

WAVES: LIGHT AND SOUND (1.PS.NGSS)

UNIT AT A GLANCE

ACTIVITY 1 - No Light! No Sight!

QUESTIONS: How can we find out if light is necessary to see objects?

Time to Complete	Phenomena	Summary: Students Will...
Preparation: 20 minutes Activity: 2 classes Lesson 1A: 45-50 min. Lesson 1B: 45-50 min.	Light for a Tree House: engineering challenge. Cannot see the figure in the box without light. Cannot see in the dark.	<ul style="list-style-type: none"> Brainstorm ideas about light Make observations of objects with no light shining on them and different amounts of light shining on them. Compare initial ideas about light.
Students Figure Out How To:	Practices	Performance Expectations (PE) at Lesson Level and Assessment
<ul style="list-style-type: none"> Construct explanations of the concept of how we see objects through observations. Determine that light is necessary for sight. 	Constructing Explanations Planning and Carrying Out Investigations Developing and Using Models Cause and Effect	PE at Lesson Level Develop an initial understanding of how light is necessary for sight. Formative Assessment Focus on Light chart Activity Page Journal Entry

ACTIVITY 2 - Path of Light

QUESTIONS: How can we use models to learn about how light travels ?

Time to Complete	Phenomena	Summary: Students Will...
Preparation: 15 minutes Activity: 2 classes Lesson 2A: 45-50 min. Lesson 2B: 45-50 min.	When a light shines on an object the light source must be pointed in the direction of the object. Light moves in a straight path. Students consider how the knowledge of how light travels in a straight path can be used to help solve a problem in lighting a tree house.	<ul style="list-style-type: none"> Be introduced to a problem of using available light to provide sufficient light and dark areas in a tree house. Use models to demonstrate how light travels. Make observations to determine the path of light from its source. Explore how light travels using a variety of materials.
Students Figure Out How To:	Practices	Performance Expectations (PE) at Lesson Level and Assessment
<ul style="list-style-type: none"> Construct explanations of the path of light using tools and models to demonstrate how light travels. Plan and carry out an investigation to produce evidence that light travels in a straight path. Begin to apply what they have learned to solve the problem of lighting a tree house. 	Constructing Explanations and Designing Solutions Carrying Out Investigations. Obtaining, Evaluating, and Communicating Information Developing and Using Models Patterns	PE at Lesson Level Use demonstrations and models to provide evidence of how light travels through air. Formative Assessment Activity Page Class Discussion/Focus on Light chart Journal Entry

ACTIVITY 3 - Objects In the Path of Light

QUESTIONS: What evidence can we gather to determine how different materials interact differently with light?

Time to Complete	Phenomena	Summary: Students Will...
Preparation: 10 minutes Activity: 2 classes Lesson 3A: 45-50 min. 2 class periods	Some materials allow light to pass through, block light, block only some light, and reflect light.	<ul style="list-style-type: none"> Plan and carry out an investigation into how different materials interact with light. Collect data to construct an explanation about how some materials allow light to pass through, reflect light, or block light. Design a tree house using their information about light and materials
Students Figure Out How To:	Practices	Performance Expectations (PE) at Lesson Level and Assessment
<ul style="list-style-type: none"> Use their findings about different materials and light to solve a problem of the appropriate amount of light in a tree house. 	<p>Constructing Explanations and Designing Solutions</p> <p>Planning and Carrying Out Investigations</p> <p>Obtaining, Evaluating, and Communicating Information</p> <p>Cause and Effect</p>	<p>PE at Lesson Level Use observations and data to explain how different materials interact differently with light.</p> <p>Summative Assessment Journal Entry Engineering Product and Presentation Class discussion and chart</p>

ACTIVITY 4 - What Can We Learn From a Shadow

QUESTIONS: How are shadows made?
 What can we determine from the position and length of a shadow?

Time to Complete	Phenomena	Summary: Students Will...
Preparation: 15 minutes Activity 4: 4 classes Lesson 4A: 50-55 min. Lesson 4B: 50-55 min. Lesson 4C: 50-55 min. Lesson 4D: 50-55 min.	The size and shape of shadows be changed based on the time of day. The size and shape of shadows can change by changing the position of the light source.	<ul style="list-style-type: none"> Trace and measure shadows in the morning, noon, and afternoon. Collect data from shadow measurements.
Students Figure Out How To:	Practices	Performance Expectations (PE) at Lesson Level and Assessment
<ul style="list-style-type: none"> Make measurements and collect data to construct evidence-based explanations. Plan and conduct an investigation as a member of a team to find out how the position of the light source affects the size and shape of a shadow. Use patterns in data to constructs an explanation. 	<p>Constructing Explanations and Designing Solutions</p> <p>Planning and Carrying Out Investigations</p> <p>Patterns</p> <p>Cause and Effect</p>	<p>PE at Lesson Level Obtain data through investigations to construct an explanation of how the position of a light source affects the size and shape of a shadow.</p> <p>Summative Assessment Respond to Text Team Presentations Journal Entry</p>

ACTIVITY 5 - Sounds We Have Heard

QUESTIONS: How are sounds made?

