Worksheet | The Secondary Stage of (6-8)

1st Semester | 2023-2024

Subject: Biology *Answer key* **Chapter:** Photosynthesis

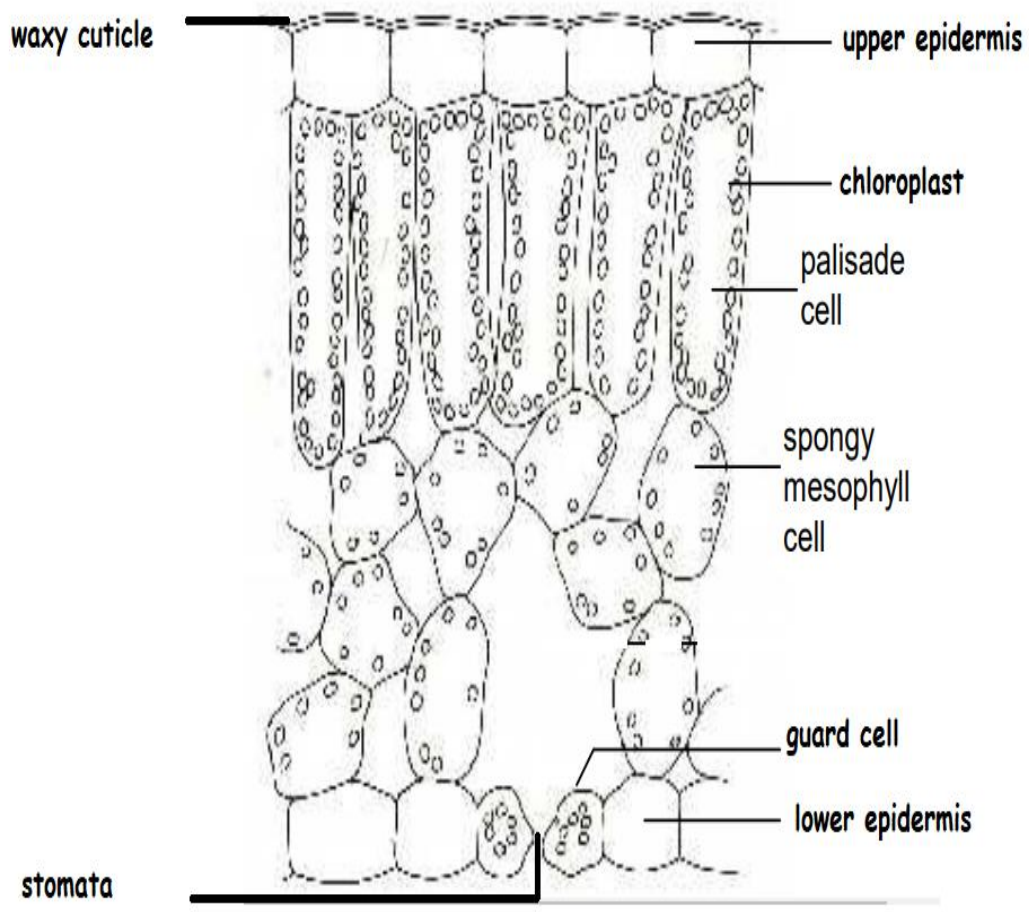
Name :

Date :

Objectives:

- **Understand the process of photosynthesis and be able to answer questions .**

Part 1 : Leaf structure



Part 2 :

