

# CLASS -7

## SUBJECT – SCIENCE(BIOLOGY)

### CHAPTER - NUTRITION IN PLANTS

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Period/ worksheet -2

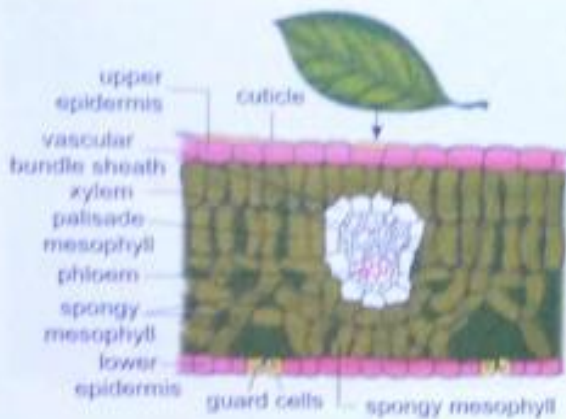
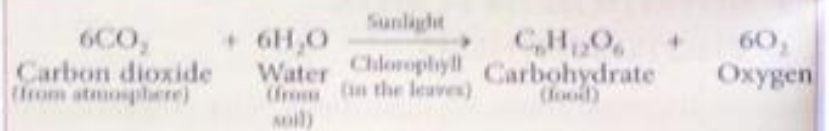


Fig. 1.5: Chlorophyll—the green pigment

The chlorophyll-containing cells of leaves, in the presence of sunlight, use carbon dioxide and water to prepare food. The food prepared is in the form of carbohydrates (sugars). These sugars ultimately get converted into starch (another carbohydrate). In brief, photosynthesis can be represented by the following equation:



From the above equation, you can see that there is an interesting by-product of photosynthesis, oxygen. This gas is essential for the survival of all living organisms.

#### 1.3.1 Roles of Leaves in Photosynthesis

Synthesis of food takes place in the leaves. In other words, it is the site of photosynthesis. All the four things ( $\text{CO}_2$ ,  $\text{H}_2\text{O}$ , sunlight and chlorophyll) required for the process, must reach the leaves. Leaves possess the following two features which make it possible:

- Leaves contain the green pigment chlorophyll in their cells. This helps leaves to capture the sun's energy, which is used to prepare food from carbon dioxide and water.
- There are small or tiny pores called stomata on the surface of the leaves. Through the stomata, carbon

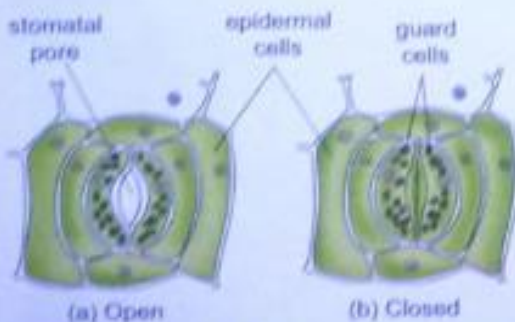


Fig. 1.6: Stomata

dioxide from the atmosphere enters the leaves. Oxygen, a by-product of photosynthesis, and water (transpiration) also go out of the leaves through these stomata.

Figure 1.6 shows the structure of a stomata. It has an opening called **stomatal opening** in the centre. The opening is surrounded by two kidney-shaped **guard cells**.

### What happens in plants with reduced leaves like the desert plants?

In desert plants like cacti, leaves are reduced to spines. This prevents or reduces the loss of water by transpiration. The stem in these plants becomes green to carry out photosynthesis.

### What happens to photosynthesis in plants with red, brown or violet leaves?

In all such leaves, green colour is also present in addition to red, brown, yellow and other pigments. However, the amount of red, brown, yellow or other pigments is very high in comparison to the green colour and therefore, these pigments mask the green colour. Photosynthesis does take place in all these leaves.

You might have seen some plants which have white and green parts in the same leaf. They are called **variegated leaves**. Remember that photosynthesis will not take place in the white portions of such leaves. Common examples are those of money plant [Fig. 1.8(a)], croton [Fig. 1.8(b)] and coleus.

### 1.3.2 Importance of Photosynthesis

Imagine what will happen to life on earth in the absence of photosynthesis!

Or

Imagine what will happen if the sun does not rise at all for four months!

In the absence of photosynthesis, life will not be possible as:

- There would be no food available. In the absence of food, the survival of living organisms will not be possible as all organisms are directly or indirectly dependent on food made by plants.



Fig. 1.7: A cactus plant

### Transpiration

The process of loss of water in vapour form through the surface of leaves is called transpiration.



