CHAPTER 13

Skills Practice Lab

Brightness of Light

OBJECTIVES

- **Determine** the relationship between the intensity of the light emitted by a light source and the distance from the source.
- **Explore** the inverse square law in terms of the intensity of light.

MATERIALS LIST

- black aperture tube for light meter
- black paper aperture stop for light meter
- black tube to cover bulb and socket
- black paper square
- clamp for support stand
- light meter
- meterstick
- meterstick-mounted bulb socket
- meterstick supports
- power supply
- small, clear incandescent bulb
- support stand
- masking tape

The measured brightness of a light depends on the distance between the light meter and the light source. In this lab, you will use a light meter to measure the intensity of light at different distances from a light source in order to investigate the relationship between the distance and the brightness of a light source.

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.**
- **If a bulb breaks, notify your teacher immediately. Do not remove broken bulbs from sockets.**
- **Never put broken glass 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.**
- **Avoid looking directly at a light source. Looking directly at a light source may cause permanent eye damage. Put on goggles.**

PROCEDURE

Preparation

1. If you are not using a datasheet provided by your teacher, prepare a data table in your lab notebook with two columns and nine rows. In the first row, label the columns *Distance (m)* and *Intensity*. In the first column of your data table, label the second through ninth rows *0.20, 0.25, 0.30, 0.35, 0.40, 0.50, 0.75,* and *1.00.*

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2. Set up the meterstick, meterstick supports, light source (bulb and socket), power supply, and light meter with aperture as shown in **Figure 1.** Carefully screw the bulb into the socket. Tape the meterstick and supports to the lab table. Set the 0.00 m mark on the meterstick directly below the face of the light meter as shown.

3. Set the bulb socket 0.20 m away from the light meter. Align the clamp and the aperture of the meter so that the aperture is level, parallel to the meterstick, and at the same height as the hole in the tube covering the bulb. Adjust the bulb socket to the 0.20 m mark on the meterstick.