

Winchester Public Schools

Fourth Grade Science Unit Guide



Weeks	Unit	PE	SEP	DCI	CCC
8 weeks	Organisms Receive Information	<p>4-PS4-2. Develop a model to describe that light reflecting from objects and entering the eye allows objects to be seen.</p> <p>4-LS1-1. Construct an argument that plants and animals have internal and external structures that function to support survival, growth, behavior, and reproduction.</p> <p>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.</p> <p>4-PS4-2. Develop a model to describe that light reflecting from objects and entering the eye allows objects to be seen.</p>	<p>Developing and Using Model</p> <p>Use a model to test interactions concerning the functioning of a natural system.</p> <p>Engaging in Argument from Evidence</p> <p>Construct an argument with evidence, data, and/or a model.</p>	<p>LS1.A: Structure and Function Plants and animals have both internal and external structures that serve various functions in growth, survival, behavior, and reproduction.</p> <p>LS1.D: Information Processing Different sense receptors are specialized for particular kinds of information, which may be then processed by the animal's brain. Animals are able to use their perceptions and memories to guide their actions.</p>	<p>Systems and System Models</p> <p>A system can be described in terms of its components and their interactions.</p> <p>Structure and Function</p> <p>Different materials have different substructures, which can sometimes be observed, and substructures have shapes and parts that serve functions</p>

<p>4 weeks</p>	<p>Energy</p>	<p>4-PS3-2. Make observations to provide evidence that energy can be transferred from place to place by sound, light, heat, and electric currents.</p> <p>4-PS3-4. Apply scientific ideas to design, test, and refine a device that converts energy from one form to another.*</p> <p>4-PS4-3. Generate and compare multiple solutions that use patterns to transfer information.*</p>	<p>Asking Questions and Defining Problems Ask questions that can be investigated and predict reasonable outcomes based on patterns such as cause and effect relationships.</p> <p>Planning and Carrying Out Investigations Make observations to produce data to serve as the basis for evidence for an explanation of a phenomenon or test a design solution.</p> <p>Constructing Explanations and Designing Solutions Use evidence (e.g., measurements, observations, patterns) to construct an explanation.</p> <p>Apply scientific ideas to solve design problems.</p>	<p>PS3.A: Definitions of Energy</p> <ul style="list-style-type: none"> • The faster a given object is moving, the more energy it possesses. • Energy can be moved from place to place by moving objects or through sound, light, or electric currents. <p>PS3.B: Conservation of Energy and Energy Transfer</p> <ul style="list-style-type: none"> • Energy is present whenever there are moving objects, sound, light, or heat. When objects collide, energy can be transferred from one object to another, thereby changing their motion. In such collisions, some energy is typically also transferred to the surrounding air; as a result, the air gets heated and sound is produced. • Light also transfers energy from place to place. • Energy can also be transferred from place to place by electric currents, which can then be used locally to produce motion, sound, heat, or light. The currents may have been produced to begin with by transforming the energy of motion into electrical energy. <p>PS3.D: Energy in Chemical Processes and Everyday Life</p> <ul style="list-style-type: none"> • The expression “produce energy” typically refers to the conversion of stored energy into a desired form for practical use. • a designed solution is determined by considering the desired features of a solution (criteria). Different proposals for solutions can be compared on the 	<p>Energy and Matter Energy can be transferred in various ways and between objects.</p>
-----------------------	----------------------	---	--	---	--

				<p>basis of how well each one meets the specified criteria for success or how well each takes the constraints into account.</p> <p>ETS1.A: Defining Engineering Problems</p> <ul style="list-style-type: none"> Possible solutions to a problem are limited by available materials and resources (constraints). The success of a designed solution is determined by considering the desired features of a solution (criteria). Different proposals for solutions can be compared on the basis of how well each one meets the specified criteria for success or how well each takes the constraints into account. 	
4 weeks	Force and Motion: Objects Collide	<p>PS3-1. Use evidence to construct an explanation relating the speed of an object to the energy of that object.</p> <p>PS3-3. Ask questions and predict outcomes about the changes in energy that occur when objects collide.</p> <p>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.*</p>		<p>PS3.A: Definitions of Energy</p> <ul style="list-style-type: none"> The faster a given object is moving, the more energy it possesses. Energy can be moved from place to place by moving objects or through sound, light, or electric currents. <p>PS3.B: Conservation of Energy and Energy Transfer</p> <ul style="list-style-type: none"> Energy is present whenever there are moving objects, sound, light, or heat. When objects collide, energy can be transferred from one object to another, thereby changing their motion. In such collisions, some energy is typically also transferred to the surrounding air; as a result, the air gets heated and sound is produced. <p>PS3.C: Relationship Between Energy and</p>	Energy and Matter Energy can be transferred in various ways and between objects.

