



# **Grade 4 Science Curriculum Map**


**2023- 2024**

## Year At A Glance: Pacing Example for Grade 4 Science


<b>Strand 4.1: Organisms Functioning in Their Environment</b>	<b>Aug - Oct</b>
4.1.1 <b>Construct an explanation</b> from evidence that plants and animals have internal and external <u>structures</u> that <u>function</u> to support survival, growth, behavior, and reproduction.	4 weeks
4.1.2 <b>Develop and use a model</b> of a <u>system</u> to describe how animals receive different types of information from their environment through their senses, process the information in their brain, and respond to the information.	2 weeks
4.1.3 <b>Analyze and interpret data</b> from fossils to provide evidence of the <u>stability and change</u> in organisms and environments from long ago.	2 weeks
4.1.4 <b>Engage in argument from evidence</b> based on <u>patterns</u> in rock layers and fossils found in those layers to support an explanation that environments have changed over time.	2 weeks
<b>Strand 4.2: Energy Transfer</b>	<b>Nov - Jan</b>
4.2.1 <b>Construct an explanation</b> to describe the <u>cause and effect</u> relationship between the speed of an object and the energy of that object.	2 weeks
4.2.2 <b>Ask questions</b> and make observations about the <u>changes</u> in energy that occur when objects collide.	3 weeks
4.2.3 <b>Plan and carry out an investigation</b> to gather evidence from observations that <u>energy</u> can be transferred from place to place by sound, light, heat, and electrical currents.	3 weeks
4.2.4 <b>Design</b> a device that converts <u>energy</u> from one form to another. <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>	2 weeks
<b>Strand 4.3: Wave Patterns</b>	<b>Jan - Mar</b>
4.3.1 <b>Develop and use a model</b> to describe the regular <u>patterns</u> of waves.	3 weeks
4.3.2 <b>Develop and use a model</b> to describe how visible light waves reflected from objects enter the eye <u>causing</u> objects to be seen.	2 weeks
4.3.3 <b>Design a solution</b> to an information transfer problem using wave <u>patterns</u> .	2 weeks
<b>Strand 4.4: Observable Patterns in the Sky</b>	<b>Mar - May</b>
4.4.1 <b>Construct an explanation</b> that differences in the apparent brightness of the Sun compared to other stars is due to the relative distance ( <u>scale</u> ) of stars from Earth.	2 weeks
4.4.2 <b>Analyze and interpret data</b> of observable <u>patterns</u> to show that Earth rotates on its axis and revolves around the Sun.	3 weeks
Review	2 weeks

### Strand 4.1 Organisms Functioning in Their Environment

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

Strand 4.1: Organisms Functioning in Their Environment		Suggested Pacing - 10 weeks	
Standard 4.1.1		4 weeks	
<p> <b>4.1.1 Construct an explanation</b> from evidence that plants and animals have internal and external <u>structures</u> that <u>function</u> to support survival, growth, behavior, and reproduction. Emphasize how structures support an organism’s survival in its environment and how internal and external structures of plants and animals vary within the same and across multiple Utah environments. Examples of structures could include thorns on a stem to prevent predation or gills on a fish to allow it to breathe underwater. (LS1.A)</p>			
<p>LS1.A Plants and animals have both internal and external structures that serve various functions in growth, survival, behavior, and reproduction.</p>			
Learning Targets	Success Criteria	Resources	Wonders Alignment
<p>I am learning about how an animal’s internal and external structures function to help it survive.</p> <p>I am learning about how a plant’s internal and external structures function to help it survive.</p>	<p>I can write an explanation, supported by examples, about how an animal’s internal and external structures function to help it to survive.</p> <p>I can write an explanation, supported by examples, about how a plant’s internal and external structures function to help it to survive.</p> <p>I can develop a model to explain how a specific structure functions to help a plant or an animal survive.</p>	<p><a href="#">GSD Model Lesson Animal and Plant Survival Investigating Plant Structures</a></p> <p><a href="#">Mystery Science Human Machine Anchor Phenomenon: Owl Ambush</a>  <a href="#">Mystery 1:</a> Why do your biceps bulge?  <a href="#">Mystery 2:</a> What do people who are blind see?  <a href="#">Mystery 3:</a> How can some animals see in the dark?</p> <p><a href="#">Canvas Distance Learning Lessons</a> Weeks 1 - 3</p> <p><a href="#">Assessment: Pollinators and Flowers (USBE)</a></p> <p><a href="#">Gr 4 OER Textbook</a></p>	<p><a href="#">Reading/Writing Workshop</a> Unit 2 Week 4 - Adapting to Survive, Animal Adaptations Unit 2, Week 5: Poetry The Sandpiper, Bat, The Grasshopper Springs, Fireflies at Dusk Unit 3 Week 5 - Food Fight</p> <p><a href="#">Literature Anthology</a> Unit 2 Week 3 - The Buffalo Are Back, Energy in the Ecosystem Unit 2 Week 4 - Spiders, Anansi and the Birds Unit 3 Week 5 - A New Kind of Corn, The Pick of the Patch Unit 5, Week 2 - Apples to Oregon</p> <p><a href="#">Leveled Readers</a> Unit 2 Week 4 - Extreme Animals</p>

