

# **LESSON- 13**

## **FUN WITH MAGNETS**

We use magnets in many ways in our day to day life. For example, to separate iron pieces from large pile of waste material, to stick favourite stickers on to doors of almirahs or refrigerators, in some pin holders, pencil boxes etc.

### **HOW MAGNETS WERE DISCOVERED?**

A shepherd named Magnes who lived in Ancient Greece, used to take his herd of sheep and goats to the nearby mountains for grazing. He would take a stick with him to control his herd. The stick had a small piece of iron attached at one end.

One day he had to pull hard to free his stick from a rock on the mountainside. That rock attracted the iron tip of the shepherd's stick. This was the discovery of natural magnets. Such rocks were called magnetite after the name of shepherd.



**SHEPHERD MAGNES FOUND NATURAL MAGNET ON HILLSIDE**

Magnetite contains iron. Some people also believe that magnetite was first discovered at a place called Magnesia. The substances having the property of attracting iron are now known as magnets.

### **MAGNET:-**

Magnet is a material which attracts materials like iron, cobalt, nickel etc.

### **TYPES OF MAGNETS -**

There are two main types of magnets. They are natural magnets and artificial magnets.

i) **Natural magnet:** - is magnet got from rocks called magnetite. It contains iron.

ii) **Artificial magnet:** - is magnet made from iron, cobalt and nickel.



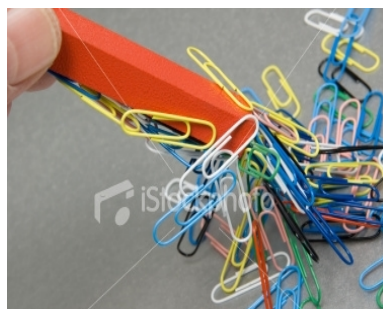
### **MAGNETIC AND NON MAGNETIC MATERIALS :-**

a) Magnetic materials :- are materials which are attracted by magnets.

e.g.:- iron, cobalt, nickel, steel etc.

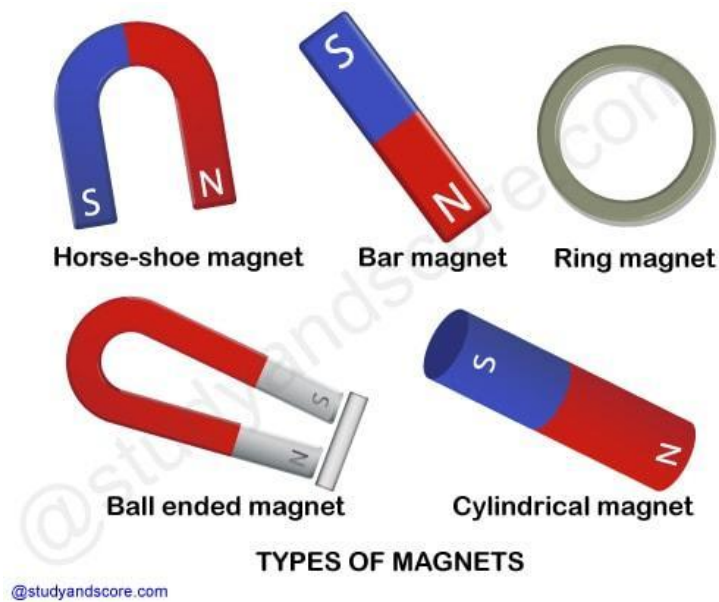
b) Non-magnetic materials :- are materials which are not attracted by magnets.

e.g.:- wood, plastic, rubber, glass etc.