				<p>Forces</p> <ul style="list-style-type: none">• When objects collide, the contact forces transfer energy so as to change the objects' motions. <p>ETS1.A: Defining Engineering Problems</p> <ul style="list-style-type: none">• Possible solutions to a problem are limited by available materials and resources (constraints). The success of a designed solution is determined by considering the desired features of a solution (criteria). Different proposals for solutions can be compared on the basis of how well each one meets the specified criteria for success or how well each takes the constraints into account.	
--	--	--	--	--	--

<p>6 weeks</p>	<p>Landforms and Fossils</p>	<p>ESS1-1. Identify evidence from patterns in rock formations and fossils in rock layers for changes in a landscape over time to support an explanation for changes in a landscape over time</p> <p>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.</p>	<p>Constructing Explanations and Designing Solutions Identify the evidence that supports particular points in an explanation.</p> <p>Planning and Carrying Out Investigations Make observations and/or measurements to produce data to serve as the basis for evidence for an explanation of a phenomenon.</p> <p>Analyzing and Interpreting Data Analyze and interpret data to make sense of phenomena using logical reasoning.</p>	<p>ESS1.C: The History of Planet Earth Local, regional, and global patterns of rock formations reveal changes over time due to earth forces, such as earthquakes. The presence and location of certain fossil types indicate the order in which rock layers were formed.</p> <p>ESS2.A: Earth Materials and Systems Rainfall helps to shape the land and affects the types of living things found in a region. Water, ice, wind, living organisms, and gravity break rocks, soils, and sediments into smaller particles and move them around.</p>	<p>Patterns Patterns can be used as evidence to support an explanation.</p> <p>Cause and Effect Cause and effect relationships are routinely identified, tested, and used to explain change.</p>
-----------------------	-------------------------------------	---	---	---	--

<p>10 Weeks</p>	<p>Investigating Waves</p>	<p>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. [Clarification Statement: Examples of models could include diagrams, analogies, and physical models using wire to illustrate wavelength and amplitude of waves.] [Assessment Boundary: Assessment does not include interference effects, electromagnetic waves, non-periodic waves, or quantitative models of amplitude and wavelength and that waves can cause objects to move.</p> <p>4-ESS2-2. Analyze and interpret data from maps to describe patterns of Earth’s features. [Clarification Statement: 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.]</p> <p>4-ESS3-1. Obtain and combine information to describe that energy and fuels are derived from natural resources and their uses affect the environment. [Clarification Statement: Examples of renewable energy resources could include wind energy, water behind dams, and sunlight; non-renewable energy resources are fossil fuels and fissile materials. Examples of environmental effects could include loss of habitat due to dams, loss of habitat due to surface mining, and air pollution from burning of fossil fuels.]</p> <p>4-ESS3-2. Generate and compare</p>	<p>Asking Questions and Defining Problems</p> <ul style="list-style-type: none"> -Ask questions that can be investigated and predict reasonable outcomes based on patterns such as cause and effect relationships. -Define a simple design problem that can be solved through the development of an object, tool, process, or system that includes several criteria for success and constraints on materials, time, or cost. <p>Developing and Using Models</p> <ul style="list-style-type: none"> -Develop a model using an analogy, example, or abstract representation to describe a scientific principle. -Develop and/or use models to describe and/or predict phenomena. -Develop a diagram 	<p>PS4.A: Wave Properties: Waves, which are regular patterns of motion, can be made in water by disturbing the surface. When waves move across the surface of deep water, the water goes up and down in place; there is no net motion in the direction of the wave except when the water meets a beach.</p> <ul style="list-style-type: none"> -Waves of the same type can differ in amplitude (height of the wave) and wavelength (spacing between wave peaks). <p>4-PS3-A Definitions of Energy: Make observations to provide evidence that energy can be transferred from place to place by sound, light, heat, and electric currents</p> <p>4-ESS2-2. Analyze and interpret data from maps to describe patterns of Earth’s features. [Clarification Statement: 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.]</p> <p>4-ESS2.B: Plate Tectonics: The locations of mountain ranges, deep ocean trenches, ocean floor structures, earthquakes, and volcanoes occur in patterns. Most earthquakes and volcanoes occur in bands that are often along the boundaries between continents and oceans. Major mountain chains form inside continents or near their edges. Maps can help locate the different land and water features where people live and in other areas of Earth.</p> <p>ESS3.A: Natural Resources: Energy and fuels</p>	<p>Patterns</p> <ul style="list-style-type: none"> -Similarities and differences in patterns can be used to sort, classify, and analyze simple rates of change for natural phenomena. <p>Energy & Matter</p> <ul style="list-style-type: none"> -Energy can be transferred in various ways and between objects <p>Cause and Effect</p> <ul style="list-style-type: none"> - Cause and effect relationships are routinely identified, tested, and used to explain change.
------------------------	-----------------------------------	---	--	--	--

		<p>multiple solutions to reduce the impacts of natural Earth processes on humans.* [Clarification Statement: Examples of solutions could include designing an earthquake resistant building and improving monitoring of volcanic activity.] [Assessment Boundary: Assessment is limited to earthquakes, floods, tsunamis, and volcanic eruptions.]</p> <p>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.</p>	<p>or simple physical prototype to convey a proposed object, tool, or process. -Use a model to test cause and effect relationships or interactions concerning the functioning of a natural or designed system.</p> <p>Constructing Explanations and Designing Solutions -Generate and compare multiple solutions to a problem based on how well they meet the criteria and constraints of the design solution.</p> <p>Engaging in Argument from Evidence -Construct and/or support an argument with evidence, data, and/or a model. -Make a claim about the merit of a solution to a</p>	<p>that humans use are derived from natural sources, and their use affects the environment in multiple ways. Some resources are renewable over time, and others are not.</p> <p>ESS3.B: Natural Hazards: A variety of natural hazards result from natural processes. Humans cannot eliminate natural hazards but can take steps to reduce their impacts.</p> <p>ETS1.B: Developing Possible Solutions: Testing a solution involves investigating how well it performs under a range of likely conditions.</p>	
--	--	--	--	---	--

			<p>problem by citing relevant evidence about how it meets the criteria and constraints of the problem.</p> <p>Obtaining, Evaluating, and Communicating Information -Obtain and combine information from books and/or other reliable media to explain phenomena or solutions to a design problem</p>		
--	--	--	--	--	--