

**PRESTON PUBLIC SCHOOLS**  
**Science Curriculum Revision to Align with NGSS**  
**Unit Plan Organizer**  
**4<sup>th</sup> Grade**

Grade Level	Unit Name	Unit Theme/Description	NGS Standards Included
4	Plant, Growth, Development, and Reproduction;  Human Machine	<p>The students will plant Wisconsin Fast Plants and house them in a light house. They will observe, water, and measure as they go from seed to seed in 40 days. They will pollinate them with dried bees when the plants develop flowers. Then when the seed pods dry they will harvest the new seeds.</p> <p>The students will explore senses and consider how the information we process helps us understand and react to our environment.</p>	<p>4-PS4-2 Develop a model to describe that light reflecting from objects and entering the eye allows objects to be seen;</p> <p>4-LS1-1 Construct an argument that plants and animals have internal and external structures that function to support survival, growth, behavior, and reproduction;</p> <p>4-LS1-2 Use a model to describe how animals receive different types of information through their senses, process the information in their brain, and respond to the information in different ways.</p> <p>Science &amp; Engineering Practices:</p> <ul style="list-style-type: none"> <li>--Students will grow plants, observe, measure, model (pollinate) the interaction between the plant and the bee and observe and identify its importance and function in our world;</li> <li>--Students will build a model of an eyeball that they then use to construct an explanation of why some people have blurry vision;</li> <li>--Students conduct an investigation to see how pupils change in response to light. Students build a model of an eye to explain how changes in pupil size changes the image that appears on the retina;</li> </ul>

			<p>--Students conduct investigations to explore how the brain processes information and responds to that information. Students analyze and interpret data from the investigations to determine how fast their reflexes are.</p> <p><b>Cross-cutting Concepts:</b>  --Students think about how the eye works as a system of different parts that interact to facilitate vision. Students consider how light interacts with the system to determine what images we see. (cause and effect);  --Students continue to think about how the eye works as a system and how changes to each part impact the system as a whole. Students also reason about the effect of changes in pupil size (cause and effect);  --Students identify patterns based on how their brains process information.</p>
4	Birth of Rocks	Students will develop an appreciation for the processes that shape the Earth's surface. After considering where volcanoes come from and how they erupt, they turn to investigations of rocks breaking apart and creating potential hazards. Through hands-on investigations, students explore the world of rocks and design ways of protecting humans from their dangers.	<p>4-ESS1-1 Identify evidence from patterns in rock formations and fossils in rock layers to support an explanation for changes in a landscape over time;  4-ESS2-1 Make observations and/or measurements to provide evidence of the effects of weathering or the rate of erosion by water, ice, wind, or vegetation;  4-ESS2-2 Analyze and interpret data from maps to describe patterns of Earth's features;  4-ESS3-2 Generate and compare multiple solutions to reduce the impact of natural Earth processes on humans.</p> <p><b>Science &amp; Engineering Practices:</b>  --Students analyze and interpret data from recent</p>

			<p>volcanic eruptions. They use their findings as evidence for an argument that volcanoes are (or are not) likely to erupt in their back yard;</p> <p>--Students conduct an investigation to construct an explanation for why some volcanoes explode and why some do not. Students model thick and thin lava to conduct their investigations;</p> <p>--Students conduct an investigation by modeling how rocks erode over time. Students conduct an explanation of why rocks erode;</p> <p>--Students design solutions to protect their “homes” from rock slides. Students argue for the merits of their design.</p> <p><b>Cross-Cutting Concepts:</b></p> <p>--Students identify patterns about the location of the world’s volcanoes and use these patterns as evidence to support an argument about why a volcano may or may not erupt in their back yard;</p> <p>--Students reason about the cause and effect of the type of lava (cause) and the nature of the eruption (effect) as well as the shape of the volcano (effect);</p> <p>--Students consider the cause and effect of ice and root wedging on rock as it is broken down into small pieces;</p> <p>--Engineering a solution to landslide hazards depends on scientific knowledge about the causes of landslides.</p>
4	Energizing Everything	<p>Students will explore how energy makes things go from powering vehicles to moving one’s body. Students will experiment with rubber band racers to discover the relationship between how much energy is stored in a material and how much is released. They will investigate the role that hills play in making roller coasters move and the</p>	<p>4-PS3-1 Use evidence to construct an explanation relating the speed of an object to the energy of that object;</p> <p>4-PS3-2 Make observations to provide evidence that energy can be transferred from place to place by sound, light, heat, and electric currents;</p> <p>4-PS3-3 Make observations to provide evidence that energy can be transferred from place to place by sound, light, heat,</p>

