

St. Andrews Scots Sr. Sec. School

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Session: 2024 – 2025

(Answer Key)

Class: VII

Subject: Science

Chapter: Nutrition in plants

A. Tick the correct answers. (Page no. 16)

1. (a) 2. (b) 3. (d) 4. (b) 5. (b) 6. (a) 7. (c) 8. (a)

B. Fill in the blanks.

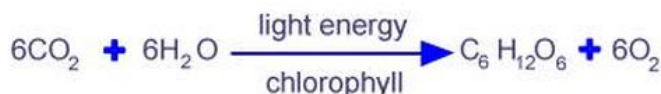
1. green; chloroplast
2. sun
3. starch
4. insectivorous
5. algae; fungi
6. symbiotic

C. Very short answer type questions.

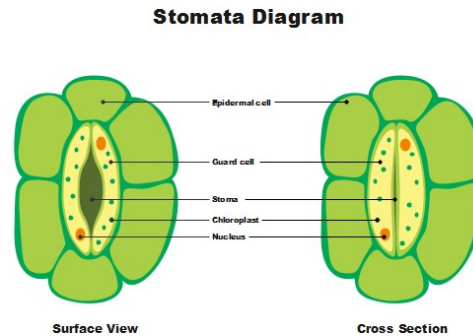
1. Green plants are called autotrophs because they can make their own food from simple inorganic substances.
2. Light.
3. Chlorophyll is essential for photosynthesis because it traps energy of the sun and changes it into chemical energy which is stored in glucose.
4. Fungi are non-green plants which derive their nutrients by digesting complex substances from dead and decaying plants and animals, and then absorbing them.
5. Chlorophyll converts solar energy into chemical energy. In plants, glucose is stored in the form of starch.
6. Raw materials for photosynthesis are water, carbon-dioxide, chlorophyll and energy from the sun.

D. Short answer type questions.

1.



2. In lichens, as alga is green it makes food by photosynthesis and provides it to fungus, Whereas fungus provide shelter, water and minerals to the alga. Such an association is called symbiosis or symbiotic association.
3. Taking food and its utilisation by the organism is called nutrition. The components that provide nutrition are called nutrients of food. These are carbohydrate, proteins, fats, vitamins and minerals.
Stomata help in photosynthesis by taking carbon-dioxide and expelling oxygen and in respiration by taking oxygen and expelling carbon-dioxide.

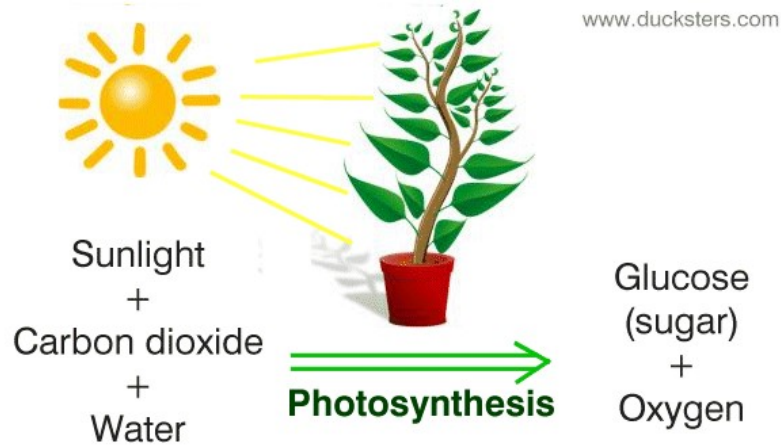


4. Rhizobium lives in the root nodules of leguminous plants and converts atmospheric nitrogen into soluble nitrates for them. This helps plants grow well.



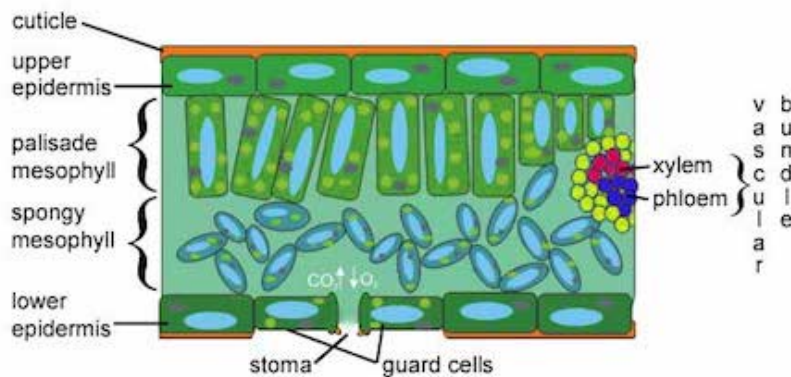
E. Long answer type questions.

