

# Mystery Science Alignment with Utah Science Standards



**Mystery Science is a hands-on curriculum that aligns with the Utah Science Standards (2020).**

Mystery Science's units of study contain:

- Hands-on, easy-prep activities with EVERY lesson
- Engaging, real-world investigative phenomena
- Thoughtful discussions to build background knowledge
- Lesson & unit assessments to evaluate comprehension
- Curated, cross-curricular extensions

**Mystery Science also offers the Anchor Layer**, which enriches the unit with an anchor phenomenon, incorporates anchor connections after each lesson, & concludes the unit with a performance task.

### Kindergarten

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### 1st Grade

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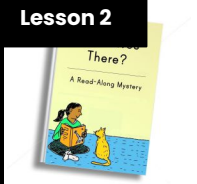
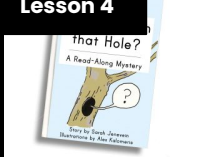
### 4th Grade

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| <b>Life Science</b>              | <b>Page 26</b> |
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### 5th Grade

|                                           |                |
|-------------------------------------------|----------------|
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## Animal Needs (Animal Secrets)

|                                                                                                      | Topic & Guiding Question                                                                                   | Student Objectives                                                                                                                                                           | Utah Science Standards (2020)                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
|------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Lesson 1</b><br>  | <b>Animal Needs: Food</b><br>Why do woodpeckers peck wood?                                                 | Students obtain information through virtual observations of different animal behaviors. They use this evidence to explain that one of the basic needs of animals is food.    | <b>K.2.1</b> Obtain, evaluate, and communicate information to describe patterns of what living things (plants and animals, including humans) need to survive.<br>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.                                                                            |
| <b>Lesson 2</b><br>  | <b>Animal Needs: Shelter Read-Along</b><br>Where do animals live?                                          | Students obtain information through media about how different animal homes are built. They use this evidence to explain that animals need shelter.                           | <b>K.2.2</b> 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.<br>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. |
| <b>Lesson 3</b><br>  | <b>Animal Needs: Safety</b><br>How can you find animals in the woods?                                      | Students obtain information through virtual observations of different animal behaviors. They use this evidence to explain that one of the basic needs of animals is shelter. | <b>K.2.1</b> Obtain, evaluate, and communicate information to describe patterns of what living things (plants and animals, including humans) need to survive.<br>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.                                                                            |
| <b>Lesson 4</b><br> | <b>Animals &amp; Changing the Environment Read-Along</b><br>How do animals make their homes in the forest? | Students take a nature walk to look for evidence of animal homes.                                                                                                            | <b>K.2.3</b> Obtain, evaluate, and communicate information about how living things (plants and animals, including humans) affect their surroundings to survive.<br>Examples could include squirrels digging in the ground to hide their food, plant roots breaking concrete, or humans building shelters.                                                                                                                                                                                 |

## Plant Needs (Plant Secrets)

|                                                                                                       | Topic & Guiding Question                                                                                        | Student Objectives                                                                                                                                                                                 | Utah Science Standards (2020)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
|-------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Lesson 1</b><br>  | <b>Living &amp; Nonliving</b><br>Are plants alive?                                                              | Students make observations of plants in order to identify their needs and that they are, in fact, living things.                                                                                   | <p><b>K.2.4</b> 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. <i>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.</i></p> <p><b>K.2.1</b> 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.</p> |
| <b>Lesson 2</b><br>  | <b>Plant Needs: Water &amp; Light</b><br>How do plants and trees grow?                                          | Students investigate to determine the basic needs of plants. They observe to identify ways young plants resemble the parent plant and how the plant changes as it proceeds through its life cycle. | <p><b>K.2.1</b> 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.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
| <b>Lesson 3</b><br> | <b>Human Impacts on the Environment</b><br><b>Read-Along</b><br>Why would you want an old log in your backyard? | Students obtain evidence of living organisms by virtually keeping watch of a log and the living things that visit it.                                                                              | <p><b>K.2.1</b> 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.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |



## Severe Weather (Wild Weather)

|                                                                                                      | Topic & Guiding Question                                                                         | Student Objectives                                                                                                                                                                                         | Utah Science Standards (2020)                                                                                                                                                                                                                                                                       |
|------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Lesson 1</b><br>  | <b>Severe Weather &amp; Preparation Read-Along</b><br><br>How can you get ready for a big storm? | Students obtain information of different types of severe weather to observe and describe how the weather changes during these events and what students can do to prepare and stay safe.                    | <b>K.1.2</b> 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. |
| <b>Lesson 2</b><br>  | <b>Wind &amp; Storms</b><br><br>Have you ever watched a storm?                                   | Students create a simple tool that allows them to observe how hard the wind is blowing. They use this tool to observe weather changes and describe the pattern of faster wind speeds right before a storm. | <b>K.1.2</b> 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. |
| <b>Lesson 3</b><br> | <b>Weather Conditions</b><br><br>How many different kinds of weather are there?                  | Students obtain information through observations of the weather. They communicate the information by acting as weather watchers and creating drawings of the weather conditions.                           | <b>K.1.1</b> 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.                            |

## Weather Patterns (Circle of Seasons)

|                                                                                                      | Topic & Guiding Question                                                                      | Student Objectives                                                                                                                                                                                  | Utah Science Standards (2020)                                                                                                                                                                                                                                                                          |
|------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Lesson 1</b><br> | <b>Daily Weather Patterns Read-Along</b><br><br>How do you know what to wear for the weather? | Students track the weather daily and analyze the data by collecting, recording, and sharing their observations to observe patterns of weather changing throughout the day and from day-to-day.      | <b>K.1.1</b> 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.                               |
| <b>Lesson 2</b><br> | <b>Seasonal Weather Patterns</b><br><br>What will the weather be like on your birthday?       | Students evaluate information in a series of unnamed drawings of each season. They use these clues to identify characteristics of each season and describe the yearly cyclical pattern.             | <b>K.1.1</b> 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.                               |
| <b>Lesson 3</b><br> | <b>Animals Changing Their Environment</b><br><br>Why do birds lay eggs in the spring?         | Students identify the reasons why birds lay eggs in the spring. Then, they develop a bird nest model and use this model as evidence for how animals can change the environment to meet their needs. | <b>K.2.3</b> 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. |

## Sunlight & Warmth (Sunny Skies)

|                                                                                                       | Topic & Guiding Question                                                                                                                  | Student Objectives                                                                                                                                                                                                         | Utah Science Standards (2020)                                                                                                                                                                                                                                                                              |
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| <b>Lesson 1</b><br>  | <b>Sunlight, Heat, &amp; Earth's Surface Read-Along</b><br><br>How could you walk barefoot across hot pavement without burning your feet? | Students make observations of the pavement heating up after being warmed by the Sun. Then, they design a solution to build a shade structure that can reduce the warming effect of sunlight.                               | <b>K.1.4</b> Design a solution that will reduce the warming effect of sunlight on an area.<br><i>Define the problem by asking questions and gathering information, convey designs through sketches, drawings, or physical models, and compare and test designs.</i>                                        |
| <b>Lesson 2</b><br>  | <b>Sunlight, Warming, &amp; Engineering</b><br><br>How could you warm up a frozen playground?                                             | Students carry out an investigation to test which materials can redirect the light and heat of sunlight. (*This lesson has students increase the warming effect of sunlight on an area.)                                   | <b>K.1.4</b> Design a solution that will reduce the warming effect of sunlight on an area.<br><i>Define the problem by asking questions and gathering information, convey designs through sketches, drawings, or physical models, and compare and test designs.</i>                                        |
| <b>Lesson 3</b><br> | <b>Sunlight &amp; Warmth</b><br><br>Why does it get cold in winter?                                                                       | Students construct an explanation for why marshmallows melt in one car and not in another car. Then, they conduct a virtual investigation to determine that the warmth of the Sun is the cause of the melted marshmallows. | <b>K.1.3</b> Carry out an investigation using the five senses, to determine the effect of sunlight on different surfaces and materials.<br><i>Examples could include measuring temperature, through touch or other methods, on natural and man-made materials in various locations throughout the day.</i> |

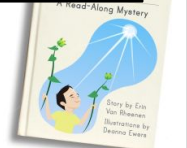
## Pushes & Pulls (Force Olympics)

|                                                                                                        | Topic & Guiding Question                                                                               | Student Objectives                                                                                                                                                         | Utah Science Standards (2020)                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
|--------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Lesson 1</b><br>   | <b>Pushes &amp; Pulls</b><br>What's the biggest excavator?                                             | Students observe different machines and use those observations as evidence for why machines make work easier.                                                              | <b>Foundational for K.3.1</b> Plan and conduct an investigation to compare the effects of different strengths or different directions of forces on the motion of an object.<br>Emphasize forces as a push or 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.                                                                                     |
| <b>Lesson 2</b><br>   | <b>Pushes, Pulls, &amp; "Work Words" Read-Along</b><br>Why do builders need so many big machines?      | Students observe construction equipment being used in different ways to move objects.                                                                                      | <b>Foundational for K.3.1</b> Plan and conduct an investigation to compare the effects of different strengths or different directions of forces on the motion of an object.<br>Emphasize forces as a push or 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.                                                                                     |
| <b>Lesson 3</b><br>   | <b>★ Strength of Pushes &amp; Pulls</b><br>How can you knock down a heavy wall?                        | Students carry out an investigation to determine the strength of a model wrecking ball's push needed to knock down a wall, but not the houses behind it.                   | <b>K.3.1</b> Plan and conduct an investigation to compare the effects of different strengths or different directions of forces on the motion of an object.<br>Emphasize forces as a push or 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.                                                                                                      |
| <b>Lesson 4</b><br>  | <b>Speed &amp; Direction of Force Read-Along</b><br>How can you knock down the most bowling pins?      | Students play a game of bumper bowling to observe the way that objects can move in straight lines, zigzags, and back and forth.                                            | <b>K.3.2</b> 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.<br><i>Define the problem by asking questions and gathering information, convey designs through sketches, drawings, or physical models, and compare and test designs.</i><br>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. |
| <b>Lesson 5</b><br> | <b>Direction of Motion &amp; Engineering</b><br>How can we protect a mountain town from falling rocks? | Students conduct an investigation of how to protect a town from a falling boulder. They design a solution to safely guide the direction of the boulder away from the town. | <b>K.3.2</b> 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.<br><i>Define the problem by asking questions and gathering information, convey designs through sketches, drawings, or physical models, and compare and test designs.</i><br>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. |
| <b>Lesson 6</b><br> | <b>Forces &amp; Engineering Read-Along</b><br>How could you invent a trap?                             | Students define a problem they would like to solve and then design a solution using what they know about the locations of objects and how they can move.                   | <b>K.3.2</b> 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.<br><i>Define the problem by asking questions and gathering information, convey designs through sketches, drawings, or physical models, and compare and test designs.</i><br>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. |

