Sunlight Warms the Earth; The Five Senses;	UT	SEEd Standards	Kindergarten	K.1.3	Carry out an investigation using the five senses, to determine the effect of sunlight on different surfaces and materials. Examples could include measuring temperature, through touch or other methods, on natural and man-made materials in various locations throughout the day.
Sunlight Warms the Earth;	UT	SEEd Standards	Kindergarten	K.1.4	Design a solution that will reduce the warming effect of sunlight on an area. Define the problem by asking questions and gathering information, convey designs through sketches, drawings, or physical models, and compare and test designs.
Pushes & Pulls; Simple Machines;	UT	SEEd Standards	Kindergarten	K.3.1	Plan and conduct an investigation to compare the effects of different strengths or different directions of forces on the motion of an object. Emphasize forces as a push and pull on an object. The idea of strength should be kept separate from the idea of direction. Non-contact forces, such as magnets and static electricity, will be taught in Grades 3 through 5.
Pushes & Pulls;	UT	SEEd Standards	Kindergarten	K.3.2	Analyze data to determine how a design solution causes a change in the speed or direction of an object with a push or a pull. Define the problem by asking questions and gathering information, convey designs through sketches, drawings, or physical models, and compare and test designs. Examples of problems requiring a solution could include having a marble or other object move a certain distance, follow a particular path, or knock down other objects.
Living vs. Non-Living; Plants Need Water & Light; Animals Need Food;	UT	SEEd Standards	Kindergarten	K.2.1	Obtain, evaluate, and communicate information to describe patterns of what living things (plants and animals, including humans) need to survive. Emphasize the similarities and differences between the survival needs of all living things. Examples could include that plants depend on air, water, minerals, and light to survive, or animals depend on plants or other animals to survive.
Living Things Change Their Environment;	UT	SEEd Standards	Kindergarten	K.2.3	Obtain, evaluate, and communicate information about how living things (plants and animals, including humans) affect their surroundings to survive. Examples could include squirrels digging in the ground to hide their food, plant roots breaking concrete, or humans building shelters.

Introduction to Weather;	UT	SEEd Standards	Kindergarten	K.1.1	Obtain, evaluate, and communicate information about local, observable weather conditions to describe patterns over time. Emphasize the students' collection and sharing of data. Examples of data could include sunny, cloudy, windy, rainy, cold, or warm.
Introduction to Weather;	UT	SEEd Standards	Kindergarten	K.1.2	Obtain, evaluate, and communicate information on the effect of forecasted weather patterns on human behavior. Examples could include how humans respond to local forecasts of typical and severe weather such as extreme heat, high winds, flash floods, thunderstorms, or snowstorms.
Habitats;	UT	SEEd Standards	Kindergarten	K.2.2	Obtain, evaluate, and communicate information about patterns in the relationships between the needs of different living things (plants and animals, including humans) and the places they live. Emphasize that living things need water, air, and resources and that they live in places that have the things they need. Examples could include investigating plants grown in various locations and comparing the results or comparing animals with the places they live.
Not currently covered.	UT	SEEd Standards	Kindergarten	K.2.4	Design and communicate a solution to address the effects that living things (plants and animals, including humans) experience while trying to survive in their surroundings. Define the problem by asking questions and gathering information, convey designs through sketches, drawings, or physical models, and compare designs. Emphasize students working from a plant, animal, or human perspective. Examples could include a plant growing to get more sunlight, a beaver building a dam, or humans caring for the Earth by reusing and recycling natural resources.
Four Seasons and Day Length;	UT	SEEd Standards	Grade 1	1.1.2	Obtain, evaluate, and communicate information about the patterns observed at different times of the year to relate the amount of daylight to the time of year. Emphasize the variation in daylight patterns at different times of the day and different times of the year. Examples could include varying locations and regions throughout the state, country, and world.
Plant Growth Conditions;	UT	SEEd Standards	Grade 1	1.2.1	Plan and carry out an investigation to determine the effect of sunlight and water on plant growth. Emphasize investigations that test one variable at a time.

[Patterns in the Sky](#);	UT	SEEd Standards	Grade 1	1.1.1	Obtain, evaluate, and communicate information about the movement of the Sun, Moon, and stars to describe predictable patterns. Examples of patterns could include how the Sun and Moon appear to rise in one part of the sky, move across the sky, and set; or how stars, other than the Sun, are visible at night but not during the day.
[Patterns in the Sky](#);	UT	SEEd Standards	Grade 1	1.1.3	Design a device that measures the varying patterns of daylight. Define the problem by asking questions and gathering information, convey designs through sketches, drawings, or physical models, and compare and test designs. Examples could include sundials for telling the time or tracking the movement of shadows throughout the day.
[Introduction to Traits](#);	UT	SEEd Standards	Grade 1	1.2.3	Obtain, evaluate, and communicate information about the patterns of plants and nonhuman animals that are alike, but not exactly like, their parents. An example could include that most carrots are orange and shaped like a cone but may be different sizes or have differing tastes.
[Introduction to Sound](#);	UT	SEEd Standards	Grade 1	1.3.1	Plan and carry out an investigation to show the cause and effect relationship between sound and vibrating matter. Emphasize that vibrating matter can make sound and that sound can make matter vibrate.
[Introduction to Light](#);	UT	SEEd Standards	Grade 1	1.3.2	Use a model to show the effect of light on objects. Emphasize that objects can be seen when light is available to illuminate them or if they give off their own light.
[Introduction to Light](#);	UT	SEEd Standards	Grade 1	1.3.3	Plan and carry out an investigation to determine the effect of materials in the path of a beam of light. Emphasize that light can travel through some materials, can be reflected off some materials, and some materials block light causing shadows. Examples of materials could include clear plastic, wax paper, cardboard, or a mirror.
[Habitats](#);	UT	SEEd Standards	Grade 1	1.2.2	Construct an explanation by observing patterns of external features of living things that survive in different locations. Emphasize how plants and nonhuman animals, found in specific surroundings, share similar physical characteristics. Examples could include that plants living in dry areas are more likely to have thick outer coatings that hold in water,

