

inquisitive

VIRGINIA SCIENCE STANDARDS OF LEARNING & INQUISITIVE CROSSWALK

Virginia Science Standards of Learning:
95% Inquisitive Alignment & Coverage



inquisitive

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. That's what it means to be Inquisitive.

Open-and-Go Lessons

Inquisitive's open-and-go lessons clearly cover the three dimensions of the NGSS and Virginia Science Standards of Learning so teachers can easily see the lesson objectives and be confident while teaching standards-aligned science. Inquisitive strives to reduce teachers' planning time. Simple, easy to use, and a beautiful experience on any device. With integrated and varied stimulus in each unit, Inquisitive is a comprehensive phenomena-based curriculum, made easy.

Phenomena-Based

Experiencing science through the lens of true observable phenomena offers all students a deep and meaningful learning experience. Each Inquisitive lesson centers around a phenomenon and includes a variety of learning tools to help students make the link from science to the real world.

Inquisitive Virginia Crosswalk

This document maps Inquisitive content to the Virginia Science Standards of Learning. We have included the relevant NGSS Performance Expectations and Inquisitive lesson learning targets, for ease of use and reference to the content statements.

Virginia Science Standards of Learning: 95% Inquisitive coverage

Kindergarten

Using my senses to understand my world

In science, kindergarten students use their senses to make observations of the characteristics and interactions of objects in their world. Students study the characteristics of water and the basic needs of living things. They also study the relationship between the sun and Earth through shadows and weather. They determine how their actions can change the motion of objects and learn how they can make a difference in their world. Throughout the elementary years, students will develop scientific skills, supported by mathematics and computational thinking, as they learn science content. In kindergarten, students will develop skills in posing simple questions, conducting simple investigations, observing, classifying, and communicating information about the natural world.

Virginia Science Standards of Learning			NGSS Code (s)	Inquisitive Lessons (Learning Targets)
Grade Level	Domain	Standards of Learning		
K	Scientific and Engineering Practices	K.1 The student will demonstrate an understanding of scientific and engineering practices by: - asking questions and defining problems - ask questions based on observations - identify a problem based on need - make predictions based on observations - planning and carrying out investigations - make observations to collect data - identify characteristics and properties of objects through observations - measure the relative length and weight of common objects - record information from investigations - interpreting, analyzing, and evaluating data - describe patterns - classify and/or sequence objects based on a single physical characteristic or property - organize and represent data - read and interpret data in object graphs, picture graphs, and tables - constructing and critiquing conclusions and explanations - make simple conclusions based on data or observations - developing and using models - distinguish between a model and an actual object - obtaining, evaluating, and communicating information	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. *	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	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

		- communicate comparative measures (e.g., heavier, lighter, longer, shorter, more, less, hotter, colder) - communicate observations using pictures, drawings, and/or speech	needed to solve a given problem. *	- 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. *	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.

Virginia Science Standards of Learning			NGSS Code (s)	Inquisitive Lessons (Learning Targets)
Grade Level	Domain	Standards of Learning		
K	Force, Motion, and Energy	K.2 The student will investigate and understand that pushes and pulls affect the motion of objects. Key ideas include: a) pushes and pulls can cause an object to move; b) pushes and pulls can change the direction of an object; c) and changes in motion are related to the strength of the push or pull.	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.	K-PS2-1 Push and Pull - Understand that pushes and pulls are used to start and stop the motion of objects. - Identify and classify pushes and pulls. Speed It Up! Slow It Down! - Demonstrate how pushes and pulls of different strengths can cause the speed of objects to change. Which Way? - 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. *	K-PS2-2 Does It Work? - 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.
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Virginia Science Standards of Learning			NGSS Code (s)	Inquisitive Lessons (Learning Targets)
Grade Level	Domain	Standards of Learning		
K	Matter	K.3 The student will investigate and understand that physical properties of an object can be described. Properties include: a) colors; b) shapes and forms; c) textures and feel; and d) relative sizes and weights of objects.	2-PS1-1 Plan and conduct an investigation to describe and classify different kinds of materials by their observable properties.	2-PS1-1 What IS This Stuff? - 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. Sorting Our Stuff - Explain that matter has properties. - Classify matter by its properties. - Observe that the properties of matter can change when heated or cooled.
		K.4 The student will investigate and understand that water is important in our daily lives and has properties. Key ideas include a) water has many uses; b) water can be found in many places; c) water occurs in different phases; and d) water flows downhill.	2-ESS2-3 Obtain information to identify where water is found on Earth and that it can be solid or liquid.	2-ESS2-3 Water, Water Everywhere! - Identify where water is found on Earth. - Understand that water can be found in liquid or solid (ice) form.

Virginia Science Standards of Learning			NGSS Code (s)	Inquisitive Lessons (Learning Targets)
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K	Living Systems and Processes	K.5 The students will investigate and understand that senses allow humans to seek, find, take in, and react or respond to different information. Key ideas include a) the five basic senses correspond to specific human body structures; and b) senses are used in our daily lives.	<u>1-LS1-1</u> 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.	<i>This Inquisitive lesson partially addresses the standard.</i> <u>1-LS1-1</u> Scaredy-Cat! ● 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.
		K.6 The student will investigate and understand that there are differences between living organisms and nonliving objects. Key ideas include a) all things can be classified as living or nonliving; and b) living organisms have certain characteristics that distinguish them from nonliving objects.	<u>K-LS1-1</u> Use observations to describe patterns of what plants and animals (including humans) need to survive.	<u>K-LS1-1</u> Staying Alive ● Identify living things and nonliving things. ● State that animals need food and water to survive. ● Describe the foods that different animals eat. What do Plants Need? ● Identify the needs of plants to live and grow.
		K.7 The student will investigate and understand that plants and animals have basic needs and life processes. Key ideas include a) living things need adequate food, water, shelter, air, and space to survive; b) plants and animals have life cycles; and c) offspring of plants and animals are similar but not identical to their parents or to one another.	<u>1-LS1-1</u> 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.* <u>1-LS3-1</u> Make observations to construct an evidence-based account that young plants and animals are like, but not exactly like, their parents.	<u>1-LS1-1</u> How Useful! ● Identify that animals use their body parts in different ways. ● Identify that animals use their body parts to survive and grow. Plant Parts ● Identify that plants have different external structures (parts). ● Identify that plants use these external structures to survive and grow. <u>1-LS3-1</u> Are We Alike? ● Explain that young animals are very much, but not exactly like, their parents. Same But Different ● Explain that types of plants or animals are recognizable as similar but can also vary in many ways. Plants Have Parents Too

