# Grade 1 Unit 2 Light Sound and Communication NEW

Content Area: **Science**
Course(s): **Science 1**
Time Period: **January**
Length: **Trimester 2**
Status: **Published**

## Unit Overview

In this unit of study, students develop an understanding of the relationship between sound and vibrating materials as well as between the availability of light and the ability to see objects. The idea that light travels from place to place can be understood by students at this level by placing objects made with different materials in the path of a beam of light and determining the effect of the different materials. The crosscutting concept of cause and effect is called out as an organizing concept for the disciplinary core ideas. Students are expected to demonstrate grade-appropriate proficiency in planning and carrying out investigations, constructing explanations, and designing solutions. Students are also expected to use these practices to demonstrate understanding of the core ideas. The crosscutting concepts of structure and function and influence of engineering, technology, and science on society and the natural world are also called out as organizing concepts for the disciplinary core ideas. Students are expected to demonstrate grade-appropriate proficiency in constructing explanations and designing solutions, asking questions and defining problems, and developing and using models. Students are also expected to use these practices to demonstrate understanding of the core ideas. Classes will also continue their efforts with the UNLESS Contest of the Philadelphia Zoo in supporting environment issues of waste management.

## NJ Student Learning Standards - Science

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| SCI.1.1-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. |
| SCI.1.1-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. |
| SCI.1.1-PS4-2 | Make observations to construct an evidence-based account that objects can be seen only when illuminated. |
| SCI.1.1-PS4-1 | Plan and conduct investigations to provide evidence that vibrating materials can make sound and that sound can make materials vibrate. |
| SCI.K-2.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. |

## Disciplinary Core Ideas

### PS4.A: Wave Properties

Sound can make matter vibrate, and vibrating matter can make sound. (1-PS4-1)

### PS4.B: Electromagnetic Radiation

Objects can be seen if light is available to illuminate them or if they give off their own light. (1-PS4-2)

Some materials allow light to pass through them, others allow only some light through and others block all the light and create a dark shadow on any surface beyond them, where the light cannot reach. Mirrors can be used to redirect a light beam. (Boundary: The idea that light travels from place to place is developed through experiences with light sources, mirrors, and shadows, but no attempt is made to discuss the speed of light.) (1-PS4-3)

## PS4.C: Information Technologies and Instrumentation

People also use a variety of devices to communicate (send and receive information) over long distances. (1-PS4-4)

## ETS1.A: Defining and Delimiting Engineering Problems

A situation that people want to change or create can be approached as a problem to be solved through engineering. (K-2-ETS1-1)

Asking questions, making observations, and gathering information are helpful in thinking about problems. (K2-ETS1-1)

Before beginning to design a solution, it is important to clearly understand the problem. (K-2-ETS1-1)

## ETS1.B: Developing Possible Solutions

Designs can be conveyed through sketches, drawings, or physical models. These representations are useful in communicating ideas for a problem's solutions to other people. (K-2-ETS1-2)

## ETS1.C: Optimizing the Design Solution

Because there is always more than one possible solution to a problem, it is useful to compare and test designs. (K2-ETS1-3)

### Science and Engineering Practices

## Planning and Carrying Out Investigations

Plan and conduct investigations collaboratively to produce evidence to answer a question. (1-PS4-1, 1-PS4-3)

## Constructing Explanations and Designing Solutions

Make observations (firsthand or from media) to construct an evidence-based account for natural phenomena. (1-PS4-2)

Use tools and materials provided to design a device that solves a specific problem. (1-PS4-4)

## Asking Questions and Defining Problems

Ask questions based on observations to find more information about the natural and/or designed world(s). (K2-ETS1-1)

Define a simple problem that can be solved through the development of a new or improved object or tool. (K-2-ETS1-1)

## Developing and Using Models

Develop a simple model based on evidence to represent a proposed object or tool. (K-2-ETS1-2)

## Analyzing and Interpreting Data

Analyze data from tests of an object or tool to determine if it works as intended. (K-2-ETS1-3)

# Crosscutting Concepts

## Cause and Effect

Simple tests can be designed to gather evidence to support or refute student ideas about causes. (1-PS4-1, 1-PS4-2, 1-PS4-3)

## Structure and Function

The shape and stability of structures of natural and designed objects are related to their function(s). (K-2-ETS1-2)

## Influence of Engineering, Technology, and Science, on Society and the Natural World

People depend on various technologies in their lives; human life would be very different without technology. (1-PS4-4)

## Scientific Investigations

Use a Variety of Methods Science investigations begin with a question. (1-PS4-1)

Scientists use different ways to study the world. (1-PS4-1)

## Learning Targets (Student Language)

- I can illustrate how the shape of an object helps it function as needed to solve a given problem.
- I can build a device that uses light or sound to communicate over a far distance.
- I can determine the effect of placing objects made with different materials in the path of a beam of light.
- I can make observations to explain how object in the sky at night can only be seen when illuminated.
- I can provide evidence that vibrating materials can make a vibrating sound and sound can make materials vibrate.

