

LAB**Electricity and Magnetism****Background**

Huge generators in power plants produce electricity by moving magnets past coils of wire. How does that produce an electric current? The moving magnet creates a changing magnetic field. This changing magnetic field induces a current in the wire coil.

Question

How does the amount of current produced depend on how the magnet and wire coil move?

Materials

cardboard tube
scissors
bar magnet
insulated wire
galvanometer or ammeter

Objectives

- **Observe** how a magnet and a wire coil can produce an electric current in a wire.
- **Compare** the currents created by moving the magnet and the wire coil in different ways.

Safety Precautions

WARNING: *Do not touch bare wires when current is running through them.*

Procedure

1. Read the procedure and safety information, and complete the lab form.
2. Wrap the wire around the cardboard tube to make a coil of about 20 turns. Remove the tube from the coil.
3. Use the scissors to cut and remove 2 cm of insulation from each end of the wire.
4. Connect the ends of the wire to a galvanometer or ammeter. Record the reading on your meter.
5. Insert one end of the magnet into the coil and then pull it out. These meters measure the current in the wire. Record the current. Move the magnet at different speeds inside the coil and record the current.
6. Watch the meter and move the bar magnet in different ways around the outside of the coil. Record your observations.
7. Repeat steps 5 through 6, keeping the magnet stationary and moving the wire coil.

LAB

(continued)

Conclude and Apply

1. **Explain** Is the current generated always in the same direction? How do you know?

2. **Describe** How was the largest current generated?

3. **Predict** what would happen if you used a coil made with fewer turns of wire. Try it.

4. **Infer** whether a current would have been generated if the cardboard tube had been left in the coil. Why or why not? Try it.

5. **Infer** Would moving a magnet in and out of coil by hand be a practical way to produce electric current for use in your home? Why or why not?

Communicate Your Data

Compare the currents generated by different members of the class. What was the value of the largest current that was generated? How was this current generated?
