

TENDER HEART HIGH SCHOOL , SEC - 33B, CHD.

Class - VII

Subject - Biology

Chapter - 4

Photosynthesis and Respiration

Teacher : Ms. Nidhi Rana

Good Morning Students! This lesson is of Class-VII for the subject of Biology, Chapter no-4, Photosynthesis and Respiration starting on Page no-41 of your textbook titled Concise Biology, Selina Publishers and is being submitted to you on 01.10.2024

Dear students, in your lesson of Photosynthesis and Respiration, today, I am going to cover the process of photosynthesis and the occurrence of photosynthesis. Kindly open your book on Page no-41 and listen carefully, as I will be asking you a few questions as between the chapter. So let us begin with the term - 'Autotrophs'.

Students, you all know that living organisms require food, which provides energy to perform the life processes. Life processes means some basic functions which allow living organisms to live on the Earth like nutrition, respiration, excretion, movement and growth.

Only green plants have the ability to prepare food by the process called photosynthesis. That is why green plants are known as autotrophs. (Here auto means self and trophs means nourishment)

Students let us now discuss the term 'Photosynthesis'. But, before that let us perform a drawing activity on Photosynthesis.

1. Start by drawing a plant with a flower, leaves and roots on a piece of paper.

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2. Continue your drawing by adding the sun, water and soil.
 3. Next, write carbon dioxide and draw an arrow towards the leaf.
 4. On the opposite side, write the word oxygen and draw another arrow, but away from the leaf this time.
 5. From the roots, draw an arrow upwards showing movement of water and minerals.
- you can pause the audio for 3 minutes and complete your drawing. I hope all of you must have drawn the diagram.

Now children you can yourself define the term photosynthesis very easily.

Photosynthesis is the process by which plants use sunlight to produce energy in the form of glucose which is later stored in plants in the form of complex carbohydrate called starch.

For preparing food, the plants require the following.

1. Water from soil.
2. Carbon di-oxide from air
3. Chlorophyll which is contained in the leaf.
4. Energy from sunlight.

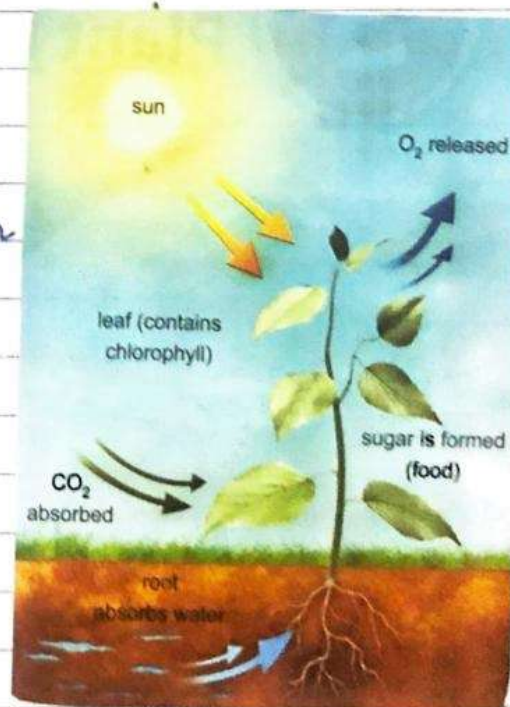


Photo means light and synthesis means combining. So, we can say that, during photosynthesis, water

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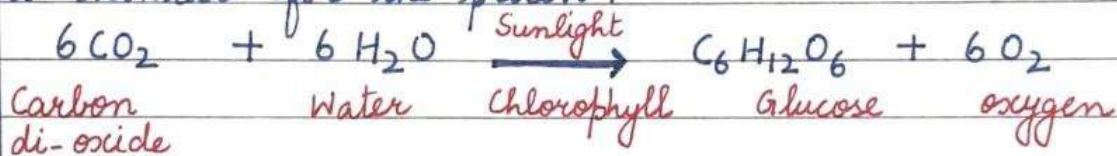
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is combined with carbon-di-oxide in the presence of light and chlorophyll to produce glucose and oxygen. Oxygen escapes from the plant body through stomata (the tiny pores found mainly on the lower surface of the leaves.)

Only green plants are capable of making food in the form of glucose because they have chlorophyll which is essential for the process.



Glucose is the main product and oxygen is a by-product of photosynthesis. Food is stored in the form of starch. The food formed by the leaves is transported to the different parts of plants for utilization and storage.

- ★ Chlorophyll is primarily found in the leaves of plants. However, you can also find the chlorophyll in the stem and fruits of plants. The complete body of small plants like algae have chlorophyll, and their complete body takes part in the process of photosynthesis. Plants in deserts, such as cactus, have spine-like leaves to reduce loss of water by transpiration. They have green stems to carry out photosynthesis.

Now, children to recapitulate, I am going to give you 4 short questions and after I said them out you can pause the audio for 3 minutes

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to write down the answers.

The questions are :

1. Which gas is produced during photosynthesis?
2. What happens to sunlight in photosynthesis?
3. Where do plants get their water from?
4. How do plants produce oxygen?

3 minutes break is over children. Let us now discuss the answers of the questions given to you.

Ans 1. Oxygen gas is produced during photosynthesis.

Ans 2. Sunlight energy is converted into chemical energy by using chlorophyll to convert water and carbon di-oxide into glucose.

Ans 3. Plants will absorb water available in the soil through its roots.

Ans 4. Plants produce oxygen during the process of photosynthesis by using the energy of sunlight. As photosynthesis requires sunlight, this process only happens during the day.

