
SCIENCE SUCCESS GUIDE

How to Study Science the SMART Way

Science is not about mugging answers.

Science is about:

- Understanding concepts
- Connecting ideas
- Remembering keywords
- Writing correct points in exams

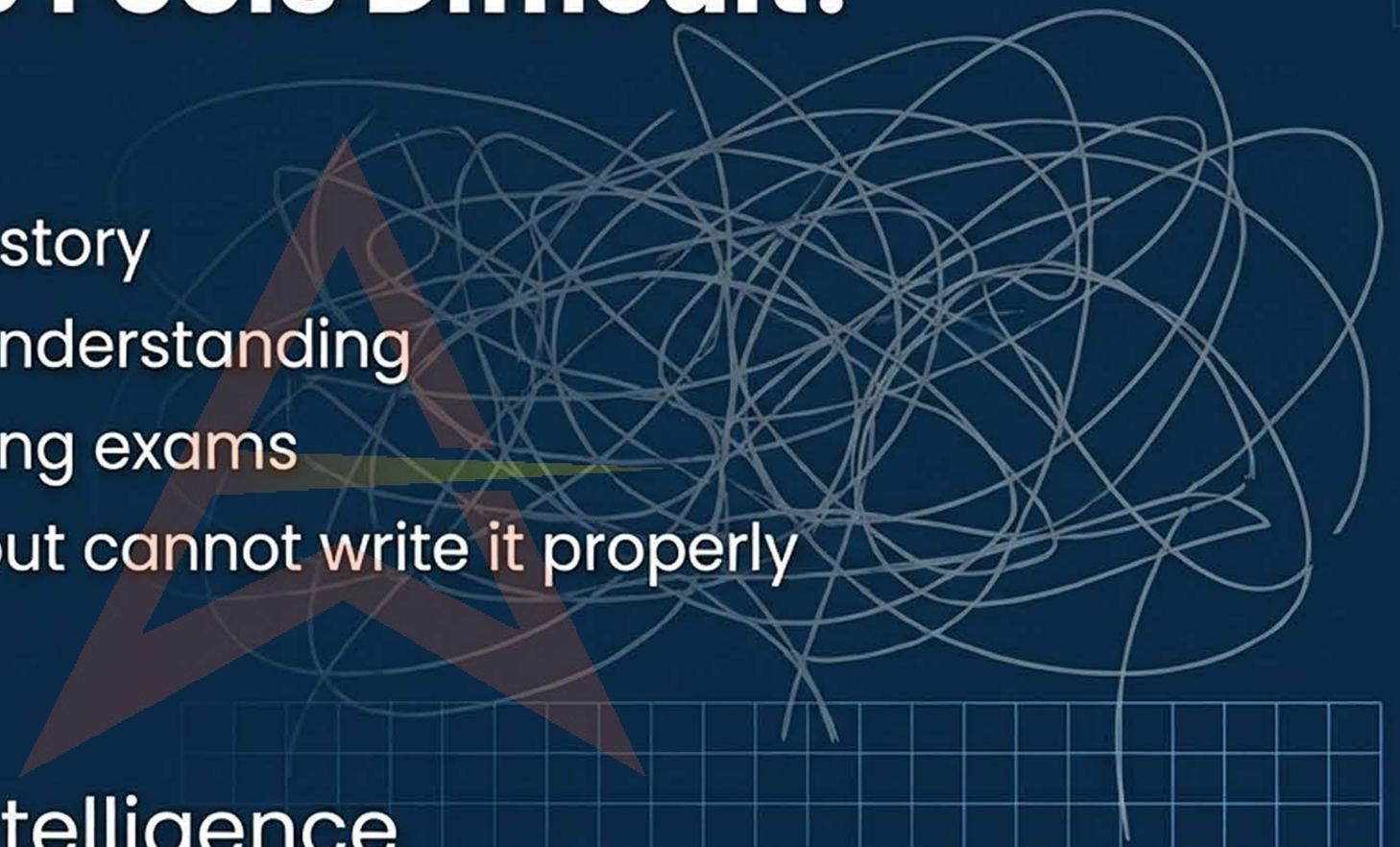
This guide will teach you:

- How to study science daily
- How to remember answers easily
- How to avoid silly mistakes
- How to score better marks with less stress

Why Science Feels Difficult?

Most students:

- Read science like a story
- Memorise without understanding
- Forget answers during exams
- Know the concept but cannot write it properly



Problem is NOT intelligence

Problem is **wrong study method**

THE GOLDEN RULE OF SCIENCE

If any one step is missing → marks are lost.

TECHNIQUE 1: TEXTBOOK FIRST RULE

Textbook is Your Main Weapon

Always study from textbook first.

- ✓ Read line by line
- ✓ Underline important words
- ✓ Focus on definitions, diagrams, processes
- ✓ Do NOT jump directly to guide answers

90% exam questions come from textbook language

TECHNIQUE 2: KEYWORD FOCUS METHOD

Marks Are Given for Keywords

In science, keywords = marks.

Example:

- Evaporation
- Photosynthesis
- Fertilisation
- Force, motion, energy

- ✓ Learn spelling of keywords
- ✓ Use them in every answer
- ✓ Underline keywords in exam

TECHNIQUE 3: WHY–HOW–WHAT METHOD

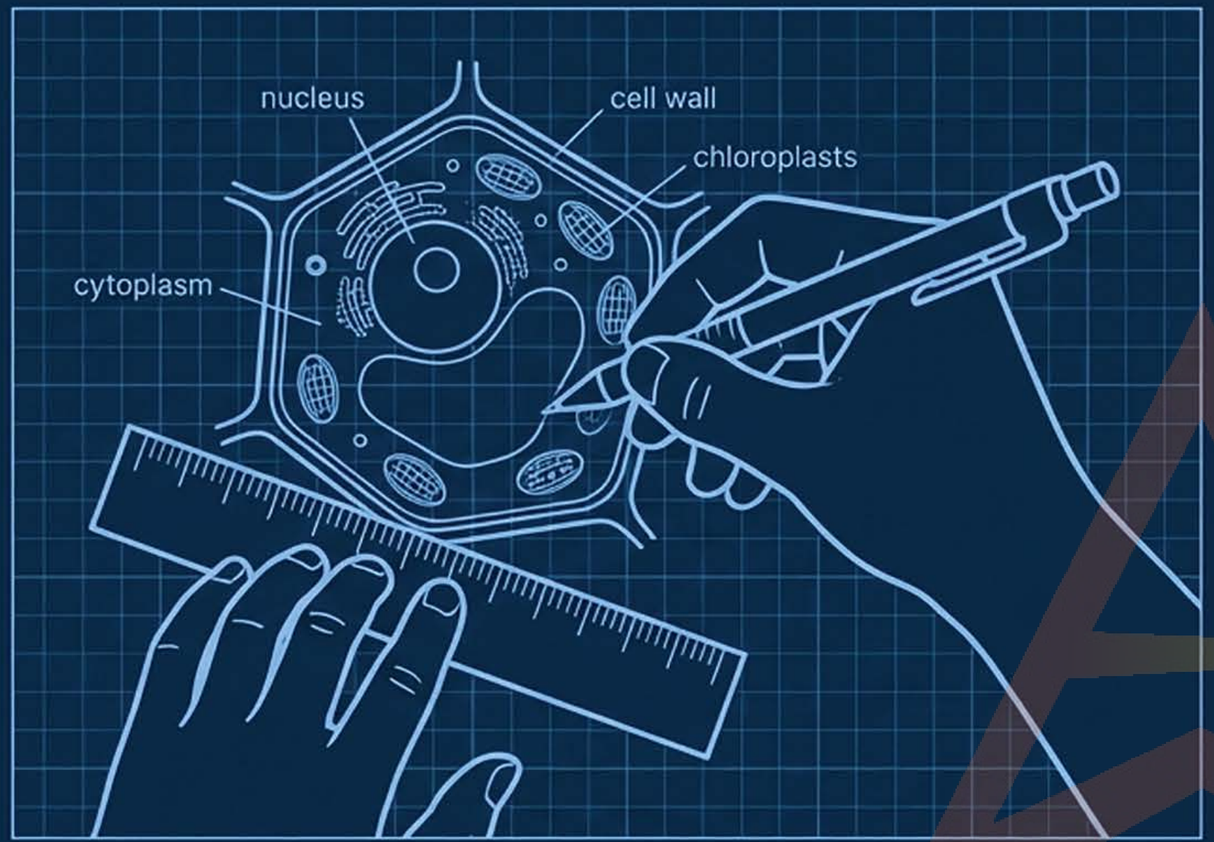
Ask These 3 Questions While Studying

For every topic ask:

