
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

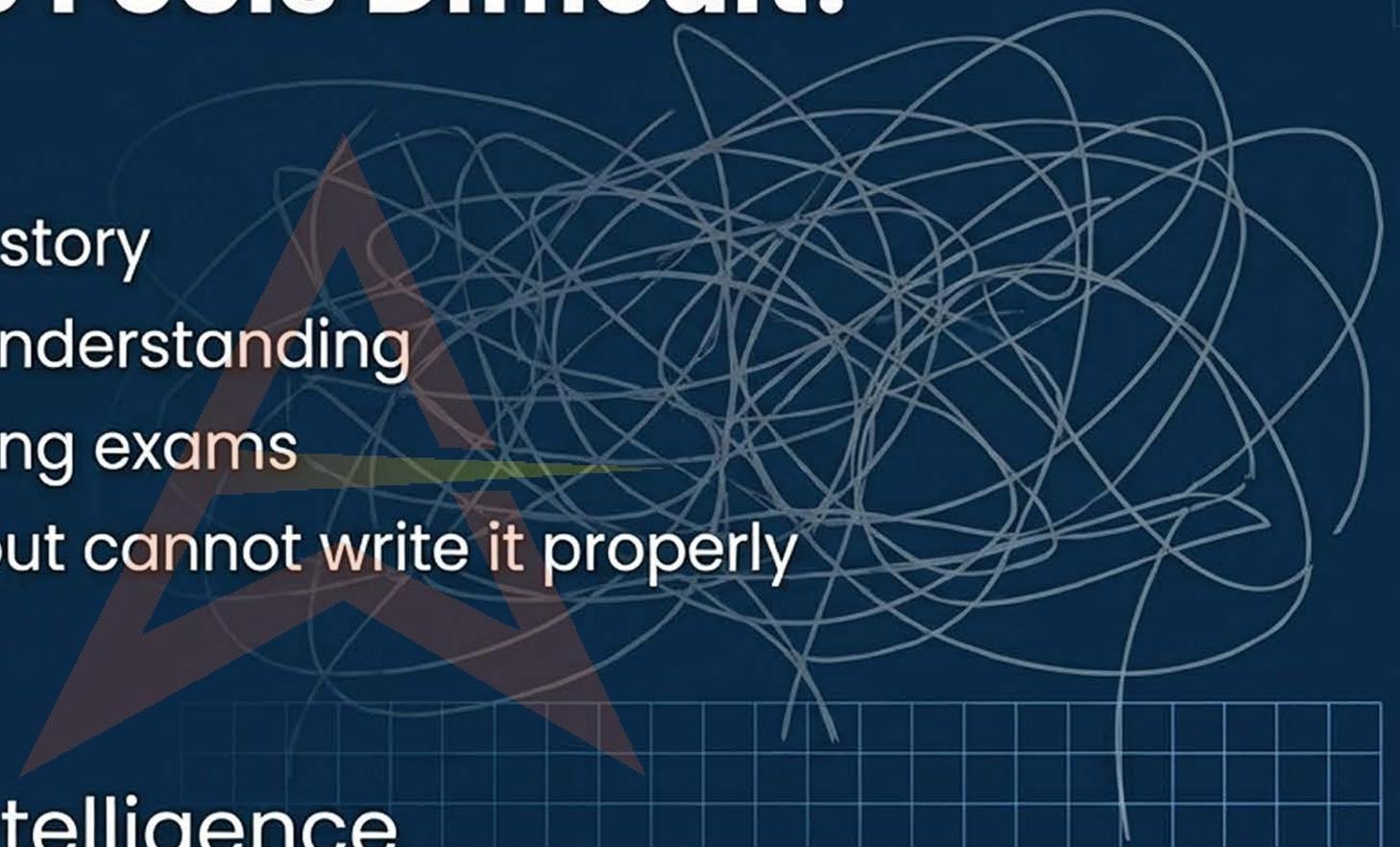
This guide will teach you:

- 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

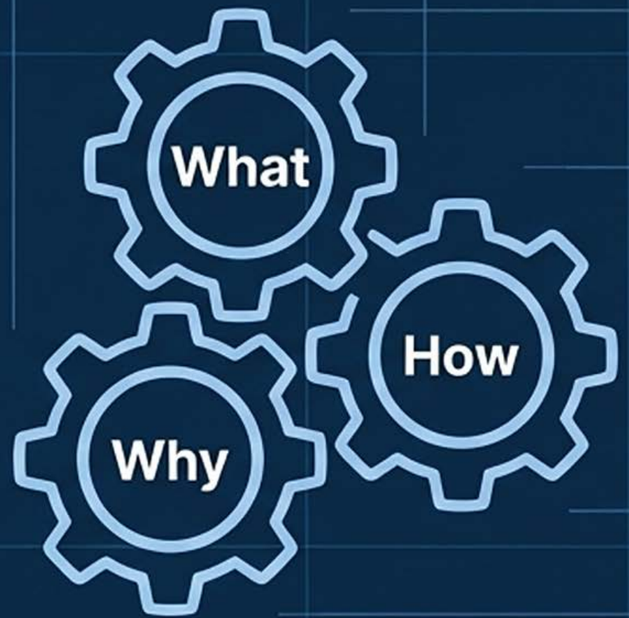
Marks Are Given for Keywords

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

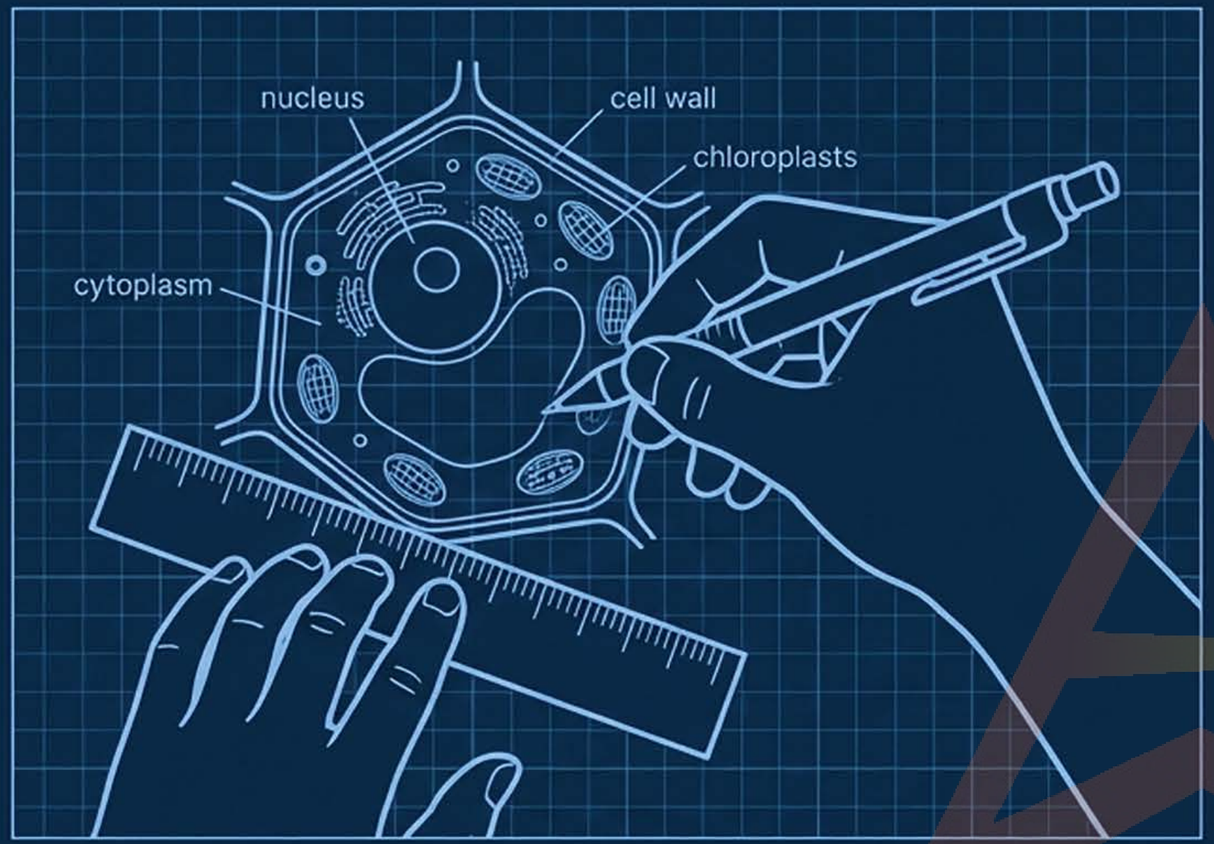
Ask These 3 Questions While Studying

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

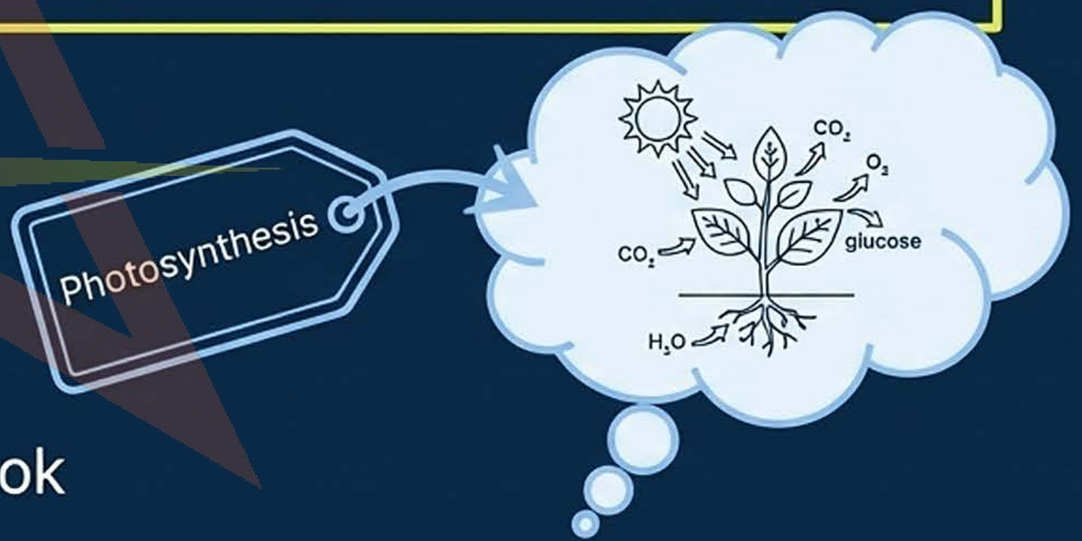
How to Use Chapterwise Keywords

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: CROP PRODUCTION AND MANAGEMENT

What is a Crop?

When the same kind of plants are grown at one place on a large scale, it is called a crop.

Kharif Crops
(The Monsoon Crop)

Sown: June-Sept.
Examples: Paddy, maize, soyabean.

Rabi Crops
(The Winter Crop)

Sown: Oct-March.
Examples: Wheat, gram, pea.

The 7 Steps of Agriculture

1. **Preparation of Soil:** Loosening the soil (tilling) to let roots breathe.
   Tools: Plough, Hoe, Cultivator.
2. **Sowing:** Planting good quality seeds. A seed drill ensures equal distance and depth.
3. **Adding Manure & Fertilisers:** Replenishing soil nutrients.
   Manure (natural) vs. Fertilisers (chemical). Crop rotation is another method.
4. **Irrigation:** Supplying water at regular intervals.
   Modern Methods: Sprinkler System & Drip System save water.
5. **Protection from Weeds:** Removing undesirable plants (weeds) that steal nutrients. Done by hand or with weedicides.
6. **Harvesting:** Cutting the mature crop. Threshing separates grain from chaff. A 'Combine' does both.
7. **Storage:** Drying grains to remove moisture, then storing them in silos or granaries to protect from pests.

Adding Manure & Fertilisers: Replenishing soil nutrients. Manure (natural) vs. Fertilisers). Crop rotations method.

Animal Husbandry: Rearing animals on a large scale with proper food and care is called Animal Husbandry.

CHAPTER 2: MICROORGANISMS: FRIEND AND FOE

Tiny living organisms, too small to be seen with naked eyes.

 **Bacteria**

 **Fungi**

 **Protozoa**

 **Algae**

Viruses: Different from others, they only reproduce inside a host. Cause common cold and Polio.

OUR FRIENDS

In the Kitchen

Curd (Lactobacillus)

Bread (Yeast for fermentation)

In Medicine

Antibiotics like Penicillin

Vaccines creating antibodies

In Agriculture

Bacteria like Rhizobium "fix" nitrogen, making soil fertile.

Cleaning the Environment

They decompose dead plants and animals.

Food Preservation

Sugar cube

Spinash and epin:/ material oil

Pasteurisation: Heating milk to 70°C then chilling it to kill microbes.

OUR FOES

Pathogens: Microbes that cause disease.

Communicable Diseases: Spread via air, water, or contact. E.g., Chicken pox, Cholera.

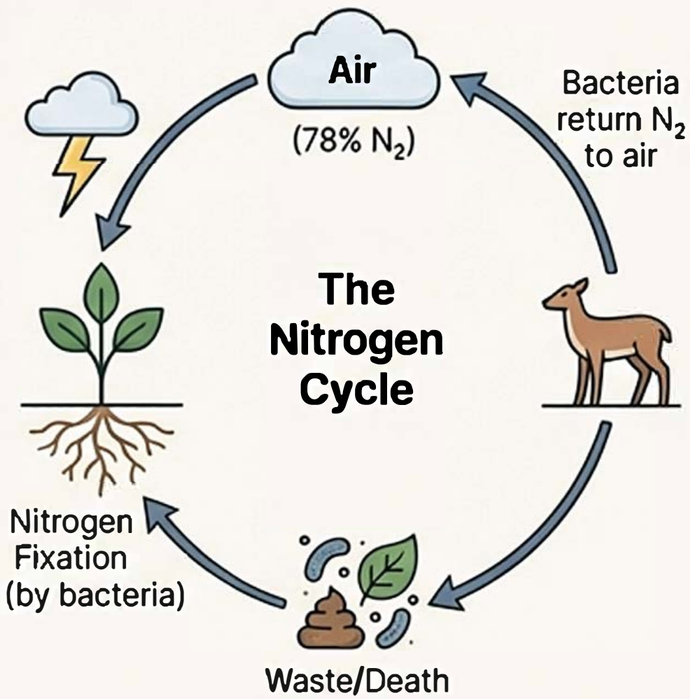
Carriers (The Transporters)