<b>Strand 4.1: Organisms Functioning in Their Environment</b>			<b>Suggested Pacing - 10 weeks</b>
<b>Standard 4.1.2</b>			<b>2 weeks</b>
<p>4.1.2 <b>Develop and use a model</b> of a <u>system</u> to describe how animals receive different types of information from their environment through their senses, process the information in their brain, and respond to the information. Emphasize how animals are able to use their perceptions and memories to guide their actions. Examples could include models that explain how animals sense and then respond to different aspects of their environment such as sounds, temperature, or smell. (LS1.D)</p>			
<p>LS1.D Different sense receptors are specialized for particular kinds of information, which may be then processed by the animal’s brain. Animals are able to use their perceptions and memories to guide their actions.</p>			
<b>Learning Targets</b>	<b>Success Criteria</b>	<b>Resources</b>	<b>Wonders Alignment</b>
<p>I am learning about how animals use their senses and their brains to gather, process, and respond to information from their environments.</p> <p>I am learning how to create a scientific model using drawings, labels, arrows, and captions to explain a phenomenon.</p>	<p>I can develop a model to show how an animal receives information from its environment, processes the information and responds.</p>	<p><a href="#">GSD Model Lesson Organisms Respond to Their Environment</a></p> <p><a href="#">Mystery Science Human Machine Mystery 4</a>: How does your brain control your body?</p> <p><a href="#">Performance Task</a>: How are animals and plants like machines?</p> <p><a href="#">Canvas Lessons</a> Weeks 4 - 5</p> <p><a href="#">Assessment: Fox Hunting (USBE)</a></p> <p><a href="#">Gr 4 OER Textbook</a></p>	<p><a href="#">Reading/Writing Workshop</a> Unit 2 Week 3 - Rescuing Our Reefs</p> <p><a href="#">Literature Anthology</a> Unit 2 Week 3 - Energy in the Ecosystem Unit 2 Week 4 - Spiders, Anansi and the Birds</p>

Strand 4.1: Organisms Functioning in Their Environment			Suggested Pacing - 10 weeks
Standard 4.1.3			2 weeks
<p> 4.1.3 <b>Analyze and interpret data</b> from fossils to provide evidence of the <u>stability and change</u> in organisms and environments from long ago. Emphasize using the structures of fossils to make inferences about ancient organisms. Examples of fossils and environments could include comparing a trilobite with a horseshoe crab in an ocean environment or using a fossil footprint to determine the size of a dinosaur. (LS4.A)</p>			
<p>LS4.A Some kinds of plants and animals that once lived on Earth are no longer found anywhere.  Fossils provide evidence about the types of organisms that lived long ago and also about the nature of their environments.  Fossils can be compared with one another and to living organisms according to their similarities and differences.</p>			
Learning Targets	Success Criteria	Resources	Wonders Alignment
<p>I am learning to use fossils to gather evidence about the types of organisms and the environments that existed long ago.</p>	<p>I can analyze data from observations of fossils and maps to make claims about the types of organisms and the environments that existed in an area long ago.</p>	<p><a href="#">GSD Model Lesson Knightia Fish Fossils</a></p> <p><a href="#">Mystery Science Animals Through Time</a>  <a href="#">Mystery 1:</a> Where can you find whales in a desert?  <a href="#">Mystery 2:</a> How do we know what dinosaurs looked like?  <a href="#">Mystery 3:</a> Can you outrun a dinosaur?</p> <p><a href="#">Canvas Lessons</a>  Weeks 6 &amp; 9/10</p> <p><a href="#">KY Through Course Task - Who Was T-Rex?</a></p> <p><a href="#">Assessment: Dragonfly Fossil (USBE)</a></p> <p><a href="#">Gr 4 OER Textbook</a></p>	<p><a href="#">Reading/Writing Workshop</a>  Unit 5 Week 5 - Time for Kids: Treasures from the Past</p> <p><a href="#">Leveled Readers</a>  Unit 5 Week 5 - Treks Through Time</p>

