# Lesson 2: Light and Shadow

## Objective:

Students will recognize that a shadow is created when there is an absence of light.

## NGSS:

Grade 1: Waves: Light and Sound

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

## Essential Questions:

* What is light?
* Where does light come from?
* How does light travel?
* What is a light wave?
* What happens when an object interrupts a light wave?
* What is the difference between opaque, translucent, and transparent?
* What is a shadow?

## Materials:

* Pipe cleaners
* Flashlight
* Lamp with removable shade; light bulb
* Candle and matches
* Book: *What Makes a Shadow?* by Clyde Robert Bulla
* Thick piece of cardboard
* Wax paper
* Saran Wrap
* Adapted worksheet with definitions and diagrams of:
* Opaque
* Translucent
* Transparent

## Directions:

This is an introductory lesson to the concept of shadows. Noting that students must first understand the concept of light prior to understanding shadows, this is a lesson that will allow students to participate in hands-on activities about light, with a goal of moving the lesson to a discussion about shadows. Begin lesson by asking essential questions—students may respond verbally, in written form, using a drawing, or acting out their responses.

1. Discuss the concept of light. Use curriculum materials to introduce the concept of light. Talk about day and night.
2. Discuss light sources. Go on a treasure hunt to locate light sources. Be sure to explore different areas, including the obvious, such as overhead classroom lights and windows, to the more abstract, such as the sun and the stars that may not be visible to a child who is blind. Use caution and emphasize safety throughout this activity, as some light sources can be hot or dangerous to touch.
3. Provide as many hands-on examples as possible, noting that many light sources emanate heat with light. Discuss how lights can be turned off and on. Discuss sounds that accompany—or do not accompany—light sources. Explore unique ways that light sources can be identified, in addition to seeing them with your eyes.
4. Talk about light waves. Using pipe cleaners, create “waves” of light emanating from a light source.
5. Discuss what happens when something interrupts the light wave. Bend the pipe cleaners to simulate how light bends when it hits an object.
6. Read the book *What Makes a Shadow?* by Clyde Robert Bulla. Allow students to actively participate in the reading through the use of dramatic inquiry and verbal descriptions of the concepts being presented in the story.
7. For students who require accessibility due to a visual impairment, a large print or braille copy of the book can be provided. Another universal adaptation for the book can include a story box that has tactile objects and/or activities that accompany the story; all students in the class can benefit from the story box.
8. Using the book, introduce the concepts of opaque, translucent, and transparent. Using a light source and materials that represent each concept, allow students to experiment with each material and the light source. For students with vision loss, the textures of the materials being used will allow differentiation between the three concepts.
9. Cardboard: opaque
10. Wax paper: translucent
11. Saran Wrap: transparent
12. Discuss how the opaque materials create shadows, using hands-on experimentation with the light source and materials, associating the story with the concept. For students with vision loss, use the candle (with supervision) for the light source, as the shadow can be recognized when the heat of the candle is blocked with the cardboard.
13. Challenge students to find light sources in their own homes and continue discussing this concept in a future, follow-up lesson.