



inquisitive

Kentucky Academic Standards for Science Crosswalk

100% Inquisitive Alignment & Coverage



What does it mean to be Inquisitive?

Our mission is for teachers to enjoy teaching and for students to learn with purpose and depth. Inquisitive lessons inspire wonder, curiosity and engagement by introducing science and engineering through real world phenomena and relevant focus questions.

Inquisitive Kentucky Crosswalk

This document maps Inquisitive 100% Content Coverage to the NGSS for Kentucky. We have included the relevant NGSS Performance Expectations and Inquisitive lesson learning targets, for ease of use and reference to the content statements.

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Kentucky Academic Standards for Science 2024				Inquisitive Lessons (Learning Targets)
Grade Level	Discipline	Performance Expectation	Clarification Statement	
K	Physical Science	K-PS2-1. 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.	Examples of pushes or pulls could include a string attached to an object being pulled, swings on a playground, a person pushing an object, a person stopping a rolling ball, and two objects colliding and pushing on each other.	<u>K-PS2-1</u> <u>Push and Pull</u> - Understand that pushes and pulls are used to start and stop the motion of objects. - Identify and classify pushes and pulls. <u>Speed It Up! Slow It Down!</u> - Demonstrate how pushes and pulls of different strengths can cause the speed of objects to change. <u>Which Way?</u> - Demonstrate how pushes and pulls can cause the direction of objects to change. - Explain that when objects collide, objects will move in different directions.
		K-PS2-2. Analyze data to determine if a design solution works as intended to change the speed or direction of an object with a push or a pull. *	Examples of problems requiring a solution could include having a marble or other object move a certain distance, follow a particular path, and knock down other objects. Examples of solutions could include tools such as a ramp to increase the speed of the object and a structure that would cause an object such as a marble or ball to turn.	<u>K-PS2-2</u> <u>Does It Work?</u> - Understand that there are several ways to solve a problem. - Analyze data from a design solution and draw a conclusion. - Explain how changing the force acting on an object changes the speed of its motion.
		K-PS3-1. Make observations to determine the effect of sunlight on Earth's surface.	Examples of Earth's surface could include sand, soil, rocks, and water.	<u>K-PS3-1</u> <u>Sunlight Warms Earth</u> Describe the warming effect of the sun on Earth's surface.
		K-PS3-2. Use tools and materials to design and build a structure that will reduce the warming effect of sunlight on an area.*	Examples of structures could include umbrellas, canopies, and tents that minimize the warming effect of the sun.	<u>K-PS3-2</u> <u>Shelter from the Sun</u> - Explain negative effects from too much sunlight and heat. - Plan, design, and build a structure to provide shade and protection from the sun's light and heat.

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K	Life Science	K-LS1-1. Use observations to describe patterns of what plants and animals (including humans) need to survive.	Examples of patterns could include that animals need to take in food but plants make their food, the different kinds of food needed by different types of animals, the requirement of plants to have light, and that all living things need water.	<u>K-LS1-1</u> <u>Staying Alive</u> ● Identify living things and nonliving things. ● State that animals need food and water to survive. ● Describe the foods that different animals eat. <u>What do Plants Need?</u> ● Identify the needs of plants to live and grow.

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K	Earth and Space Science	K-ESS2-1. Use and share observations of local weather conditions to describe patterns over time.	Examples of qualitative observations could include descriptions of the weather (such as sunny, cloudy, rainy, and warm); examples of quantitative observations could include numbers of sunny, windy, and rainy days in a month. Examples of patterns could include that it is usually cooler in the morning than in the afternoon and the number of sunny days versus cloudy days in different months.	<u>K-ESS2-1</u> <u>What is Weather?</u> • Observe the current local weather. • Describe the weather as a combination of different conditions at a particular time. <u>Watching the Weather</u> • Recognize the symbols used to depict weather. • Understand that the weather changes daily. • Record weather over time and look for patterns.
		K-ESS2-2. Construct an argument supported by evidence for how plants and animals (including humans) can change the environment to meet their needs.	Examples of plants and animals changing their environment could include a squirrel digs in the ground to hide its food and tree roots can break concrete.	<u>K-ESS2-2</u> <u>Change, Change, Change!</u> • Give an example of a living thing changing its environment and explain how and why it is doing so. • Use evidence (in images) to decide whether or an animal or plant is changing its environment.
		K-ESS3-1. Use a model to represent the relationship between the needs of different plants or animals (including humans) and the places they live.	Examples of relationships could include that deer eat buds and leaves; therefore, they usually live in forested areas; and, grasses need sunlight, so they often grow in meadows. Plants, animals, and their surroundings make up a system.	<u>K-ESS3-1</u> <u>This Is Home</u> • Describe the relationships among living things, the resources they need to survive, and where those things live. • Use a model to describe how the needs of living things are met by the places in which they live and the resources found in those places.
		K-ESS3-2. Ask questions to obtain information about the purpose of weather forecasting to prepare for, and respond to, severe weather.*	Emphasis is on local forms of severe weather.	<u>K-ESS3-2</u> <u>Weather Warning!</u> • Ask questions about severe weather in their local area. • Describe how people plan and prepare for severe weather.
		K-ESS3-3. Communicate solutions that will reduce the impact of	Examples of human impact on the land could include cutting down trees to produce paper and using resources to	<u>K-ESS3-3</u> <u>Helping Earth</u> • Describe how people affect the land, water, air, and other living things in the local environment in positive and negative ways.