Housefly

Malaria

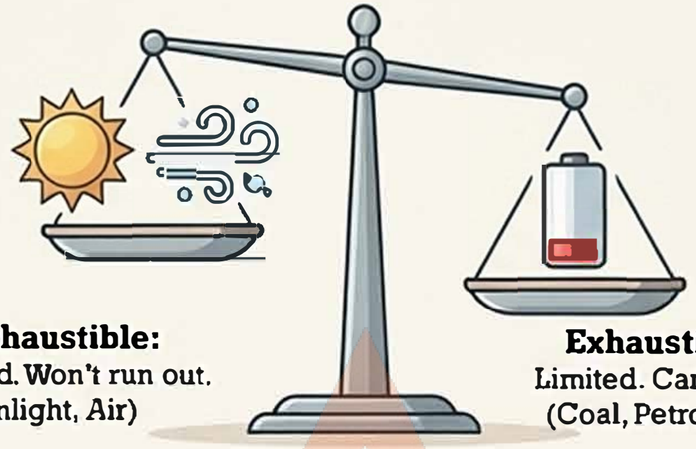
Dengue

Common Diseases
Tuberculosis (Bacteria)
Rust of Wheat (Fungi)



CHAPTER 3: COAL AND PETROLEUM

Natural Resources: Everything we use from nature.



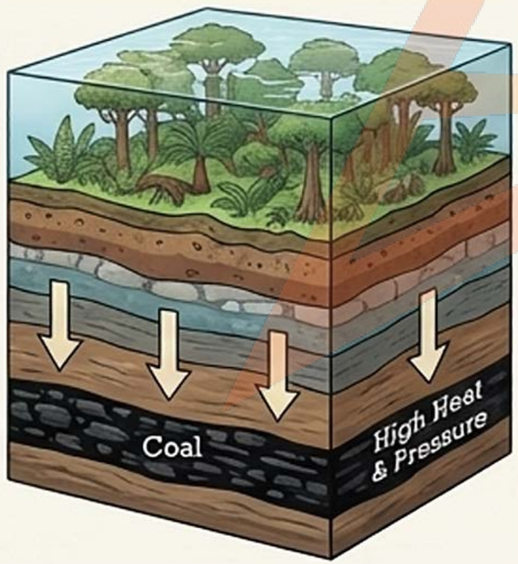
Inexhaustible:
Unlimited. Won't run out.
(Sunlight, Air)

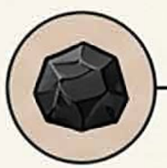
Exhaustible:
Limited. Can finish.
(Coal, Petroleum)

Fossil Fuels: Formed from the dead remains (fossils) of organisms millions of years ago.

The Story of Coal

Carbonisation
The slow process of dead vegetation turning into coal.



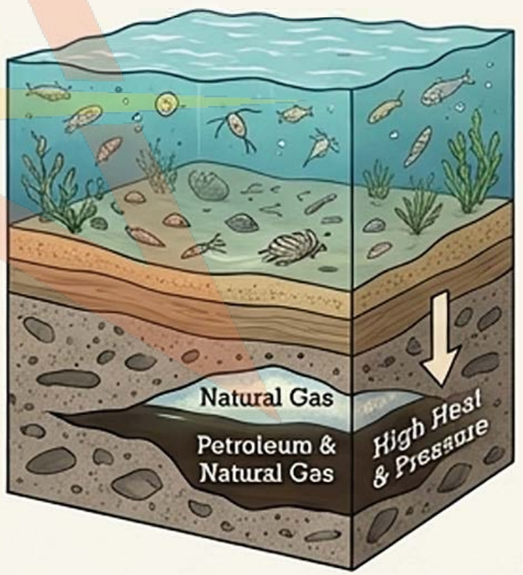


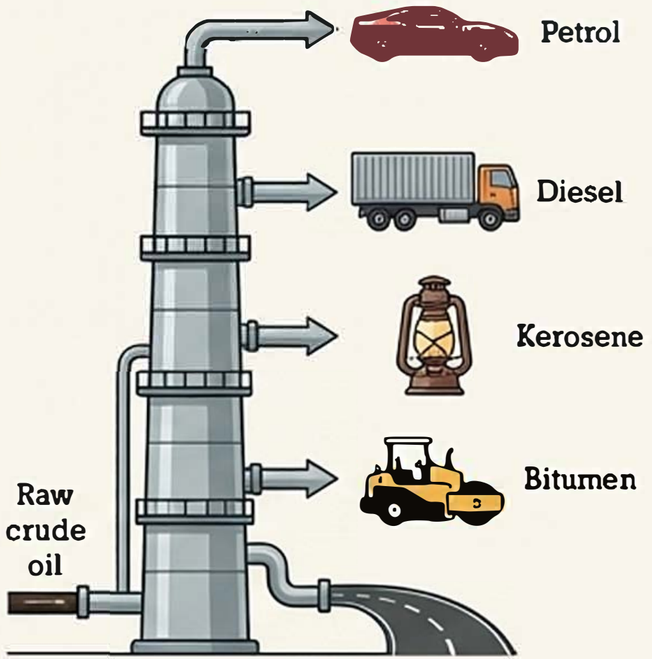
Coke:
Tough, pure carbon for steel making.

Coal Tar:
Black liquid for dyes, paints, perfumes.

Coal Gas:
Industrial fuel.

The Story of Petroleum ('Black Gold')





CNG (Compressed Natural Gas):
A cleaner fuel stored under high pressure. Causes less pollution.

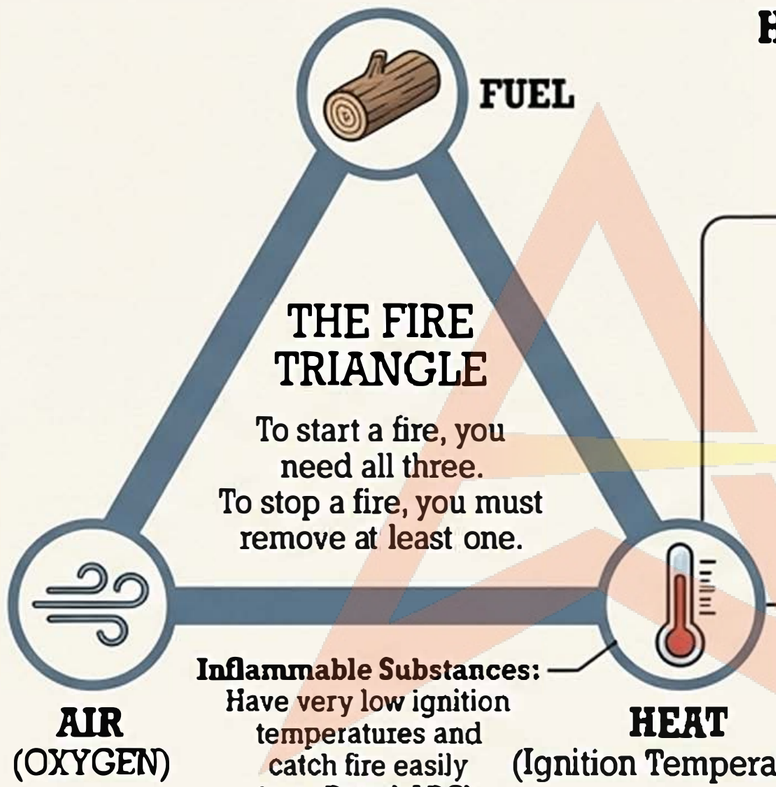
CHAPTER 4: COMBUSTION AND FLAME

What is Combustion?

