

# Unit 1: Waves and their Applications in Technologies for Information Transfer

Content Area: **Science**  
Course(s): **Earth Science, Physical Science**  
Time Period: **Generic Time Period**  
Length: **5 weeks**  
Status: **Published**

## Standards

---

SCI.1-PS4-2	Make observations to construct an evidence-based account that objects can be seen only when illuminated.
MA.1.1.MD.A.1	Order three objects by length; compare the lengths of two objects indirectly by using a third object.
MA.1.1.MD.A.2	Express the length of an object as a whole number of length units, by laying 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.
SCI.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-PS4-1	Plan and conduct investigations to provide evidence that vibrating materials can make sound and that sound can make materials vibrate.
LA.1.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.
LA.1.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).
LA.1.W.1.8	With guidance and support from adults, recall information from experiences or gather information from provided sources to answer a question.
LA.1.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.
SCI.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.

## Learning Objectives

---

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

Ask questions, make observations, and gather information about a situation people want to change to define a simple problem that can be solved through the development of a new or improved object or tool.

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.

Make observations to construct an evidence-based account that objects in darkness can be seen only when illuminated.

Plan and conduct investigations to determine the effect of placing objects made with different materials in the path of a beam of light.

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

## **Essential Questions**

---

How can we become better writers while learning about science?

What are the different types of energy?

What is heat?

What are the different types of heat?

How do objects make heat?

What is light?

What are the different types of light?

How do objects make light?

What is sound?

What are the different types of sound?

How do objects make sound?

How do they make silly sounds in cartoons?

What if there were no windows?

Could a statue's shadow move?

## **Learning Activities**

---

### ***MYSTERY SCIENCE #1 Light & Sounds: Properties of Light and Sound***

***EQ: How do they make silly sounds in cartoons?***

***Exploration Video: (10 min)***

***Activity/Materials: Be a sound effects artist (20 minutes)***

Each student will need:

- A ruler (wooden or plastic).

You may also want a way to make thunder. You can have a rainstorm without it, but it's a lot of fun to add the rumble and crash of thunder. (Also, making thunder demonstrates that vibration creates sound.)

If you want to add thunder, we suggest you use a Thunder Sheet — which could be a cookie sheet, a plastic cake pan lid, a sheet of stiff paper, or a disposable aluminum pan.

### ***Optional Extras (1 hour)***

- Writing Prompt: [How do people make sounds for cartoons?](#)
- Activity: Have more [fun experimenting with sound effects](#).

Have your students try other sound effects that are favorites of sound effects artists.

Read-aloud: Add sound effects to some [great books to read-aloud](#).

- For a chugging steam train, shake a box of macaroni and cheese in just the right rhythm.
- For a crackling fire, crunch a package of ramen noodles or crumple a big piece of cellophane wrap.
- For a gurgling stream, use a drinking straw to blow bubbles in a cup of water.
- For a flying bird or bat, slap a pair of leather gloves together.
- 
- These read-alouds are great — but maybe they'd be even better with sound effects. Consider inviting your students to add their sounds. (Be warned: This can get noisy!)

Brain Break Video: For a fun brain break, let your students [learn the art of body percussion](#) — making cool sounds by clapping and slapping and stomping.

- [The Little Old Lady Who Was Not Afraid of Anything](#), — Once there was a little old lady who was not afraid of anything — until she heard noises in the woods.
- [The Rain Stomper](#), — Can Jazmin chase away rain & thunder with her stomping and shouting?
- [In the Tall, Tall Grass](#), — Take a backyard tour with a fuzzy caterpillar and listen to the sounds in the grass.

- 

## ***MYSTERY SCIENCE #2 Light & Sounds: Properties of Light and Sound***

***EQ: What if there were no windows?***

## ***Exploration Video: (10 min)***

### ***Activity/Materials: Paper stained glass (20 minutes)***

This mystery includes two activities to get students thinking about light and materials: *Seeing & Sorting* and *Paper Stained Glass*.

