obtain and use resources, grow, reproduce, and maintain stable internal conditions while living in a constantly changing external environment.	Life Cycles and Survival
	Create representations to explain the unique and diverse life cycles of organisms other than humans (e.g., flowering plants, frogs, butterflies), including commonalities such as birth, growth, reproduction, and death.	Life Cycles and Survival
Heredity: Inheritance and Variation of Traits	Examine data to provide evidence that plants and animals, excluding humans, have traits inherited from parents and that variations of these traits exist in groups of similar organisms (e.g., flower colors in pea plants, fur color and pattern in animal offspring).	Variation of Traits
	Engage in argument from evidence to justify that traits can be influenced by the environment (e.g., stunted growth in normally tall plants due to insufficient water, change in an arctic fox's fur color due to light and/or temperature, stunted growth of a normally large animal due to malnourishment).	Variation of Traits

Third Grade cont.

	Performance Expectation	PLTW Launch Modules
Unity and Diversity	Analyze and interpret data from fossils (e.g., type, size, distribution) to provide evidence of organisms and the environments in which they lived long ago (e.g., marine fossils on dry land, tropical plant fossils in arctic areas, fossils of extinct organisms in any environment).	Environmental Changes
	Investigate how variations in characteristics among individuals of the same species may provide advantages in surviving, finding mates, and reproducing (e.g., plants having larger thorns being less likely to be eaten by predators, animals having better camouflage coloration being more likely to survive and bear offspring).	Variation of Traits
	Construct an argument from evidence to explain the likelihood of an organism's ability to survive when compared to the resources in a certain habitat (e.g., freshwater organisms survive well, less well, or not at all in saltwater; desert organisms survive well, less well, or not at all in woodlands). A. Construct explanations that forming groups helps some organisms survive. B. Create models that illustrate how organisms and their habitats make up a system in which the parts depend on each other. C. Categorize resources in various habitats as basic materials (e.g., sunlight, air, freshwater, soil), produced materials (e.g., food, fuel, shelter), or as nonmaterial (e.g., safety, instinct, nature-learned behaviors).	Environmental Changes
	Evaluate engineered solutions to a problem created by environmental changes and any resulting impacts on the types and density of plant and animal populations living in the environment (e.g., replanting of sea oats in coastal areas due to destruction by hurricanes, creating property development restrictions in vacation areas to reduce displacement and loss of native animal populations).	Environmental Changes
Earth's Systems	Display data graphically and in tables to describe typical weather conditions expected during a particular season (e.g., average temperature, precipitation, wind direction).	Weather: Factors and Hazards
	Collect information from a variety of sources to describe climates in different regions of the world.	Weather: Factors and Hazards
Earth and Human Activity	Represent data in tables and graphical displays of typical weather conditions during a particular season to identify patterns and make predictions.	Weather: Factors and Hazards

Fourth Grade

	Performance Expectation	PLTW Launch Modules
Energy (PS3)	Use evidence to explain the relationship of the speed of an object to the energy of that object.	Energy Exploration
	Plan and carry out investigations that explain transference of energy from place to place by sound, light, heat, and electric currents. a. Provide evidence that heat can be produced in many ways (e.g., rubbing hands together, burning leaves) and can move from one object to another by conduction. b. Demonstrate that different objects can absorb, reflect, and/or conduct energy. c. Demonstrate that electric circuits require a complete loop through which an electric current can pass.	Energy Exploration
	Investigate to determine changes in energy resulting from increases or decreases in speed that occur when objects collide.	Energy Exploration
	Design, construct, and test a device that changes energy from one form to another (e.g., electric circuits converting electrical energy into motion, light, or sound energy; a passive solar heater converting light energy into heat energy).*	Energy Exploration
	Compile information to describe how the use of energy derived from natural renewable and nonrenewable resources affects the environment (e.g., constructing dams to harness energy from water, a renewable resource, while causing a loss of animal habitats; burning of fossil fuels, a nonrenewable resource, while causing an increase in air pollution; installing solar panels to harness energy from the sun, a renewable resource, while requiring specialized materials that necessitate mining).	Earth: Human Impact and Natural Disasters
Waves and Their Applications in Technologies for Information Transfer	Develop a model of waves to describe patterns in terms of amplitude and wavelength and that waves can cause objects to move.	Waves and the Properties of Light
	Develop and use models to show multiple solutions in which patterns are used to transfer information (e.g., using a grid of 1s and 0s representing black and white to send information about a picture, using drums to send coded information through sound waves, using Morse code to send a message).*	Input/Output: Computer Systems
	Construct a model to explain that an object can be seen when light reflected from its surface enters the eyes.	Waves and the Properties of Light
From Molecules to Organisms: Structures and Processes	Examine evidence to support an argument that the internal and external structures of plants (e.g., thorns, leaves, stems, roots, colored petals, xylem, phloem) and animals (e.g., heart, stomach, lung, brain, skin) function to support survival, growth, behavior, and reproduction.	Organisms: Structure and Function
	Obtain and communicate information explaining that humans have systems that interact with one another for digestion, respiration, circulation, excretion, movement, control, coordination, and protection from disease.	Input/Output: Human Brain Infection: Detection (5)
	Investigate different ways animals receive information through the senses, process that information, and respond to it in different ways (e.g., skunks lifting tails and spraying an odor when threatened, dogs moving ears when reacting to sound, snakes coiling or striking when sensing vibrations).	Input/Output: Human Brain Organisms: Structure and Function

Fourth Grade Cont.

