



THE REPUBLIC OF UGANDA

**Ministry of Education and Sports**

**A'  
Level**

**SELF STUDY**

**Biology**



**NCDC**

*NATIONAL CURRICULUM  
DEVELOPMENT CENTRE*

# BIOLOGY SELF-STUDY MATERIALS

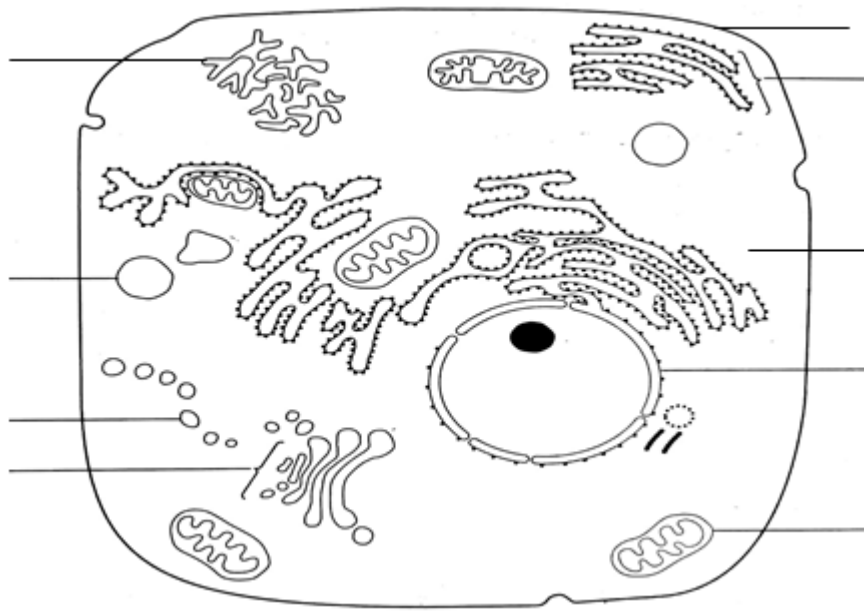
## Senior Five

### Topic: Cell Biology

By the end of this topic, you should be able to describe the structure and functions of the animal cell ultra-structure as visible under the electron microscope. You should also be able to describe the fluid-mosaic model of the plasma membrane.

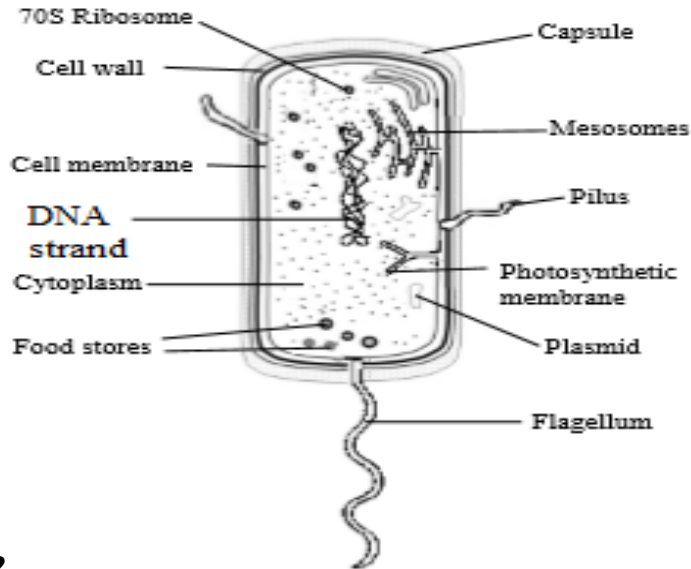
#### Activity 1: Revision

Figure 1 below shows the structure of a liver cell as seen using the electron microscope.



**Fig. 1**

1. Name the parts of the cell labeled on the diagram.
2. From the diagram, identify the cell organelles which are bound by:
  - i) a single membrane
  - ii) a double membrane
3. State the functions of membranes within a cell.
4. Figure 2 below shows the bacterial cell.