A. Testing for starch in leaves :

Objective : to detect the presence of starch in leaves

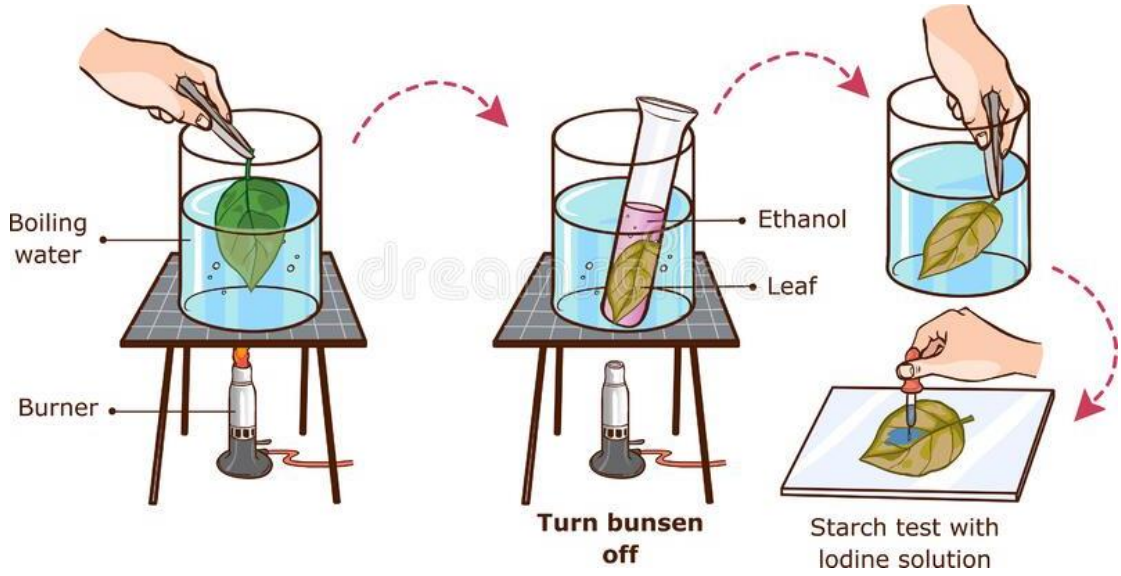
Iodine solution is used to test leaves for the presence of starch , before we start we must have a de-starched plant.

De -starching a plant

A plant can be 'de-starched' by leaving it in the dark for 2 to 3 days , **in dark the plant uses all the starch by respiration** .

Steps :

1. Heat a plant leaf in boiling water for 30 seconds to soften the cell wall .
2. Then heat it in boiling **ethanol** for a few minutes (this removes most of its colour)
3. Wash with water and spread onto a white tile.
4. Add iodine solution from a dropping pipette.



After a few minutes, the parts of the leaf that contain starch turn blue-black.

Note : Ethanol is heated using a hot water bath because it boils at 78°C,this is safer than using a Bunsen burner because ethanol is **flammable**.

- **Leaves** have green parts (where the cells contain chlorophyll) and white parts (where there is no chlorophyll).

Only the parts that were green become blue-black with iodine solution, showing the importance of chlorophyll in photosynthesis.

B. Production of Oxygen in photosynthesis :

Objective : to observe the production of oxygen bubbles using underwater plants .

Steps :

1. Place water plant in a beaker containing pond water.

2 . Cover the plant with short stemmed funnel.

3. Invert the test tube full of water and cover the stem of the funnel.

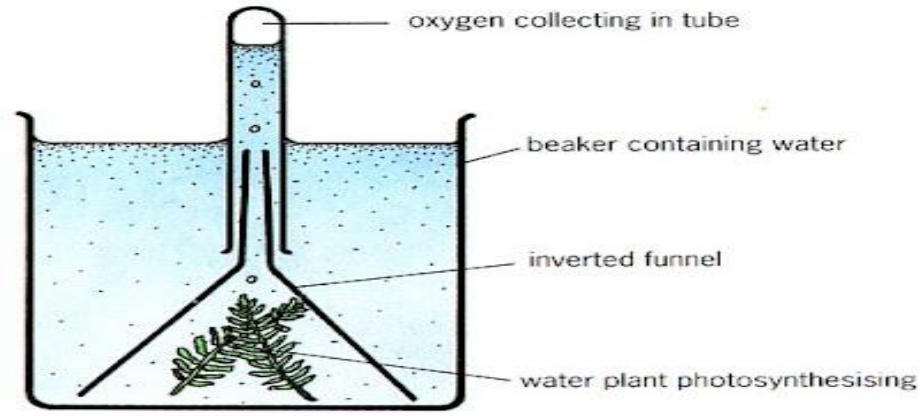
4. While placing the test tube, ensure that the level of the water in beaker is above the level of stem of funnel.

