

Some Natural Phenomena

Class 8 - Physical Science

Introduction

The Class 8 Science Chapter 15 discusses natural phenomena such as **lightning** and **earthquakes**, and the safety measures to reduce damage caused by them.

Introduction to Natural Phenomena

- Any naturally occurring calamity or physical process is called a **natural phenomenon**.
- Two major destructive natural phenomena are **lightning** and **earthquakes**.

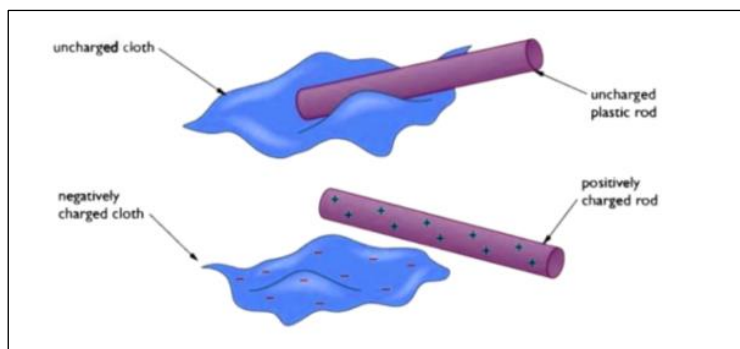
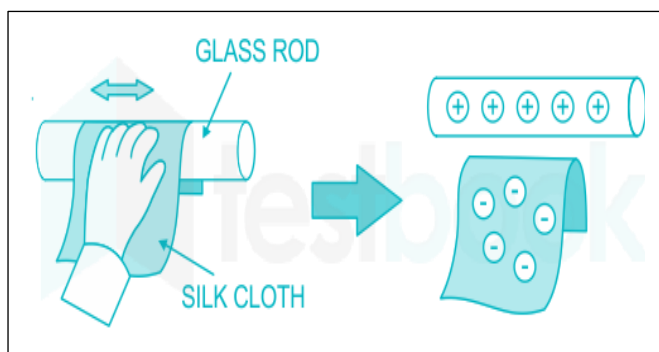
Static Charges

Methods of Charging

- A body can be charged by:
 - Rubbing (friction)**
 - Induction**
- Charges produced by rubbing are called **static charges**.

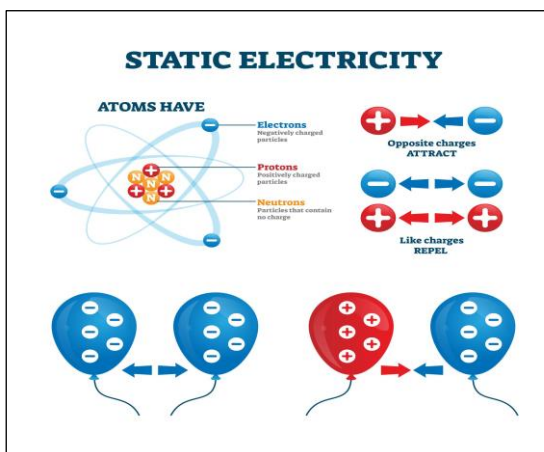
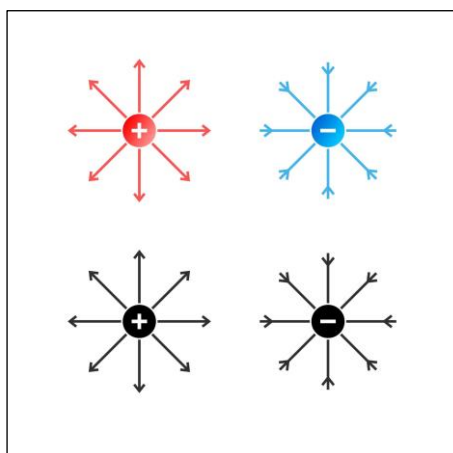
Charging by Rubbing

- When a plastic rod is rubbed with hair, it becomes charged.
- A glass rod rubbed with silk cloth also gets charged.
- Objects get charged by **gain or loss of electrons**.
- Charged objects can **attract or repel** small pieces of paper.