* **What** is it? (Definition)
* **How** does it work? (Process)
* **Why** is it important? (Reason / use)

This makes answers:

- ✔ Clear
- ✔ Complete
- ✔ Easy to remember



- ✔ Practice diagrams regularly
- ✔ Label neatly
- ✔ Use pencil & ruler
- ✔ Even if answer is incomplete, diagram gives marks

TECHNIQUE 4: DIAGRAM POWER

Diagrams Can Save Your Marks

Science without diagram = marks lost

TECHNIQUE 5: SMALL DAILY REVISION

The 15 Minutes Rule

Daily:

- 10 minutes revise old chapter
- 5 minutes revise keywords

Weekly:

- Revise all important definitions
- Revise diagrams

Small revision = big confidence

TECHNIQUE 6: ANSWER WRITING FORMAT

How to Write Perfect Answers

- ✔ Start with definition
- ✔ Write points in bullets
- ✔ Use keywords
- ✔ Draw diagram if possible
- ✔ Keep handwriting neat

Good content + bad writing = low marks

TECHNIQUE 7: EXAM DAY STRATEGY

How to Avoid Silly Mistakes

- ✓ Read question twice
- ✓ Underline keywords in question
- ✓ Write to the point
- ✓ Do not rush
- ✓ Leave space for diagram

Calm mind = correct answers

How to Use This Guide Properly

This guide is NOT for:

- ✗ Reading like a story
- ✗ Mugging answers

This guide IS for:

- ✓ Understanding concepts
- ✓ Revising keywords
- ✓ Practicing exam writing

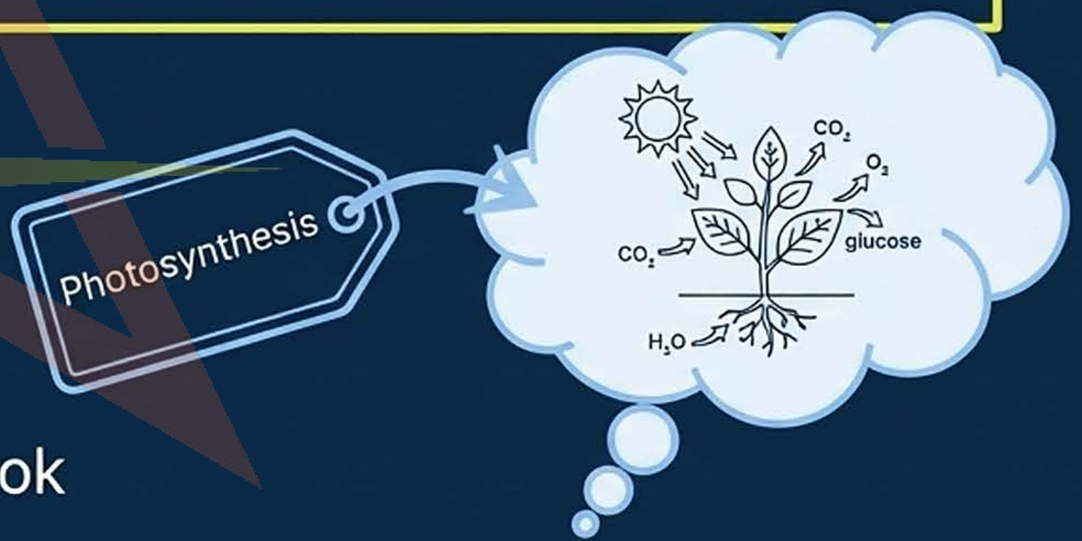
How to Use Chapterwise Keywords

Very Important Instruction

Keywords = Memory Trigger

Your task:

- 1. Read keywords carefully
- 2. Recall the topic in your mind
- 3. Open textbook
- 4. Read full explanation from textbook



Never skip textbook reading

The Final Revision Tool: One-Page Notes

After studying: ✓ **Textbook** → ✓ **Keywords** → ✓ **Diagrams**

In this guide you have one-page revision notes.

Use them:

- Before test
- Before exam
- For quick recall

One-page notes = last-day confidence booster

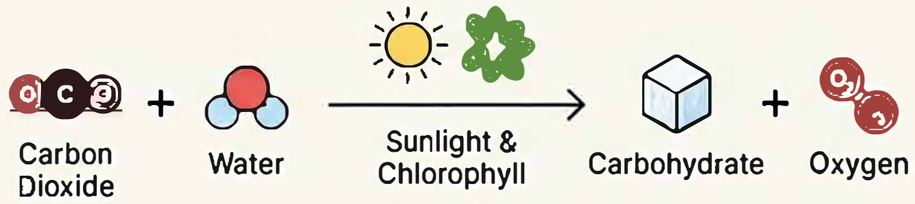
Science Can Be Easy If Studied Right

Remember:

- Science needs method, not fear
- Daily small effort beats last-minute study
- Understanding brings confidence
- Confidence brings marks

