

THE BASIC STRUCTURE OF A CELL (LESSON PLAN)

Class 9

Time 6 Periods Of 40 Mins Each

Learning objectives :

General objectives :

1. Remembering : Knowledge-based

Simple recall of concepts

Emphasizing specific facts

Memorize term concepts, principles and theories

Identifying and reciting definitions

Informative

- studied in class 8 related to the topic

-functioning of all organelles

-terminology

-definitions

-cell and its organelles

2. Understanding : Comprehension

To interpret, compare and contrast

To explain and paraphrase

-animal and plant cell

-functions of each organelle

3. Application : Interpretation

Using abstract information in concrete situation

Applying knowledge to critical situations

Using given information to interpret a situation

Providing examples

Solving problems

-to understand correlations

-disease analysis

-diseased or healthy cell

-unicellular and multicellular

-diseased conditions

4. High order thinking skills : Analysis and synthesis

Classifying, comparing and contrasting

Differentiating from given information pieces

Organizing and integrating

Compiling information from number of sources

-animal/plant cell

-uni/multicellular

-cell organelles

-building idea bank

5. Evaluation and Multi-Disciplinary

Justifying the value of a decision or outcome

-living/dead cell

Specific objectives : to help the students learn and understand

- What living organisms are made up of – cells as building blocks
- Discovery of cell – role of Robert Hooke, Leeuwenhoek, Robert Brown, Purkinje
- Cell Theory – feature, scientists and exceptions
- Cell – variety of shapes and sizes
- Characteristics of cells – minimum 5
- Structural organization of cell
- Organelles and their functions and diagrams – plasma membrane, cell wall, nucleus, endoplasmic reticulum (smooth and rough), golgi apparatus, mitochondria, plastids, vacuoles, lysosomes
- Prokaryotic and eukaryotic cells – characteristics and differences
- Plant cell and animal cell – diagram and differences
- Osmosis and diffusion – definition
- Isotonic, hypertonic and hypotonic solutions – definitions and effect on cell

Pre – topic requirement : - the students should come prepared by reading page numbers ___ to ___

- Recall the content studied in class 8

General Methodology : -

- Word part – breakup of terminology words
- Scientific talk
- Mural (picture display)
- Gamification – turning task to game
- Pupil- centered method
- Unifying a wide range of scientific facts
- Teaching every concept in context of a larger idea providing coherence across the topic
- Creating idea bank
- Making content tangible and transparent
- Guided discussion

Terminology : animal cells , biology , cell ,cellular respiration ,cell biology , cell cycle , cell membrane , cell theory , centromere , chromatid , chromatin , chromosome , cilia and flagella , cytokinesis , cytoplasm , cytoskeleton , cytosol , daughter cell , daughter chromosome , diploid cell , endoplasmic reticulum , gametes , gene theory , genes , golgi complex , haploid cell , lysosome , meiosis , metaphase , microtubules , mitochondria , mitosis , nucleus , organelles , peroxisomes , plant cells , prokaryotes , ribosomes.

DAY 1

Introductory Activity : to draw a simple cell on an inflated balloon with a marker, deflate it and again inflate slowly. This is how a cell enlarges in size.

Methodology :

- Scientific talk
- Mural – picture display
- Word – part (break up of words for terminology)
- Unifying a wide range of scientific facts
- Guided discussion (peer- peer)
- Creating idea bank
- Making concept tangible and transparent
- Gamification – turning task to game
- Intellectually engaging

Content :

- The word cell is derived from the Latin word “cellula” which means “a little room”
It was the British botanist Robert Hooke who, in 1664, while examining a slice of bottle cork under a microscope, found its structure resembling the box-like living quarters of the monks in a monastery, and coined the word “cells”

- In the year 1838, Matthias Schleiden, a German botanist, first proposed the idea that all plants consist of cells

- The Dutch scientist A.V.Leeuwenhoek, in 1674, discovered the minute forms of life such as bacteria and single celled animals in a drop of water

- In 1839, Theodar Schwann, another German botanist, asserted that all plants and animals are made up of cells

In 1831, Robert Brown discovered the nucleus in the cell

- J.E.Purkinje, in 1840, used the term protoplasm to describe the juicy, slimy gelatinous contents of the cell

In 1885, Rudolf Virchow expressed that all cells arise from pre-existing cells

- In 1932, two German Scientists, Ruska and Knoll, invented the electron microscope

- Endoplasmic Reticulum (ER) This is a complex network of tubes, the lumen of which is filled with fluid. Two types of endoplasmic reticula are seen.They are:

HOME TASK

1. Memorise the role of different scientists in cytology.
2. Read page numbers ___ to ___ of text book.

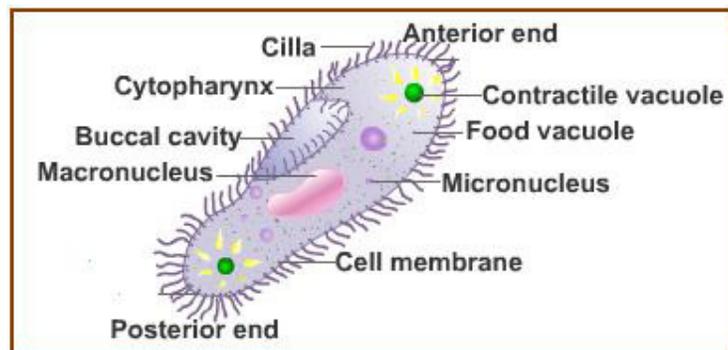
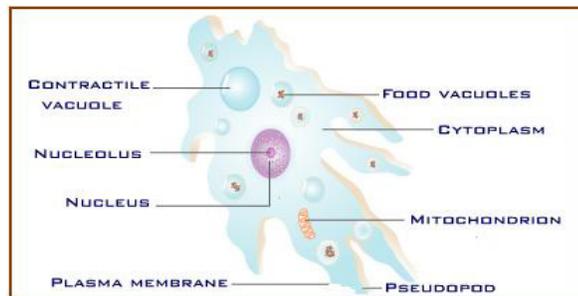
DAY 2

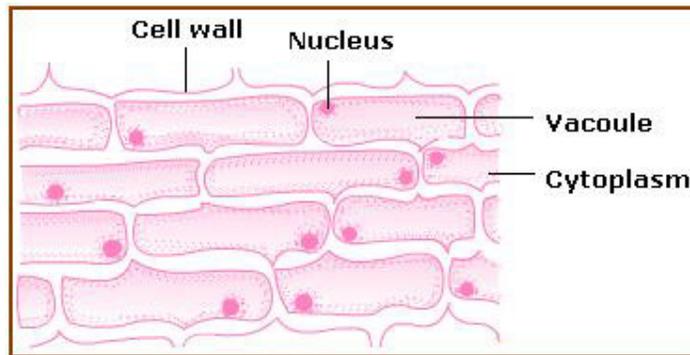
Methodology

- Real life scenario
- Scientific talk
- Guided discussion
- Creating idea bank
- Putting understanding first
- Engaging learners intellectually
- Unifying a wide range of scientific facts
- Mural – picture display

Cell - A Unit of Life

Organisms may be broadly classified into two kinds: Unicellular and Multicellular





Cells of onion peel

All living organisms, whether plants or animals, are made up of microscopic units called cells. The cell occupies the same central position in biology as the atom in the physical sciences.

All living beings, plants and animals, start their life with a single cell. Some organisms exist as a single cell and carry out the various metabolic life processes such as assimilation, respiration, reproduction, excretion, etc., that are essential for their survival. These are known as unicellular organisms.

Structure of Cell

Cells vary in shape and size. They may be oval, spherical, rectangular, polygonal, spindle shaped, star shaped, rod-shaped or totally irregular like the nerve cell. The diversity in cells is in accordance with the role or function it has to perform as part of the tissue or organ system. In general, there is no typical shape for cells.

Cell membrane is present in both plant and animal cells. It is living, elastic and made of proteins and lipids (fats). Its function is to provide a mechanical barrier for the protection of the inner cell contents and to regulate the movement of molecules in and out of the cell.

The part of the cell between the cell membrane and the nuclear membrane is called the cytoplasm.

The cytoplasm consists of the matrix and the organelles. The matrix is a transparent semi fluid substance.

When active, it is always in a state of movement. The organelles are found embedded in the cytoplasm.

They have definite shape, structure and function. All the metabolic activities of the cell such as synthesis, secretion, digestion and energy generation, are performed by the different cell organelles. Cell organelles can be seen only with the help of an electron microscope.

HOME ASSIGNMENT :

1. Practice the diagrams
2. Read page numbers ___ to ___

DAY 3

Methodology :

- Teaching every concept in context of a larger idea providing coherence across the topic
- Creating idea bank
- Putting understanding first
- Scientific talk
- Engaging learners intellectually
- Student driven approach
- Guided discussion
- Unifying a wide range of scientific facts

Following are the Important Cell-organelles:

Tubes with a smooth surface are called smooth endoplasmic reticula. They secrete lipids.

Tubes with spherical bodies (ribosomes) attached are known as rough endoplasmic reticula.

The functions of the endoplasmic reticulum are to form the skeletal framework of the cell, to provide a pathway for the distribution of nuclear material from one cell to the other and to synthesize fats, steroids and cholesterol with the help of enzymes secreted by the cell.

Golgi Apparatus

Also known as Golgi Complex or Golgi Bodies, they consist of tiny, elongated, flattened sacs (cisternae), which are stacked parallel to one another along with some vacuoles and clusters of vesicles.

The function of the golgi body is to secrete certain hormones and enzymes. It also forms lysosomes and peroxisomes. The golgi body is usually found close to the nucleus.

