



BAL BHARATI PUBLIC SCHOOL, PITAMPURA, DELHI – 110034

SUBJECT:- BIOLOGY

CLASS IX : CHAPTER:- THE FUNDAMENTAL UNIT OF LIFE

Guidelines:-

Dear Students,

- Refer to the following content of the chapter.
- These notes will help you to understand the concept of the lesson.
- Do the assignment questions in the Biology notebook.

Link for Textbook:-

http://ncertbooks.prashanthellina.com/class_9.Science.Science/CHAP%205.pdf

TOPIC:- STRUCTURAL ORGANISATION OF A CELL (part 4):-

Cell Organelles:-

V. Ribosomes:-

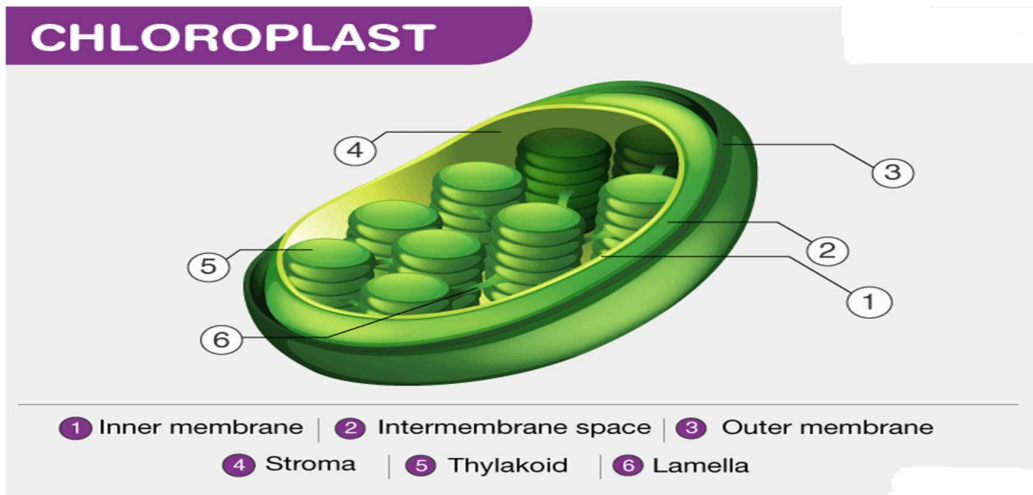
Ribosomes are non-membrane-bound and important cytoplasmic organelles found in close association with the endoplasmic reticulum. Ribosomes are either encompassed within the endoplasmic reticulum or are freely found in the cell's cytoplasm. The primary function of the ribosomes is **protein synthesis** in all living cells.

VI. Plastids:-

Plastids are large membrane-bound organelles which contain pigments. Based on the type of pigments, plastids are of three types:-

- **Chloroplasts** – Chloroplasts are double membrane-bound organelles, which usually vary in their shape – from disk shape to spherical, oval and ribbon-like. They are present in **mesophyll cells** of leaves, which store chlorophyll, the **green pigment** which is responsible for trapping light energy for photosynthesis. The inner membrane encloses a space called the **stroma**. Flattened disc-like chlorophyll-containing structures known as **thylakoids** are arranged in a stacked manner like a pile of coins. Each pile is called **granum** (plural: grana) and the thylakoids of different grana are connected by flat membranous tubules known as stromal lamella.

NOTE:- Just like the mitochondria, the stroma of chloroplast also contains DNA and ribosomes which are required for the synthesis of proteins.- **SEMI AUTONOMOUS.**



- **Chromoplasts** – The chromoplasts are **coloured plastids** which provide the plants with their characteristic colour – yellow, orange, red, etc.
- **Leucoplasts** – Leucoplasts are colourless plastids which store materials like starch, oils and protein granules.

VII. Vacuoles:-

Vacuoles are mostly defined as storage bubbles of irregular shapes which are found in cells. They are fluid-filled organelles enclosed by a membrane. **Cell sap** is the fluid in the cell and it provides turgidity and rigidity to the cell.

- The vacuole **stores the food** or a variety of nutrients that a cell might need to survive.
- It also **stores waste products**. The waste products are eventually thrown out by vacuoles. Thus, the rest of the cell is protected from contamination.
- The **animal cells** have more number of vacuoles in comparison to **plant cells**.
- Compared to the animal cells, plant cells have **larger vacuoles**.