FOLLOW THE SYSTEM, MARKS WILL FOLLOW

CHAPTER 1: NUTRITION IN PLANTS

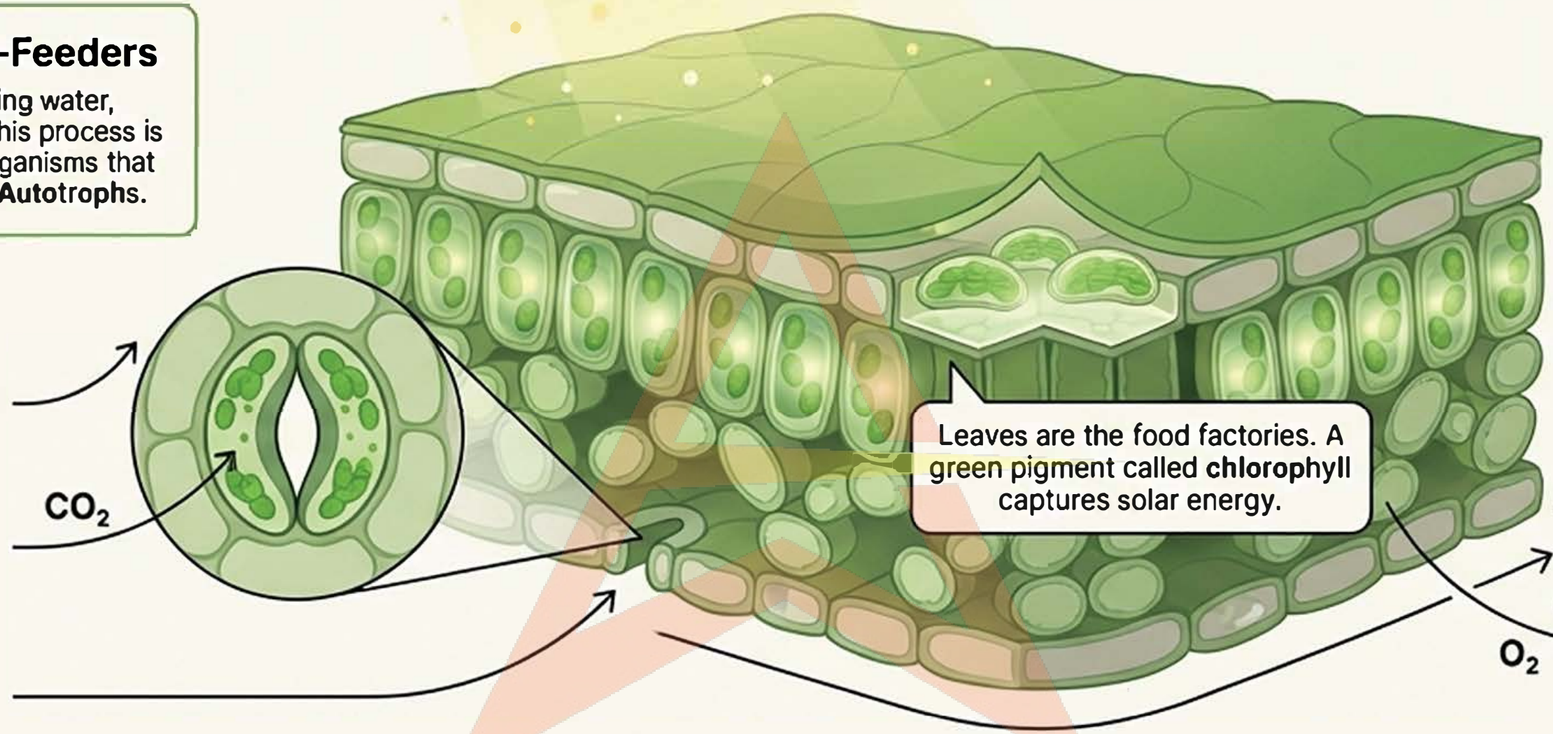


Autotrophs: The Self-Feeders

Plants create their own food using water, carbon dioxide, and minerals. This process is called **autotrophic nutrition**. Organisms that make their own food are called **Autotrophs**.

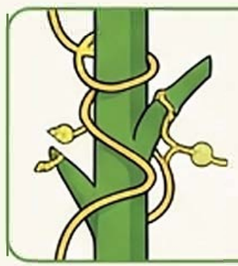
Inputs

- Water (H_2O) absorbed by roots.
- Carbon Dioxide (CO_2) enters through stomata.
- Sunlight energy captured by chlorophyll.



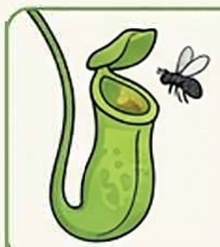
Outputs

- Carbohydrates for energy.
  - The presence of starch in leaves indicates photosynthesis has occurred.
- Oxygen (O_2) is released.



Parasitic

Parasites like Cuscuta lack chlorophyll and take food directly from a host plant.



Insectivorous

Insectivorous plants trap and digest insects to absorb nutrients.

Saprotrophic

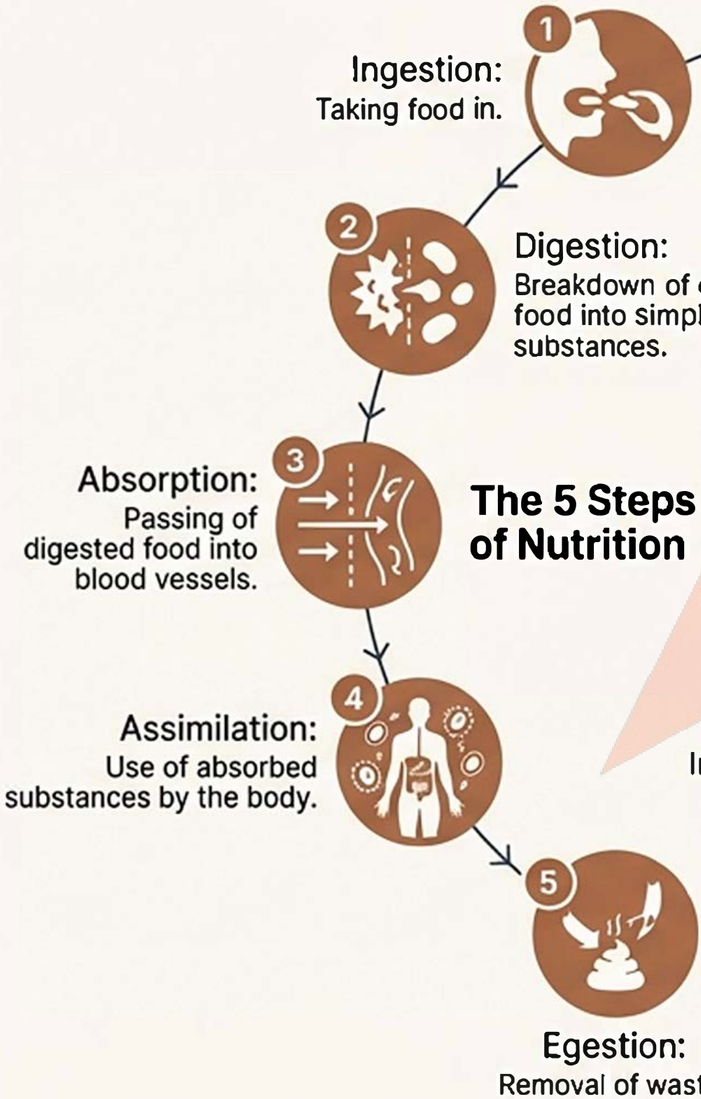
Saprotrophs like fungi and mushrooms absorb nutrients from dead and decaying matter.

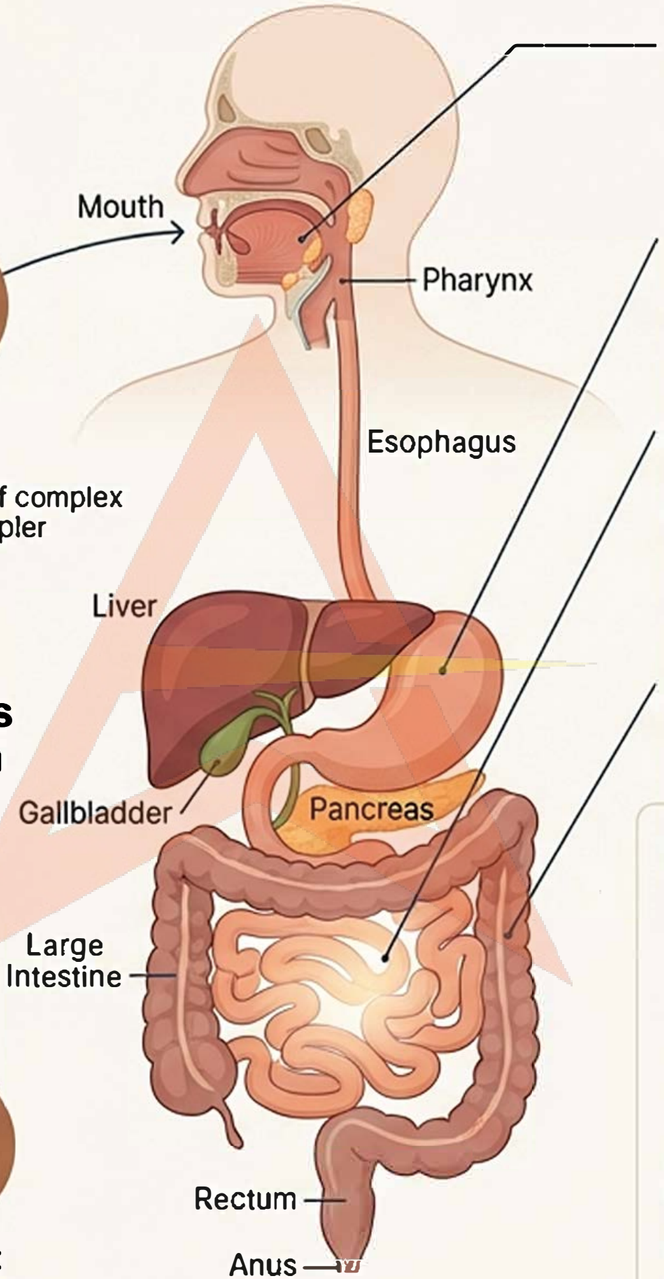
Replenishing Soil Nutrients

Plants deplete soil nutrients. Manures, fertilisers, and symbiotic bacteria like Rhizobium (in leguminous plants) replenish them.

