

**Grade Level / Content Area: 4th Grade Science Energy Unit
Curriculum**

Course Description:

After watching a video clip of a singer shattering a glass with his voice, students will gather evidence from a range of activities to explain how the singer is able to do this. The scientific explanation behind this event includes big science ideas around energy transfer and transformation and requires an understanding of the particulate nature of matter (to some degree). Throughout the unit, students should have opportunities to create and revise their own models of this glass-shattering event; however, students should also apply what they understand about sound energy to other phenomenon relevant to their own lives. (Example may include: loud airplanes flying over their neighborhoods, how guitars or other instruments work, or hearing loud music through walls from their sibling's/ neighbor's room.)

Big Ideas: *Course Objectives / Content Statement(s)*

<p>Essential Questions</p> <p>How does can we explain the relationship between energy, forces, and matter? How does understanding how sound travels impact our lives?</p>	<p>Enduring Understandings</p> <p>Students will understand that...</p> <ol style="list-style-type: none"> 1. Energy is transferred through matter. 2. Energy can be transformed or changed from one form to another. 3. There is relationship between energy, forces, and matter. 4. Sound waves have regular patterns of motions.
<p>Areas of Focus: Proficiencies</p> <p>Students will: <i>(Enter NJCCCS or Common Core CPI's here)</i></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: Ask questions and predict outcomes about the changes in energy that occur when objects collide.</p>	<p>Examples, Outcomes, Assessments</p> <p>Instructional Focus:</p> <p>Model the transfer of energy from one object to another. Describe the relationship between energy, forces and matter. Develop models to describe phenomena. Apply scientific ideas to solve design problems.</p> <p>Sample Assessments:</p> <ul style="list-style-type: none"> - Students record observations in their science notebooks. - Students develop and edit models of the anchor phenomenon throughout the Unit. - Students complete design challenges. <p>Instructional Strategies:</p> <ul style="list-style-type: none"> - Provide students with visual, auditory and hands on approaches to learning. - Allow for multiple means of expression in

	<p>assessments.</p> <ul style="list-style-type: none"> - Use of guided notes and models. - Utilize small group and large group instruction. <p>Interdisciplinary Connections</p> <p>ELA/Literacy</p> <ul style="list-style-type: none"> -RI.4.1- refer to details and example in a text -RI.4.3- explain events, procedures, ideas or concepts in historical, scientific or technical text -RI.4.9- integrate information from 2 texts to examine a topic -W.4.2- write informative/explanatory texts to examine a top experiences or gather relevant info -W.4.9- draw evidence from literary or informational texts to support analysis reflection, and research <p>Math</p> <ul style="list-style-type: none"> -4.OA.A.3- solve multi-step word problems posed with whole numbers <i>ic</i> -W.4.7- conduct short research projects that build knowledge -W.4.8- recall relevant information from <p>Technology Integration</p> <p>Global Perspectives</p>
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The following skills and themes should be reflected in the design of units and lessons for this course or content area.

21st Century Skills:

Creativity and Innovation

Critical Thinking and Problem Solving

Communication and Collaboration

Information Literacy

Media Literacy

Life and Career Skills

21st Century Themes (as applies to content area):

Financial, Economic, Business, and Entrepreneurial Literacy

Civic Literacy

Health Literacy

Grade Level / Content Area: 4th Grade From Molecules to Organisms: Structures and Processes Unit Curriculum

Course Description:

By the end of this unit, students will know:

- The core 4 functions of organisms: growth, survival, behavior and reproduction.
- Examples of how plant and animal structures, both internally and externally, function to

fulfill life processes.

- How senses benefit animals in respect to how they respond to their environment.

Big Ideas: *Course Objectives / Content Statement(s)*

By the end of this unit, students will be able to:

- Analyze a plant or animal and explain how the internal and external features support their survival.
- Model how senses are used in respect to the brain in order to respond to their environment effectively.
- Use a model to describe that organisms receive different types of information through their senses, process the information in their brains, and respond to the information in different ways.

<p>Essential Questions <i>What provocative questions will foster inquiry, understanding, and transfer of learning?</i></p> <ul style="list-style-type: none">• How does an organism’s structure fit its function?• How do structures support the survival of plants and animals?• How are instincts and learned behaviors beneficial to organisms?• How do senses function to help an animal’s survival?	<p>Enduring Understandings <i>What will students understand about the big ideas?</i></p> <p>Students will understand that...</p> <ul style="list-style-type: none">• Animals respond to different types of information through their senses (smell, touch, taste, hear and feel) to help them survive.• There are internal and external factors that affect human, plant, and animal processes of survival.• Instincts and learned behaviors are beneficial to organisms.
<p>Areas of Focus: Proficiencies (Cumulative Progress Indicators) Students will: <i>(Enter NJCCCS or Common Core CPI’s here)</i></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 that 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>4-PS4-2. Develop a model to describe that light reflecting from objects and entering the eye allows objects to be seen.</p>	<p>Examples, Outcomes, Assessments <i>(see note below about the content of this section)</i></p> <p>Instructional Focus: Model the structures of organisms. Describe the functions of structures and how they are important to the organisms. Develop models to describe phenomena. Apply scientific ideas to solve design problems.</p> <p>Sample Assessments: - Students record observations in their science notebooks. - Students develop and edit models of the anchor phenomenon throughout the Unit. - Students complete design challenges.</p>

