

Light & Shadows – Pinhole Magnifier

Forgot your glasses, need a magnifier? Try using a pinhole magnifier.

Materials:

- Clear plastic pop bottle
- Pin
- Sandpaper
- Dark piece of opaque plastic or aluminum foil large enough to cover the top of the bottle
- Knife
- Superglue or tape



Procedure: (Remember to have your parent’s permission and have them watch and help you.)

- Cut the neck of the bottle just below where it starts to widen (about 2.5 cm long).
- Sand the cut edge smooth so you won’t cut yourself.
- Cut the opaque material just large enough to completely cover the top of the bottle.
- Use your pin to poke a hole through the center of the opaque disk. Make the smallest hole you can. Start small, you can always make it larger later.
- Use the superglue or tape to attach the disk to the top of the bottle section.
- Put the object you wish to view under your magnifier and look through the pinhole. Note: You need to have lots of light.

What's Happening:

The pin hole acts as a lens. The pin hole forces every point of emitting light on the object you are viewing to form an equivalent point of light on the retina of your eye. The image appears in focus. It is very dim because the hole is very small and why you needed to use it in very bright light. Lenses are used in cameras and glasses because they let more light through. The eye is an excellent example of evolution. The first creatures to develop light sensing cells evolved the equivalent of pin holes to help focus the light. Eventually animals with lenses evolved.

I was the only member of my family who did not need glasses. I often teased them and now I need glasses to read. This often happens to people with excellent eyesight when they hit 40 - 50 years old. As you age the lenses in your eyes stiffen and the eye muscles weaken, causing things to be out of focus. Reading glasses are low power magnifying glasses that assist in focusing the image on the retina of your eye. When I forget my glasses I just curl my fingers into a fist with my index finger sticking up and open it just enough to let light through (the pin hole magnifier). Try it!

Extension:

Try putting a drop of water on top of the pinhole. What effect does this have on the image.? You could also make a magnifier by fastening plastic wrap to the top with an elastic band letting it sag slightly and filling this with water. In a pinch you can use this to focus the sun’s rays to start a fire.

This activity is based on our Light & Shadows kit. The source for this lab is <http://www.instructables.com/id/Build-a-Pinhole-Magnifier/#step1>. Our teaching kits (described on our website) are loaned out FREE to provide classroom teachers and parents of home schooled children an opportunity to explore Science in interesting ways. Please consider volunteering as a classroom guest speaker or offer your business as a field trip location.

Lorne Cooper, Regional Executive Director

PRAXIS, “Making Science Fun”. Contact Praxis at praxis@praxismh.ca, www.praxismh.ca, Tweet or follow us @PraxisMedHat, or friend us on Facebook. Address: c/o 200 7th Street S.W., Medicine Hat, AB, T1A 4K1 Phone: 403-527-5365, Fax: 403-527-6570.