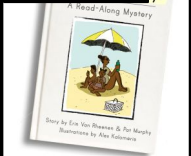
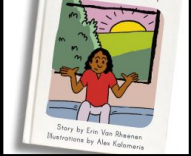
## Animal Traits & Survival (Animal Superpowers)

|                                                                                                        | Topic & Guiding Question                                                                      | Student Objectives                                                                                                                                                                                                                                 | Utah Science Standards (2020)                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
|--------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Lesson 1</b><br>   | <b>Parent &amp; Offspring Traits</b><br>How can you help a lost baby animal find its parents? | Students observe the traits of adult and baby animals in order to construct an explanation that most young animals are like, but not exactly like, their parents.                                                                                  | <b>1.2.3</b> Obtain, evaluate, and communicate information about the patterns of plants and nonhuman animals that are alike, but not exactly like, their parents.<br>An example could include that most carrots are orange and shaped like a cone but may be different sizes or have differing tastes.                                                                                                                                                                                        |
| <b>Lesson 2</b><br>   | <b>Offspring Trait Variation</b><br>Can you predict what an animal's babies will look like?   | Students observe the traits of parent and baby animals to construct an explanation that offspring look similar to their parents, but can also vary in many ways. They predict what a puppy might look like based on the traits of the parent dogs. | <b>1.2.3</b> Obtain, evaluate, and communicate information about the patterns of plants and nonhuman animals that are alike, but not exactly like, their parents.<br>An example could include that most carrots are orange and shaped like a cone but may be different sizes or have differing tastes.                                                                                                                                                                                        |
| <b>Lesson 3</b><br>  | <b>★ Parent &amp; Offspring Behavior</b><br>Why are baby birds so loud?                       | Students make observations to obtain information about the behaviors of animal parents and their offspring. They identify patterns in animal behaviors that help offspring survive.                                                                | <b>1.2.4</b> Construct an explanation of the patterns in the behaviors of parents and offspring which help offspring to survive.<br>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.                                                                                                                                |
| <b>Lesson 4</b><br> | <b>Animal Structures &amp; Survival</b><br>Why do birds have beaks?                           | Students investigate how different bird beaks are well suited for eating different kinds of food. They explain which beak would help a particular bird survive in a particular environment.                                                        | <b>1.2.2</b> Construct an explanation by observing patterns of external features of living things that survive in different locations.<br>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 more desert animals are awake at night. |
| <b>Lesson 5</b><br> | <b>Camouflage &amp; Animal Survival</b><br>Why are polar bears white?                         | Students use observations of animal parents and their offspring to construct an explanation about young plants and animals being similar, but not identical, to their parents.                                                                     | <b>1.2.2</b> Construct an explanation by observing patterns of external features of living things that survive in different locations.<br>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 more desert animals are awake at night. |

## Plant Traits & Survival (Plant Superpowers)

|                                                                                                                     | Topic & Guiding Question                                                                          | Student Objectives                                                                                                                                   | Utah Science Standards (2020)                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
|---------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Lesson 1</b><br>                 | <b>Plant Traits &amp; Offspring</b><br>What will a baby plant look like when it grows up?         | Students observe seedlings and adult plants and use their observations to identify the pattern that young plants are similar to their parent plants. | <b>1.2.3</b> Obtain, evaluate, and communicate information about the patterns of plants and nonhuman animals that are alike, but not exactly like, their parents.<br>An example could include that most carrots are orange and shaped like a cone but may be different sizes or have differing tastes.                                                                                                                                                                                                    |
| <b>Lesson 2</b><br>                 | <b>Plant Survival &amp; Engineering</b><br>Why don't trees blow down in the wind?                 | <i>Students learn how plants respond to light. They conduct an investigation to compare how the parts of a plant respond to light.</i>               | <b>2.2.4</b> 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. |
| Although this appears next on our site, we <b>recommend teaching this in 2nd grade</b> if following Utah Standards. |                                                                                                   |                                                                                                                                                      |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
| <b>Lesson 3</b><br>                | <b>Plant Movement &amp; Survival Read-Along</b><br>What do sunflowers do when you're not looking? | Students learn how plants respond to light. They conduct an investigation to compare how the parts of a plant respond to light.                      | <b>1.2.1</b> Plan and carry out an investigation to determine the effect of sunlight and water on plant growth.<br>Emphasize investigations that test one variable at a time.                                                                                                                                                                                                                                                                                                                             |

## Day Patterns (Sun & Shadows)

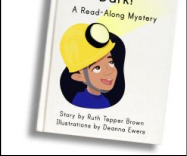
|                                                                                                        | Topic & Guiding Question                                                                                  | Student Objectives                                                                                                                                                                                                                         | Utah Science Standards (2020)                                                                                                                                                                                                                                                                                                                                                                 |
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| <b>Lesson 1</b><br>   | <b>Sun, Shadows, &amp; Daily Patterns</b><br>Could a statue's shadow move?                                | Students observe how shadows change as time passes, or as the Sun moves across the sky. They analyze how to move a light source to change the shape and direction of shadows, constructing an explanation of what causes a shadow to move. | <b>1.1.3</b> Design a device that measures the varying patterns of daylight. <i>Define the problem by asking questions and gathering information, convey designs through sketches, drawings, or physical models, and compare and test designs.</i> Examples could include sundials for telling time or tracking the movement of shadows throughout the day.                                   |
| <b>Lesson 2</b><br>   | <b>Sun, Shadows, &amp; Daily Patterns Read-Along</b><br>What does your shadow do when you're not looking? | Students conduct an investigation to gather information about how their shadow changes throughout the day.                                                                                                                                 | <b>1.1.3</b> Design a device that measures the varying patterns of daylight. <i>Define the problem by asking questions and gathering information, convey designs through sketches, drawings, or physical models, and compare and test designs.</i> Examples could include sundials for telling time or tracking the movement of shadows throughout the day.                                   |
| <b>Lesson 3</b><br>  | <b>Sun &amp; Daily Patterns</b><br>How can the Sun help you if you're lost?                               | Students develop a Sun Finder, a model of the Sun's movement across the sky. They use this model to reason about how the Sun can help guide them during the day.                                                                           | <b>1.1.1</b> Obtain, evaluate, and communicate information about the movement of the Sun, Moon, and stars to describe predictable patterns. <i>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.</i>                                |
| <b>Lesson 4</b><br> | <b>Daylight &amp; Seasonal Patterns Read-Along</b><br>Why do you have to go to bed early in the summer?   | Students obtain information about the seasonal patterns of sunrise and sunset.                                                                                                                                                             | <b>1.1.2</b> 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. <i>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.</i> |



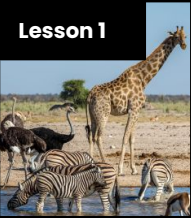
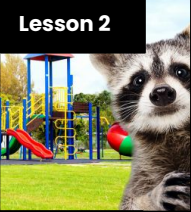
## Night Patterns (Moon & Stars)

|                                                                                                      | Topic & Guiding Question                                                                   | Student Objectives                                                                                                                                                                                                                                                 | Utah Science Standards (2020)                                                                                                                                                                                                                                                                                                                              |
|------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Lesson 1</b><br> | <b>Moon Phases &amp; Patterns</b><br>When can you see the full moon?                       | Students record observations of the Moon's shape using a series of photos collected over the course of four weeks. Using this information, students discover that the Moon follows a cyclical pattern, which they can use to predict when a full moon will appear. | <b>1.1.1</b> Obtain, evaluate, and communicate information about the movement of the Sun, Moon, and stars to describe predictable patterns.<br>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. |
| <b>Lesson 2</b><br> | <b>Stars &amp; Daily Patterns</b><br>Why do stars come out at night?                       | Students develop and use a model of the Big Dipper in the night sky. After conducting a simple investigation, students construct an explanation for why stars are only visible in the night sky.                                                                   | <b>1.1.1</b> Obtain, evaluate, and communicate information about the movement of the Sun, Moon, and stars to describe predictable patterns.<br>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. |
| <b>Lesson 3</b><br> | <b>Stars &amp; Seasonal Patterns Read-Along</b><br>How can stars help you if you get lost? | Students observe that groups of stars in the sky form a pattern: constellations. Even though the Big Dipper changes its spot in the sky in different seasons, it always points to the North Star.                                                                  | <b>1.1.1</b> Obtain, evaluate, and communicate information about the movement of the Sun, Moon, and stars to describe predictable patterns.<br>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. |

