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DEPARTMENT OF EDUCATION (S)
Government of Manipur
CHAPTER-1 - NUTRITION IN PLANTS

SOLUTIONS:

1. Why do organisms take food?

Ans: Organisms take food for various purposes which may be enlisted as follows:

- i) food helps in growth and development of the body.
- ii) food provides energy for various physical work
- iii) food is also needed for replacement and repairing of damaged tissues.
- iv) food helps in the proper functioning of the body.
- v) food protects our body from diseases and ailments.

2. Distinguish between a parasite and a saprotroph.

Ans:

Parasite	Saprotroph
i) It feeds on living organisms	i) It feeds on dead and decaying organisms.
ii) It takes readymade food from the organisms on which it feeds.	ii) It secretes digestive juices on the matter it lives, and converts it into a solution and then absorbs it.
iii) Examples are: Cuscuta and Rafflesia	iii) Examples are: Monotropa and Coral roots

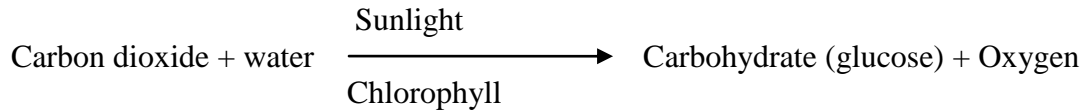
3. How would you test the presence of starch in leaves?

Ans: The presence of starch in leaves can be tested by performing Iodine test of the leaves. In this process, the chlorophyll present in green leaves is removed by boiling the leaves in alcohol and then put two drops of iodine solution. If the colour of the solution changes to blue, it indicates the presence of starch.

4. Give a brief description of the process of synthesis of food in green plants.

Ans: The process of synthesizing of food in green plants is called photosynthesis. Photosynthesis can be described briefly in the following way:

Photosynthesis or synthesis of food in green plants take place in the presence of sunlight, Carbon dioxide and water in which the green pigment called chlorophyll present in green leaves capture the solar energy. During this process synthesis of food occurs in the form of Carbohydrates (starch) or glucose with the release of oxygen gas.



5. Show with the help of a sketch that plants are the ultimate source of food.

Ans:

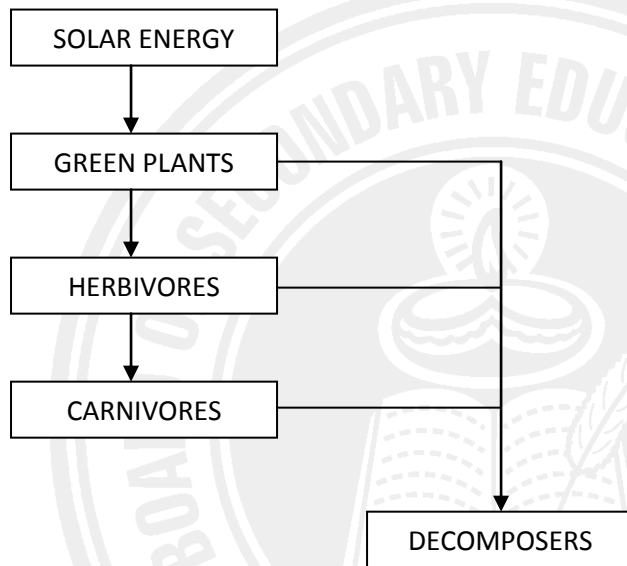


Fig: SKETCH Showing that plants are the ultimate source of energy.

6. Fill in the blanks:

- Green plants are called autotrophs since they synthesis their own food.
- The food synthesized by plants is stored as starch.
- In photosynthesis, solar energy is absorbed by the pigment called chlorophyll.
- During photosynthesis plants take in Carbon dioxide and release Oxygen gas.

7. Name the following:

- A parasite plant with yellow, slender and branched stem.**

Ans: Cuscuta

ii) A plant that is partially autotrophic.

Ans: Pitcher plant (Insectivorous plant)

iii) The pores through which leaves exchange gases.

Ans: Stomata.

8. Tick the correct answer

a) Cuscuta is an example of

(i) Autotroph (ii) parasite (iii) saprotroph (iv) host

Ans: parasite

b) The plants which traps and feeds on insects is

(i) Cuscuta (ii) china rose (iii) pitcher plant (iv) rose

Ans: pitcher plant

9. Match the items given in Column I with those in Column II.

Column I

Chlorophyll
Nitrogen
Cuscuta
Animals
Insects

Column II

Rhizobium
Heterotrophs
Pitcher plant
Leaf
Parasite

Ans:

Column I

Chlorophyll
Nitrogen
Cuscuta
Animals
Insects

Column II

Leaf
Rhizobium
Parasite
Heterotrophs
Pitcher plant

10. Mark 'T' if the statement is true and 'F' if it is false.

(i) Carbon dioxide is released during photosynthesis.