				● Determine that young plants are similar but different from the adult version of the same plant.
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K	Earth and Space Sciences	K.8 The student will investigate and understand that light influences temperature on Earth's surfaces and can cause shadows. Key ideas include: - the sun provides light and warms Earth's surface; - shadows can be produced when sunlight or artificial light is blocked by an object; and - objects in shadows and objects in sunlight have different temperatures.	<u>K-PS3-1</u> Make observations to determine the effect of sunlight on Earth's surface. <u>1-PS4-3</u> Plan and conduct an investigation to determine the effect of placing objects made with different materials in the path of a beam of light.	<u>K-PS3-1</u> Sunlight Warms Earth ● Describe the warming effect of the sun on Earth's surface. <u>1-PS4-3</u> Beam of Light ● 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.
		K.9 The student will investigate and understand that there are patterns in nature. Key patterns include - daily weather; - seasonal changes; and - day and night.	<u>K-ESS2-1</u> Use and share observations of local weather conditions to describe patterns over time. <u>1-ESS1-1</u> Use observations of the sun, moon, and stars to describe patterns that can be predicted.	<u>K-ESS2-1</u> What is Weather? ● Observe the current local weather. ● Describe the weather as a combination of different conditions at a particular time. Watching the Weather ● Recognize the symbols used to depict weather. ● Understand that the weather changes daily. ● Record weather over time and look for patterns. <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.
		K.10 The student will investigate and understand that change occurs over time. Key ideas include a) natural and human-made things change over time; b) living and nonliving things change over time; c) changes can be observed and measured; and d) changes may be fast or slow.	<u>K-ESS2-2</u> Construct an argument supported by evidence for how plants and animals (including humans) can change the environment to meet their needs. <u>2-ESS1-1</u> Use information from several sources to provide evidence that Earth events can occur quickly or slowly.	<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. <u>2-ESS1-1</u> <u>Earth Changes S-l-o-w-l-y</u> ● 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.

Virginia Science Standards of Learning			NGSS Code (s)	Inquisitive Lessons (Learning Targets)
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K	Earth Resources	K.11 The student will investigate and understand that humans use resources. Key ideas include: a) some materials and objects can be used over and over again; b) materials can be recycled; and c) choices we make impact the air, water, land and living things.	<u>K-ESS3-3</u> Communicate solutions that will reduce the impact of humans on the land, water, air, and/or other living things in the local environment. <u>K-2-ETS1-1</u> Ask questions, make observations, and gather information about a situation people want to change to define a simple problem that can be solved through the development of a new or improved object or tool.	<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. ● Communicate solutions that will reduce the impact of humans on the land, water, air, and other living things in the local community. <u>K-2-ETS1-1</u> <u>In the Making</u> ● Identify everyday designed items produced from fibers sourced from plants and animals. ● Understand that designed products offer a solution to a problem.

Grade One

How I interact with my world

In first-grade science, students become aware of factors that affect their daily lives. Students continue to learn about the basic needs of all living things and that living things respond to factors in their environment, including weather and the change of season. They continue the examination of matter by observing physical properties and how materials interact with light. Throughout the elementary years, students will develop scientific skills, supported by mathematics and computational thinking, as they learn science content. In first grade, students will develop skills in posing simple questions, conducting simple investigations, observing, classifying, and communicating information about the natural world. Students are introduced to the engineering design process.

Virginia Science Standards of Learning			NGSS Code (s)	Inquisitive Lessons (Learning Targets)
Grade Level	Domain	Standards of Learning		
1	Scientific and Engineering Practices	1.1 The student will demonstrate an understanding of scientific and engineering practices by a) asking questions and defining problems - ask questions and make predictions based on observations - identify a simple problem that can be solved through the development of a new tool or improved object b) planning and carrying out investigations - with guidance, conduct investigations to produce data - identify characteristics and properties of objects by observations - use tools to measure relative length, weight, volume, and temperature of common objects c) interpreting, analyzing, and evaluating data - use and share pictures, drawings, and/or writings of observations - describe patterns and relationships - classify and arrange objects based on a single physical characteristic or property - organize and represent various forms of data using tables, picture graphs, and object graphs - read and interpret data displayed in tables, picture graphs, and object graphs, using the vocabulary <i>more</i>, <i>less</i>, <i>fewer</i>, <i>greater than</i>, <i>less than</i>, and <i>equal to</i> d) constructing and critiquing conclusions and explanations - make simple conclusions based on data or observations - recognize unusual or unexpected results	<u>K-2-ETS1-1</u> 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. *	<u>K-2-ETS1-1</u> <u>Food, Glorious Food</u> - Recognize that we get food from plants and animals. - Identify that food products solve an important problem: we need food to survive. <u>In the Making</u> - Identify everyday designed items produced from fibers sourced from plants and animals. - Understand that designed products offer a solution to a problem. <u>No Rotten Apples</u> - 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. <u>What Is A House?</u> - 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.
			<u>K-2-ETS1-2</u> 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. *	<u>K-2-ETS1-2</u> <u>It's in the Design</u> - Identify a need or problem that needs a solution. - Develop and evaluate a simple design solution to the problem. <u>Kitchen Nightmares</u>

		e) developing and using models • use physical models to demonstrate simple phenomena and natural processes f) obtaining, evaluating, and communicating information • communicate observations and data using simple graphs, pictures, drawings, numbers, speech and/or writing •		• 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. *	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.

