

DUE DATE: _____

Name: _____

Forces LAB

PART 1: Mapping the Magnetic Field-Invisible Forces

1. **BACKGROUND INFORMATION (what is a magnetic field?):**

2. **ASK A QUESTION (Aim):**

3. **HYPOTHESIS (Use if, then, and because statement):**

4. **MATERIALS (what do you need):**

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5. **SAFETY (Identify any safety equipment and procedures for this lab):**

6. METHOD (Is your experiment a fair test?):

Independent Variable: What is the one thing that will change in your experiment?

Dependent Variable: How will you measure your results?

Constant Variable: (What are you keeping the same?):

7. PROCEDURE (list all the steps you do):

Step 1: Reminder to use paper and iron filings to map the magnetic field of magnets.

Step 2: Place a horseshoe magnet in the centre of a piece of paper and place a second piece of white paper (or clear sheet) on top of the magnet.

Step 3: Lightly sprinkle a small amount of iron filings around the magnet in a circular pattern, gradually moving outward from the magnet. (the filings should begin to “line up”). **CAUTION:** BE SURE NOT TO GET IRON FILINGS ON THE MAGNETS.

Step 4: Gently tap the paper to accentuate the magnetic filed lines formed by the filings. **Note:** observe the filings closely.

Step 5: Draw what you see in the diagram section of this lab.

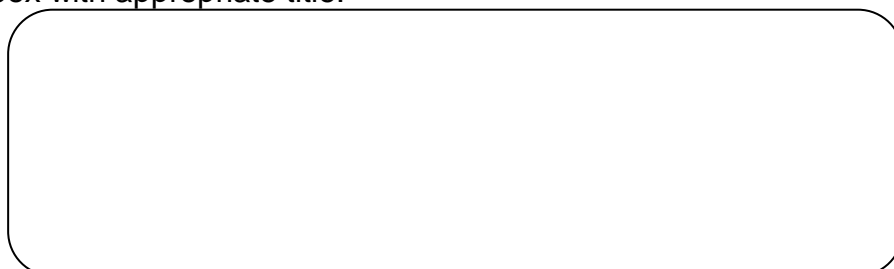
Step 6: Repeat step 3 and 4 but position the magnets so that north and north are facing each other. Draw what you see in observation box #1 with an appropriate title.

Step 7: Repeat step 3 and 4 but position the magnets so that north and south bar magnets are facing each other. **Note:** observe the filings closely. Draw what you see in your observation box with appropriate title.

Step 8: Repeat step 3 and 4 but position the magnets so that south and south bar magnets are facing each other. **Note:** observe the filings closely. Draw what you see in your observation box with appropriate title.

Step 9: Repeat step 3 and 4 but position the magnets so that south and north bar magnets are facing each other. **Note:** observe the filings closely. Draw what you see in your observation box with appropriate title.

8. DIAGRAM:



eg. Drawing of the magnetic field surrounding a horseshoe magnet

9. OBSERVATIONS:

Diagram #1-

10. RESULTS (looking at your observations):

Complete each of these sentences. Use the words **repel** and **attract**.

Magnetic fields of poles north with north _____ each other.

Magnetic fields of poles north with south _____ each other.

Magnetic fields of poles south with south _____ each other.

Magnetic fields of poles south with north _____ each other.

Therefore, like poles (North/North) _____ each other while unlike poles (North/South) _____ each other.

By mapping the _____ fields we can see the actual field lines and identify the _____ of the magnet.

11. CONCLUSION (relate to Aim, Hypothesis, and Results):

a. Were your predictions correct (look at Aim, Hypothesis, and Results?)

b. Compare the magnetic fields of the bar magnet and the Earth. Describe how the magnetic fields are similar and/or how are the magnetic fields different.

c. Describe what the magnetic field lines do when two **like** magnetic poles are placed near each other.

d. Describe what the magnetic field lines do when two **unlike** magnetic poles are placed near each other.

- e. Observe the magnetic field lines from your *observation* boxes. How can you tell where the magnetic field (force) is the **strongest**?

- f. What happens to the *strength* of the magnetic field as you get further from the magnet?

- g. A compass needle does not point exactly to the geographic North Pole. Where does it actually point?

- h. List 3-4 items found in your household that can be magnetic. What kind of material are these items made of that makes them so magnetic?

- i. Draw a picture to represent the Earth with an imaginary magnet inside that helps us to think about the Earth's magnetic field. Label the north and south poles of the magnet and the North and South poles of the Earth.