

Metric 2.3.2 - Percentage of teachers integrating ICT (excluding use of PPT) for effective teaching with Learning Management Systems (LMS), Swayam Prabha, e-Learning Resources and others during for the academic years 2023-2024.

Clarification Asked-

HEI has not provided the supporting documents

Response

1. Link to LMS is given below: -

Link- <https://sheeladevicollege.org/teacherlms/>

2023-2024

Appendix-I



SHEELA MULTIPURPOSE SOCIETY

SHEELADEVI COLLEGE OF EDUCATION (B.Ed.)

Recognised by: NCTE New Delhi, Government of Maharashtra & Affiliated to RTM Nagpur University, Nagpur.

WADI (DATTAWADI), NAGPUR-440023

E-mail : sheeladevibedcollege@yahoo.com, sheeladevibedcollege@gmail.com

Coll.Ph.: 07104-222175

Coll. Code : 254

POWER POINT PRESENTATION

PowerPoint presentations are used in many different fields due to their ability to organize and structure information, create a consistent format, and provide the audience with visuals. Educators often use this type of presentation in their classrooms in order to guide the class through a lecture.

Sheeladevi College of Education organized a Workshop on Power Point Presentation on 18, March 2024. All students were participated in this workshop. Dr. Leena Taywade, as Resource Persons of the workshop delivered a comprehensive lecture on various Power Point presentations, which was followed by practical demonstration on making PPT. It was an extensive and effective interactive session.



Place : Wadi, Nagpur

Date : 18/03/2024



Principal

Principal


Sheeladevi College of Education
Wadi, Nagpur-440023.

SHEELADEVI COLLEGE OF EDUCATION

List of Students for the Academic year 2023-24

Sr.No	Name of the Student
1	AISHWARYA DNYANESHWAR JIWTODE
2	AMRUTA JAYPRAKASH SINGH
3	ASHWINI NATTHUJI VAIDYA
4	DIPALI RAJENDRA ANNERWAR
5	DIVYA BHAGATSING BHAVMIRI
6	HEERA RAJESH MANNI
7	JAYA DEVIDAS PAWADE
8	KALYANI FANINDRAKUMAR GAUTAM
9	KARINA AFROJ KHAN
10	KARISHMA BHOJRAM PRSHURAMKAR
11	MEGHA VINAYAK BAGMARE
12	MINAL VILASRAO CHUDHARI
13	NALINI UMAKANT HULKE
14	NEHA NANDKISHOR SAHARE
15	NIDHI MUKESH RATHI
16	NUTAN CHANDRAMOULI KUSHWAHA
17	PALLAVI VIJAY GUNDALWAR
18	PALLAVI YOGRAJ YELE
19	POOJA KESHAVRAO PANSE
20	PRAJAKTA MANIKLAL KHOBRAGADE
21	PRATIKSHA BHARAT SHARMA
22	PRERNA SANJAY MESHRAM
23	PRIYA PUSHRAJ PATHAK
24	PRIYTAMA RAJAN RODGE
25	RANJANA PRAMODRAO SARDAR
26	REETA SUKHDEO KARAMKAR
27	REKHA SHAMRAOJI RAUT
28	RITI BHARDWAJ




Principal
Sheeladevi College of Education
Wadi, Nagpur 23

SHEELADEVI COLLEGE OF EDUCATION

List of Students for the Academic year 2023-24

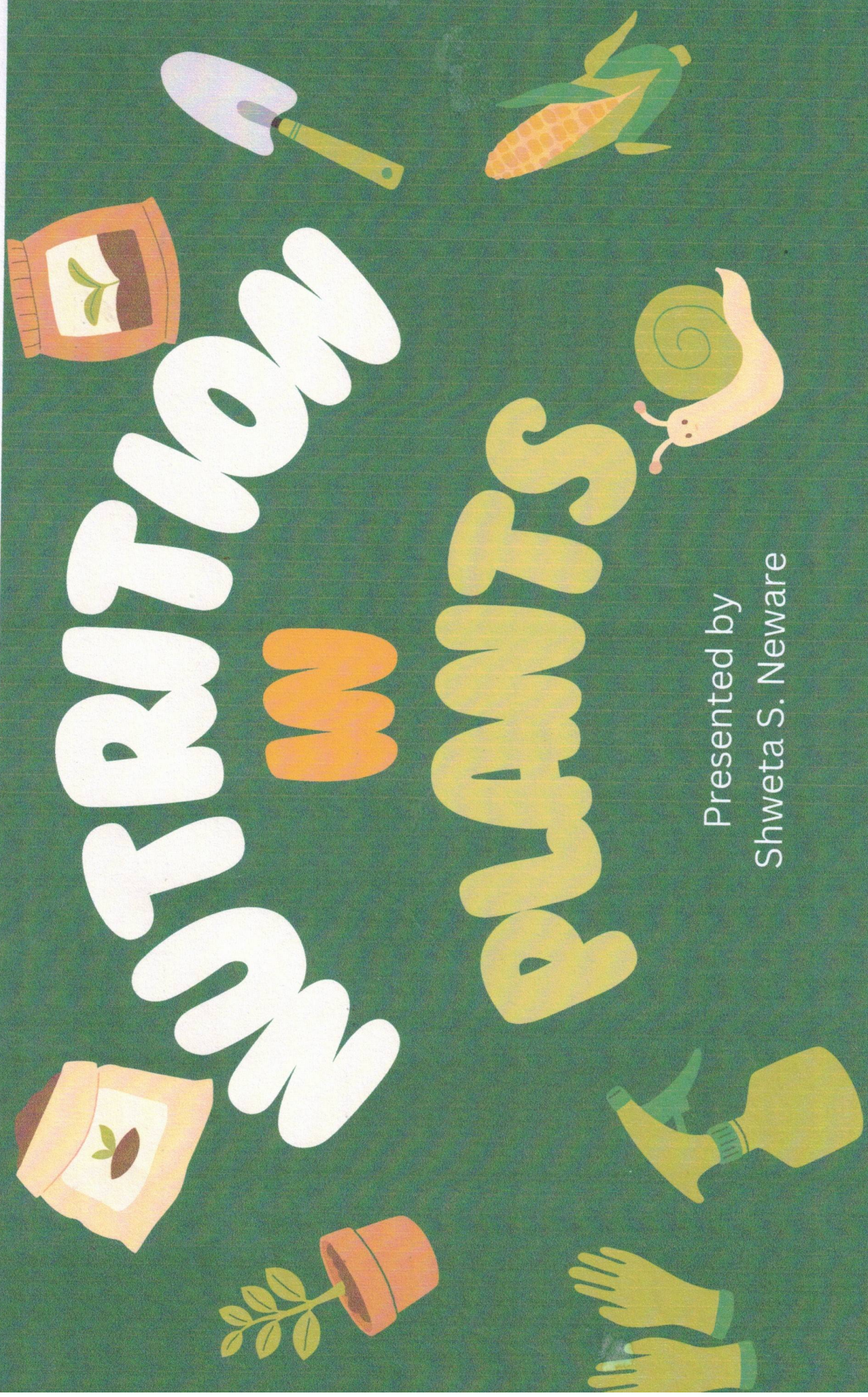
29	ROHAN RAJESH NAGARKAR
30	SANDHYA NAKULESHWAR PANDEY
31	SHABNOOR IZHAR ALI SHEIKH
32	SHARWARI GAJANAN GHAGRE
33	SHILPA ARUN INGLE
34	SHILPI SHAIENDRANATH BARAI
35	SHRIYA ANIL KALE
36	SHUBHANGI PANDHARI SILUTKAR
37	SHUBHANGI SANTOSH KALE
38	SHWETA SHANKARRAO NEWARE
39	SNEHA BHUJANG MEHARE
40	SNEHAL RANGRAO GECHODE
41	SUMAN HANSRAJ THAKUR
42	SUMAN KETAN SUKHDEVE
43	SUPRIYA KEWALRAM GHUTKE
44	SWATI RAJENDRA KASHID
45	TEJASWINI PRADIPRAO ARODE
46	TEJASWINI WANKHEDE
47	TRISHALA PRAKASH GAJBHIYE
48	VAISHALI YADAV BARSAGADE
49	VIBHA BABURAO RAMTEKE
50	VIDHYA VILAS FULKE



B. S. M.

Principal

Sheeladevi College of Education
Wadi Nagpur-23

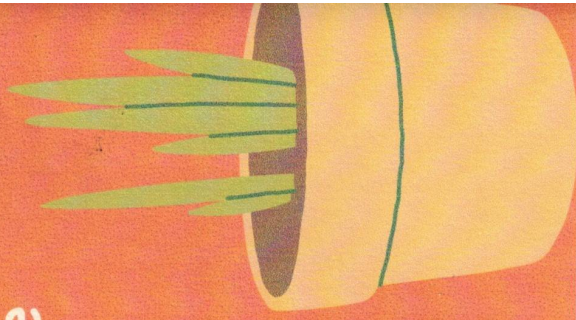


FERTILIZER IN PLANTS

Presented by
Shweta S. Neware

INTRODUCTION

- Living organisms such as plants and animals survive on food.
- The food gives them the energy to perform several activities in their life and helps in the growth.



NUTRIENTS



- Certain substances are present in the foods that help in the survival of the organisms. These special substances are called nutrients for example, proteins, vitamins, carbohydrates, minerals and fats.
- Some living organisms like plants synthesize their food by themselves while others such as animals depend upon the plants and other animals for their food.



CELLS IN LIVING ORGANISMS

Cells are tiny units that help make up a living organism. Hence they are also called building blocks of an organism.

A cell is constituted of three major parts :

- A thin outer layer called the cell membrane.
- A spherical structure located at the centre of the cell called a nucleus.
- A jelly-like substance that surrounds a nucleus called the cytoplasm.



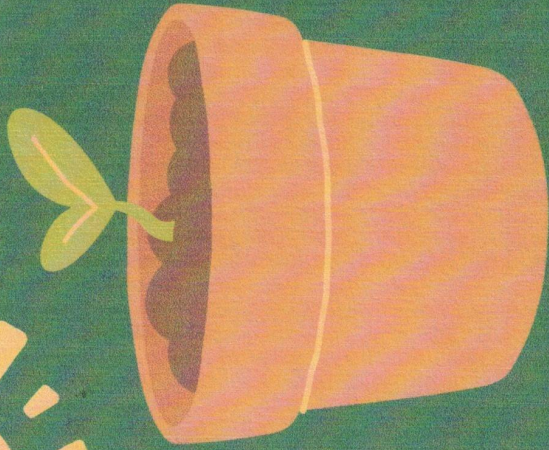
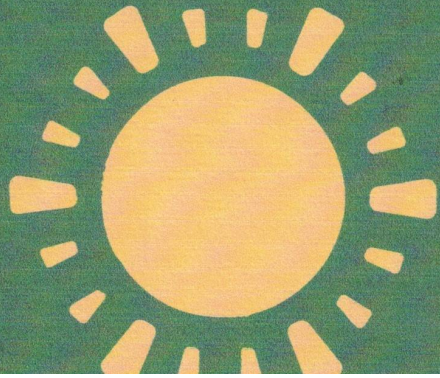
SOIL

Soil holds the plants
up. Roots grow down
into the soil. Soil
provides nutrients and
water.



SUNLIGHT

Plants require sunlight as their energy source for photosynthesis, a process which converts carbon dioxide and water into glucose.



WATER

Water helps move nutrients from the soil into the plant.

Too much water can cause a plant's roots to rot. Too little water can cause a plant to wilt or droop.



AIR

Plants need oxygen to make food and to have energy. Plants cells release their own energy by breaking down sugars and using up oxygen.

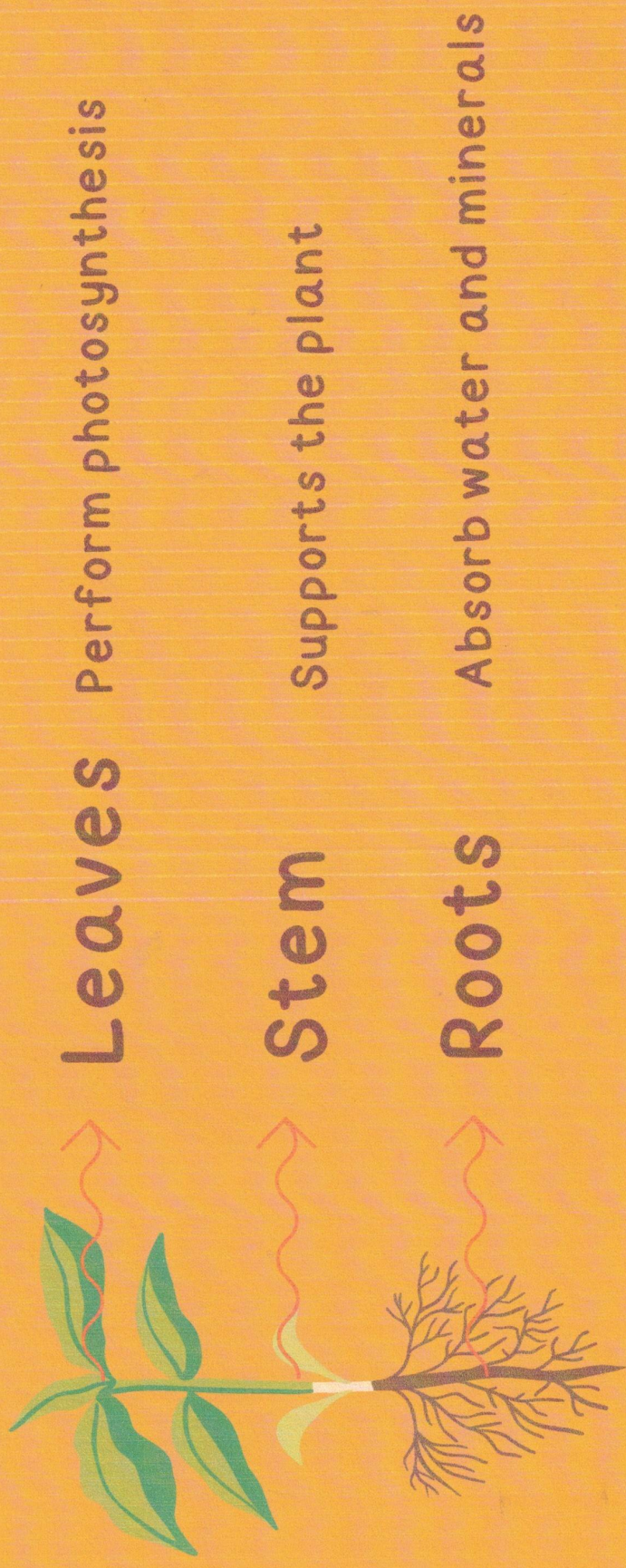




NUTRIENTS

Plants need nutrients in order to germinate, grow, fight off pests and reproduce.

Each part has a specific job
in order to keep the plant healthy:



HOW DO PLANTS PREPARE THEIR FOOD?

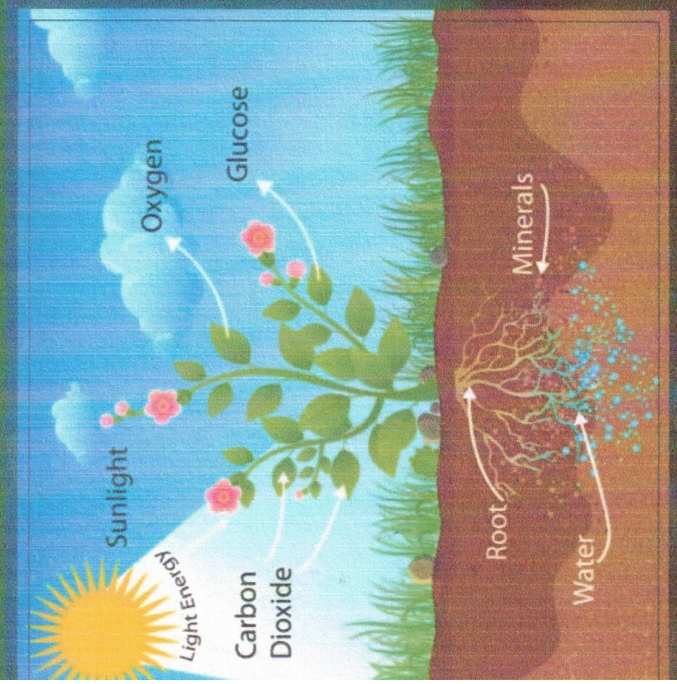
Plants prepare their food with the help of certain raw materials that they gather from their surroundings:

- Water
- Carbon Dioxide
- Sunlight
- Minerals
- Chlorophyll

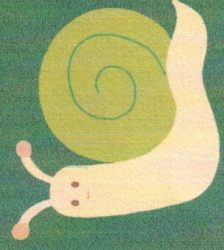
The process by which plants prepare their food by using these raw materials is called Photosynthesis.



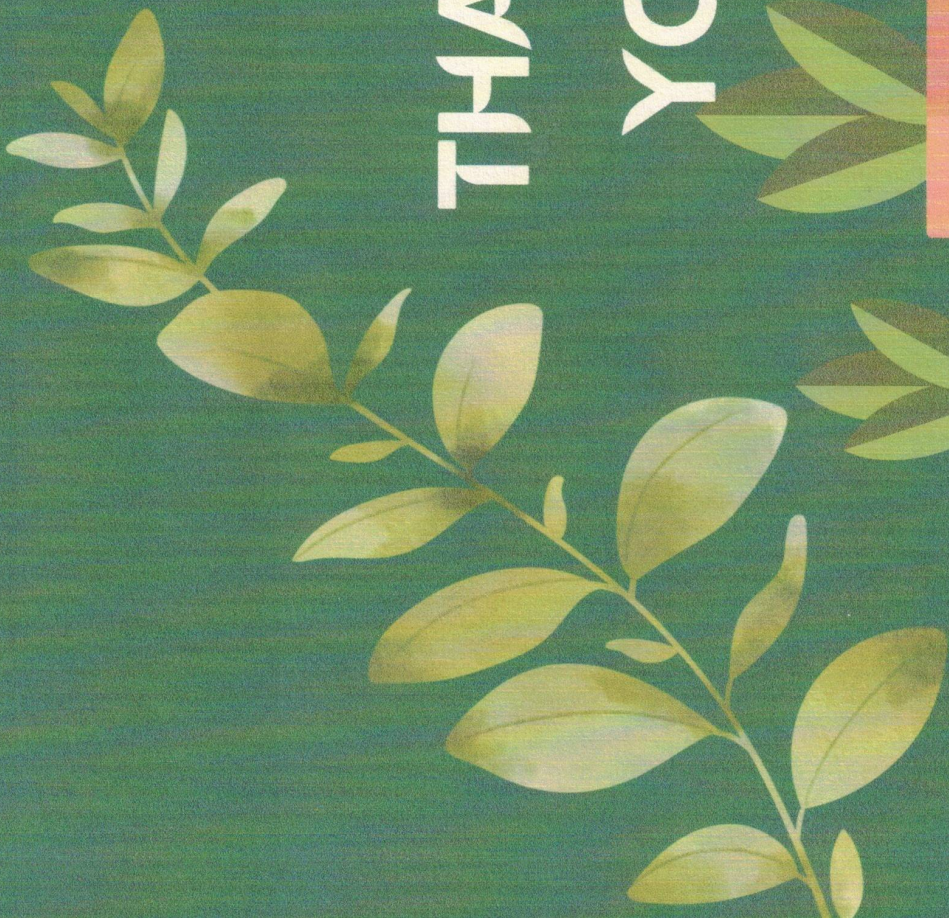
PROCESS OF PHOTOSYNTHESIS



- Carbon dioxide is taken in through tiny pores on the leaves called stomata.
- Water and minerals that are required for the process are transported to the leaves from the roots through the stem.
- Chlorophyll helps the leaves use the energy from the sunlight to prepare food using the carbon dioxide, water and minerals.
- Oxygen is released as a by-product from this process.