					animals living in cold locations have longer and thicker fur, or most desert animals are awake at night.
Communication Over Distances;	UT	SEEd Standards	Grade 1	1.3.4	Design a device in which the structure of the device uses light or sound to solve the problem of communicating over a distance. Define the problem by asking questions and gathering information, convey designs through sketches, drawings, or physical models, and compare and test designs. Examples of devices could include a light source to send signals, paper-cup-and-string telephones, or a pattern of drum beats.
Animals Help Their Babies Survive;	UT	SEEd Standards	Grade 1	1.2.4	Construct an explanation of the patterns in the behaviors of parents and offspring which help offspring to survive. Examples of behavioral patterns could include the signals that offspring make such as crying, chirping, and other vocalizations or the responses of the parents such as feeding, comforting, and protecting the offspring.
What is Engineering?;	UT	SEEd Standards	Grade 2	2.3.3	Develop and use a model to describe how an object, made of a small set of pieces, can be disassembled and reshaped into a new object with a different function. Emphasize that a great variety of objects can be built from a small set of pieces. Examples of pieces could include wooden blocks or building bricks.
Timescale of Earth's Events;	UT	SEEd Standards	Grade 2	2.1.2	Construct an explanation about changes in Earth's surface that happen quickly or slowly. Emphasize the contrast between fast and slow changes. Examples of fast changes could include volcanic eruptions, earthquakes, or landslides. Examples of slow changes could include the erosion of mountains or the shaping of canyons.
Pollination & Seed Dispersal;	UT	SEEd Standards	Grade 2	2.2.3	Develop and use a model that mimics the function of an animal dispersing seeds or pollinating plants. Examples could include plants that have seeds with hooks or barbs that attach themselves to animal fur, feathers, or human clothing, or dispersal through the wind, or consumption of fruit and the disposal of the pits or seeds.
Parts of a Plant; External Animal Parts;	UT	SEEd Standards	Grade 2	2.2.2	Plan and carry out an investigation of the structure and function of plant and animal parts in different habitats. Emphasize how different plants and animals have different structures to

					survive in their habitat. Examples could include the shallow roots of a cactus in the desert or the seasonal changes in the fur coat of a wolf.
Material Properties & Purposes;	UT	SEEd Standards	Grade 2	2.3.2	Construct an explanation showing how the properties of materials influence their intended use and function. Examples could include using wood as a building material because it is lightweight and strong or the use of concrete, steel, or cotton due to their unique properties.
Maps of Landforms;	UT	SEEd Standards	Grade 2	2.1.1	Develop and use models illustrating the patterns of landforms and water on Earth. Examples of models could include valleys, canyons, or floodplains and could depict water in the solid or liquid state.
Inspired by Nature (Biomimicry);	UT	SEEd Standards	Grade 2	2.2.4	Design a solution to a human problem by mimicking the structure and function of plants and/or animals and how they use their external parts to help them survive, grow, and meet their needs. Define the problem by asking questions and gathering information, convey designs through sketches, drawings, or physical models, and compare and test designs. Examples could include a human wearing a jacket to mimic the fur of an animal or a webbed foot to design a better swimming fin.
Heating & Cooling;	UT	SEEd Standards	Grade 2	2.3.4	Obtain, evaluate, and communicate information about changes in matter caused by heating or cooling. Emphasize that some changes can be reversed and some cannot. Examples of reversible changes could include freezing water or melting crayons. Examples of irreversible changes could include cooking an egg or burning wood.
Classification of Materials;	UT	SEEd Standards	Grade 2	2.3.1	Plan and carry out an investigation to classify different kinds of materials based on patterns in their observable properties. Examples could include sorting materials based on similar properties such as strength, color, flexibility, hardness, texture, or whether the materials are solids or liquids.
Changing the Shape of Land;	UT	SEEd Standards	Grade 2	2.1.3	Design solutions to slow or prevent wind or water from changing the shape of land. Define the problem by asking questions and gathering information, convey designs through sketches, drawings, or physical models, and compare and test designs. Examples of

