

OBJECTIVES

- **Discover** wavelengths of diffracted light.

MATERIALS LIST

- bent paper-clip riders for meterstick
- black cardboard
- cellophane tape
- diffraction grating
- grating holder and support
- incandescent light source and power supply
- meterstick and 2 supports
- metric scale and slit

In this experiment, you will pass white light through a diffraction grating and make measurements to determine wavelengths of the light's components.

SAFETY

- **Avoid looking directly at a light source. Looking directly at a light source can cause permanent eye damage. Put on goggles.**
- **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 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 the steps you will take.
2. If you are not using a datasheet provided by your teacher, prepare a data table in your lab notebook with six columns and four rows. In the first row, label the columns *Light Source*, *Image Color*, *Order*, *Image 1 (m)*, *Image 2 (m)*, and *Slit (m)*. In the first column, label the second through fourth rows *White*. Above or below the data table, prepare a space to record the slit spacing, d , of the grating.

Wavelengths of White Light

3. Set up the optical bench as shown in **Figure 1**. Mount the scale and slit on one end of the optical bench, and place a piece of tape over the slit. Place a cardboard shield around the light source to direct all the light through the slit. Illuminate the slit with white light. Mount the grating near the opposite end of the optical bench.
4. Adjust the apparatus so that the white-light source is centered on the slit and the slit scale is perpendicular to the optical bench. Tape the optical bench and the white-light source securely in place.