

# Investigating Shadows

## Engage

**Objective:** Students will be introduced to the concept of shadows and engage in a discussion about their prior knowledge.

1. Begin the lesson by displaying a picture of a tree with a long shadow during sunset.
2. Ask the students to observe the picture and share their thoughts about what they see. Prompt them with questions such as:
  - What do you notice about the tree?
  - Why do you think the tree has a long shadow?
  - Have you seen shadows like this before? Where?
3. Facilitate a class discussion, encouraging all students to participate and share their ideas.

## Explore

**Objective:** Students will explore how the position of a light source affects the size and shape of shadows.

1. Divide the students into small groups of 3-4.
2. Provide each group with a flashlight, a flat object (such as a book or block), and a white piece of paper.
3. Instruct the groups to place the object on the paper and shine the flashlight on it from different angles.
4. Ask the students to observe and sketch the shadows produced on the paper.
5. After exploring with different light angles, have each group share their observations and discuss the following questions as a whole class:
  - How did the size and shape of the shadow change when the light source was moved?
  - Did the shadow move along with the object or stay in one place?
  - What happened to the shadow when the light source was directly above the object?

## Explain

**Objective:** Students will learn about the science behind shadows and how they are formed.

1. Introduce the concept of shadows using simple language suitable for 2nd-grade students. Explain that shadows are created when an object blocks the path of light.
2. Use a visual aid, such as a diagram or a hand puppet, to demonstrate how shadows are formed.
3. Discuss key vocabulary terms, such as "light source," "object," and "shadow."
4. Provide examples of different light sources and objects that can create shadows.
5. Encourage students to ask questions and clarify any misconceptions.

## Elaborate

**Objective:** Students will apply their understanding of shadows by creating shadow puppets and presenting a short puppet show.

1. Provide materials for students to create their own shadow puppets, such as black construction paper, scissors, and popsicle sticks.
2. Instruct the students to design and cut out shadow puppet shapes of animals or objects.
3. Allow time for students to practice manipulating their shadow puppets and creating different shadow effects.
4. Divide the students into small groups to plan and rehearse a short puppet show using their shadow puppets. They should consider dialogue, movements, and storytelling.
5. Provide an opportunity for each group to perform their puppet show for the class, with a focus on how shadows are created and displayed.

## Evaluate

**Objective:** Students will demonstrate their understanding of shadows through a written reflection.

1. Distribute a reflection worksheet to each student.
2. Prompt the students to write a short paragraph explaining what they have learned about shadows.
3. Encourage students to include specific details, such as the role of light sources and objects in creating shadows.
4. Collect and review the reflection worksheets to assess student understanding.