



### Fourth Grade Science

Description: Students in fourth grade will use qualitative and quantitative data to formulate arguments about evidence, develop models, and interpret data from maps. They will also construct explanations related to the transfer of matter and energy on Earth, in physical interactions, and in organisms.

### *Physical Sciences*

<u>Reporting Topic</u>	<u>Grade Level Standards</u>	<u>Competency Statement</u>
<u>Energy Definitions</u>	<ul style="list-style-type: none"><li>• Use evidence to construct an explanation relating the speed of an object to the energy of that object (for example, use qualitative measures of changes in speed to explain how speed relates to energy). (4-PS3-1)</li></ul>	Students will: Explain the relationship between speed and energy of an object using evidence
<u>Energy Conservation and Energy Transfer</u>	<ul style="list-style-type: none"><li>• Make observations to provide evidence that energy can be transferred from place to place by sound, light, heat, and electric currents (for example, use qualitative observations as evidence that energy can be transferred from place to place by sound, light, heat, and electric currents). (4-PS3-2)</li><li>• Apply scientific ideas to design, test, and refine a device that converts energy from one form to another (for example, design, test, and refine a device—such as an electric circuit that converts electrical energy into motion, light, or sound or a passive solar heater that converts light into heat—that works within given constraints of material, cost, or time to convert motion energy to electrical energy or to use stored energy to cause motion or produce light or sound). (4-PS3-4)</li></ul>	Students will: Understand that energy can change form and transfer between objects
<u>Forces and Interactions</u>	<ul style="list-style-type: none"><li>• Ask questions and predict outcomes about the changes in energy that occur when objects collide (for example, make qualitative predictions about the change in energy due to changes in speed as objects collide). (4-PS3-3)</li></ul>	Students will: Ask questions and predict the changes in energy when two objects collide.



<u><b>Waves</b></u>	<ul style="list-style-type: none"> <li>Develop a model of waves to describe patterns in terms of amplitude and wavelength and that waves can cause objects to move (for example, create a diagram, analogy, or physical model using wire that describes qualitative patterns of amplitude and wavelength and that shows that waves can cause objects to move). (4-PS4-1)</li> </ul>	Students will: Develop and explain a model, using amplitude and wavelength, how waves cause objects to move
<u><b>Information Technology</b></u>	<ul style="list-style-type: none"> <li>Generate and compare multiple solutions that use patterns to transfer information (for example, figure out different ways to transfer information using patterns—such as sending coded information through the sound waves produced by a drum, using a grid of 1's and 0's representing black and white to send information about a picture, or using Morse code to send text—and compare these different methods). (4-PS4-3)</li> </ul>	Students will: Create multiple solutions that use patterns to transfer information and then compare them
<u><b>Electromagnetic Radiation</b></u>	<ul style="list-style-type: none"> <li>Develop a model to describe that light reflecting from objects and entering the eye allows objects to be seen (for example, create a model that shows how light reflecting off of an object enters the eye and allows an object to be seen). (4-PS4-2)</li> </ul>	Students will: Create a model showing light reflecting and entering the eye to be seen
<i><b>Life Sciences</b></i>		
<u><b>Reporting Topic</b></u>	<u><b>Grade Level Standards</b></u>	<u><b>Competency Statement</b></u>
<u><b>Structure and Function</b></u>	<ul style="list-style-type: none"> <li>Construct an argument that plants and animals have internal and external structures that function to support survival, growth, behavior, and reproduction (for example, make and defend the claim that plants and animals have external and internal structures—such as thorns, stems, roots, colored petals, hearts, stomachs, lungs, brains, skin, and other macroscopic structures—that help them survive, grow, and reproduce). (4-LS1-1)</li> </ul>	Students will: Argue that plants and animals have internal and external structures, which are for survival, growth, behavior, and reproduction.
<u><b>Information Processing</b></u>	<ul style="list-style-type: none"> <li>Use a model to describe that animals receive different types of information through their senses, process the information in their</li> </ul>	Students will: Use a model to describe that



