⚡ 12.1 Lightning

- Lightning is a massive electric spark.
- Caused by the accumulation and discharge of electric charges in clouds.
- Ancient people feared it, but now we know it's just an electrical effect.

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🔌 12.2 Charging by Rubbing

- Rubbing certain objects (e.g. plastic refill with polythene) causes them to get charged.
- These are called charged objects.
- They can attract small bits of paper or other light things.

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🌟 Activity 12.1 — Charging a Plastic Refill

🔧 What to Do:

- Rub a used pen refill with polythene.
- Bring it near bits of paper, dry leaf, husk, or mustard seeds.

🔍 Observation:

- The refill attracts small pieces → shows it's charged.

✅ Conclusion: Friction produces static electricity.

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🌟 Activity 12.2 — Try Charging Other Objects

🔧 What to Do:

- Rub objects like balloon, eraser, steel spoon with wool or polythene.
- Check if they attract paper.

✅ Note:

- Plastic objects get charged easily.
- Metals like steel do not get charged by rubbing.

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🔁 12.3 Types of Charges & Their Interaction

- There are two types of charges: Positive & Negative.
- Like charges repel, unlike charges attract.

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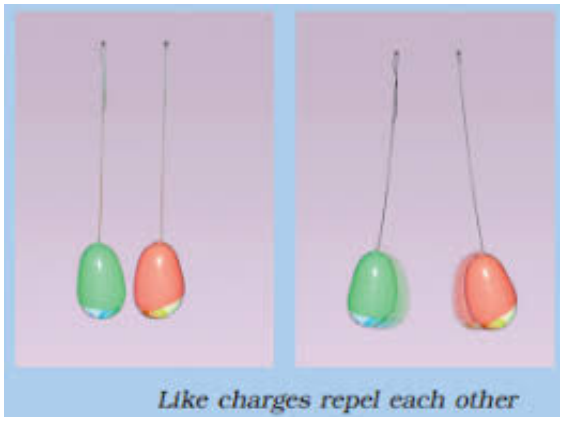
🌟 Activity 12.3 — Balloon & Refill Interactions

(a) Rub 2 balloons with wool & hang them

🔍 Observation: They repel each other → same charge repels



(b) Rub a refill & put in a glass. Bring charged balloon near it.

Interaction between like charges

Unlike charges attract each other

🔍 Observation: Balloon attracts the refill → opposite charges attract

✅ Conclusion:

- Like charges repel
- Unlike charges attract

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🔄 12.4 Transfer of Charge

- Charge can transfer from one object to another via a conductor (metal).

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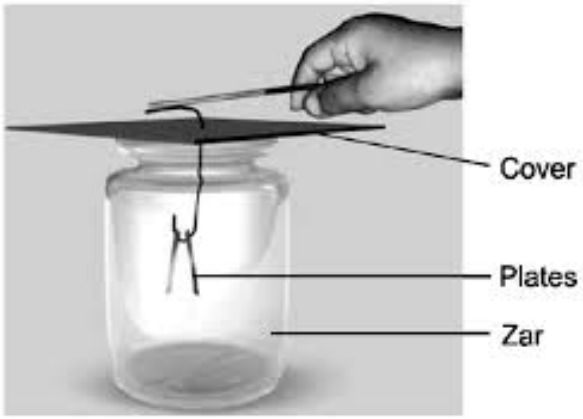
🌟 Activity 12.4 — Making a Simple Electroscope

🔧 What to Do:

- Take an empty bottle & cardboard lid.
- Insert a metal paperclip with two aluminium foil strips hanging from it.
- Charge a refill and touch the clip.



🔍 Observation:

- Foil strips repel each other (same charge).

✅ Conclusion:

- Charge transferred through metal → foils repel
- If you touch the clip → charge escapes → foils collapse
- This is earthing (discharge of charge to Earth)

—

⚡ 12.5 Lightning Formation

- Air currents move up & water droplets down during storms.
- This causes charge separation:
  - Upper cloud: Positive charge

    - Lower cloud & Earth: Negative charge
- When charge builds up enough, electric discharge occurs → lightning

Accumulation of charges leading to lightning.

☔ 12.6 Lightning Safety

- Stay indoors during lightning.
- Don’ts:
    - Don’t carry umbrellas
    - Don’t use wired phones
    - Don’t stand under tall trees
- Do’s:
    - Sit inside closed car/building
    - If outdoors with no shelter — squat with head down and hands on knees

Fig. 15.8 *Safe position during lightning*

✅ Lightning Conductor:

- A metal rod fitted to buildings.
- Transfers charge safely to the ground.

