

This 5E segment will introduce students to light and sound. They will use various objects to investigate light and sound understanding that objects that vibrate produce sound. Sounds and lights are also used to alert people.

Student Science Performance

Grade or course: First Grade	Title:
Topic: Sound and light	What's that sound? Do you see what I see?

Performance Expectation for GSE:
S1P1: Obtain, evaluate and communicate information to investigate light and sound.

- Use observations to construct an explanation of how light is required to make objects visible.
- Ask questions to identify and compare sources of light.
- Plan and carry out an investigation of shadows by placing objects at various points from a source of light.
- Construct an explanation to observe and provide evidence that vibrating materials can make sound and that sound can make materials vibrate.
- Design a signal that can serve as an emergency alert using light and/or sound to communicate over a distance.

Performance Expectations for Instruction:
 Students will

- study light and sound.
- explore how sound is produced through vibration.
- explore how and when shadows happen.
- discover various light sources.
- determine different ways to communicate using light or sound.

[Additional notes on student supports](#)

Materials:
Sound: Utilize children’s literature dealing with musical instruments and their sounds. chart paper, markers, various instruments (bell, guitar, triangle, cymbal, drums etc.)
Light: flashlights, lamps
String Telephones: cups, string, paper clips (Tie a knot to the paper clip and thread the string through a hole punched in the bottom of the cup. The paper clip will help hold knot of the string in place.)

Students will continuously obtain, evaluate, and communicate information. This is not a linear process. Students will communicate through writing and discussions to allow for formative assessment. This benefits the teacher, student, and whole group to guide instruction to clarify misconceptions or extend content.

Engaging Learners	<p>Phenomenon: Sound is produced when an object vibrates. Students will understand that vibrations are responsible for the sounds that we hear. Sound vibrations can travel through different objects.</p> <p>Utilize children’s literature dealing with musical instruments and their sounds. Ask students how do instruments make sound? A book about musical instruments can introduce students to sound through various descriptions of instruments. Remind students that sounds are produced when objects are vibrated and have them determine what is vibrating to cause the sound.</p> <p><i>Teacher Notes: Explain to students that vibrations are simply when objects wiggle or move.</i></p>
--------------------------	---

	<p>Obtaining: Students will discuss how various instruments make sound. Give students various sound makers to explore such as pots and pans, lids, paper towel tubes, wrapping paper tubes, guitar, cymbals, drums, triangle, drumsticks, bell, whistle, etc. Students will produce sounds using the various objects or instruments. Have them feel for vibrations as they hear the sound.</p> <p>Evaluating: Students will work with a partner and explore the various objects and determine how the sound is made. For example, students will pluck a guitar string or tightened rubber band and determine if it makes a sound and what happens if the string stops vibrating. Possible questions: What happens when the string vibrates? What happens when the string stops vibrating? Students will determine if vibrations of each object are what is causing the sound or not.</p> <p>Communicating: Ask students to think of other objects that make sound (toys, car engines, washing machines, their voice, etc.). Students will discuss what is causing the vibrations, and in turn, the sound in the objects.</p>
Exploring	<p>Obtaining: Students will work with a partner to design and make sound makers using various items such as, paper towel tubes, tissue boxes, yarn, pie tin, rubber bands, string, metal buttons, oatmeal canisters, aluminum foil, and other household items.</p> <p>Communicating: Students will discuss how their instrument use vibrations to produce sounds based in the engage activity.</p> <p>Evaluating: Groups will demonstrate their sound makers to determine how the vibrations produce the sound. Students will use different size paper towel rolls and determine if they make different sounds and why? Students will generate ideas about which paper towel holders will make the loudest sounds. Students will then explore the sound makers and determine which objects made different sounds.</p>
Formative Assessment of Student Learning	
Explaining Finalizing Model	<p>Obtaining: Students will compare their sound makers and how the objects made sound. (i.e. the string on the guitar is plucked and sound is produced). Remind students how sound is produced.</p> <p>Evaluating: Allow students who made similar plans to work together to revise their original design. Some students may want different sounds. Make the class an audience participation session so students can give each other feedback.</p> <p>Communicating: Students can revisit their designs and make any changes, discussing why changes could improve their instruments.</p>
Elaborating Applying Model to Solve a Problems	<p>Phenomenon: Obtaining: Students can watch and listen to a video clip and note that lights and sounds are used to alert us in emergency situations to keep us safe or to get our attention.</p> <p><i>Teacher Notes: videos can be found online demonstrating siren differences and other alarms (such as tornado).</i></p> <p>Extension: Ask students if they think that a paper towel roll would be a good way to alert us of an emergency? Why or why not? If not, what</p>

would be a good emergency alert? (i.e. sirens, flashing lights, horn, loud bells etc.)

