

<b>Content:</b> Science	<b>Grade or Course:</b> 4th Grade	<b>Date Developed:</b> 5/16/2018
<p><b>Overview:</b> Fourth grade requires students to think critically about waves, energy and energy transfer, land changes, and how different structures help living organisms survive. Students are expected to develop an understanding that energy can be transferred from place to place by sound, light, heat, and electric currents or from object to object through collisions. Students are able to describe patterns of waves in terms of amplitude and wavelength, and that waves can cause objects to move. They apply their understanding of energy to design, test, and refine a device that converts energy from one form to another. Students are expected to develop understanding of the effects of weathering or the rate of erosion by water, ice, wind, or vegetation. They apply their knowledge of natural Earth processes to generate and compare multiple solutions to reduce the impacts of such processes on humans. In order to describe patterns of Earth's features, students analyze and interpret data from maps. Fourth graders are expected to develop an understanding that plants and animals have internal and external structures that function to support survival, growth, behavior, and reproduction. Students are able to use evidence to construct an explanation of the relationship between the speed of an object and the energy of that object.</p>		
<p><b>Essential Questions:</b></p> <p><b>Physical Science Essential Questions:</b></p> <ul style="list-style-type: none"> <li>- What are waves and what are some things they can do?</li> <li>- What is energy and how is it related to motion?</li> <li>- How is energy transferred?</li> <li>- How can energy be used to solve a problem?</li> </ul> <p><b>Life Science Essential Questions:</b></p> <ul style="list-style-type: none"> <li>- How do internal and external structures support the survival, growth, behavior, and reproduction of plants and animals?</li> </ul> <p><b>Earth Science Essential Questions:</b></p> <ul style="list-style-type: none"> <li>- How can water, ice, wind, and vegetation change the land?</li> <li>- What patterns of Earth's features can be determined with the use of maps?</li> </ul>		
<p><b>EO's addressed to proficiency level:</b></p> <p><b>Asking questions and defining problems:</b></p> <ol style="list-style-type: none"> <li>a. Ask questions about what would happen if a variable were changed.</li> <li>b. Identify scientific (testable) and not-scientific (non-testable) questions.</li> <li>c. Ask questions that can be investigated and predict reasonable outcomes.</li> <li>d. Use prior knowledge to describe problems that can be solved.</li> <li>e. Design a simple design problem that can be solved through the development of an object, tool, process, or system.</li> </ol> <p><b>Planning and carrying out investigations:</b></p>		

- a. Plan and conduct an investigation collaboratively to produce data to serve as the basis for evidence.
- b. Use fair tests in which variables are controlled and the numbers of trials considered.
- c. Evaluate appropriate methods and/or tools for collecting data.
- d. Make observations and/or measurements to produce data to serve as the basis for evidence for an explanation of a phenomenon or test a design solution.
- e. Make predictions about what would happen if a variables changes.
- f. Test different models of the same proposed object, tool, or process to determine which better meets criteria for success.

**Analyzing and interpreting data:**

- a. Represent data in tables and/or various graphical representations to reveal patterns that indicate relationships.
- b. Compare and contrast data collected by different groups in order to discuss similarities and differences in their findings.
- c. Analyze data to refine a problem statement or design.
- d. Use data to evaluate and refine design solutions.

**Obtaining, evaluating, and communicating information:**

- a. Read and comprehend grade-appropriate complex texts and/or reliable media to summarize, obtain scientific and technical ideas, and describe how they are supported by evidence.
- b. Combine information in written text with that contained in tables, diagrams, and/or charts to support.
- c. Obtain and combine information from books and/or reliable media to explain phenomena or solutions to a design problem.
- d. Communicate scientific and/or technical information orally, and/or in written format.

**Standards:**

**Energy**

4-PS3-1. Use evidence to construct an explanation relating the speed of an object to the energy of that object.

4-PS3-2. Make observations to provide evidence that energy can be transferred from place to place by sound, light, heat, and electric currents.

4-PS3-3. Ask questions and predict outcomes about the changes in energy that occur when objects collide.

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 that their uses affect the environment.

**Waves: Waves and Information**

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.

4-PS4-3. Generate and compare multiple solutions that use patterns to transfer information.

**Structure, Function, and Information Processing**

4-PS4-2. Develop a model to describe that light reflecting from objects and entering the eye allows objects to be seen.

4-LS1-1. Construct an argument that plants and animals have internal and external structures that function to support survival, growth, behavior, and reproduction.

4-LS1-2. Use a model to describe that animals receive different types of information through their senses, process the information in their brain, and respond to the information in different ways.

**Earth's Systems: Processes that Shape the Earth**

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 impacts of natural Earth processes on humans.

**Units:****Physical Science Units**

- Physics of Sound (musical instrument engineering with music teacher)

**Life Science Units**

- Crayfish Structure/Function

**Earth Science Units**

- Maine Land Formation

**Assessments:**

Sound

Crayfish

Land