Virginia Science Standards of Learning			NGSS Code (s)	Inquisitive Lessons (Learning Targets)
Grade Level	Domain	Standards of Learning		
1	Force, Motion, and Energy	1.2 The student will investigate and understand that objects can move in different ways. Key ideas include a) objects may have straight, circular, spinning, and back-and-forth motions; and b) objects may vibrate and produce sound.	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. 1-PS4-1 Plan and conduct investigations to provide evidence that vibrating materials can make sound and that sound can make materials vibrate.	K-PS2-1 Push and Pull • Understand that pushes and pulls are used to start and stop the motion of objects. • Identify and classify pushes and pulls. Speed It Up! Slow It Down! • Demonstrate how pushes and pulls of different strengths can cause the speed of objects to change. Which Way? • Demonstrate how pushes and pulls can cause the direction of objects to change. • Explain that when objects collide, objects will move in different directions.

				1-PS4-1 Good Vibrations ● Identify what happens when materials vibrate. ● Investigate materials and their relationship with sound. ● Determine that vibrating materials make sound.
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Virginia Science Standards of Learning			NGSS Code (s)	Inquisitive Lessons (Learning Targets)
Grade Level	Domain	Standards of Learning		
1	Matter	1.3 The student will investigate and understand that objects are made from materials that can be described by their physical properties. Key ideas include - objects are made of one or more materials with different physical properties and can be used for a variety of purposes; - when a material is changed in size most physical properties remain the same; and - the type and amount of material determine how much light can pass through an object.	2-PS1-1 Plan and conduct an investigation to describe and classify different kinds of materials by their observable properties. 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.	2-PS1-1 What IS This Stuff? ● 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. Sorting Our Stuff ● 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 The Best Materials for the Job ● Explain how different materials have properties that make them suited for different purposes.

Virginia Science Standards of Learning			NGSS Code (s)	Inquisitive Lessons (Learning Targets)
Grade Level	Domain	Standards of Learning		
1	Living Systems and Processes	1.4 The student will investigate and understand that plants have basic life needs and functional parts that allow them to survive. Key ideas include - plants need nutrients, air, water, light, and a place to grow; - structures of plants perform specific functions; and - plants can be classified based on a variety of characteristics.	K-LS1-1 Use observations to describe patterns of what plants and animals (including humans) need to survive. 1-LS1-1 Use materials to design a solution to a human problem by mimicking how plants	K-LS1-1 What do Plants Need? ● Identify the needs of plants to live and grow. 1-LS1-1 Plant Parts ● Identify that plants have different external structures (parts). ● Identify that plants use these external structures to survive and grow.

			and/or animals use their external parts to help them survive, grow, and meet their needs.*	
		1.5 The student will investigate and understand that animals, including humans, have basic life needs that allow them to survive. Key ideas include a) animals need air, food, water, shelter, and space (habitat); b) animals have different physical characteristics that perform specific functions; and c) animals can be classified based on a variety of characteristics.	<u>K-LS1-1</u> Use observations to describe patterns of what plants and animals (including humans) need to survive. <u>1-LS1-1</u> 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.*	<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>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.

Virginia Science Standards of Learning			NGSS Code (s)	Inquisitive Lessons (Learning Targets)
Grade Level	Domain	Standards of Learning		
1	Earth and Space Sciences	1.6 The student will investigate and understand that there is a relationship between the sun and Earth. Key ideas include a) the sun is the source of energy and light that warms the Earth's land, air, and water; and b) the sun's relative position changes in the Earth's sky throughout the day.	<u>1-ESS1-1</u> Use observations of the sun, moon, and stars to describe patterns that can be predicted. <u>1-ESS1-2</u> Make observations at different times of year to relate the amount of daylight to the time of year.	<u>1-ESS1-1</u> <u>The Sun Is Out</u> ● 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. <u>Bright Moon</u> ● 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. <u>Starry, Starry Night</u> ● 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. <u>1-ESS1-2</u>

				Daylight and Nighttime • Identify that there is more daylight in summer. • Identify that there is more nighttime in winter.
		1.7 The student will investigate and understand that there are weather and seasonal changes. Key ideas include a) changes in temperature, light, and precipitation occur over time; b) there are relationships between daily weather and the season; and c) changes in temperature, light, and precipitation affect plants and animals, including humans.	3-ESS2-1 Represent data in tables and graphical displays to describe typical weather conditions expected during a particular season.	<i>These Inquisitive lessons partially address the standard.</i> 3-ESS2-1 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.

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Grade Level	Domain	Standards of Learning		
1	Earth Resources	1.8 The student will investigate and understand that natural resources can be used responsibly. Key ideas include a) most natural resources are limited; b) human actions can affect the availability of natural resources; and c) reducing, reusing, and recycling are ways to conserve natural resources.	K-ESS3-3 Communicate solutions that will reduce the impact of humans on the land, water, air, and/or other living things in the local environment.	<i>This Inquisitive lesson partially addresses the standard.</i> K-ESS3-3 Helping Earth • Describe how people affect the land, water, air, and other living things in the local environment in positive and negative ways. • Communicate solutions that will reduce the impact of humans on the land, water, air, and other living things in the local community.