<b>Strand 4.1: Organisms Functioning in Their Environment</b>			<b>Suggested Pacing - 10 weeks</b>
<b>Standard 4.1.4</b>			<b>2 weeks</b>
4.1.4 <b>Engage in argument from evidence</b> based on <u>patterns</u> 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. (ESS1.C)			
ESS1.C Local, regional, and global patterns of rock formations reveal changes over time due to earth forces, such as earthquakes. The presence and location of certain fossil types indicate the order in which rock layers were formed.			
<b>Learning Targets</b>	<b>Success Criteria</b>	<b>Resources</b>	<b>Wonders Alignment</b>
<p>I am learning to use patterns in rocks layers and the fossils found in the rock layers to make inferences about how environments have changed over time.</p> <p>I am learning to support a scientific argument with data or a model.</p>	<p>I can support a scientific argument about how an environment has changed over time using evidence from rock layers and the fossils found in those rock layers.</p>	<p><a href="#">GSD Model Lesson Rock Patterns, Layers and Fossils</a></p> <p><a href="#">Mystery Science Animals Through Time Mystery 1</a>: Where can you find whales in a desert?</p> <p><a href="#">Mystery Science Birth of Rocks Mystery 4</a>: What did your town look like 100 million years ago?</p> <p><a href="#">Canvas Lessons</a> Weeks 7 - 8</p> <p><a href="#">Assessment: Fossils in Utah (USBE)</a></p> <p><a href="#">Gr 4 OER Textbook</a></p>	<p><u>Leveled Readers</u> Unit 2 Week 3 - Saving San Francisco Bay</p>


## Strand 4.2: Energy Transfer

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

Strand 4.2: Energy Transfer			Suggested Pacing - 10 weeks
Standard 4.2.1			2 weeks
<p>4.2.1 <b>Construct an explanation</b> to describe the <u>cause and effect</u> relationship between the speed of an object and the energy of that object. Emphasize using qualitative descriptions of the relationship between speed and energy like fast, slow, strong, or weak. An example could include a ball that is kicked hard has more energy and travels a greater distance than a ball that is kicked softly. (PS3.A)</p>			
<p>PS3.A The faster a given object is moving, the more energy it possesses. Energy can be moved from place to place by moving objects.</p>			
Learning Targets	Success Criteria	Resources	Wonders Alignment
<p>I am learning about the relationship between the speed of an object and the energy of that object.</p> <p>I am learning to describe cause and effect relationships.</p>	<p>I can construct an explanation about the relationship between the speed of an object and the energy of that object using evidence from observations, measurements, and patterns.</p>	<p><a href="#">GSD Model Lesson Energy in Sports Pull Back Car Investigation Simulation: Energy Skate Park (Review)</a></p> <p><a href="#">Mystery Science Energizing Everything Anchor Phenomenon: Rube Goldberg Machine</a></p> <p><a href="#">Mystery 1: How is your body similar to a car?</a></p> <p><a href="#">Canvas Lessons</a> Weeks 11 - 12</p> <p><a href="#">Assessment: Toy Cars (USBE)</a></p> <p><a href="#">Gr 4 OER Textbook</a></p>	<p><a href="#">Reading/Writing Workshop</a> Unit 1 Week 4 - The Big Race</p> <p><a href="#">Literature Anthology</a> Unit 1 Week 4 - A Crash Course in Forces and Motion with Max Axiom, The Box-Zip Project</p> <p><a href="#">Leveled Readers</a> Unit 1 Week 4 - George's Giant Wheel</p>

<b>Strand 4.2: Energy Transfer</b>	<b>Suggested Pacing - 10 weeks</b>
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<b>Standard 4.2.2</b>	<b>3 weeks</b>
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 **4.2.2 Ask questions** and make observations about the changes in energy that occur when objects collide. Emphasize that energy is transferred when objects collide and may be converted to different forms of energy. Examples could include changes in speed when one moving ball collides with another or the transfer of energy when a toy car hits a wall. (PS3.B, PS3.C)

PS3.B Energy is present whenever there are moving objects, sound, light, or heat. When objects collide, energy can be transferred from one object to another, thereby changing their motion. In such collisions, some energy is typically also transferred to the surrounding air; as a result, the air gets heated and sound is produced.