		humans on the land, water, air, and/or other living things in the local environment.*	produce bottles. Examples of solutions could include reusing paper and recycling cans and bottles.	• Communicate solutions that will reduce the impact of humans on the land, water, air, and other living things in the local community.
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1	Physical Science	1-PS4-1. Plan and conduct investigations to provide evidence that vibrating materials can make sound and that sound can make materials vibrate.	Examples of vibrating materials that make sound could include tuning forks and plucking a stretched string. Examples of how sound can make matter vibrate could include holding a piece of paper near a speaker making sound and holding an object near a vibrating tuning fork.	<u>1-PS4-1</u> <u>Good Vibrations</u> - Identify what happens when materials vibrate. - Investigate materials and their relationship with sound. - Determine that vibrating materials make sound. <u>Move to the Sound</u> - Identify what happens to materials when sound is played. - Investigate sound and its relationship to materials. - Determine that sound can make materials vibrate.
		1-PS4-2. Make observations to construct an evidence-based account that objects can be seen only when illuminated.	Examples of observations could include those made in a completely dark room, a pinhole box, and a video of a cave explorer with a flashlight. Illumination could be from an external light source or by an object giving off its own light.	<u>1-PS4-2</u> <u>Turn on the Light!</u> - Identify that light can cause objects to be seen. - Investigate what happens to the appearance of objects when they are illuminated. - Determine that some objects give off their own light, and some objects can be seen if there is a light source available.
		1-PS4-3. Plan and conduct an investigation to determine the effect of placing objects made with different materials in the path of a beam of light.	Examples of materials could include those that are transparent (such as clear plastic), translucent (such as wax paper), opaque (such as cardboard), and reflective (such as a mirror).	<u>1-PS4-3</u> <u>Beam of Light</u> - Identify that a beam of light shines in one direction. - Investigate what effects a beam of light has on objects made from different materials. - Determine that some objects allow all light to pass through, some allow a portion of the light to pass through, and some block light and create shadows. <u>Mirror, Mirror</u> - Identify how a beam of light can reflect off objects. - Investigate what effects a beam of light has on objects made from different materials. - Determine that some objects allow light to bounce off them and light their surrounding space.
		1-PS4-4. Use tools and materials to design and build a device that uses light or sound to solve the problem of communicating over a distance.*	Examples of devices could include a light source to send signals, paper-cup-and-string “telephones,” and a pattern of drum beats.	<u>1-PS4-4</u> <u>Sounds Signals</u> - Identify that devices allow us to communicate. - Design and build a device that uses sound to communicate. - Determine communication means to send and receive information. <u>Light Signals</u> - Identify what devices allow us to communicate using light. - Design and build a device that uses light to communicate. - Determine communication means to send and receive information using light.

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1	Life Science	1-LS1-1. Use materials to design a solution to a human problem by mimicking how plants and/or animals use their external parts to help them survive, grow, and meet their needs.*	Examples of human problems that can be solved by mimicking plant or animal solutions could include designing clothing or equipment to protect bicyclists by mimicking turtle shells, acorn shells, and animal scales; stabilizing structures by mimicking animal tails and roots on plants; keeping out intruders by mimicking thorns on branches and animal quills; and detecting intruders by mimicking eyes and ears.	<u>1-LS1-1</u> <u>How Useful!</u> - Identify that animals use their body parts in different ways. - Identify that animals use their body parts to survive and grow. <u>Plant Parts</u> - Identify that plants have different external structures (parts). - Identify that plants use these external structures to survive and grow. <u>Scaredy-Cat!</u> - Identify that animals have body parts that capture and convey different kinds of information needed for growth and survival. - Identify that animals respond to these stimuli with behaviors that help them survive. - Identify that plants also respond to some external stimuli. <u>Mimic Nature</u> - Identify that plants and animals use their body parts to survive and grow. - Use materials to design a solution to a human problem that mimics how plants or animals use their external parts. - Recognize that the shape and stability of structures of natural and designed objects are related to their function.
		1-LS1-2. Read texts and use media to determine patterns in the behavior of parents and offspring that help offspring survive.	Examples of patterns of behavior could include the signals that offspring make (such as crying, cheeping, and other vocalizations) and the responses of the parents (such as feeding, comforting, and protecting the offspring).	<u>1-LS1-2</u> <u>Offspring</u> - Identify behaviors of parents and offspring that help the offspring survive. - Read grade-appropriate texts and use media to obtain scientific information. - Determine patterns in the natural world.
		1-LS3-1. Make observations to construct an evidence-based account that young plants and animals are like, but not exactly like, their parents.	Examples of patterns could include features that plants or animals share. Examples of observations could include leaves from the same kind of plant that are the same shape but can differ in size, and a particular breed of dog that looks like its parents but is not exactly the same.	<u>1-LS3-1</u> <u>Are We Alike?</u> - Explain that young animals are very much, but not exactly like, their parents. <u>Same But Different</u> - Explain that types of plants or animals are recognizable as similar but can also vary in many ways. <u>Plants Have Parents Too</u> - Determine that young plants are similar but different from the adult version of the same plant.