					solutions could include retaining walls, dikes, windbreaks, shrubs, trees, and grass to hold back wind, water, and land.
Biodiversity of Life on Earth; Habitats;	UT	SEEd Standards	Grade 2	2.2.1	Obtain, evaluate, and communicate information about patterns of living things (plants and animals, including humans) in different habitats. Emphasize the diversity of living things in land and water habitats. Examples of patterns in habitats could include descriptions of temperature or precipitation and the types of plants and animals found in land habitats.
Weather vs. Climate;	UT	SEEd Standards	Grade 3	3.1.2	Obtain and communicate information to describe climate patterns in different regions of the world. Emphasize how climate patterns can be used to predict typical weather conditions. Examples of climate patterns could be average seasonal temperature and average seasonal precipitation.
Variation of Traits;	UT	SEEd Standards	Grade 3	3.2.2	Analyze and interpret data to identify patterns of traits that plants and animals have inherited from parents. Emphasize the similarities and differences in traits between parent organisms and offspring and variation of traits in groups of similar organisms.
Patterns of Motion & Friction;	UT	SEEd Standards	Grade 3	3.3.2	Analyze and interpret data from observations and measurements of an object's motion to identify patterns in its motion that can be used to predict future motion. Examples of motion with a predictable pattern could include a child swinging on a swing or a ball rolling down a ramp.
Magnets & Static Electricity;	UT	SEEd Standards	Grade 3	3.3.4	Ask questions to plan and carry out an investigation to determine cause and effect relationships of electric or magnetic interactions between two objects not in contact with each other. Emphasize how static electricity and magnets can cause objects to move without touching. Examples could include the force an electrically charged balloon has on hair, how magnet orientation affects the direction of a force, or how distance between objects affects the strength of a force. Electrical charges and magnetic fields will be taught in Grades 6 through 8.

[Magnets & Static Electricity](#);	UT	SEEd Standards	Grade 3	3.3.5	Design a solution to a problem in which a device functions by using scientific ideas about magnets. 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 a latch or lock used to keep a door shut or a device to keep two moving objects from touching each other.
[Gravity Pulls Things Down](#); [Gravitational Forces Between Objects](#);	UT	SEEd Standards	Grade 3	3.3.3	Construct an explanation that the gravitational force exerted by Earth causes objects to be directed downward, toward the center of the spherical Earth. Emphasize that "downward" is a local description depending on one's position on Earth.
[Four Seasons and Day Length](#);	UT	SEEd Standards	Grade 3	3.1.1	Analyze and interpret data to reveal patterns that indicate typical weather conditions expected during a particular season. Emphasize students gathering data in a variety of ways and representing data in tables and graphs. Examples of data could include temperature, precipitation, or wind speed.
[Extreme Weather Solutions](#); [Natural Disasters](#);	UT	SEEd Standards	Grade 3	3.1.3	Design a solution that reduces the effects of a weather-related hazard. Define the problem, identify criteria and constraints, develop possible solutions, analyze data from testing solutions, and propose modifications for optimizing a solution. Examples could include barriers to prevent flooding or wind-resistant roofs.
[Balanced & Unbalanced Forces](#);	UT	SEEd Standards	Grade 3	3.3.1	Plan and carry out investigations that provide evidence of the effects of balanced and unbalanced forces on the motion of an object. Emphasize investigations where only one variable is tested at a time. Examples could include an unbalanced force on one side of a ball causing it to move and balanced forces pushing on a box from both sides producing no movement.
[Animal & Plant Life Cycles](#);	UT	SEEd Standards	Grade 3	3.2.1	Develop and use models to describe changes that organisms go through during their life cycles. Emphasize that organisms have unique and diverse life cycles but follow a pattern of birth, growth, reproduction, and death. Examples of changes in life cycles could include how some plants and animals look different at different stages of life or how other plants and animals only appear to change size in their life.

[Adaptations and the Environment](); [Variation of Traits]();	UT	SEEd Standards	Grade 3	3.2.3	Construct an explanation that the environment can affect the traits of an organism. Examples could include that the growth of normally tall plants is stunted with insufficient water or that pets given too much food and little exercise may become overweight.
[Adaptations and the Environment](); [Variation of Traits]();	UT	SEEd Standards	Grade 3	3.2.4	Construct an explanation showing how variations in traits and behaviors can affect the ability of an individual to survive and reproduce. Examples of traits could include large thorns protecting a plant from being eaten or strong smelling flowers to attracting certain pollinators. Examples of behaviors could include animals living in groups for protection or migrating to find more food.
[Adaptations and the Environment]();	UT	SEEd Standards	Grade 3	3.2.5	Engage in argument from evidence that in a particular habitat (system) some organisms can survive well, some survive less well, and some cannot survive at all. Emphasize that organisms and habitats form systems in which the parts depend upon each other. Examples of evidence could include needs and characteristics of the organisms and habitats involved such as cacti growing in dry, sandy soil but not surviving in wet, saturated soil.
Not currently covered.	UT	SEEd Standards	Grade 3	3.2.6	Design a solution to a problem caused by a change in the environment that impacts the types of plants and animals living in that environment. Define the problem, identify criteria and constraints, and develop possible solutions. Examples of environmental changes could include changes in land use, water availability, temperature, food, or changes caused by other organisms.
[Wave Properties]();	UT	SEEd Standards	Grade 4	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.
[Sun & Other Stars]();	UT	SEEd Standards	Grade 4	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.

