

Name _____ # _____

Date _____

Section # _____

Physics

Magnetism Lab Magnetic Field Lines

Directions

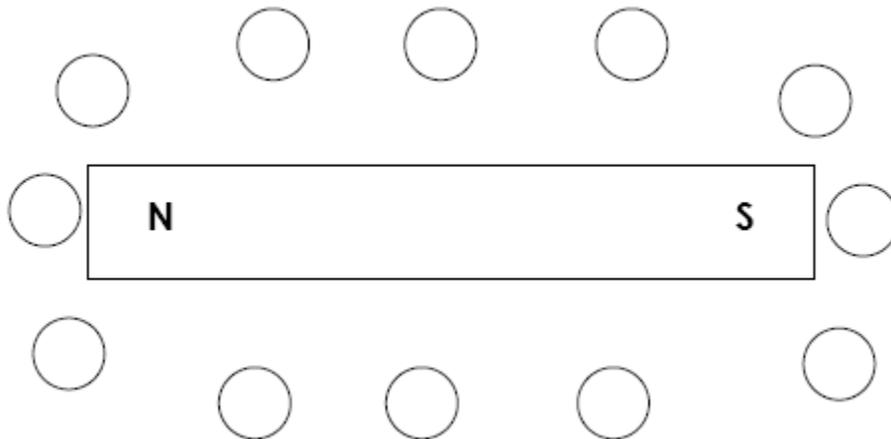
A) Place one of your bar magnets on a piece of loose-leaf. **B)** Place the plastic over the magnet and sprinkle the iron filings **from a height of about 10 cm**. **C)** Continue sprinkling until a distinct pattern emerges. The iron filings fall on the plastic and align themselves with the magnetic field.

1) Describe the field. What is the most unique characteristic of the field? **(10 points)**

2) Draw a simplified version of the field pattern that emerged when the iron filings were placed on the bar magnet. Be sure to show the shape of the field. **(5 points)**

Place your compasses in your magnetic field in the spots illustrated below. Does your compass needle line up with the flux lines? _____ **(2 points)**

Draw an arrow into each circle below to show the direction of the north pole of your compass in the field. **(3 points)**



3) Look closely at the filings. Where on the bar magnet is the magnetic field strength strongest? **(10 points)**

a) How can you tell the field is the strongest there? **(10 points)**

4) The north pole of your compass will point towards the front of the room and will be slightly tilted to the left. What color is the north pole of your compass? **(10 points)**

a) How would a physicist explain why the north pole of your compass points in this direction? **(10 points)**

5) Hold a magnaprobe above the magnet and follow the lines of magnetism around from one pole to another. Observe the compass dial as you move along the line of magnetism. What is the shape of the magnetic field above the magnet? **(10 points)**

6) Place the north end of a bar magnet about 4 cm from the south end of another bar magnet. (*as shown below*) Place a piece of plastic over the two magnets and sprinkle iron filings in the region between the magnets. Draw a simplified version of the field pattern that emerged when the iron filings were placed on the bar magnets in these configurations.

6a) (5 points) Use the north pole of your **compass to determine the direction of the magnetic flux lines**. Add arrows to your picture showing the direction of the magnetic lines of flux as determined by your compass.

Note: Only show the field lines as they appear **between** the bar magnets



6b) (5 points)



7. How do the magnetic field line patterns *between* the magnets in 6a and 6b differ? **(10 points)**

8. Which end of the unknown magnet is north and which end is south? **(10 points)**