(a) Money plant



(b) Croton plant

Fig. 1.8: Plants with leaves of different colours

## ROLES OF LEAVES IN PHOTOSYNTHESIS(WORKSHEET-4)

### • ANSWER IN ONE WORD

1. Part of plant where synthesis of food takes place.
2. Name the green pigment present in leaf.
3. Tiny pores present on the surface of the leaves.
4. Name the gases which are transported through the tiny pores present on leaves.
5. Name two kidney shaped cells which are surrounding the stomatal opening.
6. Name the plant where leaves are reduced to spines to reduce water loss.
7. Plants in which stems are carrying the process of photosynthesis.

## PHOTOSYNTHESIS IN PLANTS WITH RED BROWN AND VIOLET LEAVES (WORK SHEET 5)

### • FILL IN THE BLANKS

1. leaves that have white and green parts in the same leaf is called..... And example of such type of leaf is .....
2. In leaves of croton plant the amount of brown, red and yellow pigment is ..... In comparison to the green pigment.
3. Photosynthesis will not take place in ..... Portion of money plant leaf.

### Classroom Discussion

What will be the effect on animals if the number of plants on our planet is reduced?



Fig. 1.9: Balance of oxygen and carbon dioxide in the atmosphere

- Oxygen, a by-product of photosynthesis, will not be released. Living organisms will not be able to perform an important activity of life, respiration. Without respiration, no living organism can survive.

- Photosynthesis maintains a balance between oxygen and carbon dioxide in the atmosphere (Fig. 1.9). This balance will be disturbed in the absence of photosynthesis.

Life, thus, would be impossible without photosynthesis.

Similarly, if the sun does not rise at all for a few months, photosynthesis will not take place and the balance of gases (carbon dioxide and oxygen) will also be disturbed. Thus, existence of life would be greatly affected.

### Activity 1.1

(Demonstrate)

**Aim:** To show that sunlight is necessary for photosynthesis and starch is produced during the process

**Materials required:** Two potted green plants (of the same kind), iodine solution, dropper

**Procedure:**

- Take two potted green plants of the same kind and label the pots as A and B.
- Keep pot A in dark (or in a black box) and pot B in sunlight for 3–4 days.
- Test the leaves of the two pots with 2–3 drops of iodine solution (as was done in class VI). Note down your results.
- Now, keep pot A (earlier kept in dark) in sunlight for 3–4 days and perform the iodine test on the leaves. Again note down your results.

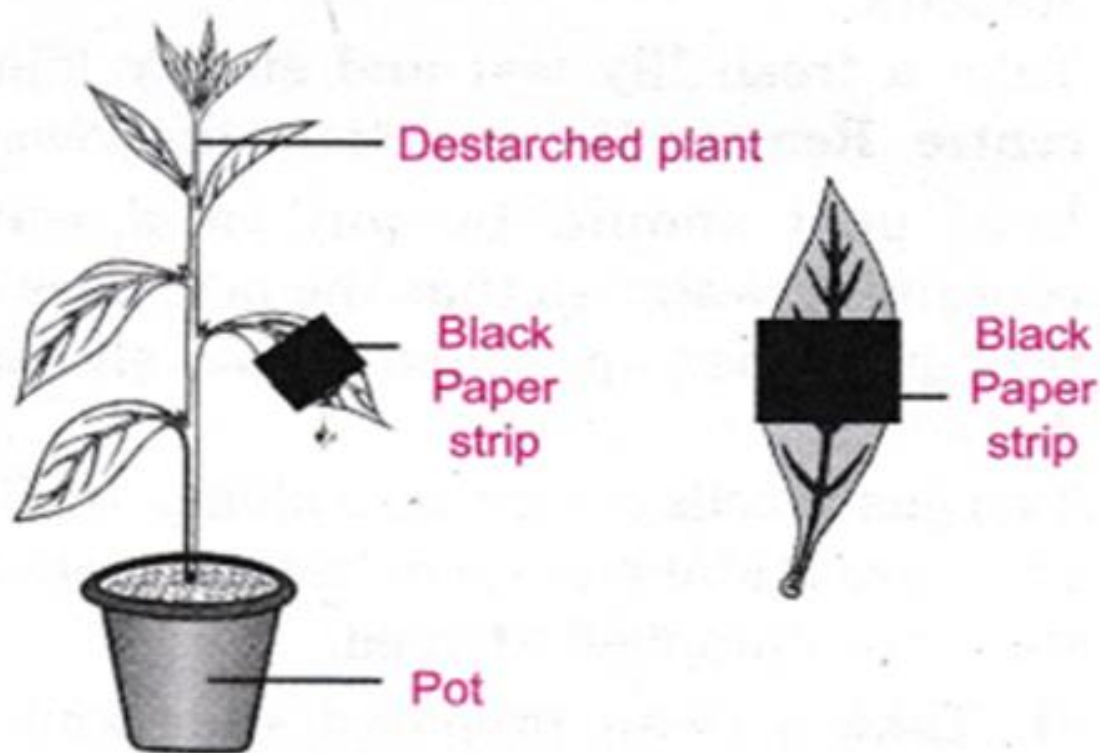
**Observations:** Leaves of pot A when kept in dark did not show blue-black colour, but those of pot B showed blue-black colour. But when pot A was kept in sunlight, the leaves showed blue-black colour.

