

Phoenixville Area School District Understanding by Design (UbD) Science

Grade Level: Grade 1

Unit Name: Sound and Light

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Stage 1 Desired Results		
	Transfer	
<p>Overarching NGSS & PA Standards:</p> <p>3.2.1.A Plan and conduct investigations to provide evidence that vibrating materials can make sound and that sound can make materials vibrate.</p> <p>3.2.1.B Make observations to construct an evidence-based account that objects in darkness can be seen only when illuminated.</p> <p>3.2.1.C Plan and conduct investigations</p>	<p><i>Students will be able to independently use their learning to...</i></p> <ol style="list-style-type: none"> 1. <i>Ask questions and/or define problems</i> 2. <i>Develop and/or use models</i> 3. <i>Plan and/or carry out investigations</i> 4. <i>Analyze and interpret data using computational thinking</i> 5. <i>Obtain, evaluate, and communicate information (supported by evidence)</i> 6. <i>Construct explanations and design solutions</i> 	
	Meaning-Making	
	<p><i>Students will understand...</i></p> <ol style="list-style-type: none"> 1. That sound can make matter vibrate and vibrating matter can make sound. 2. The phenomenon of sound using various objects 3. That they can use instruments to investigate how to change sound 4. That they can use various objects to explore the phenomenon of light and shadows. 5. That Objects in darkness can only be seen when illuminated 6. The phenomenon of how light travels. 	<p>ESSENTIAL QUESTIONS <i>Students will keep considering...</i></p> <ol style="list-style-type: none"> 1. <i>What is sound?</i> 2. <i>How can we change the properties of sound?</i> 3. <i>What is a shadow?</i> 4. <i>How does light travel and change direction? How do animals use light?</i>
	Knowledge and Skills Acquisition	
	<p style="text-align: center;">UNDERSTANDINGS</p> <ol style="list-style-type: none"> 1. <i>Objects in darkness can only be seen when illuminated.</i> 2. <i>Some materials allow all, some, or no light to pass through, while others create a shadow (transparent, translucent, opaque and reflective).</i> 3. <i>Sound and light waves can be used to communicate over long distances.</i> 	<p><i>Students will be skilled at...</i></p> <ol style="list-style-type: none"> 1. <i>Plan and carry out investigations constructing the explanation of the relationship of vibrations and sound.</i> 2. <i>Plan and carry out investigations constructing the explanation of the relationship between</i>
	<p style="text-align: center;">Key Vocabulary</p> <p style="text-align: center;">(bolded words are essential vocabulary)</p>	

<p>to determine the effect of placing objects made with different materials in the path of a beam of light.</p> <p>3.2.1.D Use tools and materials to design and build a device that uses light or sound to solve the problem of communicating over a distance.</p> <p>STEM</p> <p>K-2 ETS1-1 K-2 ETS1-2 K-2 ETS1-3</p> <p>Which branch(es) of science apply: PS</p>	<p>motion, observe, sound, vibrate, vibration, compare, ear, hear, identify, listen, property, tuning fork, information, loud, soft, gentle, hard, instrument, volume, length, pitch, direction, string, system, travel, communicate, message, dark, light, light source, shadow, sunlight, shade, sun, opaque, translucent, transparent, mirror, redirect, reflect, eye, reflection, light detector, vision, angle, model</p>	<p><i>darkness and illumination.</i></p> <p>3. <i>Plan and carry out investigations constructing the explanation of the relationship of light and shadows.</i></p> <p>4. <i>Construct an explanation and design a solution that allows communication over long distances.</i></p>
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Evaluative Criteria	Assessment Evidence	
<p>What criteria will be used in each assessment</p> <p>to evaluate attainment of the desired results?.</p> <p>Teacher observations notes and rubrics</p>	<p style="text-align: center;">PERFORMANCE TASK(S):</p> <ol style="list-style-type: none"> I. Given a flashlight, an object, and paper, and a pencil, students will find the answer to the following question. “Does a shadow get bigger or smaller when its closer to the source of light?” <ol style="list-style-type: none"> a. plan and carry out the investigation b. analyze the interpret the outcome c. answer the question about shadow size d. communicate the information with classmates II. Design a model that demonstrates vibration to make a sound given the following materials (rubber band, popsicle sticks, geo boards (from math), play doh). <ol style="list-style-type: none"> a. develops a model b. use a model to make a sound III. There is a garden outside and the plants are getting too much light. Design something that can protect the plants from getting too much sunlight. <ol style="list-style-type: none"> a. design and solution b. communicate the design with an illustration and labels IV. Investigations: <ol style="list-style-type: none"> 1. Task(s): Students observe the phenomenon of sound using various implements. Students look for vibrations at the sound source and come up with words to describe different sounds. They learn how to discriminate between different kinds of sounds and what information sounds convey. Students find out about sounds that different animals make. Assessment: Investigation 1 I-Check 2. Task(s): Students use simple instruments to investigate how to change the volume of sound (loud and soft) and the pitch of sound (high and low). Students develop a model to explain the phenomenon of sound traveling. They redesign a “sound tool” to make a device to both send and receive sound. Students learn about sound receivers used by different animals. Assessment: Investigation 2 I-Check 3. Task(s): Students use various materials that block light to explore the phenomena of light and shadows. They create and change shadows and investigate how light interacts with objects that are transparent, translucent, and opaque. Assessment: Investigation 3 I-Check 	<p>For labs, consider that some students may wish to:</p> <ul style="list-style-type: none"> • explain verbally instead of in a written format • draw their responses • write in their first language <p>If challenges arise with the complexity of the task(s), some students may need:</p> <ul style="list-style-type: none"> • more incremental steps • an alternative activity <p>Other considerations:</p> <ul style="list-style-type: none"> • When grouping students consider matching different skills sets • When asking students to describe a model, give them the opportunity to draw or write it, as well. • Teacher can scribe written responses for students

	<p>4. Task(s): Students explore the phenomenon of light travel by positioning mirrors to reflect images so they can see their own eyes and view objects behind them. They investigate how to use one and then two mirrors to direct light to different locations. They experience the phenomenon that objects can be seen only when light is available. They explore the shapes and location of eyes on different animals. Students read about devices that use light to communicate information.</p> <p>Assessment: Investigation 4 I-Check</p> <p>(How will students demonstrate their understanding (meaning making and transfer)?)</p>	
<p>Rubrics</p>	<p style="text-align: center;">OTHER EVIDENCE:</p> <ul style="list-style-type: none"> • Checklists of collaborative behaviors in labs and activities • Checklists of collaborative behaviors in class discussions • Journal entries 	<p>Differentiation Considerations:</p> <p>For journal entries, consider that some students may wish to:</p> <ul style="list-style-type: none"> • draw instead of write entries • write in their first language • explain verbally <p>If challenges arise with the complexity of the task(s), some students may need:</p> <ul style="list-style-type: none"> • more incremental steps • an alternative activity