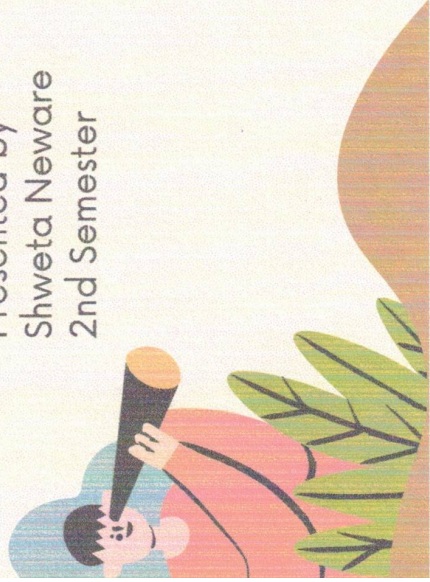
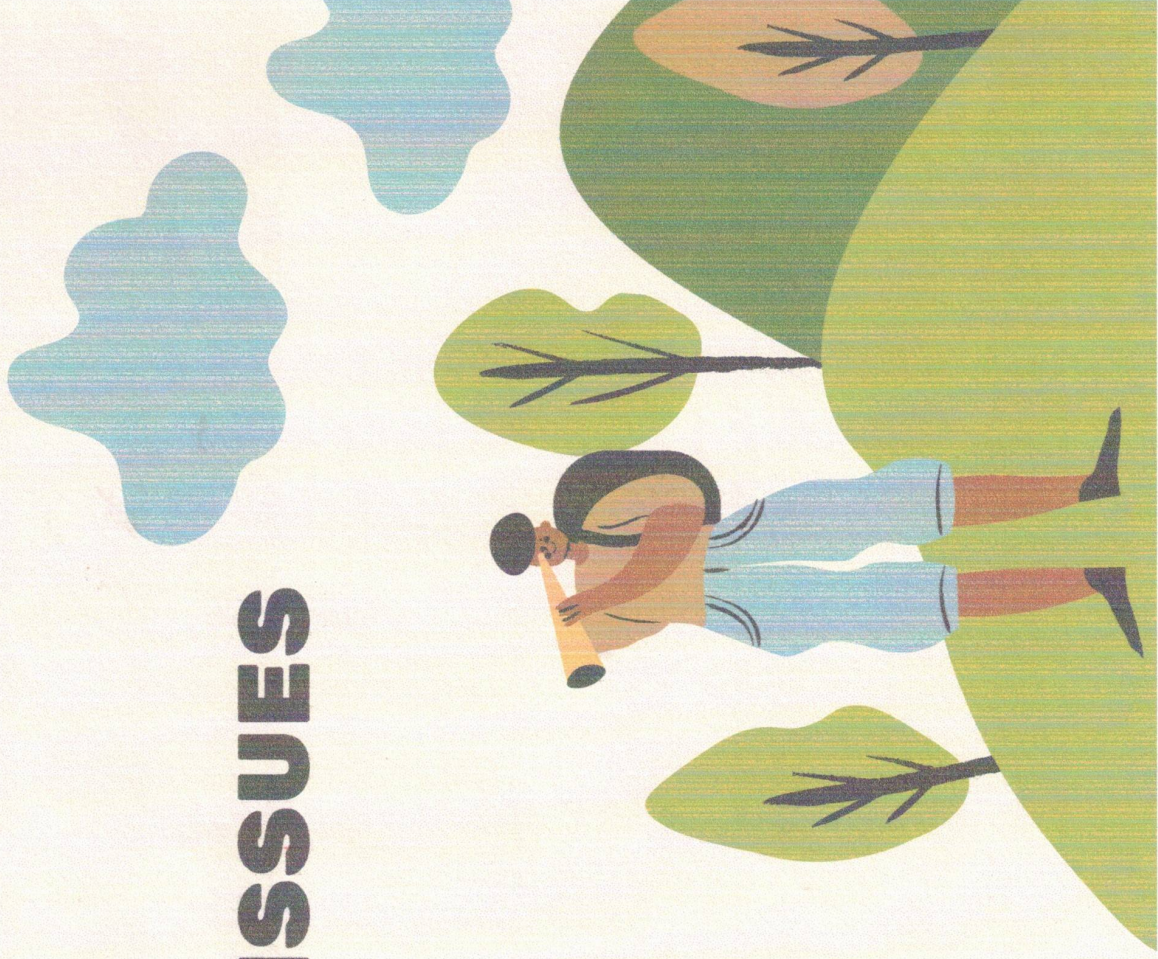
THANK
YOU



UNDERSTANDING ENVIRONMENTAL ISSUES

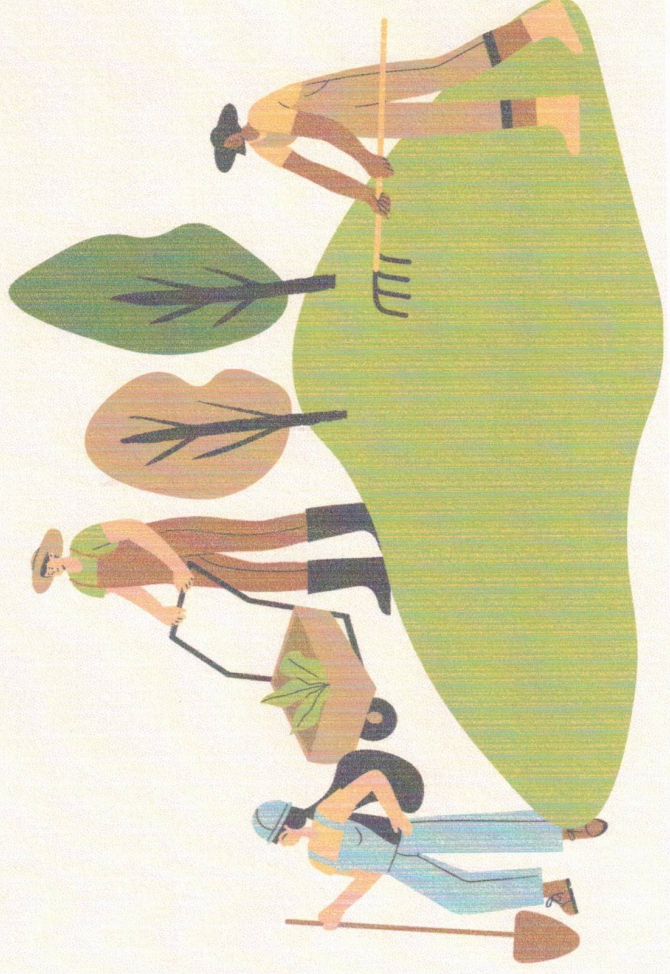
Environmental issues encompass a wide range of challenges facing our planet, from climate change and pollution to deforestation and loss of biodiversity.

Presented by
Shweta Neware
2nd Semester



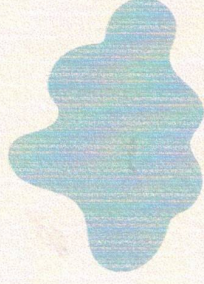
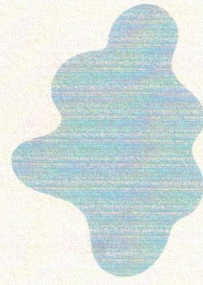
MAJOR ENVIRONMENTAL ISSUES

- Global Warming and Climate Change
- Air Pollution
- Water Pollution
- Deforestation
- Biodiversity Loss
- Waste Management



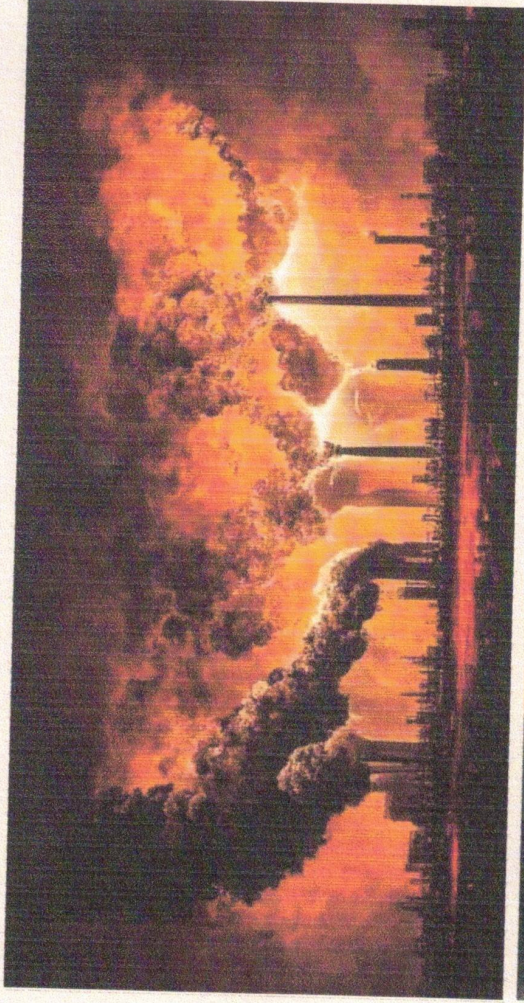
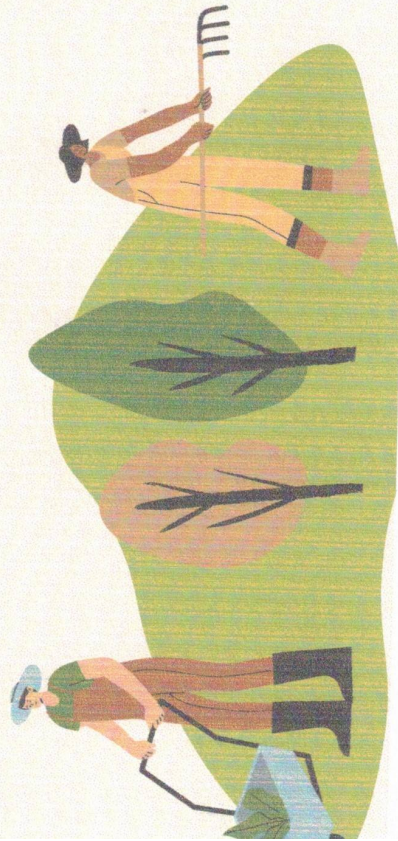
CLIMATE CHANGE

This refers to long-term shifts in temperature, precipitation patterns, and other aspects of Earth's climate. Human activities, such as burning fossil fuels and deforestation, are major contributors to climate change, leading to rising global temperatures, sea level rise, extreme weather events, and disruption of ecosystems.



AIR POLLUTION

Emissions from vehicles, industrial processes, and burning fossil fuels contribute to air pollution, which can have serious health effects on humans and animals. Common air pollutants include particulate matter, nitrogen oxides, sulfur dioxide, and volatile organic compounds.



WATER POLLUTION

Water pollution is the contamination of water bodies (such as rivers, lakes, oceans, groundwater, and aquifers) by harmful substances, making it unfit for intended use and harmful to ecosystems and human health.



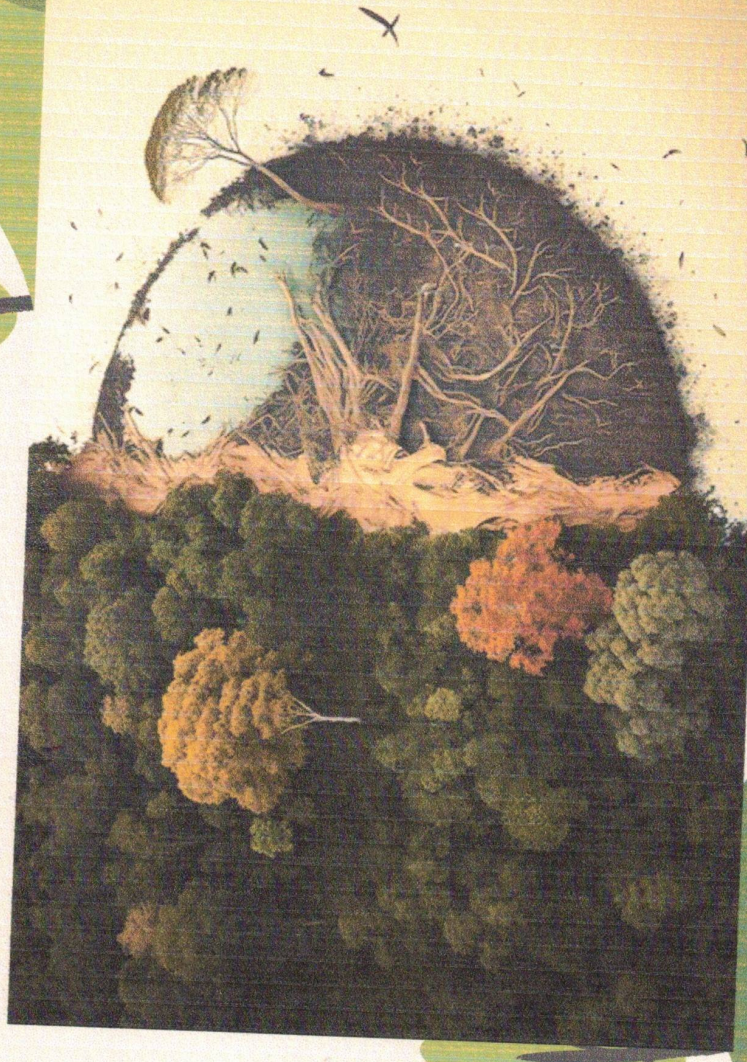
DEFORESTATION

The clearing of forests for agriculture, logging, and urban development is a significant driver of habitat loss, biodiversity decline, and climate change. Deforestation disrupts ecosystems, contributes to greenhouse gas emissions, and reduces the planet's capacity to absorb carbon dioxide.



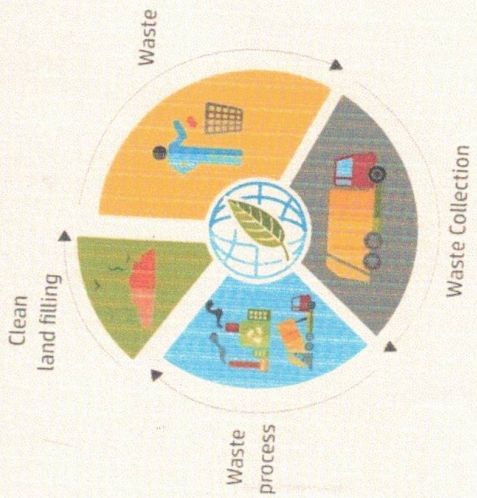
LOSS OF BIODIVERSITY

Loss of Biodiversity: Human activities, such as habitat destruction, overexploitation of natural resources, pollution, and climate change, are causing a rapid decline in biodiversity. This loss of species diversity threatens ecosystems, disrupts food chains, and reduces the resilience of ecosystems to environmental changes.



