

# Unit 5J Magnetism

#### Name:

Date:

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**Exploring Magnets and Magnetic Fields Lab** 

In this activity, you will be exploring the magnetic fields created by permanent magnets and those created by a current-carrying wire.

### **Materials:**

- permanent bar magnet
- iron filings
- battery holder
- multiple D-cell batteries
- lightly coated copper wire
- iron nail
- compass

## **Part One: Permanent Magnet**

a. Draw your prediction below of the magnetic field lines that the permanent magnet will create.

- b. Draw the actual magnetic field lines by following these steps:
  - Place the magnet under a separate, blank sheet of paper.
  - Starting at one pole, mark your starting point and place the compass there.
  - Make a mark where the opposite pole of the compass points, and replace the compass.
  - Repeat above steps until you reach the opposite end of the magnet and connect the dots.
  - Repeat as many times as possible.
- c. After drawing the magnetic field lines, shake the iron filings onto the top of the paper. Sketch the pattern of the iron filings in the space below.



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1.	Compare your initial prediction with your field line diagram and iron filing diagram. How accurate was your prediction? Explain any differences.
I	Part Two: Creating an Electromagnet
	<ul><li>a. Wrap the wire 25 times around the nail without overlapping.</li><li>b. Strip the ends of the wire to expose the copper interior so that it can be connected to the battery holder</li><li>c. Draw a diagram of your electromagnet.</li></ul>
	d. Begin with one battery connected to the wire, and attempt to pick up the paperclips with the nail.
1.	Increase the number of batteries connected to the wire. What do batteries add to the circuit?
2.	How does the strength of the magnet change as more batteries are added to the circuit?
	e. Increase the number of times the wire is wrapped around the nail to 50, and again attempt to pick up the paperclips.
3.	How does the strength of the magnet change as the wire is wrapped more times around the nail?