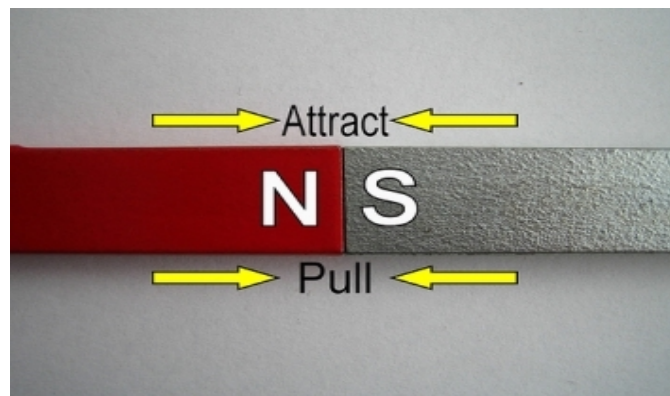


### **SHAPES OF MAGNETS :-**

Magnets are of different shapes. They are bar magnet, horse shoe magnet, cylindrical magnet etc.

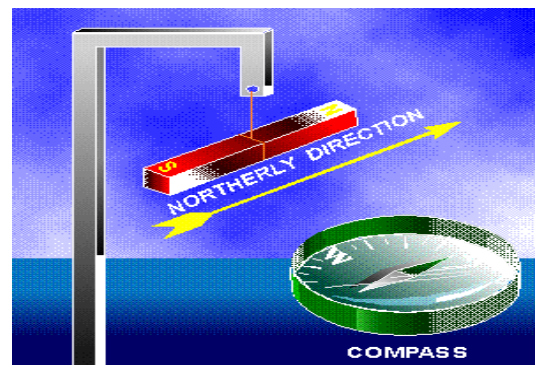
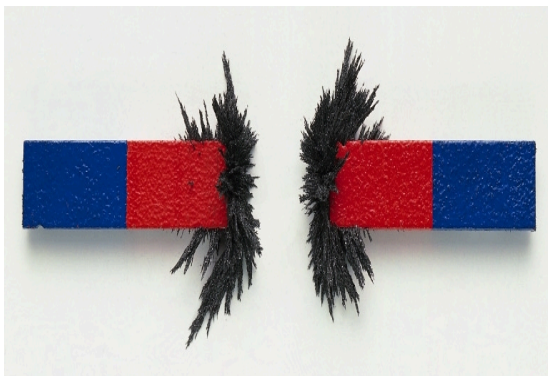


### POLES OF A MAGNET :-



The two ends of a magnet where the attraction is maximum are called the poles of the magnet. A magnet has two poles called North Pole and South Pole.

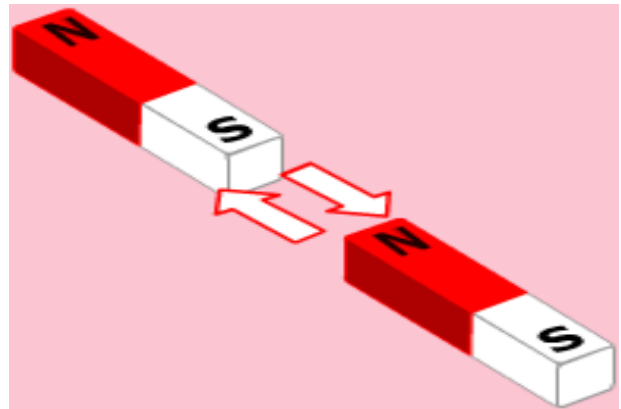
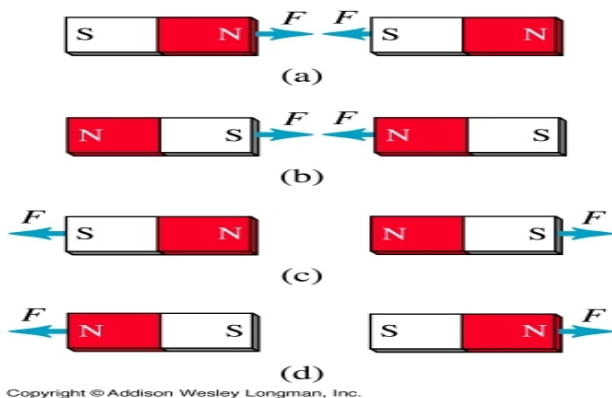
A freely suspended bar magnet points in the North – South direction. The end of the magnet which points towards the north is called the North Pole and the end of the magnet which points towards the south is called the South Pole.