## Light, Sound, & Communication (Lights & Sounds)

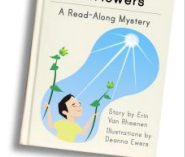
|                                                                                                       | Topic & Guiding Question                                                                                   | Student Objectives                                                                                                                                                                                                                                                        | Utah Science Standards (2020)                                                                                                                                                                                                                                                                                                                                                                                                                           |
|-------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Lesson 1</b><br>   | <b>Sounds &amp; Vibrations</b><br>How do they make silly sounds in cartoons?                               | Students explore how to make different sounds with everyday objects. They construct an explanation that objects vibrate when they make a sound, and if the vibration stops, the sound stops.                                                                              | <b>1.3.1</b> Plan and carry out an investigation to show the cause and effect relationship between sound and vibrating matter.<br>Emphasize that vibrating matter can make sound and that sound can make matter vibrate.                                                                                                                                                                                                                                |
| <b>Lesson 2</b><br>   | <b>Sounds &amp; Vibrations Read-Along</b><br>Where do sounds come from?                                    | Students create three different sound makers and construct an explanation about where the vibrations are happening in each sound experiment.                                                                                                                              | <b>1.3.1</b> Plan and carry out an investigation to show the cause and effect relationship between sound and vibrating matter.<br>Emphasize that vibrating matter can make sound and that sound can make matter vibrate.                                                                                                                                                                                                                                |
| <b>Lesson 3</b><br>   | <b>Light, Materials, Transparent &amp; Opaque</b><br>What if there were no windows?                        | Students investigate the properties of different materials that they can and cannot see through. Then they create a stained glass window using tissue paper to explore how materials interact with light.                                                                 | <b>1.3.3</b> Plan and carry out an investigation to determine the effect of materials in the path of a beam of light.<br>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.                                                                                             |
| <b>Lesson 4</b><br>  | <b>Light &amp; Illumination Read-Along</b><br>Can you see in the dark?                                     | Students look inside a completely dark box to determine if they can see the shape of the object inside. They allow more light into the box to illuminate the object and allow them to see it. Students use their observations explain that objects need light to be seen. | <b>1.3.2</b> Use a model to show the effect of light on objects.<br>Emphasize that objects can be seen when light is available to illuminate them or if they give off their own light.                                                                                                                                                                                                                                                                  |
| <b>Lesson 5</b><br> | <b>Light, Communication, &amp; Engineering</b><br>How could you send a secret message to someone far away? | Students are presented with the problem that they need to send a message at night, without using noise. They design a solution to create a color-coded message system and communicate with light signals.                                                                 | <b>1.3.4</b> Design a device in which the structure of the device uses light or sound to solve the problem of communicating over a distance.<br><i>Define the problem by asking questions and gathering information, convey designs through sketches, drawings, or physical models, and compare and test designs.</i><br>Examples of devices could include a light source to send signals, paper-cup-and-string telephones, or a pattern of drum beats. |
| <b>Lesson 6</b><br> | <b>Lights, Sounds, &amp; Communication Read-Along</b><br>How do boats find their way in the fog?           | Students obtain information about light and sound signals. They analyze different sounds with eyes closed to determine which type of sound they hear.                                                                                                                     | <b>1.3.2</b> Use a model to show the effect of light on objects.<br>Emphasize that objects can be seen when light is available to illuminate them or if they give off their own light.                                                                                                                                                                                                                                                                  |

## Animal Biodiversity & Habitats (Animal Adventures)

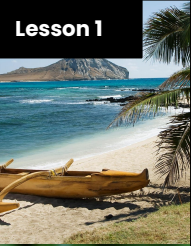
|                                                                                                        | Topic & Guiding Question                                                                      | Student Objectives                                                                                                                                                                     | Utah Science Standards (2020)                                                                                                                                                                                                                                                                                                                                                                             |
|--------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Lesson 1</b><br>   | <b>Biodiversity &amp; Classification</b><br>How many different kinds of animals are there?    | Students observe the traits of different animals and use that information to organize them into groups based on their characteristics.                                                 | <b>Foundational for 2.2.1</b> Obtain, evaluate, and communicate information about patterns of living things (plants and animals, including humans) in different habitats.<br>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. |
| <b>Lesson 2</b><br>   | <b>Habitat Diversity</b><br>Why would a wild animal visit a playground?                       | Students observe animals, plants, and the physical characteristics of two different habitats. They collect and analyze data to compare the biodiversity between the two habitats.      | <b>2.2.1</b> Obtain, evaluate, and communicate information about patterns of living things (plants and animals, including humans) in different habitats.<br>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.                  |
| <b>Lesson 3</b><br>  | <b>Biodiversity, Habitats, &amp; Species</b><br>Why do frogs say "ribbit"?                    | Students identify frogs based on their unique calls and use that information to determine the level of frog species diversity within multiple habitats.                                | <b>2.2.1</b> Obtain, evaluate, and communicate information about patterns of living things (plants and animals, including humans) in different habitats.<br>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.                  |
| <b>Lesson 4</b><br> | <b>Biodiversity &amp; Engineering</b><br>How could you get more birds to visit a bird feeder? | Students investigate which kinds of birds are likely to visit a bird feeder based on what they eat and design and build a prototype bird feeder that attracts a specific type of bird. | <b>2.2.1</b> Obtain, evaluate, and communicate information about patterns of living things (plants and animals, including humans) in different habitats.<br>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.                  |

## Plant Traits & Survival (Plant Superpowers)

*This unit is found under 1st grade on our site, but we recommend teaching Lesson 2 in 2nd grade if you are following Utah Standards.*

|                                                                                                                     | Topic & Guiding Question                                                                          | Student Objectives                                                                                                                                          | Utah Science Standards (2020)                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
|---------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Lesson 1</b><br>                | <b>Plant Traits &amp; Offspring</b><br>What will a baby plant look like when it grows up?         | <i>Students observe seedlings and adult plants and use their observations to identify the pattern that young plants are similar to their parent plants.</i> | <b>1.2.3</b> Obtain, evaluate, and communicate information about the patterns of plants and nonhuman animals that are alike, but not exactly like, their parents.<br><i>An example could include that most carrots are orange and shaped like a cone but may be different sizes or have differing tastes.</i>                                                                                                                                                                                             |
| Although this appears next on our site, we <b>recommend teaching this in 1st grade</b> if following Utah Standards. |                                                                                                   |                                                                                                                                                             |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
| <b>Lesson 2</b><br>                | <b>Plant Survival &amp; Engineering</b><br>Why don't trees blow down in the wind?                 | <i>Students learn how plants respond to light. They conduct an investigation to compare how the parts of a plant respond to light.</i>                      | <b>2.2.4</b> 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. |
| <b>Lesson 3</b><br>              | <b>Plant Movement &amp; Survival Read-Along</b><br>What do sunflowers do when you're not looking? | <i>Students learn how plants respond to light. They conduct an investigation to compare how the parts of a plant respond to light.</i>                      | <b>1.2.1</b> Plan and carry out an investigation to determine the effect of sunlight and water on plant growth.<br><i>Emphasize investigations that test one variable at a time.</i>                                                                                                                                                                                                                                                                                                                      |
| Although this appears next on our site, we <b>recommend teaching this in 1st grade</b> if following Utah Standards. |                                                                                                   |                                                                                                                                                             |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |

## Plant Growth & Interactions (Plant Adventures)

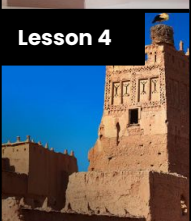
|                                                                                                        | Topic & Guiding Question                                                           | Student Objectives                                                                                                                                                             | Utah Science Standards (2020)                                                                                                                                                                                                                                                                                                                                          |
|--------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Lesson 1</b><br>   | <b>Seed Dispersal</b><br>How did a tree travel halfway around the world?           | Students develop physical models of seed structures. They observe how structure affects the seed's function in dispersing away from the tree.                                  | <b>Foundational for 2.2.3</b> 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. |
| <b>Lesson 2</b><br>   | <b>Animal Seed Dispersal</b><br>Why do seeds have so many different shapes?        | Students develop a model of a furry animal and then use it to test how far seed models with different structures can travel.                                                   | <b>2.2.3</b> 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.                  |
| <b>Lesson 3</b><br>  | <b>★ Pollination</b><br>Why do you find flowers and bees together?                 | Students develop a model of a flower and a model of a fuzzy bee. They use these models to demonstrate how animals help pollinate plants.                                       | <b>2.2.3</b> 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.                  |
| <b>Lesson 4</b><br> | <b>Water, Sunlight, &amp; Plant Growth</b><br>Could a plant survive without light? | Students conduct an investigation to determine that plants need water and light to grow.                                                                                       | <b>2.2.2</b> 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.                |
| <b>Lesson 5</b><br> | <b>Plant Needs &amp; Habitats</b><br>How much water should you give a plant?       | Students plan and conduct a series of virtual experiments in order to determine how much water and sunlight a set of mystery plants need in order to stay healthy and survive. | <b>2.2.2</b> 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.                |

