

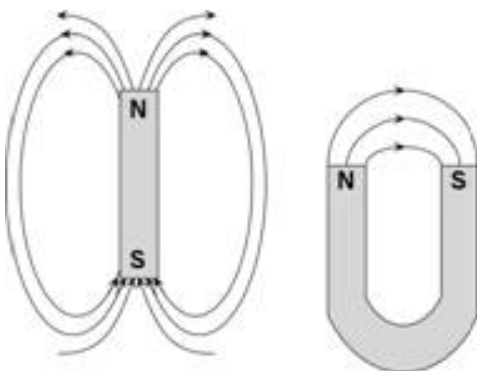
Magnetism

- **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.
- Materials that get attracted towards the magnets are the **magnetic materials**.
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- 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)**.
- 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.

- 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.

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.
- **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**.
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- **Magnetic field of the Earth:** Earth behaves as a large magnet. The North Pole of the Earth acts like the south pole of a bar magnet and the South Pole of the Earth behaves like the north pole of the magnet.
 - **Neutral points:** These are the points situated symmetrically on either side of a magnet where the magnetic field of the magnet and the horizontal component of the Earth magnetic field are equal in magnitude and opposite in direction. Hence, these two magnetic fields neutralise each other at these points.
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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.