	Performance Expectation	PLTW Launch Modules
Earth's Systems	Construct explanations by citing evidence found in patterns of rock formations and fossils in rock layers that Earth changes over time through both slow and rapid processes (e.g., rock layers containing shell fossils appearing above rock layers containing plant fossils and no shells indicating a change from land to water over time, a canyon with different rock layers in the walls and a river in the bottom indicating that over time a river cut through the rock).	Earth: Past, Present, and Future
	Plan and carry out investigations to examine properties of soils and soil types (e.g., color, texture, capacity to retain water, ability to support growth of plants).	Weather: Factors and Hazards (3)
	Explore information to support the claim that landforms are the result of a combination of constructive forces, including crustal deformation, volcanic eruptions, and sediment deposition as well as a result of destructive forces, including erosion and weathering.	Earth: Past, Present, and Future
	Analyze and interpret data (e.g., angle of slope in downhill movement of water, volume of water flow, cycles of freezing and thawing of water, cycles of heating and cooling of water, speed of wind, relative rate of soil deposition, amount of vegetation) to determine effects of weathering and rate of erosion by water, ice, wind, and vegetation using one single form of weathering or erosion at a time.	Earth: Past, Present, and Future
	Describe patterns of Earth's features on land and in the ocean using data from maps (e.g., topographic maps of Earth's land and ocean floor; maps of locations of mountains, continental boundaries, volcanoes, and earthquakes).	Earth: Past, Present, and Future
	Formulate and evaluate solutions to limit the effects of natural Earth processes on humans (e.g., designing earthquake, tornado, or hurricane-resistant buildings; improving monitoring of volcanic activity).*	Earth: Human Impact and Natural Disasters

Fifth Grade

	Performance Expectation	PLTW Launch Modules
Matter and Its Interactions (PS1)	Plan and carry out investigations (e.g., adding air to expand a basketball, compressing air in a syringe, dissolving sugar in water, evaporating salt water) to provide evidence that matter is made of particles too small to be seen.	Matter: Properties and Reactions
	Investigate matter to provide mathematical evidence, including graphs, to show that regardless of the type of reaction (e.g., new substance forming due to dissolving or mixing) or change (e.g., phase change) that occurs when heating, cooling, or mixing substances, the total weight of the matter is conserved.	Matter: Properties and Reactions
	Examine matter through observations and measurements to identify materials (e.g., powders, metals, minerals, liquids) based on their properties (e.g., color, hardness, reflectivity, electrical conductivity, thermal conductivity, response to magnetic forces, solubility, density).	Matter: Properties and Reactions
	Investigate whether the mixing of two or more substances results in new substances (e.g., mixing of baking soda and vinegar resulting in the formation of a new substance, gas; mixing of sand and water resulting in no new substance being formed).	Matter: Properties and Reactions
	Construct explanations from observations to determine how the density of an object affects whether the object sinks or floats when placed in a liquid.	
Motion and Stability: Forces and Interactions	Construct an explanation from evidence to illustrate that the gravitational force exerted by Earth on objects is directed downward towards the center of Earth.	Earth's Water and Interconnected Systems
	Design and conduct a test to modify the speed of a falling object due to gravity (e.g., constructing a parachute to keep an attached object from breaking).	This standard is not currently supported.
Ecosystems: Interactions, Energy, and Dynamics	Defend the position that plants obtain materials needed for growth primarily from air and water	Ecosystems: Flow of Matter and Energy
	Construct an illustration to explain how plants use light energy to convert carbon dioxide and water into a storable fuel, carbohydrates, and a waste product, oxygen, during the process of photosynthesis.	Ecosystems: Flow of Matter and Energy
	Construct and interpret models (e.g., diagrams, flow charts) to explain that energy in animals' food is used for body repair, growth, motion, and maintenance of body warmth and was once energy from the sun.	Ecosystems: Flow of Matter and Energy
	Create a model to illustrate the transfer of matter among producers; consumers, including scavengers and decomposers; and the environment.	Ecosystems: Flow of Matter and Energy
Earth's Place in the Universe	Defend the claim that one factor determining the apparent brightness of the sun compared to other stars is the relative distance from Earth.	Patterns in the Universe
	Analyze data and represent with graphs 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 (e.g., shadows and the position and motion of Earth with respect to the sun, visibility of select stars only in particular months).	Patterns in the Universe