CHAPTER 2: NUTRITION IN ANIMALS

Modes of Feeding
Different animals have different modes of feeding.





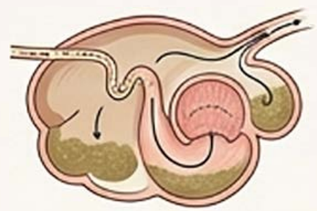
Mouth & Buccal Cavity: Ingestion begins. **Teeth** chew and break down food. **Saliva** breaks down starch into sugars.

Stomach: A thick-walled bag. Secretes mucus, **hydrochloric acid** (kills bacteria), and digestive juices to digest **proteins**.

Small Intestine: A long tube (7.5m). Receives **bile** from the liver and pancreatic juice. Digestion of carbohydrates, fats, and proteins is completed here. Inner walls have finger-like **villi** that increase the surface area for absorption.

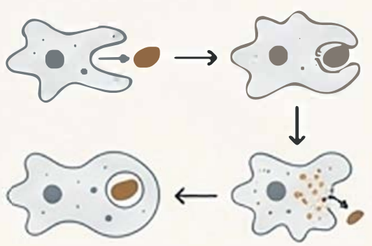
Large Intestine: Absorbs water and some salts from undigested food.

Ruminants



Grass-eating animals quickly swallow food and store it in the **rumen**. The cud later returns to the mouth for chewing **(rumination)**.

Amoeba



Amoeba uses false feet **(pseudopodia)** to capture food, which is then digested in a **food vacuole**.

CHAPTER 3: FIBRE TO FABRIC

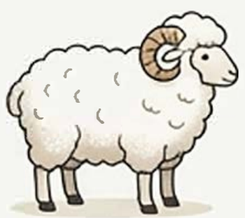
The **Source**

Plant Fibres

Cotton comes from cotton bolls. Fibres are separated from seeds by **ginning**.

Jute is obtained from the plant's stem. Fibres are separated by **retting**.

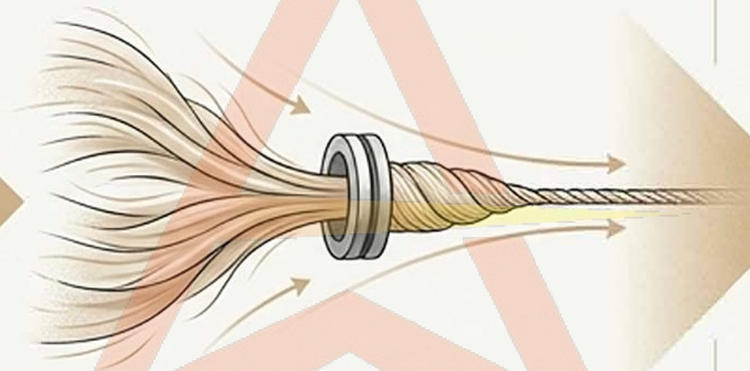
Animal Fibres



Wool is an animal fibre.

Silk is an animal fibre.

Spinning



The process of making **yarn** from fibres is called spinning.

Making **Fabric**

Weaving: Two sets of yarns are arranged together on a loom to make fabric.

Knitting: A single yarn is used to make a piece of fabric, often done with needles.

Fibre | Cotton | Jute | Ginning | Spinning | Yarn | Weaving | Knitting | Fabric

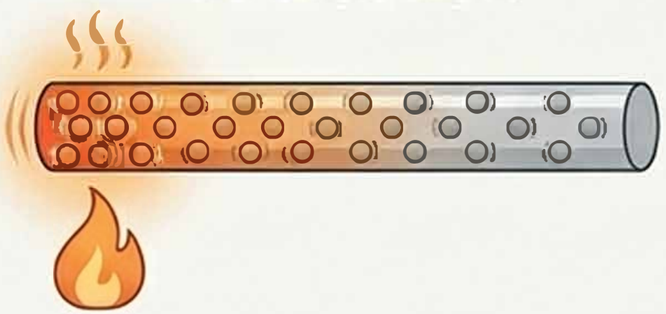
CHAPTER 4: HEAT

Heat is energy that flows from a hotter object to a colder one.

Measuring Heat: Temperature

Temperature tells us how hot or cold an object is. It's measured with a **thermometer**. Normal human body temperature is 37°C.

CONDUCTION

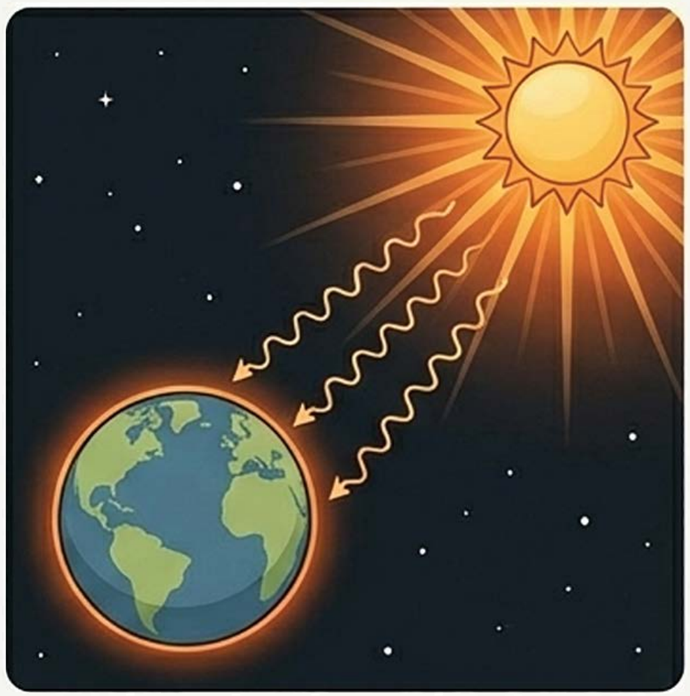


The transfer of heat in **solids**. Heat travels from particle to particle without the particles themselves moving. Metals are good **conductors**.

CONVECTION

The transfer of heat in **liquids and gases**. Hotter, less dense fluid rises, and cooler, denser fluid sinks, creating a **convection current**.

RADIATION



The transfer of heat through electromagnetic waves, requiring **no medium**. This is how the sun's heat reaches Earth.

Temperature • Thermometer • Conduction • Convection • Radiation

CHAPTER 5: ACIDS, BASES AND SALTS

ACIDS

Taste: Sour
Litmus Test: Turns **blue litmus red**.

Found naturally in fruits like lemons and oranges.

BASES

Taste: Bitter
Touch: Soapy
Litmus Test: Turns **red litmus blue**.

Substances that are bitter and feel soapy to the touch.

SALTS

Acid + Base → Salt + Water

Salts are formed from the reaction of acids and bases. Common salt is a familiar example used in food.

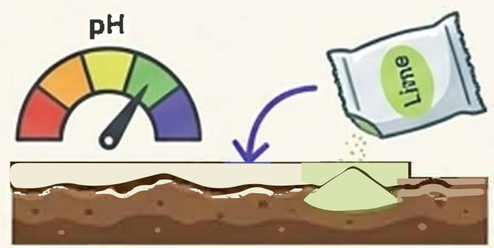
What is an Indicator?

A substance that changes color to show whether a substance is acidic or basic.

Natural Indicators

- **Litmus**: Shows red in acid, blue in base.
- **Turmeric**: Stays yellow in acid, turns red in base.
- **China Rose**: Turns dark pink in acid, green in base.

Application: Soil Health



Excess acids or bases in soil can be harmful. Soil is treated with **quicklime** or **slaked lime** (bases) to neutralize acidity.

CHAPTER 6: PHYSICAL AND CHEMICAL CHANGES CHAPTER

Physical Change: Form Alters, Substance Remains

No new substance is formed.
Usually **reversible**.