**Erosion & Earth's Surface** (Work of Water) • Page 1 of 2

|                                                                                                        | Topic & Guiding Question                                                                       | Student Objectives                                                                                                                                                                                                  | Utah Science Standards (2020)                                                                                                                                                                                                                                                                                                                                                                           |
|--------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Lesson 1</b><br>   | <b>Mapping Landforms &amp; Bodies of Water</b><br>Where's the best place to hide a treasure?   | Students develop a model (a map) of different landforms and bodies of water in a given location based on the shape of each feature.                                                                                 | <b>2.1.1</b> Develop and use models illustrating the patterns of landforms and water on Earth.<br><i>Examples of models could include valleys, canyons, or floodplains and could depict water in the solid or liquid state.</i>                                                                                                                                                                         |
| <b>Lesson 2</b><br>   | <b>Mapping: Mountains &amp; Rivers</b><br>If you floated down a river, where would you end up? | Students develop a model of the Earth's surface and use it to discover an important principle about how rivers work: rivers flow downhill, from high places to low places.                                          | <b>2.1.1</b> Develop and use models illustrating the patterns of landforms and water on Earth.<br><i>Examples of models could include valleys, canyons, or floodplains and could depict water in the solid or liquid state.</i>                                                                                                                                                                         |
| <b>Lesson 3</b><br>   | <b>Rocks, Sand, &amp; Erosion</b><br>Why is there sand at the beach?                           | Students investigate the effects of rocks tumbling in a river. Based on their observations, they construct an explanation for why rocks on the top of mountains are much bigger than the sand at the beach.         | <b>2.1.1</b> Develop and use models illustrating the patterns of landforms and water on Earth.<br><i>Examples of models could include valleys, canyons, or floodplains and could depict water in the solid or liquid state.</i>                                                                                                                                                                         |
| <b>Lesson 4</b><br>  | <b>Mapping &amp; Severe Weather</b><br>Where do flash floods happen?                           | Students use a model (i.e. a map) to examine the different factors, including the shapes and kinds of land, that contribute to flash floods. They use this to predict where flash floods are most likely to happen. | <b>2.1.2</b> Construct an explanation about the changes in Earth's surface that happen quickly or slowly.<br><i>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.</i>                                             |
| <b>Lesson 5</b><br> | <b>Erosion, Earth's Surface, &amp; Landforms</b><br>What's strong enough to make a canyon?     | Students create a model landform and investigate how some Earth events can occur quickly, while others occur slowly.                                                                                                | <b>2.EIU1.4</b> Observe and investigate how wind and water change the shape of the land resulting in a variety of landforms.                                                                                                                                                                                                                                                                            |
| <b>Lesson 6</b><br> | <b>Erosion &amp; Engineering</b><br>How can you stop a landslide?                              | Students compare multiple solutions for preventing erosion.                                                                                                                                                         | <b>2.1.3</b> Design solutions to slow or prevent wind or water from changing the shape of land.<br><i>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 include retaining walls, dikes, windbreaks, shrubs, trees, and grass to hold back wind, water, and land.</i> |



## Material Properties (Material Magic)

|                                                                                                       | Topic & Guiding Question                                                                               | Student Objectives                                                                                                                                                                                                                 | Utah Science Standards (2020)                                                                                                                                                                                                                                                                                                         |
|-------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Lesson 1</b><br>  | <b>Material Properties &amp; Engineering</b><br>Why do we wear clothes?                                | Students investigate different material properties, such as flexibility and absorbency, and use those properties to design and build a hat that protects them from the sun.                                                        | <b>2.3.2</b> Construct an explanation showing how the properties of materials influence their intended use and function.<br>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.                                    |
| <b>Lesson 2</b><br>  | <b>Classify Materials: Insulators &amp; Conductors</b><br>Can you really fry an egg on a hot sidewalk? | Students conduct an investigation of conductors and insulators in order to determine which are best suited for allowing people to handle hot items.                                                                                | <b>2.3.1</b> Plan and carry out an investigation to classify different kinds of materials based on patterns in their observable properties.<br>Examples could include sorting materials based on similar properties such as strength, color, flexibility, hardness, texture, or whether the materials are solids or liquids.          |
| <b>Lesson 3</b><br>  | <b>Material Building Blocks &amp; Engineering</b><br>Could you build a house out of paper?             | Students construct an evidence-based account of how a structure built of paper can be disassembled and rebuilt in new ways.                                                                                                        | <b>2.3.3</b> 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.<br>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. |
| <b>Lesson 4</b><br> | <b>Soil Properties</b><br>How do you build a city out of mud?                                          | Students conduct an investigation where they examine three different soil models. They use this information to determine which type of soil has the properties that will result in the best mud that can be used to build a house. | <b>2.3.1</b> Plan and carry out an investigation to classify different kinds of materials based on patterns in their observable properties.<br>Examples could include sorting materials based on similar properties such as strength, color, flexibility, hardness, texture, or whether the materials are solids or liquids.          |



## States of Matter (States of Matter)

|                                                                                                     | Topic & Guiding Question                                                                     | Student Objectives                                                                                                                                                                                             | Utah Science Standards (2020)                                                                                                                                                                                                                                   |
|-----------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Lesson 1</b><br> | <b>Liquid Water &amp; Solid Ice</b><br>Where do animals find the water they need?            | Students obtain information about the liquid water and solid ice that different animals utilize for their survival in the Arctic.                                                                              | <b>2.1.1</b> Develop and use models illustrating the patterns of landforms and water on Earth.<br>Examples of models could include valleys, canyons, or floodplains and could depict water in the solid or liquid state.                                        |
| <b>Lesson 2</b><br> | <b>Reversible &amp; Irreversible Changes</b><br>How is an ice cube like a crayon?            | Students observe the properties of different materials after being heated up and then cooled down. They use these observations to support the explanation that some changes are reversible and others are not. | <b>2.3.4</b> Obtain, evaluate, and communicate information about changes in matter caused by heating or cooling.<br>Emphasize that some changes can be reversed and some cannot. Examples of irreversible changes could include cooking an egg or burning wood. |
| <b>Lesson 3</b><br> | <b>Heating, Cooling, &amp; States of Matter</b><br>Why are so many toys made out of plastic? | Students construct an evidence- based account of how a structure built of paper can be disassembled and rebuilt in new ways.                                                                                   | <b>2.3.4</b> Obtain, evaluate, and communicate information about changes in matter caused by heating or cooling.<br>Emphasize that some changes can be reversed and some cannot. Examples of irreversible changes could include cooking an egg or burning wood. |

## Life Cycles (Circle of Life)

|                                                                                                        | Topic & Guiding Question                                                                       | Student Objectives                                                                                                                                                                                                     | Utah Science Standards (2020)                                                                                                                                                                                                                                                                                                                                                                                                                 |
|--------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Lesson 1</b><br>   | <b>Animal Life Cycles</b><br>How is your life like an alligator's life?                        | Students create models of several different animal life cycles and compare them to one another. They use these models to discover the pattern that all animals are born, grow, can have babies, and eventually die.    | <b>3.2.1</b> Develop and use models to describe changes that organisms go through during their life cycles.<br>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. |
| <b>Lesson 2</b><br>   | <b>Environmental Change &amp; Engineering</b><br>What's the best way to get rid of mosquitoes? | Students obtain and evaluate information about mosquitoes from different sources. They analyze and interpret information about the mosquito life cycle to reduce the number of mosquitoes that live in a certain area. | <b>3.2.6</b> 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.<br><i>Define the problem, identify criteria and constraints, and develop possible solutions.</i><br>Examples of environmental changes could include changes in land use, water availability, temperature, food, or changes caused by other organisms.                              |
| <b>Lesson 3</b><br>  | <b>Pollination &amp; Plant Reproduction</b><br>Why do plants grow flowers?                     | Students model the structure and function of flower parts that are responsible for creating seeds.                                                                                                                     | <b>3.2.1</b> Develop and use models to describe changes that organisms go through during their life cycles.<br>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. |
| <b>Lesson 4</b><br> | <b>Fruit, Seeds, &amp; Plant Reproduction</b><br>Why do plants give us fruit?                  | Students explore the function of fruits in plants and practice classification.                                                                                                                                         | <b>3.2.1</b> Develop and use models to describe changes that organisms go through during their life cycles.<br>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. |
| <b>Lesson 5</b><br> | <b>Plant Life Cycles</b><br>Why are there so many different kinds of flowers?                  | Students play a game that models the stages of the plant life cycle. After playing the game students use the model to show how changes to one part of the life cycle affect all other stages.                          | <b>3.2.1</b> Develop and use models to describe changes that organisms go through during their life cycles.<br>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. |

## Heredity, Survival, & Selection (Fates of Traits)

|                                                                                                        | Topic & Guiding Question                                                                                    | Student Objectives                                                                                                                                                                                                                                                                         | Utah Science Standards (2020)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
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| <b>Lesson 1</b><br>   | <b>Traits &amp; Inheritance</b><br>How do you identify a mysterious fruit?                                  | Students examine plant traits and use that information as evidence to help them identify an unknown fruit. They look for similarities and differences in the leaves, flowers, and fruits of plants to sort them into groups and identify patterns of inheritance.                          | <b>3.2.2</b> Analyze and interpret data to identify patterns of traits that plants and animals have inherited from parents.<br>Emphasize the similarities and differences in traits between parent organisms and offspring and variation of traits in groups of similar organisms.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| <b>Lesson 2</b><br>   | <b>Trait Variation, Inheritance, &amp; Artificial Selection</b><br>What do dogs and pigeons have in common? | Students analyze trait similarities and differences among parent, offspring, and sibling pigeons. They interpret this data to discover that the variation and inheritance of traits creates a pattern that explains why we see such extreme traits in artificially selected animal breeds. | <b>3.2.2</b> Analyze and interpret data to identify patterns of traits that plants and animals have inherited from parents.<br>Emphasize the similarities and differences in traits between parent organisms and offspring and variation of traits in groups of similar organisms.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| <b>Lesson 3</b><br>  | <b>Trait Variation, Survival, &amp; Natural Selection</b><br>How could a lizard's toes help it survive?     | Students compare the structures of lizards that live on an island. They simulate multiple generations of these lizards, and analyze and interpret the data to understand how these structures aid in their survival.                                                                       | <b>3.2.4</b> Construct an explanation showing how variations in traits and behaviors can affect the ability of an individual to survive and reproduce.<br>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.<br><br><b>3.2.5</b> 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.<br>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. |
| <b>Lesson 4</b><br> | ★ <b>Animal Groups &amp; Survival</b><br>Why do some animals live in groups?                                | Students observe animals that live in groups in order to obtain, evaluate, and communicate information about animal social behavior. Students use these observations as evidence that animals form groups to help them survive.                                                            | <b>3.2.4</b> Construct an explanation showing how variations in traits and behaviors can affect the ability of an individual to survive and reproduce.<br>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.                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
| <b>Lesson 5</b><br> | <b>Traits &amp; Environmental Variation</b><br>How long can people (and animals) survive in outer space?    | Students measure and compare their own physical traits (arm strength, balance, and height) and analyze the information to construct an explanation for how the environment can influence traits.                                                                                           | <b>3.2.3</b> Construct an explanation that the environment can affect the traits of an organism.<br>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.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |

## Weather & Climate (Stormy Skies)

|                                                                                                        | Topic & Guiding Question                                                                               | Student Objectives                                                                                                                                                                                                      | Utah Science Standards (2020)                                                                                                                                                                                                                                                                                                                            |
|--------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Lesson 1</b><br>   | <b>Water Cycle &amp; States of Matter</b><br>Where do clouds come from?                                | Students obtain and combine information that water can change from liquid to gas, but that it is always made of tiny drops. Clouds are made of water that has evaporated.                                               | <b>Foundational for 3.1.1</b> 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 could include temperature, precipitation, or wind speed.                           |
| <b>Lesson 2</b><br>   | <b>Local Weather Patterns &amp; Weather Prediction</b><br>How can we predict when it's going to storm? | Students make observations of clouds and develop a tool to make predictions about what kind of weather might happen next.                                                                                               | <b>3.1.1</b> 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 could include temperature, precipitation, or wind speed.                                            |
| <b>Lesson 3</b><br>   | <b>Seasonal Weather Patterns</b><br>Where's the best place to build a snow fort?                       | Students gather winter temperature data from three different towns. They represent the data in a table to compare the weather and decide which town is the best candidate to host a snow fort festival in future years. | <b>3.1.1</b> 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 could include temperature, precipitation, or wind speed.                                            |
| <b>Lesson 4</b><br> | <b>Climate &amp; Global Weather Patterns</b><br>Why are some places always hot?                        | Students obtain and combine information to describe the different climate regions of the world.                                                                                                                         | <b>3.1.2</b> 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.                                                 |
| <b>Lesson 5</b><br> | <b>Natural Hazards &amp; Engineering</b><br>How can you keep a house from blowing away in a windstorm? | Students design and build solutions that reduce the hazards associated with strong winds that could damage buildings.                                                                                                   | <b>3.1.3</b> Design a solution that reduces the effects of a weather-related hazard.<br><i>Define the problem, identify criteria and constraints, develop possible solutions, analyze data from testing solutions, and propose modifications for optimizing a solution.</i> Examples could include barriers to prevent flooding or wind-resistant roofs. |

## Stars & Planets (Stars & Planets)

*This unit is found under 5th grade on our site, but we recommend teaching lessons in 3rd grade if you are following Utah Standards.*

|                                                                                                        | Topic & Guiding Question                                                                       | Student Objectives                                                                                                                                                                                                                                                                                | Utah Science Standards (2020)                                                                                                                                                                                                                                          |
|--------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Lesson 1</b><br>   | <b>Solar System &amp; Sun Brightness</b><br><br>How can the Sun help us explore other planets? | <i>Students gather evidence to support an argument that the apparent brightness of the Sun is dependent upon an observer's distance from the Sun. They construct a model of the solar system and gather observations of the Sun's apparent brightness from each planet within their model.</i>    | <b>4.4.1</b> 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.<br><i>Emphasize relative distance from Earth.</i>                                    |
| We <b>recommend teaching this in 4th grade</b> if following Utah Standards.                            |                                                                                                |                                                                                                                                                                                                                                                                                                   |                                                                                                                                                                                                                                                                        |
| <b>Lesson 2</b><br>   | <b>Gravity</b><br><br>Why is gravity different on other planets?                               | Using mathematics and computational thinking, students calculate how high they could jump on planets and moons that have stronger or weaker gravity than Earth. Students analyze and interpret this data to construct an explanation for why the amount of gravity is different on other planets. | <b>3.3.3</b> Construct an explanation that the gravitational force exerted by Earth causes objects to be directed downward, toward the center of the spherical Earth.<br><i>Emphasize that "downward" is a local description depending on one's position on Earth.</i> |
| <b>Lesson 3</b><br> | <b>Star Brightness &amp; Habitable Planets</b><br><br>Could there be life on other planets?    | <i>Sun with the right amount of light and heat for life to exist. Students evaluate other solar systems, comparing their stars to our Sun. Based on their analysis, students plan a space mission to a planet with conditions similar to those on Earth.</i>                                      | <b>4.4.1</b> 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.<br><i>Emphasize relative distance from Earth.</i>                                    |
| We <b>recommend teaching this in 4th grade</b> if following Utah Standards.                            |                                                                                                |                                                                                                                                                                                                                                                                                                   |                                                                                                                                                                                                                                                                        |

## Forces, Motion, & Magnets (Invisible Forces)

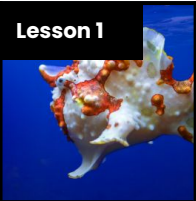
|                                                                                                        | Topic & Guiding Question                                                                             | Student Objectives                                                                                                                      | Utah Science Standards (2020)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
|--------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Lesson 1</b><br>   | <b>Balanced &amp; Unbalanced Forces</b><br>How could you win a tug-of-war against a bunch of adults? | Students develop a mental model of the nature of forces and motion and use that model to explain the behavior of an elastic jumper.     | <b>3.3.1</b> Plan and carry out investigations that provide evidence of the effects of balanced and unbalanced forces on the motion of an object.<br>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 unbalanced forces pushing on a box from both sides producing no movement.                                                                                                                                                                                            |
| <b>Lesson 2</b><br>   | <b>Balanced Forces &amp; Engineering</b><br>What makes bridges so strong?                            | Students develop and design a bridge to be as strong as possible while working with limited materials.                                  | <b>3.3.1</b> Plan and carry out investigations that provide evidence of the effects of balanced and unbalanced forces on the motion of an object.<br>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 unbalanced forces pushing on a box from both sides producing no movement.                                                                                                                                                                                            |
| <b>Lesson 3</b><br>   | <b>Pattern of Motion, Gravity, &amp; Friction</b><br>How high can you swing on a flying trapeze?     | Students make observations and measurements of a trapeze model. Then, using that information they predict the motion of a real trapeze. | <b>3.3.2</b> 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.<br>Examples of motion with a predictable pattern could include a child swinging on a swing or a ball rolling down a ramp.                                                                                                                                                                                                                                                                                |
| <b>Lesson 4</b><br>  | <b>Magnets &amp; Forces</b><br>What can magnets do?                                                  | Students investigate the properties of magnets and the fact that they exert forces that act at a distance.                              | <b>3.3.4</b> 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.<br>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. |
| <b>Lesson 5</b><br> | <b>Magnets &amp; Engineering</b><br>How can you unlock a door using a magnet?                        | Students investigate magnetic attraction and repulsion, and design a magnetic lock in the hands-on activity.                            | <b>3.3.5</b> Design a solution to a problem in which a device functions by using scientific ideas about magnets.<br><i>Define the problem, identify criteria and constraints, develop possible solutions using models, analyze data from testing solutions, and propose modifications for optimizing a solution.</i> Examples could include a latch or lock to keep a door shut or a device to keep two moving objects from touching each other.                                                                                                                                        |



## Human Body, Vision, & The Brain (Human Machine)

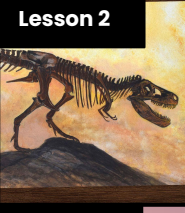
|                                                                                                        | Topic & Guiding Question                                                                     | Student Objectives                                                                                                                                                                                                           | Utah Science Standards (2020)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
|--------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Lesson 1</b><br>   | <b>Muscles &amp; Skeleton</b><br>Why do your biceps bulge?                                   | Students construct a model of the human hand to explain how muscles pull on bones to create movement.                                                                                                                        | <b>4.1.1</b> Construct an explanation from evidence that plants and animals have internal and external structures that function to support survival, growth, behavior, and reproduction.<br>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. |
| <b>Lesson 2</b><br>   | <b>Light, Eyes, &amp; Vision</b><br>What do people who are blind see?                        | Students develop a working model of an eye. They use the model to reason about how light reflects off an object and into the eye, helping an organism process information from the environment.                              | <b>4.3.2</b> Develop and use a model to describe how visible light waves reflected from objects enter the eye causing objects to be seen.<br>Emphasize the reflection and movement of light. The structure and function of organs and the relationship between color and wavelength will be taught in Grades 6 through 8.                                                                                                                                                                                                          |
| <b>Lesson 3</b><br>  | <b>Structure &amp; Function of Eyes</b><br>How can some animals see in the dark?             | Students use their eye model to discover that the pupil controls the amount of light let into the eye. In the dark, pupils get larger to let in more light.                                                                  | <b>4.3.2</b> Develop and use a model to describe how visible light waves reflected from objects enter the eye causing objects to be seen.<br>Emphasize the reflection and movement of light. The structure and function of organs and the relationship between color and wavelength will be taught in Grades 6 through 8.                                                                                                                                                                                                          |
| <b>Lesson 4</b><br> | <b>Brain, Nerves, &amp; Information Processing</b><br>How does your brain control your body? | Students investigate how their own brain works by testing their reflexes. They discover that the brain receives information from the senses, processes the information, and sends signals to the muscles to enable movement. | <b>4.1.2</b> 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 use their perceptions and memories to guide their actions.<br>Examples could include models that explain how animals sense and respond to different aspects of their environment such as sounds, temperature, or smell.                                                                                                   |

## Animal & Plant Adaptations (Animal & Plant Adaptations)

|                                                                                                       | Topic & Guiding Question                                                            | Student Objectives                                                                                                                                                                                                                                                                        | Utah Science Standards (2020)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
|-------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Lesson 1</b><br>  | <b>Animal Adaptations</b><br>Why do some sea creatures look so strange?             | Students make observations of underwater animals in order to collect evidence that external structures serve specific functions. They use their observations to construct an argument that an animal's structures work together as part of a system to support their growth and survival. | <b>4.1.1</b> Construct an explanation from evidence that plants and animals have internal and external structures that function to support survival, growth, behavior, and reproduction.<br>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. |
| <b>Lesson 2</b><br>  | <b>Learned Behavior &amp; Instinct</b><br>Why would a sea turtle eat a plastic bag? | Students use models to understand how an animal's senses, brain, and memories all work together as a system to influence their behavior and support their survival.                                                                                                                       | <b>4.1.2</b> 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 use their perceptions and memories to guide their actions.<br>Examples could include models that explain how animals sense and respond to different aspects of their environment such as sounds, temperature, or smell.                                                                                                   |
| <b>Lesson 3</b><br> | <b>Plant Adaptations</b><br>Why don't the same trees grow everywhere?               | Students use models of roots and branches to explore their functions and then construct an argument about how these structures must work together in order to support the survival of trees in the unique environment of the frozen taiga.                                                | <b>4.1.1</b> Construct an explanation from evidence that plants and animals have internal and external structures that function to support survival, growth, behavior, and reproduction.<br>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. |