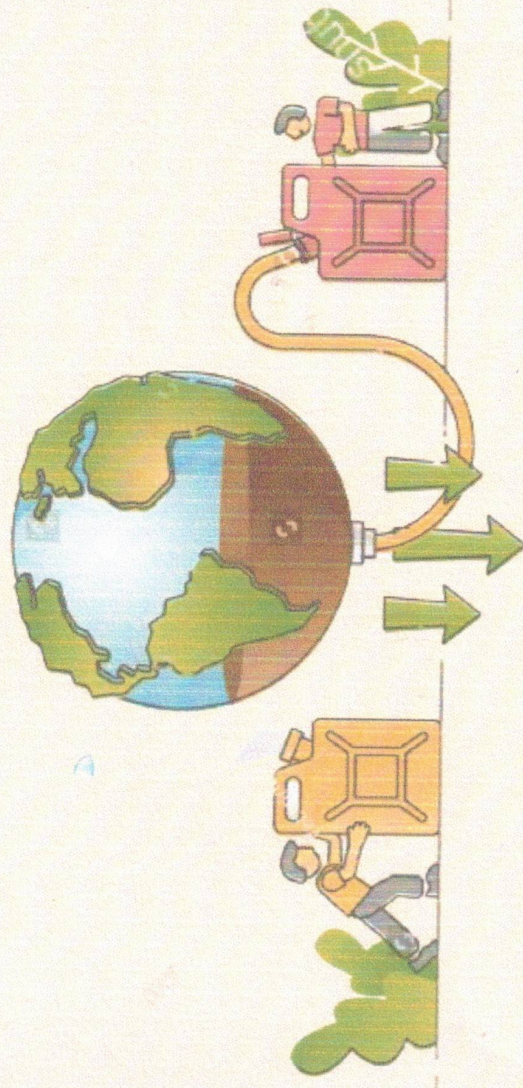
WASTE MANAGEMENT

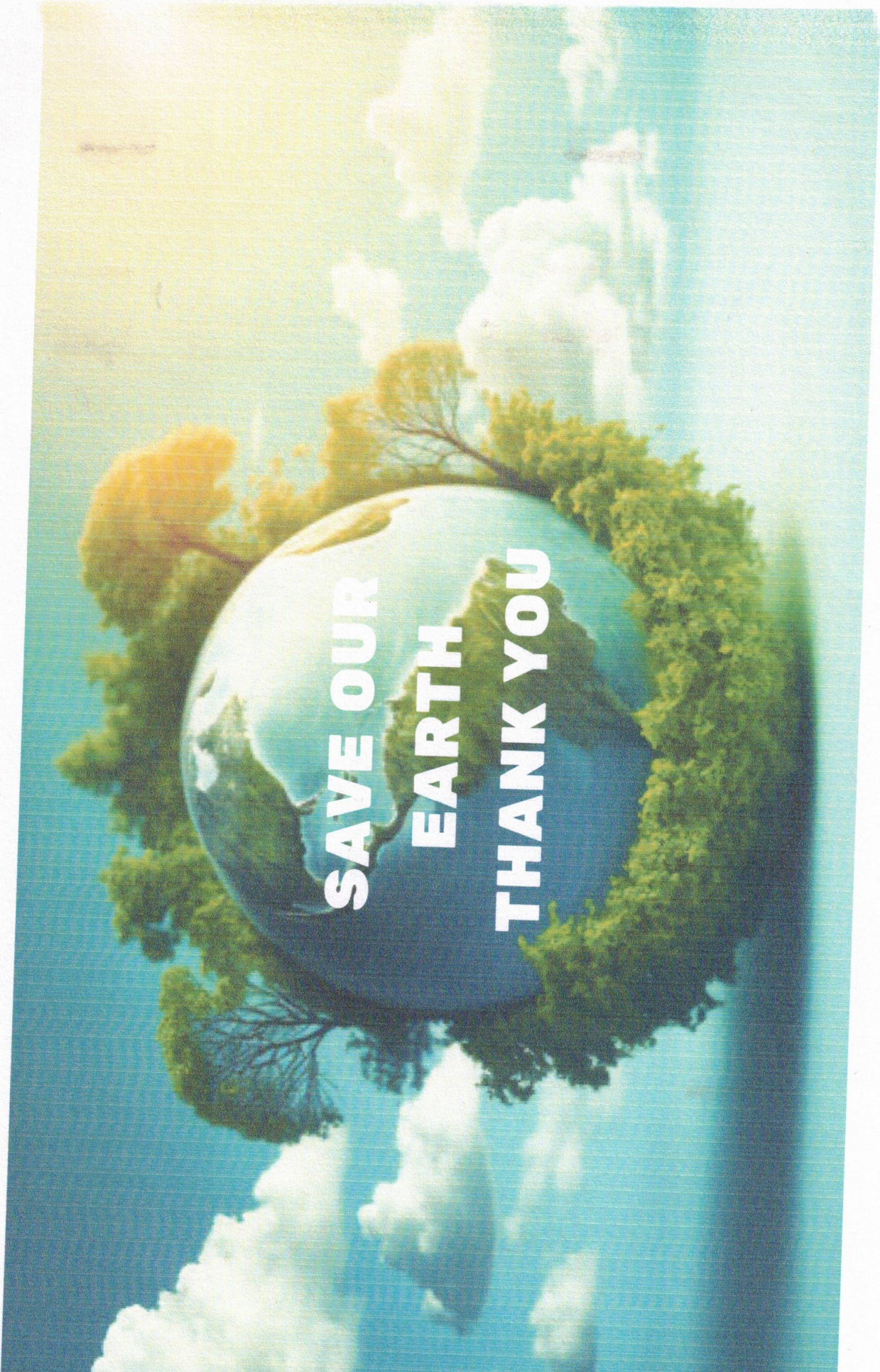
Improper disposal of waste, including plastic pollution, electronic waste, and hazardous materials, poses environmental and health risks. Landfills, incineration, and littering contribute to soil and water pollution, harm wildlife, and degrade landscapes.



RESOURCE DEPLETION

The unsustainable extraction and consumption of natural resources, such as fossil fuels, minerals, and freshwater, are depleting finite resources and causing environmental degradation. Transitioning to renewable energy sources and adopting sustainable resource management practices are crucial for mitigating this issue.



A central globe is surrounded by a ring of various trees, including a large tree with orange leaves on the left and several green trees on the right. The background is a bright blue sky with white, fluffy clouds. The text is printed in white, bold, sans-serif capital letters across the center of the globe.

**SAVE OUR
EARTH
THANK YOU**

SHRIYA KALE

B.Ed. SEM II

EPC - 3

SHILADEVI

COLLEGE, WADI

EPC 3

Method- 1 BIOLOGY

Semester- II

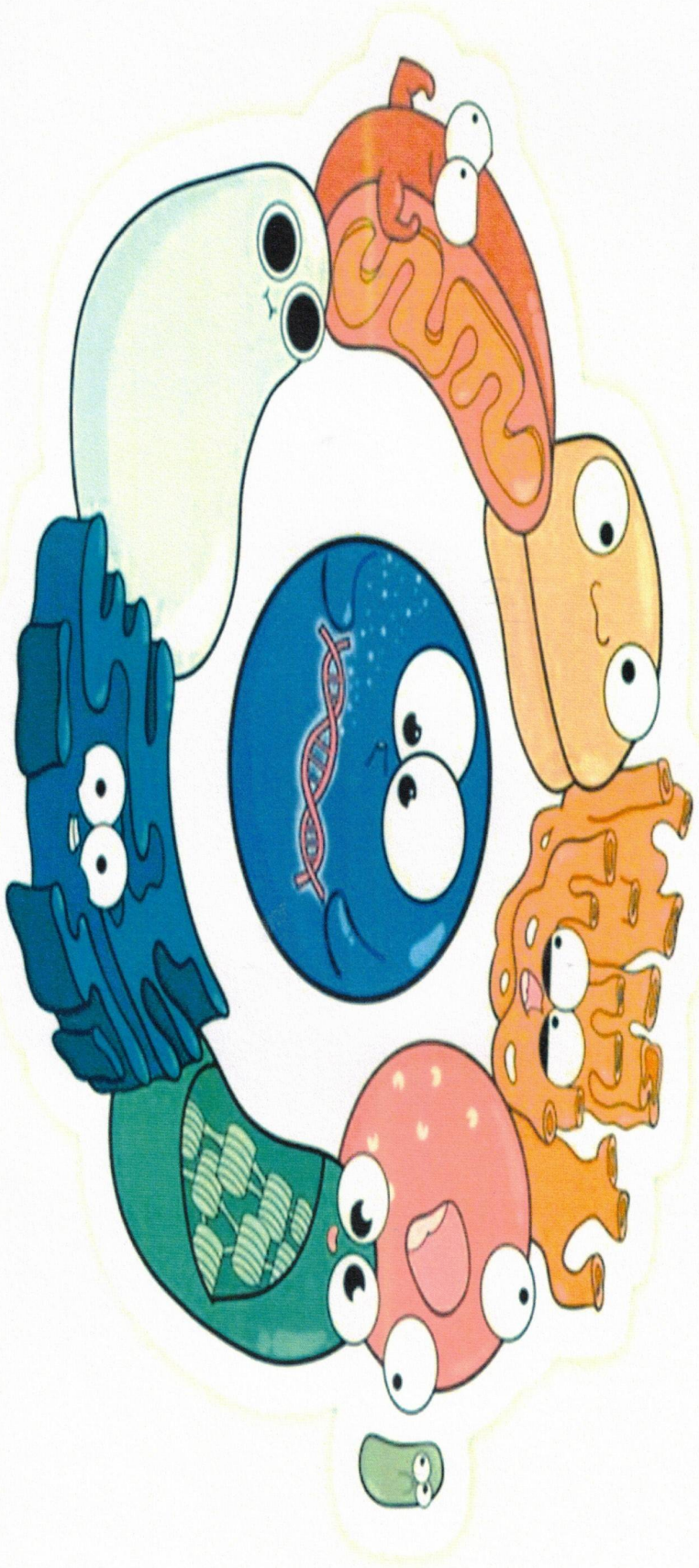
**Topic- Cells and cell organelles
(Class- 8th)**

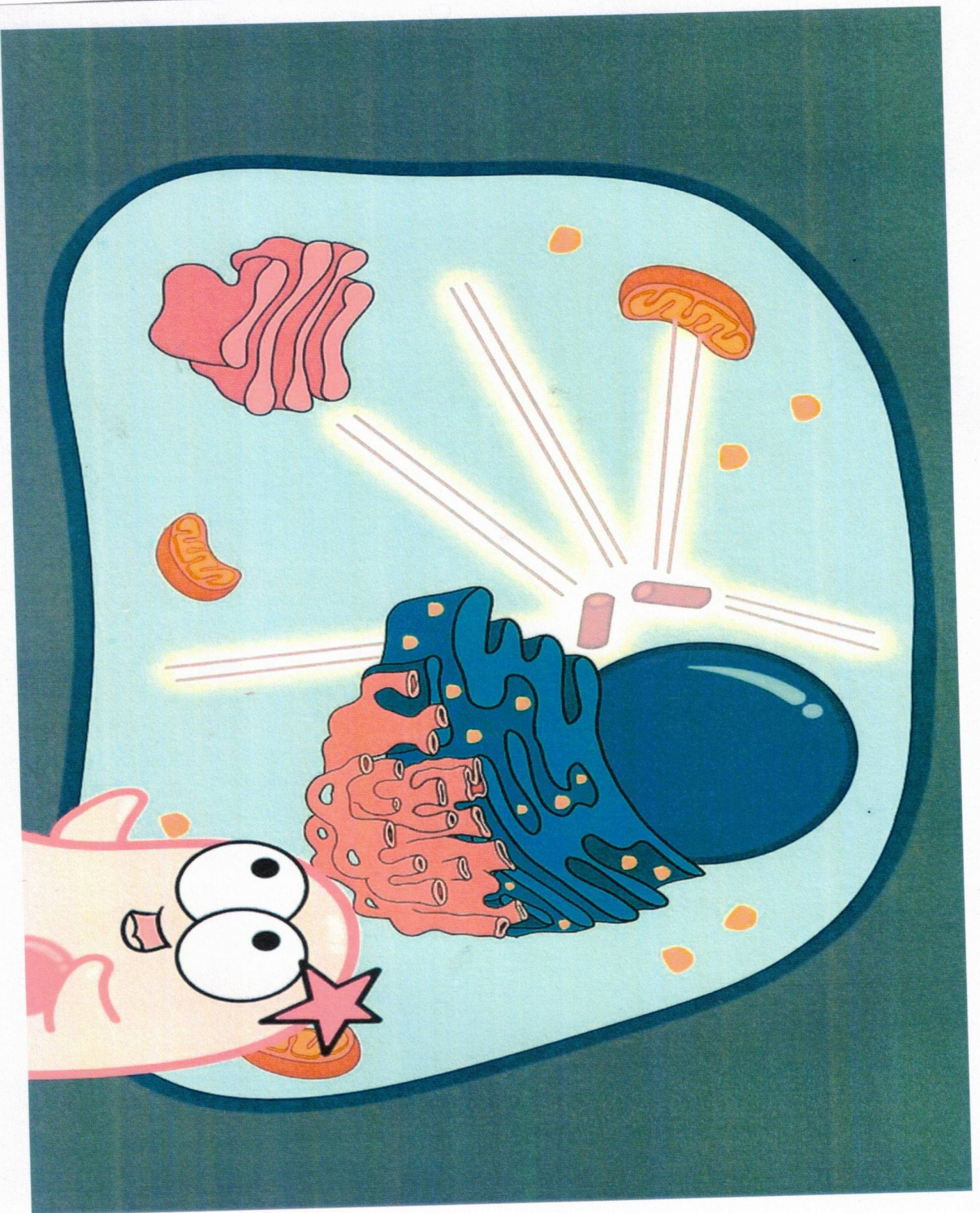
Presented by

Shriya A. Kale

**Shiladevi College of Education, Wadi
Nagpur- 440012**

CELLS AND CELL ORGANELLES





□ Contents

- ✓ Introduction (3)
- ✓ Eukaryotic cell (4)
- ✓ Prokaryotic cell (4)
- ✓ Animal and plant cell (6, 7)
- ✓ Components of a cell
- ✓ Cell organelles (11)
- Nucleus (12)
- Endoplasmic reticulum (13)
- Golgi complex (15)
- Mitochondria (16)
- Vacuole (17)
- Chloroplast (18)

Introduction

- A cell is the basic unit of life, functioning as the smallest structural and functional unit of all living organisms.
- The term "cell" was coined by the English scientist Robert Hooke in the 17th century when he observed cork cells under a simple microscope.
- Today we use more advanced tools like compound microscopes to observe cells in detail.



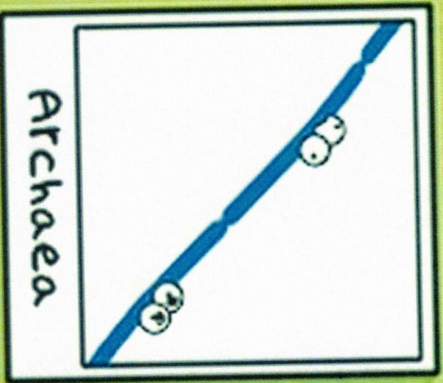
Difference between prokaryotic and eukaryotic cell

Prokaryotic cell

- Size- 1-10 mm
- Number of chromosomes- Only one
- Nucleus- nucleoid resembling nucleus
- Mitochondria- They don't have membrane bound cell organelles
- E.g. bacteria

Eukaryotic cell

- Size- 5- 100 mm
- Number of chromosomes- more than one
- Nucleus- with nuclear membrane, nucleolus and nucleoplasm
- Mitochondria- present
- E.g.- multicellular and unicellular plants and animals

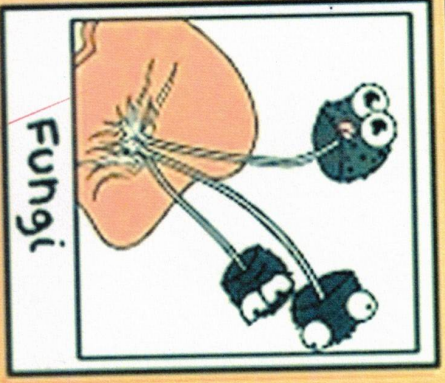
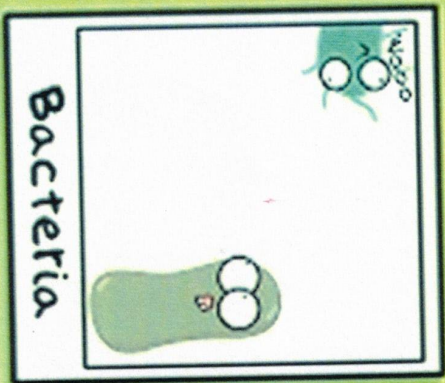


PROKARYOTES

Pro- = "Before"

Karyo- = "Nucleus"

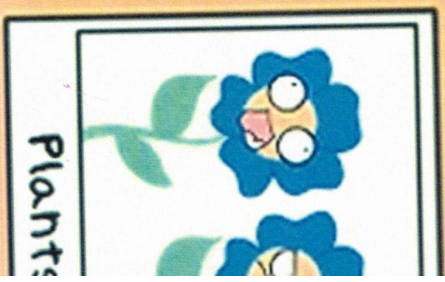
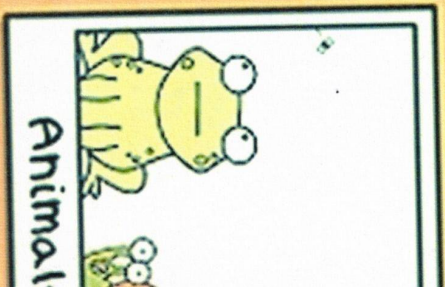
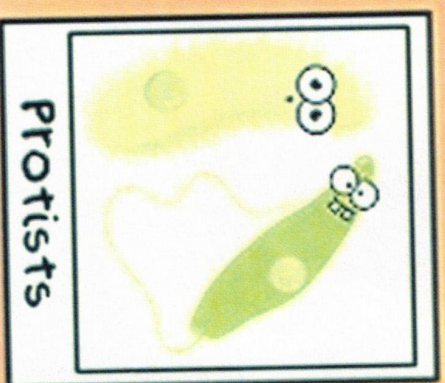
#AmoebaGIFs
@AmoebaSisters



EUKARYOTES

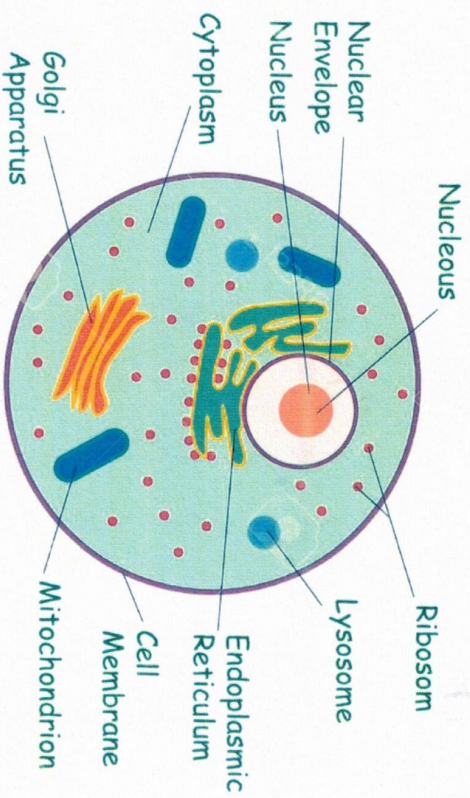
Eu- = "True"

Karyo- = "Nucleus"