5. Expose the apparatus to the sunlight.

6. After few hours, gas bubbles will form and collect in the test tube.

7. Test the gas in the test tube.

8. A **<u>glowing splinter</u>** bursts into the flame shows the presence of oxygen.



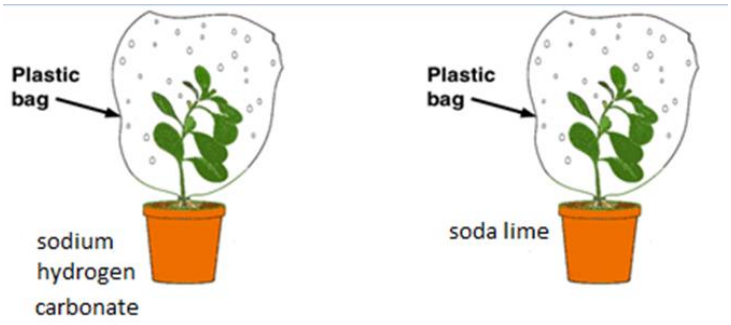
Question : describe the effect of increasing the light intensity on the number of bubbles produced during photosynthesis .

As the light intensity increases number of bubbles produced during photosynthesis will increase .

c. <u>Investigating the need for carbon dioxide in photosynthesis</u>

1. De- starch 2 plants (this step was done for you)
2. Tie a clear bag containing soda lime, around the plant.
3. Tie a clear bag containing sodium hydrogen carbonate around the other plant.
4. Place the plants in bright light for several hours.

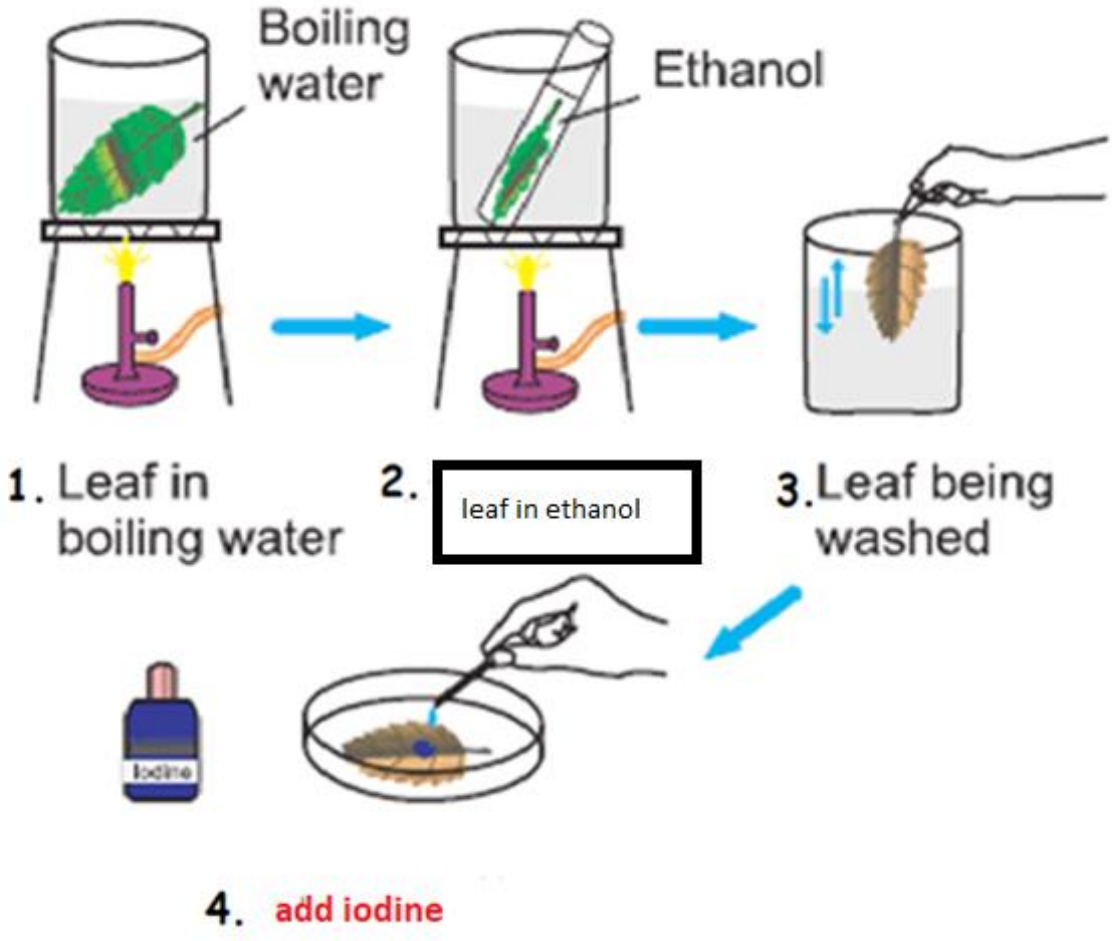
5. Test the leaves of both plants for starch using iodine