## Fossils & Changing Environments (Animals Through Time)

*This unit is found under 3rd grade on our site, but we recommend teaching lessons in 4th grade if you are following Utah Standards.*

|                                                                                                       | Topic & Guiding Question                                                                         | Student Objectives                                                                                                                                            | Utah Science Standards (2020)                                                                                                                                                                                                                                                                                                                                                                                                      |
|-------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Lesson 1</b><br>  | <b>Habitats, Fossils, &amp; Environments Over Time</b><br>Where can you find whales in a desert? | Students explore the idea that the rock under our feet sometimes contains fossils, and investigate how these fossils reveal changes in habitats through time. | <b>4.1.3</b> Analyze and interpret data from fossils to provide evidence of the stability and change in organisms and environments from long ago.<br>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. |
| <b>Lesson 2</b><br>  | <b>Fossil Evidence &amp; Dinosaurs</b><br>How do we know what dinosaurs looked like?             | Students learn how we can infer what the outside of an animal looked like by using clues about their skeleton.                                                | <b>4.1.3</b> Analyze and interpret data from fossils to provide evidence of the stability and change in organisms and environments from long ago.<br>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. |
| <b>Lesson 3</b><br> | <b>Trace Fossil Evidence &amp; Animal Movement</b><br>Can you outrun a dinosaur?                 | Students learn how fossilized animal tracks can tell us a great deal about the animals that left them.                                                        | <b>4.1.3</b> Analyze and interpret data from fossils to provide evidence of the stability and change in organisms and environments from long ago.<br>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. |

## Earth's Features & Processes (The Birth of Rocks)

*This unit is found under 4th grade on our site, but we recommend teaching most of its lessons in 5th grade if you are following Utah Standards.*

|                                                                                                        | Topic & Guiding Question                                                                         | Student Objectives                                                                                                                                                                                                                        | Utah Science Standards (2020)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
|--------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Lesson 1</b><br>   | <b>Volcanoes &amp; Patterns of Earth's Features</b><br>Could a volcano pop up where you live?    | Students use coordinates to develop a map of volcanoes to discover a pattern of where volcanoes exist on Earth. Students identify the pattern of volcanoes in the "Ring of Fire."                                                         | <b>5.1.1 Analyze and interpret data to describe patterns of Earth's features.</b><br>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.                                                                |
| We <b>recommend teaching this in 5th grade</b> if following Utah Standards.                            |                                                                                                  |                                                                                                                                                                                                                                           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
| <b>Lesson 2</b><br>   | <b>Volcanoes &amp; Rock Cycle</b><br>Why do some volcanoes explode?                              | Students investigate the properties of thin and thick lava by attempting to create air bubbles. Students realize that thick lava will cause a volcano to explode, while thin lava will not.                                               | <b>5.1.1 Analyze and interpret data to describe patterns of Earth's features.</b><br>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.                                                                |
| We <b>recommend teaching this in 5th grade</b> if following Utah Standards.                            |                                                                                                  |                                                                                                                                                                                                                                           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
| <b>Lesson 3</b><br>  | <b>Weathering &amp; Erosion</b><br>Will a mountain last forever?                                 | Students make observations of the effects of weathering to discover that rocks will become rounded and break into small pieces when they tumble down a mountain.                                                                          | <b>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.</b><br>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.                                                                                                           |
| We <b>recommend teaching this in 5th grade</b> if following Utah Standards.                            |                                                                                                  |                                                                                                                                                                                                                                           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
| <b>Lesson 4</b><br> | <b>Sedimentary Rock &amp; Fossils</b><br>What did your town look like 100 million years ago?     | Students create a model canyon and use the pattern of fossils found in each rock layer to support the explanation that the landscape has changed many times over millions of years.                                                       | <b>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.</b> 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.                                                                                             |
| <b>Lesson 5</b><br> | ★ <b>Earthquakes &amp; Engineering</b><br>Can you design a building that survives an earthquake? | Students generate multiple possible solutions to protect model buildings from earthquake damage. They compare their designs and evaluate their effectiveness given specified criteria for success and constraints of available materials. | <b>5.1.5 Design solutions to reduce the effects of naturally occurring events that impact humans.</b><br>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. |
| We <b>recommend teaching this in 5th grade</b> if following Utah Standards.                            |                                                                                                  |                                                                                                                                                                                                                                           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |

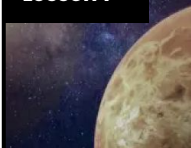
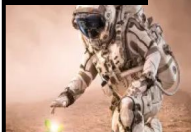
## Earth & Space Patterns (Spaceship Earth)

*This unit is found under 5th grade on our site, but we recommend teaching lessons in 4th grade if you are following Utah Standards.*

|                                                                                                        | Topic & Guiding Question                                                                  | Student Objectives                                                                                                                                                                                                                                                                                                 | Utah Science Standards (2020)                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
|--------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Lesson 1</b><br>   | <b>Day, Night, &amp; Earth's Rotation</b><br>How fast does the Earth spin?                | Students model the rotation of the Earth and investigate why the Sun looks like it's moving across the sky. Using evidence they gathered in the investigation, students build a model that explains how the Earth's rotation around its own axis causes the Sun to appear to rise and set.                         | <b>4.4.2</b> Analyze and interpret data of observable patterns to show that Earth rotates on its axis and revolves around the Sun.<br>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 connections to the tilt of Earth's axis will be taught in Grades 6 through 8. |
| <b>Lesson 2</b><br>   | <b>Earth's Rotation &amp; Daily Shadow Patterns</b><br>Who set the first clock?           | Students make a shadow clock (sundial) and investigate how the direction and length of shadows change with the position of the light shining on the sundial. Students realize that the Sun's position in the sky can be used to tell the time of day.                                                              | <b>4.4.2</b> Analyze and interpret data of observable patterns to show that Earth rotates on its axis and revolves around the Sun.<br>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 connections to the tilt of Earth's axis will be taught in Grades 6 through 8. |
| <b>Lesson 3</b><br>  | <b>Seasonal Changes &amp; Shadow Length</b><br>How can the Sun tell you the season?       | Students examine photos taken at different times of year and figure out the time of year that each photo was taken. Students discover that the Sun's path changes with the seasons, as does the time of sunrise and sunset. The Sun is always highest in the sky at noon, but that height changes with the season. | <b>4.4.2</b> Analyze and interpret data of observable patterns to show that Earth rotates on its axis and revolves around the Sun.<br>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 connections to the tilt of Earth's axis will be taught in Grades 6 through 8. |
| <b>Lesson 4</b><br> | <b>Seasonal Patterns &amp; Earth's Orbit</b><br>Why do the stars change with the seasons? | Students build a model of the universe and use it to explain why different stars are visible at different times of year. Using evidence from this model, students make an argument that supports the claim that the Earth orbits the Sun.                                                                          | <b>4.4.2</b> Analyze and interpret data of observable patterns to show that Earth rotates on its axis and revolves around the Sun.<br>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 connections to the tilt of Earth's axis will be taught in Grades 6 through 8. |
| <b>Lesson 5</b><br> | <b>Moon Phases, Lunar Cycle</b><br>Why does the Moon change shape?                        | Students use a physical model of the Sun and Moon to investigate how the Moon's phase relates to its position relative to the Sun. Students notice that the Moon's phases repeat in a predictable pattern.                                                                                                         | <b>4.4.2</b> Analyze and interpret data of observable patterns to show that Earth rotates on its axis and revolves around the Sun.<br>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 connections to the tilt of Earth's axis will be taught in Grades 6 through 8. |

## Stars & Planets (Stars & Planets)

*This unit is found under 5th grade on our site, but we recommend teaching most lessons in 4th grade if you are following Utah Standards.*

|                                                                                                                            | Topic & Guiding Question                                                                       | Student Objectives                                                                                                                                                                                                                                                                                       | Utah Science Standards (2020)                                                                                                                                                                                                                                   |
|----------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Lesson 1</b><br>                        | <b>Solar System &amp; Sun Brightness</b><br><br>How can the Sun help us explore other planets? | Students gather evidence to support an argument that the apparent brightness of the Sun is dependent upon an observer's distance from the Sun. They construct a model of the solar system and gather observations of the Sun's apparent brightness from each planet within their model.                  | <b>4.4.1</b> 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.<br>Emphasize relative distance from Earth.                                    |
| <b>Lesson 2</b><br>                        | <b>Gravity</b><br><br>Why is gravity different on other planets?                               | <i>Using mathematics and computational thinking, students calculate how high they could jump on planets and moons that have stronger or weaker gravity than Earth. Students analyze and interpret this data to construct an explanation for why the amount of gravity is different on other planets.</i> | <b>3.3.3</b> Construct an explanation that the gravitational force exerted by Earth causes objects to be directed downward, toward the center of the spherical Earth.<br>Emphasize that "downward" is a local description depending on one's position on Earth. |
| <p>Although this appears next on our site, we <b>recommend teaching this in 3rd grade</b> if following Utah Standards.</p> |                                                                                                |                                                                                                                                                                                                                                                                                                          |                                                                                                                                                                                                                                                                 |
| <b>Lesson 3</b><br>                       | <b>Star Brightness &amp; Habitable Planets</b><br><br>Could there be life on other planets?    | Sun with the right amount of light and heat for life to exist. Students evaluate other solar systems, comparing their stars to our Sun. Based on their analysis, students plan a space mission to a planet with conditions similar to those on Earth.                                                    | <b>4.4.1</b> 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.<br>Emphasize relative distance from Earth.                                    |