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1	Earth and Space Science	1-ESS1-1. Use observations of the sun, moon, and stars to describe patterns that can be predicted.	Examples of patterns could include that the sun and moon appear to rise in one part of the sky, move across the sky, and set; and stars other than our sun are visible at night but not during the day.	<u>1-ESS1-1</u> The Sun Is Out ● Identify that when the sun appears in the sky, it is daylight. ● Observe, describe, and predict the pattern of motion of the sun as it appears in the sky. Bright Moon ● Identify that the moon appears brighter when it is nighttime. ● Identify that the moon can appear at different times during the day and night. ● Observe and describe that the moon's position in the sky appears to move. Starry, Starry Night ● Understand that the appearance of stars in the sky can be observed and predicted. ● Identify that stars (other than our own sun) are visible at night but not during the day.
		1-ESS1-2. Make observations at different times of year to relate the amount of daylight to the time of year.	Emphasis is on relative comparisons of the amount of daylight in the winter to the amount in the spring or fall.	<u>1-ESS1-2</u> Daylight and Nighttime ● Identify that there is more daylight in summer. ● Identify that there is more nighttime in winter.

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2	Physical Science	2-PS1-1. Plan and conduct an investigation to describe and classify different kinds of materials by their observable properties.	Observations could include color, texture, hardness, and flexibility. Patterns could include the similar properties that different materials share.	<u>2-PS1-1</u> <u>What IS This Stuff?</u> • Understand that matter is all of the substances we can see and feel. • Investigate the differences between solids and liquids. • Understand that solids keep their shape while liquids take the shape of their container. <u>Sorting Our Stuff</u> • Explain that matter has properties. • Classify matter by its properties. • Observe that the properties of matter can change when heated or cooled.
		2-PS1-2. Analyze data obtained from testing different materials to determine which materials have the properties that are best suited for an intended purpose.	Examples of properties could include strength, flexibility, hardness, texture, and absorbency.	<u>2-PS1-2</u> <u>The Best Materials for the Job</u> • Explain how different materials have properties that make them suited for different purposes.
		2-PS1-3. Make observations to construct an evidence-based account of how an object made of a small set of pieces can be disassembled and made into a new object.	Examples of pieces could include blocks, building bricks, or other assorted small objects.	<u>2-PS1-3</u> <u>Building New Things from Parts</u> • Identify that objects are made from parts. • Explain that an object can be disassembled into parts, and these parts can be reassembled to make something new.
		2-PS1-4. Construct an argument with evidence that some changes caused by heating or cooling can be reversed and some cannot.	Examples of reversible changes could include materials such as water and butter at different temperatures. Examples of irreversible changes could include cooking an egg, freezing a plant leaf, and heating paper.	<u>2-PS1-4</u> <u>Changes from Heating and Cooling</u> • Explain that heating and cooling can change matter. • Compare and contrast changes that can be undone and cannot be undone.

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2	Life Science	2-LS2-1. Plan and conduct an investigation to determine if plants need sunlight and water to grow.	None provided.	<u>2-LS2-1</u> Growing Plants • Plan and conduct an investigation. • Collect and interpret data about plant growth. • Understand that plants need water and sunlight to grow.
		2-LS2-2. Develop a simple model that mimics the function of an animal in dispersing seeds or pollinating plants.*	None provided.	<u>2-LS2-2</u> Animal Helpers • Understand that animals help to spread seeds from plants. • Develop a simple model to demonstrate how animals help spread seeds. Unbelievable Bees! • Understand that animals help spread pollen from one plant to another. • Use a simple model to demonstrate how bees help spread pollen.
		2-LS4-1. Make observations of plants and animals to compare the diversity of life in different habitats.	Emphasis is on the diversity of living things in each of a variety of different habitats.	<u>2-LS4-1</u> Whose Habitat Is This? • Identify and describe different habitats. • Describe living things in a certain habitat. • Compare the different plants and animals that live in a certain habitat.

