

**ST.CHARLES COLLEGE OF EDUCATION, MADURAI-06**

**MODEL LESSON PLAN - BOTANY**

Name of the Student Teacher :  
Name of the Guide Teacher :  
Name of the School :  
Date :  
Class/Sec : IX 'A'  
Subject : Biology  
Unit : II  
Topic : The structure of a cell  
Time : 40 minutes

**Instructional Objectives:**

**The Student,**

- ❖ defines the basic unit of all the living organisms.
- ❖ identifies the outer cell wall of the plant cell.
- ❖ explains that cellulose is composed of hundreds and thousands of carbon, hydrogen, and oxygen atoms.
- ❖ analyzes the protoplasm and its function.
- ❖ determines protoplasm is divided into cytoplasm and nucleus.
- ❖ explains cytoplasm and its functions.
- ❖ mentions nucleus and its functions.
- ❖ recalls other components of protoplasm.
- ❖ discusses Cell membrane or plasma membrane.
- ❖ differentiates organ and an organelle.
- ❖ compares plant and animal cells
- ❖ summarize cell structure and its functions.

**Instructional resources required:**

1. Slides of cells of different plants and microscope.
2. Charts of plant cell and animal cell.
3. Table charts of organ and organelle
4. Slide of animal cell


5. Plant and animal cell pictures.

**Previous Knowledge of learners:**

- ❖ The teacher asks few questions regarding cell, plants and animals to bring out the previous knowledge of the student about the cell.

Pupils answer the following questions:

- What is a living organism?
- What is a non-living organism?
- What is the difference between living and non-living organism?
- What are the organs found in man?
- What constitute the organs?
- What constitute the tissues?

Concept/Content	Specification of behavioral Objectives	Learning Experiences	Evaluation
<p><b>Cell</b>                      “A cell is defined as the smallest, basic unit of life that is responsible for all of life's processes.”</p>	<p>defines</p>	<p>The teacher defines the A cell is defined as the smallest, basic unit of life that is responsible for all of life's processes as cell with the chart and The student looks at the chart with interest.</p> <div data-bbox="711 1279 1193 1451" style="border: 1px solid black; background-color: #90EE90; padding: 5px; margin: 10px auto; width: fit-content;"> <p>A cell is defined as the smallest, basic unit of life that is responsible for all of life's processes</p> </div>	<p>What is the fundamental unit of life?  Define a cell?</p>
<p><b>Cell wall</b>                      A cell wall as the non-living component, covering the outermost layer of a cell.</p>	<p>identifies</p>	<p>The teacher asks the student to identify that the plant cell is surrounded by the outer cell wall. The student identifies the outer cell wall of the plant cell from the slide.</p> <div data-bbox="743 1704 1161 1935" style="border: 1px solid black; background-color: #191970; color: white; padding: 5px; margin: 10px auto; width: fit-content;">  <p>A cell wall is the non-living component, covering the outermost layer of a cell. Its composition varies according to the organism and is permeable in nature. The cell wall separates the interior contents of the cell from the exterior environment. It also provides shape, support, and protection to the cell and its organelles.</p> </div>	<p>What is the boundary of the plant cell?</p>

<p><b>Cellulose</b> A molecule, consisting of hundreds – and sometimes even thousands – of carbon, hydrogen and oxygen atoms.</p>	<p>explains</p>	<p>The teacher explains that the cell wall is made up of cellulose in plant.</p> <p>The student explains the cellulose from the chart.</p> <div data-bbox="703 376 1233 629" style="border: 1px solid cyan; padding: 5px;"> <p>Cellulose is a molecule, consisting of hundreds – and sometimes even thousands – of carbon, hydrogen and oxygen atoms. Cellulose is the main substance in the walls of plant cells, helping plants to remain stiff and upright.</p> </div>	<p>What does the cell wall made up of?</p>
<p><b>Protoplasm and its function</b> It Contains organelles Appearance: Jelly-like, colorless, transparent, viscous Location: Inside the cell wall Introduced: 1835 Function: Essential for life processes</p>	<p>analyzes</p>	<p>The teacher analyzes that the protoplasm is the living part of the cell, containing various organelles. It's a jelly-like, colorless, transparent, and thick substance inside the cell wall. The term "protoplasm" was introduced in 1835 and is considered the primary substance responsible for many life processes.</p> <p>The student analyzes the components and functions of protoplasm..</p>	<p>What is protoplasm? Mention the functions of protoplasm.</p>
<p><b>Components of Protoplasm</b> Protoplasm is divided into cytoplasm and nucleus.</p>	<p>determines</p>	<p>The teacher explains that protoplasm is divided into the cytoplasm and nucleus using a chart.</p> <div data-bbox="675 1265 1193 1541" style="border: 2px solid red; padding: 5px;"> </div> <p>The student determines from the chart that protoplasm consists of two parts: the cytoplasm and the nucleus.</p>	<p>What are the two main divisions of protoplasm?</p>
<p><b>Cytoplasm and its functions</b> Found between the cell membrane and the nucleus in eukaryotic cells. Maintains the cell environment and shape. Stores substances needed by</p>	<p>explains</p>	<p>The teacher explains that the cytoplasm is the primary component of protoplasm, located between the cell membrane and the cell nucleus in a eukaryotic cell, while the students take notes.</p>	<p>What is the cytoplasm, and where is it located within a eukaryotic cell?</p>