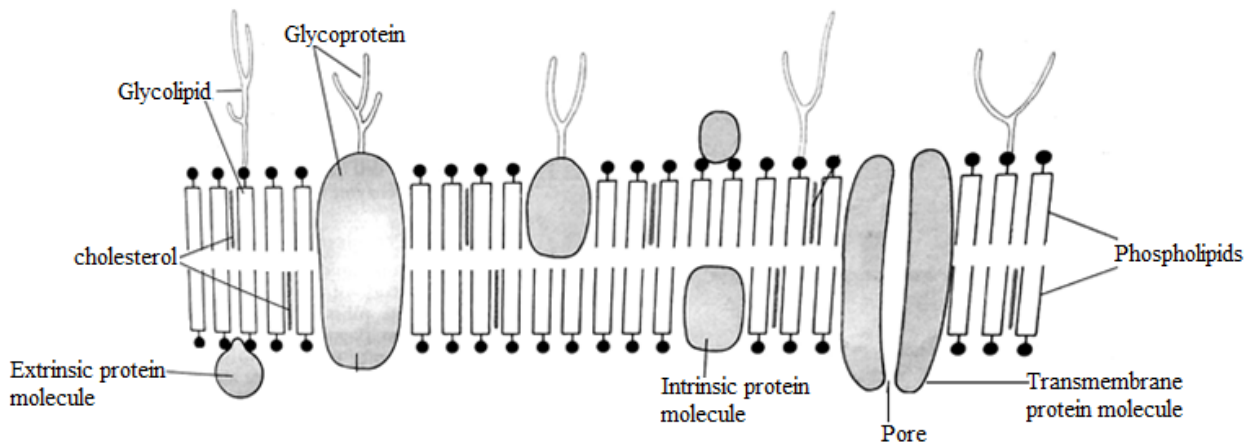


**Fig. 2**

1. Discuss the adaptations of a bacterial cell.
2. State the differences between the animal cell and a bacterial cell.

### Activity 2

Figure 3 is a fluid mosaic model of a plasma membrane.

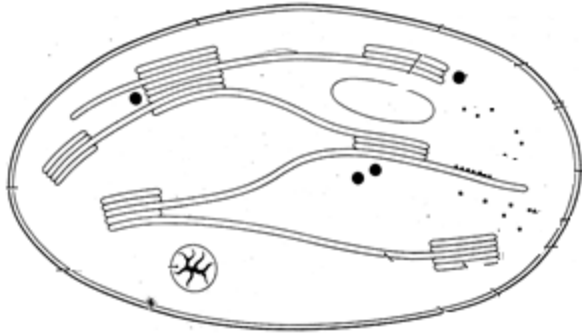


**Fig. 3**

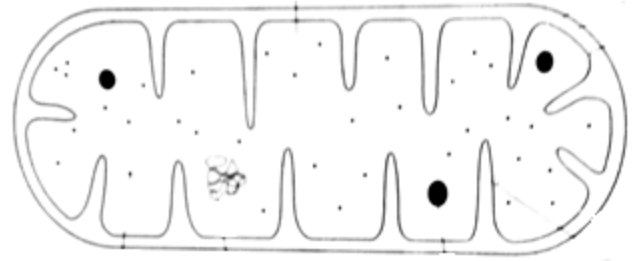
1. Describe the structure of the plasma membrane as shown above.
2. State the functions of the plasma membrane.
3. How is the structure of the plasma membrane related to its functions?

### Activity 3

Observe the following drawing of chloroplast and mitochondrion.



Chloroplast



Mitochondrion

1. State the function of each of organelles in a cell.
2. Describe the structure of each organelle.
  - i) chloroplast
  - ii) mitochondrion
3. State differences between the chloroplast and mitochondrion.
4. Discuss the adaptations of each structure to its function.

# BIOLOGY SELF-STUDY MATERIALS

## Senior Six

### Topic: Nutrition

By the end of this topic, you should be able to explain the environmental and internal factors influencing the rate of photosynthesis.

#### Activity 1: Revision

Figure 1 shows the rate of photosynthesis of tomato plants under different environmental conditions.

