

**Subject: Biology**

**Class: SS1**

**Topic: The Cell**

**Duration: 40 Minutes**

**Term: First Term**

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### **Lesson Objectives:**

By the end of this lesson, students should be able to:

1. Define the **cell as the basic unit of life**.
  2. Describe the **forms of existence of cells** (independent, colony, filament).
  3. Explain the **cell theory** and its historical development.
  4. Identify and describe the **structures of plant and animal cells** and their functions.
  5. State the **differences between plant and animal cells**.
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### **Introduction:**

All living organisms are made up of **cells**.

Cells are called the **basic unit of life** because they carry out all the activities needed for survival.

Organisms can be:

- **Unicellular** (one cell, e.g., Amoeba)
- **Multicellular** (many cells, e.g., Human, Mango tree)

The **study of cells** is known as **Cytology**.

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### **Lesson Content**

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#### **1. The Cell as the Basic Unit of Life**

A **cell** is the **smallest living part of an organism** that can function independently.

It performs all life processes such as:

- Feeding (Nutrition)
- Movement
- Breathing (Respiration)
- Growth
- Excretion (removal of waste)
- Reproduction
- Response to the environment (Sensitivity)

All life begins from a cell. For example, a human being starts life as a single fertilized egg cell.

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## 2. Forms of Existence of Cells

Cells do not always exist in the same way. They can exist in different forms:

### A. Independent (Unicellular) Organisms

- These are organisms made up of **only one cell**.
- That **single cell performs all life functions** such as movement, feeding, and reproduction.

**Examples:**

- *Amoeba*
  - *Euglena*
  - *Paramecium*
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### B. Colonial Organisms

- Here, **many identical cells live together in a group** (colony), but each cell can survive independently if separated.
- There is **no division of labor**, and each cell performs the same function.

**Example:**

- *Volvox* (a green alga that forms spherical colonies)
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### C. Filamentous Organisms

- Cells are arranged **end-to-end in chains or filaments**.
- Each cell may carry out similar functions, but they are joined together.

#### Example:

- *Spirogyra* (a green alga)
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## 3. The Cell Theory

### Definition:

The **cell theory** is a fundamental principle in biology that explains the role of cells in life.

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### Main Statements of Cell Theory:

1. **All living things are made up of cells.**
  2. **The cell is the smallest unit of structure and function in living organisms.**
  3. **All cells come from pre-existing cells through cell division.**
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### Historical Development of Cell Theory:

Scientist	Contribution
Robert Hooke (1665)	First person to observe and name "cells" using a microscope while studying cork.
Matthias Schleiden (1838)	Stated that <b>all plants are made of cells</b> .
Theodor Schwann (1839)	Stated that <b>all animals are made of cells</b> .
Rudolf Virchow (1855)	Stated that <b>new cells are produced from existing cells</b> .

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## 4. Structure of the Cell

Cells have different parts called **organelles** that perform specific functions.

#### Basic Parts of All Cells:

Organelle	Function
Cell Membrane (Plasma membrane)	Protects the cell and controls what enters or leaves (selectively permeable).
Cytoplasm	Jelly-like fluid where chemical reactions take place. Organelles are found here.
Nucleus	Controls the activities of the cell. Contains DNA (the genetic material).
Mitochondria	Produce energy for the cell. Known as the "powerhouse of the cell."
Ribosomes	Make proteins needed for growth and repair.
Endoplasmic Reticulum (ER)	Transports substances around the cell. Can be <b>Rough (with ribosomes)</b> or <b>Smooth (no ribosomes)</b> .
Golgi Apparatus (Golgi body)	Packages proteins and other substances for transport.
Lysosomes	Contain enzymes that digest waste and old organelles (mostly in animal cells).

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#### Special Structures in Plant Cells:

Organelle	Function
Cell Wall	Gives the plant cell a regular shape and protects it. Made of <b>cellulose</b> .
Chloroplasts	Contain <b>chlorophyll</b> for photosynthesis (making food using sunlight).
Large Central Vacuole	Stores water, nutrients, and waste products. Maintains <b>turgidity</b> (firmness).

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#### Diagram (Suggested for Drawing):

Draw and label:

- **Plant Cell** – include: cell wall, chloroplast, large vacuole, nucleus, cytoplasm, cell membrane, mitochondria, ribosomes, Golgi body, ER.
  - **Animal Cell** – include: nucleus, cytoplasm, cell membrane, mitochondria, ribosomes, Golgi body, ER, small vacuoles, centrioles.
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## 5. Differences Between Plant and Animal Cells

Feature	Plant Cell	Animal Cell
Cell Wall	Present (made of cellulose)	Absent
Chloroplasts	Present (for photosynthesis)	Absent
Vacuole	Large central vacuole	Small or absent
Shape	Regular and rectangular	Irregular or round
Centrioles	Absent	Present (for cell division)
Mode of Nutrition	Autotrophic (make their own food)	Heterotrophic (depend on other organisms for food)

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### Conclusion:

Cells are the **building blocks of life**.

All living organisms are either made of one cell or many cells.

The cell performs all necessary activities for survival.

Understanding cell structure and the cell theory is the foundation of modern biology.