CHAPTER 14

Skills Practice Lab

Converging Lenses

OBJECTIVES

- **Investigate** the relationships between the positions of the lens and object, and the position and size of the image.

MATERIALS LIST

- **2 screen support riders**
- **cardboard image screen with metric scale**
- **converging lens**
- **dc power supply**
- **insulated copper wire, 2 lengths**
- **lens support rider**
- **meterstick and meterstick supports**
- **metric ruler**
- **miniature lamp and base on rider**
- **object screen**

Converging lenses can produce both real and virtual images, and they can produce images that are smaller, the same size as, or larger than the object. In this experiment, you will study image formation using a converging lens.

SAFETY

- **Use a hot mitt to handle resistors, light sources, and other equipment that may be hot. Allow all equipment to cool before storing it.**
- **Never put broken glass or ceramics in a regular waste container. Use a dustpan, brush, and heavy gloves to carefully pick up broken pieces, and dispose of them in a container specifically provided for this purpose.**

PROCEDURE

Preparation

1. Read the entire lab, and plan what measurements you will take.
2. If you are not using a datasheet provided by your teacher, prepare a data table in your lab notebook with eight columns and six rows. In the first row, label the columns *Trial, Position of Lens (cm), Position of Object (cm), Position of Image (cm), q (cm), p (cm),* h_o *(cm),* and h_i *(cm).* In the first column, label the second through sixth rows *1, 2, 3, 4,* and *5.*

Formation of Images

3. Set up the meterstick, meterstick supports, image screen, and lens as shown in **Figure 1.** Locate and mark the point on the mounted screen where it intercepts the principal axis of the mounted lens.
4. Place the illuminated object screen at one end of the meterstick. Make adjustments so that the center of the object screen coincides with the principal axis of the lens.
5. Place the lens far enough from the object screen to give an object distance greater than twice the focal length of the lens. Move the image screen along the meterstick until the image is as well defined as possible. Read and record in your data table the positions of the object, lens, and image to the nearest millimeter on the meterstick. Also record the object distance, *p,* the image distance, *q,* the height of the object, h_o, and the height of the image, h_i.