

The Power of Light and Vision

Try these activities to demonstrate the power of light and how it affects the way we see the world.

SCIENCE
WEEK

9-16 NOVEMBER 2014

THE
POWER
OF SCIENCE

THE GIANT EYEBALL AND THE MAGIC ARROW

YOU WILL NEED

A round bottomed lab flask (or a large plain wine glass, or a round glass bottle), water, black marker, plain white paper, and hopefully some good weather.

BASIC INSTRUCTIONS

Feel free to experiment!

1. Draw, or print out, a black arrow about the size of the arrow shown here.
2. Fill the flask, bottle or glass with water.
3. If possible, work outside or near a bright window.
4. Hold the arrow with the paper at eye height, or tape it to the wall.
5. Look at the arrow through the flask of water. Move the flask horizontally to see the arrow clearly.
6. Notice the direction the arrow points now!
7. Move around and observe your surroundings through the water in the flask. If the weather is good enough, you should see the world "upside down" and "left to right" when looking through the water.
8. If you work carefully, you may be able to project a picture of the upside down world onto a sheet of white paper.



INVESTIGATE

- Does the same thing happen if you look through the flask just filled with air?
- What is the effect of using sparkling water?
- Will the same thing happen looking through a clear plastic bottle of water?

THE GIANT EYEBALL AND THE MAGIC ARROW CONTINUED

WHAT IS HAPPENING?

This “flipping” of an image as we look through a round body of clear liquid happens because light travels in straight lines. The light from the top of the object ends up at bottom of the image, and vice versa.

The object size seems reduced because of refraction, slight bending of the straight light rays as they pass from the air through the glass and water. This makes the image smaller and allows us to project it on to the paper - this is the basis of photography, and human vision.

Your eye is basically a round container of clear liquid, just like the flask of water. A very small, upside down, flipped image of the world around you is projected on to the back of your eye and transmitted to your brain.

EXPLORE MORE...

PhET has two interactive modules you can download and explore...

Geometric Optics - http://phet.colorado.edu/sims/geometric-optics/geometric-optics_en.html

Bending Light - <https://phet.colorado.edu/en/simulation/bending-light>