	brain, and respond to the information in different ways (for example, create a model that explains the basic systems of information transfer that allow animals to use their perceptions and memories to guide their actions). (4-LS1-2)	animals receive different types of information through their senses and process it.
<i>Earth and Space Science</i>		
<u>Reporting Topic</u>	<u>Grade Level Standards</u>	<u>Competency Statement</u>
<u>Natural Hazards</u>	<ul style="list-style-type: none"> <li>Generate and compare multiple solutions to reduce the impacts of natural Earth processes on humans (for example, design and critique different solutions to reduce the impact of natural hazards like earthquakes, floods, tsunamis, and volcanic eruptions on humans, such as by designing an earthquake-resistant building or by improving the monitoring of volcanic activity). (4-ESS3-2)</li> </ul>	Students will: Generate multiple solutions to reduce the impacts of Earth's natural disasters on people.
<u>Natural Resources</u>	<ul style="list-style-type: none"> <li>Obtain and combine information to describe that energy and fuels are derived from natural resources and their uses affect the environment (for example, gather and synthesize information to explain that energy and fuel come from renewable natural resources [such as energy generated from wind, water behind dams, and sunlight] and nonrenewable natural resources [such as fossil fuels and fissile materials] and that the use of these resources affects the environment in various ways, including loss of habitat due to dams or surface mining and air pollution from the burning of fossil fuels). (4-ESS3-1)</li> </ul>	Students will: Obtain and combine information to describe that energy and fuels are derived from natural resources.
<u>Weathering and Erosion</u>	<ul style="list-style-type: none"> <li>Make observations and/or measurements to provide evidence of the effects of weathering or the rate of erosion by water, ice, wind, or vegetation (for example, observe or measure the amount of vegetation, speed of wind, relative rate of deposition, angle of slope in the downhill movement of water, cycles of freezing and thawing of water, cycles of heating and cooling, or volume of water flow to give</li> </ul>	Students will: Observe, measure, and record changes of weathering and/or erosion by water, ice, wind, or vegetation



	evidence of the effects of weathering and the rate of erosion). (4-ESS2-1)	
<b><u>Earth's History</u></b>	<ul style="list-style-type: none"> <li>Identify evidence from patterns in rock formations and fossils in rock layers to support an explanation for changes in a landscape over time (for example, identify patterns in rock formations and use these patterns to explain changes in a landscape over time; for instance, rock layers containing marine shell fossils above rock layers containing only plant fossils might indicate a gradual change from land to water, or a canyon with different rock layers in the walls and a river in the bottom might indicate that the river gradually cut through the rock). (4-ESS1-1)</li> </ul>	Students will: Support an explanation for changes in landscapes over time using evidence from fossils and rock formations.
<b><u>Plate Tectonics</u></b>	<ul style="list-style-type: none"> <li>Analyze and interpret data from maps to describe patterns of Earth's features (for example, analyze and interpret topographic maps of the Earth's land and ocean floor as well as maps of the locations of mountains, continental boundaries, volcanoes, and earthquakes to describe patterns of Earth's features). (4-ESS2-2)</li> </ul>	Students will: Analyze and interpret data from maps to describe patterns of Earth's features.
<b><i>Engineering</i></b>		
<b><u>Reporting Topics</u></b>	<b><u>Grade Level Standards</u></b>	<b><u>Competency Statement</u></b>
<b><u>Defining Problems</u></b>	<ul style="list-style-type: none"> <li>Define a simple design problem reflecting a need or a want that includes specified criteria for success and constraints on materials, time, or cost (for example, define a simple design problem that includes constraints [available materials and resources that limit possible solutions to a problem] and criteria [the desired features of a solution that determine its success]). (4-ETS1-1)</li> </ul>	Students will: Identify a simple design problem that can be solved and includes possible constraints.
<b><u>Designing Solutions</u></b>	<ul style="list-style-type: none"> <li>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 (for example, after researching a problem, test different</li> </ul>	Students will: Generate possible solutions to a problem including



	solutions by investigating how well they perform under a range of likely conditions, and communicate with peers about proposed solutions, understanding that shared ideas can lead to improved designs). (4-ETS1-2)	constraints of the design.
<b><u>Evaluating and Testing Solutions</u></b>	<ul style="list-style-type: none"><li>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 (for example, design and conduct tests to identify failure points or difficulties in various design solutions, with the failure points and difficulties identifying the elements of the design that need to be improved and ultimately determining which solution best solves the problem given the criteria and the constraints). (4-ETS1-3)</li></ul>	Students will: Plan and carry out fair tests considering failure spots and variables in order to improve a prototype.