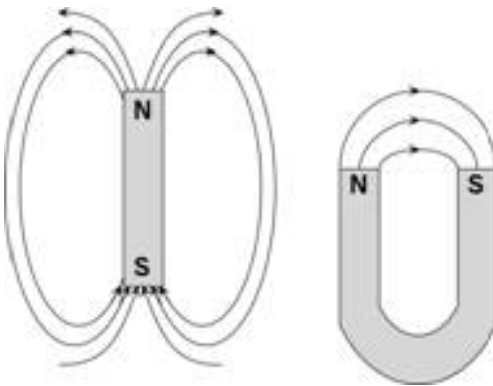


Magnetism

- **Magnetite** is a rock that has the property to attract objects made of iron.
- The substance that can attract iron, cobalt, or nickel is known as a **magnet**.
- Magnet was discovered by a shepherd named **Magnes** around 2000 B.C. who lived in **Magnesia**, Greece.
- With the passage of time, people learned to make magnets from iron pieces. These magnets are known as **artificial magnets**.
- Materials that get attracted towards the magnets are the magnetic materials.
- Materials that do not get attracted towards the magnets are the non-magnetic materials.
- Pin-holders, screwdrivers, refrigerator stickers, junkyard cranes, etc. consist of magnets.
- There are two poles of a magnet – North Pole (N) and South Pole (S).
- A large number of iron filings stick at the two poles of a magnet in comparison to the rest of the magnet body.
- There are two poles of a magnet – **North Pole (N)** and **South Pole (S)**.
- A large number of iron filings stick at the two poles of a magnet in comparison to the rest of the magnet body.
- A freely suspended bar magnet always aligns along **North-South direction**.
- The direction at a place can be identified with the help of a bar magnet or a **magnetic compass**.
- A magnetic compass consists of a **magnetic needle** that always comes to rest in the North-South direction.
- In older days, sailors found direction by suspending bar magnets.
- Materials that get attracted towards the magnets are the **magnetic materials**.
- Materials that do not get attracted towards the magnets are the **non-magnetic materials**.
- Pin-holders, screwdrivers, refrigerator stickers, junkyard cranes, etc. consist of magnets.
- The magnet attached at the end of the mechanical arm of a crane is used to separate magnetic materials, i.e., those made up of iron, from the rest of the

junk.

- There are two poles of a magnet – **North Pole (N)** and **South Pole (S)**.
- **Like poles** of two magnets always **repel** each other.
- **Unlike poles** of two magnets always **attract** each other.
- A magnetic compass works on this principle because the earth is considered as a huge bar magnet with its North and South poles aligned along the geographical South and North Poles respectively.
- **Repulsion** is considered the sure way for testing magnets.
- **Properties of Magnetic field lines**
 - Originate from the North pole and end at the South pole [outside the magnet]
 - They are closed continuous lines
 - Density of the lines increases near the poles and decreases away from the poles
 - Lines never cross each other



- Like poles repel and unlike poles attract each other.
- The region where magnetic field lines are crowded has relatively greater strength
- The magnetic poles of the Earth continuously change their position with time i.e., the magnetic North Pole becomes the magnetic South Pole and vice-versa. This phenomenon of flipping of poles is known as **magnetic reversal**.
- The angle of the horizontal plane between the geographic North (true North) and the magnetic North is known as **magnetic declination**.

There are several methods of making magnets, the simplest one is **touch-stroke method**.

- An iron bar becomes a bar magnet when one of the poles of a bar magnet is rubbed on it several times. This is known as **touch-stroke method**.
 - Remember that the pole of the magnet and the direction of its movement should not change.
 - You can convert iron nail, a needle or a blade into magnet by this method.
 - A freely suspended bar magnet **always aligns** along North-South direction.
 - **Induced Magnetism:** The temporarily acquired magnetism by a magnetic material such as soft iron or steel when placed near or in contact with a permanent magnet is known as induced magnetism.
 - The **direction at a place** can be identified with the help of a bar magnet or a magnetic compass.
 - A magnetic compass consists of a **magnetic needle** that always comes to rest in the North-South direction.
 - In older days, sailors found direction by suspending bar magnets.
1. When an electric current flows through a wire, it behaves as a magnet. This is called the magnetic effect of electric current.
 2. **Electric bell** works on the principle of magnetic effect of electric current.
 3. A **compass needle** shows deflection when brought near a current carrying wire.
 4. An iron nail behaves as an electromagnet when a current is allowed to flow through a wire, which is wrapped around the nail.
 5. Magnet is used to separate iron objects from a heap of garbage.
 6. **Types of electromagnet :** Bar-shaped or I-shaped electromagnet and Horse-shoe or U-shaped electromagnet
 7. An electric bell works on the principle of electromagnetism.
- A magnet loses its magnetic property when **dropped from a height** and **hammered**.
 - Magnets lose their magnetic property on **heating**.
 - Magnets can be stored safely as follows



Two bar magnets



Horse-shoe magnet

- Magnets should be kept away from cassettes, CDs, mobile, TVs, plastic cards, etc.
- **Metal detectors are used for security purposes at various places. They work on the principal of electromagnetism.**