**Inference:** Two things are proved

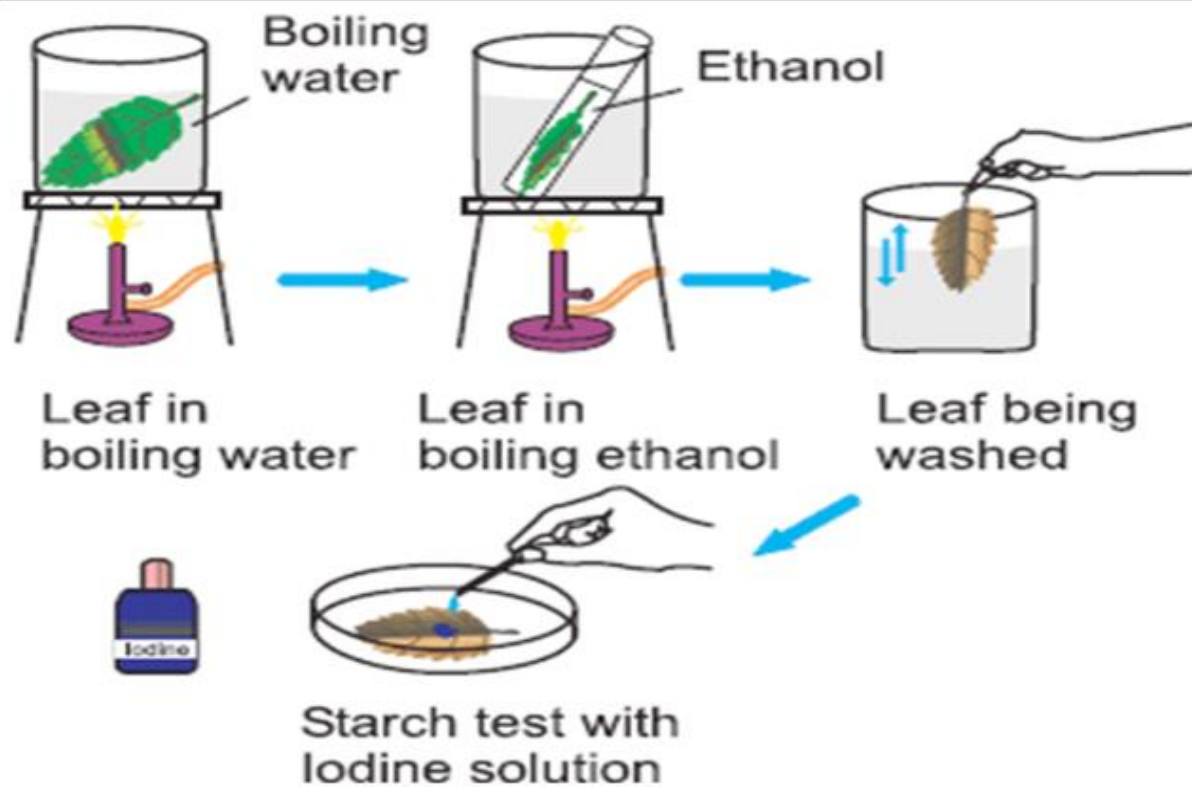
- Sunlight is necessary for photosynthesis.
- Starch is produced as a result of photosynthesis.



Starch is produced during photosynthesis



**Fig.** Experimental set-up to show light is necessary for photosynthesis



# Importance of photosynthesis and sunlight

• Answer the following questions:-

1. Write three importance of photosynthesis to maintain life on these Earth.
2. With a well labelled diagram show that light is needed for photosynthesis.

(write aim , materials required , procedure , observation and inference of the experiment)