A chemical process where a substance reacts with oxygen to give off heat.

Combustible
(e.g., wood, paper)

Non-combustible
(e.g., stone, glass)



Inflammable Substances: Have very low ignition temperatures and catch fire easily (e.g., Petrol, LPG).

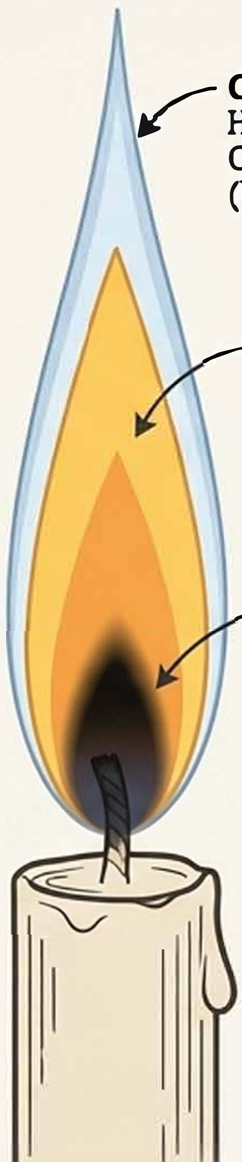
How to Extinguish a Fire

How a "break" the triangle:

Water:
Cools the fuel (removes Heat).

Never use on electrical or oil fires.

Carbon Dioxide (CO_2): Heavier than oxygen, it covers the fire like a blanket, cutting off Air.



Outer Zone (Blue): Hottest part. Complete combustion. (Used by goldsmiths)

Middle Zone (Yellow): Luminous. Partial combustion.

Inner Zone (Black): Least hot. Unburnt wax vapours.

THE HARMFUL SIDE EFFECTS

Global Warming
Too much CO_2 from burning fuels traps heat.

Acid Rain
Sulphur and Nitrogen oxides mix with rain, destroying crops and buildings.

CHAPTER 5: CONSERVATION OF PLANTS AND ANIMALS

The Problem - Deforestation

Cutting down forests on a large scale.

Deforestation

- **Increased Temperature**: Global warming due to reduced CO_2 absorption
- **Increased Pollution**: More harmful gases and particulates in the air
- **Desertification**: Fertile land turning into desert

Special Terms to Know

- **Endemic Species:** Plants or animals found ONLY in a specific area. (e.g., Giant Squirrel in Pachmarhi)
- **Endangered Animals:** Animals whose numbers are so low they might become extinct. (e.g., Tigers)
- **Red Data Book:** A book that records all endangered species.
- **Migration:** Birds flying to faraway places to lay eggs due to cold.

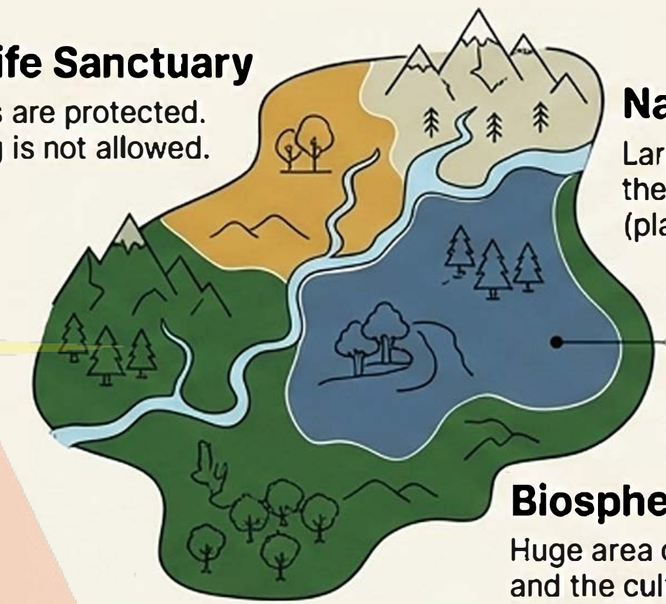
The Solution - Protected Areas

Wildlife Sanctuary

Animals are protected.
Hunting is not allowed.

National Park

Large reserves protecting the entire ecosystem (plants, animals, landscape)



Satpura National Park is the first Reserve Forest of India.

Biosphere Reserve

Huge area conserving biodiversity and the culture of local tribes (e.g., Pachmarhi Biosphere Reserve)

17 = **1**

It takes **17 full-grown trees** to make **1 tonne of paper.**

Recycle Paper, Save Trees!

CHAPTER 6: REPRODUCTION IN ANIMALS

Core Purpose: To ensure a species continues to live on, generation after generation.

Two Modes of Reproduction

Sexual Reproduction
Needs two parents

Asexual Reproduction
Needs only one parent

A Closer Look at Sexual Reproduction

Male Gamete (Sperm):
Produced by testes.

Female Gamete (Ova/Egg):
Produced by ovaries.

Fertilisation:
Fusion of Sperm + Egg = Zygote.

Development:
Zygote divides → Embryo → Foetus (with body parts).

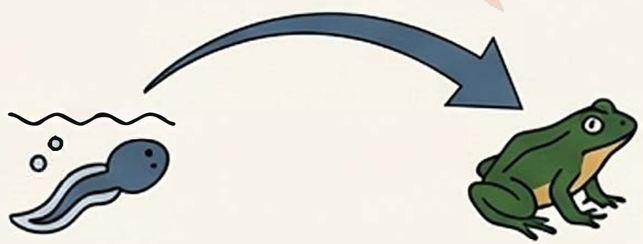
Internal Fertilisation:
Fusion inside the female body (Humans, cows, hens).

External Fertilisation:
Fusion outside in water (Frogs, fish).

Viviparous:
Give birth to young ones (Humans, dogs).

Oviparous:
Lay eggs (Hens, frogs).

Metamorphosis



Metamorphosis: The drastic change from a young form to an adult form.