How do light and sound keep us safe? Ask students what types of sounds do we hear at schools, in the community and why? (i.e. school bells, police sirens, fire truck sirens, school announcements, tornado sirens, etc.). Ask students, why they think emergency sirens make louder sounds than other sounds they hear like the TV or radio? Why do alert signals use flashing lights?

It is important that first graders understand that the vibrating object are the source that produces the sound explaining that sound is not produced without an object wiggling or vibrating. Teacher will explain to students that emergency sirens need to be louder than other sounds so people can hear them.

Teacher Notes: It is fundamental that students understand that sounds are used as emergency alerts signals to let us know that things are important or dangerous to keep us safe. Students should also understand that light is used as an emergency alert.

Phenomenon: Utilize children’s literature to introduce light. One source is [How Do I See?](#)

This online book tells students how we see things because of the way the light from different sources is reflected to our eyes.

Engage: Students will investigate sources of light. Ask students where light comes from? For example, have students make an ongoing class list of sources of light such as the sun, lamps, flashlights, fire, lightning, cell phones, computer screens, etc.

Students will classify sources of light into two groups: manmade or artificial light and natural light.

Have students make a collage of various pictures of light sources such as, lamps, lightings, headlights, sun, fire, etc. Then have students compare the sources of light and classify them as natural or artificial (manmade light).

Ask students what will happen if they put a book or their hand in front of the flashlight? Ask them how are shadows produced? Students should understand that when objects are placed in front of light, they block the light causing shadows.

Explore: Teachers can read books about shadows. Students will make their own shadows in the sun. Remind students how shadows are made. Ask students,

- Why do your shadows follow you?
- Can you see shadows on days when the sun's not shining? Why or why not?
- Can you see shadows at night? Why or why not? (Note: some

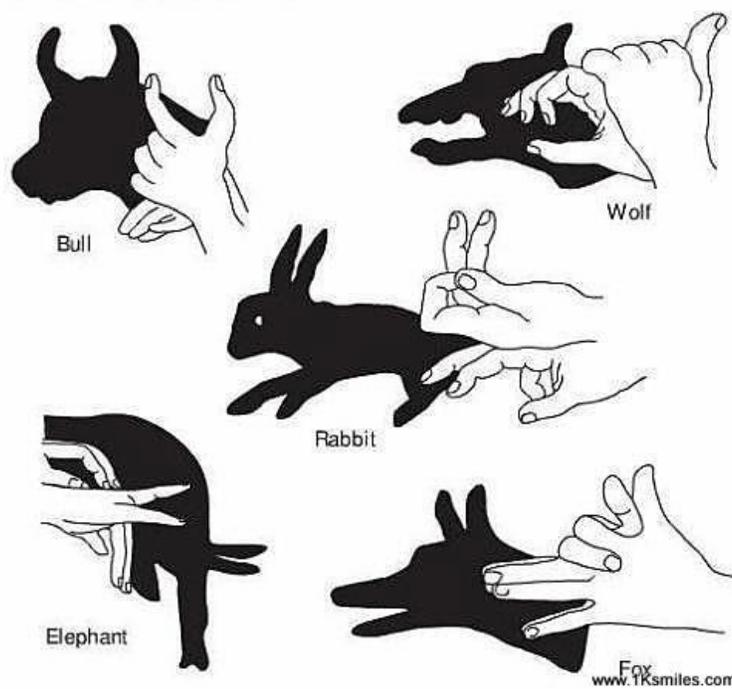
students may say no because the sun is not visible.) If so, what is the light source? Students should understand that shadows are made with other light sources as well.

Explaining:

Find the Shadow: Students will make shadows on the wall using a flashlight and their hand. Shine the flashlight on one hand. Ask students what is blocking the light? (their hand) Ask students how do they know their hand is blocking the light? (It casts a shadow on the wall.) Tell students to move the flashlight and then move their hand? What happens?

Teacher Notes: Students should understand that moving the flashlight makes the shadow move. Moving your hand close to the flashlight causes the shadow to grow or get bigger because your hand covers more of the light.

Students will enjoy making hand puppets. Challenge them to make different animals or shapes using shadows.



Elaborate:

Teacher Notes: Students should understand that we use light to make objects visible and that when objects are placed in front of the light source is produces shadows. Also, light and sound are used as alerts in an emergency situation or to gain attention to things.

Teacher Notes: It is fundamental that students understand that emergency alerts use flashing lights and loud sirens to communicate over a distance. Teacher will explain the concept of emergency alerts (i.e. Emergency alerts are used to get people's attention and help alert people in emergency situations).