	<p>Instructional Strategies:</p> <ul style="list-style-type: none"> - Provide students with visual, auditory and hands on approaches to learning. - Allow for multiple means of expression in assessments. - Use of guided notes and models. - Utilize small group and large group instruction. <p>Interdisciplinary Connections</p> <p>ELA/Literacy -</p> <p>W.4.1 Write opinion pieces on topics or texts, supporting a point of view with reasons and information. (4-LS1-1)</p> <p>SL.4.5 Add audio recordings and visual displays to presentations when appropriate to enhance the development of main ideas or themes. (4-PS4-2),(4-LS1-2)</p> <p>Mathematics -</p> <p>MP.4 Model with mathematics. (4-PS4-2)</p> <p>4.G.A.1 Draw points, lines, line segments, rays, angles (right, acute, obtuse), and perpendicular and parallel lines. Identify these in two-dimensional figures. (4-PS4-2)</p> <p>4.G.A.3 Recognize a line of symmetry for a two-dimensional figure as a line across the figure such that the figure can be folded across the line into matching parts. Identify line-symmetric figures and draw lines of symmetry. (4-LS1-1)</p> <p>Technology Integration</p> <p>Global Perspectives</p>
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Civic Literacy

Health Literacy

Grade Level / Content Area: 4th Grade From Molecules to Organisms: Structures and Processes Unit Curriculum

Course Description:

In this unit of study, students develop understandings of the effects of weathering and the rate of erosion by water, ice, wind, or vegetation. The crosscutting concepts of patterns and cause and effect are called out as organizing concepts. Students demonstrate grade-appropriate proficiency in planning and carrying out investigations and constructing explanations. Students are also expected to use these practices to demonstrate understanding of the core ideas.

Big Ideas: Course Objectives / Content Statement(s)

By the end of this unit, students will be able to:

- There are gradual and rapid changes to earth's system.
- Scientists can evaluate changes to earth's system over a period of time.

<p>Essential Questions <i>What provocative questions will foster inquiry, understanding, and transfer of learning?</i></p> <ul style="list-style-type: none">• What do the shapes of landforms and rock formations tell us about the past?• How models be used to understand interactions on earth?• How has the Earth changed over time?• How does the past help us predict the future?	<p>Enduring Understandings <i>What will students understand about the big ideas?</i></p> <ul style="list-style-type: none">• Physical and chemical principles are unchanging and drive both gradual and rapid changes in the Earth system.• Models help us understand change over time.• Physical and chemical cycles on Earth (water cycle, weather, erosion, etc) drive both gradual and rapid changes of the earth's landforms.
<p>Areas of Focus: Proficiencies (Cumulative Progress Indicators) Students will: In this unit of study, students develop understandings of the effects of weathering and the rate of erosion by water, ice, wind, or vegetation. The crosscutting concepts of patterns and cause and effect are called out as organizing concepts. Students demonstrate grade-appropriate proficiency in planning and carrying out investigations and constructing explanations. Students are also expected to use these practices to demonstrate understanding of the core ideas.</p> <p>Analyze and interpret data from maps to describe patterns of Earth's features. 4-ESS2-2</p> <p>Generate and compare multiple solutions to reduce the impacts of natural Earth processes on humans. 4-ESS3-2</p>	<p>Examples, Outcomes, Assessments <i>(see note below about the content of this section)</i></p> <p>Instructional Focus: Model the types of weathering and erosion. Evaluate and describe gradual and rapid earth changes Develop models to describe phenomena. Apply scientific ideas to solve design problems.</p> <p>Sample Assessments: - Students record observations in their science notebooks. - Students develop and edit models of the anchor phenomenon throughout the Unit. - Students complete design challenges.</p> <p>Instructional Strategies: - Provide students with visual, auditory and hands on approaches to learning. - Allow for multiple means of expression in assessments. - Use of guided notes and models.</p>

	<p>- Utilize small group and large group instruction.</p> <p>Interdisciplinary Connections</p> <p>ELA/Literacy - W.4.1 Write opinion pieces on topics or texts, supporting a point of view with reasons and information. (4-LS1-1) SL.4.5 Add audio recordings and visual displays to presentations when appropriate to enhance the development of main ideas or themes. (4-PS4-2),(4-LS1-2)</p> <p>Mathematics - MP.4 Model with mathematics. (4-PS4-2) 4.G.A.1 Draw points, lines, line segments, rays, angles (right, acute, obtuse), and perpendicular and parallel lines. Identify these in two-dimensional figures. (4-PS4-2) 4.G.A.3 Recognize a line of symmetry for a two-dimensional figure as a line across the figure such that the figure can be folded across the line into matching parts. Identify line-symmetric figures and draw lines of symmetry. (4-LS1-1)</p> <p>Technology Integration</p> <p>Global Perspectives</p>
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- Examples of how plant and animal structures, both internally and externally, function to fulfill life processes.
- How senses benefit animals in respect to how they respond to their environment.

Big Ideas: *Course Objectives / Content Statement(s)*

By the end of this unit, students will be able to:

- Analyze a plant or animal and explain how the internal and external features support their survival.
- Model how senses are used in respect to the brain in order to respond to their environment effectively.

- Use a model to describe that organisms receive different types of information through their senses, process the information in their brains, and respond to the information in different ways.

<p>Essential Questions <i>What provocative questions will foster inquiry, understanding, and transfer of learning?</i></p> <ul style="list-style-type: none"> • How does an organism’s structure fit its function? • How do structures support the survival of plants and animals? • How are instincts and learned behaviors beneficial to organisms? • How do senses function to help an animal’s survival? 	<p>Enduring Understandings <i>What will students understand about the big ideas?</i></p> <p>Students will understand that...</p> <ul style="list-style-type: none"> • Animals respond to different types of information through their senses (smell, touch, taste, hear and feel) to help them survive. • There are internal and external factors that affect human, plant, and animal processes of survival. • Instincts and learned behaviors are beneficial to organisms.
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