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2	Earth and Space Science	2-ESS1-1. Use information from several sources to provide evidence that Earth events can occur quickly or slowly.	Examples of events and timescales could include volcanic explosions and earthquakes, which happen quickly and erosion of rock, which occurs slowly.	<u>2-ESS1-1</u> Earth Changes S-l-o-w-l-y - Understand that elements and features on Earth (dirt, sand, rocks, hills, mountains, rivers, lakes, and seas) change over time. - Recognize that weathering and erosion are slow changes that transform Earth's surface over a long period of time. <u>Earth Changes Fast!</u> - Understand that elements and features on Earth (soil, sand, rocks, hills, mountains, rivers, lakes, and seas) change over time. - Recognize that volcanic eruptions, earthquakes, and floods are examples of changes that happen quickly, and transform Earth's surface suddenly.
		2-ESS2-1. Compare multiple solutions designed to slow or prevent wind or water from changing the shape of the land.*	Examples of solutions could include different designs of dikes and windbreaks to hold back wind and water, and different designs for using shrubs, grass, and trees to hold back the land.	<u>2-ESS2-1</u> The Power of Wind and Water - Understand that sudden and slow changes caused by wind and water can change the shape of the land. - Examine and discuss solutions that engineers and scientists have designed to prevent this damage from happening. - Compare solutions designed to slow or prevent wind or water from changing the shape of the land.
		2-ESS2-2. Develop a model to represent the shapes and kinds of land and bodies of water in an area.	None provided.	<u>2-ESS2-2</u> Map It! - Develop a model that identifies natural landforms and bodies of water. - Understand that maps can be used to represent many types of areas.
		2-ESS2-3. Obtain information to identify where water is found on Earth and that it can be solid or liquid.	None provided.	<u>2-ESS2-3</u> Water, Water Everywhere! - Identify where water is found on Earth. - Understand that water can be found in liquid or solid (ice) form.

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K-2	Engineering, Technology and Applications of Science	K-2-ETS1-1. Ask questions, make observations, and gather information about a situation that people want to change to define a simple problem that can be solved through the development of a new or improved object or tool. *	None provided.	K-2-ETS1-1 Food, Glorious Food - Recognize that we get food from plants and animals. - Identify that food products solve an important problem: we need food to survive. In the Making - Identify everyday designed items produced from fibers sourced from plants and animals. - Understand that designed products offer a solution to a problem. No Rotten Apples - Ask questions based on observations to find out more about the process of food production and handling. - Define a problem (how to stop fruit from turning brown) and explore and investigate solutions to the problem. What Is A House? - Ask questions based on observations. - Identify that houses are designed and built for a purpose to solve a problem. - Understand that houses give us shelter.
		K-2-ETS1-2. 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. *	None provided.	K-2-ETS1-2 It's in the Design - Identify a need or problem that needs a solution. - Develop and evaluate a simple design solution to the problem. Kitchen Nightmares - Understand that food needs to be stored and handled correctly to keep it safe to eat. - Follow the procedure for making a cooler and identify the technology involved in keeping the food safe. Useful Or Not? - Describe the usefulness of kitchen gadgets. - Generate, develop, and record a design for a new kitchen gadget. I'll Huff And I'll Puff - Develop a simple model of a house. - Test and evaluate their model. - Understand the importance of the materials used in helping the shape and stability of a structure.
		K-2-ETS1-3. Analyze data from tests of two objects designed to solve the same problem to compare the strengths and weaknesses of how each performs. *	None provided.	K-2-ETS1-3 Make It Last - Understand that cotton is a natural fiber which is often used in the kitchen. - Conduct an experiment to find out which sauce stain is the most difficult to remove. - Understand that engineering is used to improve the stain resistance of clothes so that they last longer and are therefore better for the environment.

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3	Physical Science	3-PS2-1. Plan and conduct an investigation to provide evidence of the effects of balanced and unbalanced forces on the motion of an object.	Examples could include that an unbalanced force on one side of a ball can make it start moving, and balanced forces pushing on a box from both sides will not produce any motion at all.	<u>3-PS2-1</u> <u>Move It!</u> - Identify a force as a push or a pull. - Use arrows to represent the magnitude and direction of a force. <u>Falling With Style!</u> - Describe the forces of gravity and air resistance. - Use arrows to accurately represent gravity and air resistance in a specific situation. - Explain how the shape of an object affects the amount of air resistance it experiences. <u>Balancing Forces</u> - Identify when the forces on an object are balanced or unbalanced. - Explain how balanced and unbalanced forces affect an object's motion. - Use arrows to represent balanced and unbalanced forces. <u>Forceful Friction</u> - Plan and conduct an investigation to provide evidence of the effects of balanced and unbalanced forces on the motion of an object. - Describe and represent how friction affects the motion of an object. - Use force concepts, including friction, to explain experimental observations.
		3-PS2-2. Make observations and/or measurements of an object's motion to provide evidence that a pattern can be used to predict future motion.	Examples of motion with a predictable pattern could include a child swinging in a swing, a ball rolling back and forth in a bowl, and two children on a see-saw.	<u>3-PS2-2</u> <u>Patterns in Motion</u> - Identify patterns in motion and use these patterns to predict future motion. - Make observations and measurements to produce data that serves as the basis for evidence for an explanation of an observed phenomenon.
		3-PS2-3. Ask questions to determine cause-and-effect relationships of electric or magnetic interactions between two objects not in contact with each other.	Examples of an electric force could include the force on hair from an electrically charged balloon and the electrical forces between a charged rod and pieces of paper; examples of a magnetic force could include the force between two permanent magnets, the force between an electromagnet and steel paperclips, and the force exerted by one magnet versus the force exerted by two magnets. Examples of	<u>3-PS2-3</u> <u>Hair Raising!</u> - Identify electrostatic force as a non-contact force. - Describe the interaction between two charged objects in terms of a cause and effect relationship. <u>It's Magnetic!</u> - Identify when a magnetic force is at work and what types of materials are magnetic. - Describe the interaction between two magnetic objects in terms of a cause and effect relationship.

			cause- and-effect relationships could include how the distance between objects affects the strength of the force and how the orientation of magnets affects the direction of the magnetic force.	
		3-PS2-4. Define a simple design problem that can be solved by applying scientific ideas about magnets.*	Examples of problems could include constructing a latch to keep a door shut and creating a device to keep two moving objects from touching each other.	3-PS2-4 What's the Problem? • Identify and define a problem that can be solved using magnets. • Use their knowledge of magnets and magnetic force to design a solution to the problem.