1. Availability of chlorophyll, sunlight, carbon-dioxide and water are the necessary conditions for photosynthesis. Green plants use these raw materials and make food in the form of glucose.
- Chlorophyll is a green pigment found in chloroplasts. It traps solar energy.
 - Carbon-dioxide is obtained from air through stomata.
 - Water is absorbed by roots and transported up to the leaves.
 - Energy of sunlight is trapped by chlorophyll which makes carbon-dioxide and water to combine.



2. Following features make the leaf a suitable place for photosynthesis to occur :

- Leaves have flattened structure for obtaining maximum sunlight.
- They are thin to allow sunlight to reach all their cells.
- They have stomata for obtaining carbon-dioxide and releasing oxygen.
- They have a network of xylem vessels for supply of water to all the cells.
- They have green pigment called chlorophyll found in chloroplast of leaves traps energy of the sun.



3. Differences between autotrophic and heterotrophic nutrition;

Autotrophic nutrition	Heterotrophic nutrition
1. It occur only in green plants.	1. It occurs in all non-green plants and animals.
2. carbon-dioxide and water are needed for the synthesis of food.	2. Heterotrophs derive their food from green plants or autotrophs directly or indirectly.
3. Chlorophyll and sunlight are essential for the synthesis of food.	3. Chlorophyll is absent, hence, no photosynthesis.

4. Cuscuta develops special root-like structures called haustoria which enter or pierces into the tissues of the stem of host plant and obtain prepared food.

5. (a) Non-green plants obtain their food from green plants called the host. This is called parasitic mode of nutrition, for example, *Cuscuta* and *Apodanthes*.
Non-green plants such as fungi and some bacteria obtain their food from dead and decaying matter of plants and animals. This is called saprophytic mode of nutrition.

(b) In symbiotic mode of nutrition, two organisms mutually benefit each other by giving and taking, for example, an association of an alga and a fungus in lichens and *Rhizobium* in root nodules of legumes. In parasitic mode of nutrition, only one organism is benefitted, for example, *Cuscuta* and *Apodanthes*.

6. Plants obtain nitrogen from the soil in the form of nitrates. They absorb nitrates in the form of their solution in water through roots. They need nitrogen to prepare proteins which are needed for their growth, i.e., formation of new cells, tissues, etc.

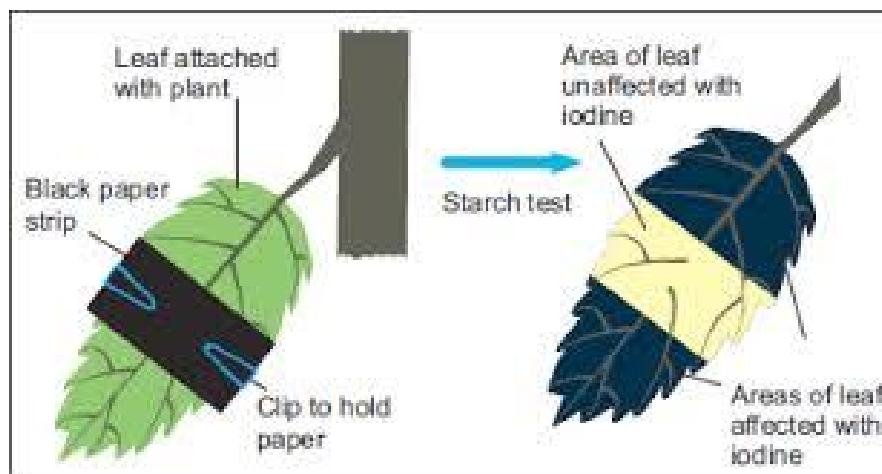
7. The necessity of sunlight for photosynthesis can be shown by the following activity;

Aim : Sunlight is necessary for photosynthesis.

Procedure : Keep a green potted plant in dark for about 48 hours to destarch its leaves. Pluck one leaf and test it for iodine to confirm that the plant is destarched. Cover a part of a healthy leaf on both the sides with a strip of black paper. Place this plant in sunlight for at least 4 hours or more. Pluck the leaf and remove black paper-strip. Boil the leaf first in water and then in alcohol. This destroys the chlorophyll and the leaf becomes colourless. Wash the leaf with warm water and put it in a petri dish. Pour few drops of iodine solution on the leaf to test for starch.

Observation : The uncovered part of the leaf that was exposed to sunlight turns blue - black, while the part covered with black strip does not turn blue-black.

Conclusion : This shows that starch is formed only in those parts which are exposed to sunlight. No starch is formed in the covered part which could not get sunlight. Hence, sunlight is necessary for photosynthesis.



B. HOTS Questions;

1. The leaves of a plant kept in dark become yellow because in the absence of sunlight chloroplasts start changing its form giving yellow colour to the leaf.
2. This is because insectivorous plants grow in nitrogen-deficient soil. To meet their nitrogen requirement, they feed on insects.
3. Bacterium Rhizobium lives in the nodules of the roots of leguminous plants. It converts atmospheric nitrogen into soluble nitrates which make the soil rich in nitrates and hence makes the soil more fertile.