organelles.													
<b>Nucleus and its functions</b> Stores genetic information. Contains ribosomes essential for protein production. Prokaryotes have a nucleoid instead of a nucleus for storing genetic information.	mentions	The teacher mentions that the nucleus is the second component of the protoplasm, which stores the genetic information of an organism.	What is the nucleus and what are the functions of it's?										
<b>Other Components of Protoplasm</b> Proteins, fats, enzymes, and hormones. These are dissolved or suspended in the water component of the protoplasm.	recalls	The teacher explains that the Proteins, fats, enzymes, hormones, all make up the protoplasm. These are either dissolved or suspended in the water component of the protoplasm. The student recalls other components of protoplasm.	State other components of protoplasm.										
<b>Cell membrane</b> The cell membrane, or plasma membrane, is in all cells and separates the cell's interior from the outside environment. It has a semipermeable lipid bilayer and regulates material transport in and out of the cell.	discusses	The teacher discusses that the cell membrane, also called the plasma membrane, is found in all cells and separates the interior of the cell from the outside environment. The cell membrane consists of a lipid bilayer that is semipermeable. The cell membrane regulates the transport of materials entering and exiting the cell. The student discusses among themselves that the animal cell does not possess a cell wall but possess only cell membrane.	What is the cell membrane, and what are its functions and structure?										
<b>Difference between an organ and an organelle</b> An organ is a collection of tissues performing specific functions in the human body. On the contrary, organelles are cellular structures performing specific functions within the cell.	differentiates	The teacher differentiates organ and organelle by using table chart. <table border="1" data-bbox="673 1429 1259 1774"> <thead> <tr> <th>Organ</th> <th>Organelle</th> </tr> </thead> <tbody> <tr> <td>Organ are part of body</td> <td>Organelles are part of cell.</td> </tr> <tr> <td>Found in multicellular organism.</td> <td>Found in all multicellular and unicellular organisms.</td> </tr> <tr> <td>They are macroscopic in structure.</td> <td>They are microscopic in structure.</td> </tr> <tr> <td>Example: Brain, Kidney, Lungs etc.</td> <td>Example: Mitochondria, Nucleus, ER, etc.</td> </tr> </tbody> </table> The student understands the differences between an organ and an organelle by observing the chart.	Organ	Organelle	Organ are part of body	Organelles are part of cell.	Found in multicellular organism.	Found in all multicellular and unicellular organisms.	They are macroscopic in structure.	They are microscopic in structure.	Example: Brain, Kidney, Lungs etc.	Example: Mitochondria, Nucleus, ER, etc.	Differentiate organ and organelle.
Organ	Organelle												
Organ are part of body	Organelles are part of cell.												
Found in multicellular organism.	Found in all multicellular and unicellular organisms.												
They are macroscopic in structure.	They are microscopic in structure.												
Example: Brain, Kidney, Lungs etc.	Example: Mitochondria, Nucleus, ER, etc.												
<b>Plant cell and animal cell</b> <b>Role in Ecosystem:</b>	compares	The teacher compares plant and animal cells using a picture chart and shows slides of	Which cell possesses										

Plants: Producers  
 Animals: Consumers

**Cell Functions and Structures:**

Plants: Exhibit specific structures and organelles suited for producing energy (e.g., chloroplasts for photosynthesis).

Animals: Exhibit structures and organelles suited for consuming and processing energy.

**Cell Composition:**

Plants: Unique organelles include chloroplasts and a cell wall.

Animals: Unique organelles include lysosomes and centrioles.

**Common Features:**

Both plant and animal cells share fundamental eukaryotic features.

Some organelles are present in both cell types.

**Higher Organisms:**

Both plants and animals are eukaryotes, possessing common eukaryotic cell features.

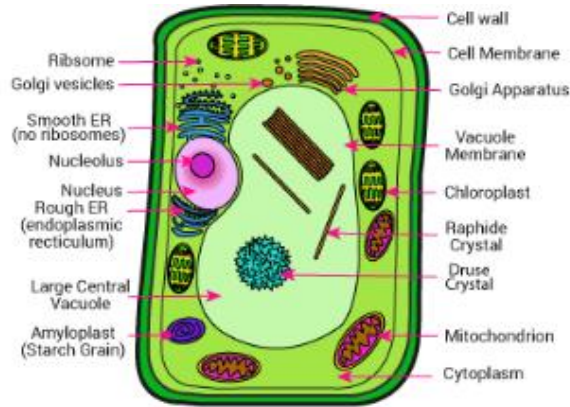
**Important points of the topic**

Cell  
 Cell wall  
 Cellulose  
 Components of Protoplasm  
 Cytoplasm and its functions

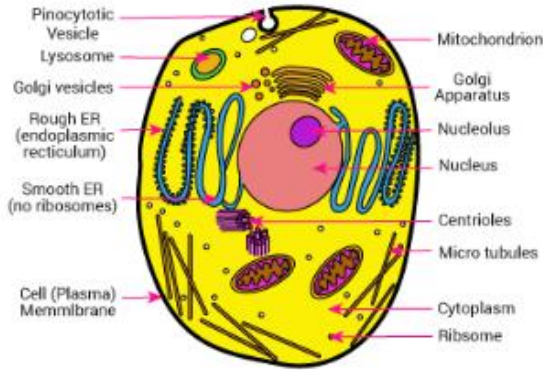
Summarizes  
 draws

plant cells through a microscope.

**Plant cell Picture:**



**Animal Cell Picture**



The student compares that plant cells have a cell wall, chloroplasts, and many large vacuoles, while animal cells have a cell membrane, small and few vacuoles, but no chloroplasts.

chloroplast?  
 Where do you find large vacuoles?  
 Where do you find cell membrane?

Draw the diagram of animal and plant cell? Label the parts.  
 What is its

Nucleus and its functions Other Components of Protoplasm Cell membrane Difference between an organ and an organelle Plant cell and animal cell			importance?
--	--	--	-------------

**Follow up activities:**

1. Draw and label diagram of a plant cell.
2. Describe the structure of an animal cell with neat labeled diagram.

**Signature of the Guide Teacher**

**Signature of the Student Teacher**