

Chapter 13

Fun With Magnets

MAGNETS : A Magnet is a material or objects that attract or pull magnetic materials like iron, cobalt, nickel etc.

TYPES OF MAGNETS :

NATURAL MAGNET : Magnets that are found in nature and made up of magnetite are called Natural magnets.

ARTIFICIAL MAGNET : These are the human made magnets with help of iron. Some examples of artificial magnets are bar magnets, horse-shoe magnet etc.

MAGNETIC AND NO-MAGNETIC MATERIALS :

MAGNETIC MATERIALS : Materials which are attracted towards magnet are called **Magnetic materials**. Examples are iron, nickel, cobalt.

NON-MAGNETIC MATERIALS : Materials which are not attracted towards magnet are called **Non-Magnetic materials**. For example wood, rubber, paper etc.

POLES OF MAGNET : Maximum power of a magnet is available at its two ends. These two ends are called poles. A magnet has two poles one is called **North Pole** and other is **South Pole**

FINDING DIRECTIONS WITH MAGNETS : Magnets are used to find directions from ancient times. A freely suspended magnet always comes to rest in **North-South direction**.

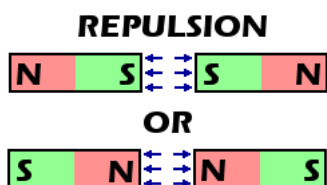
COMPASS : Compass is a device used to find directions. Compass consists of a magnetized needle and a dial, marked with directions. The freely rotating needle comes to rest in north-south direction as stated on the dial. The north pole of the needle is marked red for distinguishing it from south pole.

MAKING YOUR OWN MAGNET : Take an Iron bar and a Magnet bar. Place one of the magnet's pole at the edge of the iron bar. Slide the magnet towards the other edge of the iron bar without lifting the magnet. Lift the magnet now(at other pole) and place at the initial position again with same pole touching iron bar. Make sure not to change the direction of lifting. Repeat this process 30-40 times or more till the iron bar becomes magnetized.

ATTRACTION AND REPULTION BETWEEN DIFFERENT POLES OF MAGNETS :

>> Same poles of two magnets repel each other. For example north-north pole of two magnets will repel each other.

>> Whereas different poles of two magnets attract each other. North-south or south-north of two magnets will attract each other.



CHARACTERSTICS OF MAGNETS:

- i. They attract magnetic material towards them.
- ii. They have two poles, which are north and south pole.
- iii. Two magnets with same poles repel, whereas with different poles attract each other.
- iv. Their maximum power is at their poles.

PRECAUTIONS WITH MAGNETS:

- i. Magnets should not be heated, hammered or dropped from some height.
- ii. Magnets become weak if they are not stored properly.
- iii. Magnets should be kept in pairs with their unlike poles on the same side.

USES OF MAGNETS:

- i. Magnets are used to separate magnetic and non magnetic material.
- ii. They are used in compass to find directions.
- iii. They are used in cranes to lift heavy materials.

NCERT QUESTION-ANSWERS

1. Fill in the blanks in the following:

Answer.

- (i) Artificial magnets are made in different shapes such as bar magnets, horse-shoe magnets and cylindrical magnets.
- (ii) Materials which are attracted towards magnets are called magnetic materials.
- (iii) Paper is not a magnetic material.
- (iv) In olden days, sailors used to find direction by suspending a piece of bar magnet.
- (v) A magnet always has two poles.

2. State whether the following statements are true or false.

Answer.

- (i) False; A magnet of any shape always has two poles: north pole and south pole.
- (ii) False; Natural magnets were discovered in Greece.
- (iii) True
- (iv) False; Maximum iron filings stick at the two ends of the magnet as the magnetic strength is maximum at the ends or poles of a magnet.
- (v) True
- (vi) True; The needle of a magnetic compass always points towards the North–South direction. If the North–South direction is known, then the East–West direction can also be determined which is perpendicular to the compass needle.
- (vii) False; Rubber does not get attracted by a magnet. Therefore, it is not a magnetic material.

3. It was observed that a pencil sharpener gets attracted by both the poles of a magnet, although its body is made of plastic. Name a material that might have been used to make some part of it.

Answer.

The blade of a pencil sharpener is made of iron which is a magnetic material. Due to this a pencil sharpener gets attracted towards both poles of a magnet.

4. Column I shows different positions in which one pole of a magnet is placed near the other. Column II indicates the resulting action between them for each situation. Fill in the blanks.

Answer.

We know that the like poles of a magnet repel each other whereas the unlike poles attract each other. So, given blanks can be filled as follows:

Column I	Column II
N – N	<u>Repulsion</u>
N – <u>S</u>	Attraction
S – N	<u>Attraction</u>
<u>S</u> – S	Repulsion

5. Write any two properties of a magnet.

Answer.

Two properties of a magnet are:

- (i) A magnet always has two poles: north pole and south pole.
- (ii) Like magnetic poles repel each other and unlike magnetic poles attract each other.

6. Where are the poles of a bar magnet located?

Answer.

Poles of a bar magnet are located at its two ends.

7. A bar magnet has no markings to indicate its poles. How can you find out the location of the north pole?

Answer.

Location of the poles of a magnet can be determined by suspending it freely. A freely suspended bar magnet always points in north-south direction. The end that points towards north direction is the north pole of the magnet while the end that points towards south direction is the south pole of the magnet.

8. You are given an iron strip. How will you make it into a magnet?

Answer.

An iron strip can be converted into a magnet by following method:

Place the iron strip on a table. Place one pole of a bar magnet near one end of the iron strip. Move the bar magnet along the length of the iron strip starting from one end to the other end as shown in the following figure. Then, lift the magnet and bring the pole to the starting point and move in the same direction as before.

On repeating this process for at least 30-40 times, the iron strip will become a bar magnet with two poles.



9. How is a compass used to find directions?

Answer.

A compass has a magnetic needle that can rotate freely. When a compass is kept at a place, the magnetic needle aligns in north-south direction. Red arrow of the compass needle is termed as north pole and the other end as south pole.



Fig. A compass

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