Animal cell

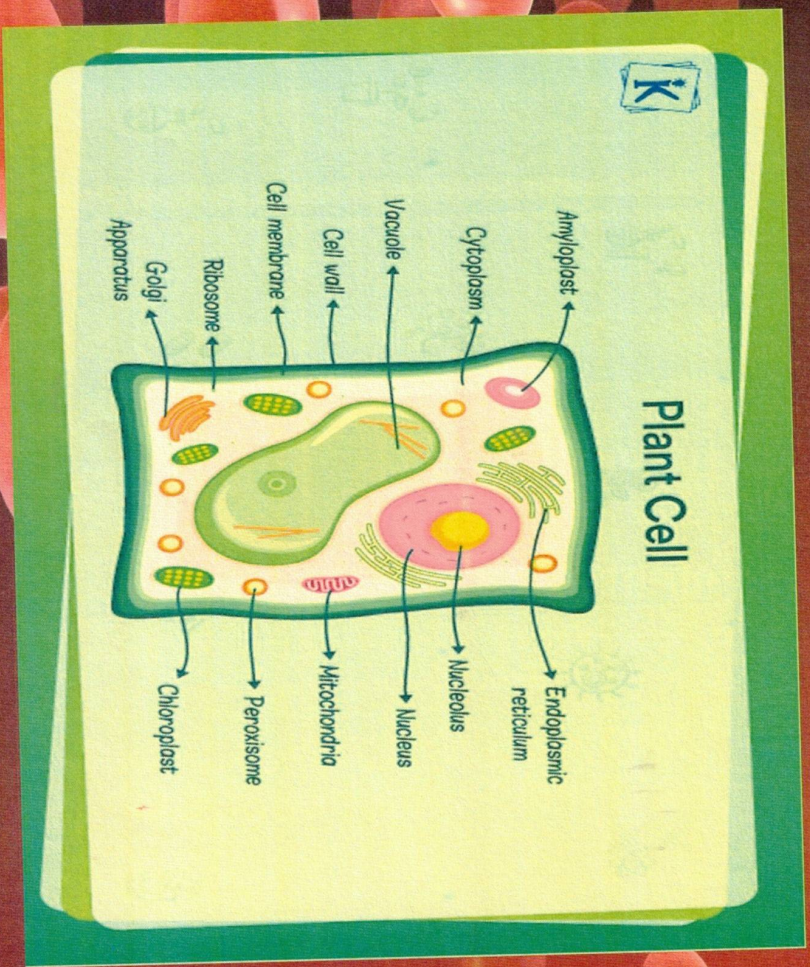
Animal Cell



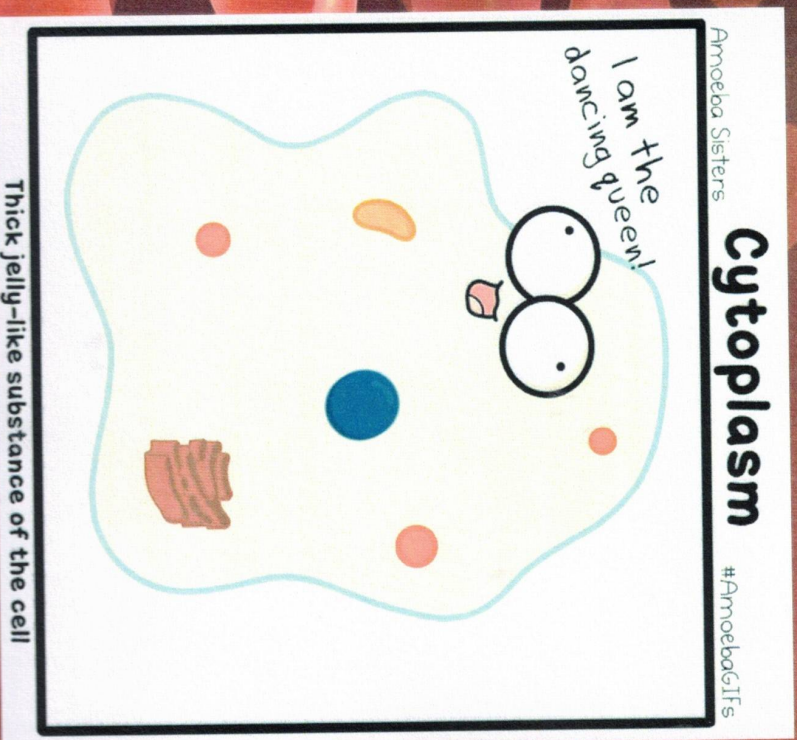
- Cell wall is absent.
- They lack chloroplasts.
- Smaller vacuoles or none.
- The shape are typically rounded or irregular.
- Have centrioles, which are involved in cell division (mitoaida and meiosis).
- Plastids are absent.
- Contains lysosomes, which are involved in digestion and waste removal.

Plant cell

- They have rigid cell wall composed of cellulose outside the cell membrane.
- Contains chloroplasts, responsible for photosynthesis.
- Have a large vacuole that stores water, nutrients and waste products.
- Centrioles are absent.
- May contain many types of plastids- amyloplasts and chromoplasts.
- Lysosomes- fewer or less prominent ones.

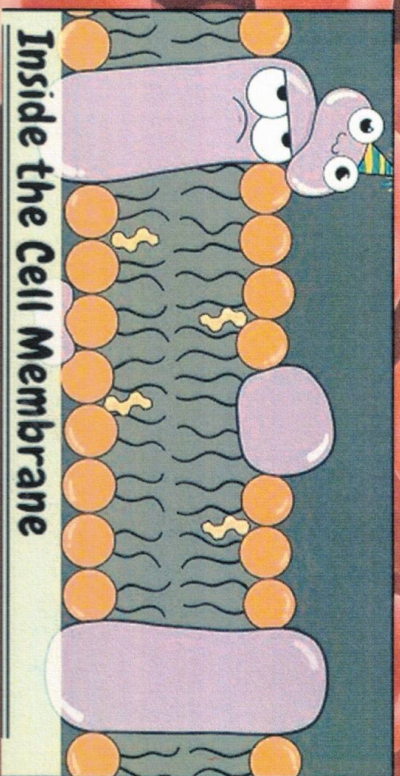
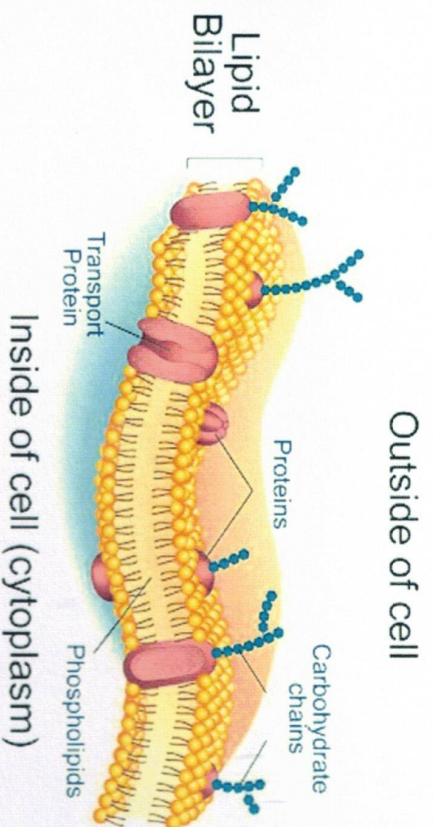


Components of a cell



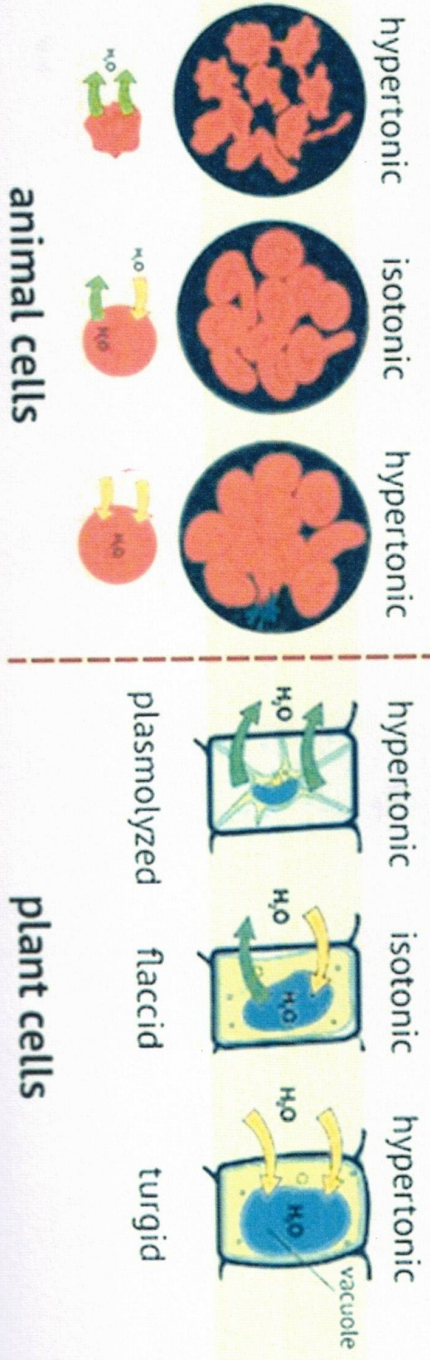
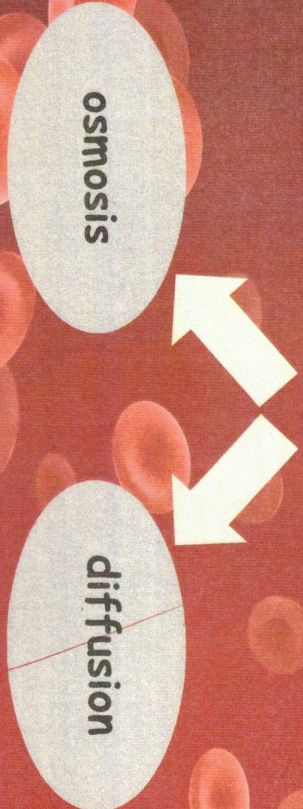
- **Cell wall** - found around the cells. Only present in plant cell. Composed of carbohydrates like cellulose and pectin. The function of the cell is to give support to the cell and protect the cell by preventing entry of excess water in the cell.
- **Cytoplasm** - it is a jelly-like substance found inside cells, filling the space between the cell membrane and the nucleus. It is a bustling environment where many cellular processes take place, such as protein synthesis and metabolism.

Structure of the Cell Membrane



- Plasma membrane - thin, fragile and elastic covering that separates cell components from outer environments.
- Protein molecules are embedded in two layers of phospholipids.
- It is selectively permeable.
- Useful molecules - salt, water and oxygen enter the cell and CO_2 exits the cell.
- The cellular environment does not change due to plasma membrane.
- This is called homeostasis.

Processes that don't consume cellular energy



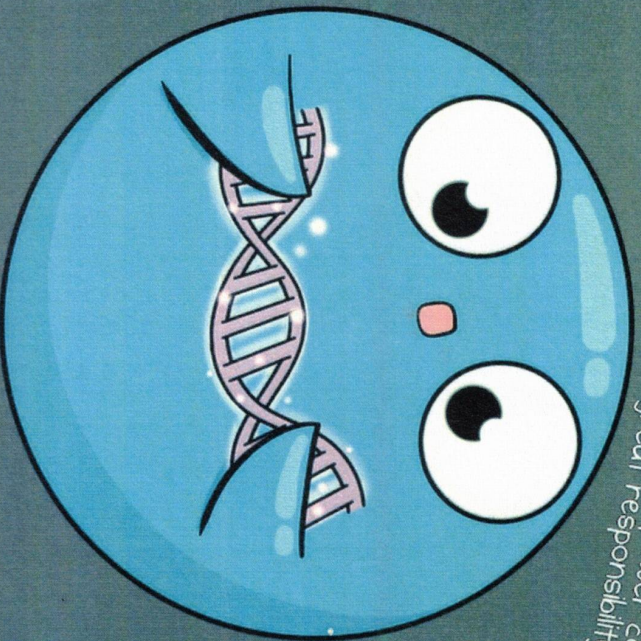
Cell organelles

- An organelle is a specialized subunit having a specialized function within the cell.
- They are the 'organs of the cell.'
- Each organ has its own lipoprotein membrane.
- Each organelle plays a unique role in maintaining the cell's homeostasis and carrying out essential processes.
- The cell organelles are - nucleus, mitochondria, endoplasmic reticulum, Golgi apparatus, lysosomes and chloroplasts in plant cells.
- Together, they work in harmony to ensure the cell's survival and proper functioning.

Nucleus

Nucleus

With great power comes great responsibility...



@AmoebaSisters

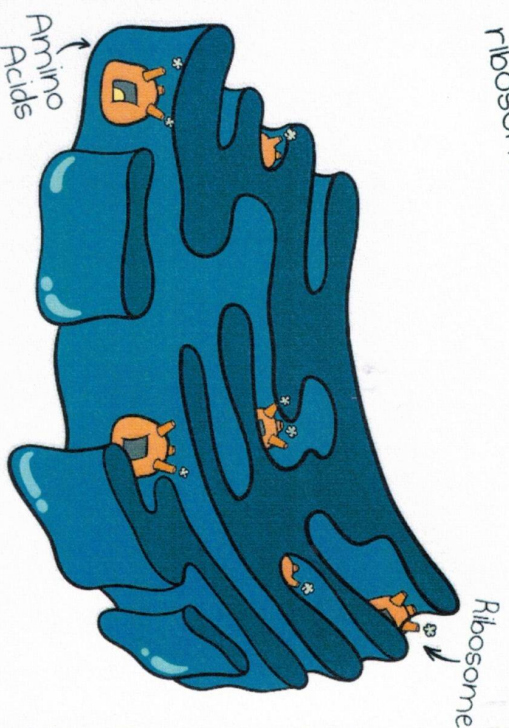
Genetic information bearer of the cell

- The command center of the cell, housing the cell's genetic material, **DNA**.
- Nucleus has one round **nucleolus** and a network of **chromatin fibres**.
- Functional segments on chromosomes are called **genes**.
- **Functions:**
 - ✓ Controls all metabolic activities of the cell and also the cell division.
 - ✓ Involved in the transmission of hereditary characters from parents to offspring.

Endoplasmic reticulum (ER)

ROUGH ENDOPLASMIC RETICULUM

"Rough" with ribosomes!



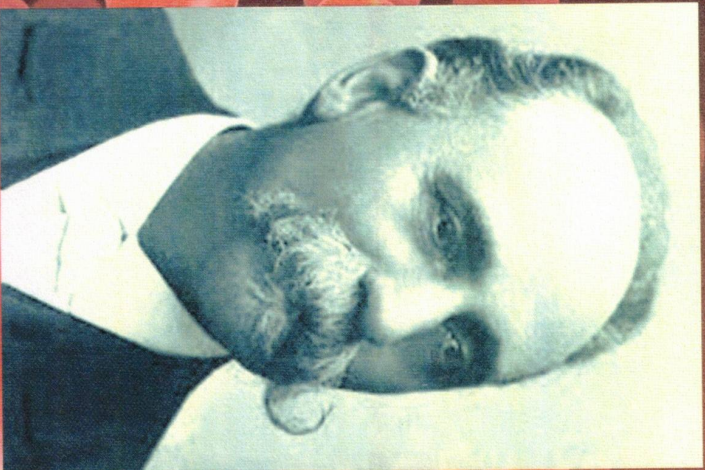
@AmoebaSisters

Protein assembly line of the cell

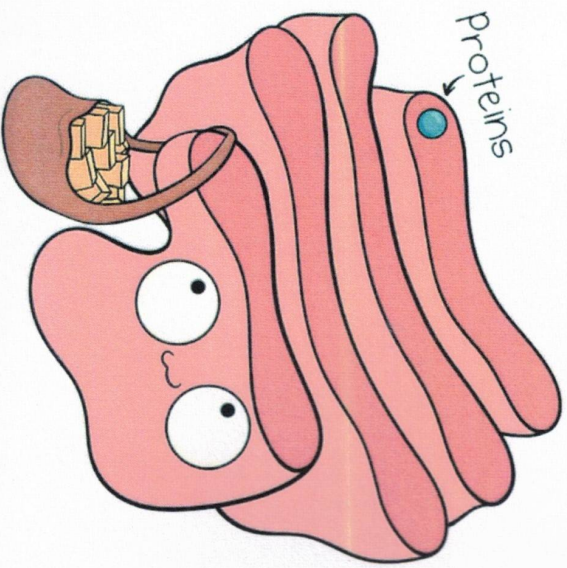
- Conducts various substances inside the cell.
 - ER has a net like structure consisting of interconnected miniature tubes and sheets filled with fluid.
 - It is connected to the nucleus from inner side to plasma membrane on the outer side.
 - There are **two types**:
 - ✓ Rough ER (ribosomes present)
 - ✓ Smooth ER (no ribosomes)
- Functions:
- ✓ Framework that supports the cell.
 - ✓ Flushes out toxins that entered the body.

Golgi complex

- Camillo Golgi described it for the first time.
- The Golgi complex is made up of 5-8 hollow and flat sacs placed **parallel** to each other.
- These sacs are called 'cisternae' and are filled with different enzymes.
- Proteins coming from ER are enclosed in vesicles, which come towards Golgi complex via cytoplasm.
- They fuse with the formation face of the Golgi membranes and empty their contents in the cisternae.
- It works like a packing department that packs and distributes substances.



GOLGI APPARATUS



@AmoebaSystems

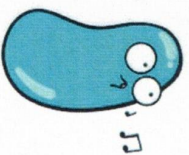
Post office of the cell

➤ Functions:

- ✓ Secretory organ of the cell.
- ✓ Modifies, sorts and packs materials synthesized in the cell and dispatches them to various targets like plasma membrane, lysosome, etc.
- ✓ Produces vacuoles and secretory vesicles.
- ✓ Helps in the formation of the cell wall, plasma membrane and lysosomes.

Lysosomes

Lysosome

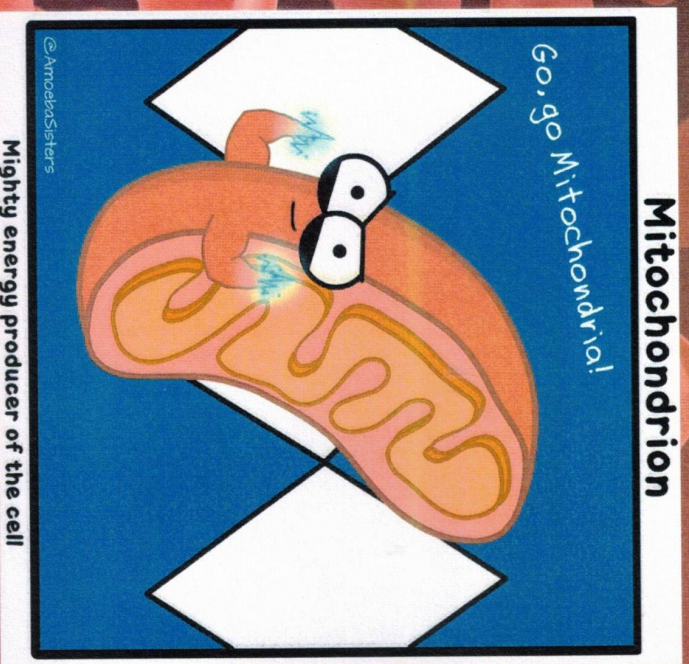


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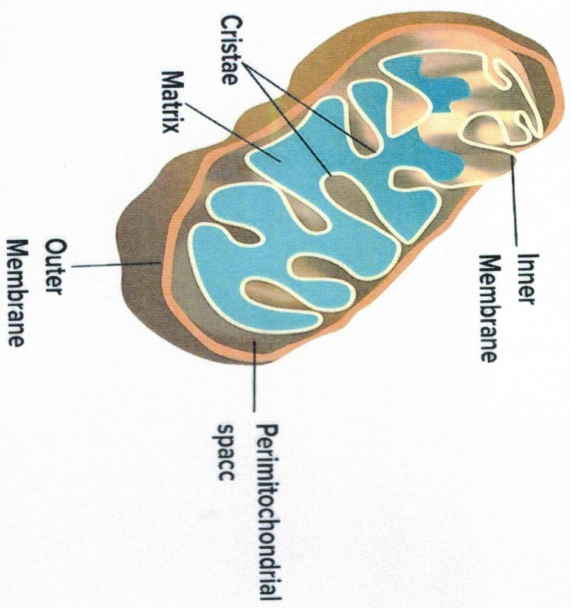
Enzyme-packed wrecking balls of the cell

- Lysosomes digest the waste.
- They are simple, single membrane bound sacs filled with digestive enzymes.
- Functions:
 - ✓ Destroys viruses and bacteria that attack the cell.
 - ✓ Destroys worn out cellular organelles and organic debris (Autolysis).
 - ✓ Called suicidal bags.
 - ✓ During starvation, lysosomes digest store proteins, fats.