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3	Life Science	3-LS1-1. Develop models to describe that organisms have unique and diverse life cycles but all have in common birth, growth, reproduction, and death.	Changes organisms go through during their life form a pattern.	<u>3-LS1-1</u> Plant Life-From Seed to Seed - Produce an informative model that shows the key stages in the life cycle of a plant. Animal Life Cycles - Produce an informative model that shows the key stages in the life cycle of a chosen animal.
		3-LS2-1. Construct an argument that some animals form groups that help members survive.	None provided.	<u>3-LS2-1</u> Group Work - Construct an argument with evidence that animals form groups for different reasons. - Understand that being part of a group helps animals survive.
		3-LS3-1. Analyze and interpret data to provide evidence that plants and animals have traits inherited from parents and that variation of these traits exists in a group of similar organisms.	Patterns are the similarities and differences in traits shared between offspring and their parents, or among siblings. Emphasis is on organisms other than humans.	<u>3-LS3-1</u> Variation of Traits - Analyze and interpret data to provide evidence of the shared traits and variations in traits that occur in a species. Inherited Traits - Identify and use evidence to support the idea that offspring inherit traits from their parents. - Identify and use evidence to support the idea that siblings with the same parents will have variations in their traits.
		3-LS3-2. Use evidence to support the explanation that traits can be influenced by the environment.	Examples of the environment affecting a trait could include that normally tall plants grown with insufficient water are stunted, and a pet dog that is given too much food and little exercise may become overweight.	<u>3-LS3-2</u> Can the Environment Affect Traits? Identify and use evidence to support the idea that the environment of a living thing can affect both its physical and behavioral traits.
		3-LS4-2. Use evidence to construct an explanation for how the variations in characteristics among individuals of the same species may provide advantages in surviving, finding	Examples of cause-and-effect relationships could be that plants that have larger thorns than other plants may be less likely to be eaten by predators, and animals that have better camouflage coloration than other animals may be more likely to survive and therefore more likely to leave offspring.	<u>3-LS4-2</u> What's My Advantage Use evidence to construct an explanation for why a variation in a trait gives certain individuals in a species a survival advantage.

		mates, and reproducing.		
		3-LS4-3. Construct an argument with evidence that in a particular habitat some organisms can survive well, some survive less well, and some cannot survive at all.	Examples of evidence could include needs and characteristics of the organisms and habitats involved. The organisms and their habitat make up a system in which the parts depend on each other.	3-LS4-3 Happy in My Habitat • Describe what a habitat is and give some examples of different habitats. • Describe the features an animal has that enable it to survive in its habitat. • Explain why an animal could not live in a different habitat
		3-LS4-4. 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.*	Examples of environmental changes could include changes in land characteristics, water distribution, temperature, food, and other organisms.	3-LS4-4 What Happens When Environments Change? • Describe some of the ways that environments can change. • Describe how changes to an environment can affect the organisms that live there. • Evaluate the effectiveness of a solution designed to solve a problem caused by changes to an environment

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3	Earth and Space Science	3-ESS2-1. Represent data in tables and graphical displays to describe typical weather conditions expected during a particular season.	Examples of data could include average temperature, precipitation, and wind direction.	<u>3-ESS2-1</u> Weather Watching - Describe some types of weather data and how they are collected. - Represent weather data as a bar graph. - Use weather data as evidence for decisions or explanations. Weather Patterns and Predictions - Draw tables and graphs to analyze weather data. - Use weather data to make a decision about when to hold an outdoor event. - Use weather data from previous years to make a prediction about future weather.
		3-ESS2-2. Obtain and combine information to describe climates in different regions of the world.	None provided.	<u>3-ESS2-2</u> What's Your Climate? - Differentiate between the terms "weather" and "climate." - Describe some of the climates found around the world.
		3-ESS3-1. Make a claim about the merit of a design solution that reduces the impacts of a weather-related hazard. *	Examples of design solutions to weather-related hazards could include barriers to prevent flooding, wind-resistant roofs, and lightning rods.	<u>3-ESS3-1</u> Weatherproof! - Give some examples of extreme weather and the problems they cause. - Make a claim about the effectiveness of a solution for a particular weather hazard and use evidence to support the claim.