PS3.C When objects collide, the contact forces transfer energy so as to change the objects' motions.


<b>Learning Targets</b>	<b>Success Criteria</b>	<b>Resources</b>	<b>Wonders Alignment</b>
<p>I am learning about how energy transfers when objects collide.</p> <p>I am learning to ask scientific questions.</p> <p>I am learning to make observations in order to answer scientific questions.</p>	<p>I can ask questions about collisions that can be investigated.</p> <p>I can make and record observations during an investigation to describe the changes in energy that occur when objects collide.</p>	<p><a href="#">GSD Model Lesson Colliding Objects with Newton's Cradles Sledding Phenomenon</a></p> <p><a href="#">Mystery Science Energizing Everything</a></p> <p><a href="#">Mystery 2: What makes roller coasters go so fast?</a></p> <p><a href="#">Mystery 3: Why is the first hill of a roller coaster always the highest?</a></p> <p><a href="#">Canvas Lessons Weeks 13 - 15</a></p> <p><a href="#">KY Through Course Task - What an Impact</a></p> <p><a href="#">Assessment: Bumper Cars (USBE)</a></p> <p><a href="#">Gr 4 OER Textbook</a></p>	<p><a href="#">Reading/Writing Workshop</a> Unit 1 Week 4 - The Big Race</p> <p><a href="#">Literature Anthology</a> Unit 1 Week 4 - A Crash Course in Forces and Motion with Max Axiom, The Box-Zip Project</p> <p>Unit 5 Week 3 - Energy is Everywhere!</p> <p><a href="#">Leveled Readers</a> Unit 1 Week 4 - George's Giant Wheel</p>



Strand 4.2: Energy Transfer		Suggested Pacing - 10 weeks	
Standard 4.2.3		3 weeks	
<p> <b>4.2.3 Plan and carry out an investigation</b> to gather evidence from observations that <u>energy</u> can be transferred from place to place by sound, light, heat, and electrical currents. Examples could include sound causing objects to vibrate and electric currents being used to produce motion or light. (PS3.A, PS3.B)</p>			
<p>PS3.A Energy can be moved from place to place by moving objects or through sound, light, or electric currents.</p> <p>PS3.B Energy can also be transferred from place to place by electric currents, which can then be used locally to produce motion, sound, heat, or light. The currents may have been produced to begin with by transforming the energy of motion into electrical energy.</p>			
Learning Targets	Success Criteria	Resources	Wonders Alignment
<p>I am learning about how energy can be transferred from place to place by moving objects, sound, light, or electric currents.</p> <p>I am learning about how electric currents transfer energy that can then be used for motion, sound, heat, or light.</p>	<p>I can work collaboratively to plan and carry out an investigation to explain how energy can be transferred from one place to another.</p>	<p><a href="#">GSD Model Lesson Energy and Electricity: The Game of Operation</a></p> <p><a href="#">Mystery Science Energizing Everything</a></p> <p><a href="#">Mystery 4:</a> Could you knock down a building using only dominoes?</p> <p><a href="#">Mystery 5:</a> Can you build a chain reaction machine?</p> <p><a href="#">Mystery 7:</a> How long did it take to travel across the country before cars and planes?</p> <p><a href="#">Canvas Lessons</a> Weeks 16 - 17</p> <p><a href="#">Assessment: Tea Kettle (USBE)</a></p> <p><a href="#">Gr 4 OER Textbook</a></p>	<p><a href="#">Reading/Writing Workshop</a> Unit 6 Week 3 - The Great Energy Debate</p> <p><a href="#">Literature Anthology</a> Unit 2 Week 3 - Energy in the Ecosystem Unit 5 Week 3 - Energy is Everywhere!, How Ben Franklin Stole the Lightning Unit 5 Week 4 - A Drop of Water Unit 6 Week 3 - Energy Island</p> <p><a href="#">Leveled Readers</a> Unit 6 Week 3 - Planet Power</p>

<b>Strand 4.2: Energy Transfer</b>	<b>Suggested Pacing - 10 weeks</b>
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<b>Standard 4.2.4</b>	<b>2 weeks</b>
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 **4.2.4 Design** a device that converts energy from one form to another. *Define the problem, identify criteria and constraints, develop possible solutions using models, analyze data from testing solutions, and propose modifications for optimizing a solution.* Emphasize identifying the initial and final forms of energy. Examples could include solar ovens that convert light energy to heat energy or a simple alarm system that converts motion energy into sound energy. (PS3.B, PS3.D, ETS1.A, ETS1.B, ETS1.C)

PS3.B Energy can also be transferred from place to place by electric currents, which can then be used locally to produce motion, sound, heat, or light. The currents may have been produced to begin with by transforming the energy of motion into electrical energy (e.g., moving water driving a spinning turbine which generates electric currents).