Mitochondria

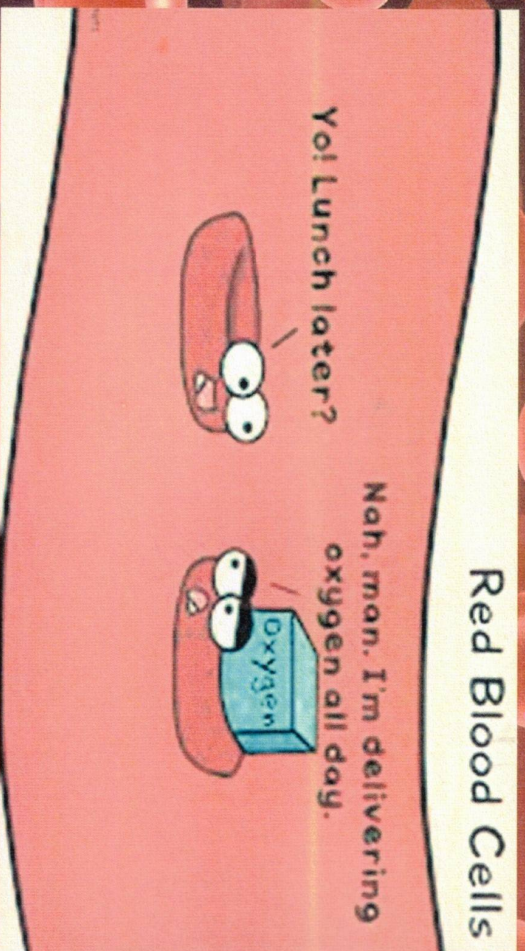


- Produces energy.
- Double membrane structure.
- Outer membrane is porous, inner membrane deeply folded. Folds are called 'cristae'.
- inner cavity filled with proteinaceous gel like matrix (ribosomes, phosphate granules, DNA). Therefore it can produce proteins.
- With the help of enzymes, mitochondria oxidise carbohydrates and fats in the cell.
- Energy is stored in the form of ATP (Adenosine Tri Phosphate).



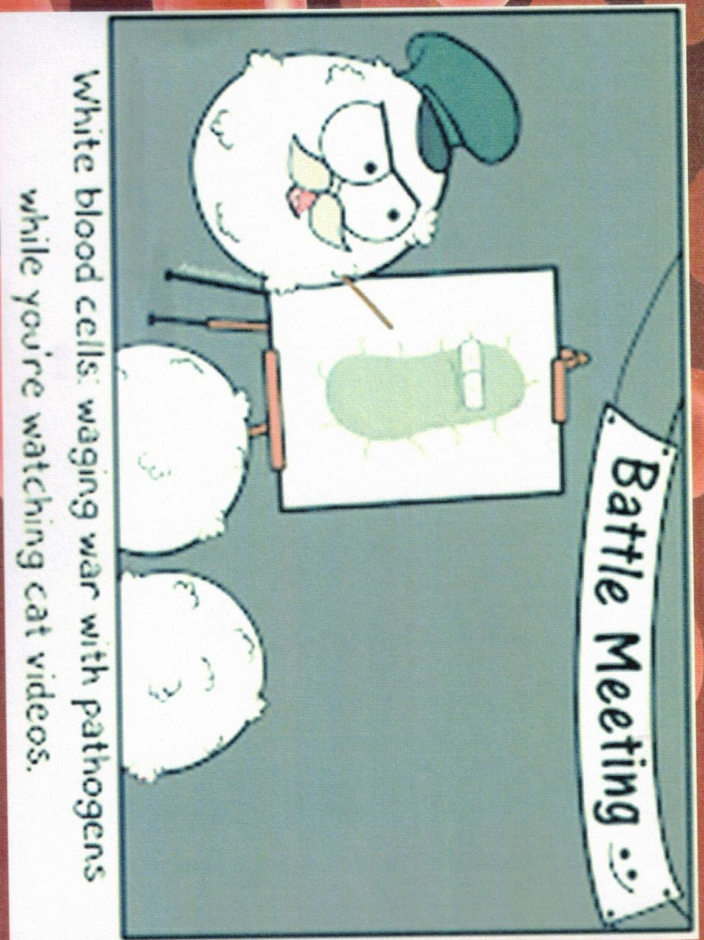
- It can be seen under the electron microscope.
- Plant cells have less mitochondria than animal cells.
- Functions:
 - ✓ To produce energy- rich compound- ATP.
 - ✓ Synthesis of proteins, carbohydrates, lipids etc. by using the energy in ATP.

Red blood cells (RBC's)



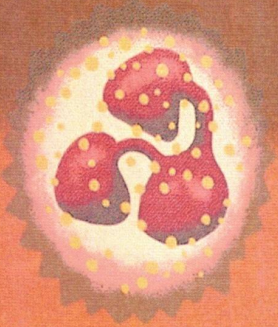
- Found in the bloodstream and are produced in the bone marrow.
- Also called as **erythrocytes**.
- **Main function**- to transport oxygen from lungs to all tissues of the body and to carry CO₂, back to lungs to be exhaled.
- Disc-shaped, packed with haemoglobin.
- **Haemoglobin**- a protein that binds oxygen, giving blood its red colour.
- Maintains the body's **oxygen supply**.

White blood cells (WBC's)

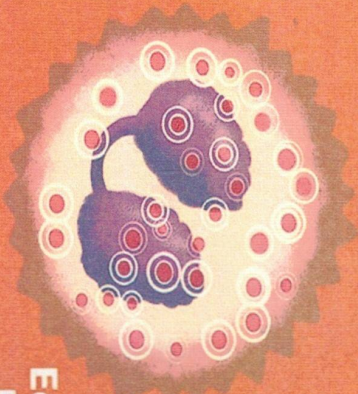


- Also called leukocytes. Found in the bloodstream of the lymphatic system, and various tissues throughout the body
- Defends the body against infections and foreign invaders - bacteria, viruses and parasites.
- Produces antibodies and coordinate immune responses.
- Essential for maintaining body's overall health and immunity.

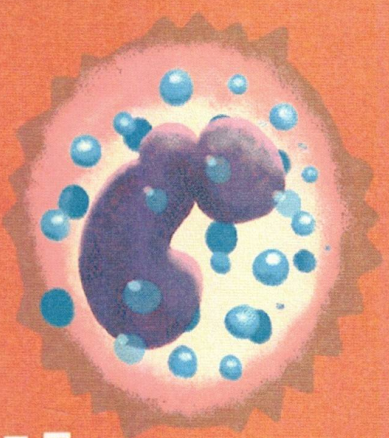
Different Types of White Blood Cells



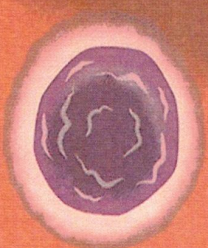
Neutrophils
First to respond
to bacteria
or a virus



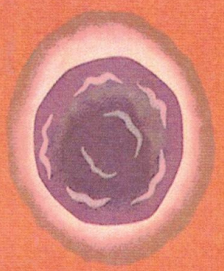
Eosinophils
Known for
their role in
allergy symptoms



Basophils
Known for
their role
in asthma



Lymphocytes
Fight infections
by producing
antibodies



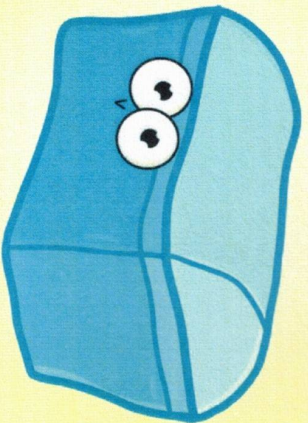
Monocytes
Clean up
dead cells

Vacuoles

Amoeba Sisters

Vacuole

#AmoebaGITS



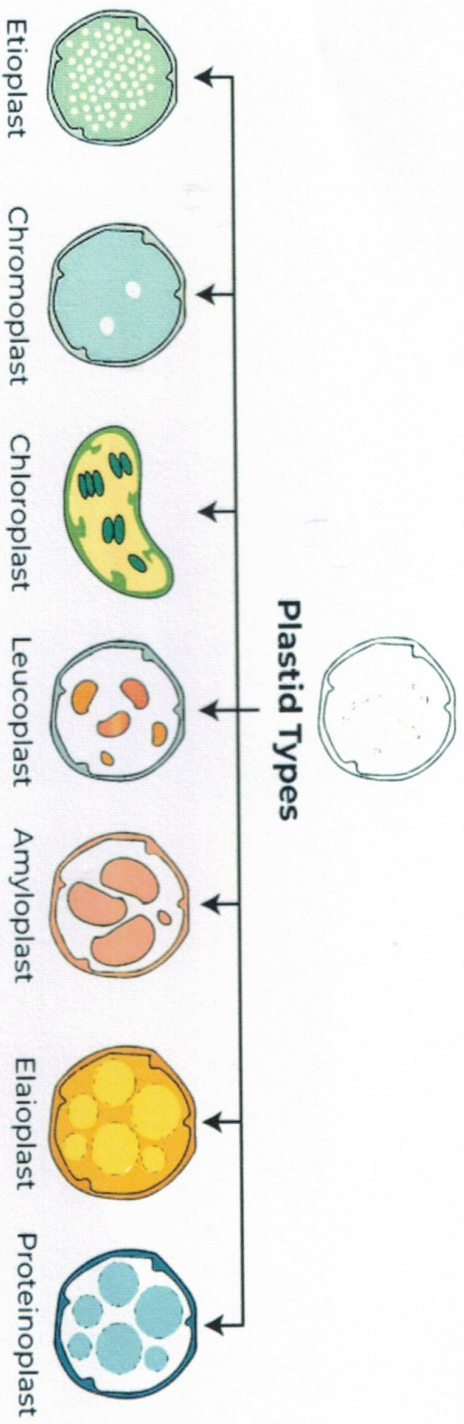
Storage containers of the cell

- Storage sacs for solid and liquid contents.
- No typical shape or size. Changes accordingly to the need of the cell.
- Bound by single membrane.

➤ Functions:

- ✓ Maintains osmotic pressure of the cell.
- ✓ Store metabolic byproducts and end products. (Glycogen, protein and water)
- ✓ In animal cell- they store waste products and for
- ✓ In plant cell- full of sap, provides turgidity and rigidity to them.

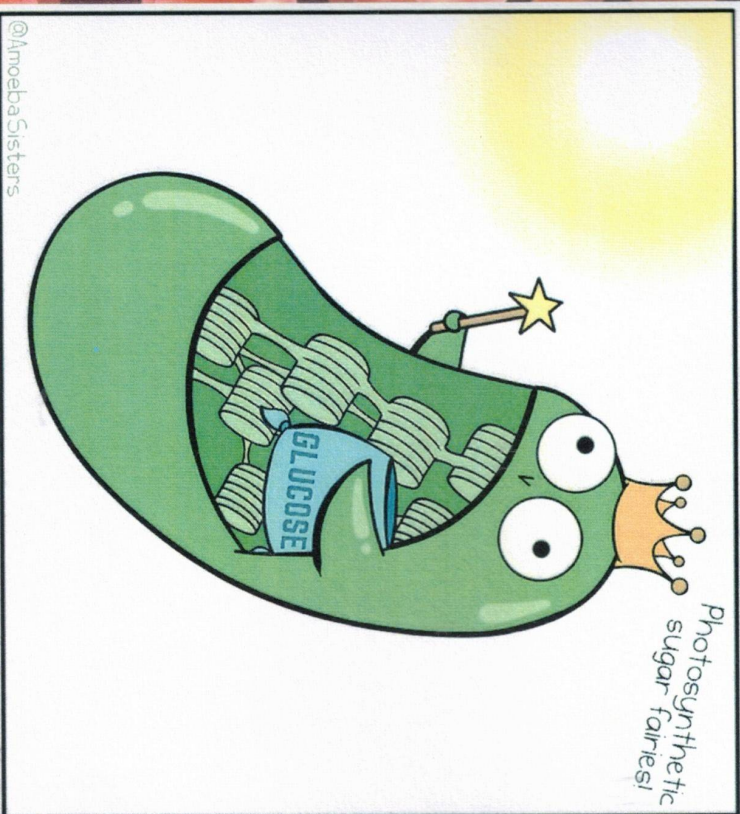
Plastids



- Type of organelle found in plant cells.
- Responsible for photosynthesis, storage and pigment synthesis.
- Most well-known plastid is chloroplast.

Chloroplast

CHLOROPLAST



Glucose synthesizers of the cell

- Important for the photosynthesis process taking place in leaves.
- Chlorophyll in chloroplast traps solar energy and converts it to chemical energy.
- Stroma contains DNA, enzymes, ribosomes and carbohydrates that are necessary for photosynthesis.
- Functions:
 - ✓ Converts solar energy to chemical energy (food).
 - ✓ Chromoplasts gives different colours to flowers and fruits.
 - ✓ Leucoplasts are involved in the synthesis and storage of food like starch, oils and proteins.

Colour of the plant part

Green (leaves)

Orange (carrot)

Yellow

Blue, purple

Dark pink (beet)

Pigment

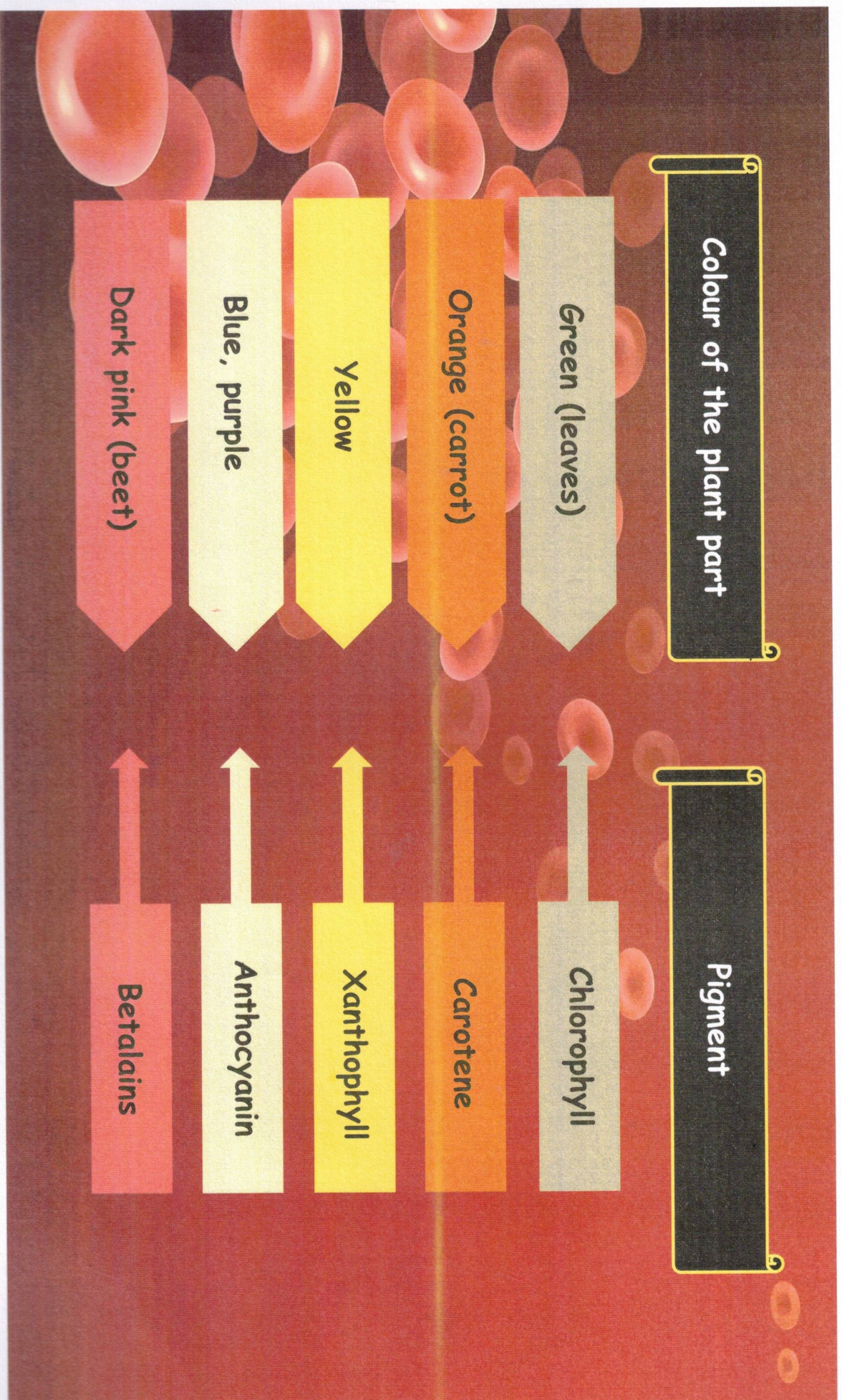
Chlorophyll

Carotene

Xanthophyll

Anthocyanin

Betalains



Summary

- Cell is the structural and functional unit of living organisms.
- There are eukaryotic cells and prokaryotic cells.
- Plant cell and animal cell have many differences and similarities.
- The components of a cell are- cell wall, plasma membrane, cytoplasm.
- The cytoplasm has various cell organelles which are the organs of the cell.
- The cell organelles are- nucleus, endoplasmic reticulum, Golgi complex, lysosomes, mitochondria, vacuoles, chloroplast.
- There are many types of plastids. The most well known is chloroplast.
- These plastids are responsible for photosynthesis, storage and pigment synthesis.

