FOSS and SEEd Standards Alignment
Fourth Grade

Strand 4.1: ORGANISMS FUNCTIONING IN THEIR ENVIRONMENT

Through the study of organisms, inferences can be made about environments both past and present. Plants and animals have both internal and external structures that serve various functions for growth, survival, behavior, and reproduction. Animals use different sense receptors specialized for particular kinds of information to understand and respond to their environment. Some kinds of plants and animals that once lived on Earth can no longer be found. However, fossils from these organisms provide evidence about the types of organisms that lived long ago and the nature of their environments. Additionally, the presence and location of certain fossil types indicate changes that have occurred in environments over time.

STANDARDS	FOSS	MINIMUM
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. (LS1.A)	***Environments*** Investigations 1: Environmental Factors Investigations 2: Ecosystems Investigations 3: Brine Shrimp Hatching Investigations 4: Range of Tolerance	***Environments*** Investigations 1: Environmental Factors Part 1 – 3 classes
4.1.2 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	***Environments*** Investigations 1: Environmental Factors Investigations 2: Ecosystems	***Environments*** Investigations 1: Environmental Factors Part 2 – 4 classes Investigations 2: Ecosystems Part 4 – 4-6 classes

animals sense and then respond to different aspects of their environment such as sounds, temperature, or smell. (LS1.D)		
4.1.3 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. (LS4.A)	***Soils, Rocks, and Landforms*** Investigation 2, Part 4 "Fossil Evidence"	***Soils, Rocks, and Landforms*** Investigation 2, Part 4 – Reading (weak tie) – 1 class
4.1.4 Engage in Argument from evidence based on patterns in rock layers and fossils found in those layers to support an explanation for how an environment has 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. (ESS1.C)	***Soils, Rocks, and Landforms*** Investigation 2, Part 4 "Fossil Evidence"	***Soils, Rocks, and Landforms*** Investigation 2, Part 4 – Reading (weak tie) – 1 class

Strand 4.2: ENERGY TRANSFER

Energy is present whenever there are moving objects, sound, light, or heat. The faster a given object is moving, the more energy it possesses. When objects collide, energy can be transferred from one object to another causing the objects' motions to change. Energy can also be transferred from place to place by electrical currents, heat, sound, or light. Devices can be designed to convert energy from one form to another.

STANDARDS	FOSS	MINIMUM
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. (PS3.A)	***Energy*** Investigation 4: Energy Transfer	***Energy*** Investigation 4: Energy Transfer Part 1 – 2-3 classes Part 2- 3 classes Part 3 – 5-6 classes
4.2.2 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. (PS3.B, PS3.C)	***Energy*** Investigation 4: Energy Transfer	***Energy*** Investigation 4: Energy Transfer Part 1 – 2-3 classes Part 2- 3 classes Part 3 – 5-6 classes
4.2.3 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 sound or light. (PS3.A, PS3.B)	***Energy*** Investigation 1: Energy and Circuits Investigation 3: Electromagnets Investigation 4: Energy Transfer Investigation 5: Waves	***Energy*** Investigation 5: Waves Part 2 – 3-5 classes Part 3 – 5-6 classes

4.2.4 Design device that converts energy from one form to another. Define the problem, identify criteria and constraints, develop possible solutions using models, analyze data from testing solutions, and propose modifications for optimizing a solution. Emphasize identifying the initial and final forms of energy. Examples could include solar ovens that convert light energy to heat energy or a simple alarm system that converts motion energy into sound energy. (PS3.B, PS3.D, ETS1.A, ETS1.B, ETS1.C)	***Energy*** Investigation 1: Energy and Circuits Investigation 2: The Force of Magnetism Investigation 3: Electromagnets Investigation 5: Waves	***Energy*** Investigation 5: Waves Part 3 – 5-6 classes

Strand 4.3: WAVE PATTERNS

Waves are regular patterns of motion that transfer energy and have properties such as amplitude (height of the wave) and wavelength (spacing between wave peaks). Waves in water can be directly observed. Light waves cause objects to be seen when light reflected from objects enters the eye. Humans use waves and other patterns to transfer information.

STANDARDS	FOSS	MINIMUM
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. (PS4.A)	***Energy*** Investigation 5: Waves	***Energy*** Investigation 5: Waves Part 1 – 3 classes
4.3.2 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. The structure and function of organs and organ systems and the relationship between color and wavelength will be taught in Grades 6 through 8. (PS4.B)	***Energy*** Investigation 5: Waves	***Energy*** Investigation 5: Waves Part 2– 3-5 classes (includes refraction)

4.3.3 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. (PS4.C, ETS1.A, ETS1.B, ETS1.C)	***Energy*** Investigation 3: Electromagnets Investigation 5: Waves	***Energy*** Investigation 5: Waves Part 2– 3-5 classes (includes refraction)

Strand 4.4: OBSERVABLE PATTERNS IN THE SKY

The Sun is a star that appears larger and brighter than other stars because it is closer to Earth. The rotation of Earth on its axis and orbit of Earth around the Sun causes observable patterns. These include day and night; daily changes in the length and direction of shadows; and different positions of the Sun and stars at different times of the day, month, and year.

STANDARDS	FOSS	MINIMUM
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)	***Earth and Sun*** Investigation 2: Planetary Systems	***Earth and Sun*** Investigation 2: Planetary Systems Part 2 – 3 classes Part 5 – 6 classes
4.4.2 Analyze and interpret data of observable patterns to show that the 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. (ESS1.B)	***Earth and Sun*** Investigation 1: The Sun Investigation 2: Planetary Systems	***Earth and Sun*** Investigation 2: Planetary Systems Part 5 – 6 classes