

4. With the switch open, connect the current meter in a straight line in series with the mounted resistance coils. Make sure the black lead on the meter is connected to the black pin on the power supply. Connect the black lead on the voltmeter to the side of the first resistance coil that is connected to the black pin on the power supply, and connect the red lead to the other side of the coil in parallel. **Do not close the switch until your teacher approves your circuit.**
5. When your teacher has approved your circuit, make sure the power supply dial is turned completely counterclockwise. Turn on the power supply, and slowly turn the dial clockwise. Periodically close the switch briefly and read the current value on the current meter. Adjust the dial until the current is approximately 0.15 A.
6. Close the switch. Quickly record the current in and the potential difference across the resistance coil in your data table. Open the switch immediately. Turn off the power supply by turning the dial completely counterclockwise. Your teacher will tell you the length and cross-sectional area of the wire on the coil. Record these values in your data table.
7. Repeat steps 3–6 with different coils until five coils have been studied.
8. Clean up your work area. Put equipment away safely.

ANALYSIS

1. **Organizing Data** Use the measurements for current and potential difference to calculate the resistance, R_C , for each resistance coil you tested.

Use the definition of resistance, $R = \frac{\Delta V}{I}$.

CONCLUSIONS

2. **Drawing Conclusions** Rate the coils from lowest to highest resistance. Record your ratings.
 - a. According to your results for this experiment, how does the length of the wire affect the resistance of the coil?
 - b. According to your results for this experiment, how does the cross-sectional area affect the resistance of the coil?
3. **Drawing Conclusions** Based on your results for the metals used in this experiment, which metal has the greatest resistance? Which metal has the least resistance? Explain how you arrived at these conclusions.

Figure 1

Step 3: The set of mounted resistance coils shown includes five different resistance coils. In this lab, you will measure the current and potential difference for each coil in turn.

Step 4: Use your finger to trace the circuit from the black pin on the power supply through the circuit to the red pin on the power supply to check for proper connections.

Step 6: Close the switch only long enough to take readings. Open the switch as soon as you have taken the readings.