Reversible melting

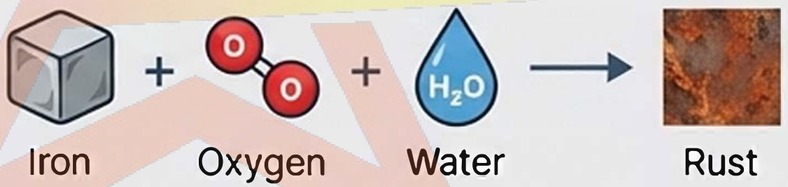
Tearing paper

Boiling water

Chemical Change: A New Substance is Created

New substances are formed.
Usually **irreversible**.

Rusting: A Classic Chemical Change



Rusting is a chemical change where iron reacts with oxygen and water to form a new substance, **rust**.

Burning wood

Burning match

Browning of fruit

How to Prevent Rusting

Painting • Oiling and Greasing • **Galvanisation** (coating with a layer of zinc)

CHAPTER 7: WEATHER, CLIMATE AND ADAPTATIONS OF ANIMALS TO CLIMATE

Weather: The day-to-day condition of the atmosphere (temperature, rainfall, humidity).

Climate: The **average** weather pattern of a place, studied over a long period of time.

POLAR REGIONS

Extremely cold for most of the year.

Adaptation: The features and habits that help an organism survive in its habitat.

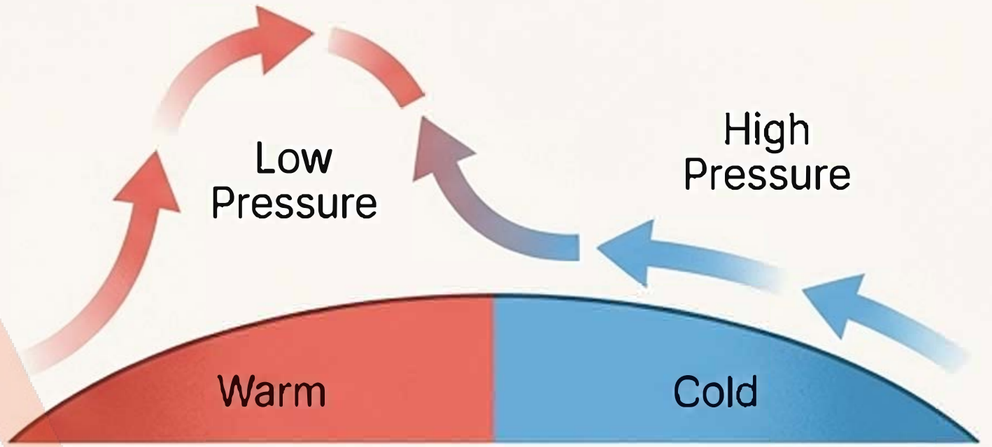
TROPICAL RAINFORESTS

Hot and humid with plentiful rainfall.

- ✓ **Competition for food**: Animals are adapted to eat specific foods (e.g., Toucan's long beak).
- ✓ **Living on trees:** Many animals have developed strong tails or sticky pads to live in the dense forest canopy (e.g., Monkeys, Tree Frogs).
- ✓ **Camouflage:** Blending in with the surroundings to avoid predators.

CHAPTER 8: WINDS, STORMS AND CYCLONES

Air exerts pressure.
Moving air is called **wind**.



Winds are generated due to uneven heating of the Earth.

Thunderstorms

Caused by the rapid upward movement of warm, moist air. Accompanied by heavy rain, thunder, and lightning.

Cyclones

Cyclones are violent, rotating storms that form over warm oceans. They bring very strong winds, heavy rain, and high tidal waves, causing widespread destruction.

CYCLONE SAFETY

- Follow weather warnings and forecasts.
- Move to a safe, sturdy shelter.
- Stay indoors during the storm.
- Keep an emergency kit ready.

Wind • Air pressure • Thunderstorm • Cyclone

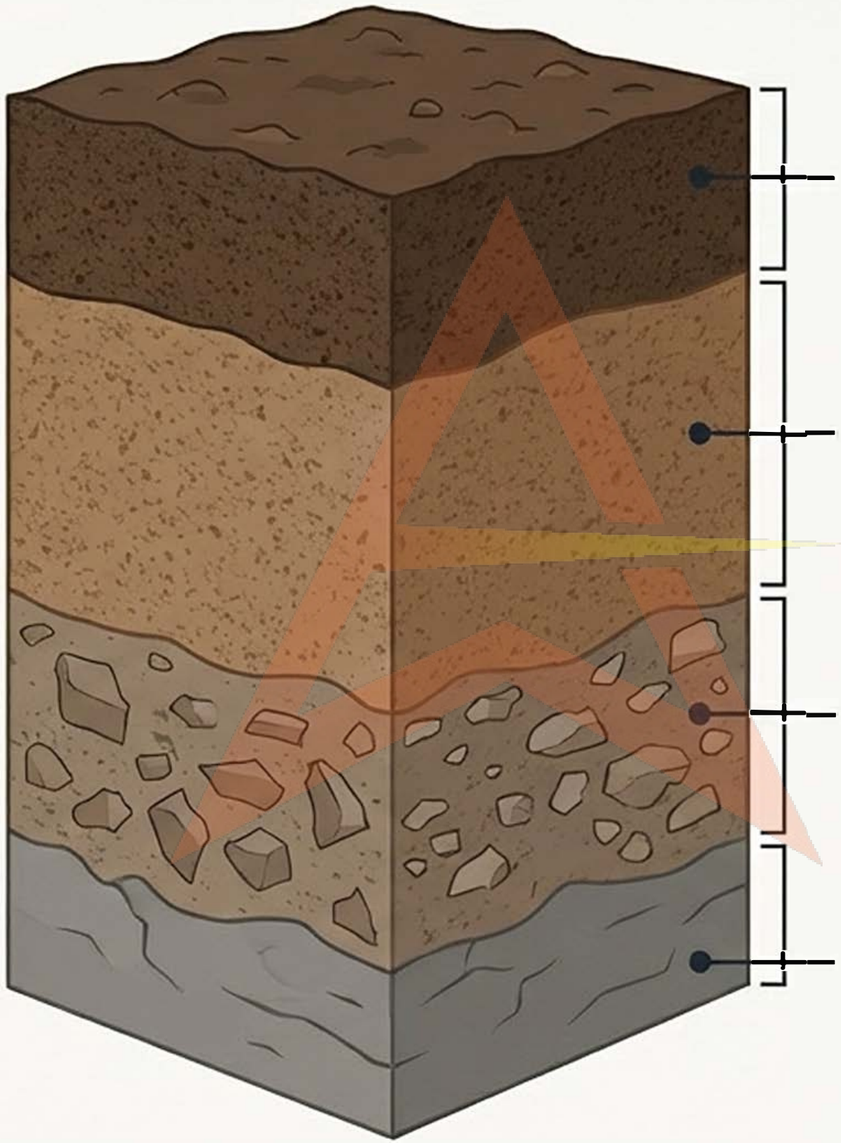
CHAPTER 9: SOIL

- Contains air.
- Contains water (moisture).
- Supports plant growth.
- Home to microorganisms.

Soil Erosion

The removal of the topsoil layer by wind, water, or ice.

Deforestation is a major cause of soil erosion, as tree roots help bind the soil together.



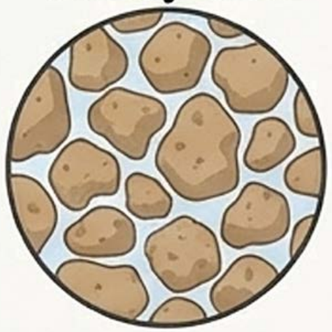
A Horizon (Topsoil):
Rich in humus and minerals. Dark in color.

B Horizon (Subsoil):
Contains less humus but more minerals.

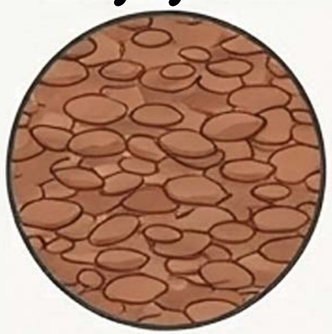
C Horizon:
Made of small lumps of rock.

