Chapter 4 - Cell

1. **Cell = Basic Unit of Life**

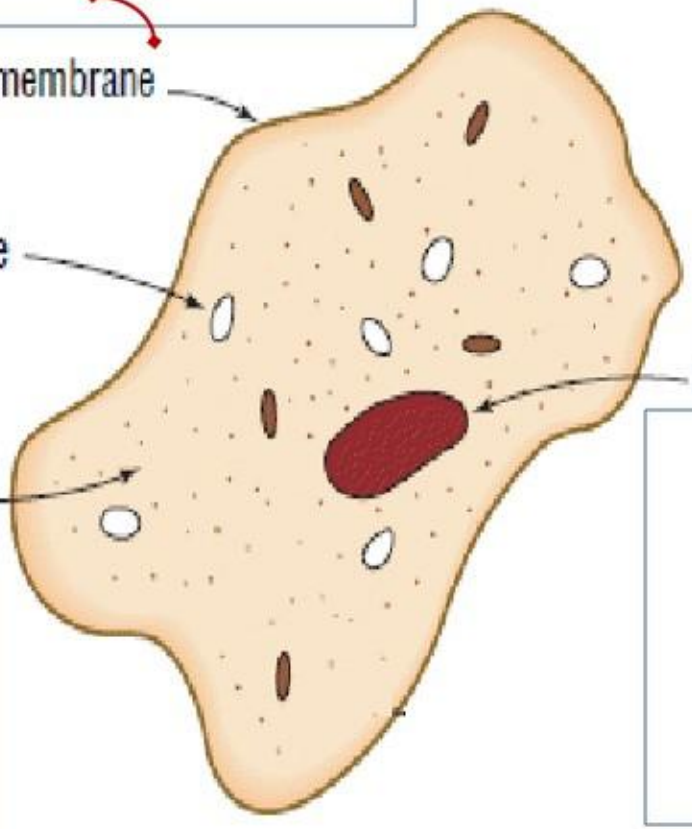
2. Use microscope to see

3. All **Living Things are made up of CELLS** (Living & Dead Cells)

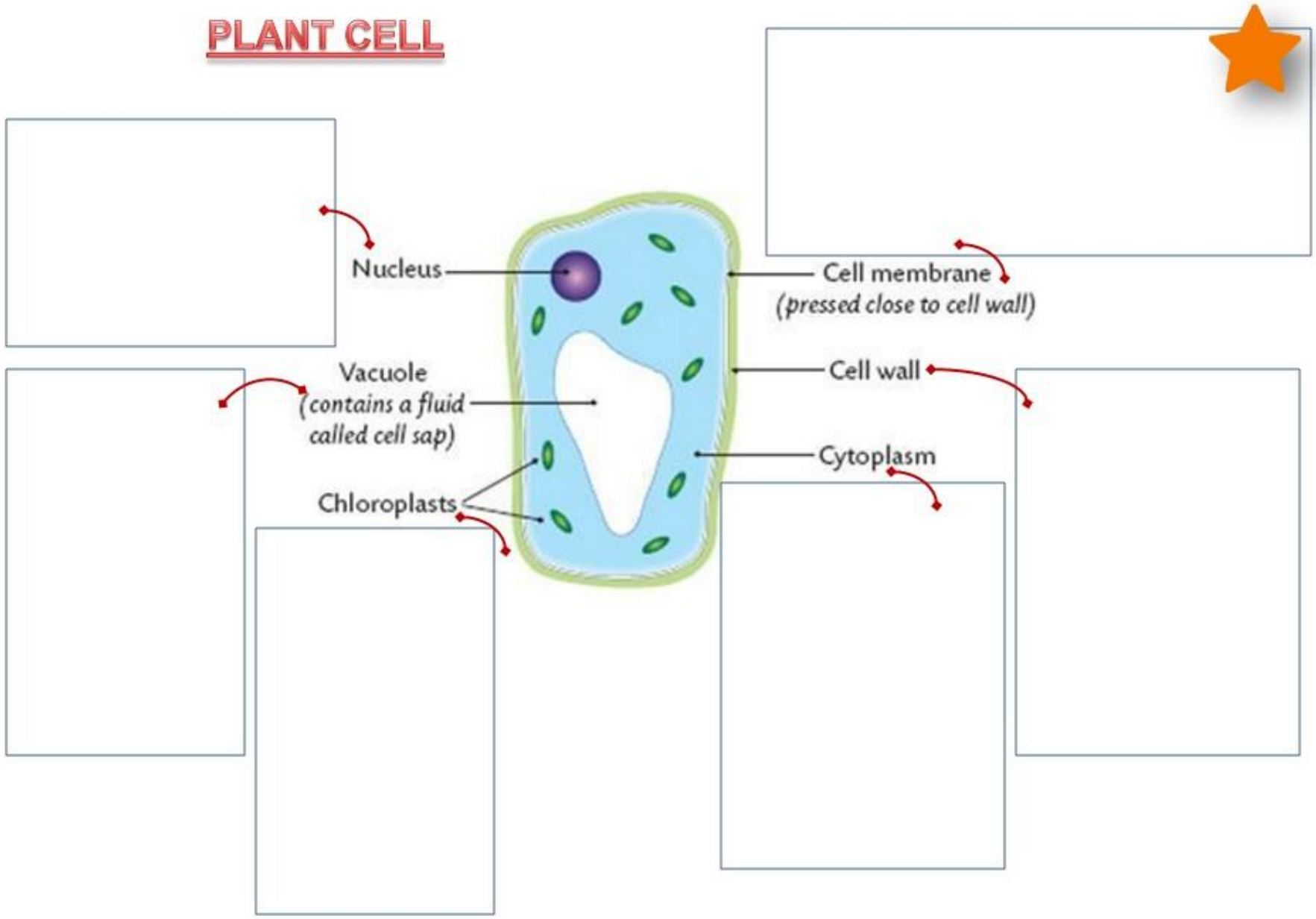
4. **UNICELLULAR ORGANISMS**
   → Made up of *1 Cell* (1 Parent)
   → Eg: Amoeba, Yeast, Paramecium

