



Curiosity Guide #203

Refraction of Light

Accompanies Curious Crew, Season 2, Episode 3 (#203)

Broken Pencil

Investigation #3

Description

A puzzle: How can you break a pencil without breaking it?

Materials

- Glass jar
- Water
- Pencil or straw

Procedure

- 1) Fill the jar about two-thirds full with water.
- 2) Ask a friend to stand in front of the jar and watch the pencil as it goes into the jar.
- 3) Keep the pencil straight up and down. Place it in the water so that it is closer to the back of the jar and off to the left side.
- 4) What do you and your friend notice?
- 5) Keep the pencil toward the back side of the jar. Slide the pencil toward the middle and then to the right side of the jar. What happens?
- 6) Compare how the pencil looks from the different perspectives.

My Results

Explanation

Light refracts or bends when traveling from one substance to another. In this case, the light coming from the pencil is leaving the dense water and going into the less dense air, where the light can travel faster. When the pencil is on either side of the cup, the bottom half appears further to the outside of the cup than it really is. The image bends away from the normal position. When the pencil is in the center, the light rays follow the normal path, and so the pencil does not appear broken.

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