LAB 21. PERMANENT MAGNETS

Problem

- What are magnetic fields?
- How can we understand the shape and properties of fields?
- How do magnetic fields affect matter?

Equipment

1. two bar magnets
2. bar magnet, thread, magnetic compass
3. magnets of different configurations, white paper, iron filings

Activities

Here we look at magnetic fields, particularly to visualize them and understand the direction and magnitude of forces on items subject to the fields.

This lab consists of several stations. You may do them in any order.

Bar Magnets

Place one bar magnet flat on the table. Individually, bring each end of the other magnet slowly toward each end of the magnet on the table. What happens in each of the four cases?

Earth's Magnetic Field

Tie a thread around the middle of a bar magnet. Pick up the magnet by the thread and adjust the position of the thread loop so that the hanging magnet balances horizontally. In what orientation (north-south, east-west, etc.) does the hanging magnet eventually come to rest?

Bring a compass toward each end of the bar magnet. How does the compass react to each of the two ends of the magnet?

Magnets and Iron Filings

Place a magnet under a sheet of paper and sprinkle iron filings evenly on the paper. Filings should be on the paper in locations away from the magnet as well as directly atop it. (In other words, don't just allow clumps of filings to congregate at the poles of the magnet.) Sketch the pattern that is formed.

Repeat with a different magnet.

Report

Submit this paper for grading or check-off. Have a lovely weekend.