[Structure of Living Things](#);	UT	SEEd Standards	Grade 4	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.
[Light Reflection & Vision](#);	UT	SEEd Standards	Grade 4	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.
[Information Transfer](#);	UT	SEEd Standards	Grade 4	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.
[Fossils & Extinction](#);	UT	SEEd Standards	Grade 4	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.
[Energy Transfer](#);	UT	SEEd Standards	Grade 4	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 motion or light.
[Energy Transfer](#);	UT	SEEd Standards	Grade 4	4.2.4	Design a 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.
Earth's Landscapes; Fossils & Extinction;	UT	SEEd Standards	Grade 4	4.1.4	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.
Earth's Orbit and Rotation;	UT	SEEd Standards	Grade 4	4.4.2	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.
Collisions;	UT	SEEd Standards	Grade 4	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.
Collisions;	UT	SEEd Standards	Grade 4	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.
Brain Processing of Senses;	UT	SEEd Standards	Grade 4	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 animals sense and then respond to different aspects of their environment such as sounds, temperature, or smell.
Weathering & Erosion;	UT	SEEd Standards	Grade 5	5.1.3	Ask questions to plan and carry out investigations that provide evidence for the effects of weathering and the rate of erosion on the geosphere. Emphasize weathering and erosion by water, ice, wind, gravity, or vegetation. Examples could include observing the effects of cycles of freezing and thawing of water on rock or changing the slope in the downhill movement of water.
Water Quality & Distribution;	UT	SEEd Standards	Grade 5	5.1.2	Use mathematics and computational thinking to compare the quantity of saltwater and freshwater in various reservoirs to provide evidence for the distribution of water on Earth. Emphasize reservoirs such as oceans, lakes, rivers, glaciers, groundwater, and polar ice caps. Examples of using mathematics and computational thinking could include measuring, estimating, graphing, or finding percentages of quantities.
Properties of Matter;	UT	SEEd Standards	Grade 5	5.2.2	Ask questions to plan and carry out investigations to identify substances based on patterns of their properties. Emphasize using properties to identify substances. Examples of properties could include color, hardness, conductivity, solubility, or a response to magnetic forces. Examples of substances could include powders, metals, minerals, or liquids.
Particle Nature of Matter;	UT	SEEd Standards	Grade 5	5.2.1	Develop and use a model to describe that matter is made of particles on a scale that is too small to be seen. Emphasize making observations of changes supported by a particle model of matter. Examples could include adding air to expand a balloon, compressing air in a syringe, adding food coloring to water, or dissolving salt in water and evaporating the water. The use of the terms atoms and molecules will be taught in Grades 6 through 8.
Natural Disasters;	UT	SEEd Standards	Grade 5	5.1.1	Analyze and interpret data to describe patterns of Earth's features. Emphasize most earthquakes and volcanoes occur in bands that are often along the boundaries between continents and oceans while major mountain chains may be found inside continents or near their edges. Examples of data could include maps showing locations of mountains on continents and the ocean floor or the locations of volcanoes and earthquakes.

[Interactions of Earth's Spheres](#);	UT	SEEd Standards	Grade 5	5.1.4	Develop a model to describe interactions between Earth's systems including the geosphere, biosphere, hydrosphere, and/or atmosphere. Emphasize interactions between only two systems at a time. Examples could include the influence of a rainstorm in a desert, waves on a shoreline, or mountains on clouds.
[Human Impacts on the Environment](#);	UT	SEEd Standards	Grade 5	5.3.4	Evaluate design solutions whose primary function is to conserve Earth's environments and resources. Define the problem, identify criteria and constraints, analyze available data on proposed solutions, and determine an optimal solution. Emphasize how humans can balance everyday needs (agriculture, industry, and energy) while conserving Earth's environments and resources.
[How Do We Use Food](#); [Food Webs](#);	UT	SEEd Standards	Grade 5	5.3.1	Construct an explanation that plants use air, water, and energy from sunlight to produce plant matter needed for growth. Emphasize photosynthesis at a conceptual level and that plant matter comes mostly from air and water, not from the soil. Photosynthesis at the cellular level will be taught in Grades 6 through 8.
[How Do We Use Food](#); [Food Webs](#);	UT	SEEd Standards	Grade 5	5.3.2	Obtain, evaluate, and communicate information that animals obtain energy and matter from the food they eat for body repair, growth, and motion and to maintain body warmth. Emphasize that the energy used by animals was once energy from the Sun. Cellular respiration will be taught in Grades 6 through 8.
[Food Webs](#);	UT	SEEd Standards	Grade 5	5.3.3	Develop and use a model to describe the movement of matter among plants, animals, decomposers, and the environment. Emphasize that matter cycles between the air and soil and among plants, animals, and microbes as these organisms live and die. Examples could include simple food chains from ecosystems such as deserts or oceans or diagrams of decomposers returning matter to the environment. Complex interactions in a food web will be taught in Grades 6 through 8.
[Extreme Weather Solutions](#);	UT	SEEd Standards	Grade 5	5.1.5	Design solutions to reduce the effects of naturally occurring events that impact humans. 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 that humans cannot eliminate natural hazards, but they can take steps