Check your understanding :

Question 1:

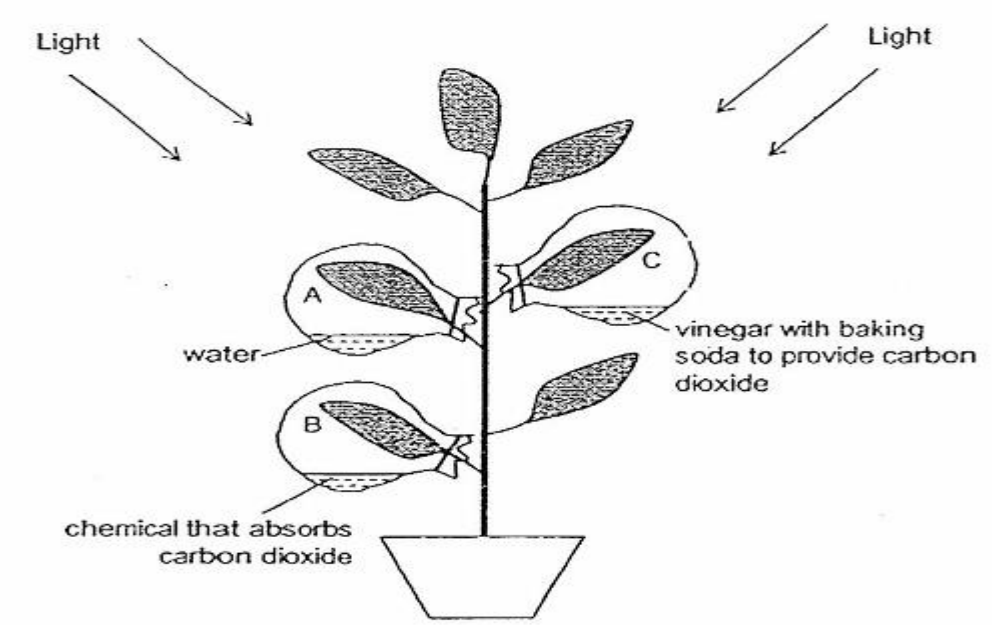
Describe the steps 2 and 4 to detect the presence of starch in leaves :



Question 2 :

Carbon dioxide is needed for photosynthesis

Use the diagram below to answer the following questions .

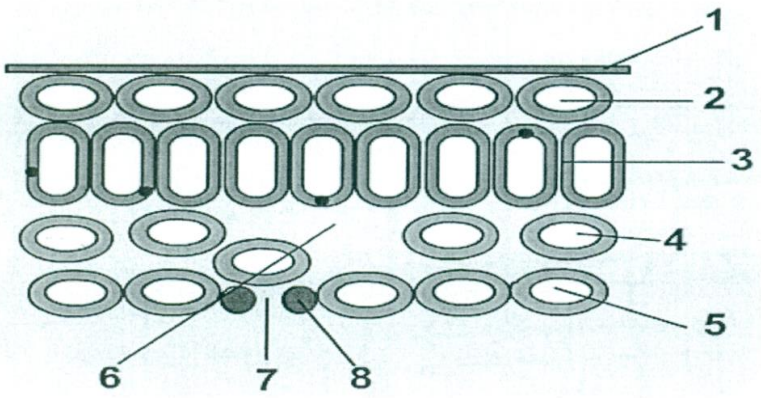


1. Vinegar with baking soda is used to produce carbon dioxide
2. Leaves can make photosynthesis because they have chloroplasts

3. In photosynthesis plants need water ,carbon dioxide and produce starch and oxygen in the presence of light.
4. Which leaf A,B or C will turn blue black when iodine is added. C

Question 3 :

1. The figure below shows a cross section in a leaf .



- Name the following parts :
  2: Upper epidermis
  4: Spongy mesophyll
  8: Guard cells

- What is the function of part 3 ? Most photosynthesis takes place in this part (it absorbs light)

- Photosynthesis is an important process in plants .

  a. Write the word equation of photosynthesis.

