

# PHYSICS DEPARTMENT COPY

## *Experiment 16: Magnetism, Magnetic Force, and Electromagnets*

Question: What can you conclude about the strength of the magnetic field from your data?

Distance From Magnetic Pole (cm)	5	10	15	20	25	30	35	40	50	55	60
Amount of Deflection From North ( $\theta^\circ$ )											

**Sketch your results from mapping the magnetic field lines. Be sure to put in arrows for direction.**



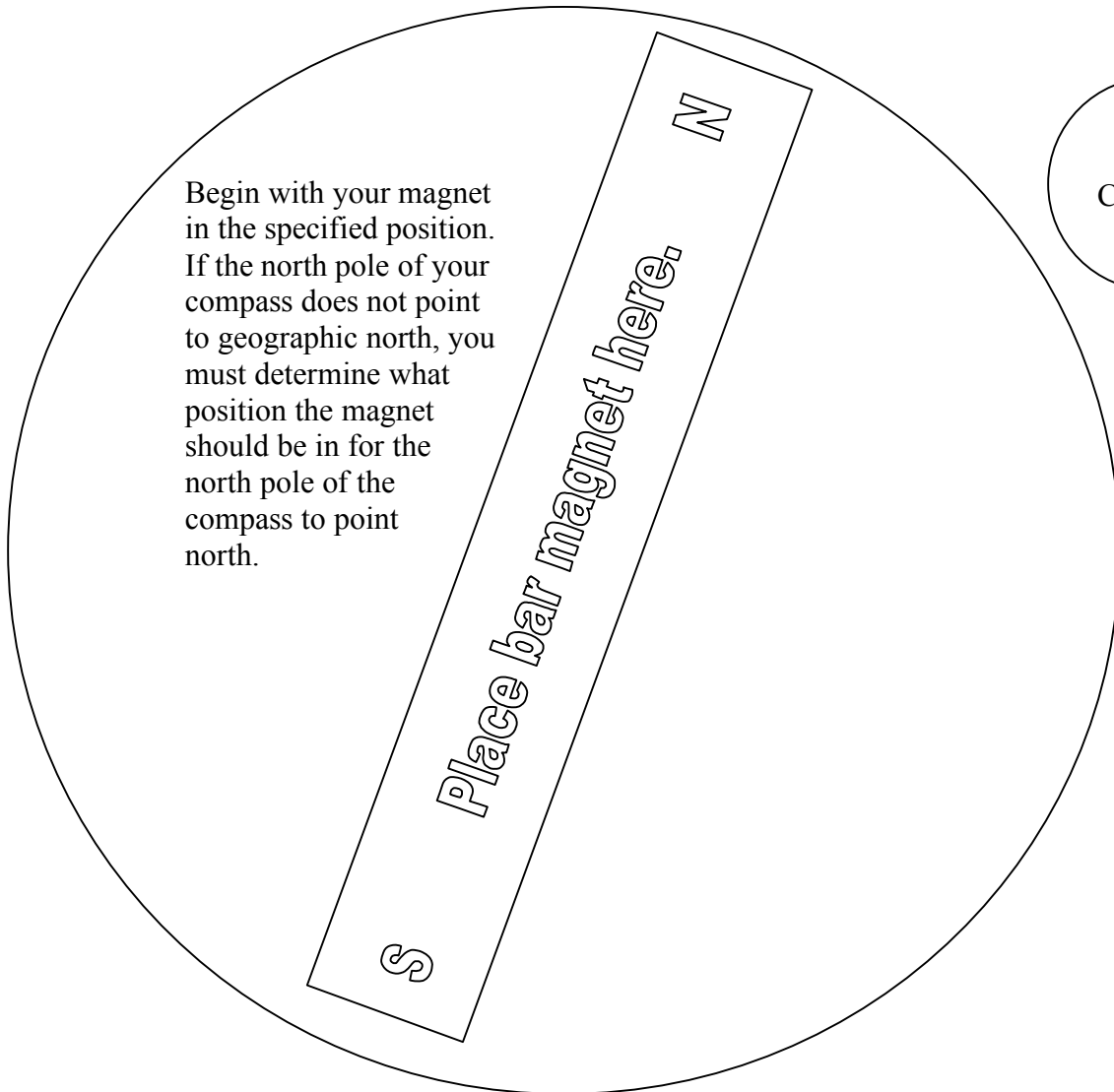
Question: **Describe any patterns you see as you answer these questions:** Where are the lines closer together? Which pole do they leave from/enter? What do you think the lines are doing inside the magnet?

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## Earth Map

Label the location of Earth's magnetic north and south poles.

Geographic North  
Magnetic \_\_\_\_\_



Geographic South  
Magnetic \_\_\_\_\_

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## Data Tables:

Table 2      *Current through wire wrapped around the rod:* \_\_\_\_\_

Number of turns of wire wrapped around the rod	<i>Deflection angle of compass needle</i>
0	
10	
20	
30	
40	
50	

Table 3      *Number of turns of wire wrapped around the rod:* \_\_\_\_\_

Current through wire wrapped around the rod	<i>Deflection angle of compass needle</i>
0 A	
1 A	
2 A	
3 A	
4 A	
5 A	

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## Questions:

1. *Summarize briefly what you did in Part 1 and what you observed.*
2. *Explain why the stroked nail attracted the paper clips, and why it was important to stroke it with the same pole of the bar magnet, in the same direction. (Explain in terms of the magnetic domains that you learned about in class.)*
3. *After you dropped the nail, were you able to pick up any paper clips? What do you think happened?*
4. *How are current and magnetic fields related? What type of relationship do your graphs reveal?*
5. *Explain why the rod with the wire wrapped around it becomes a magnet.*
6. *Why would the deflection angle of the needle increase when the number of turns in the wire increases, and when the current increases?*