Reference

Balbharti textbook, Science, class 8th- Cells and Cell Organelles.

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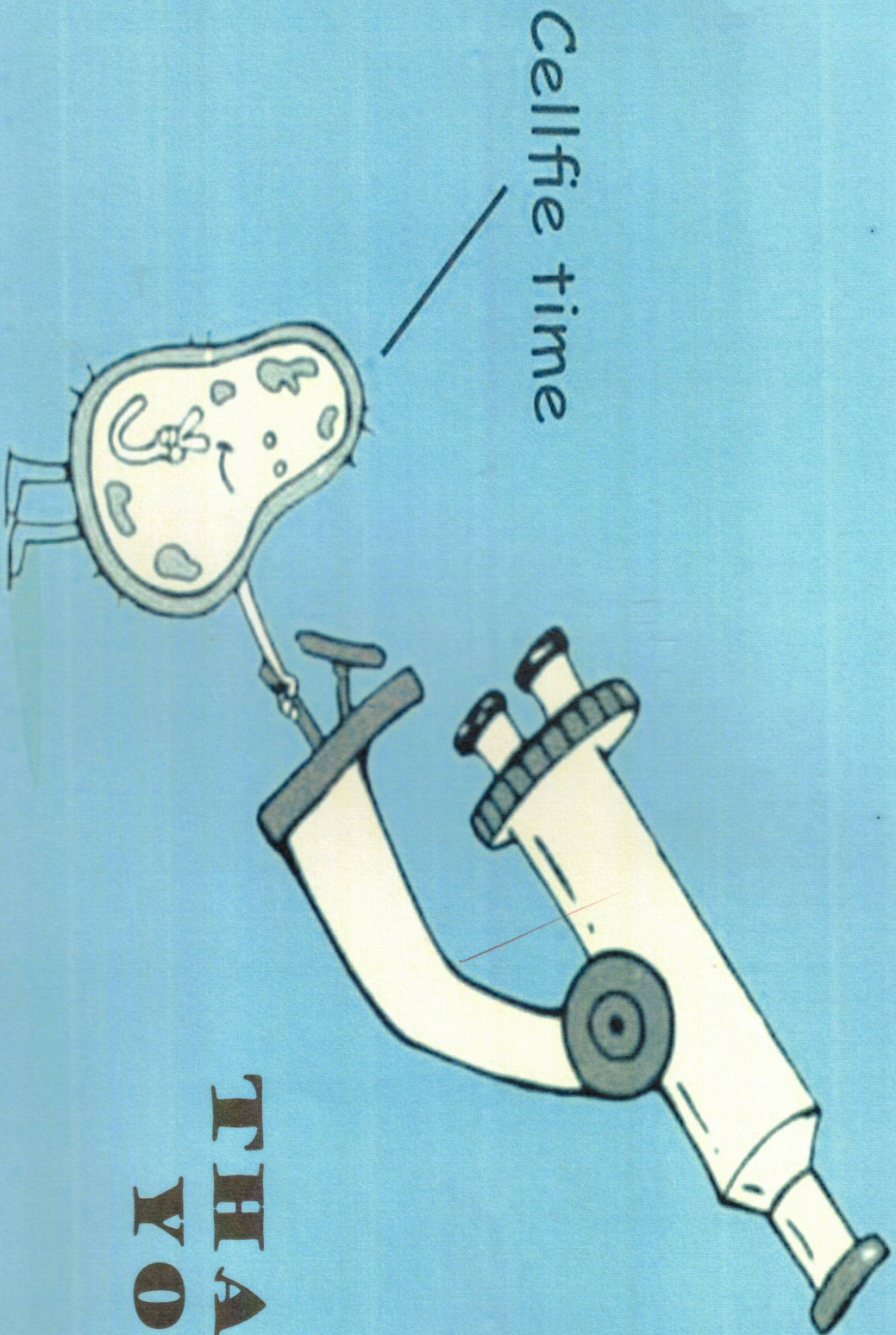
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Cellfie time

**THANK
YOU**

EPC 3

Method- 2 CHEMISTRY

Semester- II

Topic- Carbon- An important element

(Class - 9th)

Presented by

Shriya A. Kale

Shiladevi College of Education, Wadi

Nagpur- 440012

CARBON

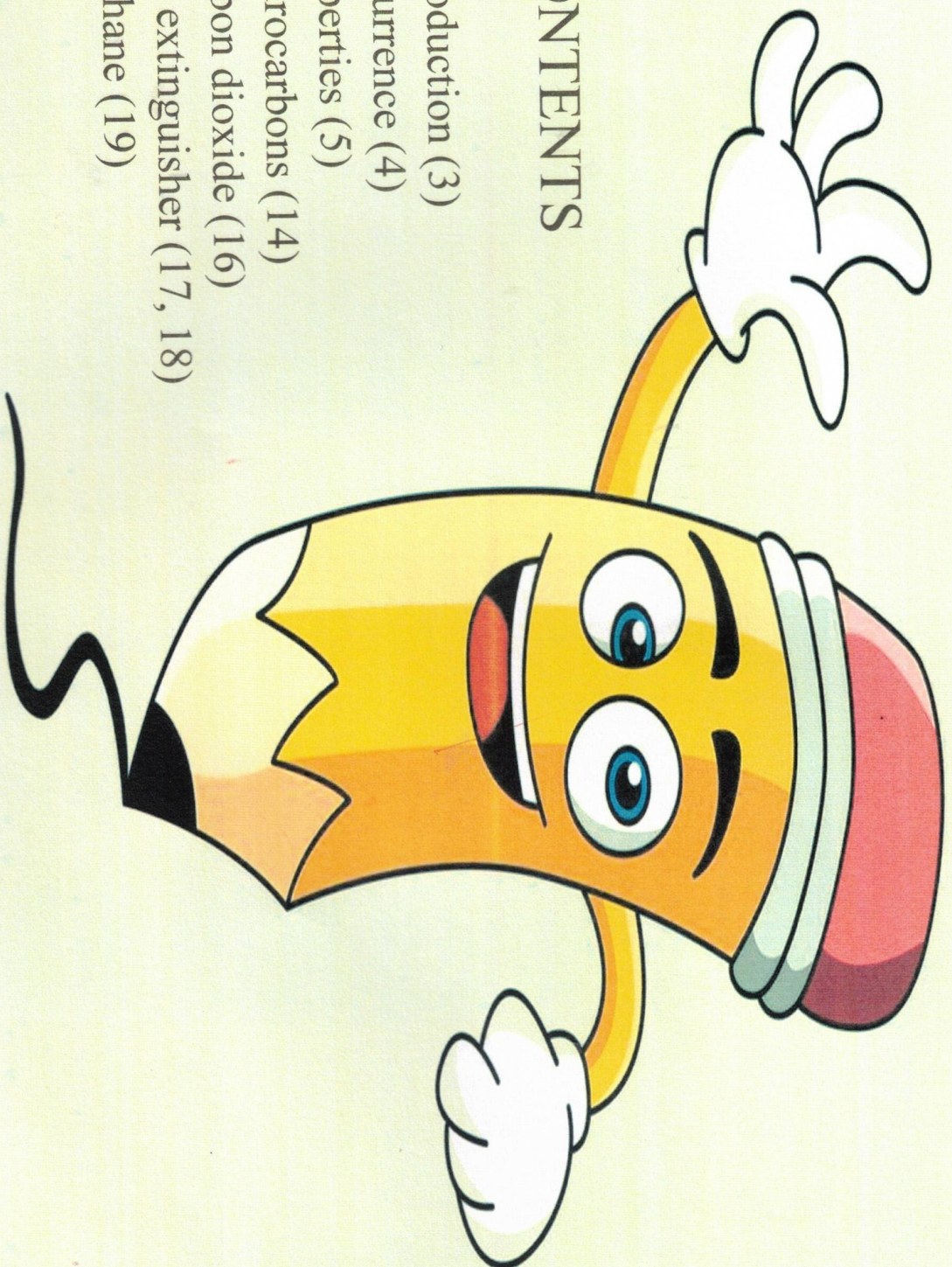


An important element



□ CONTENTS

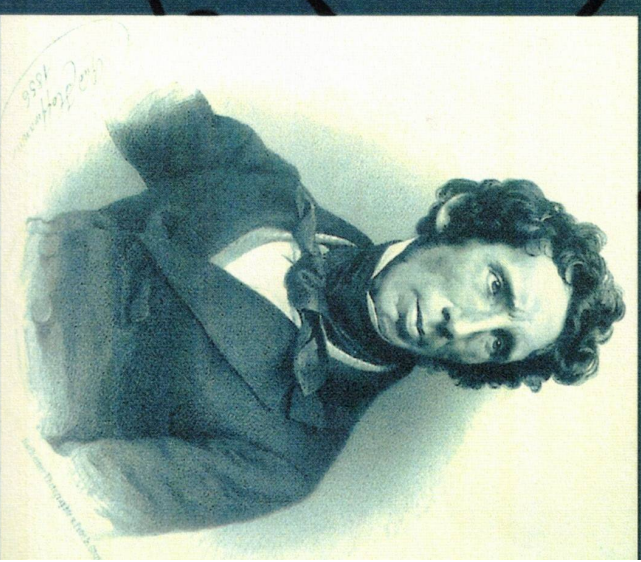
- ❖ Introduction (3)
- ❖ Occurrence (4)
- ❖ Properties (5)
- ❖ Hydrocarbons (14)
- ❖ Carbon dioxide (16)
- ❖ Fire extinguisher (17, 18)
- ❖ Methane (19)



Introduction

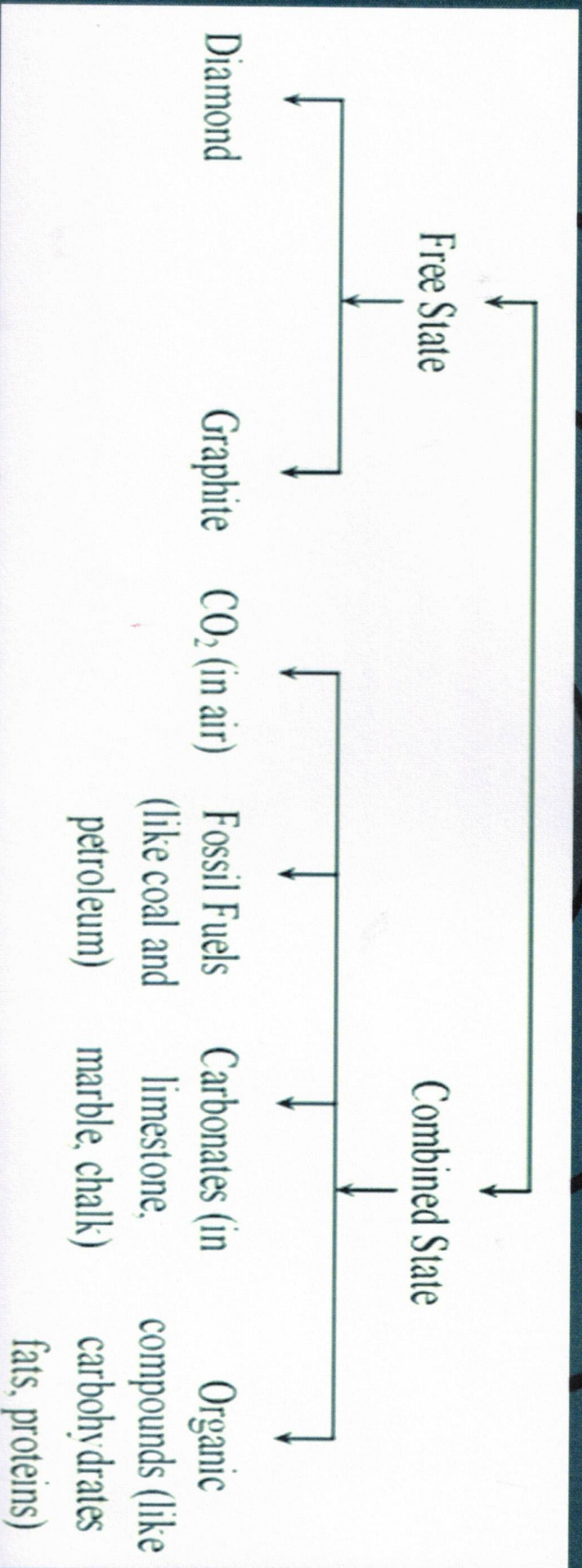
- Carbon is abundantly available in nature and occurs free as well as in combined state, after hydrogen, helium and oxygen.
- It is the element with the symbol C and atomic number 6.
- Carbon forms strong bonds with many other elements, allowing a wide variety of compounds to be created.
- Compounds obtained directly or indirectly from plants and animals are called organic compounds and those obtained from minerals are called inorganic compounds.
- All organic compounds contains carbon.
- Also the main element even in cellular DNA and RNA.
- The German chemist Wohler synthesized an organic compound, urea from an inorganic compound ammonium cyanate.
- Ever since then, many organic compounds are made from inorganic compounds.
- Carbon was found to be the main element in all these compounds.
- Hence organic chemistry is referred to as chemistry of carbon compounds.

CARBON



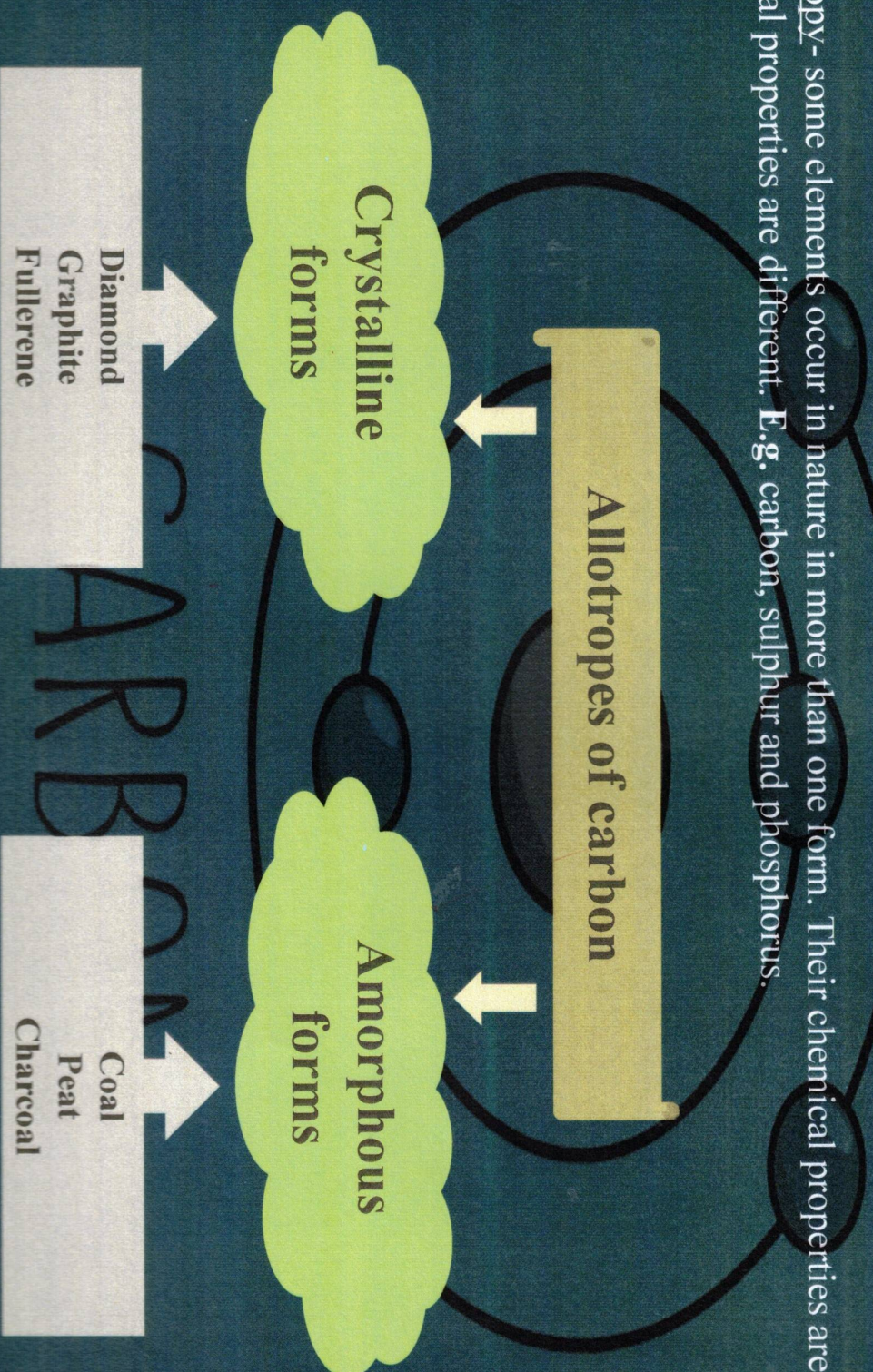
Occurrence of carbon

➤ Name carbon is derived from the Latin word 'carbo' meaning coal.



Properties

Allotropy - some elements occur in more than one form. Their chemical properties are the same but physical properties are different. E.g. carbon, sulphur and phosphorus.

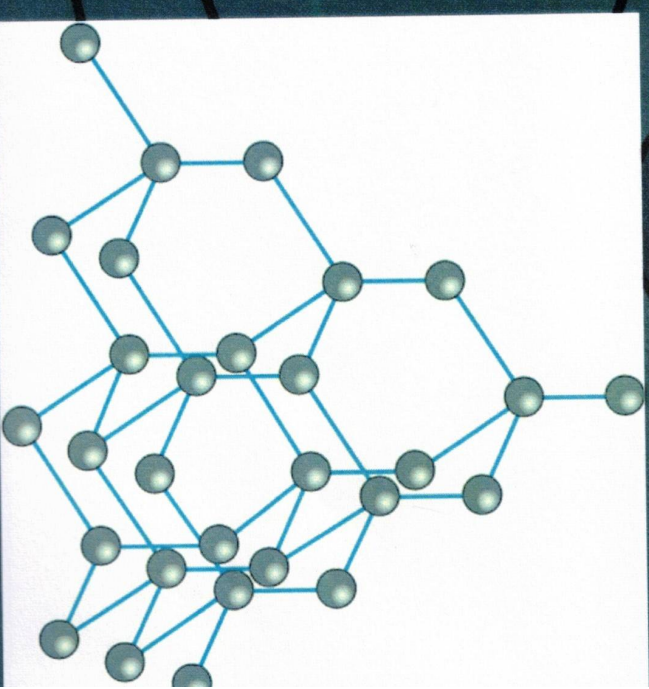


Crystalline forms

- Has a regular and definite arrangement of atoms.
- High melting points and boiling points.
- Definite geometrical shape, sharp edges and plane surfaces.