Ans: F

(ii) Plants which synthesize their food are called saprotrophs

Ans: F

(iii) The product of photosynthesis is not a protein.

Ans: T

(iv) Solar energy is converted into chemical energy during photosynthesis

Ans: T

11. Choose the correct option from the following:

Which part of the plants take in carbon dioxide from the air for photosynthesis?

(i) Root hair (ii) Stomata (iii) Leaf veins (iv) Petals

Ans: Stomata

12. Choose the correct option from the following:

Plants take carbon dioxide from the atmosphere mainly through their

(i) roots (ii) stem (iii) flowers (iv) leaves

Ans: leaves

13. Why do farmers grow many fruits and vegetables crops inside large green houses? What are the advantages to the farmers?

Ans: Farmers grow many fruits and vegetable crops inside large green houses because

- (i) green houses provides required temperature for the crops,
- (ii) green houses prevents the crops from wind, cold, insects, pests etc.

The advantages of farming in green houses are

- (i) better yield or increase in productivity of fruits and vegetable crops,
- (ii) it requires less efforts of farmer and make them easier to grow and produce more.

EXTRA QUESTIONS AND ANSWERS:

1. What are nutrients?

Ans: The components of food like carbohydrates, fats, proteins, vitamins and minerals which are necessary for the growth and development of an organism are called nutrients.

2. What is nutrition?

Ans: Nutrition is the mode of taking food by an organism and its utilisation by the body.

3. How are plants classified?

Ans: Plants are classified on the basis of their mode of nutrition.

4. What are Autotrophs or Autotrophic plants?

Ans: Autotrophic plants are those plants which can manufacture their own food from simple inorganic substances. Example: All green plants

5. What are Heterotrophs or Heterotrophic plants?

Ans: Heterotrophic plants are those plants which cannot manufacture their own food but depends upon others organisms for their food. Example: fungi, parasite etc.

6. What are the various modes of plant nutrition?

Ans: The various modes of nutrition are

- i) Autotrophic nutrition
- ii) Heterotrophic nutrition

7. What is an Autotrophic mode of nutrition?

Ans: The mode of nutrition in which organisms make food themselves from simple substances is called an autotrophic nutrition. Example: Green plants.

8. What is a Heterotrophic mode of nutrition?

Ans: The mode of nutrition in which organisms depend on plants and other organisms for their food is called a heterotrophic nutrition. Example: Cuscuta, Mushroom, Lichens etc.

9. In which part of the plant food is prepared?

Ans: Food is prepared mainly in the leaves and some green parts (green stems and green branches) of plants as in the case of desert plants where there are no leaves.

10. What are the food factories of plants?

Ans: Leaves are the food factories of plants.

11. What are stomata?

Ans: The tiny pores present on the lower surface of leaves surrounded by guard cells are called stomata.

12. What are vessels?

Ans: Vessels are like pipes which run throughout the root, the stem, the branches and the leaves for transportation of water and minerals. They form a continuous path or passage for the nutrients to reach the leaf.

13. Name the pigment which makes the leaves green.

Ans: Chlorophyll

14. What is the ultimate source of energy?

Ans: Sun is the ultimate source of energy.

15. What will happen if there are no green plants on the earth?

Ans: There would not be any living organisms on earth in the absence of green plants.

16. What are algae?

Ans: The slimy green patches in ponds or stagnant water bodies which are green in colour due to the presence of chlorophyll and can prepare their own food by photosynthesis are called algae.

17. Name the chemical which is used to test the presence of starch in leaf.

Ans: Iodine

18. What is photosynthesis?

Ans: The process by which plants make their own food in the presence of sunlight, carbon dioxide present in air, water, and chlorophyll present in leaves is called as photosynthesis.

19. What are the raw materials for photosynthesis?

Ans: Chlorophyll, Carbon dioxide, water and sunlight are the raw materials for photosynthesis.

20. What are the end products of photosynthesis?

Ans: Carbohydrates (glucose) and Oxygen are the end products of photosynthesis.

