

LESSON 1 | Properties of Light

Objective

Students will develop and use a model to describe that light waves are reflected, absorbed, or transmitted through different materials.

Time

45–60 minutes

Materials

- Flashlights
- Testing materials such as aluminum foil, wax paper, plastic wrap, cloth of different thicknesses, white paper, tissue paper in a variety of colors
- Follow the Light! activity sheet

Extension Material

- This lesson is part of the “Science in Action” program. You can implement the lessons as standalone experiments or use them sequentially. Elevate experiments by using Google’s free Science Journal app on classroom tablets and Chromebooks to measure and record observations; experiment data will be stored on Google Drive so you can access it across devices. To get more info and to download the app, go to sciencejournal.withgoogle.com.

Instructions

1 Turn out the lights in the classroom and lower window shades so the room is relatively dark. Switch on a flashlight and point it at an object. Ask students what they observe. Prompt them to explain what their observations suggest about the properties of light (it can travel through air, it travels in a straight line, it can be reflected off materials).



2 Ask students what they can observe about the properties of light using only their eyes (e.g., relative brightness, color). Using a classroom tablet or your own phone, open a new experiment in Google’s Science Journal app (see box below for how to use app) and choose the Brightness sensor tool, denoted by a lightbulb. Point the flashlight toward and away from your device’s light meter and have students observe the changing intensity on the graph. How do these measurements compare with their own observations?

4 Divide students into groups and prepare them to conduct their own light experiment. Give each group the student activity sheets, a flashlight, and a set of testing materials. Explain that they will test light with different materials, then make a claim-evidence-reasoning explanation about which of the tested materials would be the best option for a specific function. Remind them that their explanations must contain sufficient evidence to support their argument. Have them complete Step 2 of the activity individually and hand in their answers.

3 Write these words on the board: *absorb, reflect, transmit*. Ask students what these words might have to do with how light interacts with materials. Discuss the meanings: absorb (light is absorbed and converted to heat), reflect (light bounces off), transmit (light moves through). How do these scientific meanings compare with other usages (e.g., absorb/transmit/reflect on knowledge)?

5 Extension: Allow each group to take turns using the Science Journal app on a classroom tablet to measure the intensity of light as it travels through different materials. Encourage students to experiment with different measurements, such as of light that is reflected.

How to Use Google’s Science Journal App



To start an investigation in the Science Journal app, click on the menu (three parallel lines) at the top left of the screen and tap “Experiments.” Tap the Plus button at the bottom right of the screen, then tap the Sensor button (circle with a wavy line) in the toolbar. In a blue bar, you’ll see a menu of sensor tools (brightness meter, accelerometer, magnetometer, etc.). Choose one, then tap the red “record” button to record observations.

Name _____

Follow the Light!

How will light react when you shine it on different materials?



Step 1: Investigate

Look at your testing materials and predict whether light will be reflected, absorbed, or transmitted by each. Use a flashlight to test your predictions. Record your data below.

MATERIAL	PREDICTION	OBSERVATION
	How will light interact with the material?	What happened when you shined light on the material?

Step 2: Explain

Imagine you need to make lenses for a pair of sunglasses with one of your materials. Which would you choose and why? Using the evidence you collected above, explain your claim here.
