



## PREPARATORY PHYSICAL SCIENCE (PHSC - 001) Lab. Exercise No. 8

Name: \_\_\_\_\_

Student's ID \_\_\_\_\_, Section \_\_\_\_\_, Date \_\_\_\_\_

### Study Magnetic Lines of Forces

#### Object:

- Plot the magnetic lines of forces using a bar magnet and a magnetic compass.
- After completing this section you will be able to explain how magnetic lines of force enter and exit a bar magnet.

#### Material required:

Drawing paper, Bar magnet, Magnetic compass, Scotch tape.

#### Theoretical Background:

##### Magnetic field:

Space around a magnet in which its magnetic field effect is felt is called a magnetic field. Or it is a region within which the magnet can exert its magnetic force.

##### Magnetic poles:

Magnet has maximum power of attraction or repulsion on its opposite ends called poles.

##### Magnetic force:

Magnet attracts other magnetic substance with a force. This force is different from electrostatic force and gravitational force called magnetic force.

##### Magnetic lines of force:

A magnetic line of force is a curve in a magnetic field such that the tangent at any point on it gives the direction of the magnetic intensity at that point .

##### Non-Magnets and magnets:

Substance is neither attracted nor repelled by a magnet are called non-magnet e.g. wood, paper, glass etc.

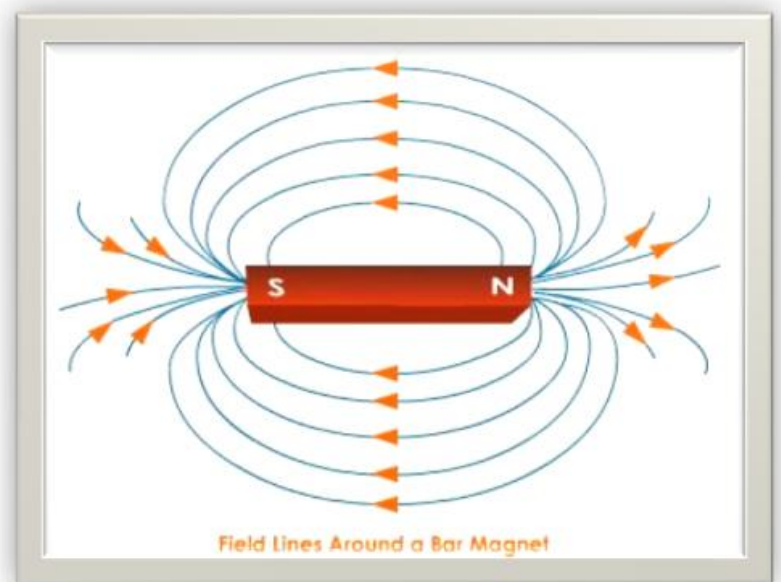
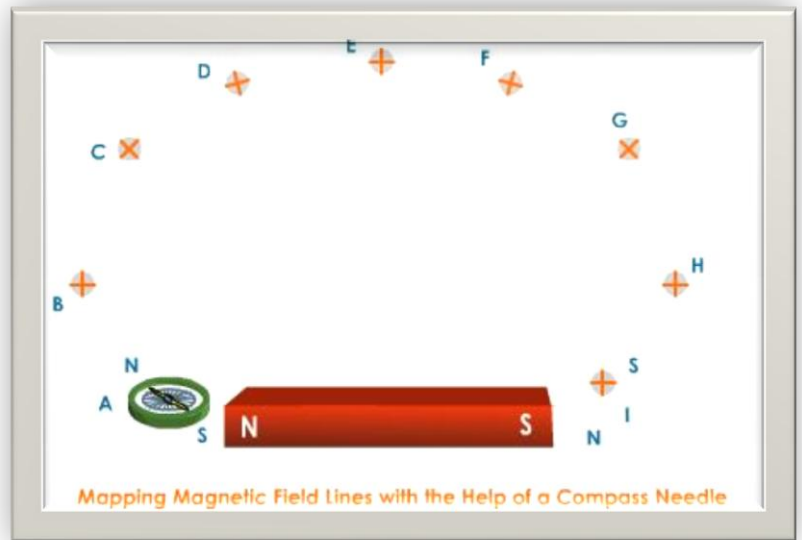
Substances which attract each other magnetically called magnets e.g. iron, nickel, cobalt etc.

## Properties of magnetic lines forces:

- Magnetic lines of forces form close path emitting from North Pole and sink into South Pole.
- The lines force is continuous through the magnet.
- Two lines of forces cannot pass through a common point.
- The line of force contract longitudinally. The contraction of lines of force explains the force of attraction between two opposite kinds of magnetic poles.
- The magnetic lines of force can pass more easily through iron than air.
- Magnetic lines forces repel each other in horizontal direction.

## **Procedure:**

- Place a drawing paper on the table.
- Mark a line in the middle of the paper and place magnetic compass on the paper.
- Gently move the paper such the magnetic compass becomes parallel to the line.
- Mark the position of paper. Place the bar magnet on the paper parallel to the line such that it's north pointing towards the Geographical south.
- Take five points on each side of the North Pole.
- Place compass needle in front of the one of the point such that one end of its needle coincide with the point.
- Place needle in front of the second dot such that one end of its needle coincide with the point and mark other dot as shown in the Fig. 1
- In this manner continue marking up to the South Pole.
- Join these dots to get magnetic lines of force. Indicate the direction of lines of force by arrow from north to south.
- In this manner draw five lines on each side as shown in the Fig. 2.



**Result:**

The magnetic field of a bar magnet is traced by drawing magnetic lines force as shown in the Fig. 2

**Review Questions**

- Q 1. What do the lines around the bar magnet indicate?
- Q 2. A magnetic field line is used to find the direction of
- a) south-north
  - b) a bar magnet
  - c) a compass needle
  - d) magnetic field
- Q 3. The direction of a magnetic field is taken.
- a) north to south and back
  - b) south to north and back
  - c) north to south only
  - d) south to north only

**End of the Lab Exercise**