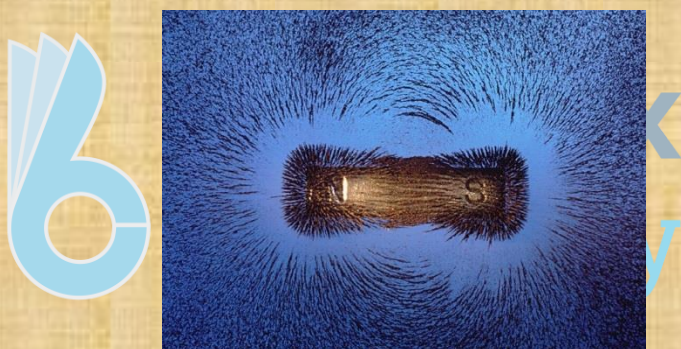


CHAPTER 02**Playing with magnets****What is a magnetic field?**

A magnetic field is the magnetic space around the magnet. Magnets produce a magnetic force called a magnetic field. This field is invisible to our eyes but iron fillings can be used to show these fields.



Magnetic field

Finding out whether the given object is a magnet or not:

You have been given three objects of same size, shape and color and a bar magnet. You have to decide which one among them is a magnet, which is not a magnet but made up of a magnetic material or a non-magnetic material.

Bring three objects one after the other close to one pole of the bar magnet and observe whether they get attracted, repelled or not attracted. Record your observation in table 2. After that bring those objects close to the other pole of the bar magnet in the same way and record your observations.

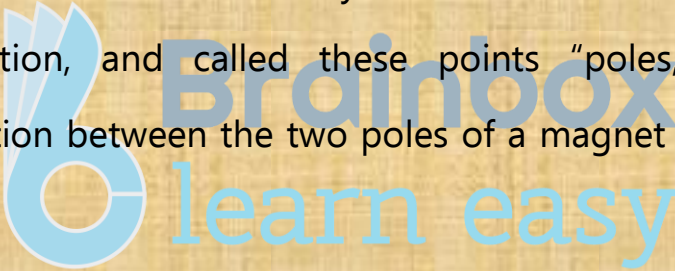
Observation	Object 1	Object 2	Object 3
Change observed when brought close to one pole of the bar magnet.	Attracted	Attracted	Not effected
Change observed when brought close to other pole of the bar magnet.	Repelled	Attracted	Not effected

What do you conclude by comparing the recorded observations?

By the above observations, we conclude the following:

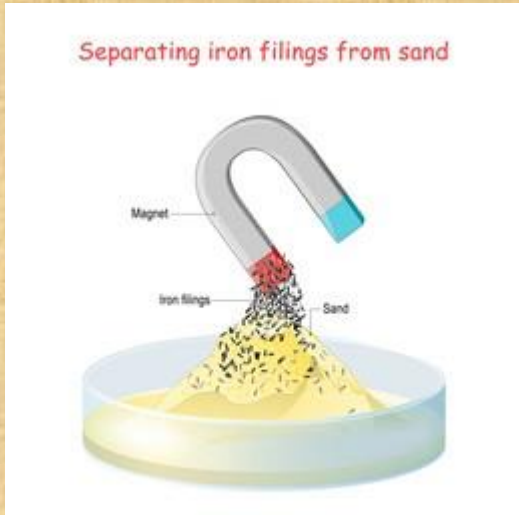
If an object is attracted by one pole of the bar magnet and repelled by the its other pole, then you can say that it is a magnet. If an object is attracted by both the poles of a bar magnet and not repelled by any pole, then you can say that it is not a magnet but a magnetic substance. If an object is neither attracted by magnet nor repelled by it, then you can say that it is neither a magnet nor a magnetic substance.

Back in 12th century scientists mapped a magnetic field on the surface of a spherical magnet using iron needles. They traced the lines formed by the needles to their points of intersection, and called these points "poles," making the connection between the two poles of a magnet and the Earth's poles.



Can we separate iron filings from soil?

Take a bar magnet and roll it in the soil in your school ground for some time. Pull out the magnet.



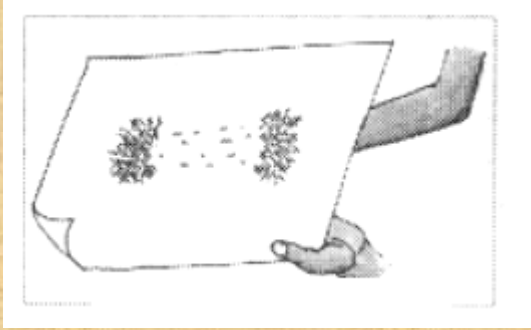
What do you find? Does anything get attached to the magnet?

You may find some dark particles of soil sticking to the magnet. Now gently remove these dark particles from the magnet and collect them in a sheet of paper. These are iron filings.