PS3.D The expression “produce energy” typically refers to the conversion of stored energy into a desired form for practical use—for example, the stored energy of water behind a dam is released so that it flows downhill and drives a turbine generator to produce electricity. Food and fuel also release energy when they are digested or burned. When machines or animals “use” energy, most often the energy is transferred to heat the surrounding environment.

ETS1.A Possible solutions to a problem are limited by available materials and resources (constraints). The success of a designed solution is determined by considering the desired features of a solution (criteria).


ETS1.B Tests are often designed to identify failure points or difficulties, which suggest the elements of the design that need to be improved.

ETS1.C Different solutions need to be tested in order to determine which of them best solves the problem, given the criteria and the constraints.

<b>Learning Targets</b>	<b>Success Criteria</b>	<b>Resources</b>	<b>Wonders Alignment</b>
<p>I am learning how energy can be converted from one form to another.</p> <p>I am learning about criteria and constraints in an engineering problem.</p> <p>I am learning to generate and compare solutions to determine which solution best solves the problem.</p>	<p>I can design a device that converts energy from one form to another.</p> <p>I can identify the initial and final forms of energy in my device.</p> <p>I can test my device and explain the elements of my device that could be improved based on how well my device meets the criteria and constraints.</p>	<p><a href="#">GSD Model Lesson Energy and Electricity: Operation Game Engineer An Alarm System</a></p> <p><a href="#">Mystery Science Energizing Everything Mystery 6:</a> What if there were no electricity?</p> <p><a href="#">Performance Task:</a> Can you turn on a flashlight without touching it?</p> <p><a href="#">Mystery 8:</a> Renewable Energy and Natural Resources</p> <p><a href="#">Canvas Lessons</a> Weeks 18 - 19/20</p> <p><a href="#">Assessment: Producing Electricity (USBE)</a></p> <p><a href="#">Gr 4 OER Textbook</a></p>	No alignment


### Strand 4.3: Wave Patterns

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

Strand 4.3: Wave Patterns			Suggested Pacing - 7 weeks
Standard 4.3.1			3 weeks
<p> 4.3.1 <b>Develop and use a model</b> to describe the regular <u>patterns</u> of waves. Emphasize patterns in terms of amplitude and wavelength. Examples of models could include diagrams, analogies, and physical models such as water or rope. (PS4.A)</p>			
<p>PS4.A Waves, which are regular patterns of motion, can be made in water by disturbing the surface. When waves move across the surface of deep water, the water goes up and down in place; it does not move in the direction of the wave except when the water meets the beach.</p> <p>Waves of the same type can differ in amplitude (height of the wave) and wavelength (spacing between wave peaks).</p>			
Learning Targets	Success Criteria	Resources	Wonders Alignment
<p>I am learning how waves transfer energy from place to place.</p> <p>I am learning to describe wave patterns by describing the amplitude and wavelength of different waves.</p>	<p>I can develop a model that shows wave patterns by describing the amplitude and wavelength of waves.</p> <p>I can explain how to change the amplitude or wavelength of a wave that I make with a rope.</p>	<p><a href="#">GSD Model Lesson</a>  <a href="#">Intro to Waves Water</a>  <a href="#">Sound Waves</a></p> <p><a href="#">Mystery Science Waves of Sound</a>  <a href="#">Anchor Phenomenon:</a> Seeing Sound  <a href="#">Mystery 1:</a> How far can a whisper travel?  <a href="#">Mystery 2:</a> What would happen if you screamed in outer space?  <a href="#">Mystery 3:</a> Why are some sounds high and some sounds low?  <a href="#">Performance Task:</a> How can you make sound waves visible?</p> <p><a href="#">Canvas Lessons</a>            Weeks 21 - 24</p> <p><a href="#">Assessment: Waves (USBE)</a></p> <p><a href="#">Gr 4 OER Textbook</a></p>	<p><a href="#">Literature Anthology</a>            Unit 1 Week 3 - Earthquakes</p>

