

Unit Name: Waves: Light and Sound

Time Frame: Trimester 2

Author: Egg Harbor Township STEM Committee

UNIT

Subject: **Science**

Country: **USA**

Course/Grade: **1st Grade**

State/Group: **NJ**

School: **Egg Harbor Township High School**

UNIT SUMMARY

The student will investigate the relationship between sound and vibrating materials as well as the effect of placing objects made with different materials in the path of a beam of light.

UNIT RESOURCES

- *What Living Things Need: Light*
- *Bright Lights and Shadowy Shapes*
- *My Light by Molly Bang*
- *All about light by Monica Hal*
- *The Energy we See: A Look at Light by Jennifer Boothroyd*
- *Exploring Light by Carol Ballard*
- *How do we use Light? By Daniel Nunn*
- *Me and My Shadow: A Book about Light by Buffy Silverman*
- *Barn Dance by Bill Martin*
- *Bat loves the Night by Nicola Davies*
- *Light and Sound: The Best Start in Science by Clint Twist*
- *The Sounds of a Summer Night by May Garelick*
- *Energy Makes Things Happen by Kimberly Bradley*
- *Moonbear's Shadow by Frank Asch*
- *Whose shadow is this? : a look at animal shapes--round, long, and pointy by Berge, Claire*
- *What makes day and night by Branley, Franklyn Mansfield*
- *What makes a shadow? by Bulla, Clyde Robert*
- *I see myself by Cobb, Vicki*
- *Shadow by Lee, Suzy*
- *Guess Whose Shadow by Stephen R. Swineburn*
- *Nothing sticks like a shadow by Tompert, Ann*
- *Sound by Manolis, Kay*
- *Sounds All Around by Wendy Pfeffer*
- *All about sound by Lisa Traumbauer*

Internet Resource Links:

www.brainpop.com

<http://www.sciencekids.co.nz/projects/stringphone.html>

<http://freepdfdb.com/pdf/sound-and-vibrations-grand-valley-state-university-44278741.html>

<http://freepdfdb.com/pdf/sound-amp-vibration-project-creates-welcome-31188168.html>

<http://freepdfdb.com/pdf/sound-activities-department-of-physics-purdue-university-4390654.html>

<http://freepdfdb.com/pdf/sound-and-vibrations>

<http://www.discoveryeducation.com/teachers/free-lesson-plans/the-phenomenon-of-sound-waves.cfm>

<http://www.brainpopjr.com/science/energy/light/grownups.weml>

<http://pbskids.org/zoom/activities/sci/#sound&txtSearchFor=SOUND%7CSOUNDING%7CSOUNDS%7CSOUNDNESS%7CULTRASOUND%7CSOUNDED%7CULTRASOUNDS> **Then scroll down to Sound: Listen Up

STAGE ONE

GOALS AND STANDARDS

Science:

1-PS4-1. Plan and conduct investigations to provide evidence that vibrating materials can make sound and that sound can make materials vibrate.

[Clarification Statement: Examples of vibrating materials that make sound could include tuning forks and plucking a stretched string. Examples of how sound can make matter vibrate could include holding a piece of paper near a speaker making sound and holding an object near a vibrating tuning fork.]

1-PS4-2. Make observations to construct an evidence-based account that objects can be seen only when illuminated.

[Clarification Statement: Examples of observations could include those made in a completely dark room, a pinhole box, and a video of a cave explorer with a flashlight. Illumination could be from an external light source or by an object giving off its own light.]

1-PS4-3. Plan and conduct an investigation to determine the effect of placing objects made with different materials in the path of a beam of light.

[Clarification Statement: Examples of materials could include those that are transparent (such as clear plastic), translucent (such as wax paper), opaque (such as cardboard), and reflective (such as a mirror).]

**[Assessment Boundary: Assessment does not include the speed of light.]

1-PS4-4. Use tools and materials to design and build a device that uses light or sound to solve the problem of communicating over a distance.

[Clarification Statement: Examples of devices could include a light source to send signals, paper cup and string “telephones,” and a pattern of drum beats.]

** [Assessment Boundary: Assessment does not include technological details for how communication devices work.]

ENDURING UNDERSTANDINGS

- To develop understanding of the relationship between sound and vibrating materials.
- To develop an understanding of the relationship of the availability of light and the ability to see objects.
- To understanding that light travels from place to place in a straight beam.
- A beam of light is affected by placing objects made of different materials in the path of the beam.

ESSENTIAL QUESTIONS

How does light travel and what can cause it to stop?
How does sound travel from one place to another place?

KNOWLEDGE AND SKILLS

Vocabulary:

- **Sound** – something that you hear
- **Vibrate** – to move back and forth
- **Illuminate** – to light something up
- **Transparent** – clear like glass and lets light through
- **Translucent** – not completely clear but lets some light through
- **Opaque** - not letting light through, or not transparent
- **Reflective** – acting like a mirror

Students will know:

Sound can make materials vibrate.

Vibrating materials can make sound.

Light travels in a straight beam.

Different materials can affect light beams.

Sound and light can help us communicate with others.

STAGE TWO

PERFORMANCE TASKS

Design and build a device that uses light or sound to solve the problem of communicating over a distance.

OTHER EVIDENCE

Formative assessments

- Teacher Questions
- Class Discussions

Relating concepts of science standards to reading and math activities

STAGE THREE

LEARNING PLAN

Activities, experiences, and lessons:

Students may choose to design anyone of the following devises (or their own new invention):



- 2 cans and string



- Shoebox – tissue boxes and rubber bands



- Flashlight shinning through different color objects

You will need:

- Cans
- String
- Rubber bands
- Shoe boxes/Tissue boxes
- Flashlight
- Colored overlays
- Tape
- Scissors
- Mirror

Directions:***Refer to STEM Design Challenge Steps**

1. In whole group, read scenario and brainstorm ideas
2. Pair Students
3. Design a communication device in which they are able to answer math problems with a YES or No answer system.
4. Provide time and paper to plan and draw diagram of design
5. Provide time for students to create and follow their plan.
6. Students will demonstrate and explain how their device works by answering yes or no questions.
7. Students will reflect on success of each shield or covering and how to improve.
8. Students will revisit designs and allow to modify or discuss what would work better.