1. *Diamond*

- **Occurrence-** Found mainly in India in Golconda (Telangana) and Panna (Madhya Pradesh). Also in Brazil, Belgium, Russia and America.
- **Structure-** Every carbon atom is bonded to four neighboring atoms by covalent bonds. Due to this three dimensional structure, diamond becomes very hard.



CARBON

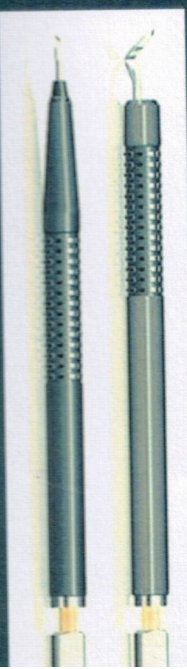
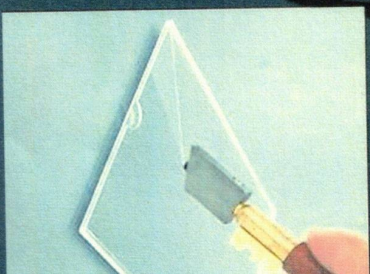
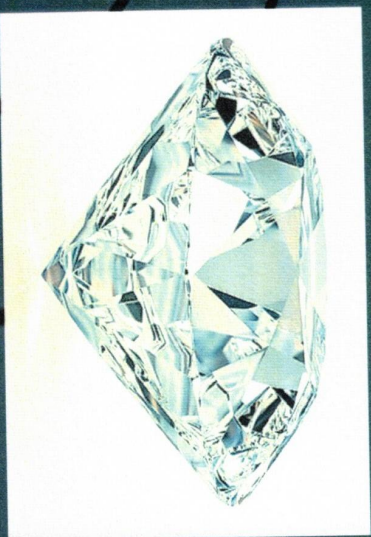
➤ Properties

- i. Pure diamond is the hardest natural substance.
- ii. Density is 3.5 g/cm^3 .
- iii. Melting point of diamond is 3500°C .
- iv. Does not dissolve in any solvent.
- v. Acids/bases have no effect on it.
- vi. Bad conductor of electricity as it does not have free electrons.

➤ Uses

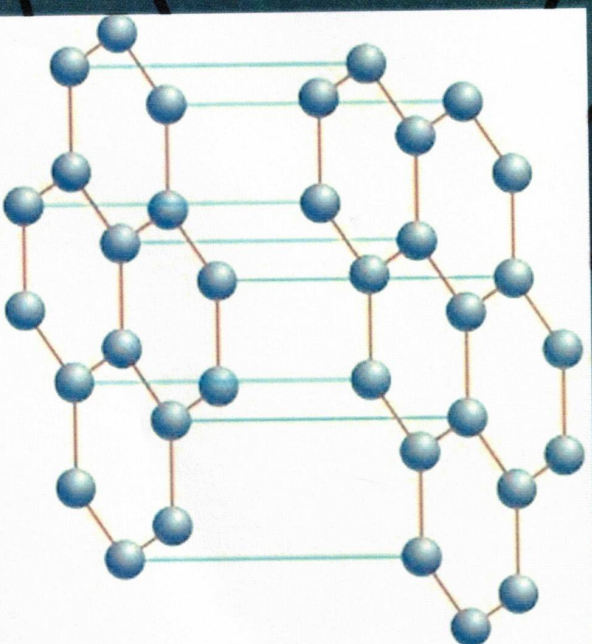
- i. In glass cutting and rock drilling machines.
- ii. Ornaments
- iii. Knives used in eye surgery.
- iv. polishing other diamonds.
- v. Make windows giving protection from radiation in space and in artificial satellites.

CARBON



II. Graphite

- Occurrence-found in the natural state in India, Russia, New Zealand and America. Used in pencil is made by mixing graphite with clay. This process was discovered by Nicholas Jacques Conte in 1795.
- Structure-every carbon atom in graphite is bonded to three other carbon atoms in such a way that a hexagonal layered structure is formed. Made of many sheets or layers of carbon atoms. One layer of graphite is called graphene.



CARBON

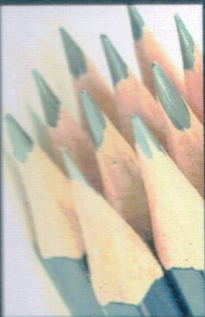
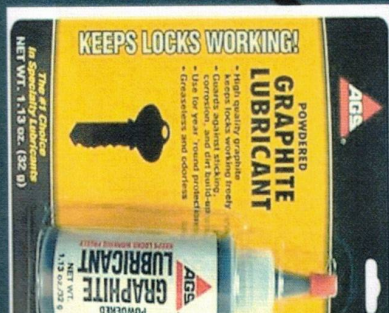
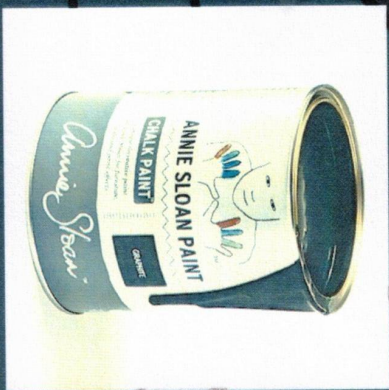
➤ Properties

- i. Black, soft, brittle and slippery.
- ii. Free electrons move continuously within the entire layer. Hence good conductor of electricity.
- iii. Due to layered structure, graphite can be used for writing on paper.
- iv. Density, 1.9 to 2.3 g/cm^3 .
- v. Does not dissolve in most solvents.

➤ Uses

- i. Making lubricants.
- ii. Making carbon electrodes.
- iii. Pencils for writing.
- iv. In paints and polish.
- v. Arc lamps which gives a very bright light.

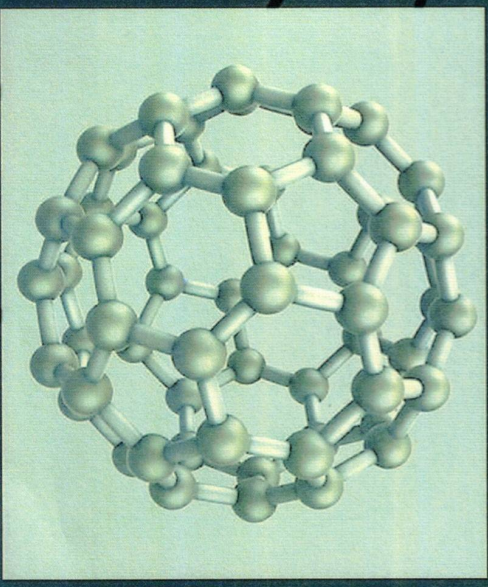
CARBON



III. Fullerene

- Rarely found in nature.
- Found in soot and in interstellar space.
- E.g. Buckminsterfullerene (C₆₀). Named after the architect Richard Buckminster Fuller because its structure resembles the geodesic dome he designed.
- C₆₀, C₇₀, C₈₂ and C₈₆ are other examples of fullerene.
- Their molecules occur in small numbers in soot.

CARBON



Amorphous forms/ non-crystalline forms

Coal

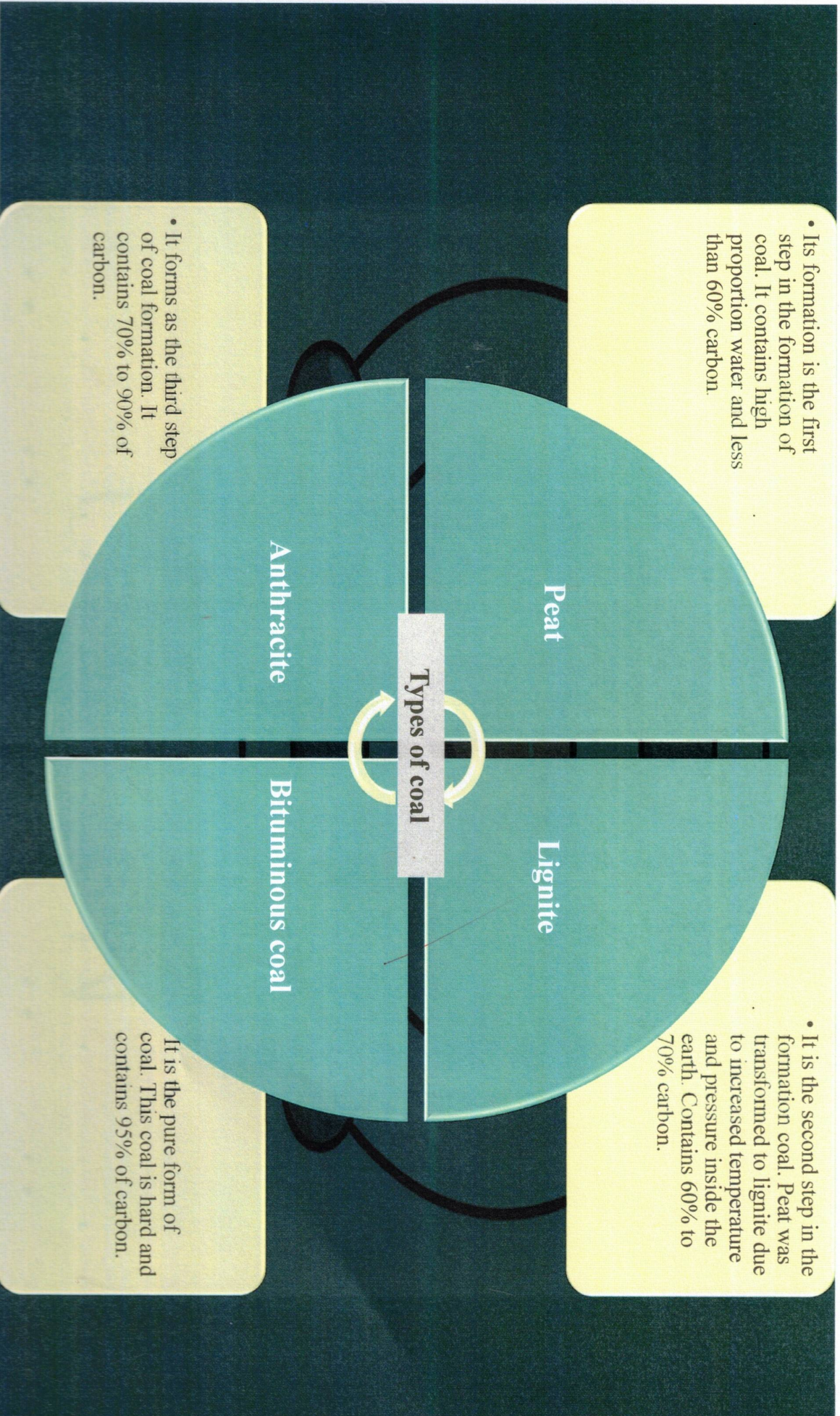
It is a fossil fuel. Contains carbon, hydrogen & oxygen. Also contains nitrogen, phosphorous & sulphur. It occurs in solid state. And it is of 4 types.

Charcoal

Made from animals- bones, horns, etc. on the other hand it is also made up of plants- formed by combustion of wood in an insufficient supply of air.

Coke

Used as a domestic fuel. It is used as a reducing agent. Used in the production of aeriform fuel such as water gas ($\text{CO}+\text{H}_2$) & producer gas ($\text{CO}+\text{H}_2+\text{CO}_2+\text{N}_2$).



• Its formation is the first step in the formation of coal. It contains high proportion water and less than 60% carbon.

• It is the second step in the formation coal. Peat was transformed to lignite due to increased temperature and pressure inside the earth. Contains 60% to 70% carbon.

• It forms as the third step of coal formation. It contains 70% to 90% of carbon.

It is the pure form of coal. This coal is hard and contains 95% of carbon.

Anthracite

Peat

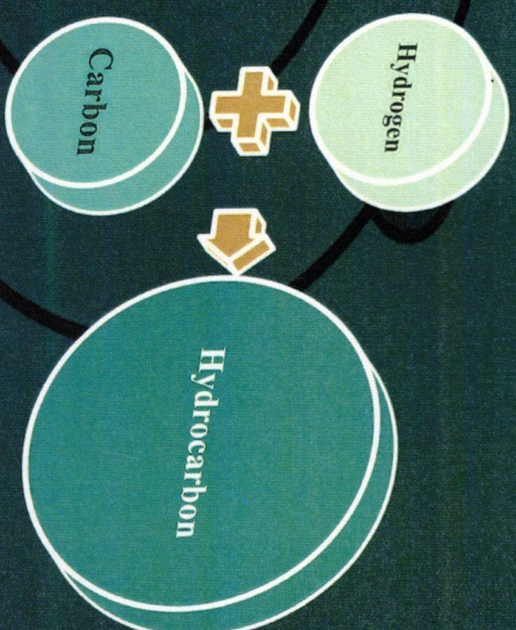
Lignite

Bituminous coal

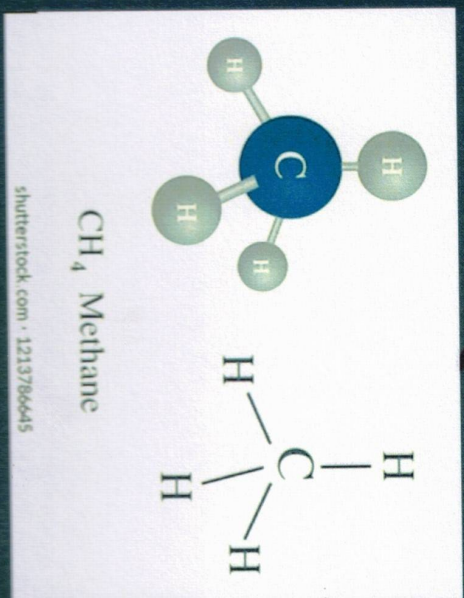
Types of coal

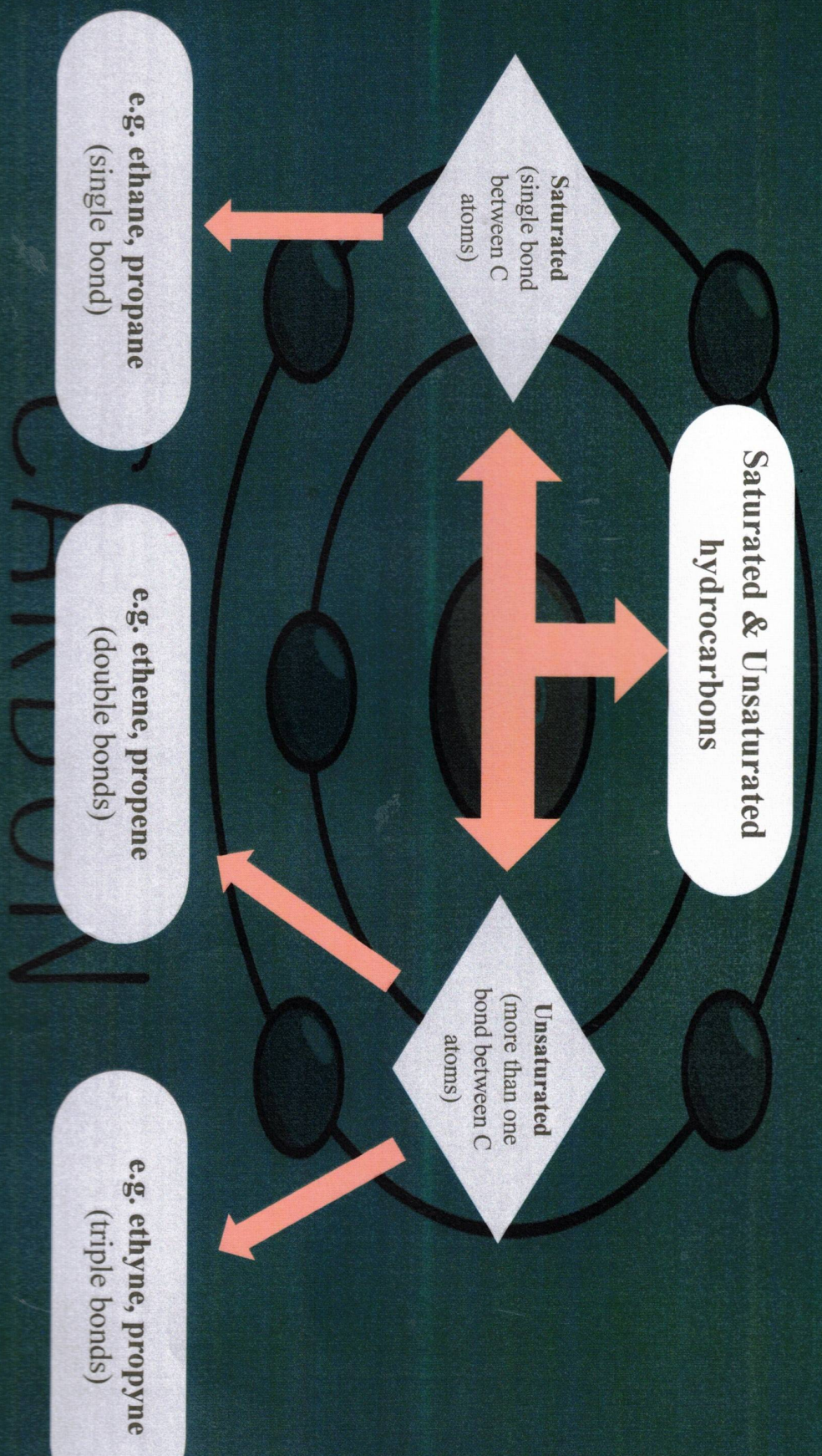
Hydrocarbons

- Along with element hydrogen is also included in most organic compounds.
- Compounds formed from carbon and hydrogen are called basic organic compounds of hydrocarbons.



- Electronic configuration of carbon is 2, 4. If four electrons are added to the orbit of carbon, its octet becomes complete and its electronic configuration becomes stable. Therefore, the valency of carbon is 4.
- Carbon atom can form four covalent bonds with other carbon atoms or atoms of different elements.
- When a carbon atom shares one electron each with four hydrogen atoms and forms four C-H bonds, a methane CH_4 molecule is formed.