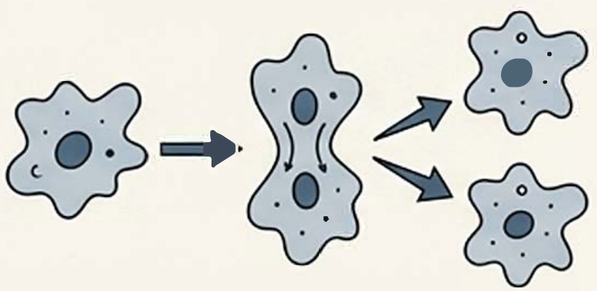
A Closer Look at Asexual Reproduction

Budding in Hydra

Parent bud

Fully formed has detached

Binary Fission in Amoeba

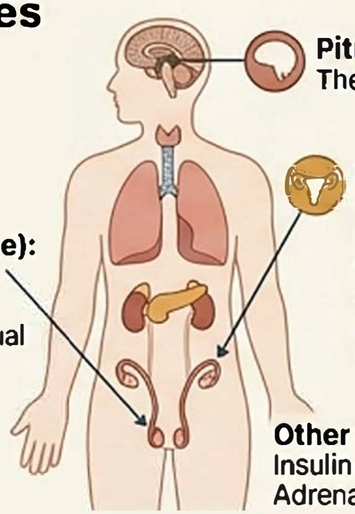


CHAPTER 7: REACHING THE AGE OF ADOLESCENCE

Defining the Period

- **Adolescence:** The "teen" years (age 11-19) when the body undergoes changes leading to reproductive maturity.
- **Puberty:** The process of these changes happening in the body.

The Chemical Messengers - Hormones



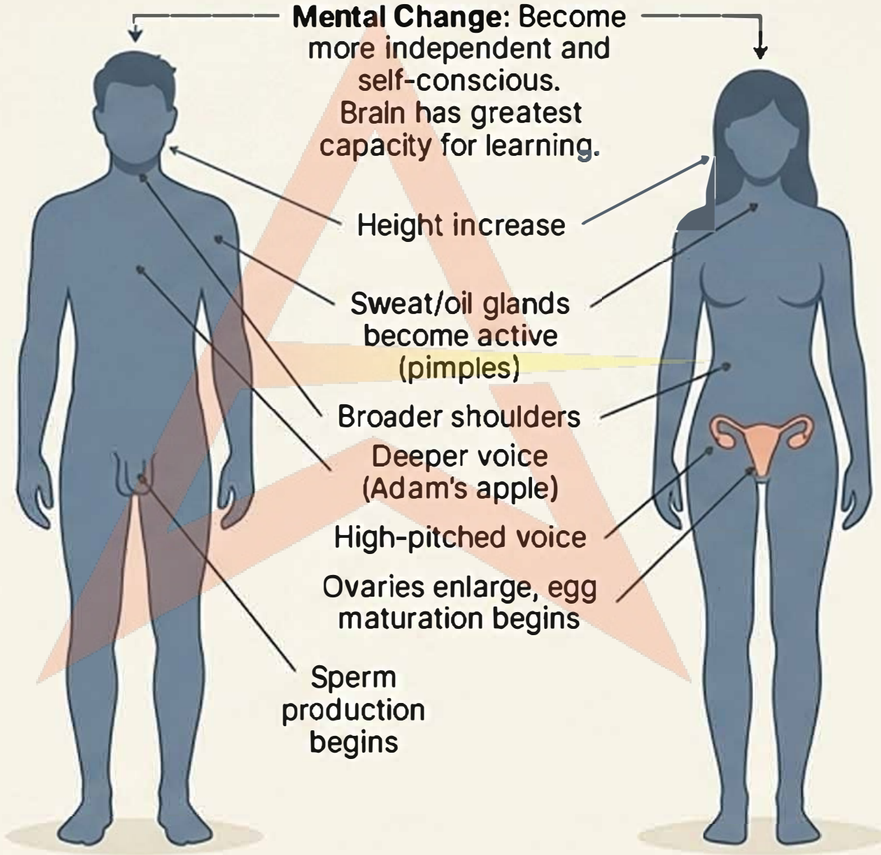
Pituitary Gland
The "Master Gland"

Testosterone (Male Hormone):
From Testes. Controls secondary sexual characters (beards).

Estrogen (Female Hormone):
From Ovaries. Controls secondary sexual characters (breast development).

Other Hormones
Insulin (Pancreas - Diabetes), Adrenalin (Adrenals - Stress)

Changes at Puberty



Key Biological Processes

Key terms: **Menarche** (first flow), **Menopause** (stoppage)

Sex Determination

Sperm (X) + Egg (X) = **XX (Girl)**

Sperm (Y) + Egg (X) = **XY (Boy)**

The father's sperm decides the sex of the baby.

Reproductive Health

Balanced Diet: Rapid growth requires a balanced diet. Iron is important.

Personal Hygiene: Bathe daily as sweat glands are very active.

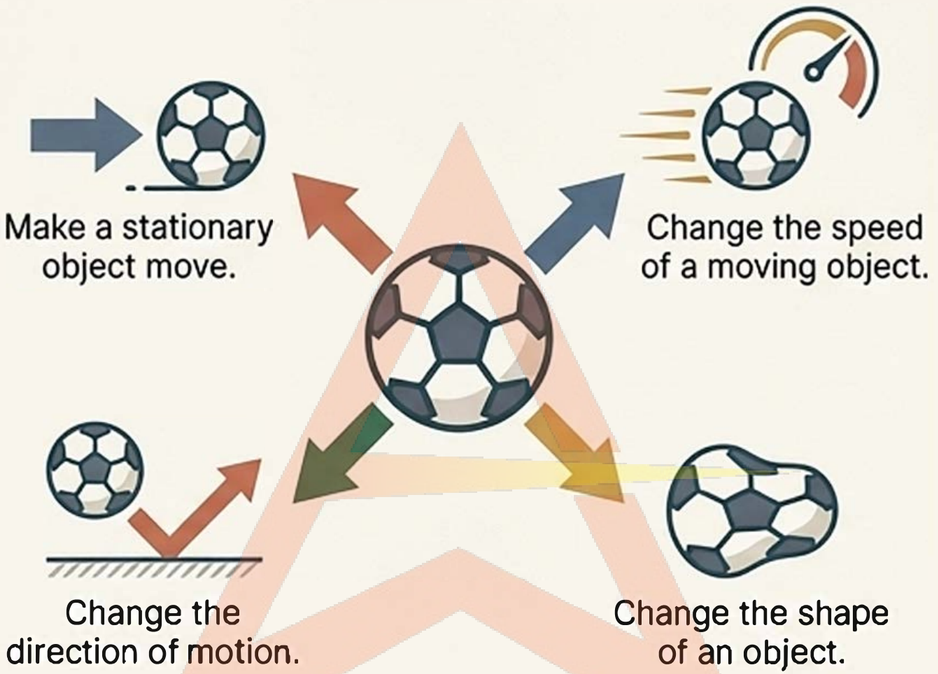
Say 'NO' to Drugs: Drugs are addictive and ruin health.

CHAPTER 8: FORCE AND PRESSURE

What is Force?

A push or a pull on an object.

Forces are due to an interaction between at least two objects.



Types of Forces

Contact Forces (Needs Touching)

Muscular Force

Friction

Non-Contact Forces (Action at a Distance)

Magnetic Force

Electrostatic Force

Gravitational Force

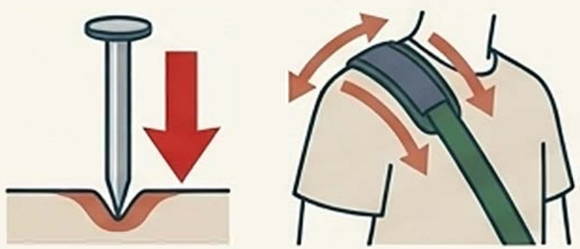
Understanding Pressure

Force acting on a unit area.