Grade Two

Change occurs all around us

Science in second grade builds on previous understandings of forces, water, weather, and plants and animals, and students explore these concepts through the lens of change. They examine how water changes phase, how visible and invisible forces change motion, how plants and animals change through their life cycles, and how weather changes the Earth. Students also examine how change occurs over a short or long period of time. Throughout the elementary years, students will develop scientific skills, supported by mathematics and computational thinking, as they learn science content. In second grade, students will develop skills in posing simple questions, planning and conducting simple investigations, observing, classifying, and communicating information about the natural world. Students engage in more aspects of the engineering design process at this level.

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2	Scientific and Engineering Practices	2.1 The student will demonstrate an understanding of scientific and engineering practices by a) asking questions and defining problems ● ask questions that can be investigated ● make predictions based on observations and prior experiences ● identify a simple problem that can be solved through the development of a new tool or improved object b) planning and carrying out investigations ● with guidance, plan and conduct simple investigations to produce data ● use appropriate tools to measure length, weight, and temperature of common objects using U.S. Customary units ● measure time intervals using proper tools c) interpreting, analyzing, and evaluating data ● organize and represent data in pictographs and bar graphs ● read and interpret data represented in pictographs and bar graphs d) constructing and critiquing conclusions and explanations ● make simple conclusions based on data or observations ● distinguish between opinion and evidence	<u>K-2-ETS1-1</u> 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. *	<u>K-2-ETS1-1</u> <u>Food, Glorious Food</u> ● Recognize that we get food from plants and animals. ● Identify that food products solve an important problem: we need food to survive. <u>In the Making</u> ● Identify everyday designed items produced from fibers sourced from plants and animals. ● Understand that designed products offer a solution to a problem. <u>No Rotten Apples</u> ● 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. <u>What Is A House?</u> ● 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.
			<u>K-2-ETS1-2</u> Develop a simple sketch, drawing, or physical model to	<u>K-2-ETS1-2</u> <u>It's in the Design</u> ● Identify a need or problem that needs a solution.

		- recognize unusual or unexpected results e) developing and using models - use models to demonstrate simple phenomena and natural processes f) obtaining, evaluating, and communicating information - communicate observations and data using simple graphs, drawings, numbers, speech, and/or writing	illustrate how the shape of an object helps it function as needed to solve a given problem. *	- 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. *	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.

Virginia Science Standards of Learning			NGSS Code (s)	Inquisitive Lessons (Learning Targets)
Grade Level	Domain	Standards of Learning		
2	Force, Motion, and Energy	2.2 The student will investigate and understand that different types of forces may cause an object's motion to change. Key ideas include a) forces from direct contact can cause an object to move; b) some forces, including gravity and magnetism, can cause objects to move from a distance; and c) forces have applications in our lives.	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.	3-PS2-1 Move It! - Identify a force as a push or a pull. - Use arrows to represent the magnitude and direction of a force.

Virginia Science Standards of Learning			NGSS Code (s)	Inquisitive Lessons (Learning Targets)
Grade Level	Domain	Standards of Learning		
2	Matter	2.3 The student will investigate and understand that matter can exist in different phases. Key ideas include a) matter has mass and takes up space; b) solids, liquids, and gases have different characteristics; and c) heating and cooling can change the phases of matter.	<u>2-PS1-1</u> Plan and conduct an investigation to describe and classify different kinds of materials by their observable properties	<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.

Virginia Science Standards of Learning			NGSS Code (s)	Inquisitive Lessons (Learning Targets)
Grade Level	Domain	Standards of Learning		
2	Living Systems and Processes	2.4 The student will investigate and understand that plants and animals undergo a series of orderly changes as they grow and develop. Key ideas include a) animals have life cycles; and b) plants have life cycles.	<u>3-LS1-1</u> Develop models to describe that organisms have unique and diverse life cycles but all have in common birth, growth, reproduction, and death.	<u>3-LS1-1</u> <u>Plant Life-From Seed to Seed</u> ● Produce an informative model that shows the key stages in the life cycle of a plant. <u>Animal Life Cycles</u> ● Produce an informative model that shows the key stages in the life cycle of a chosen animal.
		2.5 The student will investigate and understand that living things are part of a system. Key ideas include a) plants and animals are interdependent with their living and nonliving surroundings; b) an animal's habitat provides all of its basic needs; and c) habitats change over time due to many influences.	<u>3-LS2-1</u> Construct an argument that some animals form groups that help members survive. <u>3-LS3-2</u> Use evidence to support the explanation that traits can be influenced by the environment. <u>3-LS4-3</u> Construct an argument with evidence that in a particular	<u>3-LS2-1</u> <u>Group Work</u> ● Construct an argument with evidence that animals form groups for different reasons. ● Understand that being part of a group helps animals survive. <u>3-LS3-2</u> <u>Can the Environment Affect Traits?</u> ● Identify and use evidence to support the idea that the environment of a living thing can affect both its physical and behavioral traits. <u>3-LS4-3</u>

			habitat some organisms can survive well, some survive less well, and some cannot survive at all.	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
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Virginia Science Standards of Learning			NGSS Code (s)	Inquisitive Lessons (Learning Targets)
Grade Level	Domain	Standards of Learning		
2	Earth and Space Sciences	2.6 The student will investigate and understand that there are different types of weather on Earth. Key ideas include a) different types of weather have specific characteristics; b) measuring, recording, and interpreting weather data allows for identification of weather patterns; and c) tracking weather allows us to prepare for the weather and storms.	3-ESS2-1 Represent data in tables and graphical displays to describe typical weather conditions expected during a particular season. 3-ESS3-1 Make a claim about the merit of a design solution that reduces the impacts of a weather-related hazard. *	3-ESS2-1 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-ESS3-1 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.
		2.7 The student will investigate and understand that weather patterns and seasonal changes affect plants, animals, and their surroundings. Key ideas include a) weather and seasonal changes affect the growth and behavior of living things; b) wind and weather can change the land; and c) changes can happen quickly or slowly over time.	3-ESS2-1 Represent data in tables and graphical displays to describe typical weather conditions expected during a particular season. 4-ESS2-1 Make observations and/or measurements to provide	3-ESS2-1 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. 4-ESS2-1 Weathering