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4	Physical Science	4-PS3-1. Use evidence to construct an explanation relating the speed of an object to the energy of that object.	None provided.	<u>4-PS3-1</u> <u>Fast Energy</u> - State that objects that are moving faster have more energy. - Use practical examples or observations as evidence to support their statement.
		4-PS3-2. Make observations to provide evidence that energy can be transferred from place to place by sound, light, heat, and electric currents.	None provided.	<u>4-PS3-2</u> <u>Sound Moves</u> - Explain how sound is produced. - State that sound travels from one place to another, and cite practical observations as evidence. <u>Heat Moves</u> - Use their measurements and observations to explain how heat moves. - Identify how heat moves from one object to another in familiar, real-life contexts. <u>Switch the Light On!</u> - Describe how light energy travels from one place to another. - Describe how to build a circuit that changes electrical energy into light energy.
		4-PS3-3. Ask questions and predict outcomes about the changes in energy that occur when objects collide.	Emphasis is on the change in the energy due to the change in speed, not on the forces, as objects interact.	<u>4-PS3-3</u> <u>When Objects Collide</u> - Identify and give examples of instances of how motion energy is transferred through collisions. - Explain that some of the motion energy in a collision is transformed into sound and heat.
		4-PS3-4. Apply scientific ideas to design, test, and refine a device that converts energy from one form to another. *	Examples of devices could include electric circuits that convert electrical energy into motion energy of a vehicle, light, or sound; and a passive solar heater that converts light into heat. Examples of constraints could include the materials, cost, or time to design the device.	<u>4-PS3-4</u> <u>Converting Energy</u> - Explain, with an example, how energy can be converted from one form into another. - Describe the criteria and constraints associated with the design of a solution to a problem. - Use the engineering process in collaboration with others to design, build, test, and refine a solution to a problem.
		4-PS4-1. Develop a model of waves to describe patterns in terms of amplitude and wavelength and that waves can cause objects to move.	Examples of models could include diagrams, analogies, and physical models to illustrate wavelength and amplitude of waves.	<u>4-PS4-1</u> <u>Catch the Wave</u> - Describe wave patterns found in nature. - Describe differences in wave patterns in terms of their wavelength and amplitude. <u>Modeling Waves</u> - Use a physical model to observe and analyze the natural phenomenon of wave motion. - Develop a model to explain that waves can cause objects to move.

		4-PS4-2. Develop a model to describe that light reflecting from objects and entering the eye allows objects to be seen.	Examples of models could include diagrams, analogies, and physical models that illustrate light reflecting from objects and entering the eye.	<u>4-PS4-2</u> <u>Eye, Eye!</u> • State that light travels in straight lines called rays. • Explain that we see objects when light rays reflect off them and into our eyes. • Describe how mirrors change the path of light and help us to see things we cannot look at directly.
		4-PS4-3. Generate and compare multiple solutions that use patterns to transfer information.*	Examples of solutions could include drums sending coded information through sound waves, using a grid of 1's and 0's representing black and white to send information about a picture, and using Morse code to send text.	<u>4-PS4-3</u> <u>Sending Information</u> • Use a code to send and receive messages. • Compare the effectiveness of different methods for sending and receiving encoded messages. • Appreciate how today's technology is far more effective and efficient at sending and receiving information than what was used a hundred years ago. • <u>Get the Message</u> • Send and receive simple messages using a visual form of binary code. • Understand that binary code is used by modern communication technologies to send and receive information.

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Grade Level	Discipline	Performance Expectation	Clarification Statement	
4	Life Science	4-LS1-1. Construct an argument that plants and animals have internal and external structures that function to support survival, growth, behavior, and reproduction.	Examples of structures could include thorns, stems, roots, colored petals, heart, stomach, lung, brain, and skin.	<u>4-LS1-1</u> Plantific! - Identify important external structures of a plant and describe their function. - Identify an important internal structure of a plant and describe its function. - Understand that plant structures work together as a connected system. Survivors - Identify different external structures of a variety of animals. - Explain how an external structure helps an animal to survive. The Inside Story! - Identify the position and the function of the heart, lungs, and brain in their body. - Explain how these structures, along with the nerves, work together to aid growth and survival. - Give examples of animals that have internal structures similar to and different from those in humans.
		4-LS1-2. 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.	Emphasis is on systems of information transfer.	<u>4-LS1-2</u> Sensing Information - Describe the senses as the ways in which an animal's brain receives information about the environment. - Use a model to identify each stage in the sequence of events, that begins with a change in an animal's environment, and ends with the brain directing the body to respond.
		4-LS4-1. Analyze and interpret data from fossils to provide evidence of the organisms and the environments in which they lived long ago.	Examples of data could include type, size, and distributions of fossil organisms. Examples of fossils and environments could include marine fossils found on dry land, tropical plant fossils found in Arctic areas, and fossils of extinct organisms.	<u>3-LS4-1</u> Fossil Stories - Describe what a fossil is and name an example of one. - Give a simple explanation of how fossils are formed. - Give an example of the type of information we can obtain from a fossil. - Explain how the locations of fossils can tell us about changes to the environment over time.