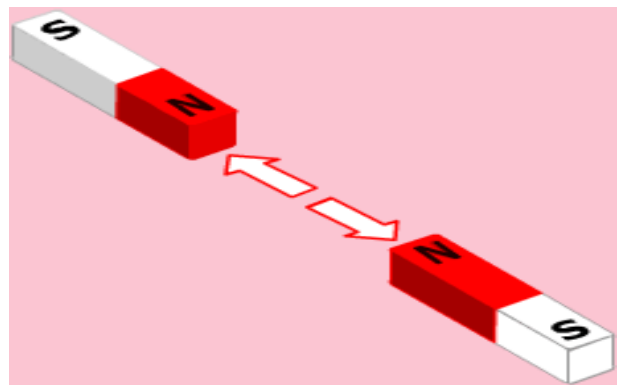
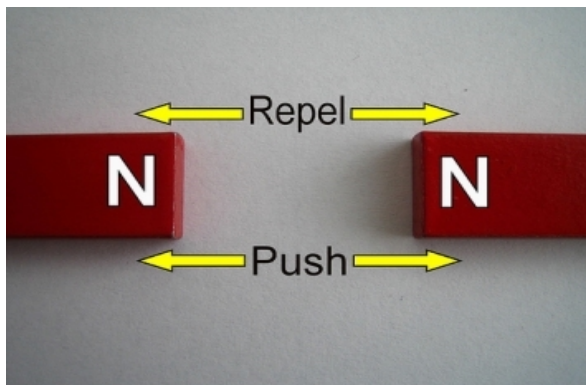


## ATTRACTION AND REPULSION BETWEEN MAGNETS :-

i) The opposite poles of two magnets attract each other.



ii) The similar poles of two magnets repel each other.

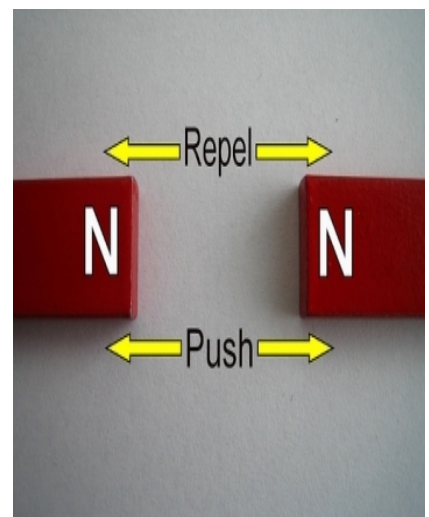
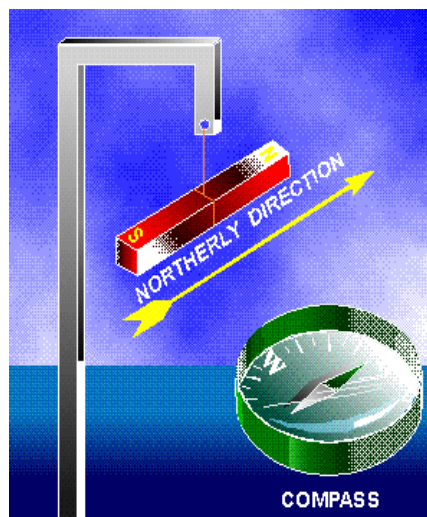


## PROPERTIES OF MAGNETS :-

i) Magnets attract materials like iron, cobalt, nickel etc.