Lysosomes

These are tiny, spherical, sac-like structures scattered all over the cytoplasm. Their main function is digestion. They contain powerful destructive enzymes capable of digesting all organic material, and hence called “digestive bags”.

present in white blood cells are capable of digesting bacteria and viruses. During starvation, lysosomes digest proteins, fats and glycogen in the cytoplasm, and supply energy to the cell. They are also capable of digesting worn out cell organelles, or even digesting the entire damaged cell containing them. Hence, “suicide bag” is a sobriquet that is often used for Lysosomes.

These organelles are found in the liver and kidney cells. They are small, membrane-bound sacs, and contain powerful oxidative enzymes.

Their chief function is to remove toxic substances.

HOME TASK :

1. memorize the organelles and their functions
2. read page numbers ___ to ___ of text book

DAY 4

Methodology :

- Teaching for putting understanding first
- Teaching every concept in context of a larger idea providing coherence across the topic
- Mural – picture display
- Scientific talk
- Guided discussion
- Creating idea bank
- Student driven approach

Introductory Activity : to study osmosis and diffusion

Ribosomes

These are spherical, granular particles which occur freely in the matrix or remain attached to the rough endoplasmic reticulum. Ribosomes contain RNA (ribonucleic acid) and proteins. Their function is to provide the surface for protein synthesis.

Centrosome

This is found in the cytoplasm near the outer surface of the nucleus and contains two cylinders called

centrioles. The centrosome is found only in the animal cell. The centrosome and the centrioles play an important role by forming the poles of the spindle during cell division.

Mitochondria

These may be cylindrical, rod-shaped or spherical and distributed in the cytoplasm. Each mitochondrion is bound by a double membrane. The inner membrane is folded into ridges called cristae, which increase the surface area of the membrane.

It is in the mitochondria that the sugar is finally burnt during cellular respiration. The energy thus released is stored as high-energy chemicals called ATP (adenosine triphosphate). Hence, mitochondria are termed as the “power house” or the “power plant” of the cell. The body cells use the energy stored in ATP for synthesis of new chemical compounds, the transport of these compounds and for mechanical work.

Plastids

These organelles are found only in plant cells.

Plastids are of three types: Chloroplasts Chromoplasts Leucoplasts

Chloroplasts They are green and found in leaves. The green colour is due to the presence of chlorophyll.

Chromoplasts They are yellow, orange and red, and found in flowers and fruits.

Leucoplasts They are colourless and found in roots, seeds and underground stem

The function of the chloroplast is to trap solar energy for photosynthesis. Chromoplasts impart colour to flowers to attract insects for pollination. Leucoplasts store food in the form of carbohydrates, fats and proteins.

Nucleus This is a prominent, spherical or oval structure found at the centre of the cell. It is the controlling centre of all cell activities and has been described as the brain of the cell. It regulates all metabolic and hereditary activities of the cell.

The nucleus is composed of the following structures:

Nuclear Membrane : **Nucleoplasm Nucleolus Chromatin network**

Nuclear Membrane This is a double-layered membrane which separates the nucleoplasm from the cytoplasm. The nuclear membrane has minute pores which allow the selective transfer of material between the nucleoplasm and the cytoplasm.

Nucleoplasm Within the nuclear membrane, completely filling up the space, is a clear, semi-solid, granular substance or matrix called the nucleoplasm. The nucleolus and the chromatin network lie suspended in the nucleoplasm.

HOME TASK :

1. to memorize the organelles and their functions
2. read page numbers ___ to ___ of text book

DAY 5

Methodology :

- Scientific talk
- Mural (picture display)
- Gamification – turning task to game
- Pupil- centered method
- Unifying a wide range of scientific facts
- Teaching every concept in context of a larger idea providing coherence across the topic
- Creating idea bank
- Making content tangible and transparent
- Guided discussion

Nucleolus This dense, spherical granule found in the nucleus contains RNA (ribonucleic acid) which is responsible for protein synthesis in the cytoplasm.

Chromatin Network These are very fine thread-like, coiled filaments uniformly distributed in the nucleoplasm. At the time of cell division, the chromatin becomes thick and ribbon like and are known as chromosomes. The chromosomes contain genes, which are composed of DNA (deoxy-ribonucleic acid). Genes are responsible for storing and transmitting hereditary characteristics from one generation to another. A gene is the functional unit of a chromosome. Genes are arranged in single linear order along the chromosome. One gene may be responsible for a single characteristic, or a single characteristic may be transmitted by a set of genes.

Prokaryotic and Eukaryotic Cells

The structure of the cell that we have studied so far is that of a eukaryotic cell. How is a prokaryotic cell different from a eukaryotic cell? The main difference between these two cell types is that prokaryotic cells do not have a nuclear membrane. The nuclear material consists of a single chromosome and lies in the cytoplasm. The nuclear region in the cytoplasm is called nucleoid. Membrane-bound organelles are absent. Prokaryotic cells are found in bacteria and cyanobacteria (blue-green algae).

