



TEACHER GUIDE

LIGHT AND REFLECTION GRADES 3-5

COMMON MISCONCEPTIONS

- **Light does not travel from a source to an object.**
When an object is illuminated by a lamp or the sun, it is because light is travelling from the source to the object. The further away from the source you are, the less illuminated an object will be.
- **Light does not need to enter the eye in order for an object to be seen.**
Light is necessary for our eyes to see objects. This is why it is impossible to see anything in a completely dark room.
- **Light needed to see an object is coming from the eye rather than to the eye. Our eyes produce light so we can see things.**
Our eyes do not produce any light. Objects must be illuminated by a source (lamp, sun, etc.) for us to be able to see them.
- **Only shiny objects reflect light.**
Shiny objects reflect light really well, but any object you can see reflects light or you wouldn't be able to see it.
- **Black does not reflect any light.**
Black does reflect light, just less than white or lighter colors.
- **Light goes around things and does not travel in a straight line.**
Light travels in straight line. You have a shadow because your body is blocking the path of some of the light from the sun. Light only goes around things if it is reflected.

LIGHT AND REFLECTION AT THE ELEMENTARY LEVEL

Light, at the elementary level, is not meant to be introduced in great depth. Instead, the concept of light is introduced in conjunction with reflection in the context of vision—something relevant to students at this age. Students do start to learn about waves (wavelength, amplitude) at this level, but in the mechanical sense (4-PS4-1). Students are gaining the foundational knowledge they will need later to understand electromagnetic waves.

At the elementary level, we do discuss that light travels from a source to an object, and that it is reflected off objects in order for them to be seen by our eyes. However, method of travel is not specified. Students should be comfortable with

the idea that light is produced by a source. Sources of light might include the sun or lamps. The light from these sources travels in a straight line. It doesn't bend, but can be reflected off the surface of objects. It is this reflected light that allows us to see objects—our eyes don't produce light and neither do the objects (with the exception of luminous objects). Anything that is visible regardless of color or reflectivity is reflecting light, or it would not be able to be seen. However, some surfaces and colors do reflect better than others. For example, white reflects better than black, and shiny reflects better than matte.

VISION

Again, at the elementary level, vision is used in conjunction with light and reflection to create a relevant context for a basic understanding of both light and vision. The biology of vision is not addressed in depth. It is enough for students to understand that light is critically necessary to be able to see an object (no light, no sight) and that the structure of their eyes produces inverted reflections, but their eyes work with their brain to translate into the upright images they see.

CDS, DVDS, AND BLU-RAYS

Music and movie entertainment come to us courtesy of light and reflection. CDs, DVDs, and Blu-Ray discs are covered with tiny patterns of grooves that store information. When you play one of these discs, lasers in your CD, DVD, or Blu-Ray player read those grooves by reflecting the laser beam. This information is decoded as the music you hear or the movie you watch.