Bedrock:
Hard, solid rock.

Sandy Soil



Clayey Soil



Loamy Soil

CHAPTER 10: RESPIRATION IN ORGANISMS

Respiration: The process of breaking down food to release energy for life activities like growth and repair. All living organisms respire.

Breathing: The physical process of taking in oxygen and giving out carbon dioxide. It is a part of respiration.

Respiration: The chemical process that occurs inside cells to release energy.

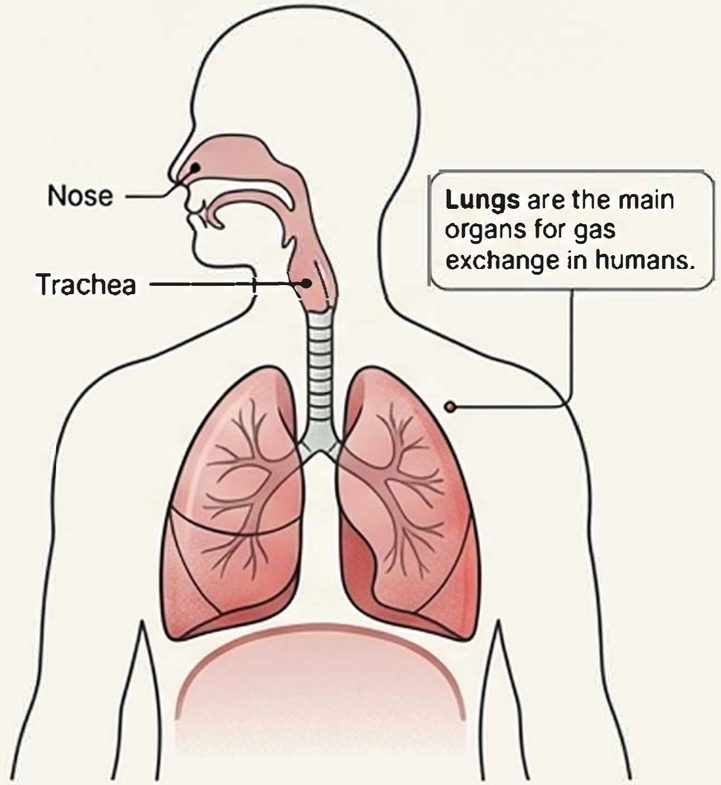
Aerobic Respiration

O_2

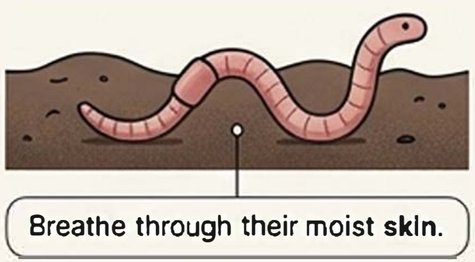
Glucose + Oxygen → Carbon Dioxide + Water + Energy

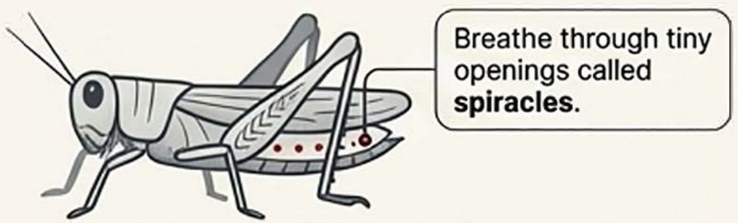
Anaerobic Respiration

Anaerobic Respiration
Takes place in the **absence of oxygen**.
Releases less energy. Occurs in organisms like yeast and sometimes in our muscle cells.



Breathing in Other Organisms

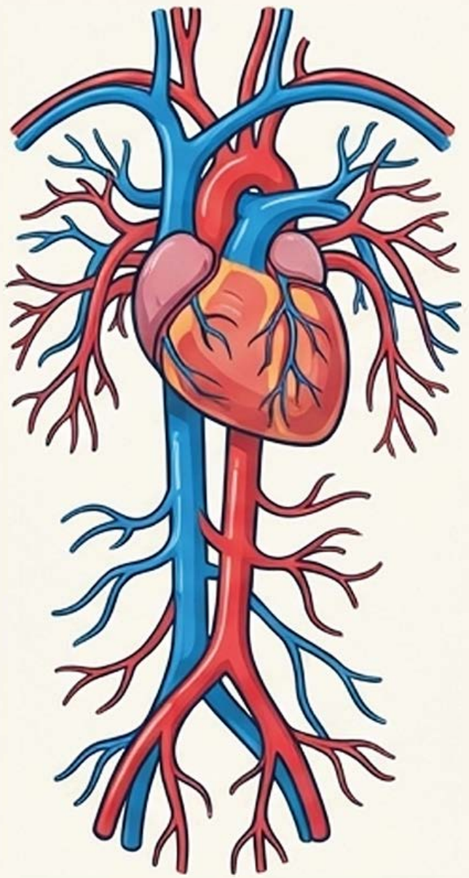




CHAPTER 11: TRANSPORTATION IN ANIMALS AND PLANTS

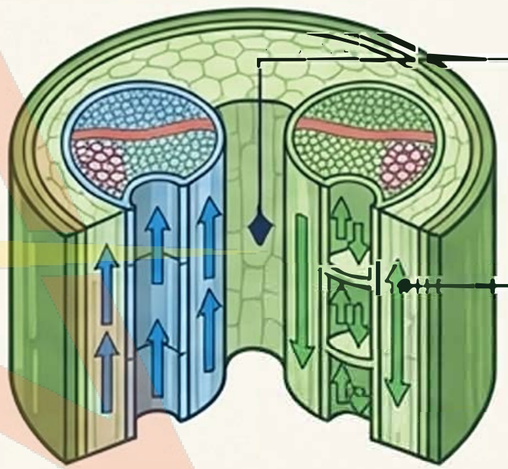
Transportation: The life process of moving substances like food, oxygen, and waste from one part of an organism to another.

Transport in Animals



- **Heart**
  A muscular pump that circulates **blood** throughout the body.
- **Blood Vessels**
  Arteries (carry blood away from the heart) and Veins (carry blood to the heart).
- **Blood**
  A fluid connective tissue containing:
  - **Red Blood Cells**: Transport oxygen.
  - **White Blood Cells**: Fight infection.
  - **Platelets**: Help in clotting.

Transport in Plants



Xylem
A network of tubes that transports **water and minerals** from the roots up to the rest of the plant.

Phloem
A network of tubes that transports **food** (sugars) made in the leaves to all other parts of the plant.

Excretion: The Removal of Waste

The process of removing waste products from the body. In humans, the **kidneys** are the main excretory organs, filtering waste from the blood to produce urine.

CHAPTER 12: REPRODUCTION IN PLANTS

Reproduction: The biological process by which new individual organisms ('offspring') are produced from their 'parents'.

Asexual Reproduction

One Parent, Identical Offspring

Involves only one parent. The new plant is genetically identical to the parent.

Vegetative Propagation

Involves only one parent. The new plant is genetically identical to the parent.

Budding

Fragmentation

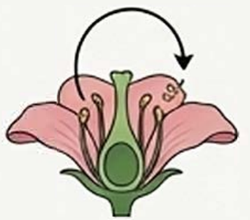
Sexual Reproduction

Two Gametes, Genetic Variation

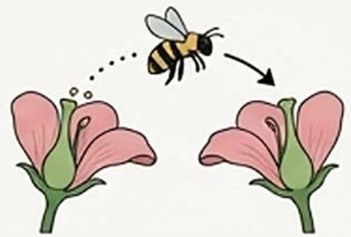
Involves the fusion of male and female **gametes**.
The **flower** is the reproductive part of the plant.

1 Pollination

The transfer of pollen (containing male gametes) from the anther to the stigma.