HOME TASK :

1. To memorise the organelles and their functions
2. To practice back exercise

Prepared By
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DAV Bathinda

RUBRICS OF ALL ACTIVITIES :

	<u>5 POINTS</u>	<u>4 POINTS</u>	<u>3 POINTS</u>	<u>2 POINTS</u>
<u>Student involvement and asking questions</u>	Student collects Information and asks Questions more than once	Student collects information and Asks questions Once in a class	Rarely Participating and asking Questions	Seldom collects ideas And asking questions
<u>Number of correct answers (OUT OF 5)</u>	maximum Traits cited	most of the traits cited	few traits cited	single trait cited
<u>Pictorial representation</u>	Orderly and Clear, visually effective	Orderly and clear	Orderly but Not clear	Not orderly and clear
<u>Understanding of the topic</u>	Shows complete Understanding of the topic	Shows Substantial Understanding of the topic	Shows Some Understanding of the topic	Shows inability to Understand
<u>Formulating the information</u>	Student listens carefully and responds to all questions	Student listens carefully and responds to most of the questions	Student listens casually and responds to few questions	Student listens without interest and is unable to respond to questions
<u>Team work</u>	The group worked together and they were open To new ideas	The group Worked mostly together and accepted new Ideas sometimes	There was Conflict Between the Group members at Various instances	The group did not Work effectively together and Had some Conflict
<u>Following instructions</u>	Student listens to instructions and does all steps carefully	Student listens to instructions and does most steps carefully	Student listens to instructions and does few steps carefully	Student is unable to follow instructions and cannot follow the steps

Suggested activities for formatives :

- ROLE PLAY ON CELL ORGANELLES
- ACTIVITIES AND GAMES

- GROUP DISCUSSIONS
- LINO : A virtual corkboard of sticky-notes
- POLL : Teachers can create a feedback poll or ask questions
- COGGLE : A mind mapping tool
- PEN AND PAPER TEST

After the above tasks the students can be judged upon following skills : Working in a group, leadership skills, helping friends, coping with stress, being benign, social skills, emotional skills, scientific aptitude, applying knowledge in daily life, problem solving, developing good attitude towards teachers, class mates, school, school programmes, creating healthy environment.

MULTIPLE CHOICE QUESTIONS :

Topic: The Cell & Fundamental Unit of life MCQ
Q.1: The largest cell in the human body is -
(a) Nerve cell (b) Muscle cell (c) Liver cell (d) Kidney cell
Q.2: The barrier between the protoplasm and the other environment in an animal cells -
(a) Cell wall (b) Nuclear membrane (c) Tonoplast (d) Plasma membrane
Q.3: The term 'Cell' was given by -
(a) Leeuwenhoek (b) Robert hooke (c) Flemming (d) Robert Brown
Q.4: Who proposed the cell theory? -
(a) Schleiden and Schwann (b) Watson and Crick (c) Darwin and Wallace (d) Mendel and Morgan
Q.5: A plant cell differs from an animal cell in the absence of -
(a) Endoplasmic Reticulum (b) Mitochondria (c) Ribosome (d) Centrioles
Q.6: Centrosome is found in -
(a) Cytoplasm (b) Nucleus (c) Chromosomes (d) Nucleolus
Q.7: The power house of a cell is -
(a) Chloroplast (b) Mitochondrion (c) Golgi apparatus (d) Nucleolus
Q.8: Within a cell the site of respiration (oxidation) is the -
(a) Ribosome (b) Golgi apparatus (c) Mitochondrion (d) Endoplasmic Reticulum
Q.9: Which is called 'Suicidal Bag'?
(a) Centrosome (b) Lysosome (c) Mesosome (d) Chromosome
Q.10: Ribosomes are the center for -
(a) Respiration (b) Photosynthesis (c) Protein synthesis (d) Fat synthesis
Q.11: Double membrane is absent in -
(a) Mitochondrion (b) Chloroplast (c) Nucleus (d) Lysosome
Q.12: Cell organelle found only in Plant is -
(a) Golgi apparatus (b) Mitochondria (c) Plastids (d) Ribosomes
Q.13: Organisms lacking nucleus and membrane bound organelle are -
(a) Diploids (b) Prokaryotes (c) Haploids (d) Eukaryotes
Q.14: Animal cell is limited by -
(a) Plasma membrane (b) Shell membrane (c) Cell wall (d) Basement membrane
Q.15: The network of Endoplasmic Reticulum is present in the -
(a) Nucleus (b) Nucleolus (c) Cytoplasm (d) Chromosomes
Q.16: Lysosome are reservoirs of -
(a) Fat (b) RNA (c) Secretary Glycoprotein (d) Hydrolytic Enzymes
Q.17: The membrane surrounding the vacuole of a plant cell is called -
(a) Tonoplast (b) Plasma membrane (c) Nuclear membrane (d) Cell wall