**Pressure formula:

$$\text{Pressure} = \frac{\text{Force}}{\text{Area}}$$

**The Golden Rule:
Smaller Area = Higher Pressure



Pressure in Fluids (Liquids & Gases)

Liquids

Pressure increases with depth.

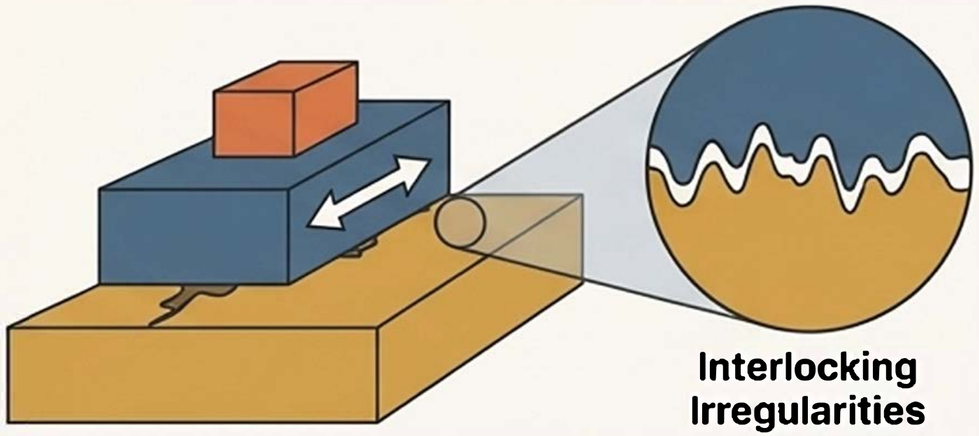
Gases

The air around us exerts Atmospheric Pressure.

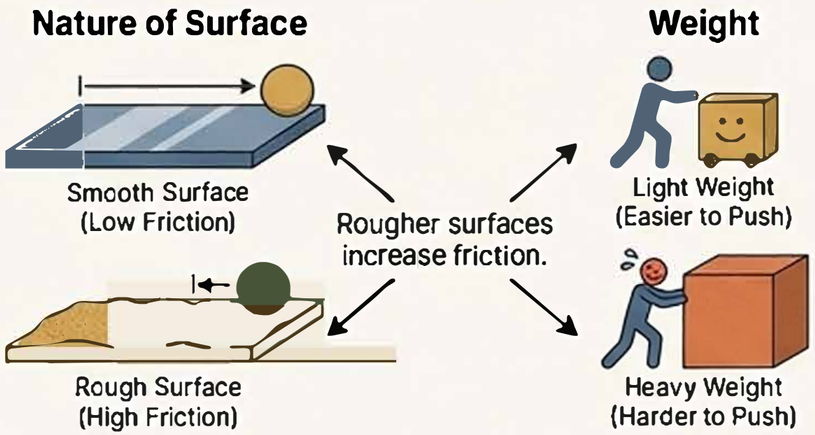
CHAPTER 9: FRICTION

What is Friction?

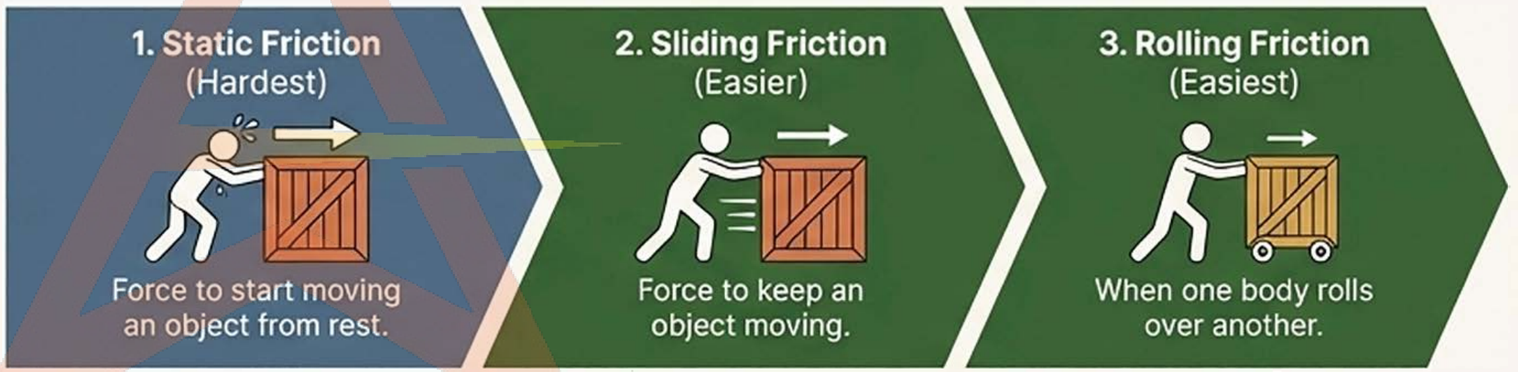
- A force that opposes motion. It acts between two surfaces in contact.
- Caused by the interlocking of irregularities (bumps) on surfaces.



Factors Affecting Friction



The Three Types of Friction



Controlling Friction

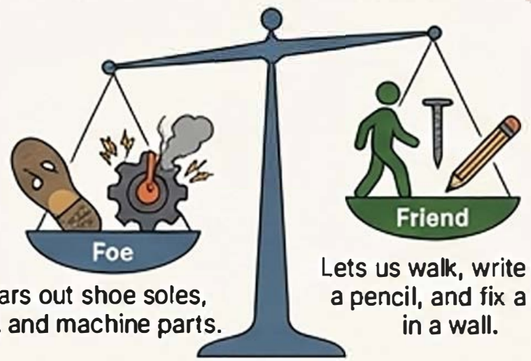
Increasing Friction

Using rough surfaces, treads, brakes, and spikes.

Reducing Friction

Using lubricants (oil, grease), wheels, and ball bearings.

Friction - Friend and Foe



Wears out shoe soles, tires, and machine parts.

Lets us walk, write with a pencil, and fix a nail in a wall.

Fluid Friction (Drag)

Water and air also exert friction called Drag. Streamlined shapes are used to reduce it.

CHAPTER 10: SOUND

The Origin of Sound

Sound is produced by VIBRATING bodies.