Time to Complete	Phenomena	Summary: Students Will...
Preparation: 15 minutes Activity 5: 4 classes Lesson 5A: 45-50 min. Lesson 5B: 45-50 min. Lesson 5C: 45-50 min. 2 class periods	Salt bounces or moves when a loud sound occurs nearby. Sounds are produced by vibrations. A loud sound can vibrate nearby objects.	<ul style="list-style-type: none"> Make observations of vibrating objects that produce sounds. Make observations of sounds that vibrate nearby objects. Compare a variety of sounds to determine the source of vibrations that produce the sound. Use tuning forks as a tool to demonstrate how vibrations produce sounds. Read informational text regarding sounds and vibrations.
Students Figure Out How To:	Practices	Performance Expectations (PE) at Lesson Level and Assessment
<ul style="list-style-type: none"> Produce different sounds using a variety of materials. Identify the source of vibrations that are producing the sound. Use a model to demonstrate how sound can make nearby objects vibrate. Classify sounds by their origin. Produce sounds using a variety of materials to demonstrate the source of the sound. Use information from text to construct explanations. 	<p style="color: #0070c0; margin: 0;">Developing and Using Models</p> <p style="color: #0070c0; margin: 0;">Constructing Explanations</p> <p style="color: #0070c0; margin: 0;">Obtaining, Evaluating, and Communicating Information</p> <p style="color: #70ad47; margin: 0;">Cause and Effect</p>	<p>PE at Lesson Level</p> <p>Use tools and models to provide evidence that vibrating material produces sound and the sound can make nearby objects vibrate.</p> <p>Formative Assessment</p> <p>Sounds We Hear chart Listen for Sounds chart Summary Discussion Activity Page</p> <p>Summative Assessment</p> <p>Journal Entry Respond to Text</p>

ACTIVITY 6 - Good Vibrations!

QUESTIONS: How do vibrations produce sound?

How can we investigate to find out if sounds can be heard through liquids and solids?

Time to Complete	Phenomena	Summary: Students Will...
Preparation: 20 minutes Activity 6: 4 classes Lesson 6A: 45-50 min. 2 class periods Lesson 6B: 55-60 min. 2 class periods	Design, build, and present an instrument or noise-maker using a variety of materials.	<ul style="list-style-type: none"> Develop a model of vibrations using a plucked ruler. Relate the back-and-forth motions of the ruler to vibrations. Use observations to determine if sounds can be heard in liquids and solids. Construct explanations of sound through the designing and building of instruments.

ACTIVITY 6 - Good Vibrations! - Continued

Students Figure Out How To:	Practices	Performance Expectations (PE) at Lesson Level and Assessment
<ul style="list-style-type: none"> Use a model of a plucked ruler to explain vibrations. Use the Engineering Design Plan to make a musical instrument that produces a sound. 	<p>Construct Explanations and Design Solutions</p> <p>Planning and Carrying Out Investigations.</p> <p>Developing and Using Models</p> <p>Cause and Effect</p>	<p>PE at Lesson Level Design and present a sound maker that demonstrates how vibrations produce sounds.</p> <p>Summative Assessment Journal Entries Instrument/Sound Maker and Presentation Class Discussion</p>

ACTIVITY 7 - Communicating With Light or Sound

QUESTIONS: How can we use light and/or sound to communicate?
How can we investigate to find out if sounds can be heard through liquids and solids?

Time to Complete	Phenomena	Summary: Students Will...
Preparation: 10 minutes Activity 7: 2-3 classes Lesson 7A: 45-50 min. 2 class periods	<p>Light and sound can be used to communicate over a distance.</p> <p>Design a communication system using light and/or sound to signal different community emergency personnel.</p>	<ul style="list-style-type: none"> Use the Engineering Design Plan to design and build a model of a communication system to solve a problem in a community.
Students Figure Out How To:	Practices	Performance Expectations (PE) at Lesson Level and Assessment
<ul style="list-style-type: none"> Work collaboratively. Design and demonstrate their communication system. Apply knowledge about light and sound to their engineering design. Apply their communication system to a situation. 	<p>Constructing Explanations and Designing Solutions</p> <p>Developing and Using Models</p> <p>Influence of Engineering, Technology, and Science on Society and the Natural World</p>	<p>PE at Lesson Level Work collaboratively to use tools and a variety of materials to design and develop a communication system that uses light and/or sound.</p> <p>Summative Assessment Student Presentations Journal Entry</p>