



LESSON PLAN

LIGHT REFLECTION & VISION GRADES 3-5

SUMMARY

Students explore the science behind light and reflections. Then they investigate properties of light and its importance to human vision. They also use light and reflection to create a cool visual phenomenon.



4-PS4-2 Develop a model to describe that light reflecting from objects and entering the eye allows objects to be seen.

Science & Engineering Practices	Connections to Classroom Activity
<p>Developing and Using Models (4-PS4-2)</p>	<ul style="list-style-type: none"> Observe and draw models of the human eye.
Disciplinary Core Ideas	Connections to Classroom Activity
<p>PS4.B: Electromagnetic Radiation An object can be seen when light reflected from its surface enters the eyes.</p> <p><u>Additional DCIs addressed by this lesson:</u> LS1.A: Structure and Function Plants and animals have both internal and external structures that serve various functions in growth, survival, behavior, and reproduction.</p>	<ul style="list-style-type: none"> Experiment with trying to see objects when there is no light to learn how it is necessary. Think about the human eye and brain and how these structures help us see and process information. Explore the human sense of sight.

LS1.D: Information Processing

Different sense receptors are specialized for particular kinds of information, which may be then processed by the animal's brain. Animals are able to use their perceptions and memories to guide their actions.

Crosscutting Concepts

Cause and Effect (4-PS4-2)

Connections to Classroom Activity

- Explore the cause and effect relationship between light and vision.

DURATION

One or two 45-minute classroom periods

PRE-ASSESSMENT QUESTIONS

Please see discussion questions located under the video. These can be discussed as a group or answered individually in student science notebooks.



ENGAGE

Pass out mirrors and have students look in a mirror. What do they see? *Themselves.* Why? *Their sense of vision (eyes and brain) are working with light to be able to see the image of themselves. The shiny smooth surface of the mirror reflects light and we see an image.*



EXPLORE

How do objects affect light? Demonstrate with a piece of construction paper - cut into a triangle or a recognizable shape and tape to a window. Place a piece of plastic (cellophane or laminating paper) in front of the construction paper. Students should be able to see through the cellophane to identify the shape and color of the construction paper. This means almost all light is passing through the cellophane, it is **transparent**. Remove the cellophane and place a light colored paper over the triangle. (Students should be able to see a dark outline of the triangle). Students can now see the shape but not the color of the triangle - some light is passing through. This is **translucent**. Then use a solid object like a textbook. You should not be able to see the paper at all - this is **opaque**. Allow students time to experiment with classroom objects on their own using the window or other sources of light as a backdrop. They can record whether objects are opaque, transparent, or translucent in their notebooks.

MATERIALS

- A window or source of light
- Construction paper
- Various items to study opacity (paper, plastic, glass, solid objects)
- Several mirrors
- Cheap laser pointer

DIY Activity (Optional)

- Video—create one or download from our website.
- Phone or tablet
- Large box or dollhouse
- Sheet of clear plastic
- Tape

In order to model reflection we are going to use a keychain laser pointer. **CAUTION:** *Be careful not to aim the laser in the direction of any students.* Place a mirror flat against one wall of the classroom. Shine the laser at the mirror and note where the laser dot ends up. Notice how the location of the reflected laser dot changes based on the angle at which you shine the laser light onto the mirror. Allow the students to suggest different flat materials like paper, cardboard, plastic, etc., to place right in front of the mirror to see if the laser will reflect off of those surfaces as well. Make predictions and compare.



EXPLAIN



WATCH THE GENERATION GENIUS LIGHT REFLECTION VIDEO AS A GROUP.

Then facilitate a conversation using the Discussion Questions.



ELABORATE

Students can complete the optional DIY Activity, which takes what they have learned about eyesight and reflection and applies it to a fun project. Students should be able to explain how light and reflections cause the hologram-like phenomena to work. (Note: this DIY is one of the more difficult in our videos.)



EVALUATE

In their science notebooks, students should draw a diagram that shows how our eyes see our reflections in a mirror. *Light reflected off the image enters the eyeball through the front lens. Since light travels in straight lines, it crosses at the lens, inverting the image at the back of our eye. Our brain automatically turns the image right-side up!*

