



Making Shadows

INTRODUCTION

Children are fascinated by light and shadows. This lesson explores how you can change the look of a shadow created by a flashlight and an opaque object. Students will find out how to make shadows sharp and in focus or fuzzy and out of focus by going through the following investigation.

WHERE'S THE SCIENCE?

A **shadow** is the absence of light. Every **light source** in a room will cast its own shadow. If you have three bulbs in chandelier, then you will have three shadows of one object. Short shadows are darker, because the light source is closer and at a higher angle making the shadow shorter. Long shadows are at a lower angle because the light source is further away. As the flashlight is moved the angle at which the light hits the **opaque** object changes. This difference causes the shadow to move or even change its shape.

MATERIALS

(Per group of 4 students)

- Flashlight
- Piece of white paper
- Opaque objects (Lego piece or a block)
- Dark room



PROCEDURES

1. Introduce the lesson by asking students what they think they know about shadows. Chart students' ideas and post in a visible place in the classroom.
2. Tell the students that today they are going to investigate light and shadows. Give each group a flashlight and let them explore with the tool for five minutes.
3. Call them back to the carpet area and discuss what they noticed about how the flashlight works. When did they see light? Shadows? After the discussion, tell them they will work in partners and record the results of their investigation in their science notebooks. Instruct them to follow the next series of directions with their partner. Posting these directions in the front of the room will avoid confusion or missing steps.
 1. Hold the opaque object in front of the light.
 2. Shine the flashlight on the object to create a shadow on the paper. Move the flashlight until the object disappears. Now make the shadow again.
 3. Bring the shadow into focus. Make it as long or short as possible without disappearing.
 4. Record in your science notebook what you did to change the shadows.
4. Instruct the students to return to the carpet or group area with their science notebooks when the investigation is complete. Discuss what they did and their results. Return back to the chart paper and record their ideas and further questions.
5. Challenge them by asking, "Can you make two shadows? Can you make your shadow point left or right?" Send them back to their groups to complete the new task. Remind them to use the information they recorded in their science notebooks to guide their investigation.
6. Once everyone is complete, instruct the students to return to the carpet or group area with their science notebooks. Discuss what they did and their results. Were all groups successful? Add their new ideas and observations to the chart paper. Conclude the lesson by asking the students to complete a quick write on shadows in their science notebooks.

Additional Resources

<http://www.learner.org/teacherslab/science/light/index.html>

Informational site about light.

http://www.bbc.co.uk/schools/ks2bitesize/science/activities/light_shadows.shtml

Interactive site on light and shadows.

Color and Light ISBN-10: 1-59242-366-3 Delta Science Readers
www.deltaeducation.com

Vocabulary

Light Source: Anything that makes light, such as the Sun, a light bulb, or a flame.

Shadow: Dark area made when an object blocks light.

Opaque: not transparent or translucent; impenetrable to light; not allowing light to pass through.

Nevada State Science Standard

P5C1 Students know light can be described in terms of simple properties (e.g. color, brightness, reflection). I/S

N5A1 Students know scientific progress is made by conducting careful investigations, recording data, and communicating the results in an accurate method. E/S

N5A5 Students know how to plan and conduct a safe and simple investigation. E/S

N5B3 Students know the benefits of working with a team and sharing findings. E/L

Safety Reminder

Remind students not to shine the flashlight directly into their eyes.