Charged Objects

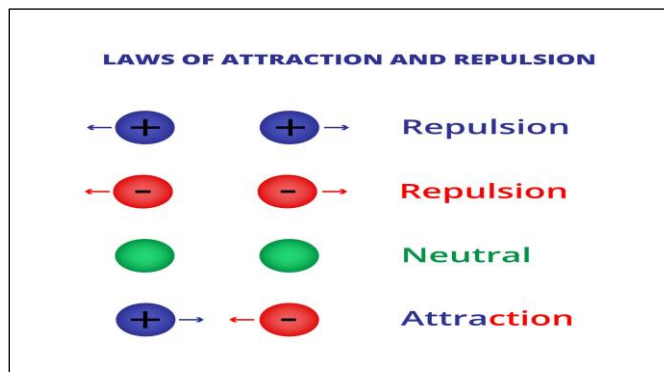
Objects that carry electric charge due to rubbing or other methods are called **charged objects**.



Interaction Between Like and Unlike Charges

- **Like charges repel** each other.
- **Unlike charges attract** each other.

charge on object 1
charge on object 2
the force of object 2 on object 1
the force of object 1 on object 2
 $F_{12} = F_{21} = k \frac{q_1 q_2}{r^2}$
electrostatic constant
distance between the two objects

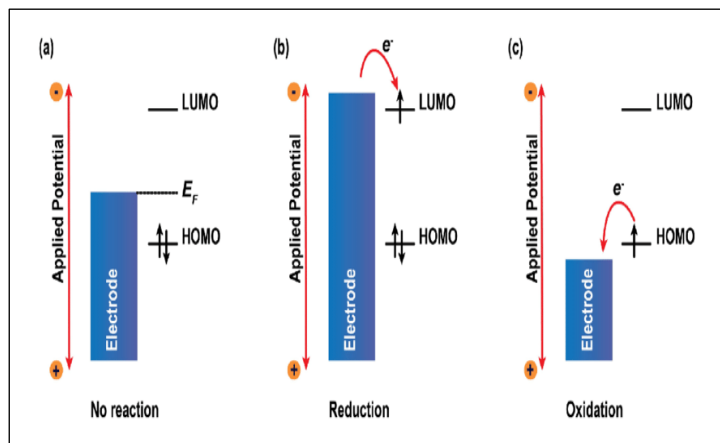
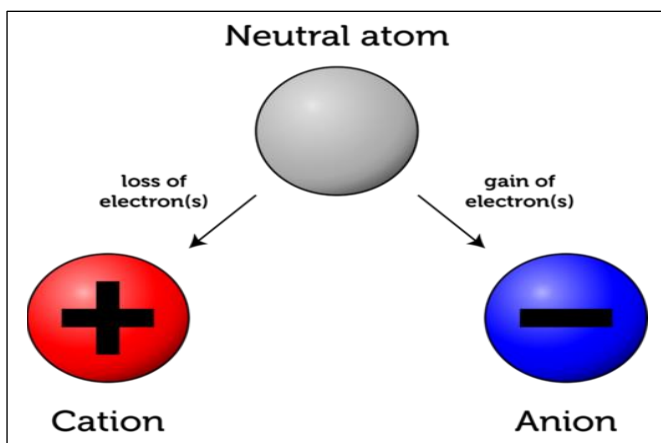


Convention of Positive and Negative Charges

- By convention, the charge acquired by a **glass rod rubbed with silk** is called **positive charge**.

