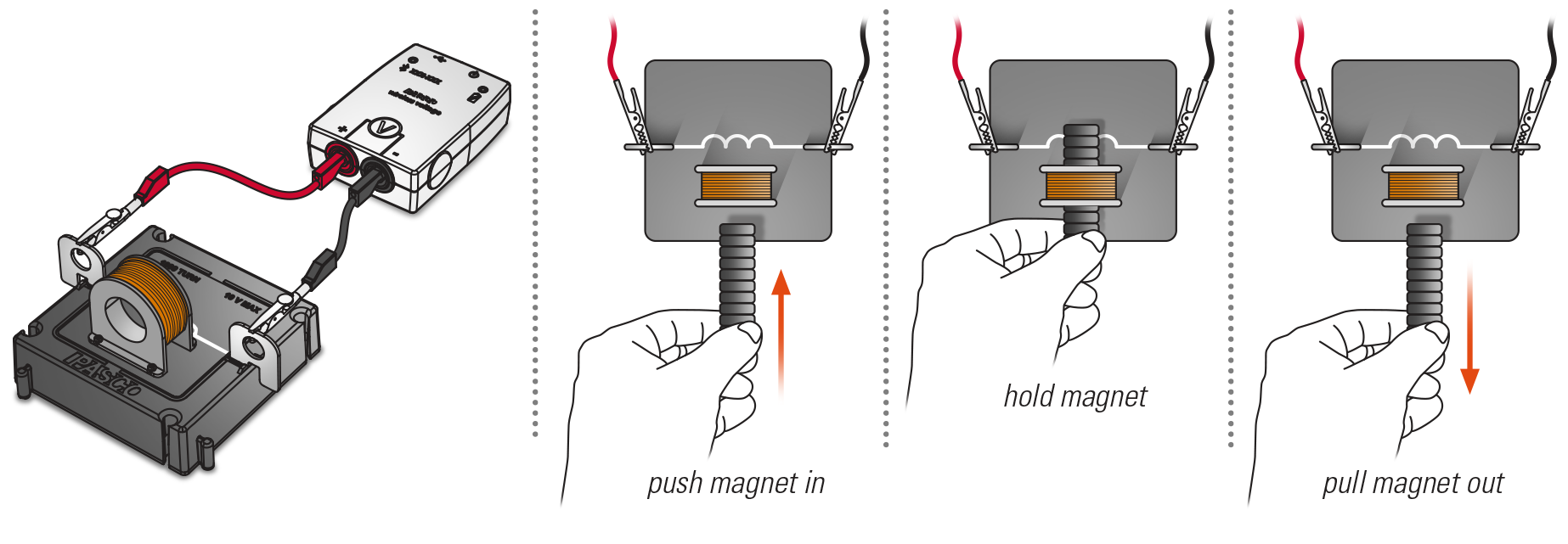
# **Investigation: Induction**

**Essential Question: How is an electrical current created in a wire with a magnet?**

Batteries are not the only method for creating an electric current. An electric current can also be generated with nothing more than a coil of wire and a magnet! In this investigation, you will explore what is required in order to generate a current and how the current behaves in a circuit when using a permanent magnet.

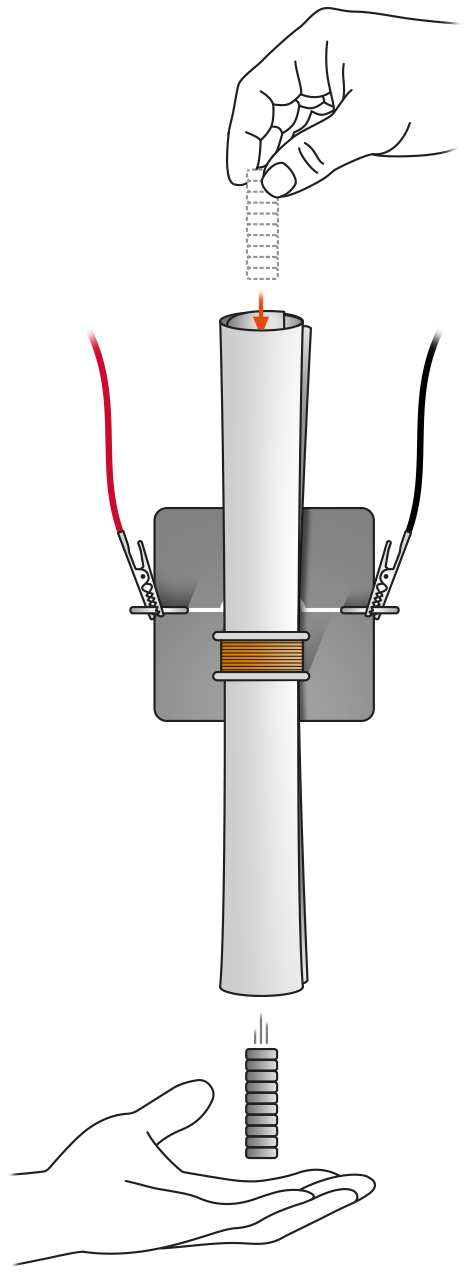
Part 1: Generating current



1. Open the experiment file **Induction** and then connect the voltage sensor to your software.
2. Connect the voltage sensor to the coil.
3. Begin recording data. Move the north end of the magnet into the coil, hold it in the coil, and then move the magnet out of the coil, as shown in the diagram.
4. Repeat the experiment, but flip the magnet so that the south end of the magnet is inserted in the coil.
5. Repeat the experiment, but move the magnet in and out of the coil at different speeds.

Questions

1. Describe the voltage measured under the following conditions:
   * The north end of the magnet is moved into the coil.
   * The magnet is held in the coil.
   * The north end of the magnet is moved out of the coil.
2. What major changes did you notice when you inserted the south end of the magnet?
3. What major changes did you notice when you moved the magnet at a faster speed?



Part 2: Magnetic Flux

1. Hold the coil on its side, so that the hole faces downward.
2. Roll a piece of paper to create a tube and insert it in the coil.
3. Drop the stack of magnets in the tube and let it fall through the other end, catching the magnets as they fall through.

Questions

1. Is the incoming flux significantly greater, less, or about the same as the outgoing flux? Why?
2. Is the incoming voltage peak significantly higher, lower, or about the same as the outgoing peak? Why?
3. Is the incoming peak in the same or opposite direction as the outgoing peak? Why?
4. What could you change about the experiment to change the magnetic flux?