<b>Strand 4.3: Wave Patterns</b>	<b>Suggested Pacing - 7 weeks</b>
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<b>Standard 4.3.2</b>	<b>2 weeks</b>
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 **4.3.2 Develop and use a model** to describe how visible light waves reflected from objects enter the eye causing objects to be seen. Emphasize the reflection and movement of light. The structure and function of organs and organ systems and the relationship between color and wavelength will be taught in Grades 6 through 8. (PS4.B)

PS4.B An object can be seen when light reflected from its surface enters the eyes.


<b>Learning Targets</b>	<b>Success Criteria</b>	<b>Resources</b>	<b>Wonders Alignment</b>
<p>I am learning about how light travels and can reflect off of objects.</p> <p>I am learning about how the movement of light and reflection allows us to see objects.</p>	<p>I can develop a model to show how light travels allowing us to see an object.</p>	<p><a href="#">GSD Model Lesson</a>  <a href="#">Light and Seeing Objects</a></p> <p><a href="#">Mystery Science Human Machine</a>  <a href="#">Mystery 2:</a> What do people who are blind see?  <a href="#">Mystery 3:</a> How can some animals see in the dark?</p> <p><a href="#">Canvas Lessons</a>            Weeks 25 - 26</p> <p><a href="#">Assessment: Rearview Mirror (USBE)</a></p> <p><a href="#">Gr 4 OER Textbook</a></p>	<p>No alignment</p>

Strand 4.3: Wave Patterns		Suggested Pacing - 7 weeks	
Standard 4.3.3		2 weeks	
<p>4.3.3 <b>Design a solution</b> to an information transfer problem using wave <u>patterns</u>. <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. (PS4.C, ETS1.A, ETS1.B, ETS1.C)</p>			
<p>PS4.C Digitized information can be transmitted over long distances without significant degradation. High-tech devices, such as computers or cell phones, can receive and decode information— convert it from digitized form to voice—and vice versa.</p> <p>ETS1.A, ETS1.B, ETS1.C Possible solutions to a problem are limited by available materials and resources (constraints). The success of a designed solution is determined by considering the desired features of a solution (criteria). Different proposals for solutions can be compared on the basis of how well each one meets the specified criteria for success or how well each takes the constraints into account. Research on a problem should be carried out before beginning to design a solution. Testing a solution involves investigating how well it performs under a range of likely conditions. At whatever stage, communicating with peers about proposed solutions is an important part of the design process, and shared ideas can lead to improved designs. Tests are often designed to identify failure points or difficulties, which suggest the elements of the design that need to be improved. Testing a solution involves investigating how well it performs under a range of likely conditions. Different solutions need to be tested in order to determine which of them best solves the problem, given the criteria and the constraints.</p>			
Learning Targets	Success Criteria	Resources	Wonders Alignment
<p>I am learning about how information can be transferred over long distances using waves and patterns.</p> <p>I am learning how to design solutions to an information transfer problem.</p> <p>I am learning to compare solutions based on how well the solutions meet the criteria and take into account the constraints.</p>	<p>I can apply what I have learned about waves and patterns to design a solution for transferring information.</p> <p>I can communicate my solution by writing an explanation and/or developing a model.</p> <p>I can evaluate my solution by reflecting on how well the solution meets the criteria and takes into account the constraints.</p>	<p><a href="#">GSD Model Lesson Information Transfer</a></p> <p><a href="#">Canvas Lessons</a> Weeks 27 - 28</p> <p><a href="#">Assessment: Cell Phone Message (USBE)</a></p> <p><a href="#">Gr 4 OER Textbook</a></p>	<p>No alignment</p>