Q.18: Cell secretion is done by -

(a) Plastids (b) ER (c) Golgi apparatus (d) Nucleolus

Q.19: Centrioles are associated with -

(a) DNA synthesis (b) Reproduction (c) Spindle formation (d) Respiration

Q.20: Main difference between animal cell and plant cell is -

(a) Chromosome (b) Ribosome (c) Lysosome (d) Endoplasmic Reticulum

LAB WORK :

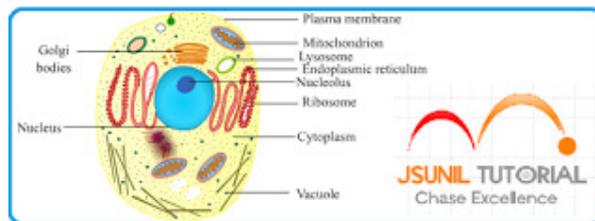
1. to prepare temporary stained mount of onion peel
2. To prepare temporary stained mount of human cheek cell
3. To demonstrate the process of diffusion
4. to study osmosis in raisins
5. to study plasmolysis and deplasmolysis

REMEDIAL MEASURES :

Assignment with answers :

1. What is plasma membrane? What are their functions?

Ans:



- Plasma membrane also called as cell membrane, is the outer covering of a cell that separates the cell contents (protoplasm) from the surrounding medium.
- It is made up of proteins and lipids.
- It gives form (shape and size) to the cell
- It maintains the individuality of the cell (i.e. separates cells)
- It keeps the cell contents in place

2. What are cell organelles ?

Ans: The certain specific living parts of a cell with a definite function are called Cell organelles. All cells are found to have same organelles and together these constitute to the basic unit of life.

3. What is cellulose and its functions?

Ans: Cellulose is the main component of a plant cell wall. It is responsible for giving structural shape to the cell and also to protect the protoplasm.

4. What is a Prokaryotic cell? Give an Example.

Ans: The cells that do not have a nuclear membrane and membrane bound cell organelles (i.e. well-defined nucleus) are known as Prokaryotic Cells. Example:- Blue green algae, Bacteria, *Mycoplasma* etc.

5. What are the advantages of multicellularity ?

Ans:

- The division of labour in a multicellular organism increases the efficiency of the organism.
- It increases the Chance of survival.

6. What are vacuoles? What are their functions?

Ans:

- Vacuoles are clear fluid/gas filled spaces in the cytoplasm.
- In plant cells, it is larger and less in number as compared to the animal cells.
- Vacuoles help in the storage of water, food and other waste substances.

7. What is ER ? Name two types of ER. Write its main functions.

Ans:

- Endoplasmic Reticulum or ER, is a network of tube like structures found in the cytoplasm.
- The two types of ER are Rough Endoplasmic Reticulum (RER) and Smooth Endoplasmic Reticulum (SER).
- It provides channel for quick transport of materials
- It provides materials (i.e. lipids and proteins) for membrane biogenesis.

8. Write the Function of Chromatin material.

Ans: The Chromatin material mainly consists of DNA's, therefore plays an important role in storing and transmitting hereditary information (DNA) from one generation to another.

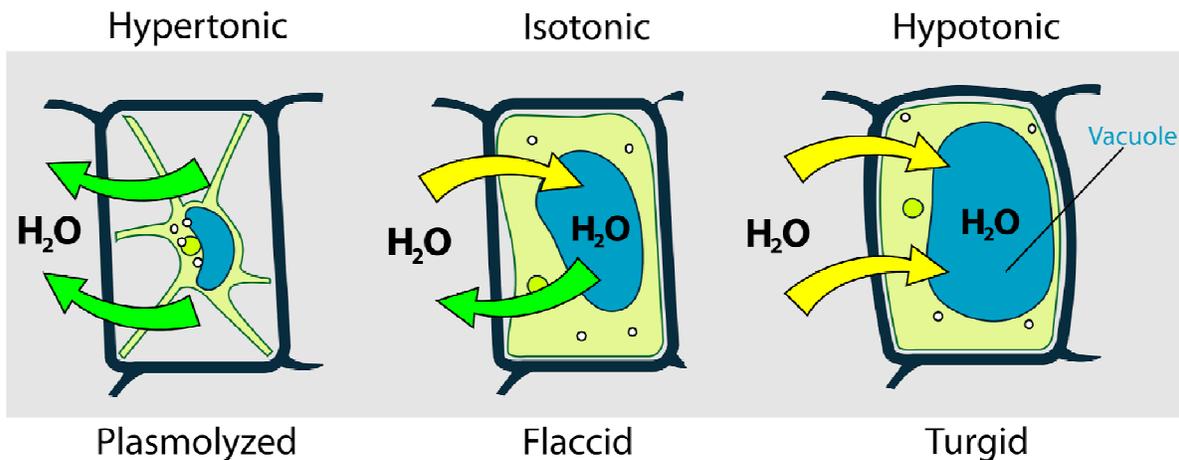
9. Name a cell that lacks membrane. Where is it prepared?

