Unit 2: Sound and Light

Content Area: **Science**
Course(s):
Time Period: **Trimester 2**
Length: **10-12 weeks**
Status: **Published**

Summary

This module provides experiences that help students develop an understanding of how to observe and manipulate the phenomena of sound and light. They explore these dimensions of the natural world using simple tools and musical instruments. Students learn that sound comes from vibrating objects. They explore how to change sound volume and pitch, and develop simple models for how sound travels from a source to a receiver. With light, students also work with sources and receivers. They find out what happens when materials with different properties are placed in a beam of light, and explore how to create and change shadows and reflections. Students explore how to use sound and light devices to communicate information and compare the ways that animals use their senses (ears and eyes) to gather information about their environment.

Revision Date: July 2020

Standards

9.4.2.CI	Creativity and Innovation
9.1.2.CAP	Career Awareness and Planning
P.1	Act as a responsible and contributing community members and employee.
1-PS4	Waves and their Applications in Technologies for Information Transfer
K-2-ETS1-1	Ask questions, make observations, and gather information about a situation people want to change (e.g., climate change) to define a simple problem that can be solved through the development of a new or improved object or tool.
1-PS4-1	Plan and conduct investigations to provide evidence that vibrating materials can make sound and that sound can make materials vibrate.
9.4.2.CT	Critical Thinking and Problem-solving
P.5	Utilize critical thinking to make sense of problems and persevere in solving them.
PS4.A	Wave Properties
P.8	Use technology to enhance productivity increase collaboration and communicate effectively.
1-PS4-2	Make observations to construct an evidence-based account that objects can be seen only when illuminated.
K-2-ETS1-2	Develop a simple sketch, drawing, or physical model to illustrate how the shape of an object helps it function as needed to solve a given problem.
PS4.B	Electromagnetic Radiation
LA.RI.1.1	Ask and answer questions about key details in a text.
K-2-ETS1-3	Analyze data from tests of two objects designed to solve the same problem to compare the strengths and weaknesses of how each performs.

LA.RI.1.2	Identify the main topic and retell key details of a text.
LA.RI.1.3	Describe the connection between two individuals, events, ideas, or pieces of information in a text.
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.
LA.RI.1.4	Ask and answer questions to help determine or clarify the meaning of words and phrases in a text.
LA.RI.1.5	Know and use various text features (e.g., headings, tables of contents, glossaries, electronic menus, icons) to locate key facts or information in a text.
LA.RI.1.6	Distinguish between information provided by pictures or other illustrations and information provided by the words in a text.
PS4.B	Electromagnetic Radiation
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.
PS4.C	Information Technologies and Instrumentation
LA.SL.1.1	Participate in collaborative conversations with diverse partners about grade 1 topics and texts with peers and adults in small and larger groups.
LA.SL.1.2	Ask and answer questions about key details in a text read aloud or information presented orally or through other media.
LA.SL.1.3	Ask and answer questions about what a speaker says in order to gather additional information or clarify something that is not understood.
LA.SL.1.4	Describe people, places, things, and events with relevant details, expressing ideas and feelings clearly.
LA.SL.1.5	Add drawings or other visual displays to descriptions when appropriate to clarify ideas, thoughts, and feelings.
LA.SL.1.6	Produce complete sentences when appropriate to task and situation.
CRP.K-12.CRP4	Communicate clearly and effectively and with reason.

Essential Questions/Enduring Understandings

- What causes sound,it changes and how does it travel?
- What information do sound and light give you?
- How can we communicate with sound and light?
- What happens when different objects block a beam of light?

Objectives

Students will know…..

- Sound is vibration
- Objects made of different materials make different sounds
- Sound can have different volumes and pitches

- How sound waves travel
- Light is energy and light waves travel through the air
- Objects can be opaque, translucent, or transparent
- How shadows are created
- What happens when there is no light
- How to communicate with sound and light
- How to design an experiment and test a theory

Students will be skilled at…..