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4	Earth and Space Sciences	4-ESS1-1. Identify evidence from patterns in rock formations and fossils in rock layers to support an explanation for changes in a landscape over time.	Examples of evidence from patterns could include rock layers with marine shell fossils above rock layers with plant fossils and no shells, indicating a change from land to water over time; and 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.	<u>4-ESS1-1</u> <u>Has the Earth Changed?</u> - Describe how Earth's surface changes over time. - Use rock layers and the fossils found in them as evidence of Earth's changes.
		4-ESS2-1. Make observations and/or measurements to provide evidence of the effects of weathering or the rate of erosion by water, ice, wind, or vegetation.	Examples of variables to test could include angle of slope in the downhill movement of water, amount of vegetation, speed of wind, relative rate of deposition, cycles of freezing and thawing of water, cycles of heating and cooling, and volume of water flow.	<u>4-ESS2-1</u> <u>Weathering</u> - Describe a process by which rocks become weathered. - Use observations from an investigation as evidence for an explanation of how weathering occurs. <u>Erosion</u> - Give an example of an erosion process and explain how it moves weathered rock. - Use practical observations as evidence for an explanation of how the slope of the land can affect the rate of erosion.
		4-ESS2-2. Analyze and interpret data from maps to describe patterns of Earth's features.	Maps can include topographic maps of Earth's land and ocean floor, as well as maps of the locations of mountains, continental boundaries, volcanoes, and earthquakes.	<u>4-ESS2-2</u> <u>Mapping Patterns</u> - Describe the positions of Earth's mountain ranges on the continents and the position of the ocean trenches. - Describe the locations of volcanoes and earthquake activity and note that they are similar.
		4-ESS3-1. Obtain and combine information to describe that energy and fuels are derived from natural resources and that their uses affect the environment.	Natural resources are derived from both renewable energy (e.g., wind, water, biomass) and non-renewable energy (e.g., fossil fuels and fissile materials). Examples of environmental effects could include loss of habitat, soil erosion, or air pollution.	<u>4-ESS3-1</u> <u>Energy Resources</u> - Explain the difference between a renewable and a nonrenewable energy resource. - Describe the effects of a particular energy resource on the environment.
		4-ESS3-2. Generate and compare multiple solutions to reduce the impacts of natural Earth processes on humans. *	Examples of solutions could include designing an earthquake-resistant building and improving the monitoring of volcanic activity.	<u>4-ESS3-2</u> <u>Living With Earth's Hazards</u> - Describe some natural hazards that cause problems for humans. - Design and evaluate a potential solution to reduce harm caused by a natural hazard.

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5	Physical Science	5-PS1-1. Develop a model to describe that matter is made of particles too small to be seen.	Examples of evidence could include adding air to expand a basketball, compressing air in a syringe, dissolving sugar in water, and evaporating salt water.	<u>5-PS1-1</u> Too Small to Be Seen • State that all matter is made of particles too small to see. • Describe differences among the particles in solids, liquids, and gases. • Use the movement of particles to explain observations of matter.
		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.	Examples of reactions or changes could include phase changes, dissolving, and mixing that form new substances.	<u>5-PS1-2</u> Weighing Matter • Understand that the weight of matter is always conserved, even when that matter undergoes change. • Use their own observations and measurements as evidence to support a claim.
		5-PS1-3. Make observations and measurements to identify materials based on their properties.	Examples of materials to be identified could include baking soda and other powders, metals, minerals, and liquids. Examples of properties could include color, hardness, reflectivity, electrical conductivity, thermal conductivity, response to magnetic forces, and solubility; density is not intended as an identifiable property.	<u>5-PS1-3</u> Material Properties • Accurately describe the properties of common materials. • Use the results of testing for particular properties to identify a material.
		5-PS1-4. Conduct an investigation to determine whether the mixing of two or more substances results in new substances.	None provided.	<u>5-PS1-4</u> Mixing Matter • Use experimental observations to determine whether mixing substances has produced a new substance. • Identify variables that are changed or kept the same so that an experiment can be a fair test.
		5-PS2-1. Support an argument that the gravitational force exerted by Earth on objects is directed down.	“Down” is a local description of the direction that points toward the center of the spherical Earth.	<u>5-PS2-1</u> Goin' Down! • Explain that objects near Earth’s surface fall downward because the force of gravity is pulling them toward the planet’s center. • Carry out an investigation and record observations. • Make a claim and use evidence and reasoning to support it. • Evaluate the validity of a claim based on evidence presented.