		<p>energy transfer that happens when two objects collide. Students will realize that thinking about the world in terms of energy helps them make sense of how and why things speed up and slow down. Hands-on activities focus on engineering, testing hypotheses, and using results to develop their ideas.</p>	<p>and electric currents;  4-PS3-4 Apply scientific ideas to design, test, and refine a device that converts energy from one form to another;  4-ESS3-1 Obtain and combine information to describe that energy and fuels are derived from natural resources and their uses affect the environment.</p> <p><b>Science &amp; Engineering Practices:</b>  --Students build rubber band racers and use them to carry out an investigation to examine the relationship between stored energy and motion. Students analyze and interpret data from their races. As engineers, students modify their racers to improve how well they move;  --Students build a model of a roller coaster and carry out an investigation using marbles. Students analyze and interpret data from the model to explain the connection between height, energy, and motion;  --Students discuss an investigation using a model roller coaster to determine how energy can be stored in the hills of the coaster and how that energy is released to make the marbles go different distances. Students analyze and interpret data from the model to explain how the heights of different hills give marbles the energy to roll;  --Students begin to design a chain reaction machine. They start by figuring out how to connect two components of the chain reaction: the lever and the slide;  --Students design a chain reaction machine that displays a message at the end. The chain reaction machines use multiple components to transfer energy from one part to the next;  --Students design flashlights using batteries, lights and tin foil. Students experiment with different</p>
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			<p>ways of constructing their flashlights so that they turn on and off.</p> <p><b>Cross-cutting Concepts:</b></p> <ul style="list-style-type: none"> <li>--Students explain how energy can be stored and released using a rubber band. The amount of energy that can be put into the system is related to the amount of energy that is released;</li> <li>--Students consider how energy is stored and released in a system as they experiment with their marble coasters;</li> <li>--Students consider the ways in which energy can be stored and released as they trace the path of energy through a chain reaction;</li> <li>--Electricity is a form of energy that can be stored and transferred via wires, where it is used to produce not only movement, but also light, heat, and more.</li> </ul>
4	Waves of Sound	<p>This unit helps students develop the idea that sound is an actual thing, a wave of vibrations traveling through the air. Equipped with this understanding, students can begin to make sense of how sound and music work.</p>	<ul style="list-style-type: none"> <li>--4-PS4-1 Develop a model of waves to describe patterns in terms of amplitude and wavelength and that waves can cause objects to move;</li> <li>--4-PS4-3 Generate and compare multiple solutions that use patterns to transfer information;</li> </ul> <p><b>Science &amp; Engineering Practices:</b></p> <ul style="list-style-type: none"> <li>--Students document their understanding of how vibrations travel using a model of their paper cup telephones. Students can design their own series of investigations to figure out how to make their telephone work better in different circumstances. Students construct their explanation of how the telephone works. Students extend the lesson by developing a way to send a message using patterns of sounds;</li> <li>--Students conduct investigations with balloons to experience the vibrations caused by sound of their</li> </ul>

			<p>voices. Students construct an explanation that sound is a vibration. Students can develop a model to explain how sound travels through a medium and how it can cause distant objects to move;</p> <p>--Students analyze and interpret data from oscilloscopes to determine how wave lengths differ between how high and low pitched sounds. Students make claims and argue from evidence about which wavelength patterns were generated from different pitches. Students then use a rope to model waves created by different pitches and begin to explore the relationship between wavelength and frequency.</p> <p><b>Cross-cutting Concepts:</b></p> <p>--Students identify patterns about the relationship between the tension of the string and the quality of the sound it produces. Students also investigate patterns in how different materials affect the quality of the sound that is transmitted;</p> <p>--Students consider the effect of vibrations on the movement of distant objects;</p> <p>--Students identify and analyze the oscilloscope patterns made by sounds with low or high pitches.</p>
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