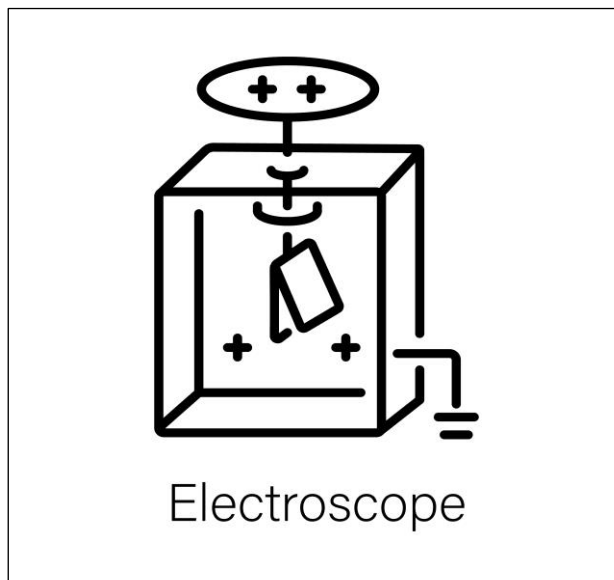
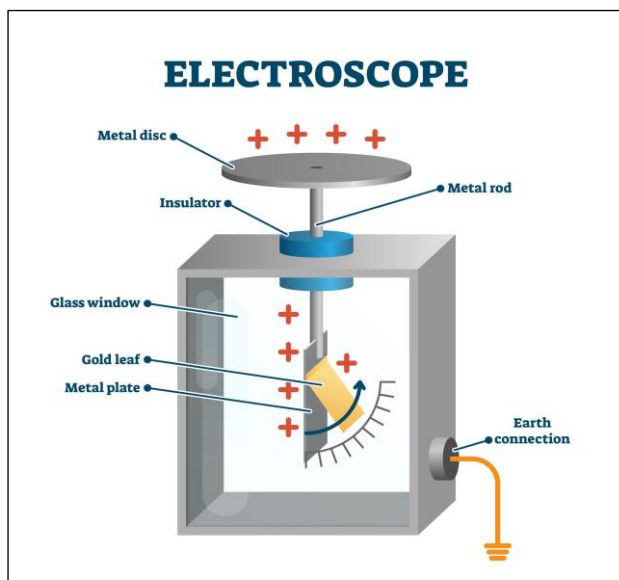
Transfer of Charges

- Electric charge can be transferred through **conductors** like metals.
- Transfer of charge occurs due to **movement of electrons** from one object to another.



Electroscope

- An **electroscope** is a device used to detect the presence of electric charge.

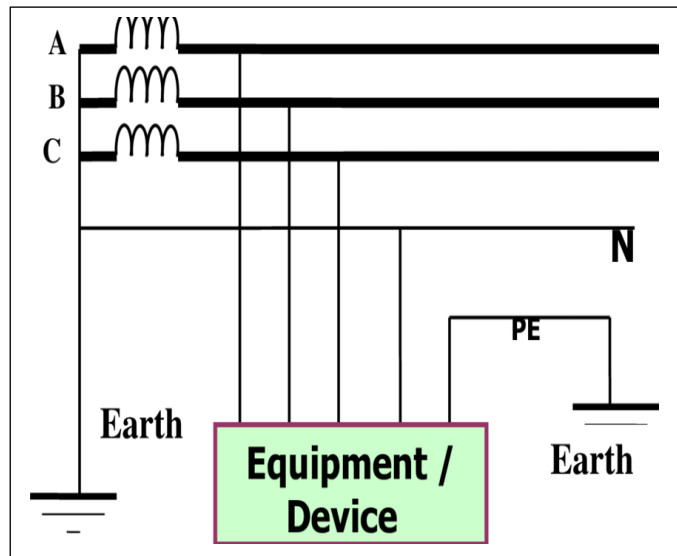
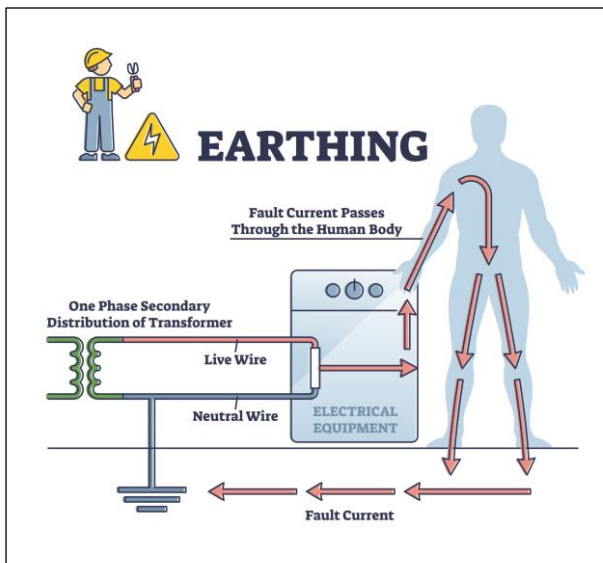