For *Seeing & Sorting*, if you have a class of students, break them up into groups of 2 to 4. Each group will need:

- Printouts of [Sorting Sheets](#)
- An assortment of materials that are transparent, translucent, and opaque. You need a couple of examples from each category. The list below gives you examples of materials that are easy to buy or find:
  - Transparent: clear plastic soda bottles or food containers, colored cellophane, clear report covers or sheet protectors, plastic bags, CD cases
  - Translucent: wax paper, tissue paper, cloudy plastic
  - Opaque: Construction paper in different colors, cardboard, aluminum foil
    - Tissue paper in many colors
    - [Flower Shape Sheet](#) — this is optional. You can have students make flowers or let them make patterns of their own.
    - Glad Press n Seal
    - Windows in which you will display student's artwork

For *Seeing & Sorting*, cut materials up so that each group has samples of all the materials. Materials do not have to be exactly the same size or shape. When you are cutting up flat materials, we suggest making squares measuring about 3"X3" (about 8 cm X 8 cm).

For *Paper Stained Glass*, you need small squares and long strips of colored tissue paper. Using a paper cutter makes this a quick and easy job.

- For *Paper Stained Glass*, each student will need a square of Press n Seal.

### ***Optional Extras (1 hour)***

- Writing Prompt: [If there were no windows...](#)
- Activity Extension: Extend the [activity](#) by adding other materials to your paper stained-glass art.

- Activity Extension: Try making Paper Stained Glass using different pattern, such as [a heart, a star, or a fish](#).
- Activity: Encourage students to [look for see-through, opaque, and kind-of-see-through materials](#) in their everyday life.
- Books: These [online books](#) reinforce & expand students understanding of light.
- These online books are on [Get Epic!](#) For teachers, registration is free.
  - [Playing with Light and Shadows](#), by Jennifer Boothroyd, revisits the concept of transparent, translucent, and opaque.
  - [Sensing Light and Sound](#), by Jennifer Boothroyd, shows that eyes to sense light and ears sense sound.
  - [Sending Messages with Light and Sound](#), by Jennifer Boothroyd, describes how people use light and sound to send messages.
  - [Lights Out!](#), by Lucille Recht Penner, is an entertaining story about a girl who counts lights at night as everyone goes to sleep. Great practice in subtraction.

## **MYSTERY SCIENCE #1 *Spinning Sky***

***EQ: Could a statue's shadow move?***

***Exploration Video: (10 min)***

***Activity: Moving Shadows (30 minutes)***

**Step 1: Get supplies and print handouts.**

You'll be setting up activity stations where students can experiment with shadows. Students can work alone or in small groups.

- Print one set of [paper gnomes](#)
- Print one set of [shadow patterns](#)
- Choose how many stations you want (up to 7).
- Get a flashlight (one with a [single bright LED](#)) for each station.
- Get tape to tape down the paper gnomes and shadow patterns.

## Step 2: Before class, set up activity stations.

For each station:

- Cut out a paper gnome. Fold on the solid lines at his feet and the tip of his hat.
- Overlap the flaps at the gnome's feet and tape him to the rectangle on a Shadow Pattern page.
- Tape the Shadow Pattern page down to a table or desk.
- Put a flashlight beside the gnome.

## Step 3: Find a sunny spot. (Optional, but recommended)

If it's sunny, you can watch how a shadow cast by the sun changes over time — just by marking a shadow early in the lesson and checking on it later. For this, you'll need:

- a spot that will be in the sun for the whole time you are teaching the mystery
- a paper gnome taped to a piece of blank paper
- masking tape for taping the paper down
- a pencil or marker for tracing the shadow.

We explain how to set up the gnome [here](#) in the lesson.

If it's cloudy when you teach, don't worry. We show the experiment in the video. You can watch the video and try the experiment yourself on a day when the sun is out.

### *Optional Extras (1 hour)*

- Activity: [Vocabulary Cards](#) let students practice reading and writing skills while learning science vocabulary.
- Readings: [Three readings](#) about shadows for Kindergarten and first grade.
- These Common-Core-aligned readings are free with registration on ReadWorks. All readings include comprehension questions.

Read-aloud: Get students thinking and talking about shadows with [three read-aloud books](#).

- [Me and My Shadow](#)— A girl learns about making shadows in the sun. (Kindergarten)
- [Maria Makes a Snake](#)— Two friends make shadows with a flashlight. (Grade 1)

- [Light](#)— A reading about light and how it makes shadows. (Grade 1)

- 

- For a simple, well-illustrated explanation that introduces students to the fun of making shadows of their own, read [What Makes a Shadow?](#) by Clyde Robert Bulla.