- Asking questions and defining problems
- Developing and using models
- Planning and carrying out investigations
- Making observations
- Analyzing and interpreting data
- Using mathematics and computational thinking
- Constructing explanations and designing solutions
- Engaging in argument from evidence
- Obtaining, evaluating and communicating information

Learning Plan

- Preview the essential questions and connect learning throughout the unit
- Gain students understanding and prior knowledge of sound and light
- Maintain a KWL chart
- Read literature on sound and vibration
- Read literature on light
- Utilize FOSS kit with materials: Sound and Light
- Introduce key vocabulary:
    - Sound Vocabulary: back-and-forth motion, communicate, high-pitched, loud, low-pitched, pitch, soft, sound, sound receiver, sound source, vibrate, vibration, volume
    - Light Vocabulary: angle, block, dark, light, light source, opaque, redirect, reflect, reflection, shade, shadow, Sun, sunlight, translucent, transparent, vision
- Explore the production of sound with a table fiddle, tuning forks, a tone generator, cups, sticks, and rubber bands
- Look for sound sources and come up with words to describe a sound
- Use simple instruments (xylophone, one-string guitar, tuning forks) and objects around the classroom (rulers, rubber bands around different books, etc.) to investigate how to change volume and sound pitch
- Use a spoon-gong to model how sound travels from the source to the receiver
- Redesign a spoon-gong to make a device to both send and receive sound
- Sort or graph objects according to the type of pitch they make
- Read literature about sound receivers used by different animals

- Use flashlights, sunlight, and solid materials to explore blocking light to create shadows
- Investigate blocking light with objects fo different transparencies
- Label objects around the classroom opaque, translucent, or transparent
- Explore using mirrors and redirecting beams of light
- Explore observing objects in illuminated and non-illuminated settings
- Students can also watch videos of cave explorers deep in the earth, using light from a single flashlight. With experiences such as these, they will come to understand that objects can be seen only when illuminated, either from an external light source or by when they give off their own light
- View pictures of animals and observe the location of their eyes then discuss the benefits to the animal
- Maintain observational journals with student note-taking and drawings of experiments and activities
- Incorporate literature on sound and light through shared reading, big books, and nonfiction books from classroom libraries

Assessment

Students will be assessed through a variety of methods. Teacher will use various types of assessments to gauge student understanding. Students will be required to have understanding and mastery of the following key concepts:

Formative Assessments: Teacher observation, student responses during lessons

Summative Assessments: Foss investigation checklists, science notebook (see focus questions below)

Benchmark Assessments: Investigation I-Checks (see focus questions below), science notebook (see focus questions below)

Alternative Assessments: Oral presentations or student-produced projects that further explore focus questions below.

- Investigation 1.1 FQ: What causes sound?
- Investigation 1.2 FQ: What kinds of sounds are easy to identify?
- Investigation 1.3 FQ: What information does sound give us?
- Investigation 2.1 FQ: How can we make loud and soft sounds?
- Investigation 2.2 FQ: How can we make low-pitched and high-pitched sounds?
- Investigation 2.3 FQ: How does sound travel from the source to the receiver?
- Investigation 2.4 FQ: How can we use sound to communicate over long distances?
- Investigation 3.1 FQ: What makes a shadow?
- Investigation 3.2 FQ: How can we use the sun to create shadows?
- Investigation 3.3 FQ: What happens when different materials block light?
- Investigation 4.1 FQ: How can we redirect a light beam?
- Investigation 4.2 FQ: What can we see with a mirror?
- Investigation 4.3 FQ: What can be seen with no light?
- Investigation 4.4 FQ: How can we communicate with light?

Materials

Core Book List

FOSS Kit: Sound and Light

Different objects such as plastic balls, paper clips, craft sticks, etc. to explore sounds made by different materials

BrainPop Junior

Discovery Education

Mystery Doug

Science notebook for assessment and journaling

Scholastic News or similar magazine if applicable

Magic School Bus

- Season 1 Episode 8: In the Haunted House (Sound)
- Season 3 Episode 5: Gets a Bright Idea (Light)

Available Shared Reading F&P Classroom:

- Tap, Tap, Tappity-Tap (Fiction)