

28.4: Procedures

Warnings

- Do not bang or drop magnets; this may disorder the magnetic domains.
- Iron filings will not wash off a magnet; use the paper as a barrier.

You will observe several magnetic field patterns, and test magnetic attraction.

Patterns

1. Draw a table in which record your observations. **Do not fill in data until you have read the instructions for obtaining that data.**

Table 28.4.1: Patterns Data

Shape of Magnet	Visible Looping (yes or no)

2. Choose 3 different magnet shapes; record the magnet shapes. Place one magnet under the piece of paper. Lightly sprinkle iron filings from the container onto the paper, like you are seasoning your food, until a pattern emerges. Observe and record whether there is any visible looping in the pattern. Sketch the shape of the magnet and the magnetic field pattern for this magnet, under your data table. Pour the iron filings from the paper back into the container. Repeat this process for the 2 additional magnet shapes you chose.

Example

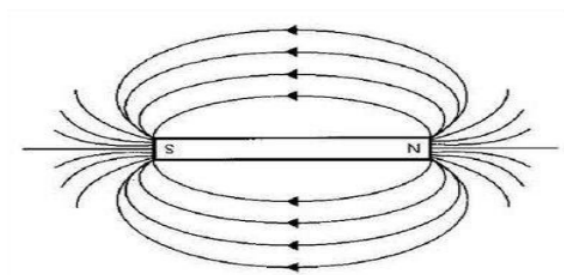


Figure 28.4.1

Magnetic Metal

3. Place the large paperclip on your lab table, and place a piece of paper over the paperclip. Lightly sprinkle iron filings onto the paper until. Record whether you are able to discern the paperclip, whether there is a magnetic field pattern.
4. Place one of the bar magnets on your lab table, and place the large paperclip on top of a bar magnet, at one end, such that the paperclip extends out from the top surface of the magnet. Place a piece of paper over this magnet-paperclip system. Lightly sprinkle iron filings onto the paper until the pattern emerges. Record whether you are able to discern the paperclip from the bar magnet.



Figure 28.4.2

Strongest Magnet

- Spread the small paperclips onto the table. Have each team member choose a magnet. Have a team competition to determine which magnet is the strongest. Describe the properties of this magnet, like its shape and what it was able to do to win the competition.

Multiple Fields

- Draw a table in which to record your observations of magnetic field interactions. Read the instructions for obtaining the data.

Table 28.4.2: Multiple Fields Data

	Interaction Visible (Yes or No)	Lines Connect or Bend Away
Opposite Poles		
Like Poles		

- Orient the bar magnets such that the opposite poles are attracting, but are not touching. Place the piece of paper over this two magnet system. Lightly sprinkle iron filings onto the paper until the pattern emerges. Observe and record whether the pattern shows interaction between the magnets in your *multiple fields* data table. Also record whether magnetic field patterns appear to connect or bend away from each other.
- Re-orient the bar magnets such that the like poles are repelling, but are not touching. Repeat the process you used for opposite poles and record your observations in the *multiple fields* data table.
- Use a combination of magnets, or magnets and paperclips, to create a design. Place the piece of paper over this combination system. Lightly sprinkle iron filings onto the paper until patterns emerge. Sketch the orientations of the magnets and/or paperclips in your design. Describe or sketch what you observe happening to the magnetic fields in this system. Repeat the process for a 2nd combination design.

Mapping the Field

- Place a strong bar magnet on the table. Slowly move the magnetic compass around the magnet and observe the compass needle. Place the compass at multiple locations, encircling the entire bar magnet, and sketch the direction the arrow points at these locations. Your sketch should result in a map of the field surrounding the bar magnet.

Example

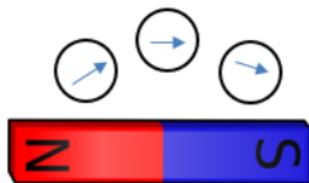


Figure 28.4.3

Magnetic Materials

- Draw a table in which to list 5 magnetic and 5 non-magnetic materials/objects in your classroom. Read the instructions for obtaining the data.

Table 28.4.3: Magnetic & Non-magnetic Data

	Magnetic	Non-magnetic
1		
2		
3		
4		

	Magnetic	Non-magnetic
5		

12. Choose a strong magnet and test items in your classroom to complete your *magnetic and non-magnetic* data table.

Extension of the Field

13. Draw a table in which to record magnetic fields interacting through materials data. Read the instructions for recording data about these objects.

Table 28.4.4: Materials Data

Material	Interaction Felt (Yes or No)
Paper	
Wood	
Lab Table	
Rubber	
Glass	

14. Choose two strong magnets. Determine if the magnets are strong enough to interact through the items listed below. Record your results in your *materials* data table.

- A sheet of paper (Paper)
- A wood door (Wood)
- The thickness of the edge of your table (Lab Table)
- The seat of your chair (Rubber)
- A glass window (Glass)

Clean-up

- Clean up all iron filings
- Throw away the piece of paper
- Wash your team table

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