

## Post-trip Lesson for Shadow Stories Turned Around?

### Engagement

Ask students what they remember about what they learned about light when they went to the Discovery.

### Exploration

Tell the students that you're going to talk about light and refraction.

Take the glass and place it in front of the paper with the arrow drawn on it, so that you can see the arrow through the glass. Ask the students which direction the arrow is pointing. Now pour water into the glass. Ask the students which direction the arrow is pointing. Ask why it's pointed in a different direction than it was when the glass was empty.

### Explanation

The light traveled through the air, through the glass, through the water, through the back of the glass then through the air again before hitting the arrow. Anytime light travels from one material to another it bends or refracts. As the light travels through a substance, it becomes concentrated into a focal point, usually near the center. After light passes through the focal point, the rays cross over each other and cause images to appear reversed.

### Extension

Allow students to examine a straw in a glass of water. Explore what happens to the straw. Why does it appear to bend when in the water? This is due to refraction!

### Other resources

<https://www.youtube.com/watch?v=o08jgkut7e8>

Nevada Academic Content Standards in  
Science (NGSS): 1-PS4-3

Common Core: W.K.2.2.

### What You Will Need:

- A transparent water glass
- A piece of paper with an arrow drawn on it
- A pitcher of water