## Essential Questions

- How can light or sound be used to communicate over a distance?
- How can you prove that you can only see something when someone shines a light on it or if the object gives off its own light?
- How do instruments (band) make sound?
- What happens to a beam of light when you put different kinds of things in front of it? How would you design an experiment to prove your thinking?

## Materials and Resources

- Mystery Science Lessons

- Read Alouds

- Cross Cut Weather Reading Activities
- Mystery Labs
- Additional Hands on Activities

## Assessments

- Anecdotal notes
- Conferences
- Lab activity
- Lesson assessments
- Open-ended responses
- Participation
- Performance assessment
- Performance task
- Sharing strategies
- Teacher observation
- Unit assessment

## Learning Plan (Pacing Guide)

| Topic | # of Days (30 min Sessions) | Student Learning Targets (Objectives) |
|---|---|---|
| Anchor Phenomenon:<br><br>Everglades Adventure | 1 | Make observations to construct an evidence-based account that objects in dar illuminated. [Clarification Statement: Examples of observations could include dark room, a pinhole box, and a video of a cave explorer with a flashlight. Illu external light source or by an object giving off its own light.] (1-PS4-2) |
| Lesson 1: | 4 | Plan and conduct investigations to determine the effect of placing objects mad the path of a beam of light. [Clarification Statement: Examples of materials c transparent (such as clear plastic), translucent (such as wax paper), opaque (su |

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| How do they make silly sounds in cartoons? | | reflective (such as a mirror).] [Assessment Boundary: Assessment does not in PS4-3) |
| Read-AlongLesson 2:<br><br>Where do sounds come from? | 3 | Ask questions, make observations, and gather information about a situation p define a simple problem that can be solved through the development of a new (K-2-ETS1-1) |
| Lesson 3:<br><br>What if there were no windows? | 4 | Develop a simple sketch, drawing, or physical model to illustrate how the sha function as needed to solve a given problem. (K-2-ETS1-2) |
| Read-AlongLesson 4:<br><br>Can you see in the dark? | 3 | |
| Lesson 5:<br><br>How could you send a secret message to someone far away? | 4 | |
| Read-AlongLesson 6:<br><br>How do boats find their way in the fog? | 3 | |
| Performance Task:<br><br>What do we see and hear in the Everglades at night? | 1 | |

## Interdisciplinary Connections

**NJSLS ELA**

- W.1.2 Write informative/explanatory texts in which they name a topic, supply some facts about the topic, and provide some sense of closure. (1-PS4-2)
- W.1.7 Participate in shared research and writing projects (e.g., explore a number of "how-to" books on a given topic and use them to write a sequence of instructions). (1-PS4-1, 1-PS4-2, 1-PS4-3, 1-PS4-4)
- W.1.8 With guidance and support from adults, recall information from experiences or gather information from provided sources to answer a question. (1-PS4-1, 1-PS4-2, 1-PS4-3)
- 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. (1-PS4-1,1-PS4-2, 1-PS4-3)
- RI.2.1 Ask and answer such questions as who, what, where, when, why, and how to demonstrate understanding of key details in a text. (K-2-ETS1-1)
- W.2.6 With guidance and support from adults, use a variety of digital tools to produce and publish writing, including in collaboration with peers. (K-2-ETS1-1, K-2-ETS1-3)
- W.2.8 Recall information from experiences or gather information from provided sources to answer a question. (K-2-ETS1-1, K-2-ETS1-3)
- SL.2.5 Create audio recordings of stories or poems; add drawings or other visual displays to stories or recounts of experiences when appropriate to clarify ideas, thoughts, and feelings. (K-2-ETS1-2)

