Utah Science

Grade 4

Adopted 2020

Organisms Functioning In Their Environment 4.1

1. Construct an explanation from evidence that plants and animals have internal and external structures that function to support survival, growth, behavior, and reproduction. Emphasize how structures support an organism's survival in its environment and how internal and external structures of plants and animals vary within the same and across multiple Utah environments. Examples of structures could include thorns on a stem to prevent predation or gills on a fish to allow it to breathe underwater. 4.1.1

2. Develop and use a model of a system to describe how animals receive different types of information from their environment through their senses, process the information in their brain, and respond to the information. Emphasize how animals are able to use their perceptions and memories to guide their actions. Examples could include models that explain how animals sense and then respond to different aspects of their environment such as sounds, temperature, or smell. 4.1.2

3. Analyze and interpret data from fossils to provide evidence of the stability and change in organisms and environments from long ago. Emphasize using the structures of fossils to make inferences about ancient organisms. Examples of fossils and environments could include comparing a trilobite with a horseshoe crab in an ocean environment or using a fossil footprint to determine the size of a dinosaur. 4.1.3

4. Engage in argument from evidence based on patterns in rock layers and fossils found in those layers to support an explanation that environments have changed over time. Emphasize the relationship between fossils and past environments. Examples could include tropical plant fossils found in Arctic areas and rock layers with marine shell fossils found above rock layers with land plant fossils. 4.1.4

Energy Transfer 4.2

1. Construct an explanation to describe the cause and effect relationship between the speed of an object and the energy of that object. Emphasize using qualitative descriptions of the relationship between speed and energy like fast, slow, strong, or weak. An example could include a ball that is kicked hard has more energy and travels a greater distance than a ball that is kicked softly. 4.2.1

	2. **Ask questions and make observations about the changes in energy that occur when objects collide. Emphasize that energy is transferred when objects collide and may be converted to different forms of energy. Examples could include changes in speed when one moving ball collides with another or the transfer of energy when a toy car hits a wall.** 4.2.2
	3. **Plan and carry out an investigation to gather evidence from observations that energy can be transferred from place to place by sound, light, heat, and electrical currents. Examples could include sound causing objects to vibrate and electric currents being used to produce motion or light.** 4.2.3
	4. **Design a device that converts energy from one form to another. Examples could include solar ovens that convert light energy to heat energy or a simple alarm system that converts motion energy into sound energy.** 4.2.4
Wave Patterns 4.3	1. **Develop and use a model to describe the regular patterns of waves. Emphasize patterns in terms of amplitude and wavelength. Examples of models could include diagrams, analogies, and physical models such as water or rope.** 4.3.1
	2. **Develop and use a model to describe how visible light waves reflected from objects enter the eye causing objects to be seen. Emphasize the reflection and movement of light.** 4.3.2
	3. **Design a solution to an information transfer problem using wave patterns. Define the problem, identify criteria and constraints, develop possible solutions using models, analyze data from testing solutions, and propose modifications for optimizing a solution. Examples could include using light to transmit a message in Morse code or using lenses and mirrors to see objects that are far away.** 4.3.3
Observable Patterns In The Sky 4.4	1. **Construct an explanation that differences in the apparent brightness of the Sun compared to other stars is due to the relative distance (scale) of stars from Earth. Emphasize relative distance from Earth. (ESS1.A)** 4.4.1
	2. **Analyze and interpret data of observable patterns to show that Earth rotates on its axis and revolves around the Sun. Emphasize patterns that provide evidence of Earth's rotation and orbits around the Sun. Examples of patterns could include day and night, daily changes in length and direction of shadows, and seasonal appearance of some stars in the night sky. Earth's seasons and its connection to the tilt of Earth's axis will be taught in Grades 6 through 8.** 4.4.2