## Sound, Waves, & Communication (Waves of Sound)

|                                                                                                      | Topic & Guiding Question                                                             | Student Objectives                                                                                                                                                                                                                                          | Utah Science Standards (2020)                                                                                                                                                                                                                                                                                                                                                                                                   |
|------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Lesson 1</b><br>  | <b>Pattern Transfer &amp; Technology</b><br>How do you send a secret code?           | Students explore how digital devices encode complex information. Students generate their own codes in order to transfer information across the classroom. Then, they compare their codes and evaluate which worked best given the criteria and constraints. | <b>4.3.3</b> Design a solution to an information transfer problem using wave patterns.<br><i>Define the problem, identify criteria and constraints, develop possible solutions using models, analyze data from testing solutions, and propose modifications for optimizing a solution.</i> Examples could include using light to transmit a message in Morse code or using lenses and mirrors to see objects that are far away. |
| <b>Lesson 2</b><br>  | <b>Sound, Vibration, &amp; Engineering</b><br>How far can a whisper travel?          | Students investigate sound energy using paper cup telephones. Students figure out that sound is a vibration that can travel through a medium.                                                                                                               | <b>4.3.1</b> Develop and use a model to describe the regular patterns of waves.<br>Emphasize patterns in terms of amplitude and wavelength. Examples of models could include diagrams, analogies, and physical models such as water or rope.                                                                                                                                                                                    |
| <b>Lesson 3</b><br>  | <b>Sound &amp; Vibrations</b><br>What would happen if you screamed in outer space?   | Students construct a model of sound vibrations to explain how air is a medium that sound vibrations travel through.                                                                                                                                         | <b>4.3.1</b> Develop and use a model to describe the regular patterns of waves.<br>Emphasize patterns in terms of amplitude and wavelength. Examples of models could include diagrams, analogies, and physical models such as water or rope.                                                                                                                                                                                    |
| <b>Lesson 4</b><br> | <b>Sound Waves &amp; Wavelength</b><br>Why are some sounds high and some sounds low? | Students make observations of vibrations and sound waves to discover that high pitch sounds vibrate faster and have short wavelengths and low pitch sounds vibrate slower and have long wavelengths.                                                        | <b>4.3.1</b> Develop and use a model to describe the regular patterns of waves.<br>Emphasize patterns in terms of amplitude and wavelength. Examples of models could include diagrams, analogies, and physical models such as water or rope.                                                                                                                                                                                    |

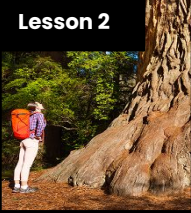
## Energy & Energy Transfer (Energizing Everything)

|                                                                                                        | Topic & Guiding Question                                                                         | Student Objectives                                                                                                                                                                                                                                                                              | Utah Science Standards (2020)                                                                                                                                                                                                                                                                                                                                                                                          |
|--------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Lesson 1</b><br>   | <b>Speed &amp; Energy</b><br>How is your body similar to a car?                                  | Students learn about stored energy and about the relationship between motion and energy. Students build models of an amusement park ride and discover how energy can be stored in materials. Stored energy can be converted to speed.                                                           | <b>4.2.1</b> Construct an explanation to describe the cause and effect relationship between the speed of an object and the energy of that object.<br>Emphasize using qualitative descriptions of the relationship between the 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. |
| <b>Lesson 2</b><br>   | <b>Gravitational Energy, Speed, &amp; Collisions</b><br>What makes roller coasters go so fast?   | Students build a model of a roller coaster and carry out an investigation using marbles. Students learn that lifting an object up stores energy in the object. When the object falls, that stored energy is released. They realize that energy is transferred when objects collide.             | <b>4.2.2</b> Ask questions and make observations about the changes in energy that occur when objects collide.<br>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.                                                 |
| <b>Lesson 3</b><br>  | <b>Collisions &amp; Energy Transfer</b><br>How can marbles save the world?                       | Students investigate how energy transfers when objects collide. In the activity, Bumper Jumper, students ask questions and make predictions about how far a marble will launch over a jump after colliding with other objects.                                                                  | <b>4.2.2</b> Ask questions and make observations about the changes in energy that occur when objects collide.<br>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.                                                 |
| <b>Lesson 4</b><br> | <b>Energy Transfer &amp; Engineering</b><br>Could you knock down a building using only dominoes? | Students experiment with ways to store and release energy, creating the beginning of a chain reaction machine with a lever and a ramp. Students figure out that a domino standing on end is storing energy, only requiring a small amount of energy (a tiny push) to release the stored energy. | <b>4.2.3</b> 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 being used to produce motion or light.                                                                                                                                                                                         |
| <b>Lesson 5</b><br> | <b>Energy Transfer &amp; Engineering</b><br>Can you build a chain reaction machine?              | Students continue to build a chain reaction machine – identifying a goal, brainstorming and testing multiple ideas, and determining an optimal solution. The chain reaction machine uses multiple components to transfer energy from one part to the next.                                      | <b>4.2.3</b> 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 being used to produce motion or light.                                                                                                                                                                                         |

## Electricity, Light, & Heat (Electricity, Light & Heat)

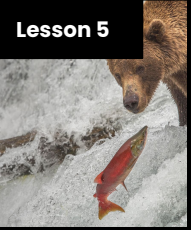
|                                                                                                       | Topic & Guiding Question                                                                                                  | Student Objectives                                                                                                                                                                                                                                       | Utah Science Standards (2020)                                                                                                                                                                                                                                                                                                                                                                                                       |
|-------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Lesson 1</b><br>  | <b>Renewable Energy &amp; Natural Resources</b><br><br>What's the best way to light up a city?                            | <i>Students evaluate the advantages and disadvantages of wind, water, and solar energy to power a town. Students obtain and evaluate information about the needs of each source of energy and analyze and interpret data about the town's resources.</i> | <b>5.3.4</b> Evaluate design solutions whose primary function is to conserve Earth's environments and resources.<br><i>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.</i>                         |
| We <b>recommend teaching this in 5th grade</b> if following Utah Standards.                           |                                                                                                                           |                                                                                                                                                                                                                                                          |                                                                                                                                                                                                                                                                                                                                                                                                                                     |
| <b>Lesson 2</b><br>  | <b>Electrical Energy</b><br><br>What if there were no electricity?                                                        | Students design a flashlight with an on/off switch, using batteries, flights, and tin foil. Students figure out that electricity can be transformed to other forms of energy, such as movement, light, and heat.                                         | <b>4.2.4</b> Design a device that converts energy from one form to another.<br><i>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 solar ovens that convert light energy to heat energy or a simple alarm system that converts motion energy into sound energy.</i> |
| <b>Lesson 3</b><br> | <b>Heat Energy &amp; Energy Transfer</b><br><br>How long did it take to travel across the country before cars and planes? | Students build a paper spinner and conduct an investigation to explain how heat makes things move. Students realize that heat energy can be transformed into motion energy using a turbine.                                                              | <b>4.2.3</b> 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 being used to produce motion or light.                                                                                                                                                                                                      |

**Ecosystems & The Food Web** (Web of Life) • Page 1 of 2

|                                                                                                        | Topic & Guiding Question                                                                            | Student Objectives                                                                                                                                                     | Utah Science Standards (2020)                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
|--------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Lesson 1</b><br>   | <b>Food Chains &amp; Matter Flow</b><br>What if all the ants disappeared?                           | Students construct models of food chains by linking cards discovering that different interrelationships exist between organisms.                                       | <b>5.3.3</b> Develop and use a model to describe the movement of matter among plants, animals, decomposers, and the environment.<br>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. |
| <b>Lesson 2</b><br>   | <b>Plant Growth &amp; Matter</b><br>How does a tiny seed become one of the heaviest trees on Earth? | Students gather evidence through a series of virtual experiments to construct an argument that plants use mostly air and water as the materials for their growth.      | <b>5.3.1</b> Construct an explanation that plants use air, water, and energy from sunlight to produce plant matter needed for growth.<br>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.                                                                                                                                                    |
| <b>Lesson 3</b><br>  | <b>Decomposers &amp; Matter Flow</b><br>Where do fallen leaves go?                                  | Students conduct an investigation to gain an understanding of the important role that decomposers play in recycling matter from dead leaves back into the environment. | <b>5.3.3</b> Develop and use a model to describe the movement of matter among plants, animals, decomposers, and the environment.<br>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. |
| <b>Lesson 4</b><br> | <b>Decomposers &amp; Soil Nutrients</b><br>Do worms really eat dirt?                                | Students make observations of worms to realize that worms act as decomposers to eat dead matter in an ecosystem and cycle nutrients into the soil.                     | <b>5.3.3</b> Develop and use a model to describe the movement of matter among plants, animals, decomposers, and the environment.<br>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. |