Ans: Ribosomes is a cell organelle which lacks membrane and is prepared in the Nucleolus.

10. What is plasmolysis? What happens to a plasmolysed cell when it is placed in water ?

Ans:

- The detachment of cell membrane of the plant cell from the cell wall when put in Hypertonic Solution is known as Plasmolysis.
- The cell that has undergone plasmolysis i.e. plasmolysed cell when placed in water, the water moves into the cell from the solution due to the higher concentration of water in the solution (Endosmosis) and therefore the cell swells.



11. What do you mean by nucleoid?

Ans: The undefined nuclear region of prokaryotic cells like blue green algae are known as nucleoid. The nucleoid contains nucleic acid but does not have any membrane covering it.

12. What are the factors which restrict the size of the cell?

Ans: The factors which restrict the size of the cell are:

- Functions of cell.
- Cell's requirement of oxygen and other materials from the environment.
- Regulating ability of the nucleus of the cell.

13. Name the two nucleic acids present in the cell and their functions.

Ans:

1. Ribose Nucleic Acid (RNA) – It helps in protein synthesis.
2. Deoxyribo Nucleic Acid (DNA) – It stores hereditary information.

14. Give any two functions of plastids.

Ans:

- Leucoplast are the site of storage of food.
- Chromoplast provide colour to various flowers and fruits.

15. Write down the main functions of cell wall.

Ans:

- Cell wall provides shape as well as rigidity to the cell.
- It protects the protoplasm.
- It is involved in the movement of materials in and out of the cell.
- It prevents the cell from bursting even in very dilute solution.

16. Describe in short the chief components of a nucleus.

Ans:

- *Nucleoplasm* – the semi-fluid part of protoplasm lying inside the nucleus, in which nucleoli and Chromatin fibers are found.
- *Nucleolus* – a dense, spherical, darkly stained structure, which the site of formation and store house of RNA's.
- *Nuclear Membrane*- The membrane that bounds the nucleus, which semi-permeable, double layered and porous.

17. What role does a nucleus play in cellular reproduction?

Ans: The nucleus plays the central role in the cell division/reproduction. Nucleus carry the hereditary information and it divides to form two new cell by the process of cellular reproduction. Apart from that, nucleus also plays a vital role in determining when the cell will divide.

18. Write functions of lysosomes?

Ans:

- They take part in intracellular digestion of foreign particles.
- They provide energy during starvation.
- They help in defence against bacterial and viral infections.
- They remove cellular debris.

19. Define Osmosis. In what ways it is different from diffusion?

Ans:

Diffusion

Diffusion is defined as the movement of particles from a region of high concentration to a region of low concentration.

Osmosis

Osmosis is defined as the passage of water from a region of high water concentration to a region of low concentration through a Semi-permeable membrane.

20. Write one function each of – Ribosomes, Vacuole, Plasma Membrane

Ans:

- Ribosomes : It helps in Protein Synthesis
- Vacuole : They help in the storage of water, food and other waste substances.
- Plasma Membrane : It regulates the flow materials in and out of the cell.

1. Fill in the blanks:-

(a) New cells are formed from pre-existing cells.

(b) Movement of water molecules from their higher concentration to their lower concentration through a semi-permeable membrane is called Osmosis.

(c) The functional components of cell are plasma membrane, cytoplasm & nucleus.

(d) Protoplasm has two parts- cytoplasm & nucleoplasm.

(e) Nucleus, mitochondria & plastids have their own DNA & ribosomes.

(f) The shrinkage or contraction of the contents of the cell away from the cell wall is known as plasmolysis.

(g) The process by which Amoeba can engulf a food particle is endocytosis.

(h) Biogenesis is the manufacture of lipids required for making cell membrane.

(i) A cell that lacks nuclear membrane is called a prokaryotic cell & the nuclear region is called nucleoid.

(j) Movement of materials in & out of the cell takes place by diffusion & osmosis.

2. What is the advantage of multicellularity over unicellularity?

Ans- Division of labour.

3. What are the chromosomes made up of?

Ans- DNA & proteins

4. A cell placed in a solution swells up. What kind of solution is it? Why does it happen?

Ans- It is a hypotonic solution & water enters the cell by endosmosis causing the cell to swell up.

5. Why are lysosomes known as “suicidal bags”?

Ans- They secrete powerful digestive enzymes to digest the worn out and damaged cell organelles as well as the cell itself when it loses its functional ability.