					to reduce their impacts. Examples of events could include landslides, earthquakes, tsunamis, blizzards, or volcanic eruptions.
Conservation of Matter;	UT	SEEd Standards	Grade 5	5.2.4	Use mathematics and computational thinking to provide evidence that regardless of the type of change that occurs when heating, cooling, or combining substances, the total weight of matter is conserved. Examples could include melting an ice cube, dissolving salt in water, and combining baking soda and vinegar in a closed bag.
Chemical vs. Physical Changes;	UT	SEEd Standards	Grade 5	5.2.3	Plan and carry out investigations to determine the effect of combining two or more substances. Emphasize whether a new substance is or is not created by the formation of a new substance with different properties. Examples could include combining vinegar and baking soda or rusting an iron nail in water.
Water Cycle (6-8 Version)	UT	SEEd Standards	Grade 6	6.3.1	Develop a model to describe how the cycling of water through Earth's systems is driven by energy from the Sun, gravitational forces, and density
The Solar System; Gravitational Forces Between Objects;	UT	SEEd Standards	Grade 6	6.1.2	Develop and use a model to describe the role of gravity and inertia in orbital motions of objects in our solar system.
The Solar System;	UT	SEEd Standards	Grade 6	6.1.3	Use computational thinking to analyze data and determine the scale and properties of objects in the solar system. Examples of scale could include size or distance. Examples of properties could include layers, temperature, surface features, or orbital radius. Data sources could include Earth and space-based instruments such as telescopes or satellites. Types of data could include graphs, data tables, drawings, photographs, or models.
Symbiosis (Interactions Between Organisms);	UT	SEEd Standards	Grade 6	6.4.2	Construct an explanation that predicts patterns of interactions among organisms across multiple ecosystems. Emphasize consistent interactions in different environments such as competition, predation, and mutualism.

Solar & Lunar Eclipses; Causes of Seasons;	UT	SEEd Standards	Grade 6	6.1.1	Develop and use a model of the Sun-Earth-Moon system to describe the cyclic patterns of lunar phases, eclipses of the Sun and Moon, and seasons. Examples of models could be physical, graphical, or conceptual.
Maintaining Biodiversity;	UT	SEEd Standards	Grade 6	6.4.5	Evaluate competing design solutions for preserving ecosystem services that protect resources and biodiversity based on how well the solutions maintain stability within the ecosystem. Emphasize obtaining, evaluating, and communicating information of differing design solutions. Examples could include policies affecting ecosystems, responding to invasive species or solutions for the preservation of ecosystem resources specific to Utah, such as air and water quality and prevention of soil erosion.
Intro to Thermal Energy;	UT	SEEd Standards	Grade 6	6.2.2	Develop a model to predict the effect of heat energy on states of matter and density. Emphasize the arrangement of particles in states of matter (solid, liquid, or gas) and during phase changes (melting, freezing, condensing, and evaporating).
Intro to Climate Change;	UT	SEEd Standards	Grade 6	6.3.4	Construct an explanation supported by evidence for the role of the natural greenhouse effect in Earth's energy balance, and how it enables life to exist on Earth. Examples could include comparisons between Earth and other planets such as Venus or Mars.
Heat: Transfer of Thermal Energy;	UT	SEEd Standards	Grade 6	6.2.3	Plan and carry out an investigation to determine the relationship between temperature, the amount of heat transferred, and the change of average particle motion in various types or amounts of matter. Emphasize recording and evaluating data, and communicating the results of the investigation.
Heat: Transfer of Thermal Energy;	UT	SEEd Standards	Grade 6	6.2.4	Design an object, tool, or process that minimizes or maximizes heat energy transfer. Identify criteria and constraints, develop a prototype for iterative testing, analyze data from testing, and propose modifications for optimizing the design solution. Emphasize demonstrating how the structure of differing materials allows them to function as either conductors or insulators.
Food Webs: Cycling of Matter & Flow of Energy;	UT	SEEd Standards	Grade 6	6.4.3	Develop a model to describe the cycling of matter and flow of energy among living and nonliving parts of an ecosystem. Emphasize food webs and the role of producers,

					consumers, and decomposers in various ecosystems. Examples could include Utah ecosystems such as mountains, Great Salt Lake, wetlands, or deserts.
Competition in Ecosystems;	UT	SEEd Standards	Grade 6	6.4.1	Analyze data to provide evidence for the effects of resource availability on organisms and populations in an ecosystem. Ask questions to predict how changes in resource availability affects organisms in those ecosystems. Examples could include water, food, or living space in Utah environments.
Competition in Ecosystems;	UT	SEEd Standards	Grade 6	6.4.4	Construct an argument supported by evidence that the stability of populations is affected by changes to an ecosystem. Emphasize how changes to living and nonliving components in an ecosystem affect populations in that ecosystem. Examples could include Utah ecosystems such as mountains, Great Salt Lake, wetlands, or deserts.
Climate Zones & Ocean Currents;	UT	SEEd Standards	Grade 6	6.3.3	Develop and use a model to show how unequal heating of the Earth's systems causes patterns of atmospheric and oceanic circulation that determine regional climates. Emphasize how warm water and air move from the equator toward the poles. Examples of models could include Utah regional weather patterns such as lake-effect snow or wintertime temperature inversions.
Atoms & Molecules;	UT	SEEd Standards	Grade 6	6.2.1	Develop models to show that molecules are made of different kinds, proportions and quantities of atoms. Emphasize understanding that there are differences between atoms and molecules, and that certain combinations of atoms form specific molecules. Examples of simple molecules could include water (H_2O), atmospheric oxygen (O_2), or carbon dioxide (CO_2).
Air Masses & Weather Fronts;	UT	SEEd Standards	Grade 6	6.3.2	Investigate the interactions between air masses that cause changes in weather conditions. Collect and analyze weather data to provide evidence for how air masses flow from regions of high pressure to low pressure causing a change in weather. Examples of data collection could include field observations, laboratory experiments, weather maps, or diagrams.