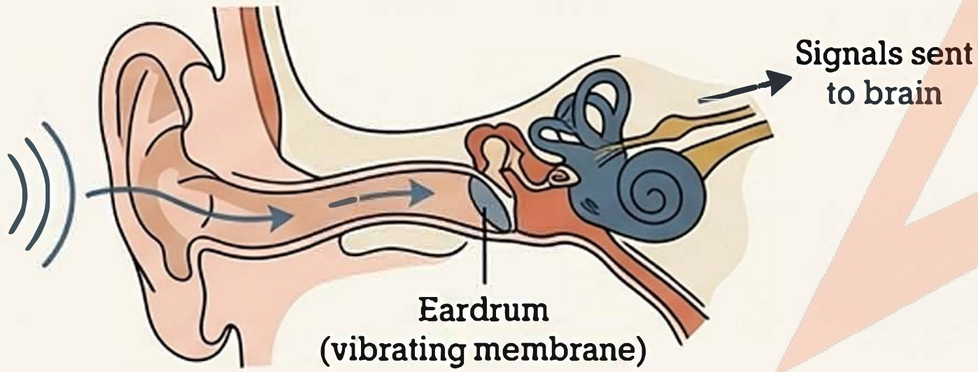
Human Voice

How Sound Travels

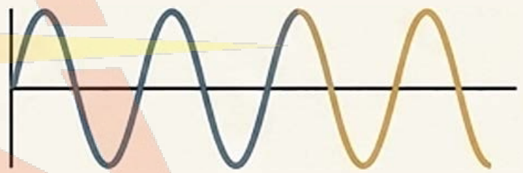
Sound needs a medium (Solid, Liquid, or Gas) to travel.

Sound cannot travel in a vacuum.

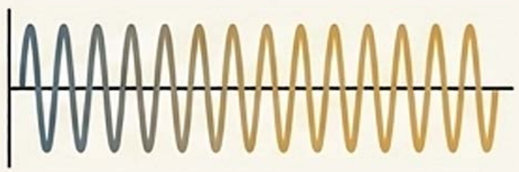
How We Hear



Properties of Sound



Loudness (determined by Amplitude)
Large Amplitude = Loud Sound
Measured in decibels (dB).



Pitch (determined by Frequency)
High Frequency = High Pitch (shrill)
E.g., a baby's voice.
Measured in Hertz (Hz).

The Range of Hearing

Noise Pollution

Unpleasant sounds are noise.
Health Problems: Lack of sleep, hypertension
Solutions:

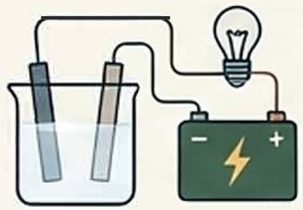
Silencers

Planting trees (absorb sound)

CHAPTER 11: CHEMICAL EFFECTS OF ELECTRIC CURRENT

1 Do Liquids Conduct Electricity?

Good Conductors
Examples: Lemon juice, tap water, salt water.



Poor Conductors
Example: Distilled water (no salts).

Pro-Tip: Use an LED, as it glows even with a weak current.

2 The Chemical Effect

When an electric current passes through a conducting solution, a chemical reaction happens.

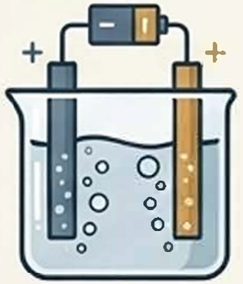
Bubbles rising

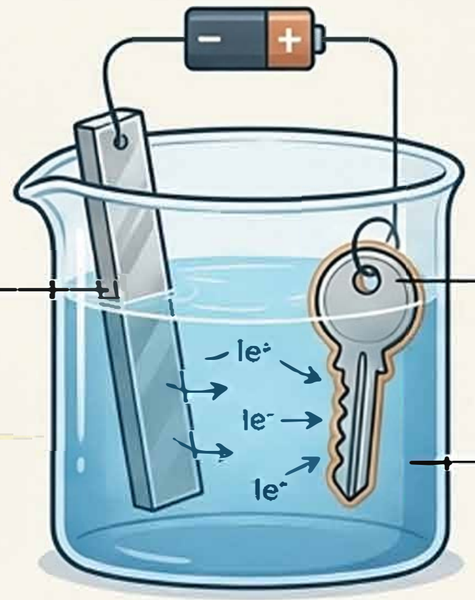
Metal forming

Color change

***William Nicholson** showed that passing current through water produces bubbles of oxygen and hydrogen.

Electroplating: The process of depositing a layer of a desired metal on another material using electricity.





3 Real-World Uses of Electroplating

Chromium Plating:
Reason: For shine, and it doesn't rust or scratch.

Tin Cans:
Reason: Iron is coated with less-reactive Tin to keep food safe.

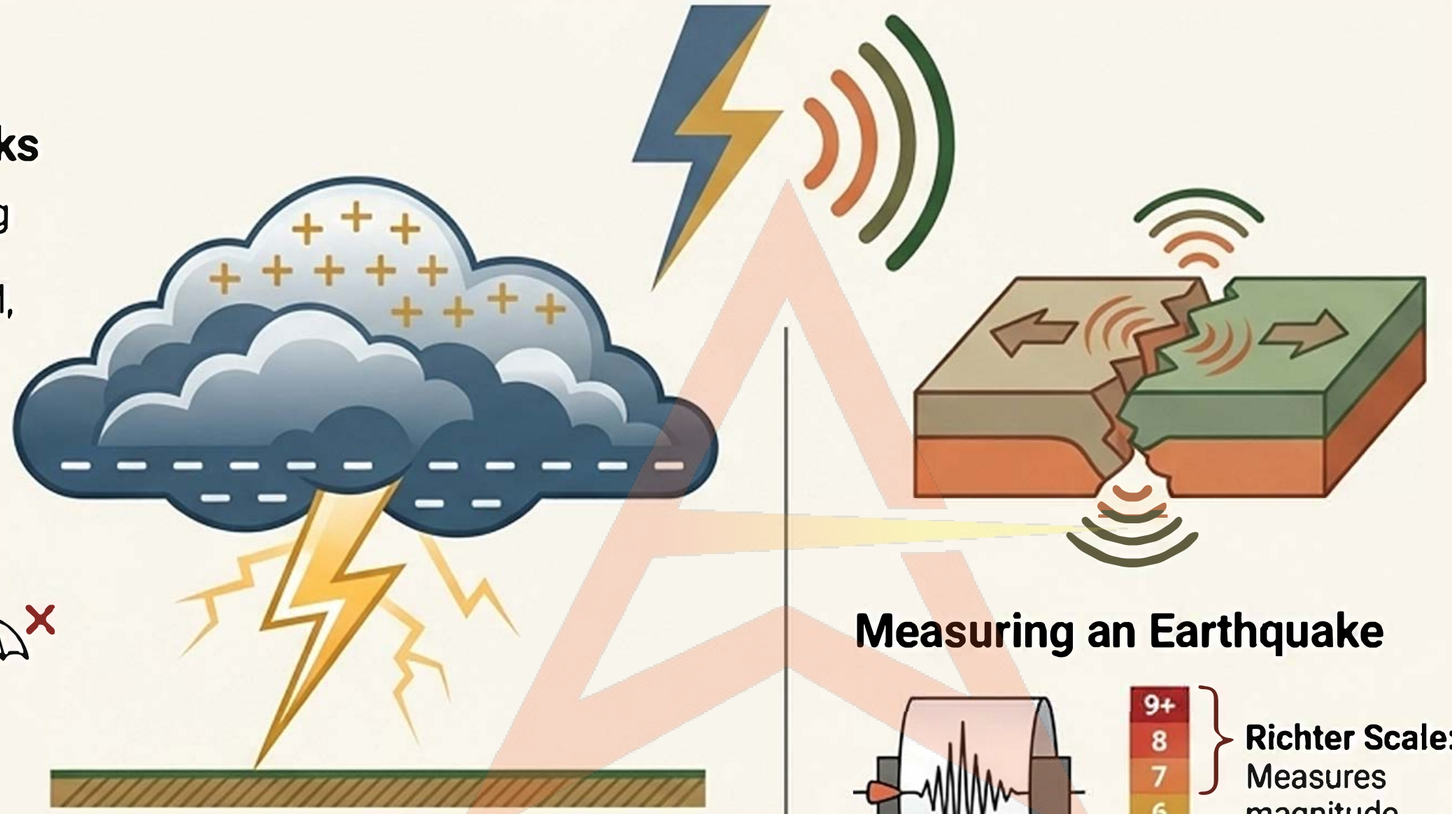
Zinc Coating:
Reason: Protects iron from rusting.