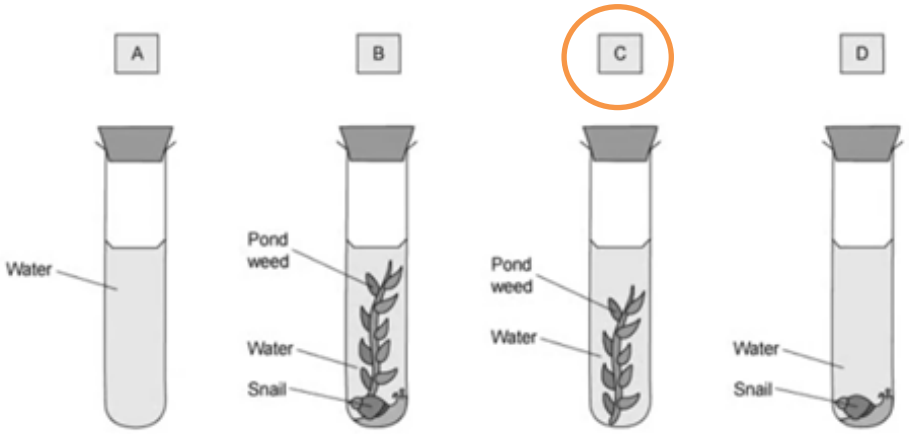
Question 4:

Circle the correct answer :

a. An experiment is set up with four test tubes as shown in the diagram below.

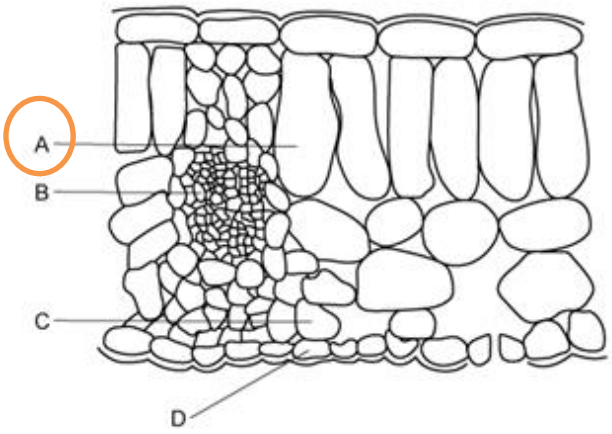
All four test tubes are left in sunlight for 6 hours.

Which test tube would contain the least amount of dissolved carbon dioxide after 6 hours?



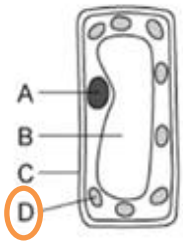
b. The diagram below shows a section through a leaf.

Which cell type would have the highest concentration of oxygen on a bright, sunny day?



c. The diagram below shows a palisade mesophyll cell found in the leaves of plants.

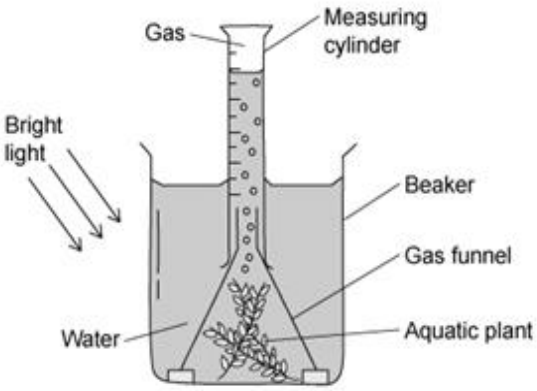
In which region of the cell would starch be stored?



d. A student sets up an experiment to measure the rate of oxygen production of an aquatic plant when it is photosynthesising.

The student repeated the experiment several times to calculate the average amount of oxygen collected.

Which two factors should be kept constant during the student's experiment?



A. The size of the funnel and beaker.

B. The size of the aquatic plant and time exposed to light.

C. The size of the aquatic plant and the amount of water in the beaker.

D. The size of the aquatic plant and the amount of gas in the measuring cylinder.