Discharged Objects

- When objects lose their charge by transfer, they are called **discharged objects**.

Earthing

- The process of transferring excess charge from a charged object to the **earth** is called **earthing**.



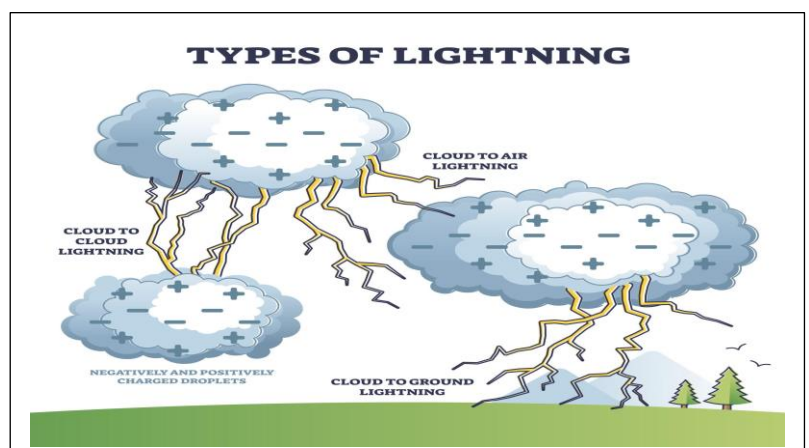
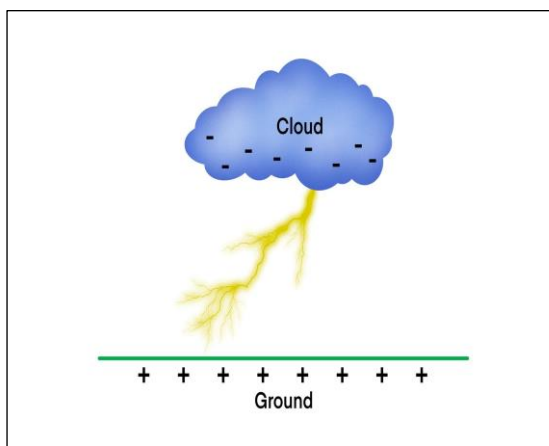
Lightning

Lightning – Introduction

- During thunderstorms:
 - Air currents move upward.
 - Water droplets move downward.
- This causes separation of charges inside clouds.
- When charge becomes large, air starts conducting electricity.
- This sudden discharge of electricity is called **lightning**.

Electric Discharge

- The flow of charge from:
 - cloud to cloud, or
 - cloud to earth is called **electric discharge**.



Lightning Safety: Steps to Follow

Outside the House

- Take shelter under a safe place.

- Stay inside a car if available.
- Avoid metal objects.
- Do not lie flat on the ground; crouch with head between knees.

Inside the House

- Avoid contact with electrical wires and telephones.
- Avoid bathing.
- Unplug electrical appliances.

Lightning Conductors

- Lightning conductors protect buildings from lightning.
- A metal rod fixed on the roof provides a safe path for electric charge to reach the earth.