**NJSLS Math**

- MP.2 Reason abstractly and quantitatively. (K-2-ETS1-1, K-2-ETS1-3)
- MP.4 Model with mathematics. (K-2-ETS1-1, K-2-ETS1-3)
- MP.5 Use appropriate tools strategically. (1-PS4-4)
- 1.MD.A.1 Order three objects by length; compare the lengths of two objects indirectly by using a third object. (1-PS4-4)
- 1.MD.A.2 Express the length of an object as a whole number of length units, by layering multiple copies of a shorter object (the length unit) end to end; understand that the length measurement of an object is the number of same-size length units that span it with no gaps or overlaps. (1-PS4-4)
- 2.MD.D.10 Draw a picture graph and a bar graph (with single-unit scale) to represent a data set with up to four categories. Solve simple put-together, take-apart, and compare problems using information presented in a bar graph. (K-2-ETS1-1, K-2-ETS1-3)

**English Language Arts/Literacy**

Students will participate in shared research and writing projects as they engage in engineering design. Students can use text and media resources to first gather information about devices that use light or sound to communicate over a distance. They can demonstrate understanding of key details in a text by asking and answering questions during class and small-group discussions. In addition, students recall information from experiences or gather information from provided sources to support their thinking as they design and build their device. As students complete their devices, they prepare a sketch or drawing of their device, label the components, and describe, in writing, how each component relates to the function of the device and how their communication device works. Students can also write components, and describe, in writing, how each

component relates to the function of the device and how their communication device works. Students can also write a "how to" book describing how to use tools and materials to build their design. Students can also use drawings or other visual displays to accompany their writing in order to describe their thought process and clarify their ideas. Adult support should be provided throughout the process.

**Mathematic**

Students need opportunities to use tools for a variety of purposes as they design and build devices for communicating with light or sound. They can use objects such as interlocking cubes or paper clips to measure length in nonstandard units, expressing their measurements as whole numbers. Students can also use indirect measurement (i.e., compare the lengths of two objects indirectly by using a third object) to order three objects by length. For example, they might compare the lengths of string used for paper-cup telephones and observe and describe the relative effectiveness of each length of string.

Students can also use graphs to organize data, such as the number of drum beats, and then analyze the data to find a pattern. Students will reason abstractly and quantitatively as they organize data into graphs, analyze the data, and use it to solve simple put-together, take-apart, and compare problems.

**Climate Change**

Students will learn about the Philadelphia Zoo UNLESS Contest. They will discuss how their school is participating, ways they can support the cause, and how the project will address an environmental issue that is impacting wildlife.

## Accommodations and Modifications (Interventions. Special Education, ELL, Enrichment)

- Collaborate with after-school programs or clubs to extend learning opportunities.
- Engage students with a variety of Science and Engineering practices to provide students with multiple entry points and multiple ways to demonstrate their understanding.
- Follow all modifications and accommodations as outlined in IEPs and 504s.
- Provide ELL students with multiple literacy strategies.
- Provide multiple grouping opportunities for students to share their ideas and to encourage work among various backgrounds and cultures (e.g.
- Provide opportunities for students to connect with people of similar backgrounds (e.g. conversations via digital tools such as Zoom/Google Meets, experts from the community helping with a project, journal articles, and biographies).
- Provide students with multiple choices for how they can represent their understandings (e.g. multisensory techniques-auditory/visual aids; pictures, illustrations, graphs, charts, data tables, multimedia, modeling).
- Structure lessons around questions that are authentic, relate to students' interests, social/family background and knowledge of their community.

- Structure the learning around explaining or solving a social or community-based issue.
- Use project-based science learning to connect science with observable phenomena.

## Career Reading, Life Literacies, and Key Skills

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| TECH.9.4.2.CI.1 | Demonstrate openness to new ideas and perspectives (e.g., 1.1.2.CR1a, 2.1.2.EH.1, 6.1.2.CivicsCM.2). |
| TECH.9.4.2.CI.2 | Demonstrate originality and inventiveness in work (e.g., 1.3A.2CR1a). |
| TECH.9.4.2.CT.1 | Gather information about an issue, such as climate change, and collaboratively brainstorm ways to solve the problem (e.g., K-2-ETS1-1, 6.3.2.GeoGI.2). |
| TECH.9.4.2.CT.2 | Identify possible approaches and resources to execute a plan (e.g., 1.2.2.CR1b, 8.2.2.ED.3). |
| TECH.9.4.2.CT.3 | Use a variety of types of thinking to solve problems (e.g., inductive, deductive). |
| TECH.9.4.2.IML.3 | Use a variety of sources including multimedia sources to find information about topics such as climate change, with guidance and support from adults (e.g., 6.3.2.GeoGI.2, 6.1.2.HistorySE.3, W.2.6, 1-LSI-2). |