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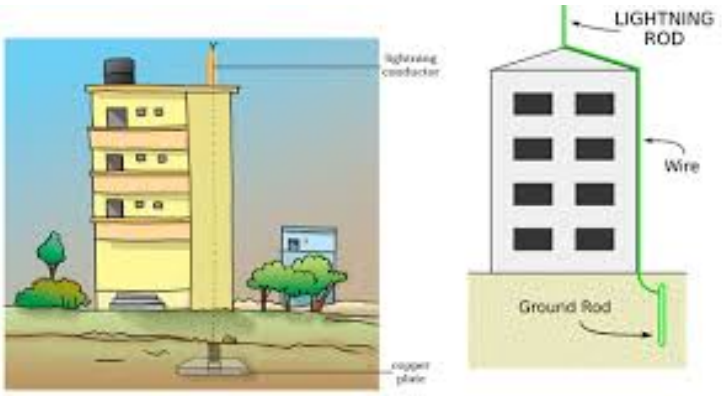
🌍 12.7 Earthquakes

- Sudden shaking of earth’s crust due to movement of plates.

- Can cause massive damage.



✅ Cause:

- Earth's crust is broken into plates that move.
- Their collision or sliding causes tremors → earthquakes.

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🌟 Activity 12.5 — Learn from Earthquake Events

🔧 What to Do:

- Ask elders about the 2001 (Bhuj) & 2005 (Kashmir) earthquakes.
- Collect photos & make a short report on damage.

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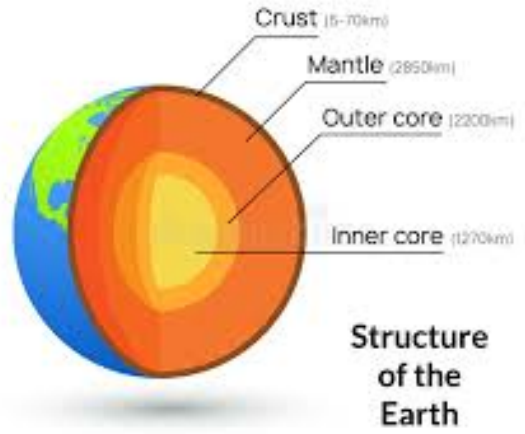
🌟 Activity 12.6 — Tsunami Aftermath

🔧 What to Do:

- Mark tsunami-affected areas around the Indian Ocean on a world map.
- Talk to elders about what happened in 2004 tsunami.

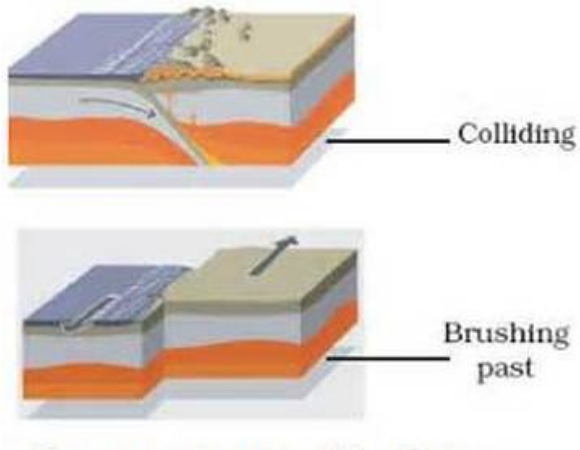
🌍 What Causes an Earthquake?

- **The outer layer of Earth (crust) is broken into big pieces called tectonic plates.**
- **These plates are constantly moving, although very slowly.**



✅ **Earthquakes happen when:**

- **Plates collide, slide, or move apart.**



- **Stress builds up at the edges and when it becomes too much,**
  ➔ Energy is suddenly released in the form of vibrations ➔ causing an earthquake.

✅ **The place inside Earth where the earthquake starts = Focus.**
✅ **The point directly above it on the surface = Epicentre.**

- **The strongest vibrations are felt at the epicentre.**

📊 Measuring Earthquakes

- Richter scale measures earthquake strength.
- Magnitude >7 = severe damage
- Tremors recorded using seismograph

✅ Example:

- Bhuj and Kashmir quakes >7.5

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🛑 Earthquake Safety

🏠 If Indoors:

- Take shelter under table
- Stay away from windows, shelves
- Don’t rush out

🏞️ If Outdoors:

- Move to open area
- Stay away from trees, poles
- If in a vehicle — stay inside till shaking stops

✅ Quake-safe Building Tips:

- Use light materials (mud/timber)
- Fix cupboards/shelves to walls
- Keep emergency/fire equipment ready