6. Why is the nucleus so significant in a cell?

Ans- Nucleus has the following important functions-

(i) It controls all cell activities

(ii) It contains hereditary material that transmits hereditary information from one generation to the next

(iii) It helps in cell division

7. Differentiate between plant and animal cells.

1. PLANT CELL

1- Surrounded by two membranes- cell wall & cell membrane.

2- Possess three types of plastids chloroplasts, chromoplasts, leucoplasts.

3- Do not possess lysosomes.

4- Nucleus is towards the periphery.

5- Centrioles are absent

ANIMAL CELL

1- Surrounded only by cell / plasma membrane.

2- Do not possess plastids.

3-Possess lysosomes
4-Nucleus is in the center ..

5-Centrioles present & help in cell division.

8. Give the major functions of the following cell organelles-

(a) Endoplasmic reticulum

RER-- Synthesis of proteins as it has ribosomes attached to it

SER- Synthesis of lipids required for making cell membrane

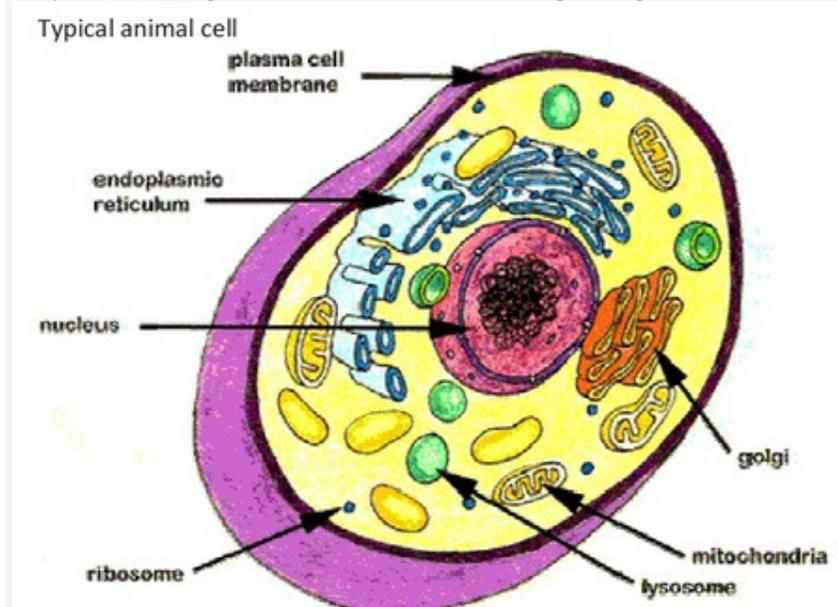
(b) Golgi apparatus-----Storage & packaging of various products.

(c) Mitochondria-----Production of ATP(Adenosine Triphosphate) which is a source of energy.

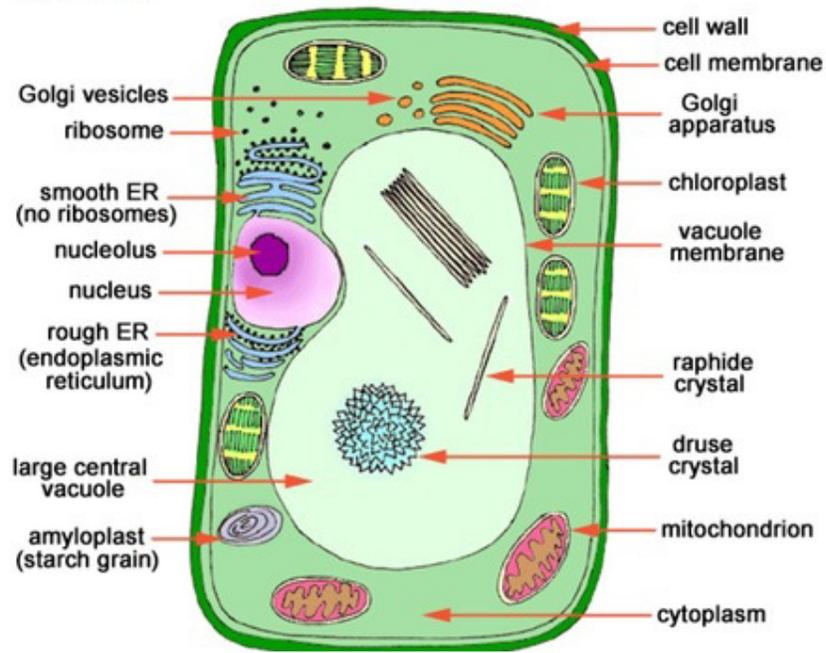
(d) Ribosomes ---Protein synthesis

(e) Golgi ApparatusStorage & packaging of various products.

f) LysosomesDigestion of worn out & damaged organelles



Typical plant cell



Chapter 5

THE FUNDAMENTAL UNIT OF LIFE

Assignment No. 5

Q1. Match the following:

I. Single matching

Column I	Column II
a) Nucleus	i. Cellulose
b) Mitochondria	ii. Double membrane
c) Cell wall	iii. Cell sap
d) Vacuole.	iv. Power house

II. Double matching

Column I	Column II	Column III
a) Multicellular Organisms	i. Lipids	1. Suicide bags
b) Plasma membrane	ii. Plants	2. Inner folded Membrane
c) Mitochondria	iii. Digestive enzymes	3. Proteins
d) Lysosomes	iv. Outer porous membrane	4. Animals.

