

## KALEIDOSCOPIES

Students explore how light moves and reflects by using mirrors to create a colorful kaleidoscope to take home, using only two materials.

### SCIENCE CONCEPTS

Everything we see depends on light.

- The colors we see through the kaleidoscope depend on the colors of tape the students choose and the colors of the world through the other side of the kaleidoscope.
- The shapes students see through the kaleidoscope do not match the shape of the tape, because they see it reflected through the triangular prism they build.

Students learn about reflections.

- Light bounces off of mirrors to create images.
- We can also make reflections of a reflection when we use more than one mirror.

### BEFORE YOU VISIT

How do our eyes see?	We see because light enters our eyes and sends signals to our brains. Objects must emit or reflect at least some light for us to see them. Without light, we cannot see.
How do mirrors work?	Light from an object hits the mirror and bounces back the way it came, forming an <b>image</b> of the original.

### AFTER YOU VISIT

#### Questions

- What different ways did students find to attach tape to the ends? Did they overlap their tape colors? Did they cut it? How did this affect what they see in their kaleidoscopes?
- Can students observe different shades of the same tape color? Why do you think this is happening? (Answer: students create different shades of tape by layering them over one another. So, red over red may look darker, or blue over red may create darker or more purple shades.)

#### Activities

- Have students make lists of the different shapes they observe through their kaleidoscopes. Some patterns get very complicated!
- Teachers might have students try to make certain shapes appear in the kaleidoscopes by changing the tape on the ends. Students will naturally make many different shapes with their initial designs, so use what they've already made to reverse engineer specific shapes.



## CAREERS THAT USE ENGINEERING

**Telescope maker:** Some people use telescopes in their backyards to look at stars, and some people put telescopes on spacecraft to help astronomers study the universe. Both kinds need someone to build the telescope, and this involves building lenses and giant mirrors to focus light from stars and galaxies billions upon billions of miles away.

**Optician:** People who wear glasses visit opticians to get the right glasses for their vision. Opticians learn how light changes when it travels through glass and use this knowledge to help people see more clearly.

**Solar engineer:** Some types of solar power use mirrors to concentrate a wide collection of light onto a small point. This industry requires engineers to craft and build these mirrors, which can help provide energy to people and businesses.

Learn about [more careers](#) that use engineering!

## MINNESOTA ACADEMIC STANDARDS FOR SCIENCE K-12

*0.1.1.21 Use observations to develop an accurate description of a natural phenomenon and compare one's observations and descriptions with those of others.*

*2.1.2.2.2 Describe why some materials are better than others for making a particular object and how materials that are better in some ways may be worse in other ways.*