[The Fossil Record]();	UT	SEEd Standards	Grade 7	7.5.2	Analyze and interpret data for patterns in the fossil record that document the existence, diversity, extinction, and change of life forms throughout the history of life on Earth, under the assumption that natural laws operate today as in the past.
[Tectonic Plates]();	UT	SEEd Standards	Grade 7	7.2.2	Construct an explanation based on evidence for how processes have changed Earth's surface at varying time and spatial scales. Examples of processes that occur at varying time scales could include slow plate motions or rapid landslides. Examples of processes that occur at varying spatial scales could include uplift of a mountain range or deposition of fine sediments.
[Tectonic Plates]();	UT	SEEd Standards	Grade 7	7.2.5.1	Ask questions and analyze and interpret data about the patterns between plate tectonics and: the occurrence of earthquakes and volcanoes, continental and ocean floor features, and the distribution of rocks and fossils.
[Rocks & Minerals (Including Rock Cycle)]();	UT	SEEd Standards	Grade 7	7.2.1	Develop a model of the rock cycle to describe the relationship between energy flow and matter cycling that create igneous, sedimentary, and metamorphic rocks. Emphasize the processes of melting, crystallization, weathering, deposition, sedimentation, and deformation, which act together to form minerals and rocks.
[Rock Layers (Geologic Time)]();	UT	SEEd Standards	Grade 7	7.2.6	Make an argument from evidence for how the geologic time scale shows the age and history of Earth. Emphasize scientific evidence from rock strata, the fossil record, and the principles of relative dating, such as superposition, uniformitarianism, and recognizing unconformities.
[Reproduction of Living Things]();	UT	SEEd Standards	Grade 7	7.4.1	Develop and use a model to explain the effects that different types of reproduction have on genetic variation. Emphasize genetic variation through asexual and sexual reproduction.
[Predicting Natural Disasters]();	UT	SEEd Standards	Grade 7	7.2.3	Ask questions to identify constraints of specific geologic hazards and evaluate competing design solutions for maintaining the stability of human-engineered structures, such as homes, roads, and bridges. Examples of geologic hazards could include earthquakes, landslides, or floods.

[Plant & Animal Cells](#);	UT	SEEd Standards	Grade 7	7.3.1	Plan and carry out an investigation that provides evidence that the basic structures of living things are cells. Emphasize that cells can form single-celled or multicellular organisms, and multicellular organisms are made of different types of cells.
[Plant & Animal Cells](#);	UT	SEEd Standards	Grade 7	7.3.2	Develop and use a model to describe the function of a cell in living systems and the way parts of cells contribute to cell function. Emphasize the cell as a system, including the interrelating roles of the nucleus, chloroplasts, mitochondria, cell membrane, and cell wall.
[Newton's Laws of Motion](#);	UT	SEEd Standards	Grade 7	7.1.1	Carry out an investigation which provides evidence that a change in an object's motion is dependent on the mass of the object and the sum of the forces acting on it. Various experimental designs should be evaluated to determine how well the investigation measures an object's motion. Emphasize conceptual understanding of Newton's First and Second Laws. Calculations will only focus on one-dimensional movement; the use of vectors will be introduced in high school.
[Newton's Laws of Motion](#);	UT	SEEd Standards	Grade 7	7.1.2	Apply Newton's Third Law to design a solution to a problem involving the motion of two colliding objects in a system. Examples could include collisions between two moving objects or between a moving object and a stationary object.
[Natural Selection](#);	UT	SEEd Standards	Grade 7	7.4.2	Obtain, evaluate, and communicate information about specific animal and plant adaptations and structures that affect the probability of successful reproduction. Examples of adaptations could include nest building to protect young from the cold, herding of animals to protect young from predators, vocalization of animals and colorful plumage to attract mates for breeding, bright flowers attracting butterflies that transfer pollen, flower nectar and odors that attract insects that transfer pollen, or hard shells on nuts that squirrels bury.
[Natural Selection](#);	UT	SEEd Standards	Grade 7	7.5.1	Construct an explanation that describes how the genetic variation of traits in a population can affect some individuals' probability of surviving and reproducing in a specific environment. Over time, specific traits may increase or decrease in populations. Emphasize the use of proportional reasoning to support explanations of trends in changes to populations over time. Examples could include camouflage, variation of body shape, speed and agility, or drought tolerance.

