

Water Lens

Overview: Waves of light enter your eyes through the pupil, which is the small black dot right in the center of your colored iris. Your lens bends and focuses the light that enters your eye. In this experiment, we will study this process of bending light and we will look at the difference between concave and convex lenses.

Materials

- washer (3/8 inch inside diameter)
- microscope slide
- petroleum jelly (or lip balm)
- newsprint with small type
- pipette (1 mL) or eyedropper or spoon
- pen
- paper towel
- water

Experiment

1. Apply a little petroleum jelly on the washer's flat side. NOTE: Washers have flat and rounded sides, so be sure you are putting the petroleum jelly on the flat side of the washer.
2. Put the washer, petroleum jelly side down, on the middle of the microscope slide. Twist the washer a bit to seat it on the slide and make a seal. This should keep the water in place.
3. Put the washer and slide on the newsprint.
4. Fill the pipette with water.
5. Use the pipette to slowly place water in the washer. Fill the washer until the water makes a domed shape. You have just made a convex lens!
6. Find a letter *e* on the newspaper and put the lens over it. Draw a diagram of what the *e* looks like through the convex lens.
7. Now use the pipette to remove water from the washer (or you can absorb some with a paper towel). Your goal is to create a dip in the surface of the water. Now find the same *e* and place your new concave lens over the letter. Draw a picture of what the *e* looks like through the new lens.

Water Lens Data Table

Water Lens Type (<i>concave or convex</i>)	Draw a Diagram of the Lens	Draw a Diagram of the Newsprint

Reading

You can see that a convex lens bends outward and a concave lens bends inward. What does this do to light?

In a convex lens, the domed surface means that if light waves come in through the flat bottom surface, they will be spread out, or refracted, as they exit the curved portion of the lens. But since a concave lens dips inward it creates the opposite effect. When light waves exit the concave surface, they are brought together. This makes images appear smaller.

The lens does all the focusing work, but it is actually the shape of the eye that determines what you see. If you have a tall, oblong eye, you are far-sighted. And conversely, if your eyes are short and fat, you are near-sighted. In either case, the lenses are functioning properly but the actual shape of the eye needs a slight adjustment.

Exercises

1. What are the two main types of lenses?
2. How are the two main types of lenses shaped
3. How do the two main types of lenses work?

Answers to Exercises: Water Lens

1. What are the two main types of lenses? (convex and concave)
2. How are the two main types of lenses shaped? (convex bulges outward and concave dips inward)
3. How do the two main types of lenses work? (convex makes things appear larger, concave makes them appear smaller)