			evidence of the effects of weathering or the rate of erosion by water, ice, wind, or vegetation.	- Describe a process by which rocks become weathered. - Use observations from an investigation as evidence for an explanation of how weathering occurs. Erosion - 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.
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Virginia Science Standards of Learning			NGSS Code (s)	Inquisitive Lessons (Learning Targets)
Grade Level	Domain	Standards of Learning		
2	Earth Resources	2.8 The student will investigate and understand that plants are important natural resources. Key ideas include a) the availability of plant products affects the development of a geographic area; b) plants provide oxygen, homes, and food for many animals; and c) plants can help reduce the impact of wind and water.	2-ESS2-1 Compare multiple solutions designed to slow or prevent wind or water from changing the shape of the land. 2-LS4-1 Make observations of plants and animals to compare the diversity of life in different habitats. 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.	<i>These Inquisitive lessons partially address the standard.</i> 2-ESS2-1 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-LS4-1 Who's 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. 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.

Grade Three

Interactions in our world

The focus of science in third grade is interactions in our world. Students continue to study forces and matter by learning about simple machines and by examining the interactions of materials in water. They also look at how plants and animals, including humans, are constantly interacting with the living and nonliving aspects of the environment. This includes examining how adaptations satisfy life needs of plants and the importance of water, soil, and the sun in the survival of plants and animals. Throughout the elementary years, students will develop scientific skills, supported by mathematics and computational thinking, as they learn science content. In third grade, students will develop more sophisticated skills in posing questions and predicting outcomes, planning and conducting simple investigations, collecting and analyzing data, constructing explanations, and communicating information about the natural world. Students begin to use the engineering design process to apply their scientific knowledge to solve problems.

Virginia Science Standards of Learning			NGSS Code (s)	Inquisitive Lessons (Learning Targets)
Grade Level	Domain	Standards of Learning		
3	Scientific and Engineering Practices	3.1 The student will demonstrate an understanding of scientific and engineering practices by a) asking questions and defining problems ● ask questions that can be investigated and predict reasonable outcomes ● ask questions about what would happen if a variable is changed ● define a simple design problem that can be solved through the development of an object, tool, process, or system b) planning and carrying out investigations ● with guidance, plan and conduct investigations ● use appropriate methods and/or tools for collecting data ● estimate length, mass, volume, and temperature ● measure length, mass, volume, and temperature in metric and U.S. Customary units using proper tools ● measure elapsed time ● use tools and/or materials to design and/or build a device that solves a specific problem c) interpreting, analyzing, and evaluating data ● organize and represent data in pictographs or bar graphs ● read, interpret, and analyze data represented in pictographs and bar graphs	<u>3-5-ETS1-1</u> Define a simple design problem reflecting a need or a want that includes specified criteria for success and constraints on materials, time, or cost. *	<u>3-5-ETS1-1</u> <u>Putting Forces to Work</u> ● 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. <u>How Can We Help?</u> ● 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.

		- analyze data from tests of an object or tool to determine if it works as intended d) constructing and critiquing conclusions and explanations - use evidence (measurements, observations, patterns) to construct or support an explanation - generate and/or compare multiple solutions to a problem - describe how scientific ideas apply to design solutions e) developing and using models - use models to demonstrate simple phenomena and natural processes - develop a model (e.g., diagram or simple physical prototype) to illustrate a proposed object, tool, or process f) obtaining, evaluating, and communicating information - read and comprehend reading-level appropriate texts and/or other reliable media - communicate scientific information, design ideas, and/or solutions with others	<u>3-5-ETS1-2</u> 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. *	<u>3-5-ETS1-2</u> 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.
			<u>3-5-ETS1-3</u> 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. *	<u>3-5-ETS1-3</u> 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.
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Virginia Science Standards of Learning			NGSS Code (s)	Inquisitive Lessons (Learning Targets)
Grade Level	Domain	Standards of Learning		
3	Force, Motion, and Energy	3.2 The student will investigate and understand that the direction and size of force affects the motion of an object. Key ideas include - multiple forces may act on an object; - the net force on an object determines how an object moves; - simple machines increase or change the direction of a force; and - simple and compound machines have many applications.	<u>3-PS2-1</u> Plan and conduct an investigation to provide evidence of the effects of balanced and unbalanced forces on the motion of an object.	<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.

Virginia Science Standards of Learning			NGSS Code (s)	Inquisitive Lessons (Learning Targets)
Grade Level	Domain	Standards of Learning		
3	Matter	3.3 The student will investigate and understand how materials interact with water. Key ideas include - solids and liquids mix with water in different ways; and - many solids dissolve more easily in hot water than in cold water.	<u>2-PS1-4</u> Construct an argument with evidence that some changes caused by heating or cooling can be reversed and some cannot.	<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.

