



LESSON PLAN

INTRODUCTION TO LIGHT GRADES K-2

SUMMARY

Students explore the properties of light to learn that light goes through some objects but not others. Duration: 45 minutes.



1-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.

Science & Engineering Practices	Connections to Classroom Activity
<p>Planning and Carrying Out Investigations</p> <p>Planning and carrying out investigations to answer questions or test solutions to problems in K-2 builds on prior experiences and progresses to simple investigations, based on fair tests, which provide data to support explanations or design solutions.</p> <p>Plan and conduct investigations collaboratively to produce data to serve as the basis for evidence to answer a question. (1-PS4-1),(1-PS4-3)</p>	<ul style="list-style-type: none"> Students investigate how different materials allow different amounts of light to pass through them.
Disciplinary Core Ideas	Connections to Classroom Activity
<p>PS4.B: Electromagnetic Radiation</p> <p>Objects can be seen if light is available to illuminate them or if they give off their own light.</p>	<ul style="list-style-type: none"> Students will find that some materials allow no light to pass through them, some materials allow a little light to pass through them and others don't allow any light to pass through them.

Some materials allow light to pass through them, others allow only some light through and others block all the light and create a dark shadow on any surface beyond them, where the light cannot reach. Mirrors can be used to redirect a light beam.

Crosscutting Concepts

Cause and Effect

Simple tests can be designed to gather evidence to support or refute student ideas about causes.

Connections to Classroom Activity

- Shining a light on an object will result in differing levels of light passing through, depending on the material of the object.



ENGAGE

Before beginning the exploration, place a flashlight (turned off) inside a brown paper bag and tell students their job is to guess what is inside the bag by asking questions that can be answered with yes or no. Allow students to ask several yes or no questions to try to narrow down what is in the bag. After a minute or so, tell students you will give them a hint. Put your hand inside the bag and turn on the flashlight. Most likely this hint will be enough for students to figure out that there is a flashlight in the bag. Segue to the lesson by telling students that when you turned on the flashlight, some of the light came through the paper bag. Today they will investigate a variety of materials to see which ones let all the light pass through, which materials let some light pass through, and which materials let no light pass through them.

MATERIALS

- Flashlight
- Paper bag
- Variety of materials with varying transparency: Wax paper, Cardboard, Paper, A book, Tissue paper, Plastic wrap, Foil, Paper bag

DIY Activity

- Phone with a light app (point source lights work better than flashlights)
- Large black permanent marker
- Clear lid from a potato chip tube



EXPLORE

Before beginning the investigations, students should make some predictions about each of their materials. They can simply list their materials in a science notebook or on a piece of paper and make two columns; one for predict, and one for test. For this age level, the vocabulary they can use is “all”, “some” or “none”. Once students have their papers set up, pass a bag of materials out to each group of three or four and a flashlight. Allow them about 10 minutes to conduct the investigation. If they finish early, they can test other items they have in their desks or pencil boxes and add them to their list.





EXPLAIN

Allow different groups to share out their results. Check for agreement after each. Some questions to ask while they share out might be, “How did you know that only some of the light was passing through?” They may have compared how much light was hitting the object vs. how much was being seen on the other side. Finally introduce the vocabulary related to the investigation. Explain that transparent materials let all the light shine through, translucent materials only let some light shine through and opaque materials don’t let any light shine through.



ELABORATE

Discuss different sources of light. Today they used a flashlight, “What are some other sources of light besides a flashlight?” (the sun, a fire, TVs, a cell phone, a match, etc.)



WATCH THE GENERATION GENIUS INTRODUCTION TO LIGHT VIDEO AS A GROUP

Then facilitate using the Discussion Questions.



EVALUATE

Students can play the online Kahoot! quiz game located below the video which provides downloadable scores at the end of the quiz game. Alternatively, you can use the paper quiz or the exit ticket questions. All these resources are located below the video in the Assessment section.



EXTENSION

Older or more advanced students could discuss how some things are designed for a purpose based on whether light can shine through them or not. Prompt with questions such as, “What are some examples of things that were designed to be able to let all the light shine through them?” (car windows, glasses, hand lens, etc.) Continue with asking, “What are some examples of things that were designed to let only some light shine through them?” (sunglasses, lamp shade, etc.) Finally ask, “What are some examples of things that are designed to let no light shine through?” (a sun hat, a patio cover, a visor in a car, etc.) Relate this conversation to engineers and how they choose materials carefully based on specific properties (such as transparency). Materials they choose need to meet the needs of the purpose or function of the product they are designing.