For an entertaining tale of a rabbit who bets a woodchuck that he can outrun his shadow, read [Nothing Sticks Like a Shadow](#) by Ann Tompert. You might want to ask your students if they think the rabbit will win.

To encourage students to think about how their own shadows change, read [My Shadow](#) by Robert Louis Stevenson. Ask students if their shadow has ever been taller than they are.

- Activity: These activities are great for a sunny day — [Where's the Shadow?](#) and [Shadow Partners](#).

-show Brainpop about heat

-Smartboard heat activity: KWL, sort

-Interactive notebook activity: Students will cut & sort cards into 2 pockets: natural heat and man made heat

-Speaking and listening activity: Students partner up to give each other feedback

-Interactive notebook activity: Students will partner up and experiment with different types of heat (lightbulb, friction with hands, blowdryer, etc.) Which object produces the most heat? Why do you think?

-Speaking and listening activity: Students partner up to give each other feedback about predictions

-show Brainpop about light

-Smartboard light activity: KWL, sort

-Interactive notebook activity: Students will cut & sort cards into 2 pockets: natural light and man made light

-Speaking and listening activity: Students partner up to give each other feedback

-Interactive notebook activity: Students will partner up and make predictions if a flashlight can pass light through the given objects: felt, cotton, sandpaper, etc. Students will carry out experiments and record results

-Speaking and listening activity: Students partner up to give each other feedback about predictions

-Interactive notebook activity: Groundhog's Day STEAM activity-Students will work in small groups to create a groundhog out of construction paper that will create the LONGEST shadow when a flashlight is shined upon it

-Students will plan, carry out, and record results from how long their shadow is

-Speaking and listening activity: Students share what worked well, what they could have done differently, and how to change their design next time

-show Brainpop about sound

-Smartboard sound activity: KWL, sort

-Interactive notebook activity: Students will cut & sort cards into 2 pockets: natural sound and man made sound

-Speaking and listening activity: Students partner up to give each other feedback

-Interactive notebook activity: Students will partner up and go on a sound scavenger hunt to find 5 containers hidden around the room. Students will shake the containers and make a prediction as to what may be inside

-Speaking and listening activity: Students partner up to give each other feedback about predictions

-review the 3 different types of energy: heat, sound, light

-Interactive notebook activity: Students will cut & sort cards into 3 pockets: heat, light, sound

-Speaking and listening activity: Students partner up to give each other feedback

-Smartboard lesson: how does manmade energy work?



- Interactive notebook activity: Students will cut & sort cards into 3 pockets: battery, electricity, gas
- Speaking and listening activity: Students partner up to give each other feedback

## **Materials & Resources**

---

<https://mysteryscience.com>

Smartboard with internet access

Science Smartboard files (W drive)

Interactive Science Notebook ([www.NicoleAndEliceo.com](http://www.NicoleAndEliceo.com))

scissors

glue sticks

pencils

crayons

blowdryer, lightbulb, mini heater

felt, cotton, sandpaper

construction paper

flashlights

5 film canisters filled with something that makes a sound

## **Assessment**

---

Daily Interactive Science Notebook production

Heat handout

Light handout

Sound handout

Groundhog's Day STEAM handout

## **Accommodations and Modifications**

---

- Large print textbooks
- Additional time for assignments
- Review of directions
- Have student restate information
- Provision of notes or outlines
- Concrete examples
- Adaptive writing utensils
- Support auditory presentations with visuals
- Weekly home-school communication tools (notebook, daily log, phone calls or email messages)
- Space for movement or breaks
- Extra visual and verbal cues and prompts
- Books on tape
- Graphic organizers

- Quiet corner or room to calm down and relax when anxious
- Preferential seating
- Alteration of the classroom arrangement
- Reduction of distractions
- Answers to be dictated
- Hands-on activities
- Use of Manipulatives
- Follow a routine/schedule
- Alternate quiet and active time
- Teach time management skills
- Rest breaks
- Verbal and visual cues regarding directions and staying on task
- Daily check-in special education teacher
- Visual daily schedule
- Varied reinforcement procedures
- Immediate feedback
- Personalized examples