Virginia Science Standards of Learning			NGSS Code (s)	Inquisitive Lessons (Learning Targets)
Grade Level	Domain	Standards of Learning		
3	Living Systems and Processes	3.4 The student will investigate and understand that adaptations allow organisms to satisfy life needs and respond to the environment. Key ideas include a) populations may adapt over time; b) adaptations may be behavioral or physical; and c) fossils provide evidence about the types of organisms that lived long ago as well as the nature of their environments.	<u>3-LS4-1</u> Analyze and interpret data from fossils to provide evidence of the organisms and the environments in which they lived long ago. <u>3-LS4-2</u> Use evidence to construct an explanation for how the variations in characteristics among individuals of the same species may provide advantages in surviving, finding mates, and reproducing. <u>3-LS4-4</u> 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.*	<u>3-LS4-1</u> <u>Fossil Stories</u> ● 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. <u>3-LS4-2</u> <u>What's My Advantage</u> ● Use evidence to construct an explanation for why a variation in a trait gives certain individuals in a species a survival advantage. <u>3-LS4-4</u> <u>What Happens When Environments Change?</u> ● 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
		3.5 The student will investigate and understand that aquatic and terrestrial ecosystems support a diversity of organisms. Key ideas include a) ecosystems are made of living and nonliving components of the environment; and b) relationships exist among organisms in an ecosystem.	<u>3-LS4-3</u> 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.	<u>3-LS4-3</u> <u>Happy in My Habitat</u> ● 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. <u>5-LS2-1</u> <u>A Web of Life</u> ● Describe, with examples, how individual food chains connect to form food webs. ● Understand that food webs show the movement of matter through an ecosystem.

Virginia Science Standards of Learning			NGSS Code (s)	Inquisitive Lessons (Learning Targets)
Grade Level	Domain	Standards of Learning		
3	Earth and Space Sciences	3.6 The student will investigate and understand that soil is important in ecosystems. Key ideas include a) soil, with its different components, is important to organisms; and b) soil provides support and nutrients necessary for plant growth.	<u>5-LS1-1</u> Support an argument that plants get the materials they need for growth chiefly from air and water.	<i>This Inquisitive lesson partially addresses the standard.</i> <u>5-LS1-1</u> <u>Plant Matters</u> ● 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.
		3.7 The student will investigate and understand that there is a water cycle and water is important to life on Earth. Key ideas include a) there are many reservoirs of water on Earth; b) the energy from the sun drives the water cycle; and c) the water cycle involves specific processes.	<u>5-ESS2-2</u> Describe and graph the amounts and percentages of salt water and fresh water in various reservoirs to provide evidence about the distribution of water on Earth. <u>5-ESS3-1</u> Obtain and combine information about solutions individual communities use to protect the Earth's resources and environment.*	<i>These Inquisitive lessons partially address the standard.</i> <u>5-ESS2-2</u> <u>Interacting Systems</u> ● Describe how water evaporating and condensing in the atmosphere results in rainfall. ● 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. <u>5-ESS3-1</u> <u>Water World</u> ● 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.

Virginia Science Standards of Learning			NGSS Code (s)	Inquisitive Lessons (Learning Targets)
Grade Level	Domain	Standards of Learning		

3	Earth Resources	3.8 The student will investigate and understand that natural events and humans influence ecosystems. Key ideas include - human activity affects the quality of air, water, and habitats; - water is limited and needs to be conserved; - fire, flood, disease, and erosion affect ecosystems; and - soil is a natural resource and should be conserved.	<u>4-ESS3-2</u> Generate and compare multiple solutions to reduce the impacts of natural Earth processes on humans. * <u>5-ESS3-1</u> Obtain and combine information about solutions individual communities use to protect the Earth's resources and environment.*	<u>4-ESS3-2</u> Living With Earth's Hazards - Describe some natural hazards that cause problems for humans. - Design and evaluate a potential solution to reduce harm caused by a natural hazard. <u>5-ESS3-1</u> 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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Grade Four

Our place in the solar system

Our solar system is a grand place, and in fourth-grade science, students learn where we fit in this solar system. Starting with the solar system, and then moving to the planet Earth, the Commonwealth of Virginia, and finally their specific ecosystems, students examine how features of plants and animals support life. They also explore how living things interact with both living and nonliving components in their ecosystems. Throughout the elementary years, students will develop scientific skills, supported by mathematics and computational thinking, as they learn science content. In fourth grade, students will continue to develop skills in posing questions and predicting outcomes, planning and conducting simple investigations, collecting and analyzing data, constructing explanations, and communicating information about the natural world. Students continue to use the engineering design process to apply their scientific knowledge to solve problems.

Virginia Science Standards of Learning			NGSS Code (s)	Inquisitive Lessons (Learning Targets)
Grade Level	Domain	Standards of Learning		
4	Scientific and Engineering Practices	4.1 The student will demonstrate an understanding of scientific and engineering practices by a) asking questions and defining problems ● identify scientific and non-scientific questions ● develop hypotheses as cause-and-effect relations ● define a simple design problem that can be solved through the development of an object, tool, process, or system b) planning and carrying out investigations ● identify variables when planning an investigation ● collaboratively plan and conduct investigations ● use tools and/or materials to design and/or build a device that solves a specific problem ● take metric measurements using appropriate tools ● measure elapsed time c) interpreting, analyzing, and evaluating data ● organize and represent data in bar graphs and line graphs ● interpret and analyze data represented in bar graphs and line graphs ● compare two different representations of the same data (e.g., a set of data displayed on a chart and a graph) ● analyze data from tests of an object or tool to determine whether it works as intended	<u>3-5-ETS1-1</u> Define a simple design problem reflecting a need or a want that includes specified criteria for success and constraints on materials, time, or cost. *	<u>3-5-ETS1-1</u> 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.
			<u>3-5-ETS1-2</u> 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. *	<u>3-5-ETS1-2</u> 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.

		d) constructing and critiquing conclusions and explanations • use evidence (i.e., measurements, observations, patterns) to construct or support explanations and to make inferences e) developing and using models • develop and/or use models to explain natural phenomena • identify limitations of models f) obtaining, evaluating, and communicating information • read and comprehend reading-level-appropriate texts and/or other reliable media • communicate scientific information, design ideas, and/or solutions with others	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. *	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 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.
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Virginia Science Standards of Learning			NGSS Code (s)	Inquisitive Lessons (Learning Targets)
Grade Level	Domain	Standards of Learning		
4	Force, Motion, and Energy	4.2 The student will investigate and understand that plants and animals have structures that distinguish them from one another and play vital roles in their ability to survive. Key ideas include a) the survival of plants and animals depends on photosynthesis; b) plants and animals have different structures and processes for obtaining energy; and c) plants and animals have different structures and processes for creating offspring.	<u>4-LS1-1</u> Construct an argument that plants and animals have internal and external structures that function to support survival, growth, behavior, and reproduction. <u>4-LS1-2</u> 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.	<u>4-LS1-1</u> <u>Plantific!</u> - 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. <u>Survivors</u> - Identify different external structures of a variety of animals. - Explain how an external structure helps an animal to survive. <u>The Inside Story!</u> - 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. <u>4-LS1-2</u> <u>Sensing Information</u> - 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.

