

## Lenses

### What You Need

- 1 long, thin jar, such as an olive jar, or a test tube with a stopper that fits it snugly
- 1 medicine dropper
- 1 sheet of clear cellophane
- 1 magnifying glass or any convex lens.

### Try This!

1. Fill a long, thin jar (or a test tube) to the brim with fresh, clean water, and cap the jar. (If you use a test tube, seal it with a cork or rubber stopper.) You can use this cylinder-shaped container of water as a 'lens'.
2. Hold the 'lens' in the horizontal position, very close to the paper, and examine the writing below, by looking through the lens:

**BOB      DAD      MOM      OXO**

3. Move the 'lens' away from the writing. What happens to the **images** of the words as you move the lens away?
4. Why do the images of some words appear 'upside down' (inverted), but not other images?
5. Place one drop of water on a small piece of clear cellophane. Use the drop of water as a magnifying glass to examine a letter on this page. How is the image different from the actual letter?
6. Use a simple magnifying lens (hand magnifier) to examine some words on this page, with the magnifier close to the page. How is the image different from the original writing?
7. Move the magnifier further away from the page. What happens to the image when you do this?
8. Hold the magnifier so that its lens makes light from a window fall on a sheet of white paper. Change the distance between the lens and the paper, until you see a sharp image on the sheet of paper. How is the image different from the scene outside the window?

**Caution! *Never look at the sun through a convex lens!***

You may permanently damage your eyes this way.

Lenses are everywhere! Your own eyes have lenses. Cameras have lenses. There are lenses in movie projectors, slide projectors, overhead projectors, microscopes and some telescopes. Even headlights have lenses. Lenses use the property of **refraction**, where light entering a new medium changes direction. If the lenses are shaped properly, you can make light converge to a point or diverge. Corrective lenses in eyeglasses help you to see better, when your own eyes are not perfect. You can read more about lenses in a physics book or in a science encyclopedia.