Q2. Name the organelles that contain genetic material.

Q3. Why are lysosomes called as suicidal bags?

Q3. Name the three types of plastids and the functions they perform.

Q4. Expand: RER, SER, DNA, ATP and ER.

Q5. Shape and size of cells are related to the function they perform. Explain with example.

Q6. A special process helps in the intake of oxygen inside the cells and release of carbon dioxide from the cells. Name the process.

Q7. Define Osmosis and Plasmolysis.

Q8. *Amoeba* is able to engulf its food due to the flexibility of the cell membrane. What is this process called as?

Q9. Egg membranes from three eggs were carefully taken out and labeled as A, B and C. Each of these membranes were filled with 1% solution of sugar. Membrane A was immersed in 0.5% sugar solution, Membrane B was immersed in 1% sugar solution and Membrane C was immersed in 2% sugar solution. Predict the behaviour of the three membranes.

Q10. Give four differences between the eukaryotic and prokaryotic cells.

Q11. Differentiate between plant cell and animal cell on the basis of:

Cell wall, vacuole and plastids.

Q12. Give the functions of the following:

- a) Cell wall
- b) Cell membrane
- c) Nucleus
- d) Mitochondria
- e) Golgi apparatus
- f) Lysosomes
- g) Plastids
- h) SER
- i) RER
- j) Ribosomes

Q13. State the similarity between mitochondria and plastids.

Q14. Name the substances stored in Vacuole.

REVISION BANK

Q15 .What is the percentage of plant cell volume does the central vacuole occupy?

Q16. Draw a well labeled diagram of plant cell

**Multiple choice questions Based on Practical Skills:
Temporary Mount**

1. In order to locate the specimen under the compound microscope the objective lens to be used is
 - a) 10X
 - b) 40X
 - c) 100X
 - d) fine adjustment and 40X
2. If the power of eyepiece is 10X and that of objective lens is 40X, then the total magnification of microscope will be
 - a) 10X
 - b) 400X
 - c) 100X
 - d) 4X
- 3) While preparing the temporary mount of cheek cell the tissue that is scrapped from the inner side of cheek is:
 - a) epithelial tissue
 - b) muscular tissue
 - c) connective tissue
 - d) nervous tissue
- 4) The stain used in preparing temporary mount of cheek cell is
 - a) glycerine
 - b) safranin
 - c) water
 - d) methylene blue
- 5) Which of the following organelle is visible in the temporary mount of cheek cell
 - a) nucleus
 - b) mitochondria
 - c) golgi body
 - d) lysosomes
- 6) To avoid air bubble during the preparation of temporary slide one should
 - (a) use needle to place the cover slip
 - (b) allow the slide to fall gently on the cover slip
 - (c) remove air bubbles using the brush
 - (d) none of the above
- 7) After staining onion peel for 2-3 minutes what will be the colour of the peel
 - a) colourless
 - b) red
 - c) blue
 - d) yellow
- 8) Use of tooth pick in preparing temporary mount of cheek cell is
 - a) to scrap the inner lining of cheek
 - b) to place the cover slip
 - c) to remove the air bubble
 - d) none of the above
- 10) The stain used in preparing temporary mount of onion peel is
 - a) glycerine
 - b) safranin
 - c) water
 - d) methylene blue
- 11) Which of the following organelle is visible in the temporary mount of onion peel
 - a) nucleus
 - b) mitochondria
 - c) golgi body
 - d) lysosomes
- 12) Soham while observing an onion peel slide under the microscope noted the following characteristics.
 - a) Presence of a single nucleus in a cell
 - b) Cells attached edge to edge without any intercellular spaces
 - c) Presence of cell wall around each cell
 - d) All of these

- 13) Human cheek cell was stained, mounted and observed under the compound microscope. The components of the cell which would be seen are :-
- a) Cell wall, nucleus and cytoplasm
 - b) Plasma membrane, cytoplasm, nucleus
 - c) Plasma membrane, nucleus, mitochondria
 - d) Cell wall, nucleus, vacuole
- 14) Use of brush in preparing temporary mount of onion peel is-
- a) to paint the peel
 - b) to transfer the peel
 - c) to remove the air bubble
 - d) to clean the slide
- 15) Microscopic observation of onion peel shows nucleus at the periphery the reason for this is
- a) large nucleus
 - b) large vacuole
 - c) lack of cytoplasm
 - d) improper staining