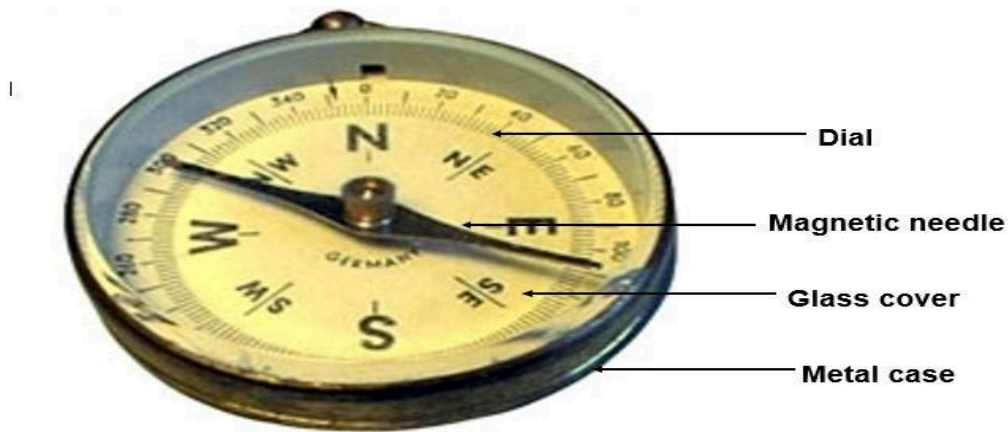
ii) A freely suspended magnet points in the north – south direction.

iii) The opposite poles of two magnets attract each other and the similar poles of two magnets repel each other.



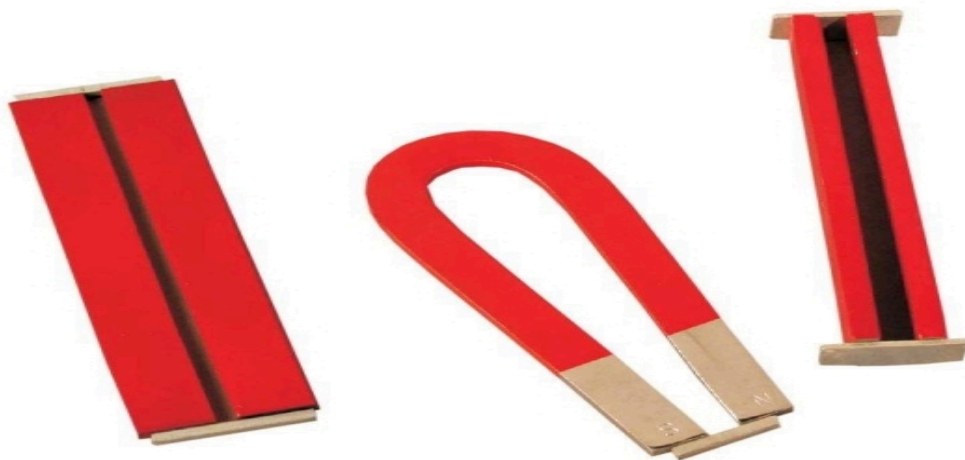
### **MAGNETIC COMPASS :-**

A magnetic compass is a device used to find directions. It has a metal case with a glass cover. A magnetic needle which can rotate freely is pivoted inside the case. It also has a dial marked with directions inside it.



### **A FEW CAUTIONS ABOUT MAGNETS :-**

- i) Magnets lose their properties if they are heated, hammered or dropped from a height.
- ii) Magnets should be stored properly. Bar magnets should be kept in pairs with their opposite poles on the same side. They should be separated by a piece of wood and two pieces of soft iron should be placed at the two ends. For a horse shoe magnet a piece of soft iron should be kept across the poles.
- iii) Magnets should be kept away from radio, television, music systems, computers, mobile phones, cassettes, compact discs etc.



## **ACTIVITIES**

### **1. THE STRENGTH OF THE MAGNET IS MORE AT THE POLES OF THE MAGNET :-**

Take some iron pins or iron filings and put them on a paper. Roll a bar over them. You will observe that maximum iron pins or filings stick to the ends (poles) of the magnet this shows that the strength of the magnet is more at the poles of the magnet.