Multicellular Organisms;	UT	SEEd Standards	Grade 7	7.3.3	Construct an explanation using evidence to explain how body systems have various levels of organization. Emphasize understanding that cells form tissues, tissues form organs, and organs form systems specialized for particular body functions. Examples could include relationships between the circulatory, excretory, digestive, respiratory, muscular, skeletal, or nervous systems. Specific organ functions will be taught at the high school level.
Gravitational Forces Between Objects;	UT	SEEd Standards	Grade 7	7.1.5	Engage in argument from evidence to support the claim that gravitational interactions within a system are attractive and dependent upon the masses of interacting objects. Examples of evidence for arguments could include mathematical data generated from various simulations.
Genes & Mutations;	UT	SEEd Standards	Grade 7	7.4.3	Develop and use a model to describe why genetic mutations may result in harmful, beneficial, or neutral effects to the structure and function of the organism. Emphasize the conceptual idea that changes to traits can happen because of genetic mutations. Specific changes of genes at the molecular level, mechanisms for protein synthesis, and specific types of mutations will be introduced at the high school level.
Electric & Magnetic Fields;	UT	SEEd Standards	Grade 7	7.1.3	Construct a model using observational evidence to describe the nature of fields existing between objects that exert forces on each other even though the objects are not in contact. Emphasize the cause and effect relationship between properties of objects (such as magnets or electrically charged objects) and the forces they exert.
Electric & Magnetic Fields;	UT	SEEd Standards	Grade 7	7.1.4	Collect and analyze data to determine the factors that affect the strength of electric and magnetic forces. Examples could include electromagnets, electric motors, or generators. Examples of data could include the effect of the number of turns of wire on the strength of an electromagnet, or of increasing the number or strength of magnets on the speed of an electric motor.
Comparative Anatomy;	UT	SEEd Standards	Grade 7	7.5.3	Construct explanations that describe the patterns of body structure similarities and differences within modern organisms and between ancient and modern organisms to infer possible evolutionary relationships.

Comparative Anatomy;	UT	SEEd Standards	Grade 7	7.5.4	Analyze data to compare patterns in the embryological development across multiple species to identify similarities and differences not evident in the fully formed anatomy.
Biotechnology;	UT	SEEd Standards	Grade 7	7.4.4	Obtain, evaluate, and communicate information about the technologies that have changed the way humans affect the inheritance of desired traits in organisms. Analyze data from tests or simulations to determine the best solution to achieve success in cultivating selected desired traits in organisms. Examples could include artificial selection, genetic modification, animal husbandry, or gene therapy.
Not currently covered.	UT	SEEd Standards	Grade 7	7.2.4	Develop and use a scale model of the matter in the Earth's interior to demonstrate how differences in density and chemical composition (silicon, oxygen, iron, and magnesium) cause the formation of the crust, mantle, and core.
Wave Reflection, Absorption & Transmittance;	UT	SEEd Standards	Grade 8	8.2.4	Use computational thinking to describe a simple model for waves that shows the pattern of wave amplitude being related to wave energy. Emphasize describing waves with both quantitative and qualitative thinking. Examples could include using graphs, charts, computer simulations, or physical models to demonstrate amplitude and energy correlation.
Wave Reflection, Absorption & Transmittance;	UT	SEEd Standards	Grade 8	8.2.5	Develop and use a model to describe the structure of waves and how they are reflected, absorbed, or transmitted through various materials. Emphasize both light and mechanical waves. Examples could include drawings, simulations, or written descriptions of light waves through a prism; mechanical waves through gas vs. liquids vs. solids; or sound waves through different mediums.
Synthetic Materials;	UT	SEEd Standards	Grade 8	8.1.4	Obtain and evaluate information to describe how synthetic materials come from natural resources, what their functions are, and how society uses these new materials. Examples of synthetic materials could include medicine, foods, building materials, plastics, or alternative fuels.
Properties of Elements;	UT	SEEd Standards	Grade 8	8.1.2	Obtain information about various properties of matter, evaluate how different materials' properties allow them to be used for particular functions in society, and communicate your

					findings. Emphasize general properties of matter. Examples could include color, density, flammability, hardness, malleability, odor, ability to rust, solubility, state, or the ability to react with water.
Predicting Natural Disasters;	UT	SEEd Standards	Grade 8	8.4.5	Analyze and interpret patterns of the occurrence of natural hazards to forecast future catastrophic events, and investigate how data are used to develop technologies to mitigate their effects. Emphasize how some natural hazards, such as volcanic eruptions and severe weather, are preceded by phenomena that allow prediction, but others, such as earthquakes, may occur without warning.
Potential vs. Kinetic Energy;	UT	SEEd Standards	Grade 8	8.2.1	Use computational thinking to analyze data about the relationship between the mass and speed of objects and the relative amount of kinetic energy of the objects. Emphasis should be on the quantity of mass and relative speed to the observable effects of the kinetic energy. Examples could include a full cart vs. an empty cart or rolling spheres with different masses down a ramp to measure the effects on stationary masses. Calculations of kinetic and potential energy will be learned at the high school level.
Potential vs. Kinetic Energy;	UT	SEEd Standards	Grade 8	8.2.2	Ask questions about how the amount of potential energy varies as distance within the system changes. Plan and conduct an investigation to answer a question about potential energy. Emphasize comparing relative amounts of energy. Examples could include a cart at varying positions on a hill or an object being dropped from different heights. Calculations of kinetic and potential energy will be learned at the high school level.
Photosynthesis & Respiration;	UT	SEEd Standards	Grade 8	8.3.1	Plan and conduct an investigation and use the evidence to construct an explanation of how photosynthetic organisms use energy to transform matter. Emphasize molecular and energy transformations during photosynthesis.
Newton's Laws of Motion; Potential vs. Kinetic Energy;	UT	SEEd Standards	Grade 8	8.2.3	Engage in argument to identify the strongest evidence that supports the claim that the kinetic energy of an object changes as energy is transferred to or from the object. Examples could include observing temperature changes as a result of friction, applying force to an object, or releasing potential energy from an object.