### Strand 4.4: Observable Patterns in the Sky

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

Strand 4.4: Observable Patterns in the Sky		Suggested Pacing - 5 weeks	
Standard 4.4.1		2 weeks	
4.4.1 <b>Construct an explanation</b> that differences in the apparent brightness of the Sun compared to other stars is due to the relative distance ( <u>scale</u> ) of stars from Earth. Emphasize relative distance from Earth. (ESS1.A)			
ESS1.A The sun is a star that appears larger and brighter than other stars because it is closer. Stars range greatly in their distance from Earth.			
Learning Targets	Success Criteria	Resources	Wonders Alignment
<p>I am learning about why the Sun is brighter than other stars.</p> <p>I am learning about distance and scale in the universe.</p>	<p>I can use evidence and reasoning about scale to explain why the Sun is brighter than other stars.</p>	<p><a href="#">GSD Model Lesson Bright Stars</a></p> <p><a href="#">Mystery Science Spaceship Earth Mystery 6</a>: How can the Sun help us explore other planets?</p> <p><a href="#">Mystery 8</a>: Could there be life on other planets?</p> <p><a href="#">Canvas Lessons</a> Weeks 29 - 30</p> <p><a href="#">Assessment: Stars and the Sun (USB)</a></p>	<p><a href="#">Literature Anthology</a> Unit 4 Week 4 - Why Does the Moon Change Shape</p>

<b>Strand 4.4: Observable Patterns in the Sky</b>		<b>Suggested Pacing - 5 weeks</b>	
<b>Standard 4.4.2</b>		<b>3 weeks</b>	
<p> <b>4.4.2 Analyze and interpret data</b> of observable <u>patterns</u> to show that Earth rotates on its axis and revolves around the Sun. Emphasize patterns that provide evidence of Earth’s rotation and orbits around the Sun. Examples of patterns could include day and night, daily changes in length and direction of shadows, and seasonal appearance of some stars in the night sky. Earth’s seasons and its connection to the tilt of Earth’s axis will be taught in Grades 6 through 8. (ESS1.B)</p>			
<p>ESS1.B The orbits of Earth around the sun and of the moon around Earth, together with the rotation of Earth about an axis between its North and South poles, cause observable patterns. These include day and night; daily changes in the length and direction of shadows; and different positions of the sun, moon, and stars at different times of the day, month, and year.</p> <p>Some objects in the solar system can be seen with the naked eye.</p> <p>Planets in the night sky change positions and are not always visible from Earth as they orbit the sun. Stars appear in patterns called constellations, which can be used for navigation and appear to move together across the sky because of Earth’s rotation.</p>			
<b>Learning Targets</b>	<b>Success Criteria</b>	<b>Resources</b>	<b>Wonders Alignment</b>
<p>I am learning about how Earth moves in space.</p> <p>I am learning to relate the observations that I make on Earth to the movement of the Earth-Sun system.</p>	<p>I can analyze data about shadows to find patterns and relate these patterns to the location of the Sun in the sky.</p> <p>I can write an explanation or develop a model to explain what causes day and night.</p> <p>I can write an explanation or develop a model to explain why we see different stars during different times of the year.</p>	<p><a href="#">GSD Model Lesson Changing Shadows</a></p> <p><a href="#">Mystery Science Spaceship Earth Mystery 1</a>: How fast does the Earth spin?</p> <p><a href="#">Mystery 2</a>: Who set the first clock?</p> <p><a href="#">Mystery 3</a>: How can the Sun tell you the season?</p> <p><a href="#">Mystery 4</a>: Why do the stars change with the seasons?</p> <p><a href="#">Canvas Lessons</a> Weeks 31, 32, &amp; 36/37</p> <p><a href="#">Assessment: Tree Shadows (USBE)</a></p>	<p><a href="#">Reading/Writing Workshop</a> Unit 4 Week 4 - Wonders of the Night Sky</p> <p><a href="#">Literature Anthology</a> Unit 4 Week 4 - Why Does the Moon Change Shape</p> <p><a href="#">Leveled Readers</a> Unit 4 Week 4 - Stargazing</p>

<b>All Strands</b>			
<b>Review</b>			<b>2 weeks</b>
Ideas for preparing students for the RISE.			
<b>Learning Targets</b>	<b>Success Criteria</b>	<b>Resources</b>	<b>Wonders Alignment</b>
<p>I am learning to use scientific reasoning to figure out answers to questions about new phenomena.</p> <p>I am learning to gather information from simulations and virtual investigations to answer questions.</p>	<p>I can apply my knowledge of science concepts and practices to answer questions about a new phenomenon.</p>	<p><a href="#">Utah RISE Benchmarks</a> 4.1.3, 4.3.1, 4.3.2</p> <p><a href="#">PhET Simulations</a> Collision Lab Circuit Construction Kit: DC Energy Skate Park Basics Energy Forms and Changes Waves Intro Wave on a String <a href="#">PhET Review Worksheets</a></p> <p><a href="#">Canvas Lessons</a> Weeks 33-35</p>	<p>No alignment</p>