Earthquakes

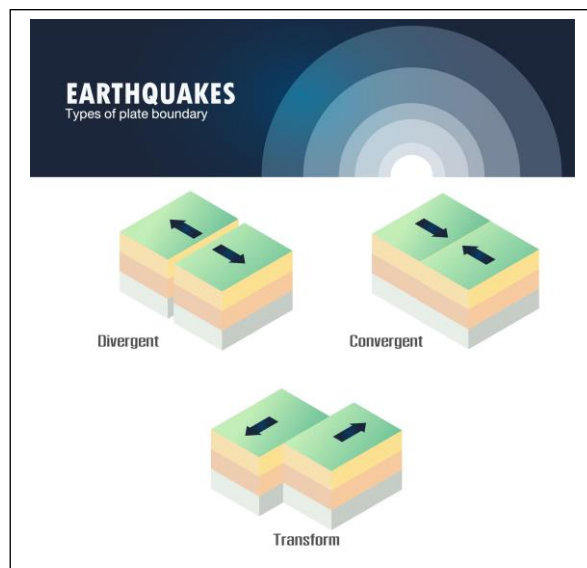
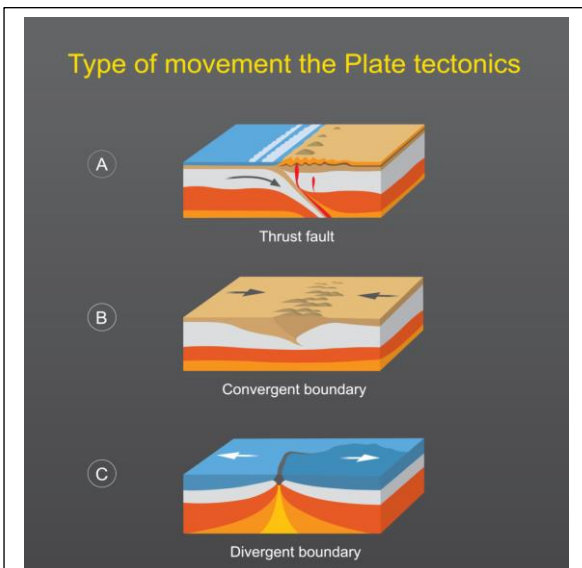
- Sudden shaking of the earth due to disturbance inside the crust.
- Causes large-scale damage to life and property.
- Earthquakes cannot be predicted.

Causes of Earthquake

- Caused by movement or collision of **tectonic plates**.

Movement of Plates

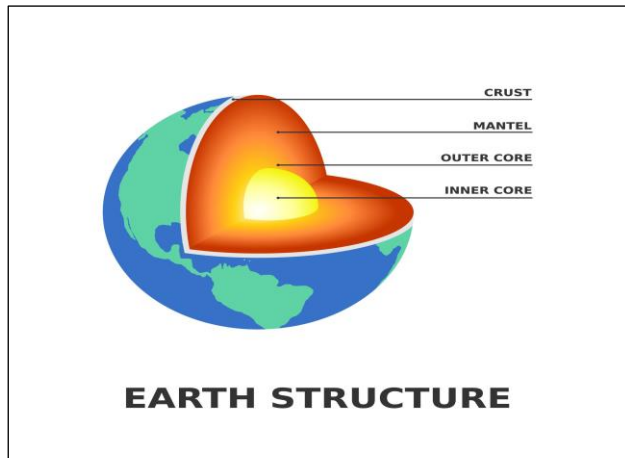
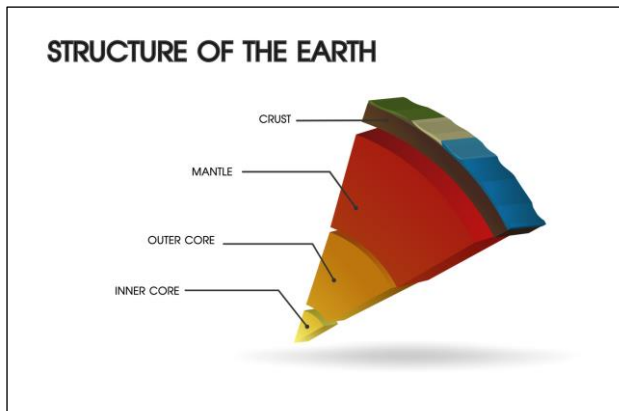
- Earth's crust is broken into large pieces called **plates**.
- Continuous movement of plates causes earthquakes.