21. Name the process through which the autotrophs or green plants prepare their food.

Ans: Photosynthesis

22. What are the conditions necessary for photosynthesis?

Ans: The conditions necessary for photosynthesis are:

- i) the presence of chlorophyll, a green pigment.
- ii) the presence of sunlight, as source of energy
- iii) Carbon dioxide from the air
- iv) water from soil

23. What is the role or importance of chlorophyll in photosynthesis?

Ans: Chlorophyll is necessary because it can trap the energy from sunlight and helps to carry out the process of photosynthesis. Without chlorophyll, plants cannot manufacture their food.

24. Write the reaction to represent the process of photosynthesis.

Ans:



25. How does carbon dioxide enter into the leaf?

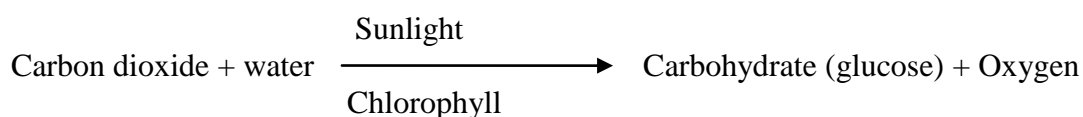
Ans: Carbon dioxide from the air is taken in through tiny holes/pores called stomata. These pores are surrounded by guard cells. During day time when the guard cells are turgid, the stomata remains open and carbon dioxide enters into the leaves.

26. Explain the process of photosynthesis in plants.

Ans: Photosynthesis is the process of manufacturing their own food by the green plants using chlorophyll in the presence of carbon dioxide, water and sunlight to produce carbohydrate and oxygen.

The process of photosynthesis takes place in the leaves of a plant where the green pigment chlorophyll is present along with other requirements i.e. carbon dioxide and water. The chlorophyll traps light energy from sunlight while water is transported to the leaves by the vessels. Then, carbon dioxide enters the leaves through the stomata. Thus photosynthesis occurs in this way. Carbohydrates (glucose) are synthesized during the process along with the release of oxygen gas.

The process of photosynthesis can be represented by the following reaction:



27. Write the importance of photosynthesis.

Ans: The importance of photosynthesis are:

- i. Green plants manufacture their own food by the process of photosynthesis.
- ii. It, in turn, provides these plants as food for the animals that cannot synthesize their own food.
- iii. The Oxygen gas which is an important factor for the survival of all animals is released as an end product of photosynthesis.
- iv. Without photosynthesis, there would not be any plants. If there are no plants, life would not be possible on this earth.

28. How are heterotrophic plants categorised? Explain with examples.

Ans: Heterotrophic plants are categorised in the following ways:-

- a) Saprophytic Plants: Those plants which grow and live on death and decaying organic matter of plants and animals are called saprophytic plants. E.g.- Monotropa, Coral root.
- b) Parasitic Plants: Those plants which obtain their nutrition from other living plants or host are called parasitic plants. E.g. Cuscuta, Rafflesia
- c) Insectivorous Plants: The insect eating plants which absorb the nutrients mainly nitrogen from the insects by secreting a juice is called insectivorous plants. E.g Pitcher plant, Venus fly trap
- d) Symbiotic Plants: Plants which live together with other organisms sharing shelter and nutrients, in which both the organisms are mutually benefited are called symbiotic plants. E.g. Rhizobium with Leguminous plants, Lichens (an alga with a fungus)

29. Differentiate between autotrophic and heterotrophic mode of nutrition

Ans: Autotrophic and heterotrophic mode of nutrition can be differentiated as below:

Autotrophic nutrition	Heterotrophic nutrition
1. This type of nutrition is found in green plants only	1. It is found in all organisms other than green plants.
2. These green plants can manufacture their own food	2. These organisms cannot prepare their own food but depend on others.
3. Carbon dioxide and water is utilised to prepare food in presence of sunlight and chlorophyll.	3. No such process takes place in such mode of nutrition.

30. Name the substances from which plants get nutrients.

Ans: Plants get nutrients from fertilizers, manures and from the atmosphere.

31. What is the mode of nutrition of Cuscuta?

Ans: Parasitic mode of nutrition.

32. Give an example of a parasitic plant?

Ans: Cuscuta

33. What are Insectivorous plants?

Ans: The insect eating plants which absorb the nutrients mainly nitrogen from the insects by secreting a juice are called insectivorous plants.

Example: Pitcher plant.

34. What are saprotrophs?

Ans: The organisms which get their nutrients from dead and decaying organic matter are called saprotrophs.