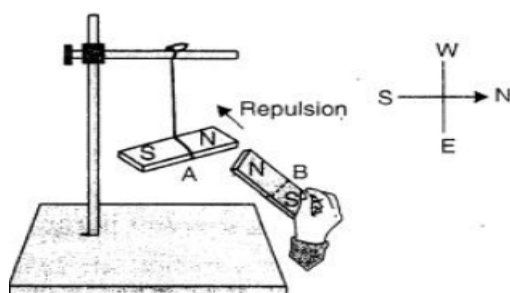


### **2. TO PROVE THAT LIKE POLES REPEL WHILE UNLIKE POLES ATTRACT EACH OTHER:-**

Suspend a bar magnet, whose poles are marked, with a thread on a wooden stand. It will come to rest in the north-south direction. Take another bar magnet in your hand whose poles are also marked. Bring the north pole of this magnet close to the north pole of the suspended magnet. You will observe that the north pole of the suspended magnet turns away from the north pole of the magnet that you are holding in your hand.

Next, bring the south pole of the magnet in your hand close to the north pole of the suspended magnet. The north pole of the suspended magnet gets attracted towards it.

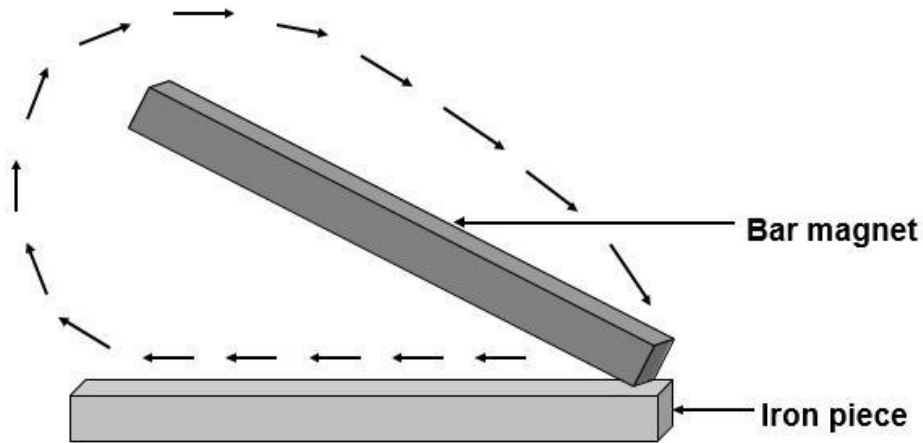
This proves that like poles repel and unlike poles attract each other.