Now, let us know more about the structure of leaf, where photosynthesis occurs.

Before we start with the internal structure of leaf let us have a look on the external structure of leaf. All of you may bring one leaf and observe it carefully.

You can see a stalk of leaf called petiole, a midrib, veins, veinlets, leaf apex, leaf margin and lamina. Most leaves are green, flat and broad so that they can absorb as much sunlight as possible. The leaves are thin so that

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all the cells would be able to get much sunlight and carbon di-oxide. The midrib and the veins keep the leaf firm and exposed to the sun. If we observe the leaf section under the microscope we will find small pores on the under surface of the leaf. These pores are called stomata. The stomata helps to absorb carbon dioxide and give out oxygen during the photosynthesis. These openings are surrounded by a pair of bean-shaped cells called guard cells. When guard cells are turgid, the stomata opens and when the guard cells are flaccid, the stomata closes. During the day, the guard cells absorb water and the stomata remain open. At night, the water is drawn out of the guard cells and the stomata remain closed.

Now, I will explain you the meaning of the words turgid and flaccid.

Turgid means swollen, inflated or distended due to water uptake.

Flaccid means weak or soft when a part of a plant is not containing enough water.

Now, children keep the diagram of section of a leaf given on Page no 42 of your textbook in front of you to study the internal structure of leaf.

Photosynthesis occurs in the mesophyll cells of the leaf. Mesophyll cells contain numerous plastids called chloroplasts. Chloroplasts contain the green

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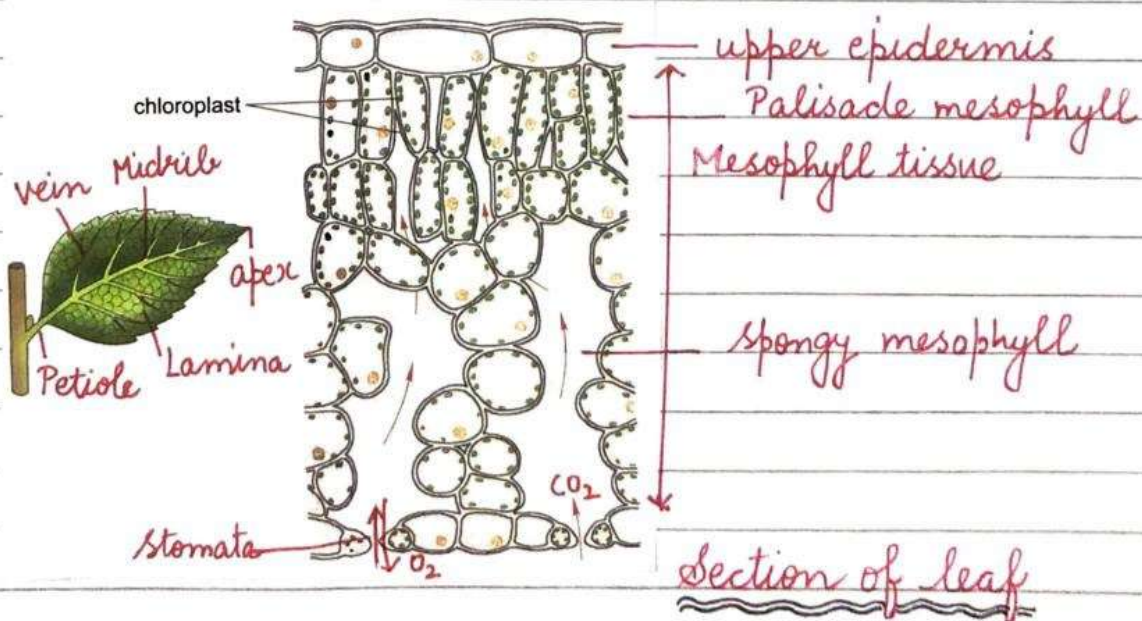
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pigment called the chlorophyll. Chlorophyll pigment is of utmost importance as it absorbs the sunlight which provides energy for the process of photosynthesis. The entire process of photosynthesis occurs inside the chloroplast of the leaf. These cells are more abundant on the upper side of the leaf where they can receive more sunlight. On the lower surface of the leaf are numerous pores called stomata which open into small spaces inside the leaf called spongy mesophyll. Carbon dioxide from the air diffuses into the leaf through the stomata and reaches the chlorophyll containing cells called chloroplasts.

Now, students I will explain you the meaning of the term used by me above, that is chloroplast.

- * Chloroplasts are the organelles that are present only in plant cells that conduct photosynthesis as it contains a green pigment called chlorophyll which captures the energy from sunlight.



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Now, children I am ending this lesson here. Read the chapter from your textbook upto which it is covered in today's lesson. Also, listen the audio again so that the whole concept should be fully understood to you all.

Lastly, I will give you the home assignment which is also mentioned in the notes. The answer key to it will be provided to you on 8th October 20

Home Assignment

- Q1. Why do leaves generally look green?
- Q2. What is the source of energy for photosynthesis?
- Q3. Which gas is taken in and which one is given out by a green leaf in bright sunlight?
- Q4. What is the role of chlorophyll in photosynthesis?
- Q5. Which four of the following are needed for photosynthesis in a leaf?
 - (i) Carbon di-oxide
 - (ii) Oxygen
 - (iii) Nitrates
 - (iv) Water
 - (v) chlorophyll
 - (vi) soil
 - (vii) light

Note: Do these questions in your notebook.