Virginia Science Standards of Learning			NGSS Code (s)	Inquisitive Lessons (Learning Targets)
Grade Level	Domain	Standards of Learning		
4	Matter	4.3 The student will investigate and understand that organisms, including humans, interact with one another and with the nonliving components in the ecosystem. Key ideas include - interrelationships exist in populations, communities, and ecosystems; - food webs show the flow of energy within an ecosystem; - changes in an organism's niche and habitat may occur at various stages in its life cycle; and - classification can be used to identify organisms.	<u>5-LS2-1</u> Develop a model to describe the movement of matter among plants, animals, decomposers, and the environment.	<u>5-LS2-1</u> 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.

Virginia Science Standards of Learning			NGSS Code (s)	Inquisitive Lessons (Learning Targets)
Grade Level	Domain	Standards of Learning		
4	Living Systems and Processes	4.4 The student will investigate and understand that weather conditions and phenomena affect ecosystems and can be predicted. Key ideas include - weather measurements create a record that can be used to make weather predictions; - common and extreme weather events affect ecosystems; and - long term seasonal weather trends determine the climate of a region.	<u>3-ESS2-1</u> Represent data in tables and graphical displays to describe typical weather conditions expected during a particular season.	<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.

		4.5 The student will investigate and understand that the planets have characteristics and a specific place in the solar system. Key ideas include a) planets rotate on their axes and revolve around the sun; b) planets have characteristics and a specific order in the solar system; and c) the sizes of the sun and planets can be compared to one another.	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 the Earth. 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	<i>These Inquisitive lessons partially address the standard.</i> 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 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.
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Virginia Science Standards of Learning			NGSS Code (s)	Inquisitive Lessons (Learning Targets)
Grade Level	Domain	Standards of Learning		
4	Earth and Space Sciences	4.6 The student will investigate and understand that there are relationships among Earth, the moon, and the sun. Key relationships include a) the motions of Earth, the moon, and the sun; b) the causes for Earth's seasons; c) the causes for the four major phases of the moon and the relationship to the tide cycles; and d) the relative size, position, age and makeup of Earth, the moon, and the sun.	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. 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.	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 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.

		4.7 The student will investigate and understand that the ocean environment has characteristics. Key characteristics include a) geology of the ocean floor; b) physical properties and movement of ocean water; and c) interaction of organisms in the ocean.	<u>4-ESS2-2</u> Analyze and interpret data from maps to describe patterns of Earth's features. <u>5-ESS3-1</u> Obtain and combine information about ways individual communities use science ideas to protect the Earth's resources and environment.	<i>These Inquisitive lessons partially address the standard.</i> <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. <u>5-ESS3-1</u> <u>Water World</u> ● 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.
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Virginia Science Standards of Learning			NGSS Code (s)	Inquisitive Lessons (Learning Targets)
Grade Level	Domain	Standards of Learning		
4	Earth Resources	4.8 The student will investigate and understand that Virginia has important natural resources. Key resources include a) watersheds and water; b) plants and animals; c) minerals, rocks, and ores; and d) forests, soil, and land.		<i>Inquisitive does not currently have content for this Virginia Science Standard.</i>

Grade Five

Transforming matter and energy

Grade five science delves more deeply into foundational concepts in physical science as students begin to make connections between energy and matter. Students explore how energy is transformed, and learn about electricity, sound, and light. They also learn about the composition of matter and explore how energy can change phases of matter. Students apply an understanding of force, matter, and energy when they explore how the Earth's surface changes. Students continue to develop scientific skills and processes as they pose questions and predict outcomes, plan and conduct investigations, collect and analyze data, construct explanations, and communicate information about the natural world. Mathematics and computational thinking gain importance as students advance in their scientific thinking. Students continue to use the engineering design process to apply their scientific knowledge to solve problems.

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5	Scientific and Engineering Practices	5.1 The student will demonstrate an understanding of scientific and engineering practices by a) asking questions and defining problems ● ask testable questions based on observations and predict reasonable outcomes based on patterns ● develop hypotheses as cause-and-effect relationship ● define design problems that can be solved through the development of an object, tool, process, or system b) planning and carrying out investigations ● collaboratively plan and conduct investigations to produce data ● identify independent variable, dependent variables, and constants ● determine data that should be collected to answer a testable question ● take metric measurements using appropriate tools ● use tools and/or materials to design and/or build a device that solves a specific problem c) interpreting, analyzing, and evaluating data ● represent and analyze data using tables and graphs ● organize simple data sets to reveal patterns that suggest relationships ● compare and contrast data collected by different groups and discuss similarities and differences in their findings	<u>3-5-ETS1-1</u> Define a simple design problem reflecting a need or a want that includes specified criteria for success and constraints on materials, time, or cost. *	<u>3-5-ETS1-1</u> <u>Putting Forces to Work</u> ● 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. <u>How Can We Help?</u> ● 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.
			<u>3-5-ETS1-2</u> 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. *	<u>3-5-ETS1-2</u> <u>Let's Build Bridges</u> ● 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. <u>What a Pest!</u> ● 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.

