CHALLENGE: TRANSMISSION & SHADOWS

Shadows

Shadows are an absence of light. Light travels in a straight line, and when it meets an obstacle, cannot move around it. The light is then either reflected, absorbed, or transmitted. If the object is transparent, and the light is transmitted, the light will continue on its path on the other side of the obstacle. If the object is opaque, however, the light is either reflected, absorbed, or both. Either way, the light does not make it to the other side of the object, and a shadow is formed.

Selective Transmission

Some transparent objects allow only certain wavelengths, or colors, of light to pass through them. This is called selective transmission. A red piece of plastic, like the Reflect View, will allow only red light to pass through it. All other wavelengths of light will be absorbed, or blocked.

Big Idea

Explore the formation of shadows by selectively transparent objects using knowledge of selective transmission.

Related Activities

Activity 3: Transmission with Gummy Bears

Activity 4: White Light and Shadows

What You'll Need

- 2 Lazr fingers/Light BLOX: Red and Blue
- 1 Reflect View
- A long, thin object, like a LASER pointer/pencil
- A blank wall/screen

ACTIVITY SHEET

Transmission & Shadows

We're now going to use what we know about selective transmission to create shadows using selectively transparent objects.

1. Place the Reflect View about 5-10 cm from the wall/screen.

Start out by shining the red Lazr finger at the Reflect View. What happens?

_____

_____

You should see that the red light passes through the Reflect View, and shines on the screen behind it.

2. Stand the pencil vertically next to the Reflect View.

Shine the red light at the pencil on its own. What do you see? Is this what you expected?

_____

_____

The pencil casts a shadow on the screen behind it. Regardless of the color of the light, the opaque pencil allowed none of the light to pass through it.

3. Move the pencil so that it stands between you and the Reflect View.

Shine the red Lazr finger at the pencil and the Reflect View together. What do you see on the screen?

_____

_____

You'll notice that the red light passes through the Reflect View unhindered. The pencil blocks the light, however, and a shadow of the pencil is formed on the screen.

Now shine the blue light at the Reflect View and pencil together. What do you see?

_____

_____

This time, the entire Reflect View casts a shadow! None of the blue light makes it to the other side of the Reflect View, since the Reflect View absorbed all the blue light, and would only allow red light to pass.