5. Turn the voltage-adjustment knob counterclockwise until the voltage meter reads zero. Adjust the power supply until the current meter on the photoelectric-effect device reads about 10 mA.

6. Slowly increase the potential difference by turning the voltage-adjustment knob. Turn the knob as slowly as possible as you approach 0.0 mA and stop just as the meter reaches 0.0 mA.

7. When the current meter reads 0.0 mA, read the voltage meter. Record the values in your data table as I_1 and ΔV_1. Repeat steps 5 through 7 to find ΔV when the current goes to zero four more times. Record the average current as I_6 and the average potential difference as ΔV_{stop} in your data table. The lowest potential difference for which the current is zero is the *stopping voltage.*

8. Prevent light from entering the device, and replace the blue filter with the green filter. Repeat steps 5 through 7 for the green filter. Record all data in your data table.

9. Turn the light source off. Prevent light from entering the device, and replace the green filter with the red filter. Replace the light source with the second light source if available. Place the light source close to the red filter. Turn on the light source, and repeat steps 5 through 7.

10. Clean up your work area. Put equipment away safely so that it is ready to be used again.

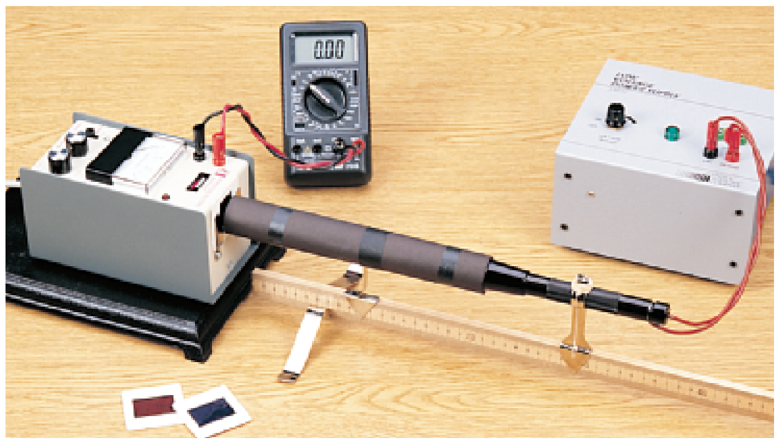

Figure 1

Step 3: When the photoelectric-effect device is operating, the current meter will probably not read zero even though there is no photocurrent. Set the meter to zero by starting a photocurrent and applying a potential difference to stop it. When the current meter returns to its original setting, set the meter to zero.

Step 5: Make sure the device is shielded from light in the room. Start a photocurrent in the device.

Step 7: Adjust the potential difference very slowly. Stop just as the meter reaches 0.0 mA.

ANALYSIS

1. **Organizing Data** For each trial, calculate the maximum kinetic energy (in eV) of the emitted electrons using the equation $KE_{max} = \Delta V_{stop} \times e$, where ΔV_{stop} is the stopping voltage and $e = 1.60 \times 10^{-19}$ C.

2. **Constructing Graphs** Graph the maximum kinetic energy of the emitted electrons versus the wavelength of the light source.

CONCLUSIONS

3. **Analyzing Graphs** Use your graph to answer the following questions.

   a. What is the relationship between the maximum kinetic energy of the emitted electrons and the wavelength of the light?

   b. What is the wavelength of light at which the kinetic energy is zero?

4. **Drawing Conclusions** What is the relationship between the stopping voltage and the wavelength of light?