A Brief Summary on Cell Organelles:-

Cell Organelles	Structure	Functions
Cell membrane	A double membrane composed of lipids and proteins. Present both in plant and animal cell.	Provides shape, protects the inner organelle of the cell and acts as a selectively permeable membrane.
Centrosomes	Composed of Centrioles and found only in the animal cells.	It plays a major role in organizing the microtubule and Cell division.

Chloroplasts	Present only in plant cells and contains a green-coloured pigment known as chlorophyll.	Sites of photosynthesis.
Cytoplasm	A jelly-like substance, which consists of water, dissolved nutrients and waste products of the cell.	Responsible for the cell's metabolic activities.
Endoplasmic Reticulum	A network of membranous tubules, present within the cytoplasm of a cell.	Forms the skeletal framework of the cell, involved in the Detoxification, production of Lipids and proteins.
Golgi apparatus	Membrane-bound, sac-like organelles, present within the cytoplasm of the eukaryotic cells.	It is mainly involved in secretion and intracellular transport.
Lysosomes	A tiny, circular-shaped, single membrane-bound organelles, filled with digestive enzymes.	Helps in the digestion and removes wastes and digests dead and damaged cells. Therefore, it is also called as the "suicidal bag".
Mitochondria	An oval-shaped, membrane-bound organelle, also called as the "Power House of The Cell".	The main sites of cellular respiration and are also involved in storing energy in the form of ATP molecules.
Nucleus	A largest, double membrane-bound organelles, which contains all the cell's genetic information.	Controls the activity of the cell, helps in cell division and controls the hereditary characters.
Plastids	Double membrane-bound organelles. There are 3 types of plastids: <ol style="list-style-type: none"> 1. Leucoplast –Colourless plastids. 2. Chromoplast–Blue, Red, and Yellow colour plastids. 3. Chloroplast – Green coloured plastids. 	Helps in the process of photosynthesis and pollination, imparts colour to leaves, flowers and fruits and stores starch, proteins and fats.
Ribosomes	Non-membranous organelles, found floating freely in the cell's cytoplasm or embedded within the endoplasmic reticulum.	Involved in the Synthesis of Proteins.
Vacuoles	A membrane-bound, fluid-filled organelle found within the cytoplasm.	Provide shape and rigidity to the plant cell and helps in digestion,

		excretion, and storage of substances.
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Cell Division:-

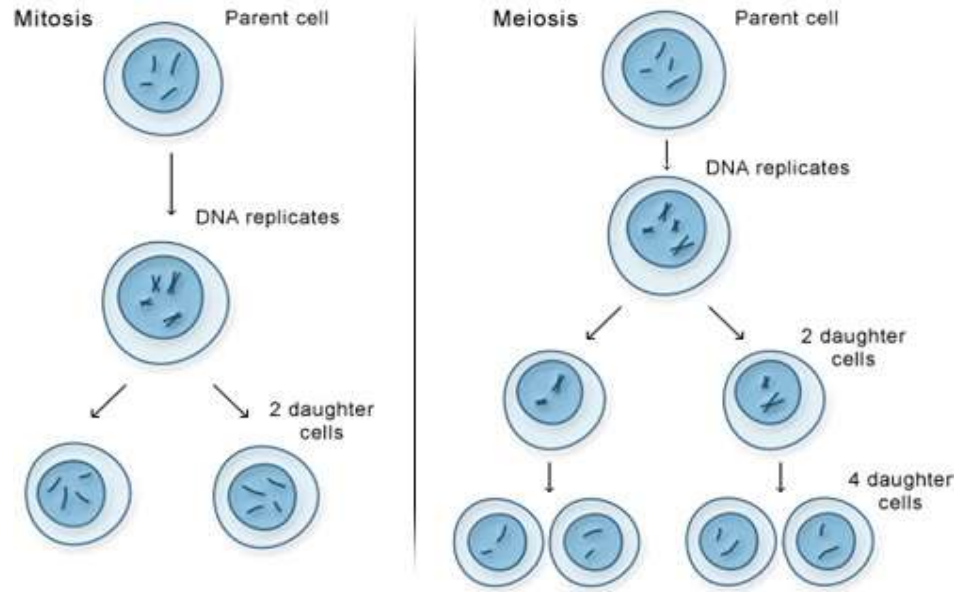
Cell division happens when a parent cell divides into two or more cells called daughter cells. Cell division usually occurs as part of a larger cell cycle. All cells reproduce by splitting into two, where each parental cell gives rise to two daughter cells.