5. **MULTICELLULAR ORGANISMS**
   → Made up of *many cells*
   → Eg: Lion, Owl, Human, Shark

ANIMAL CELL

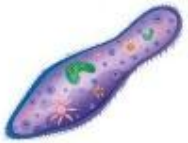
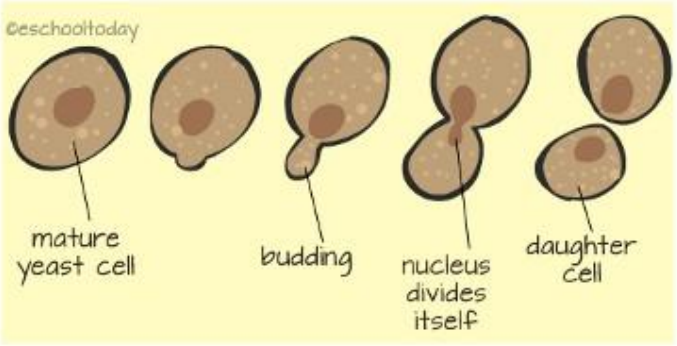


PLANT CELL


Nucleus
Cell membrane
(pressed close to cell wall)
Vacuole
(contains a fluid
called cell sap)
Cell wall
Cytoplasm
Chloroplasts

CELL DIVISION

Important for Cell to Reproduce = To Grow and Replace the Old & Damage Cell

Binary Fission	Budding
 Paramecium  Amoeba	 Eg: Yeast & Hydra

EXPERIMENTS

Experiment 1

Materials needed:

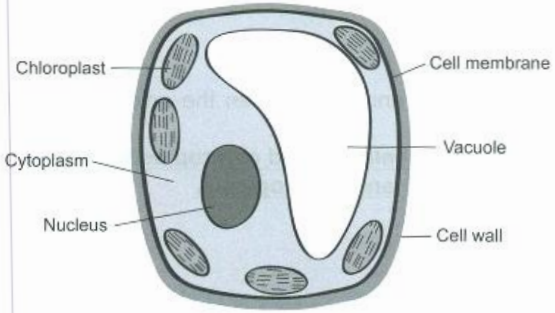
- Some animal cells
- Some plant cells
- A microscope

Steps:

1. Place one of the cell samples on the microscope.

2. Observe the cell.

   - Draw the cell observed in the space below and label the cell parts.



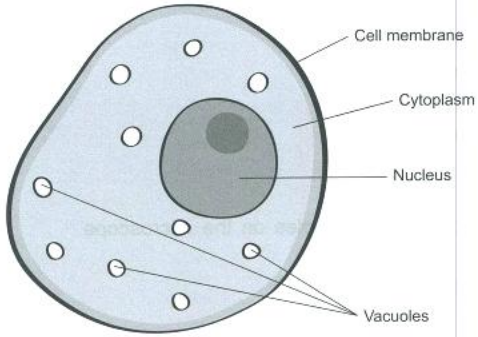
   - Is the cell a plant cell or an animal cell?

     Plant cell

3. Place the other cell sample on the microscope.

4. Observe the cell.

   - Draw the cell observed in the space below and label the cell parts.



   - Is the cell a plant cell or an animal cell?

     Animal cell

   - What is/are the difference(s) between the animal cell and the plant cell?

     The plant cell has a cell wall and chloroplasts while the animal cell does not have a cell wall and chloroplasts.

EXPERIMENTS

Experiment 2

Materials needed:

- 1 petri dish
- Agar-agar

Steps:

1. Prepare some agar-agar in a petri dish.
2. Scratch the agar-agar with your finger nail.
3. Leave the petri dish at room temperature, near a window.
4. Observe the petri dish over a period of 2 weeks.

- What can be observed about the agar-agar in the petri dish over the 2 weeks?

  Brown patches appeared on the agar-agar over the period of 2 weeks. The brown patches increased over the period of 2 weeks.

- Explain your observation.

  The bacteria and micro-organisms in our fingernails were transferred to the agar-agar in the process of scratching it. They then went through cell division and increased in number, causing the brown patches to increase over time.