Self-Pollination



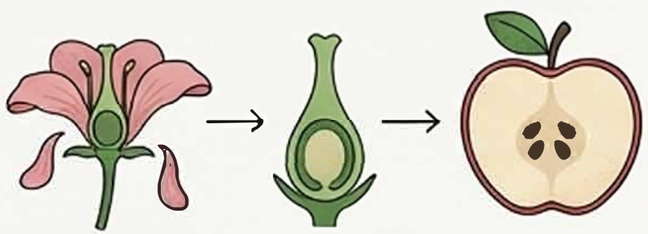
Cross-Pollination

2 Fertilisation

The fusion of the male gamete with the female gamete (in the ovule).

3 Result

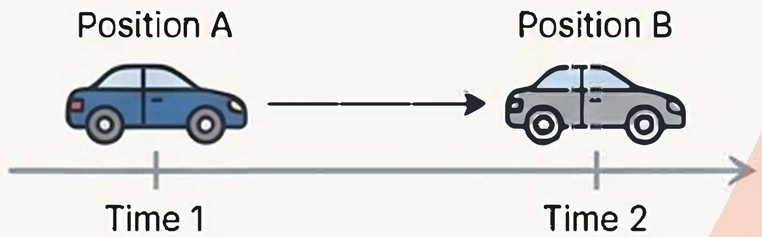
Fertilisation results in the formation of a zygote, which develops into an embryo within a **seed**. The ovary develops into the fruit.



CHAPTER 13: MOTION AND TIME

Motion

Motion is the change in the position of an object with respect to **time**.



Speed

Speed is the **distance** an object travels per unit of **time.**

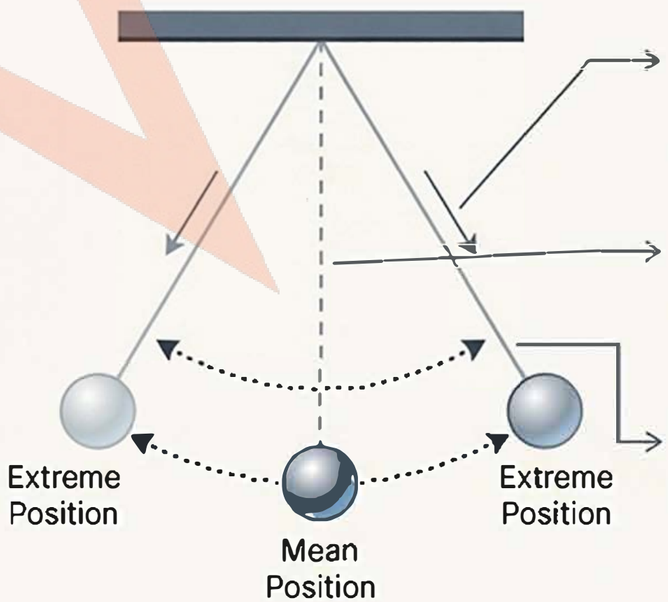
$$\text{Speed} = \frac{\text{Total Distance Travelled}}{\text{Total Time Taken}}$$

Common units: m/s or km/h.

Measurement of Time

The standard unit of time is the second (s).

Focus Study: The Simple Pendulum



Oscillation: One complete to-and-fro movement of the pendulum bob.

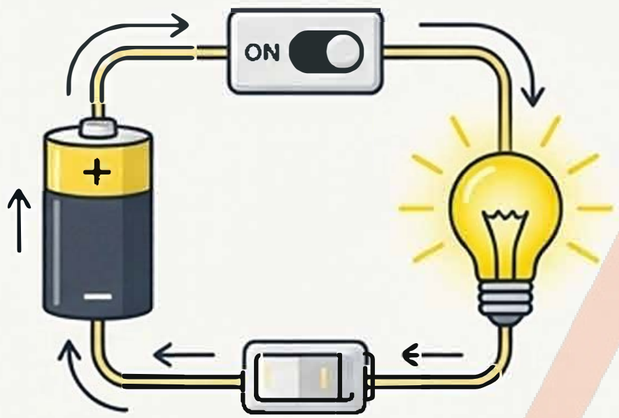
Time Period: The time taken by the pendulum to complete one oscillation.

Characteristic: The time period of a pendulum is constant for a given length.

CHAPTER 14: ELECTRIC CURRENT AND ITS EFFECTS

Fundamental Concept: The Electric Circuit

Electric current is the flow of electric charge. It only flows through a closed circuit, from the positive to the negative terminal of a cell.

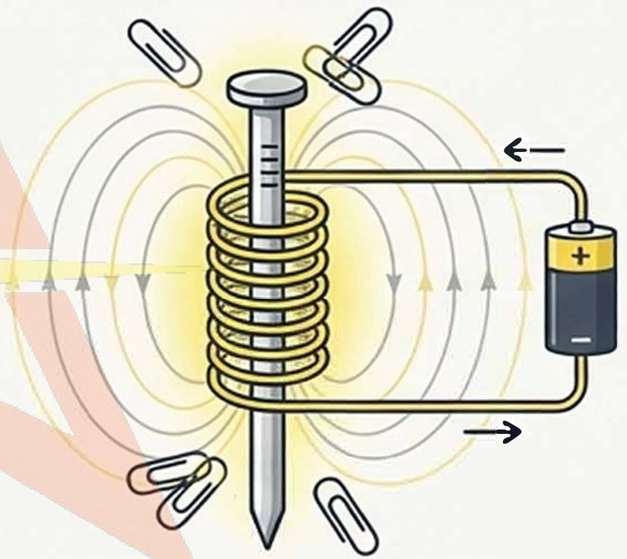


Current Produces Heat

When an electric current passes through a wire, the wire gets hot. This is the **heating effect** of current.

Current Produces Magnetism

An electric current flowing through a wire produces a magnetic field around it. **This is the magnetic effect of current.**



Application: The Electromagnet

An **electromagnet** is a temporary magnet created by passing current through a coil of wire. Its strength can be changed, and it can be switched on or off.

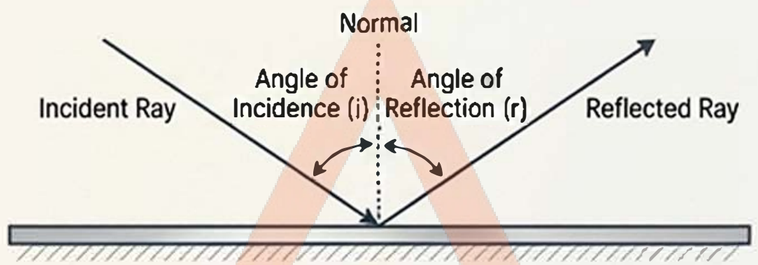
Safety Device: The Fuse

A **fuse** is a safety device containing a special wire that melts and breaks the circuit if the current becomes dangerously high, protecting appliances from damage.

CHAPTER 15: LIGHT

Light travels in a straight line.

Core Concept: Reflection



Reflection is the bouncing back of light when it strikes a smooth, polished surface like a mirror. We see objects because they reflect light into our eyes.