CHAPTER 12: SOME NATURAL PHENOMENA

LIGHTNING

The Science of Sparks

Static Electricity: Rubbing objects can give them a charge. Like charges repel, unlike charges attract.



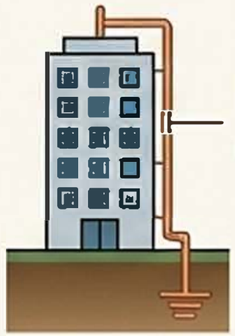
Lightning Safety: Do's and Don'ts

Unsafe

Safe

If Outdoors: Squat low on the ground. Do not lie flat.

Key Concept



Lightning Conductor

Electroscope: A device to detect if an object is charged.

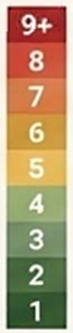
EARTHQUAKES

The Science of Shaking

Cause: A sudden shaking caused by a disturbance deep inside the Earth's Crust when tectonic plates brush past or collide.

Measuring an Earthquake

Seismograph: Records tremors.



Richter Scale: Measures magnitude. Above 7 is very destructive.

Earthquake Safety: What to Do

If Indoors: Hide under a table.

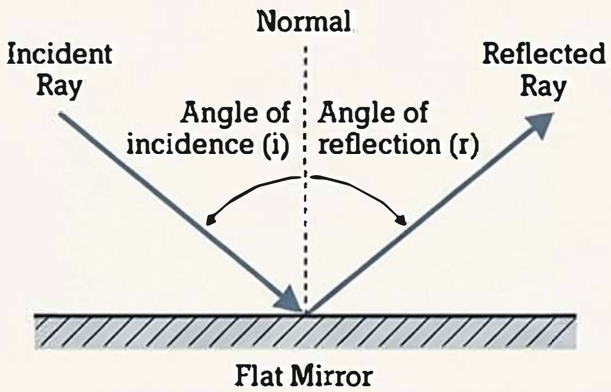
If Outdoors: Stay away from buildings and trees.

Earthing: Transferring charge from a charged object to the earth earth for safety.

CHAPTER 13: LIGHT

The Nature of Reflection

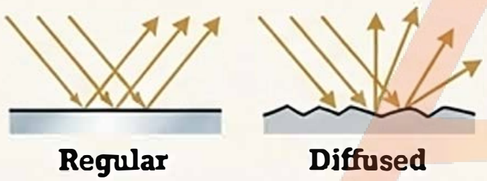
We see things because light bounces off them and enters our eyes.



Laws of Reflection

$$\angle i = \angle r$$

Types of Reflection



Images in a Plane Mirror

Image is erect (upright) and the same size.

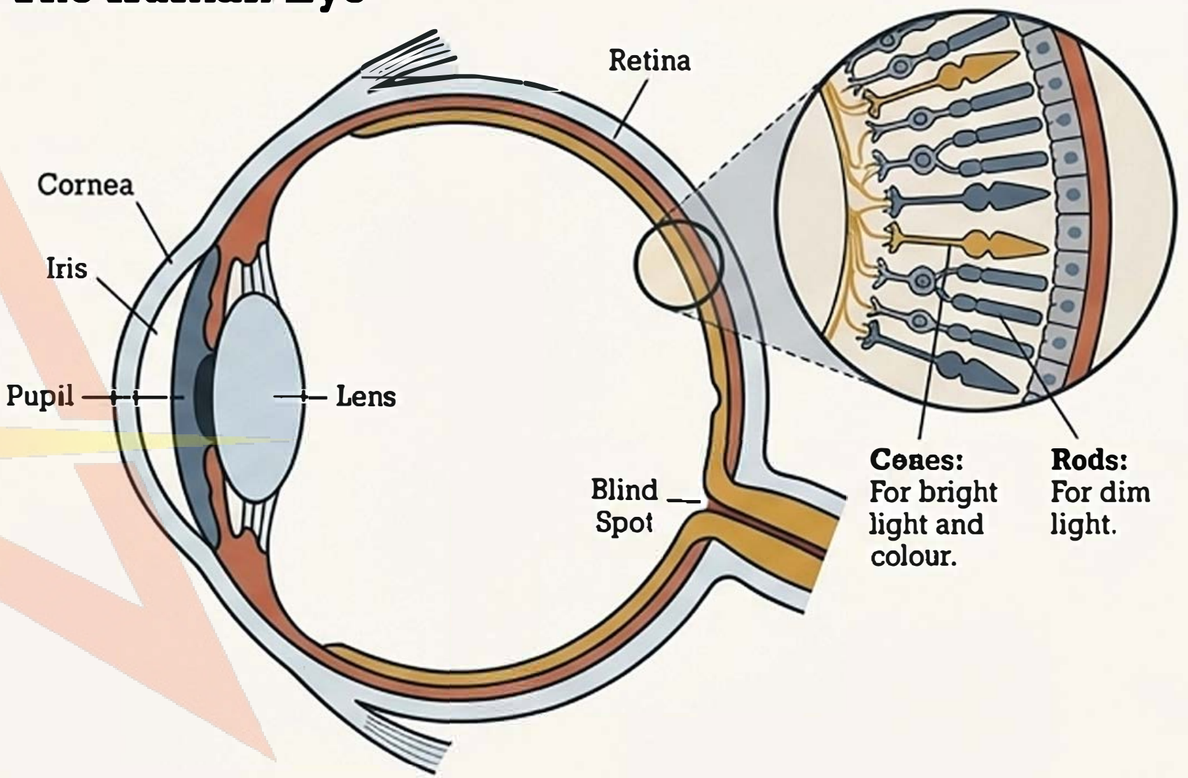
Key Concept Callout

Lateral Inversion

AMBULANCE | AMBULANCE

Left appears right, and right appears left.

The Human Eye



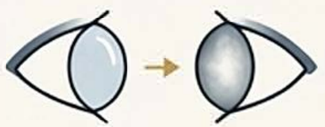
Interesting Light Phenomena

Two mirrors at an angle create multiple images.

Dispersion: Splitting of white light.

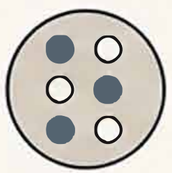
Persistence of Vision: The image stays on the retina for 1/16th of a second. This is how movies work.

Vision Care & Aids



Clear Lens

Cataract
A transparannt opauve lens is a clouding of the lens.



Braille System: A writing system for visually impaired persons using raised dots.