Spread some iron filings uniformly on a sheet of paper. Place a bar magnet below this sheet.

- What do you observe?
- Do you observe any change in the pattern of iron filings spread over the sheet?

You will observe that the uniformly spread iron filings concentrate at two points of the paper sheet.



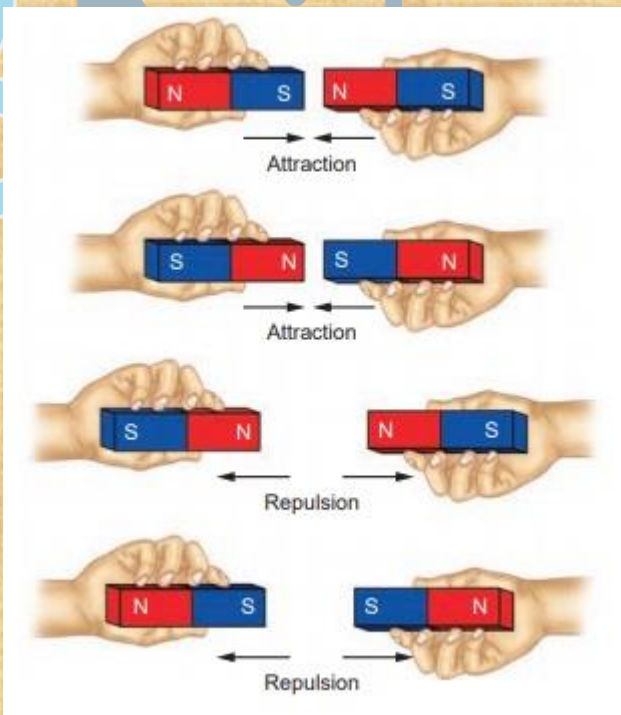
At some distance you will find some scattered iron filings between these two points. This change in the spread of iron filings on the sheet of paper is due to the magnet present below it. The iron filings move towards its ends because of this magnet. Thus the ends of the bar magnet attract more iron filings than the middle part of the magnet.

By this activity we can conclude that every bar magnet always has two ends whose attracting capacity is more than its other parts. These ends are called poles of the magnet.



Magnetism either attracts or repels objects. All magnets have two ends – a north pole and a south pole. A magnet's poles are the surfaces from which lines of magnetism leave a magnet and reconnect on return to the magnet. The pole of a magnet is the area that has the greatest magnetic field strength in a given direction. Magnetism either attracts magnetic objects or pushes them away. If the same poles of two magnets are placed near to each other, they push away and repel. If two different poles are placed near each other, they attract and pull together.

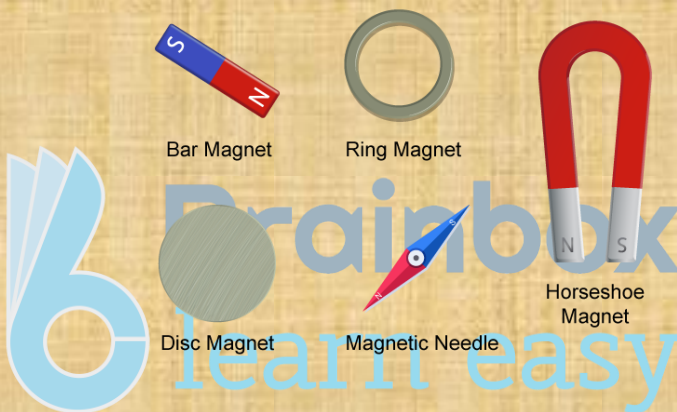
Take two similar magnets and place them in four different ways.



What do you observe?

You notice that like poles (N-N, S-S) repel each other and unlike poles (N-S) attract each other. Unlike poles of two magnets attract each other whereas like poles repel each other.

The magnets we see in our daily life come in different shapes. Some of them are bar magnets, horse shoe magnets, spherical and disc magnets.



Bar magnets:

A bar magnet is a rectangular piece made from steel, iron or any other material that shows the property of a permanent magnet. It has two poles – a north pole and a south pole. If it hangs freely, it always aligns in north-south direction. Its northern pole always faces towards the earth's magnetic north pole. These are the weakest type of magnets. Bar magnets are used every day for hanging things on a refrigerator or for closing cabinets.

Horseshoe magnet:

As the name says, it is shaped like horseshoe or u shaped. It has stronger magnetic field than many others. By making both the ends of the magnet point in the same direction, the strength of the magnet basically doubles. They are used to pick up large pieces of metals that are heavy and hard to reach small pieces of metal in construction or engineering.

Spherical magnets:

These are sphere in form and also known as ball magnets. These are widely used in magic hobbies, electronics and many more.

Disc magnets:

Disc magnets are circular magnets which are thin and flat. They are widely used in markets and industries.