Performance Task

16.3 Lenses 18.

In this performance task, you will investigate the lens-like properties of a clear bottle.

- a water bottle or glass with a round cross-section and smooth, vertical sides
- enough water to fill the bottle
- a meter stick or tape measure
- a bright light source with a small bulb, such as a pen light
- a small bright object, such as a silver spoon.

Instructions

Procedure

1. Look through a clear glass or plastic bottle and describe what you see.
2. Next, fill the bottle with water and describe what you see.
3. Use the water bottle as a lens to produce the image of a bright object.
4. Estimate the focal length of the water bottle lens.
    a. How can you find the focal length of the lens using the light and a blank wall?
    b. How can you find the focal length of the lens using the bright object?
    c. Why did the water change the lens properties of the bottle?

Teacher Support

Teacher Support The learning objectives in this section help your students master the following standards:

- (7) Science concepts. The student knows the characteristics and behavior of waves. The student is expected to
    - (D) investigate behaviors of waves, including reflection, refraction, diffraction, interference, resonance, and the Doppler effect;
    - (E) describe and predict image formation as a consequence of reflection from a plane mirror and refraction through a thin convex lens; and
    - (F) describe the role of wave characteristics and behaviors in medical and industrial applications.

In addition, the High School Physics Laboratory Manual addresses content in this section in the lab titled: Mirrors and Lenses, as well as the following standards:

- (7) Science concepts. The student knows the characteristics and behavior of waves. The student is expected to
    - (D) investigate behaviors of waves, including reflection, refraction, diffraction, interference, resonance, and the Doppler effect.