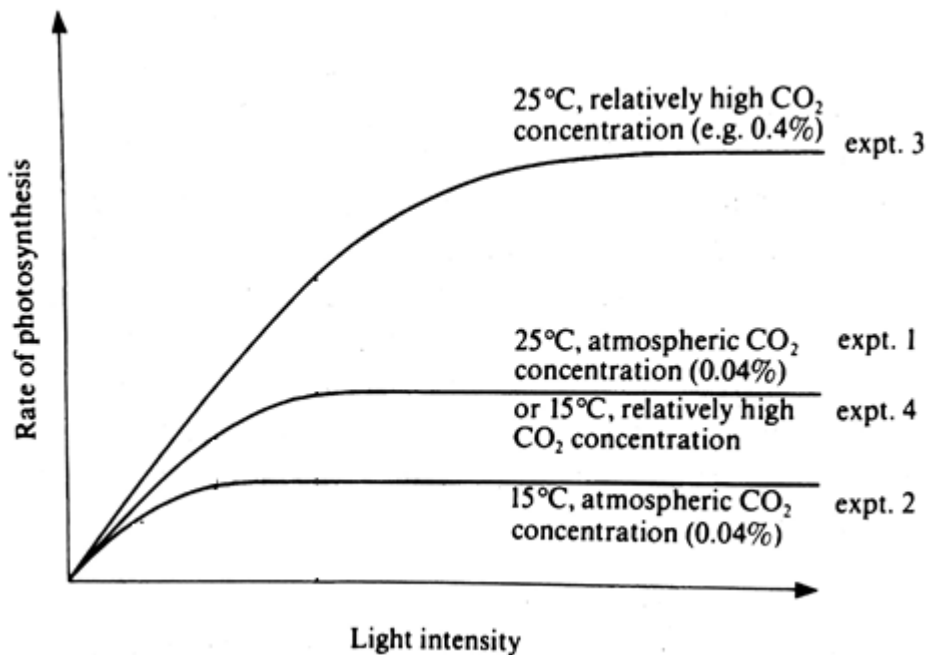


Fig. 1

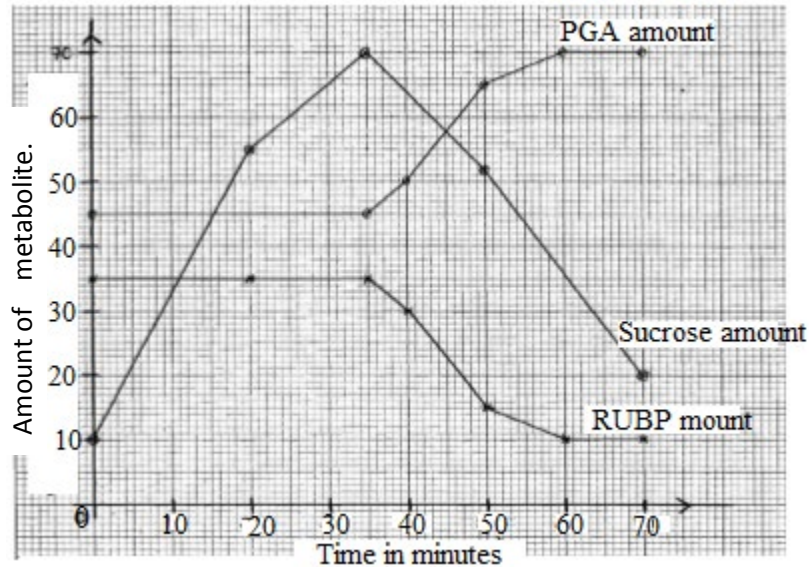
1. What is meant by a limiting factor?
2. State the limiting factor in each of the experiments 1, 2, 3, and 4.
3. Explain the results in:
  - i) Experiment 1
  - ii) Experiment 2
  - iii) Experiment 3

#### Activity 2

In an investigation to study the effect of light intensity on the physiology of Spirogyra, the amount of Phosphoglyceric acid (PGA), Ribulose biphosphate (RuBP), and Sucrose, were

determined at different times in the presence of light. At the 35<sup>th</sup> minute, light was removed completely.

Figure 2 below shows the variation of the amount of PGA, RUBP and Sucrose with time.



**Fig. 2**

1. Compare the changes in the amounts of PGA and RUBP with time.
2. Account for the changes in the amount of:
  - i) PGA
  - ii) RUBP
3. Explain the changes in the amount of PGA and RUBP with time if carbon dioxide was used instead of light.
4. State how the chloroplast is adapted for:
  - i) light dependent reactions of photosynthesis.
  - ii) light independent reactions of photosynthesis.

## Topic: Homeostasis

By the end of this topic, you should be able to describe the structure and function of the nephron.

### Activity 1

Figure 3 shows changes in salt (ion) concentration in region C and of the fluid as it passes through part of the nephron of a mammalian kidney.

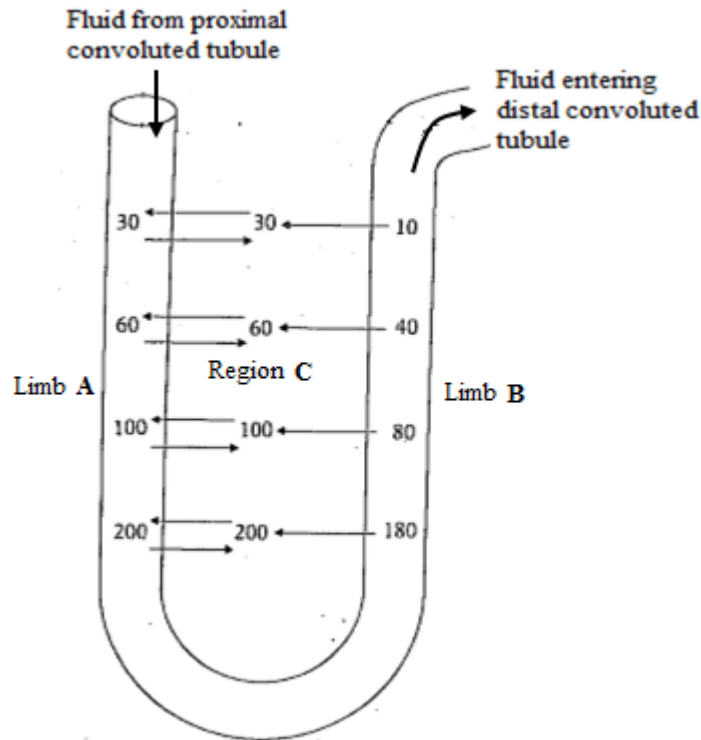


Fig. 3

1. State and explain the principle illustrated in Figure 3 in relation to osmoregulation.
2. Explain the changes in concentration of the fluid in:
  - i) Region C
  - ii) Limb A
  - iii) Limb B
3. State the significance of the changes in concentration of the fluid in Figure 3 to a mammal.
4. Suggest the change in structure of Figure 3 in a mammal living in conditions drier than that of the mammal whose nephron is shown. Give reasons for your answer.



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