**ELECTROMAGNET INVESTIGATION #1** **NAME:\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**

 **HOUR:\_\_\_\_\_\_\_\_**

**Answer and discuss these questions with your lab partners.**

1. When you tested a complete circuit with a compass, how strong was the magnetic field surrounding the wire?

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1. What ideas do you have to make the magnetic field surrounding the wire much stronger?

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1. What experiments have we done in class that resulted in a stronger magnetic field?

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**PART 1: MAKING A ELECTROMAGNET**: Follow the steps in the procedure to create an electromagnet.

1. Wrap the thin wire 40 times around the rivet. Be sure to leave about 10 cm of wire free at the start end so you can attach it to a D-cell.
2. Make sure all wraps are in the same direction. Keep the wraps between the head of the rivet and the first black washer.
3. Put the rivet/wire system into a circuit, using one D-cell in a holder and a switch.
4. When connecting wires to the D-cell, connect to the spring closest to the terminal for the best results. E. Always leave the switch open unless you are testing the rivet, or you might drain the D-cells.
5. See if you can use the rivet as a magnet by testing it with paper clips.

**DRAW A DETAILED ILLUSTRATION OF YOUR ELECTROMAGNET. LABEL EACH COMPONENT IN YOUR ILLUSTRATION**

**PART 2: EXPLORE INTERACTIONS**

* Test the interaction between a permanent magnet and the rivet head. What happens? \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
* Reverse the direction of the current flow and then test the magnet again. Record your observations:\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

**ANSWER THE FOLLOWING QUESTIONS ABOUT YOUR ELECTROMAGNET DESIGN.**

1. What can you tell me about your system?

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1. What details of the design were important to get the electromagnet working?

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1. What does wrapping the wire around the core accomplish?

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1. How would you compare the magnetic force of a single wire in a circuit with an electromagnet coil?

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1. What makes the magnetic force of the electromagnet coil so much stronger?

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