Experiment 3

Materials needed:

- 1 plant cell
- 1 animal cell
- 2 petri dishes
- Some water
- Microscope

Steps:

1. Pour the same amount of water into each petri dish.
2. Put the animal cell in one petri dish and the plant cell in the other petri dish.
3. Observe the cells over a few days.

   - What can be observed about the cells under the microscope?

     The plant cell swelled while the animal cell burst.

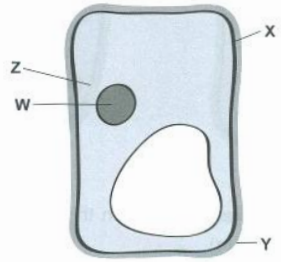
   - Explain your observation.

     Water entered both the plant cell and the animal cell. The plant cell has a thick layer of cell wall to keep it firm and prevents it from bursting. However, the animal cell does not have a cell wall, thus, when too much water entered the cell, the thin cell membrane burst.

WORKED EXAMPLES

Example 1

Study the diagram of a cell shown below.



(a) Is the cell above a plant cell or an animal cell? Give a reason for your answer. (1m)

(b) Is the cell able to carry out photosynthesis? Explain your answer. (1m)

Thought Process:

Topic	:	Cells
Key Concept(s)	:	A typical plant cell has the following parts; cell wall, cell membrane, cytoplasm, chloroplasts, nucleus and a large vacuole. Chloroplasts are disc-like structures needed for photosynthesis.
Key Words / Key Phrases	:	(a) Plant, cell wall (b) No, no chloroplasts, contains chlorophyll, traps light for photosynthesis
Process Skills	:	Observing, Communicating, Inferring, Analysing

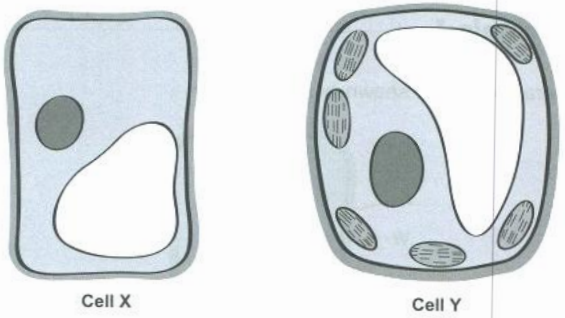
Answers:

(a) **Plant** cell. It has a **cell wall** and only plant cells have a cell wall. (1m)

(b) **No**. It **does not have chloroplasts** which **contains chlorophyll** that **traps light energy for photosynthesis**. (1m)

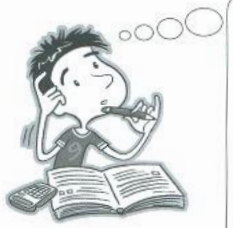
Example 2

June observed 2 different cells, X and Y, from the same plant as shown in the diagram below.



(a) Which cell, X or Y, is most likely taken from the root? (1m)

(b) Explain your answer in (a). (1m)



Thought Process:

Topic	:	Cells
Key Concept(s)	:	A typical plant cell has the following parts; cell wall, cell membrane, cytoplasm, chloroplasts, nucleus and a large vacuole. Chloroplasts are disc-like structures needed for photosynthesis.
Key Words / Key Phrases	:	(a) X (b) No chloroplasts, roots do not carry out photosynthesis
Process Skills	:	Observing, Communicating, Comparing, Inferring, Analysing

Answers:

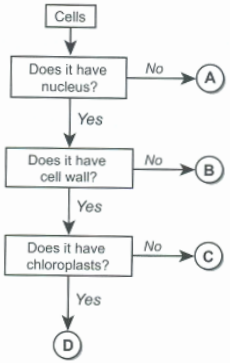
(a) Cell **X** (1m)

(b) Cell X **does not have chloroplasts** as **roots do not need to carry out photosynthesis**. (1m)

WORKED EXAMPLES

Example 3

Study the flow chart shown below.



(a) Which cell, A, B, C or D, cannot reproduce? Give a reason for your answer. (1m)
(b) Which cell is able to carry out photosynthesis? Explain why. (1m)
(c) Which cell(s), A, B, C, and/or D, is/are plant cells? Give a reason for your answer. (1m)

Thought Process:

Topic	:	Cells
Key Concept(s)	:	Nucleus controls all the activities in the cell. Chloroplasts are dis-like structure needed for photosynthesis.
Key Words / Key Phrases	:	(a) A, no nucleus that controls all the activities in the cell, including reproduction (b) D, has chloroplasts, contains chlorophyll, traps light for photosynthesis (c) C, D, have cell wall
Process Skills	:	Observing, Communicating, Comparing, Inferring, Analysing

Example 3

Answers:

(a) Cell **A**. It **does not have a nucleus** that **controls all the activities in the cell**, including the reproduction of the cell. (1m)

(b) Cell **D**. It **has chloroplasts that contain chlorophyll** which **traps light energy for photosynthesis**. (1m)

(c) Cell **C** and Cell **D**. They **have a cell wall** and only plant cells have a cell wall. (1m)