# **Poles of Magnet**

## **Introduction to Magnetic Poles**

Magnets exhibit a unique property where they sometimes stick together and sometimes push apart.

This behavior is due to the presence of two poles in a magnet: North pole and South pole.

Opposite poles attract each other, while similar poles repel each other.

Not all materials interact with magnets; only certain materials, such as iron, nickel, and cobalt, possess the necessary properties to be attracted to magnets.

### **Identification of Magnetic Poles**

When a bar magnet is moved over materials like iron filings, the filings mostly cling to the ends of the magnet.

These ends, where the magnetic force is strongest, are called the magnetic poles.

The end of the magnet that points toward the geographical north is called the south pole.

The end of the magnet that points toward the geographical south is called the north pole.

This behavior can be observed when a magnet is allowed to hang freely, aligning itself with the Earth's magnetic field.

#### **Unbreakable Pairing of Magnetic Poles**

A unique property of magnets is that their poles always exist in pairs.

If a magnet is broken into smaller pieces, each piece automatically forms its own north pole and south pole.

This ensures that no matter how small the fragment, it will always have both poles.

#### Interaction Between Magnets: Attraction and Repulsion

Magnets interact with each other based on the type of poles they present:

- Like poles (north-north or south-south) repel each other.
- **Opposite poles** (north-south or south-north) attract each other.

Repulsion is the definitive way to test whether an object is a magnet or not.

# **Magnetic Strength and Its Distribution**

The magnetic force of a magnet is not uniform across its surface:

- Maximum strength is concentrated at the poles.
- Minimum strength is found at the center of the magnet.

This explains why materials like iron filings tend to cluster at the ends rather than the middle of the magnet.