Like poles repel each other

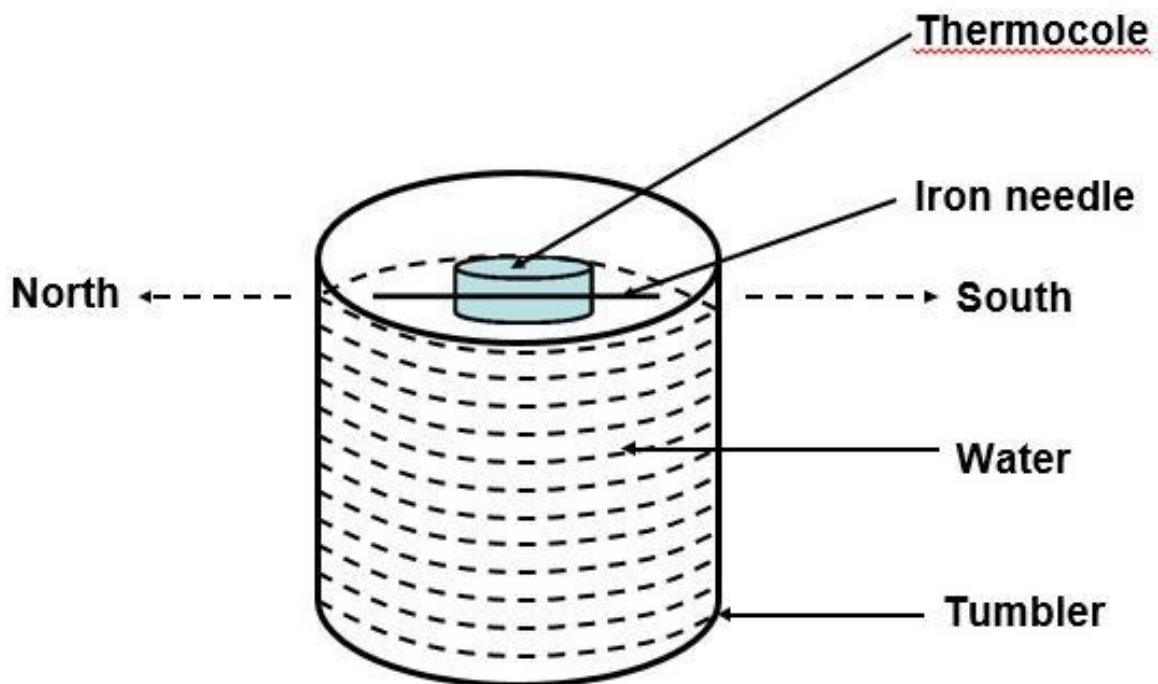
### 3. HOW TO MAKE A MAGNET :-

Take a rectangular piece of iron, a needle, a blade or an iron nail. Keep it on a table. Take a bar magnet and keep one of its pole on one end of the piece of iron. Move it along the piece of iron till the other end. Then lift the magnet and repeat this process 30 to 40 times. Then the piece of Iron becomes a magnet.



### 4. HOW TO MAKE A MAGNETIC COMPASS:-

Magnetise an iron needle with a bar magnet. Insert the needle through a piece of thermocole. Float it in a cup of water. The needle points in the North – South direction.



## **KEY WORDS:**

1. COMPASS- An instrument which is used to find the directions.
2. MAGNET- A material that attracts objects made of Iron, Nickel, and Cobalt.
3. MAGNETITE- It is a natural magnet.
4. MAGNETIC MATERIALS- Materials that are attracted to magnets.
5. NON MAGNETIC MATERIALS- Materials that are not attracted to magnet.
6. MAGNETIC FORCE- The force exerted by a magnet on magnetic materials in its magnetic field.
7. MAGNETIC POLES- Each of the two points of a magnet where the magnetic strength is maximum.
8. DEMAGNETISE- The tendency to lose magnetism and magnetic properties.

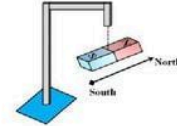
## **MINDMAP**



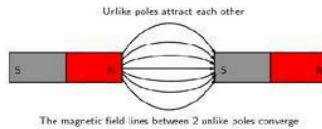
**Meaning** - Objects that produces magnetic fields  
- Eg. Natural Magnet Magnetite

### Properties

- i) Two poles- North and South
- ii) Magnet loses its properties when - heated, hammered, dropped from height
- iii) To determine direction - freely suspend magnet align in N-S direction

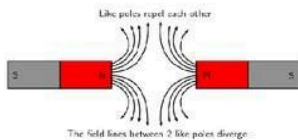


### Magnets



### Magnetic Poles

- i) Opposite poles attract each other.
- ii) Similar poles repel each other
- iii) Force of attraction of magnet is greater at poles than in middle



### Compass

Instrument with a pointer to show N-S direction  
**Uses**- Navigation tool



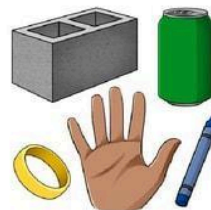
### Magnetic Material

Attracted towards magnets  
e.g. Iron, Nickel



### Non- Magnetic Material

Do not get attracted towards magnets  
e.g. Rubber, Plastic



## Fun with Magnets