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 of your textbook titled Concise Biology, Selina Publications. It is being submitted to you on **07.10.2024**

Dear Students, in the previous lecture we have learnt about the process of photosynthesis. Today, I am going to cover the adaptative features of leaves to carry out photosynthesis and the various factors affecting photosynthesis. Kindly open your book on Page no-43 and listen carefully. Now, let us begin with today's lesson.

Students, you all know that photosynthesis occurs in the mesophyll cells of the leaf which contain numerous plastids called chloroplasts. Chloroplasts contain the green pigment called the chlorophyll which absorbs the sunlight to provide energy for the process of photosynthesis.
The next important structure present on the lower surface of the leaf are numerous pores called stomata, through which carbon di-oxide from the air diffuses into the leaf and reaches the chloroplasts.

Now, let us learn how the leaves are adapted to carry out photosynthesis.

1. They have broad, wide and flat surfaces to absorb maximum amount of sunlight.

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2. Presence of minute pores called stomata for exchange of gases between the leaf and the atmosphere. Carbon dioxide from the atmosphere enters the pallisade mesophyll through the stomata.
3. Each cell of the palisade mesophyll contains numerous chloroplasts and the chlorophyll pigment to absorb sunlight.
4. The extensive network of veins support the leaf and transport water and mineral ions in every cell of the leaf. Veins also help in the transportation of prepared food to other parts of the plant.
5. The oxygen produced at the end of photosynthesis is released through stomata.

Now, children let us study the factors affecting photosynthesis. But before that let us do sunlight experiment. For that all of you arrange two small potted plants. You can pause the audio and bring two small plants. Take 2 minutes break for arranging the plants. Welcome back children, I hope all of you are with two potted plants with you. Now, place one pot in a dark room and the other in the sunlight. Water the plants everyday and notedown your observations after a week. You will observe that a plant kept in dark room looks limp and is dying. This is because the plant had a sunlight deficiency while in dark room so therefore photosynthesis was not possible.

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Now let us continue further to understand the three most important factors that affect the rate of photosynthesis.

1. Carbon di-oxide
2. Light
3. Suitable temperature which is about 38°c. It should not be higher than 40°c because it slows down and can even stop the enzyme action.

All the three factors and interdependent and each of these factors limits the other. For example if carbon dioxide is less and the other two are more that is light is sufficient and temperature is suitable still there will be less photosynthesis. Here carbon dioxide is the limiting factor which means the factor which directly affects the rate of photosynthesis on its own.

Similarly, less light will slow down the process even if there is lot of carbon dioxide and suitable temperature. Therefore in this case light is the limiting factor. One more important fact that I want to tell you here is that too much light can also slow down the rate of photosynthesis because too much sunlight beyond a certain limit destroys chlorophyll. This level varies from plant to plant. While some plants need to be kept in shade whereas some plants do perfectly well in direct sunlight.

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Before I proceed further let us understand what are enzymes. Enzymes are proteins that act as biocatalysts. Catalysts increase the rate at which chemical reactions occur. Almost all metabolic processes in the cell need enzymes in order to occur at rates fast enough to sustain life.

Now children I think you have well understood the process of photosynthesis and can summarize the significance of photosynthesis.

1. Photosynthesis is the only natural process which produces tremendous amount of organic matter for sustaining life on the earth. It is the only known method in which organic food is manufactured from inorganic raw materials. All animals including human beings are directly or indirectly dependent on photosynthetic plants for their food.

2. Energy of the sun that had be captured and preserved by plants centuries ago are stored irthin fossil fuels - coal, petroleum and natural gas. These fuels are now used to take care of all our domestic and industrial energy needs.

3. All the free oxygen in the atmospheric air is the result of photosynthesis. No animal can survive without oxygen as it is needed for respiration. Even the plants use the same oxygen in the dark for their own respiration

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Hence our atmosphere gets replenished with oxygen by photosynthesis. In the absence of photosynthesis, the oxygen level in the atmosphere would decrease drastically and life on earth would become impossible.

Now children you can very well conclude the end products of photosynthesis. Think and write it down. You can take two minutes break and pause the audio to write you answer.

Well children, I know all of you must have written. Absolutely right! There are two end products of photosynthesis

1. Glucose - The sugar is either utilised by the cells or stored in the form of starch.
2. Oxygen - Some of the oxygen released may be used in respiration in the leaf cells, but the major portion of it is not required and hence given out into the atmosphere through the stomata.

Children before I end up today's lecture I want you to perform a photosynthesis chemical experiment. For that take some small plants and put them in a transparent glass filled with water. You can uproot some grass also for this experiment. Then cover the mouth of the glass with foil paper. During the next little while, bubbles will appear on the sides of the glass. This is a photosynthesis chemical response that shows plants changing carbon dioxide and water into food.

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This confirms that gas produced is oxygen as it supports combustion. Hence oxygen is produced during the process of photosynthesis.

I am ending today's topic with this activity. Now children give a thorough reading of all the activities and along with that listen to the audio to understand them well.

Thankyou.