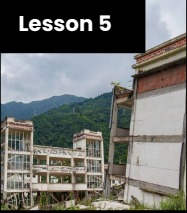
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**Ecosystems & The Food Web** (Web of Life) • Page 2 of 2

|                                                                                                       | Topic & Guiding Question                                                   | Student Objectives                                                                                                                                                                                                                                                                                                                    | Utah Science Standards (2020)                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
|-------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Lesson 5</b><br>  | <b>★ Ecosystems &amp; Matter Cycle</b><br>How could a fish feed a forest?  | Students develop a model of a pond ecosystem and realize that interrelationships exist between decomposers, plants, and animals. Students discover that each organism must be in balance for the pond ecosystem to function.                                                                                                          | <b>5.3.3</b> Develop and use a model to describe the movement of matter among plants, animals, decomposers, and the environment.<br>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. |
| <b>Lesson 6</b><br>  | <b>Protecting Environments</b><br>How can we protect Earth's environments? | In this lesson, students learn about what happens in unbalanced ecosystems and how that can lead to an overabundance of algae and harmful algal blooms. In the activity, Bloom Busters, students play a game in which they obtain and combine science ideas in order to help a community respond to and prevent harmful algal blooms. | <b>5.3.4</b> Evaluate design solutions whose primary function is to conserve Earth's environments and resources.<br>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.                                                                                            |
| <b>Lesson 7</b><br> | <b>Food Webs &amp; Flow of Energy</b><br>Why did the dinosaurs go extinct? | Students develop a model of a dinosaur food web. Students realize that blocking the sun's energy would have disastrous effects on the organisms that rely on this energy in the food web and cause the extinction of some entire species.                                                                                             | <b>5.3.2</b> 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.<br>Emphasize that the energy used by animals was once energy from the Sun. Cellular respiration will be taught in Grades 6 through 8.                                                                                                                                                                  |

## Earth's Features & Processes (The Birth of Rocks)

*This unit is found under 4th grade on our site, but we recommend teaching most lessons in 5th grade if you are following Utah Standards.*

|                                                                                                                     | Topic & Guiding Question                                                                             | Student Objectives                                                                                                                                                                                                                        | Utah Science Standards (2020)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
|---------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Lesson 1</b><br>                | <b>Volcanoes &amp; Patterns of Earth's Features</b><br><br>Could a volcano pop up where you live?    | Students use coordinates to develop a map of volcanoes to discover a pattern of where volcanoes exist on Earth. Students identify the pattern of volcanoes in the "Ring of Fire."                                                         | <b>5.1.1</b> 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.                                                                       |
| <b>Lesson 2</b><br>                | <b>Volcanoes &amp; Rock Cycle</b><br><br>Why do some volcanoes explode?                              | Students investigate the properties of thin and thick lava by attempting to create air bubbles. Students realize that thick lava will cause a volcano to explode, while thin lava will not.                                               | <b>5.1.1</b> 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.                                                                       |
| <b>Lesson 3</b><br>                | <b>Weathering &amp; Erosion</b><br><br>Will a mountain last forever?                                 | Students make observations of the effects of weathering to discover that rocks will become rounded and break into small pieces when they tumble down a mountain.                                                                          | <b>5.1.3</b> 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.                                                                                                                  |
| <b>Lesson 4</b><br>              | <b>Sedimentary Rock &amp; Fossils</b><br><br>What did your town look like 100 million years ago?     | <i>Students create a model canyon and use the pattern of fossils found in each rock layer to support the explanation that the landscape has changed many times over millions of years.</i>                                                | <b>4.1.4</b> 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.                                                                                                 |
| Although this appears next on our site, we <b>recommend teaching this in 4th grade</b> if following Utah Standards. |                                                                                                      |                                                                                                                                                                                                                                           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
| <b>Lesson 5</b><br>              | <b>★ Earthquakes &amp; Engineering</b><br><br>Can you design a building that survives an earthquake? | Students generate multiple possible solutions to protect model buildings from earthquake damage. They compare their designs and evaluate their effectiveness given specified criteria for success and constraints of available materials. | <b>5.1.5</b> Design solutions to reduce the effects of naturally occurring events that impact humans. <i>Define the problem, identify criteria and constraints, develop possible solutions using models, analyze data from testing solutions, and propose modifications for optimizing a solution.</i> 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. |



## Electricity, Light, & Heat (Electricity, Light & Heat)

*This unit is found under 4th grade on our site, but we recommend teaching lesson 1 in 5th grade if you are following Utah Standards.*

|                                                                                                        | Topic & Guiding Question                                                                                                  | Student Objectives                                                                                                                                                                                                                                | Utah Science Standards (2020)                                                                                                                                                                                                                                                                                                                                                                                                |
|--------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Lesson 1</b><br>   | <b>Renewable Energy &amp; Natural Resources</b><br><br>What's the best way to light up a city?                            | Students evaluate the advantages and disadvantages of wind, water, and solar energy to power a town. Students obtain and evaluate information about the needs of each source of energy and analyze and interpret data about the town's resources. | <b>5.3.4</b> Evaluate design solutions whose primary function is to conserve Earth's environments and resources.<br>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.                         |
| <b>Lesson 2</b><br>   | <b>Electrical Energy</b><br><br>What if there were no electricity?                                                        | <i>Students design a flashlight with an on/off switch, using batteries, flights, and tin foil. Students figure out that electricity can be transformed to other forms of energy, such as movement, light, and heat.</i>                           | <b>4.2.4</b> Design a device that converts energy from one form to another.<br>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 solar ovens that convert light energy to heat energy or a simple alarm system that converts motion energy into sound energy. |
| We <b>recommend teaching this in 4th grade</b> if following Utah Standards.                            |                                                                                                                           |                                                                                                                                                                                                                                                   |                                                                                                                                                                                                                                                                                                                                                                                                                              |
| <b>Lesson 3</b><br> | <b>Heat Energy &amp; Energy Transfer</b><br><br>How long did it take to travel across the country before cars and planes? | <i>Students build a paper spinner and conduct an investigation to explain how heat makes things move. Students realize that heat energy can be transformed into motion energy using a turbine.</i>                                                | <b>4.2.3</b> 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 being used to produce motion or light.                                                                                                                                                                                               |
| We <b>recommend teaching this in 4th grade</b> if following Utah Standards.                            |                                                                                                                           |                                                                                                                                                                                                                                                   |                                                                                                                                                                                                                                                                                                                                                                                                                              |

## Water Cycle & Earth's Systems (Watery Planet)

|                                                                                                        | Topic & Guiding Question                                                                                 | Student Objectives                                                                                                                                                                                                                                                             | Utah Science Standards (2020)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
|--------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Lesson 1</b><br>   | <b>Hydrosphere &amp; Water Distribution</b><br>How much water is in the world?                           | Students analyze and interpret data from world maps to determine the relative amounts of fresh, salt, and frozen water. Students figure out that while the Earth has a lot of water, most of Earth's water is not fresh or accessible.                                         | <b>5.1.2</b> 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.<br>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.                                                                            |
| <b>Lesson 2</b><br>   | <b>Mixtures &amp; Solutions</b><br>How much salt is in the ocean?                                        | Students create a model ocean to observe how salt seems to completely vanish when dissolved in water. Students measure and graph quantities to provide evidence that the salt is still in the solution, even though we can't see it.                                           | <b>5.2.4</b> 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.<br>Examples could include melting an ice cube, dissolving salt in water, and combining baking soda and vinegar in a closed bag.                                                                                                                                                                   |
| <b>Lesson 3</b><br>  | <b>Groundwater as a Natural Resource</b><br>When you turn on the faucet, where does the water come from? | Students learn most people get fresh water from underground sources. Students determine the best place to settle a town by considering features of the landscape & the characteristics of the plants that thrive there.                                                        | <b>5.1.2</b> 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.<br>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.                                                                            |
| <b>Lesson 4</b><br> | <b>Water Cycle</b><br>Can we make it rain?                                                               | Students create a model of the ocean and sky to investigate how temperature influences evaporation and condensation. Students figure out that higher ocean temperatures lead to more evaporation, thus leading to more rain.                                                   | <b>5.1.4</b> Develop a model to describe interactions between Earth's systems including the geosphere, biosphere, hydrosphere, and/or atmosphere.<br>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.                                                                                                                                                                                           |
| <b>Lesson 5</b><br> | <b>Natural Disasters &amp; Engineering</b><br>How can you save a town from a hurricane?                  | Students define the problem that a town needs protection from flooding. They design solutions using different types of flood protection. They realize flooding is caused by severe rainfall generated by hurricanes. Hurricanes are created where ocean temperatures are warm. | <b>5.1.5</b> Design solutions to reduce the effects of naturally occurring events that impact humans.<br><i>Define the problem, identify criteria and constraints, develop possible solutions using models, analyze data from testing solutions, and propose modifications for optimizing a solution.</i> 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. |

## ★ **Chemical Reactions & Properties of Matter** (Chemical Magic)

|                                                                                                       | Topic & Guiding Question                                                                     | Student Objectives                                                                                                                                                                                                     | Utah Science Standards (2020)                                                                                                                                                                                                                                                                                                                                                                                                                                          |
|-------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Lesson 1</b><br>   | <b>★ Properties of Matter</b><br>Can you identify a mysterious ingredient?                   | Students conduct a series of tests on four unknown ingredients. Based on their observations, students identify each ingredient based on its unique properties.                                                         | <b>5.2.2</b> 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.                                                                                         |
| <b>Lesson 2</b><br>   | <b>★ Particle Models</b><br>Why can you smell things you can't see?                          | Students investigate the phenomenon of a mysterious sweet smell. They develop and use particle model to understand how particles too small to be seen explain why we smell things we can't see.                        | <b>5.2.1</b> 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. |
| <b>Lesson 3</b><br>  | <b>★ Properties of Matter: Acids</b><br>How can you tell if acids are hiding in your fridge? | Students explore acidity as a property of matter. They conduct an investigation using baking soda as an acid indicator to identify if any household ingredients are actually acidic.                                   | <b>5.2.2</b> 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.                                                                                         |
| <b>Lesson 4</b><br> | <b>★ Chemical Reactions &amp; Fair Tests</b><br>Why do some things explode?                  | Students investigate explosions and chemical reactions. They conduct a fair test to determine which two substances combine to form a new substance. The new substance formed is a gas, which causes a small explosion! | <b>5.2.3</b> 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.                                                                                                                                           |
| <b>Lesson 5</b><br> | <b>Chemical Reactions</b><br>What do fireworks, rubber, and Silly Putty have in common?      | Students investigate chemical reactions. They conduct an investigation to determine which two substances results in a new substance–goo!                                                                               | <b>5.2.3</b> 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.                                                                                                                                           |