		5-PS3-1. Use models to describe that energy in animals' food (used for body repair, growth, motion, and to maintain body warmth) was once energy from the sun.	Examples of models could include diagrams and flow charts.	5-PS3-1 Energy for Living Things • State reasons as to why animals need to eat food. • Create an accurate model of a food chain. • Identify that energy in animals' food was once energy from the sun.
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5	Life Science	5-LS1-1. Support an argument that plants get the materials they need for growth chiefly from air and water.	Emphasis is on the idea that plant matter comes mostly from air and water, not from the soil.	<u>5-LS1-1</u> Plant Matters - State the materials needed for a plant to grow. - Use experimental data or observations as evidence to support their statement about the materials needed for a plant to grow.
		5-LS2-1. Develop a model to describe the movement of matter among plants, animals, decomposers, and the environment.	Emphasis is on the idea that matter that is not food (air, water, decomposed materials in soil) is changed by plants into matter that is food. Examples of systems could include organisms, ecosystems, and the Earth.	<u>5-LS2-1</u> Plant Matters - State the materials needed for a plant to grow. - Use experimental data or observations as evidence to support their statement about the materials needed for a plant to grow. Nature's Recyclers - Explain observations of rotting plant and animal matter as the actions of decomposers. - Describe the important role decomposers play in recycling matter. A Web of Life - Describe, with examples, how individual food chains connect to form food webs. - Understand that food webs show the movement of matter through an ecosystem. A Damaged Web - Describe, with examples, how removing a species from a food web damages an ecosystem. Describe, with examples, the effect on an ecosystem of introducing a new species.

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5	Earth and Space Science	5-ESS1-1. Support an argument that differences in the apparent brightness of the sun compared to other stars is due to their relative distances from Earth.	None provided.	5-ESS1-1 Hello Sun! - State that the sun is a star. - Explain why the sun appears to be the biggest and brightest object in the sky.
		5-ESS1-2. Represent data in graphical displays to reveal patterns of daily changes in the length and direction of shadows, day and night, and the seasonal appearance of some stars in the night sky.	Examples of patterns could include the position and motion of Earth with respect to the sun and selected stars that are visible only in particular months.	5-ESS1-2 Day And Night - It's A Fine Line - Use a model to explain why we experience day and night. - Graph data of the numbers of daylight hours and use their graphs to describe patterns. Casting Shadows Great and Small - Understand that the shape and size of a shadow depends on the position and direction of the light source. - Generate measurement data, use the data to create a graph, and analyze the graph to describe a pattern. - Explain why their shadow changes over the course of a day. Star Patterns - Explain that the apparent movement and changing position of the stars across the night sky is due to the rotation of Earth. - Explain that different stars are visible at different times of the year because Earth revolves around the sun.
		5-ESS2-1. Develop a model using an example to describe ways the geosphere, biosphere, hydrosphere, and/or atmosphere interact.	Examples could include the influence of the ocean on ecosystems, landform shape, and climate; the influence of the atmosphere on landforms and ecosystems through weather and climate; and the influence of mountain ranges on winds and clouds in the atmosphere. The geosphere, hydrosphere, atmosphere, and biosphere are each a system.	5-ESS2-1 Earth's Spheres - Describe each of the four systems that combine to make up Earth. - Give examples of things that form part of each system.
		5-ESS2-2. Describe and graph the amounts and percentages of salt water and fresh	None provided.	5-ESS2-2 Interacting Systems Describe how water evaporating and condensing in the atmosphere results in rainfall.

		water in various reservoirs to provide evidence about the distribution of water on Earth.		• Develop a model to explain how changes in one of Earth's systems (spheres) results in a change to one (or more) of the other systems.
		5-ESS3-1. Obtain and combine information about solutions individual communities use to protect the Earth's resources and environment.*	Examples could include agricultural solutions to prevent fertilizer runoff or using goats to control invasive plant species.	5-ESS3-1 Water World • Describe the relative amounts of salt water and freshwater found on Earth as well as the main sources of each. • Represent the actual amounts of Earth's salt water and freshwater in a graphical way. Science to the Rescue! • Describe the harmful effects on the environment of certain human activities. • Give an example of a science-based action that has repaired or protected the environment.

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3-5	Engineering, Technology and Applications of Science	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. *	None provided.	3-5-ETS1-1 Putting Forces to Work - Identify and define a design problem that can be solved through the development of an object. - Recognize that the success of a designed solution is determined by considering the desired features of a solution. How Can We Help? - Explore and define design opportunities. - Develop and communicate design ideas through describing, drawing, and modeling a sequence of steps. - Use given components and equipment to safely make a solution.
		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. *	None provided.	3-5-ETS1-2 Let's Build Bridges - Understand that the design process is important in generating safe products. - Work collaboratively to generate and compare multiple solutions to a problem. - Recognize that engineers improve existing technologies when designing new products. What a Pest! - Understand that a pest can be a plant or animal in the wrong place. - Collaborate to develop possible solutions by modifying a bike helmet to prevent a bird swooping and attacking. Design Challenge - Keeping the Rain Off - Understand that the properties of a material can be changed. - Design, test, and evaluate a sustainable product made from a material with suitable properties.
		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. *	None provided.	3-5-ETS1-3 Make Me Move - Recognize that they should research a problem before beginning to design a solution. - Identify that testing a solution involves investigating how well it performs. - Understand that communicating with peers about proposed solutions is an important part of the design process. Water Transporter - Design, plan, produce, test, and evaluate a model of a water irrigation system that could be used to water a vegetable garden. Plastic - Not So Fantastic! - State why plastic packaging is an environmental problem. - Suggest some sustainable alternatives to plastic packaging. Fashionable Fabrics - Identify the properties of a material that make it suitable for a particular purpose. - Understand that some choices of materials are more sustainable than others. - Use experimental observations to explain why certain materials are chosen for certain products.