	<p>Have students design a way to send a signal using light, sound or both to someone across the room or down the hall. Ideas include string telephones, flashlight, bells, etc. Have pairs of students work together to test their device and make revisions to present to the class. Display the devices and explanations of how they are used.</p> <p><i>String Telephones</i>—If using a plastic or paper cup, put a hole in the bottom. If using tin cans, with a hammer and nail make a hole in the end of each can. Thread a string 10–12 feet long through each hole. Tie a big knot at the end of each string or tie the string to a paper clip to anchor the string. Using two cans or cups as a unit, have two students take the cans and stretch the string between the cans until it is tight. Be careful not to touch the string. Have one student talk as the other listens. With the second set of telephones, have two more students loop and cross the string of the second telephone over the string of the first telephone. Now let one student talk and three students listen. (This will show students that sound waves vibrate, move, and travel through solid objects.)</p>
<i>Evaluation</i>	<p style="text-align: center;"><i>Assessment of Student Learning</i></p> <p>In science interactive notebooks or journals, students will draw pictures of sound makers and label where or how the sounds are made. Have them draw a light source and tell how shadows are made.</p>
<i>SEP, CCC, DCI</i>	Science Essentials
Science and Engineering Practices	<ul style="list-style-type: none"> ● Asking questions and defining problems ● Planning and carrying out investigations ● Constructing explanations ● Obtaining, communicating, and evaluating information
Crosscutting Concepts	<ul style="list-style-type: none"> ● Patterns ● Cause and Effect ● Structure and Function
Disciplinary Core Ideas	<p>From <u><i>A Framework for K-12 Science Education:</i></u></p> <p>PS4.A Waves and their Application in Technologies for Information Transfer</p> <p>PS4.B Electromagnetic Radiation</p> <p>PS4.C Information Technologies and Instrumentation</p>

Additional Supports for struggling learners:

The following supports are suggestions for this lesson and are not the only options to support students in the classroom. These supports target students that struggle with science material, this lesson or a previous lesson. These are generalized supports and do not take the place of IEP accommodations as required by each student’s Individualized Education Program.

General supports for the following categories:

<u>Reading:</u>	<u>Writing:</u>	<u>Math:</u>
<ol style="list-style-type: none"> 1. The teacher can have students match letters prior to reading to remind them of the alphabet. 2. The teacher can have students identify words that they know in the text as the class reads. 3. The teacher should remind students to use strategies when they are reading. 	<ol style="list-style-type: none"> 1. The teacher can provide practice for students in the area of writing both in context and practicing just letters. 2. The teacher can provide a sentence starter for the students. 3. The teacher should continually give encouragement to the students. 4. The teacher can provide constructive positive feedback during the writing process to help students understand the expectations. 	<ol style="list-style-type: none"> 1. Provide students with opportunities to interact with numbers. 2. The teacher can provide manipulatives to allow the students to count and interact with materials.

Supports for this specific lesson if needed:

Performance expectations for instruction:

1. The teacher should provide information to students in various formats to reach as many students as possible.
2. The students should be given adequate time to complete each part of the lesson.
3. The students should be allowed to express their knowledge in various formats.
4. The teacher should be sure to provide multiple ways for the students to communicate their knowledge of the material.

Engage:

1. The teacher should consider reading books about music aloud to the class.
2. The teacher should then consider showing a video of musical instruments being played and ask students to make observations.
3. The teacher should consider showing vibration and sound with a tuning fork. This explicitly shows the connection.

4. The teacher should have clear and consistent guidelines for class discussions. These guidelines are meant to help students feel more comfortable and be more likely to participate in the discussion.
5. The teacher should nudge students to try various sound makers.
6. The teacher should use flexible and intentional grouping to group students. Best practice is to use data to drive student groupings.
7. The teacher should consider having students draw their understanding of vibration.

Exploring:

1. The teacher should consider providing students with an organizer to assist with their design of the instrument.
2. The teacher should use intentional and flexible grouping to group students. Best practice is to use data to drive student groupings.

Explaining:

1. The teacher should provide clear and consistent guidelines for comparing sound makers.
2. The students should provide an explanation for any changes that they decide to make to their instrument design.
3. Students may need additional time to revise their designs.

Elaborating:

1. The teacher may need to show the video more than once.
2. The teacher should consider having a class discussion about observations of the sirens and other emergency sounds.
3. The teacher should ask students about personal experience with sirens. Most students will have, at least, heard sirens in the car with their parents.
4. Ask students to think about fire drills and the sounds related to those. Also, ask students to think about why we cannot turn the siren down.
5. Ask students to think about experiences they have with the difference between night and day.
6. The teacher can compare the lights inside to the sunlight outside.
7. The teacher can turn the lights off in the classroom and see if there is any other lights that the students can identify in the room.
8. The teacher should consider taking students outside to make observations about the day.
9. The teacher should consider using hand puppets to tell a story.
10. Then have the students try to make hand puppets.
11. The teacher should give students with an organizer to draw ideas that they have for designing an emergency signal.
12. The teacher should consider showing students string telephones and allow them to play with the string telephones.
13. Students may need additional time to complete their assignments.

Evaluating:

1. Students may need additional time to complete their assignment.
2. The teacher should be sure to provide multiple ways for the students to communicate their knowledge of the material. This could include labeling images, drawing pictures, writing or verbally explaining.