Types of Cell Division:-

- There are two distinct types of cell division out of which the first one is vegetative division, wherein each daughter cell duplicates the parent cell called **mitosis** giving rise to **diploid** cells (cells having the exact number of chromosomes for a given species). In humans the number of chromosomes in the nucleus of each cell is **46** (Diploid number).
NOTE:- Mitosis: The process cells use to make exact replicas of themselves. Mitosis is observed in almost all the body's cells, including eyes, skin, hair, and muscle cells.
- The second one is **meiosis**, which divides into four **haploid** daughter cells (cells having half the number of chromosomes for a given species). In humans, half the number of chromosomes in the cell is **23** (Haploid number).
NOTE :- Meiosis: In this type of cell division, sperm or egg cells are produced instead of identical daughter cells as in mitosis.

➤ A SUMMARY OF THE PROCESSES OF CELL DIVISION:-

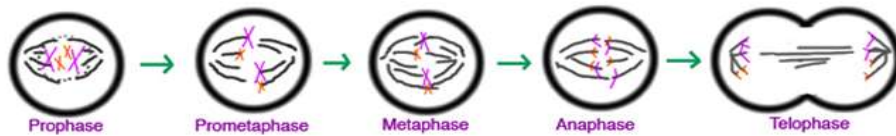
The stages show how the number of chromosomes varies in each kind of cell division.



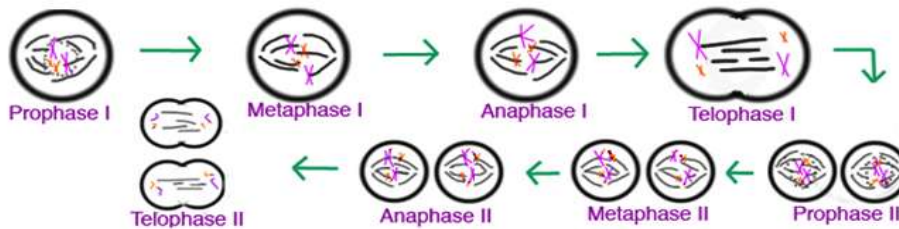
➤ **A SPECIFIC DESCRIPTION OF THE PROCESSES OF CELL DIVISION:-**

Types of Cell Division

MITOSIS



MEIOSIS



➤ **NOTE:- YOU ARE NOT EXPECTED TO MEMORISE THE SPECIFIC STAGES BUT THE IMAGE HAS BEEN SHARED JUST FOR UNDERSTANDING THE CONCEPT**

Kindly refer to the link shared for better understanding of Cell division:-

<https://youtu.be/6jED-UOxhJU>

ASSIGNMENT:-

1. Give reasons:-
 - (a) Mitochondria are called power houses of the cell.
 - (b) Lysosomes are called suicidal/digestive bags.
 - (c) Vacuoles in plant cells are less in number.
2. Enumerate the functions of:-
 - (a) Endoplasmic reticulum
 - (b) Vacuoles
 - (c) Ribosomes
3. Elaborate the function of vacuoles in a plant cell.
4. Identify the kind of cell division involved in:-
 - (a) Growth and repair of body parts
 - (b) Formation of gametes
5. Show the processes of cell division- Mitosis and Meiosis, with the help of diagrams
6. Identify the cell components responsible for the functions given in Column 2: -

Functions of the cell parts

Cell Part	Function
	The control centre of the cell. Contains genetic information.
	Watery, jelly-like liquid that fills the cell. It is where the chemical reactions take place.
	Controls what enters and leaves the cell.
	Provides support to the cell, helping it to keep its shape. It is made from cellulose.
	Absorb the sunlight energy for use in photosynthesis. They contain the green pigment, chlorophyll.
	Stores cell sap, a solution of sugar and salts.

BBPS, PITAMPURA