Image Formation by a Plane Mirror

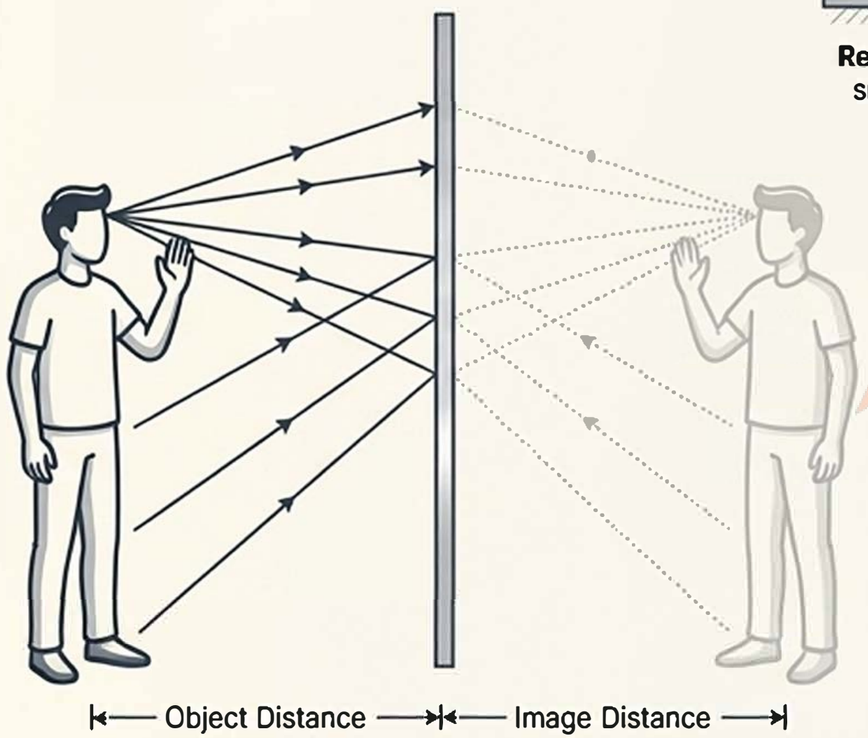
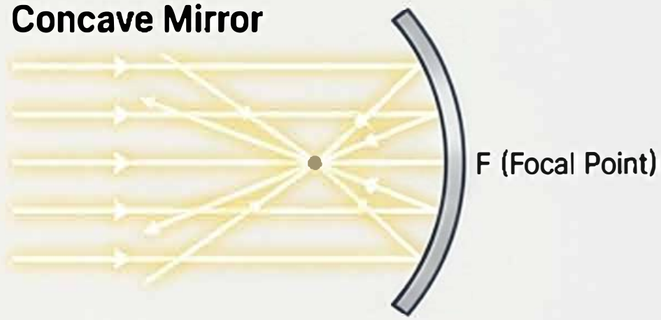


Image Formation by a Plane Mirror

- **Virtual** (cannot be formed on a screen)
- Erect (upright)
- Same size as the object
- Located at the same distance behind the mirror
- **Laterally Inverted**

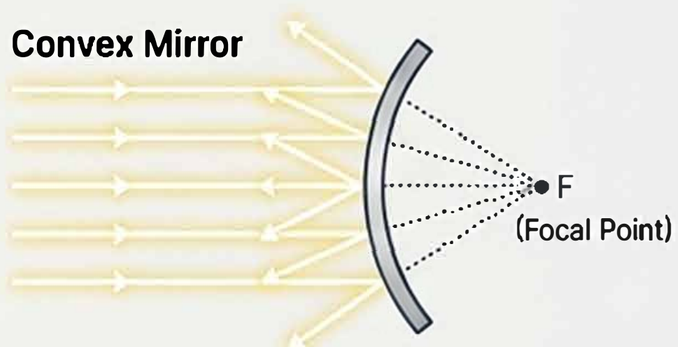
Spherical Mirrors

Concave Mirror



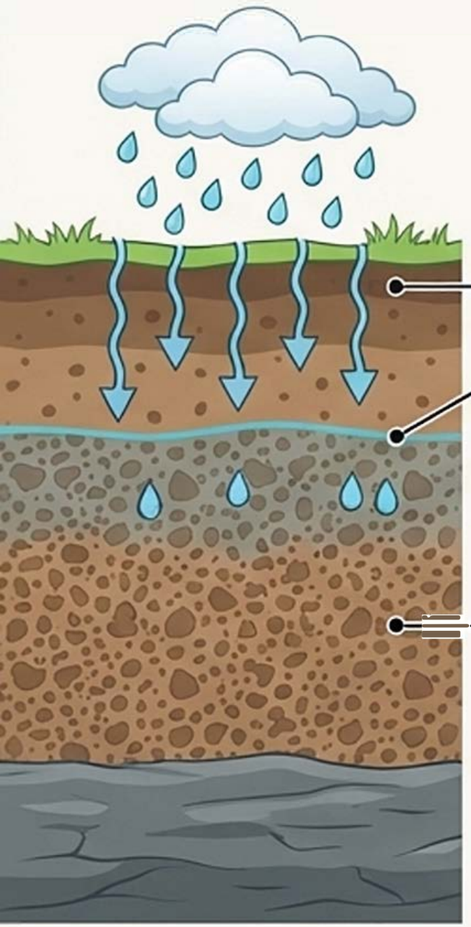
A **converging** mirror. Can form both real and virtual images depending on the object's position.

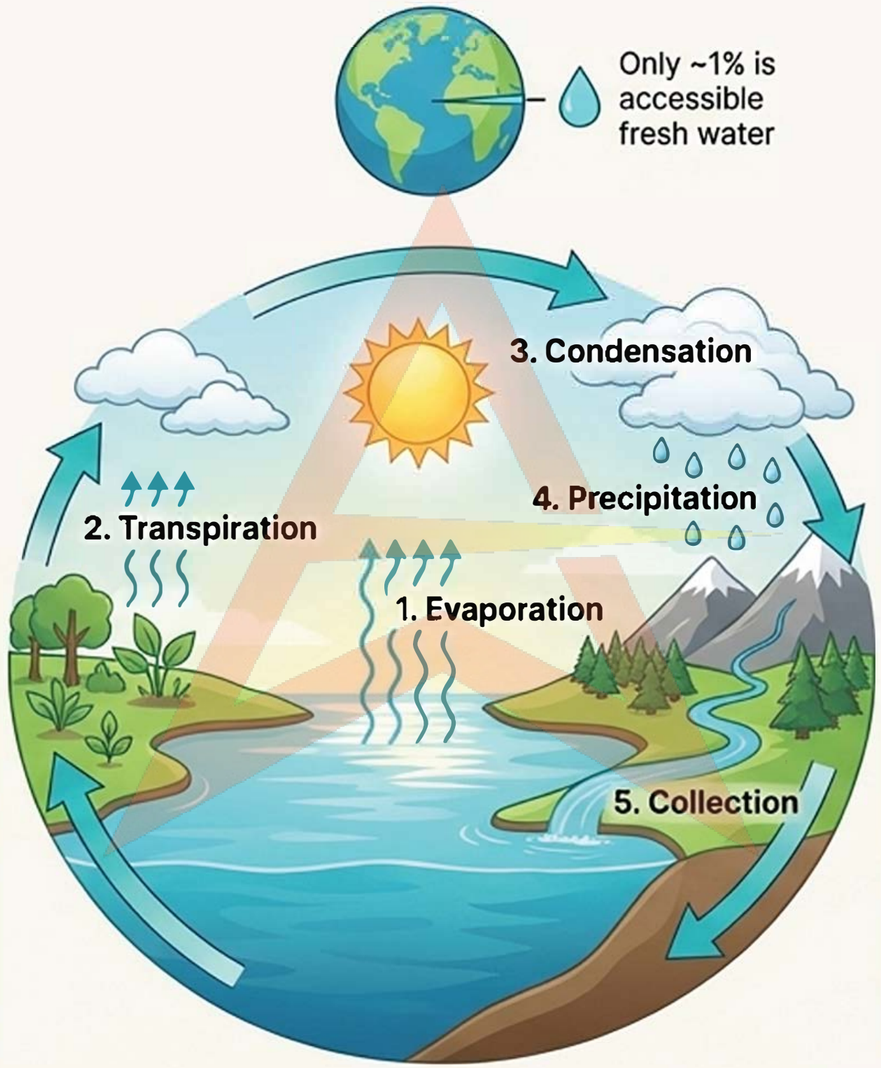
Convex Mirror



A **diverging** mirror. Always forms a virtual, erect, and smaller image. Used as side-view mirrors in vehicles.

Water is essential for all life.





We Must Conserve Water

Rainwater Harvesting
The process of collecting and storing rainwater for later use, which helps recharge groundwater levels.

Fix leaks promptly

Use water efficiently

Implement drip irrigation

! Excessive pumping of **groundwater** leads to the depletion of the water table.

The **water cycle** ensures the continuous availability of water on Earth.