Lab 36-1: **Magnetism - Part 1**

Purpose: To investigate basic magnetism effects.

Materials: 1 ring magnet 2 bar magnets 2 compasses 1 long wire
1 iron fillings 1 solenoid
(paper clips, copper tube, Al foil, pennies, several different nails, silver/gold jewelry you happen to be wearing)

Procedure:

Part 1: What is magnetic?

1. Using the permanent magnets, determine which elements are naturally magnetic. Some of the materials are at your desk, and some have to stay at the teacher's desk.

2. Apart from some rare-earth metals, there are only three elements that are naturally magnetic. What were they?

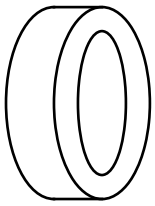
3. Looking at a periodic table, what do you notice about the three elements that are magnetic?

Part 2: How do permanent magnets interact?

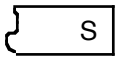
4. Using the two bar magnets, how do the different poles of the magnets interact with each other?

5. If two magnets are repelling each other, what must be true about the poles facing each other? What about if they attract each other?

6. The poles on the ring magnet are not marked. Using a bar magnet, determine how the poles are arranged on the ring magnet and draw your results here.



7. Your teacher has a bar magnet that was broken in half (accidentally.) Bring your compass, and go inspect the broken halves of the magnet. One is marked "N" and the other is marked "S". Do those old marks make sense; is one of them really just a north pole and the other really just a south pole?



Part 3: What is a compass?

8. Your compass needle has a red half and a white half. Leaving the compass and the magnet on the table, slide the compass around the magnet. What do you notice about the compass needle?

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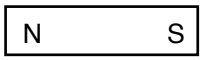
9. Try and draw what you just described in the space below.



10. Keeping them on the table, rotate the two compasses around each other. What do you notice about the compass needles?

11. Here is a confusing one: A long time ago, compasses were magnetized needles used for navigation. The two ends of the needle were called the "north-seeking pole" and the "south-seeking pole." This has since been shortened to "north pole" and "south pole." Since the north pole of a magnet would point to the earth's North Pole, what kind of magnetic pole is the North Pole?

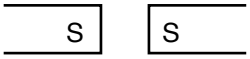
Part 4: Visualizing the magnetic field.

12. Much like we visualized an electric field with field lines, we can visualize a magnetic field. Thankfully, it is easier to visualize because we can use a compass or iron filings to map out the magnetic field. Both a compass and the iron filings will orient themselves parallel to the magnetic field they are in. You already saw the compass in number 10 above, so here are the iron filings.

13. Use the iron filings to make a sketch of the magnetic field around a single magnet, and then around the ends of two magnets, oriented as shown.

a.

b.



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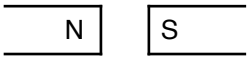

d.