[Natural Resource Distribution]();	UT	SEEd Standards	Grade 8	8.4.1	Construct a scientific explanation based on evidence that shows that the uneven distribution of Earth's mineral, energy, and groundwater resources is caused by geological processes. Examples of uneven distribution of resources could include Utah's unique geologic history that led to the formation and irregular distribution of natural resources like copper, gold, natural gas, oil shale, silver, or uranium.
[Intro to Thermal Energy]();	UT	SEEd Standards	Grade 8	8.1.5	Develop a model that uses computational thinking to illustrate cause and effect relationships in particle motion, temperature, density, and state of a pure substance when heat energy is added or removed. Emphasize molecular-level models of solids, liquids, and gases to show how adding or removing heat energy can result in phase changes, and focus on calculating the density of a substance's state.
[Intro to Thermal Energy]();	UT	SEEd Standards	Grade 8	8.1.7	Design, construct, and test a device that can affect the rate of a phase change. Compare and identify the best characteristics of competing devices and modify them based on data analysis to improve the device to better meet the criteria for success.
[Intro to Climate Change]();	UT	SEEd Standards	Grade 8	8.4.4	Analyze and interpret data on the factors that change global temperatures and their effects on regional climates. Examples of factors could include agricultural activity, changes in solar radiation, fossil fuel use, or volcanic activity. Examples of data could include graphs of the atmospheric levels of gases, seawater levels, ice cap coverage, human activities, or maps of global and regional temperatures.
[Human Impacts on the Environment]();	UT	SEEd Standards	Grade 8	8.4.2	Engage in argument supported by evidence about the effect of per capita consumption of natural resources on Earth's systems. Emphasize that these resources are limited and may be non-renewable. Examples of evidence include rates of consumption of food and natural resources such as freshwater, minerals, or energy sources.
[Human Impacts on the Environment]();	UT	SEEd Standards	Grade 8	8.4.3	Design a solution to monitor or mitigate the potential effects of the use of natural resources. Evaluate competing design solutions using a systematic process to determine how well each solution meets the criteria and constraints of the problem. Examples of uses of the natural environment could include agriculture, conservation efforts, recreation, solar energy, or water management.

Food Webs: Cycling of Matter & Flow of Energy;	UT	SEEd Standards	Grade 8	8.3.2	Develop a model to describe how food is changed through chemical reactions to form new molecules that support growth and/or release energy as matter cycles through an organism. Emphasize describing that during cellular respiration molecules are broken apart and rearranged into new molecules, and that this process releases energy.
Food Webs: Cycling of Matter & Flow of Energy;	UT	SEEd Standards	Grade 8	8.3.3	Ask questions to obtain, evaluate, and communicate information about how changes to an ecosystem affect the stability of cycling matter and the flow of energy among living and nonliving parts of an ecosystem. Emphasize describing the cycling of matter and flow of energy through the carbon cycle.
Digital vs. Analog Signals;	UT	SEEd Standards	Grade 8	8.2.6	Obtain and evaluate information to communicate the claim that the structure of digital signals are a more reliable way to store or transmit information than analog signals. Emphasize the basic understanding that waves can be used for communication purposes. Examples could include using vinyl record vs. digital song files, film cameras vs. digital cameras, or alcohol thermometers vs. digital thermometers.
Chemical Reactions;	UT	SEEd Standards	Grade 8	8.1.3	Plan and conduct an investigation and then analyze and interpret the data to identify patterns in changes in a substance's properties to determine whether a chemical reaction has occurred. Examples could include changes in properties such as color, density, flammability, odor, solubility, or state.
Chemical Reactions;	UT	SEEd Standards	Grade 8	8.1.6	Develop a model to describe how the total number of atoms does not change in a chemical reaction, indicating that matter is conserved. Emphasize demonstrations of an understanding of the law of conservation of matter. Balancing equations and stoichiometry will be learned at the high school level.
Atoms & Molecules;	UT	SEEd Standards	Grade 8	8.1.1	Develop a model to describe the scale and proportion of atoms and molecules. Emphasize developing atomic models of elements and their numbers of protons, neutrons, and electrons, as well as models of simple molecules. Topics like valence electrons, bond energy, ionic complexes, ions, and isotopes will be introduced at the high school level.