Example: Mushroom (fungi)

35. What do you mean by symbiotic relationship?

Ans: The relationship between some organisms in which they live together and share both shelter and nutrients is called a symbiotic relationship.

Example: Lichens (an alga with a fungus)

36. What are Lichens?

Ans: Lichens are symbiotic plants in which two organisms live together with mutual benefits to each others- an alga, which contains chlorophyll and a fungus. The fungus provides shelter, water and minerals to the alga and, in return, the alga prepares and provides food to the fungus.

37. In which forms plants use nitrogen?

Ans: Plants use nitrogen in soluble forms.

38. Name the bacteria which convert atmospheric nitrogen into a soluble form.

Ans: Rhizobium bacteria present in the roots of leguminous plants like grams, peas, beans etc.

39. What is the importance of Rhizobium bacteria.

Ans: Plants cannot use nitrogen from the atmosphere directly. They need nitrogen in a soluble form. Rhizobium bacteria can fix atmospheric nitrogen and convert it into a usable form which the plants itself cannot do. Rhizobium lives in the roots of leguminous plants like grams, peas, beans etc and provides them with nitrogen in return the plants

provides food and shelter to the bacteria. Thus, they have a symbiotic relationship which is of great significance for the farmers by reducing the use of nitrogenous fertilizers.

40. How are nutrients replenished in the soil?

Ans: The amounts of minerals and nutrients keep on decreasing as plants absorb it from the soil. In order to replenish these deficiencies of nutrients, fertilizers and manures containing nutrients such as nitrogen, potassium, phosphorus etc. are needed to be added from time to time to enrich the soil. The plants will remain healthy if we can fulfil its nutrient requirement.

41. Name the units which make the bodies of living organism.

Ans: The units make the bodies of living organism are called cells.

42. What are the three main parts of a cell?

Ans: The three parts of a cell are

- i) Cell membrane, ii) Nucleus, iii) Cytoplasm.

43. Perform an activity to show that photosynthesis requires sunlight.

Ans: Take a potted plant and keep it in a dark place for 2-3 days so that the leaves get destarched. Cover a part of one of its leaves with the strip of black paper. Make sure that you cover both the sides of the leaf. Now place this plant in sunlight for 3—4 hours. Pluck the selected covered leaf and remove the black paper covering it. Place this leaf in the beaker containing water and boil it for about 10 minutes. Take out the leaf and now boil it in alcohol, using the water boiled, for 10 minutes. This removes the chlorophyll. Take out the leaf and wash it under running water. Place this leaf in the Petri dish and put a few drops of iodine solution on it. Now observe the change in colour.

The leaf turns blue-black except in the covered region. As this covered region did not receive light, photosynthesis did not occur. Hence no starch was formed there. The uncovered region received light and starch was formed there due to photosynthesis.

Thus, the above activity shows that sunlight is necessary for photosynthesis

44. Perform an activity to show that fungi grows easily on dead and decaying organic matter.

Ans: An activity that shows that saprotrophs feed on dead and decaying organic matter is given below:

Take a piece of bread and moisten it with water and leave it in a moist warm place for 2-3 days or until fluffy patches appear on them. After few days, some bluish green patches are seen to appear on the bread. If it is observed carefully under a microscope or a magnifying glass, cotton-like threads are seen spreading on the piece of bread. These are called fungi and they are absorbing the nutrients from dead and decaying bread. The same activity can be conducted on different fruits, vegetables, leathers etc.

45. Draw a schematic diagram showing photosynthesis.

Ans:

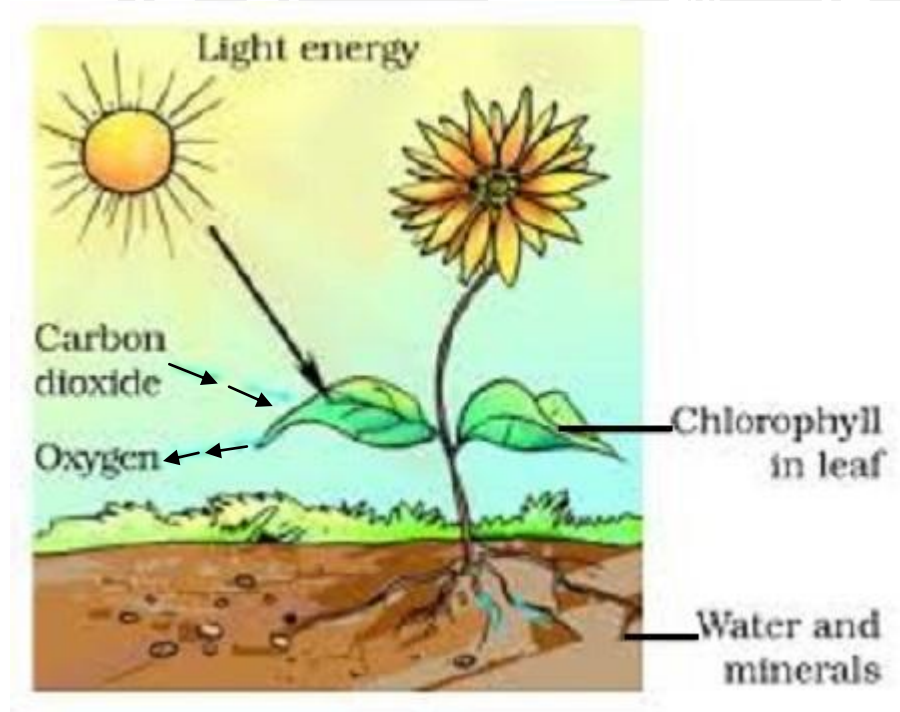


Fig. Diagram showing photosynthesis

46. Draw a simple structure of a cell.

Ans:

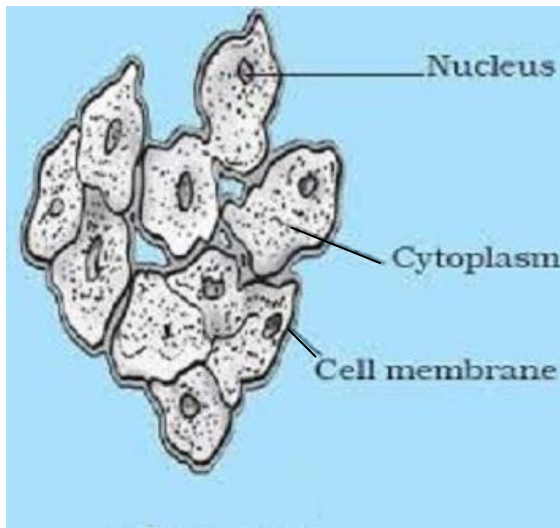


Fig: A simple structure of a cell

47. Draw a well labelled diagram of a section of a leaf.

Ans:

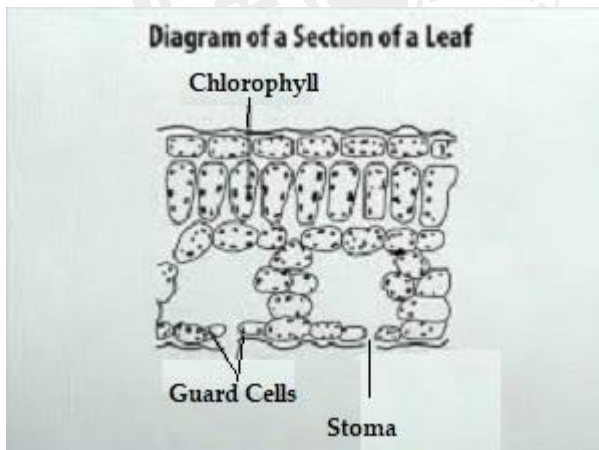


Fig: Diagram of a section of a leaf.

48. Draw a structure of a Stomata

Ans:

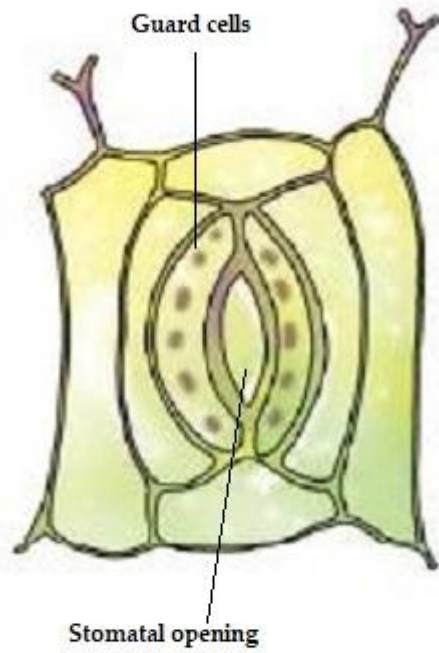


Fig: Diagram showing a structure of Stomata.



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