Saturated & Unsaturated hydrocarbons

Saturated
(single bond between C atoms)

Unsaturated
(more than one bond between C atoms)

e.g. ethane, propane
(single bond)

e.g. ethene, propene
(double bonds)

e.g. ethyne, propyne
(triple bonds)

HYDROCARBON

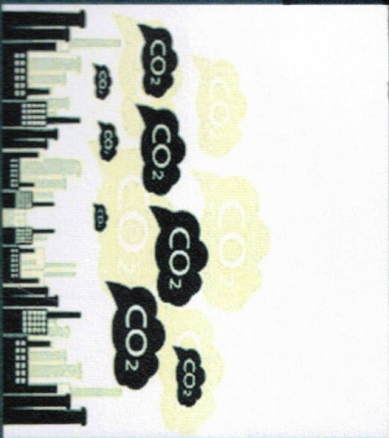
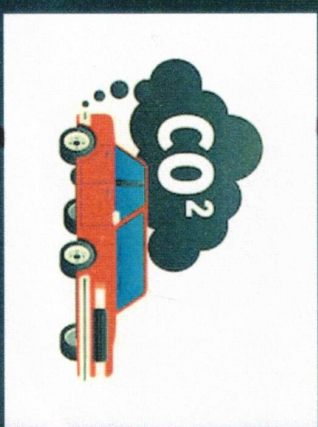
Carbon dioxide

- Molecular formula: CO_2 , molecular mass: 44, melting point: -56.6°C .
- Occurs in the air in free state to the extent of about 0.03%. Exhaled air contains about 4% of CO_2 .
- Also present as a salt in chalk and marble/limestone.
- Given out in the combustion of wood and the fossil fuel coal.

➤ Chemical properties

- i. Sodium carbonate (washing soda) is formed when CO_2 is passed through an aqueous solution of sodium hydroxide.
- ii. Chemical equation of the reaction: $2\text{NaOH} + \text{CO}_2 \rightarrow \text{Na}_2\text{CO}_3 + \text{H}_2\text{O}$
- iii. Sodium bicarbonate (baking soda) is formed on passing CO_2 through an aqueous solution of sodium carbonate.
- iv. Chemical equation of the reaction: $\text{Na}_2\text{CO}_3 + \text{H}_2\text{O} + \text{CO}_2 \rightarrow 2\text{NaHCO}_3$

CHARBON

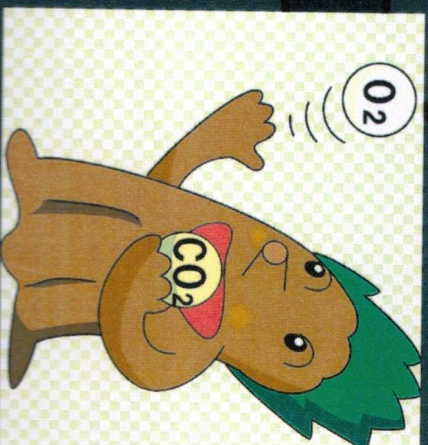


➤ Uses

- i. CO₂ is used to make aerated drinks.
- ii. Solid CO₂ is used in cold storage & to also keep milk and milk products.
- iii. Used for getting special effects of a mist in dramas & movies.
- iv. CO₂ obtained by chemical reaction or kept under pressure is used in fire extinguishers.
- v. Plants use CO₂ in air for photosynthesis.

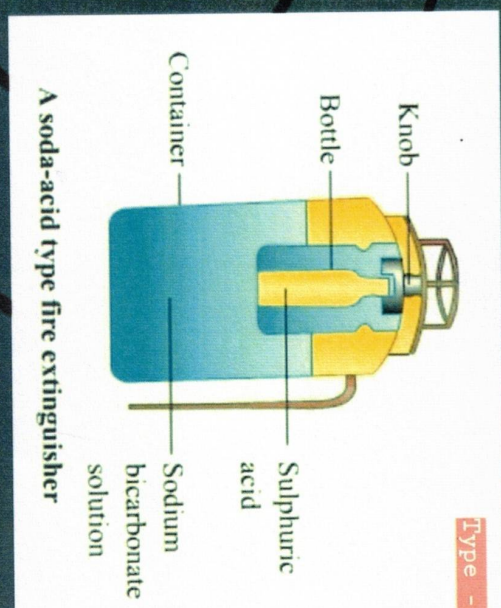
➤ Regular fire extinguisher

- ✓ Contains sodium bicarbonate powder. There is also dilute sulphuric acid placed in the glass capsule.
- ✓ The capsule breaks on pressing the knob, the sulphuric acid comes in contact with the sodium bicarbonate & the two react chemically to release CO₂ which comes out.



- ✓ CO₂ based fire extinguishers do not cause corrosion and are non conductors of electricity. Therefore used when electronic equipment catches fire.
- ✓ CO₂ are used to extinguish small scale fire.
- ✓ In modern fire extinguishers liquid and solid CO₂ is filled under pressure.
- ✓ On reducing the pressure it becomes gaseous and comes out of the hose.
- ✓ Chemical reaction: $2\text{NaHCO}_3 + \text{H}_2\text{SO}_4 \rightarrow \text{Na}_2\text{SO}_4 + 2\text{H}_2\text{O} + 2\text{CO}_2 \uparrow$
- ✓ Nowadays, many types of fire extinguishers are used.

CARBON

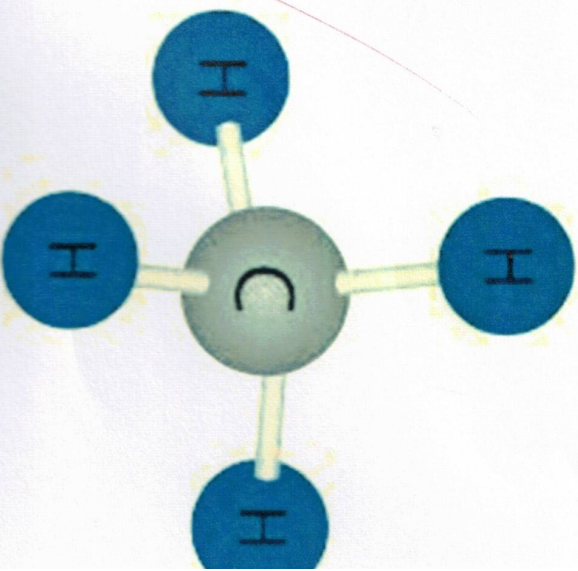


Methane

- Molecular formula: CH_4 , molecular mass: 16
- Discovered by Italian scientist Alessandro Volta (1776).
- Occurs as a natural gas to the extent of 87%.
- Decomposition of organic matter in the absence of air (anaerobic) produces methane.
- Present in biogas.
- Found in coal mines.
- Found at the surface of marshy places therefore called marsh gas.
- On heating mixture of H and CO gases at 300°C in the presence of nickel, CH_4 gas is formed.

Physical properties

- Melting point: -182°C .
- Boiling point: -161°C .
- Colorless gas.

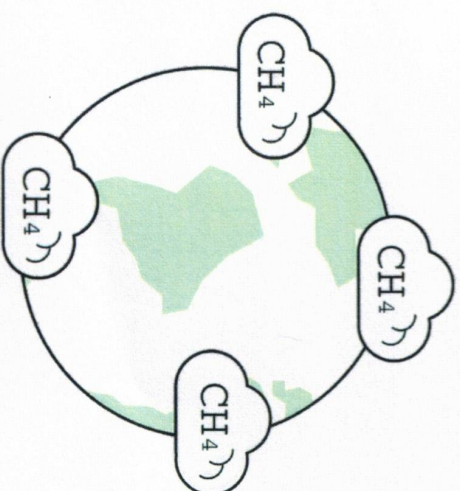


CARBON

- i. Density is less than water.
- ii. Is in gaseous state at room temperature.
- iii. Sparingly soluble in water.

➤ Chemical properties

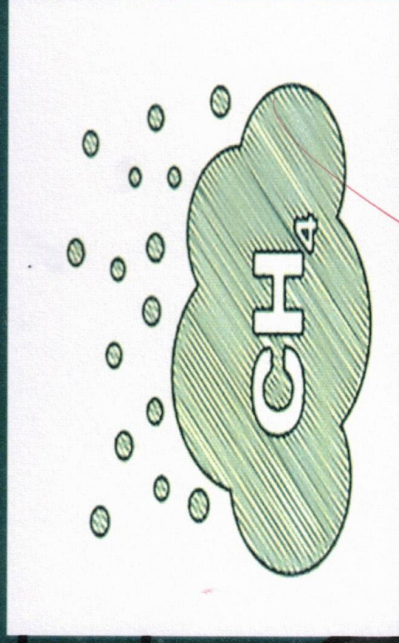
- i. Highly inflammable. It burns by reacting with oxygen to give a bluish flame. In this reaction, 213 kcal/mol of heat is given out.
 CH_4 burns completely.
- ii. Chemical reaction: $\text{CH}_4 + 2\text{O}_2 \rightarrow \text{CO}_2 + 2\text{H}_2\text{O} + \text{heat}$.
- iii. Chlorination: CH_4 and chlorine gas react with each other at the temperature of 250 °C to 400 °C in the presence of UV light and form mainly methyl chloride and hydrogen chloride. This reaction is called chlorination of CH_4 .
- iv. Chemical reaction: $\text{CH}_4 + \text{Cl}_2 \rightarrow \text{CH}_3\text{Cl} + \text{HCl}$



CARBON

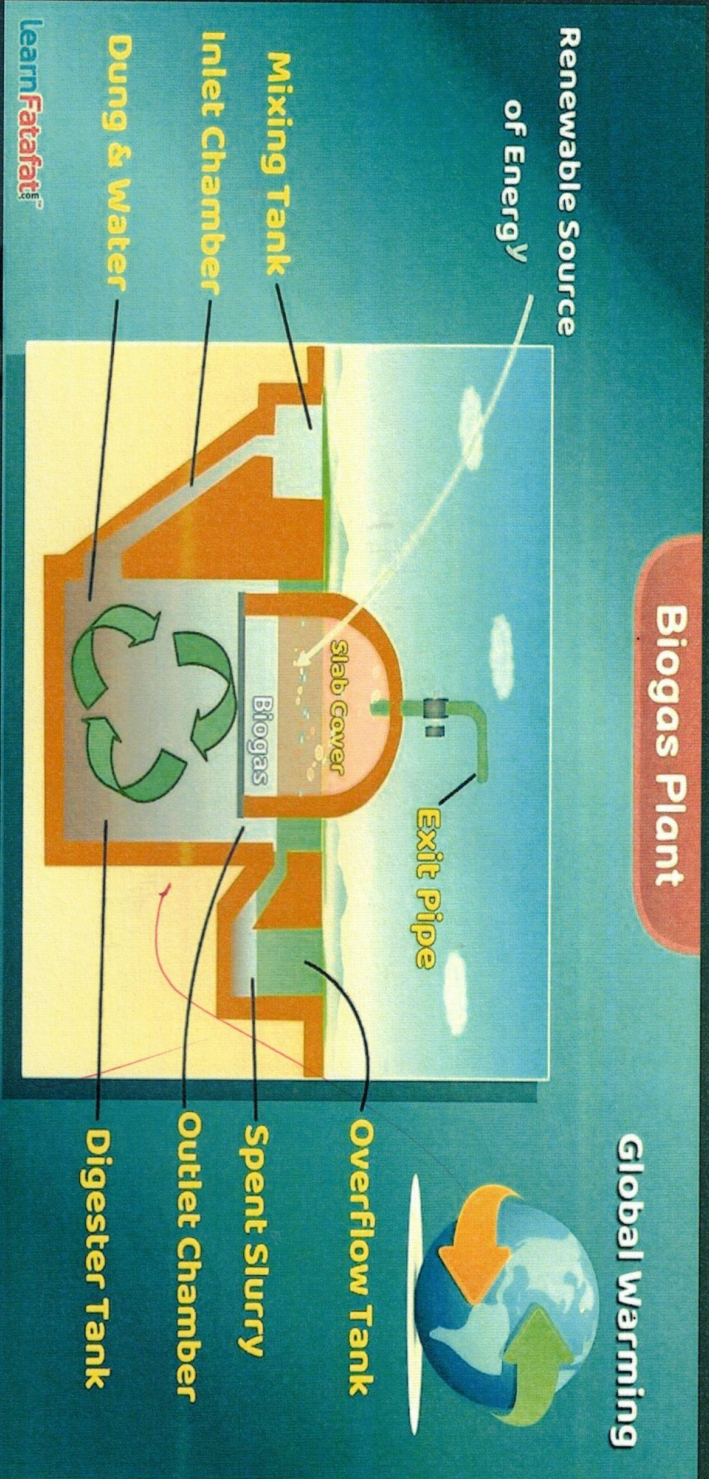
➤ Uses

- i. CH_4 is the form of natural gas is used on industries such as fabric mills, paper mills, food processing industry, petrol purification.
- ii. Being the smallest hydrocarbon, the proportion of CO_2 released. In the combustion of CH_4 is the small and therefore, it is used as a domestic fuel.
- iii. CH_4 is used for production of organic compounds such as ethanol, methyl chloride, methylene chloride and acetylene.



CARB

Biogas Plant



Animal dung, dry leaves, wet garbage get decomposed by anaerobic microbes in a biogas plant. This produces CH_4 gas also called **biogas**. It is a very cheap fuel option which meets the demand for cooking gas. It is also used for the production of an electricity. Biogas contains about 55% to 60% CH_4 and the rest is CO_2 . It is a fuel which is convenient to use and in addition to this, a very good manure is also produced as a side product of the process.

Biogas production process

(it is an anaerobic process. Takes place in two stages)

Production of acids
(the microbes act on the biodegradable complex organic compound and produce organic acids)

Methane gas production
(the methanogenic bacteria act on the organic acids to produce CH_4 gas)

CHARBON



Summary

- ✓ Carbon is found in nature in free as well as compound state. Carbon in free state is found as diamond and graphite, and in combined state is found as: CO_2 and in the forms of carbonates, fossil fuels, carbonaceous nutrients, natural fibers.
- ✓ The allotropes of carbon are: a) crystalline forms- diamond, graphite and fullerene and b) amorphous forms- coal, charcoal, coke.
- ✓ Hydrocarbons are compounds formed from carbon and hydrogen and are also called basic organic compounds.
- ✓ CO_2 occurs in free state and used in fire extinguishers and aerated drinks.
- ✓ CH_4 occurs as a natural gas, found in coal mines.
- ✓ Biogas plant is a cheap fuel option, which meets the demands for cooking gas.

CARBON

Reference

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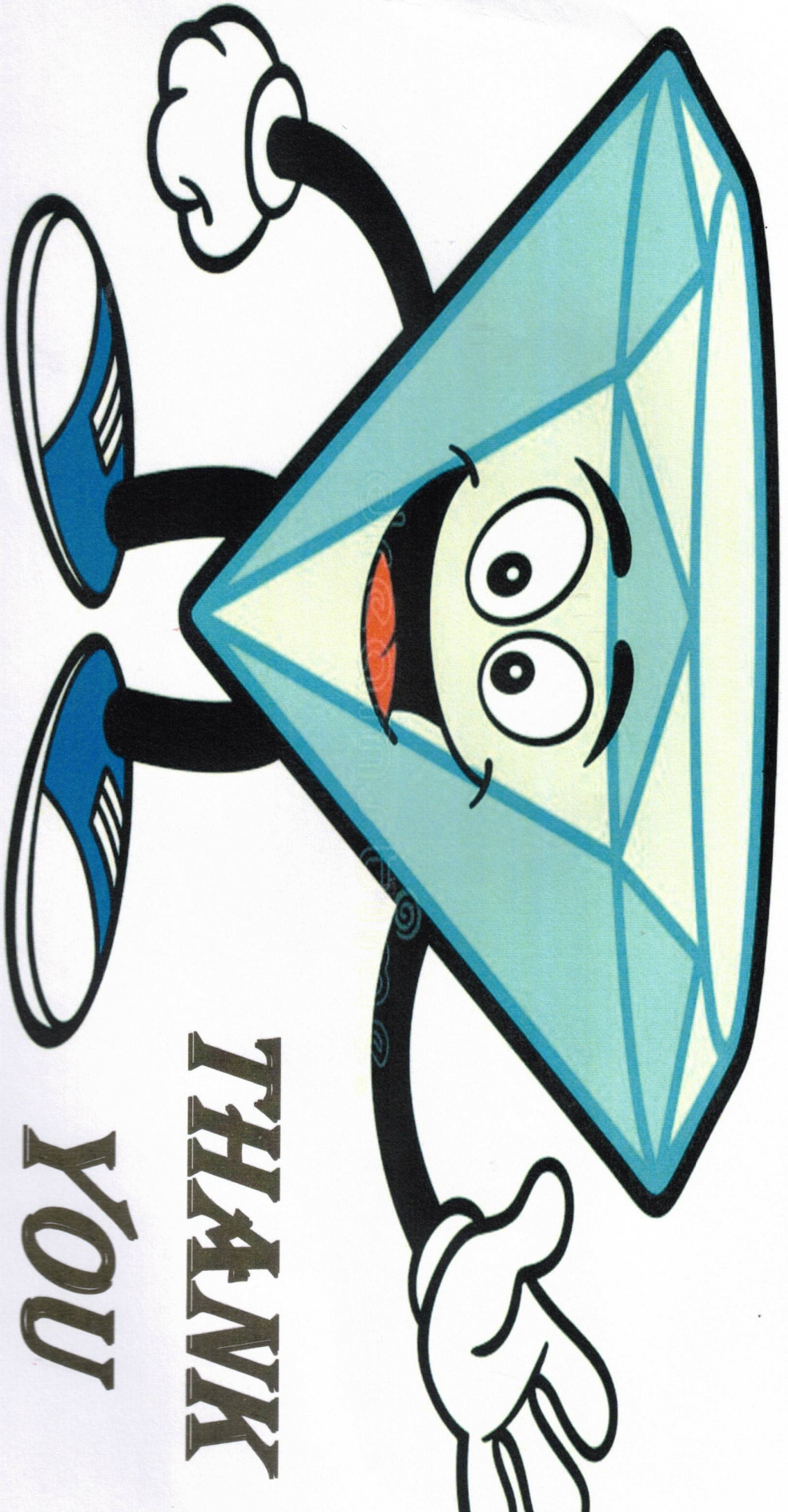
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CHAKSON

4/11/2024
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**THANK
YOU**