		• use data to evaluate and refine design solutions d) constructing and critiquing conclusions and explanations • construct and/or support arguments with evidence, data, and/or a model • describe how scientific ideas apply to design solutions • generate and compare multiple solutions to problems based on how well they meet the criteria and constraints e) developing and using models • develop models using an analogy, example, or abstract representation to describe a scientific principle or design solution • identify limitations of models f) obtaining, evaluating, and communicating information • read and comprehend reading-level-appropriate texts and/or other reliable media • communicate scientific information, design ideas, and/or solutions with others		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. *	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.

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5	Force, Motion, and Energy	5.2 The student will investigate and understand that energy can take many forms. Key ideas include a) energy is the ability to do work or to cause change; b) there are many different forms of energy; c) energy can be transformed; and d) energy is conserved.	<u>4-PS3-1</u> Use evidence to construct an explanation relating the speed of an object to the energy of that object. <u>4-PS3-1</u> Use evidence to construct an explanation relating the speed of an object to the energy of that object. <u>4-PS3-2</u> Make observations to provide evidence that energy can be transferred from place to place by sound, light, heat, and electric currents. <u>4-ESS3-1</u> Obtain and combine information to describe that energy and fuels are derived from natural resources and their uses affect the environment.	<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. <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. <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.
		5.3 The student will investigate and understand that there is a relationship between force and energy of moving objects. Key ideas include a) moving objects have kinetic energy; b) motion is described by an object's direction and speed; c) changes in motion are related to net force and mass; d) when objects collide, the contact forces transfer energy and can change objects' motion; and e) friction is a force that opposes motion.	<u>4-PS3-1</u> Use evidence to construct an explanation relating the speed of an object to the energy of that object. <u>4-PS3-3</u> Ask questions and predict outcomes about the changes in energy that occur when objects collide. <u>3-PS2-1</u> Plan and conduct an investigation to provide	<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. <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. <u>3-PS2-1</u> <u>Forceful Friction</u>

			evidence of the effects of balanced and unbalanced forces on the motion of an object.	- 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.
		5.4 The student will investigate and understand that electricity is transmitted and used in daily life. Key ideas include a) electricity flows easily through conductors but not insulators; b) electricity flows through closed circuits; c) static electricity can be generated by rubbing certain materials together; d) electrical energy can be transformed into radiant, mechanical, and thermal energy; and e) a current flowing through a wire creates a magnetic field.	<u>3-PS2-3</u> Ask questions to determine cause and effect relationships of electric or magnetic interactions between two objects not in contact with each other. <u>4-PS3-2</u> Make observations to provide evidence that energy can be transferred from place to place by sound, light, heat, and electric currents. <u>4-PS3-4</u> Apply scientific ideas to design, test, and refine a device that converts energy from one form to another.	<i>These Inquisitive lessons partially address the standard.</i> <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>4-PS3-2</u> <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 <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.
		5.5 The student will investigate and understand that sound can be produced and transmitted. Key ideas include a) sound is produced when an object or substance vibrates; b) sound is the transfer of energy; c) different media transmit sound differently; and d) sound waves have many uses and applications.	<u>4-PS4-1</u> Develop a model of waves to describe patterns in terms of amplitude and wavelength and that waves can cause objects to move. <u>4-PS4-3</u> Generate and compare multiple solutions that use patterns to transfer information.*	<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. <u>4-PS4-3</u>

				Sending Information • 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. Get the Message • 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.
		5.6 The student will investigate and understand that visible light has certain characteristics and behaves in predictable ways. Key ideas include a) visible light is radiant energy that moves in transverse waves; b) the visible spectrum includes light with different wavelengths; c) matter influences the path of light; and d) radiant energy can be transformed into thermal, mechanical, and electrical energy.	4-PS4-2 Develop a model to describe that light reflecting from objects and entering the eye allows objects to be seen.	4-PS4-2 Eye, Eye! • 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.

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5	Matter	5.7 The student will investigate and understand that matter has properties and interactions. Key ideas include a) matter is composed of atoms; b) substances can be mixed together without changes in their physical properties; and c) energy has an effect on the phases of matter.	5-PS1-1 Develop a model to describe that matter is made of particles too small to be seen. 5-PS1-3 Make observations and measurements to identify materials based on their properties.	5-PS1-1 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-PS1-3 Material Properties • Accurately describe the properties of common materials.

			5-PS1-4 Conduct an investigation to determine whether the mixing of two or more substances results in new substances. 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.	● Use the results of testing for particular properties to identify a material. 5-PS1-4 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-PS1-2 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.
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5	Earth and Space Sciences	5.8 The student will investigate and understand that Earth constantly changes. Key ideas include a) Earth's internal energy causes movement of material within the Earth; b) plate tectonics describe movement of the crust; c) the rock cycle models the transformation of rocks; d) processes such as weathering, erosion, and deposition change the surface of the Earth; and e) fossils and geologic patterns provide evidence of Earth's change.	3-LS4-1 Analyze and interpret data from fossils to provide evidence of the organisms and the environments in which they lived long ago.	<i>This Inquisitive lesson partially addresses the standard.</i> 3-LS4-1 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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5	Earth Resources	The student will investigate and understand that the conservation of energy resources is important. Key ideas include a) some sources of energy are considered renewable and others are not; b) individuals and communities have means of conserving both energy and matter; and c) advances in technology improve the ability to transfer and transform energy.	<u>4-PS3-4</u> Apply scientific ideas to design, test, and refine a device that converts energy from one form to another. * <u>4-ESS3-1</u> Obtain and combine information to describe that energy and fuels are derived from natural resources and that their uses affect the environment.	<u>4-PS3-4</u> Converting Energy ● 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. <u>4-ESS3-1</u> Energy Resources ● Explain the difference between a renewable and a nonrenewable energy resource. ● Describe the effects of a particular energy resource on the environment.