Structure of the Earth

The earth has four main layers:

- Crust
- Mantle
- Outer Core
- Inner Core



Seismic / Fault Zones

- Weak regions along plate boundaries.
- Earthquakes mostly occur in these zones.

Power of Earthquake

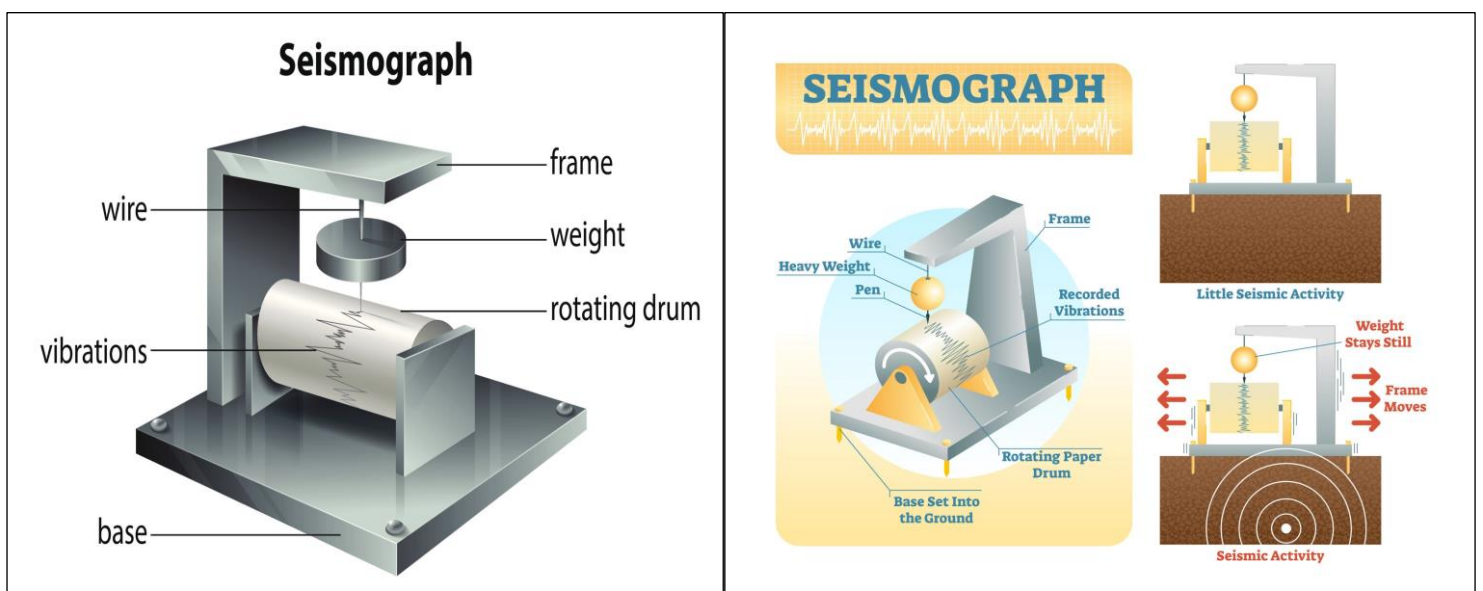
- Measured on the **Richter Scale**.
- Magnitude **above 7** is highly destructive.
- The scale is **not linear**.
- Increase of 2 units means **1000 times more energy**.

Seismic Waves

- Waves produced due to tremors inside the earth are called **seismic waves**.

Seismograph

- A device used to record seismic waves.
- Consists of a vibrating rod or pendulum.



Protection from Earthquake

Outdoors

- Move to an open area away from buildings.
- Stay inside the car if driving.

Indoors

- Take shelter under a table.
- Stay away from heavy objects.

Structural Measures

- Earthquake-resistant buildings.
- Fix cupboards and shelves to walls.
- Proper fire-fighting arrangements.

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