

Bending Light

Leading questions:

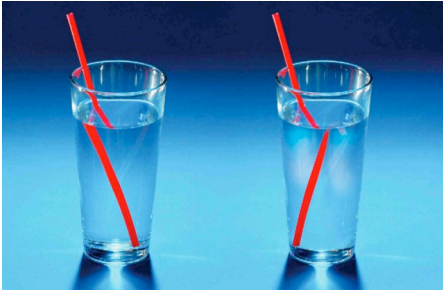
- Is the path of light different in water than it is in air?
Ask: Does the light travel in a particular way, like a straight line? Is this always the case?
- What happens to the path of a ray of light when it passes from one material into another?
Ask: Talk to students about their ideas and where their predictions come from. The experiment will answer the question.

What to do:

1. Look at a straw in a glass of water.
 - Describe what you see.
 - Why do you think the straw appears the way it does?
Explain: Light travels at different speeds through different materials. When light rays pass from one medium to another, the difference in speeds between the two materials causes the ray to bend where the materials meet. This causes the object to appear to be in two pieces.
2. Compare aiming a laser pointer into the dish of water and then corn oil. (**Caution! Do not aim the laser at anyone's eyes!**)
 - Examine the path of the light at different angles in these two materials and describe what you see.
Explain: The greater the angle that the laser is aimed at the dish, the greater the bending of the angle. The corn oil has a greater effect on the light ray than water. The bending of light as it passes through a material is referred to as refraction.
 - Where does the path of the light appear to change direction?
Explain: The path of the ray of light bends where air and the liquid meet (the plastic dish has an effect as well).
 - Describe the path of the light inside either of the liquids.
3. Immerse the glass wand into the cup of corn oil.
 - Describe what you see.
 - Why do you think the glass wand appears to disappear?
Explain: Corn oil and the glass both bend (refract) light the same amount. We therefore do not see a difference when light passes from one material (the glass) to the other (the corn oil).

Summary:

In any given material, like water, air, or glass, light always travels in a straight line. When light passes through different materials, its path can be deflected, or bent where the materials meet. Scientists refer to this as **refraction**. The ability of a material to bend light at its surface is called **index of refraction**. If two materials have the same index of refraction, light will continue to travel in a straight line.



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