PENANG SANGAM HIGH SCHOOL
P.O.BOX 44, RAKIRAKI
LESSON NOTES

Year/Level: 12C/D **Subject:** Biology

Strand	1 structure & life processes
Sub Strand	1.4 comparative form and function in plants and animals
Content Learning Outcome	Study the storage and utilization of food in plants.

Use of Ingredients

- Plants use light, carbon dioxide and water as the ingredients for making food by the process of photosynthesis.
- Oxygen is produced as a by-product of photosynthesis.

Photosynthesis

Carbon dioxide + Water + ATP (energy) $\longrightarrow$ Glucose + Oxygen

$6CO_2 + 6H_2O + ATP\ (energy) \longrightarrow C_6H_{12}O_6 + 6O_2$

Food Storage by Plants

- Plants store most of the food they make until they need for growth or reproduction.
- Phloem carries food from the leaves to cortex cells in the stems and roots.
- Food is stored as starch or glucose in the cortex cells.
- Consumers eat plants to get energy from their stored food.
- Except for flower nectar and fruits, plants make all food for their own use.

Food Usage by Plants

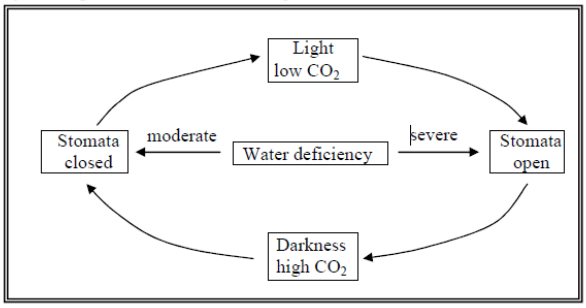
- When a plant needs to use some of its stored food, it hydrolyses starch into molecules small enough to pass through cell membranes.
- This process of food hydrolyses is called **respiration**.
- Respiration in plants is carried out in the mitochondria just like in other organisms.
- The phloem then carries the food molecules to the cells that need energy.

Glucose + Oxygen $\longrightarrow$ ATP (energy) + Carbon dioxide + Water

$C_6H_{12}O_6 + 6O_2 \longrightarrow ATP\ (energy) + 6CO_2 + 6H_2O$

Activity

1. Study the diagram below to answer the questions that follow.



(i) Explain the advantage of closing the stomata in darkness.

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(ii) Describe how low carbon dioxide in the leaf will cause the stomata to open.

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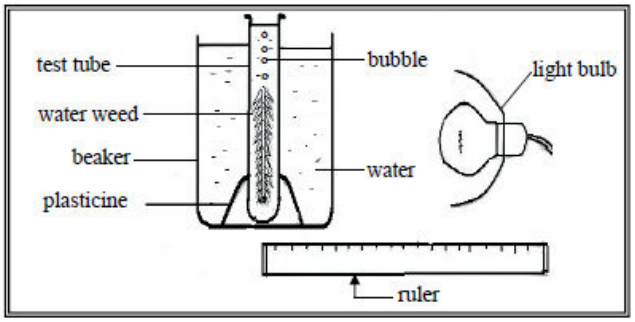
2. The experimental set-up shown below was used by a group of sixth form students to investigate the effect of light intensity on the rate of photosynthesis.



The table below summarises the result obtained at each light intensity

Light Intensity (%)	Number of bubbles produced per minute		
	Trial 1	Trial 2	Trial 3
100	18	17	18
50	14	13	12
25	9	10	8
10	5	6	5

(i) Calculate the average rate of photosynthesis in terms of the bubbles produced per minute at the 50% light intensity. (Show your working)

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(ii) The plant was left for 3 minutes at each light intensity before the reading was taken. Explain why this was done.

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(iii) Explain why the test tube was placed in a beaker of water.

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