

# Fourth Grade

## OREGON State Standards

### Science

### Earth & Space Science

#### 4.ESS1 Earth's Place in the Universe

- 4.ESS1.1 **Identify evidence from patterns in rock formations and fossils in rock layers to support an explanation for changes in a landscape over time.** [Clarification Statement: Examples of evidence from patterns could include rock layers with shell fossils above rock layers with plant fossils and no shells, indicating a change from water to land over time; and, a canyon with different rock layers in the walls and a river in the bottom, indicating that over time a river cut through the rock.]

#### 4.ESS2 Earth's Systems

- 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.**<sup>^</sup> [Clarification Statement: Examples of variables to test could include angle of slope in the downhill movement of water, amount of vegetation, speed of wind, relative rate of deposition, cycles of freezing and thawing of water, cycles of heating and cooling, and volume of water flow.]
- 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.]

#### 4.ESS3 Earth and Human Activity

- 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; nonrenewable energy resources that cannot be replaced 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.
- 4.ESS3.2 **Generate and compare 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.]

# Engineering, Technology, and the Application of Science

## 4.ETS1 Engineering Design

4.ETS1.1

**Define a simple design problem reflecting a need or a want that includes specified criteria for success and constraints on materials, time, or cost.** [Clarification Statement: A design problem must be identified before solutions are developed. Solutions or designs identify the criteria for success and identify limitations and constraints.]

4.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.** [Clarification Statement: Emphasis is on researching a problem prior to designing a solution, plan for testing to evaluate how well it will perform under a range of likely conditions using scientific knowledge and communicating the design process.]

4.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.** [Clarification Statement: Emphasis is on identifying the purpose of the investigation and specific evidence to collect, testing one criteria or constraint at a time, and record the data accordingly.]

## Life Science

### 4.LS1 From Molecules to Organisms: Structures and Processes

4.LS1.1

**Construct an argument that plants and animals have internal and external structures that function to support survival, growth, behavior, and reproduction.** [Clarification Statement: Examples of structures could include thorns, stems, roots, colored petals, heart, stomach, lung, brain, and skin.]

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.** [Clarification Statement: Emphasis is on systems of information transfer.]

# Physical Science

## 4.PS3 Energy

4.PS3.1 **Use evidence to construct an explanation relating the speed of an object to the energy of that object.** [Clarification Statement: Examples of evidence relating speed and energy could include change of shape on impact or other results of collisions.]

4.PS3.2 **Make observations to provide evidence that energy can be transferred from place to place by sound, light, heat, and electric currents.** ^  
Clarification Statement: Emphasis is on gathering evidence through observations to explain how energy is transferred and transformed within a system (e.g. relative rate an ice cube melts on different surfaces or obtain observational data for what affects how to change the amount of electricity a solar panel makes.)

4.PS3.3 **Ask questions and predict outcomes about the changes in energy that occur when objects collide.** [Clarification Statement: Emphasis is on the change in the energy due to the change in speed, not on the forces, as objects interact.]

4.PS3.4 **Apply scientific ideas to design, test, and refine a device that converts energy from one form to another.\*** [Clarification Statement: Examples of devices could include electric circuits that convert electrical energy into motion energy of a vehicle, light, or sound; and, a passive solar heater that converts light into heat. Examples of constraints could include the materials, cost, or time to design the device.]

## 4.PS4 Waves and their Applications in Technologies for Information Transfer

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.]

4.PS4.2 **Develop a model to describe that light reflecting from objects and entering the eye allows objects to be seen.** [Clarification Statement: Emphasis is a model to show the path that light traveled from the light source to your eye in the investigation (e.g. build a periscope to see around corners and over walls or trying to read or see objects in the dark).]

4.PS4.3 **Generate and compare multiple solutions that use patterns to transfer information.\*** [Clarification Statement: Emphasis is on generation and comparison of multiple solutions. Examples of solutions could include drums sending coded information through sound waves, using a grid of 1's and 0's representing black and white to send information about a picture, and using Morse code to send text.]