



SCIENCE EXPERIMENT



BUILDING A HOMEMADE TELESCOPE WITH LENSES



WHAT YOU'LL LEARN

How convex lenses can be used to magnify distant objects and create images.

Name: _____ Date: _____

MATERIALS



- 2 convex lenses (one with a longer focal length for the objective lens, one with a shorter focal length for the eyepiece)
- Cardboard tube (18–24 in / 45–60 cm long)
- 2 cardboard circles (to fit inside the tube)
- Tape
- Black paper or paint
- Scissors
- Ruler
- Distant object to view (trees, buildings, mountains, etc.)

PROCEDURE



- 1. Prepare the Tube**
Line the inside of the cardboard tube with black paper or paint to reduce glare. Let it dry if using paint.
- 2. Make Lens Holders**
Cut two cardboard circles that fit snugly inside the tube. Cut a hole in the center of each circle slightly smaller than the lens, then tape the lens in place.
- 3. Install the Objective Lens**
Place the lens with the longer focal length at one end of the tube. This is the objective lens.
- 4. Install the Eyepiece Lens**
Place the lens with the shorter focal length at the other end of the tube. This is the eyepiece.
- 5. Adjust for Focus**
Look through the eyepiece and slowly move it in and out (or adjust the two lenses) until the image looks sharp. Tape it in place when focused.
- 6. Test Your Telescope**
Take your telescope outside and point it at a distant object. Look through the eyepiece and observe!

YOUR HOMEMADE TELESCOPE



SAFETY FIRST



- Do not look at the Sun through your telescope.
- Use your telescope to view distant objects only.
- Handle lenses gently. They can break if dropped.

FOCUSING TIP



The distance between the lenses is important. For best results, the distance between the objective lens and eyepiece should be approximately equal to the sum of their focal lengths.

Example: 20 cm (objective) + 5 cm (eyepiece) $\approx$ 25 cm between lenses.

OBSERVE & RECORD



What did you observe?

How clear was the image? ☆☆☆☆
(1 = blurry 5 = very clear)

What could you improve?

Draw what you saw through your telescope.

CONCLUSION



What did you learn from this experiment?

WHAT TO TRY NEXT



- Try different eyepiece lenses and compare magnification.
- Build a telescope with a longer tube.
- Learn how real telescopes are used by scientists!