Lesson : 1. Nutrition in Plants.

Grade : VII

Basic concepts – A Flow Chart

NUTRITION

- It is the mode of taking food by an organism and its utilization by the body.
- The components of food that provide nourishment to the body are called Nutritions.

Modes of Nutrition in Plants

Autotrophic

- Mode of nutrition in which plants make food for themselves from simple substances.
- Plants that make their own food are called **autotrophs.**

Process of making food

photosynthesis

Green plants prepare their own food with the help of carbon dioxide and water taken from the environment in presence of sunlight using a green coloured pigment called chlorophyll (found in green leaves) for the manufacture of food. This process is known as photosynthesis (photo = light; synthesis = to combine). The process of photosynthesis can be summarised as under:

Carbon dioxide + Water $\xrightarrow[\text{Sunlight}]{\text{Chlorophyll}}$ Glucose + Oxygen (food)

Heterotrophic

Mode of nutrition in which plants depend on food prepared by other plants.

Parasites

- Organisms that live on the body of other organisms.
- All parasitic plants feed on other plants as either **partial parasites:** Obtain some of their nutrition from the host, e.g., mistletoe or **Total parasites:** Dependant completely on the host for nutrition, e.g.Cuscuta.

Saprophytes

- Organisms that obtain nutrition from dead and decaying plant and animal matter.
- E.g., Mushrooms, moulds and certain types of fungi and bacteria.

Insectivorous

- Green plant which obtain their nourishment partly from soil and atmosphere and partly form small insects.
- Example: Pitcher Plant, bladderwort and venus fly trap.

Symbiotic

- Mode of nutrition in which two different individuals associate with each other to fulfill their requirement of food.
- Lichens found on tree trunks is the association between alga and fungus. Alga obtains water from fungus and fungus in turn obtains food from alga.

Replenishment of Nutrients in Soil

- Nutrients like nitrogen, potassium. Phosphorus, etc. are replenished by adding fertilizers and replenished by adding fertilizes and manure.
- Nitrogen is naturally replenished by leguminous plants (gram. Peas, moong, etc). Root nodules in these plants contain the bacterium Rhizobium which converts atmospheric nitrogen into a soluble form absorbed by roots.

Know the Terms

- **Saprotrophic Nutrition**: The mode of nutrition in which the organism decomposes the dead and decaying organic materials of the body by secreting enzymes and then absorb the nutrients in solution.
- **Saprotrophs :** Plants which use saprotrophic mode of nutrition.
- Some organisms live together and share shelter and nutrients. This is called symbiotic relationship.
- Lichens are the most common example of symbiotic relationship in which an algae and a fungus live together.
- **Stomata :** There are tiny pores present on the surface of the leaves for exchange of gases from atmosphere. Each pore is called stomata (stoma-singular form) and is surrounded by Guard cells.
- **Food factory :** Leaves are called the food factory of the plants because the food is prepared in the leaves.
- **Rhizobium :** Rhizobium is a bacterium which lives on root nodules of pulses and other lequminous plants. It provides nitrogen to plants by the process known as 'nitrogen fixation'.
- **Legumes :** The plants related to pulses and have pods are called lequmes like methi, urad.
- **Iodine test :** This test is performed to detect the formation of starch in the leaves. The starch gives blue – black color with iodine.
- **Fertilizers :** The inorganic chemical compounds prepared in the industries and rich in the nutrients are called fertilizers.

Objective Type Questions

(1 Mark each)

I. Multiple choice questions

1. The raw materials for photosynthesis are

   a. Oxygen and water b. Carbon dioxide and water

   c. Water, carbon dioxide, cholorophyll d. Nitrogen and water

2. Algae is

   a. Parasite b. Saprotroph c. Autotroph d. None of these

3. Which one of the following is parasite?

a. Lichens b. Algae c. Cuscuta d. Fungus

4. During photosynthesis.

a. Carbon dioxide is released b. Oxygen is released

c. Nitrogen is released d. None of these

5. Insectivorous plant is

a. Mushroom b. Mango tree c. Pitcher plant d. Algae

6. Lichens are the association of

a. An autotroph and a saprotroph b. An autotroph and a heterotroph

c. A green plant and non-green plant d. All of the above

7. The tissue responsible for the transportation of food in plants.

a. Xylem b. Phloem c. Stomata d. Root hair

8. Organisms which prepare food by themselves using simple naturally available raw materials are referred to as. [NCERT Exemplar]

a. Heterotrophs b. Autotrophs c. Parasites d. Saprophytes

9. Which of the following statement is / are. **[NCERT Exemplar]**

i. All green plants can prepare their own food.

ii. Most animals are autotrophs

iii. Carbon dioxide is not required for photosynthesis.

iv. Oxygen is liberated during photosynthesis

Choose the correct answer from the option below.

a.i and iv b. only ii c. ii and iv d. i and ii

10. Which of the following raw materials is available in air for photosynthesis?

a. Oxygen b. Carbon dioxide c. Nitrogen d. Hydrogen

11. In the absence of which of the following will photosynthesis not occur in leaves?

a. Guard cells b. Chlorophyll c. Vacuole d. Space between cells

12. Pitcher plant traps insects because it.

a. Is a heterotroph b. Grown in soils which lack in nitrogen

c. Does not have chlorophyll d. Has a digestive system like human beings

13. The term that is used for the mode of nutrition in yeast, mushroom and bread-mould is

a. Autotrophic b. insectivorous c. Saprophytic d. Parasitic

14. When we observe the lower surface of a leaf through a magnifying lens we see numerous small openings. Which of the following is the term given to such openings?

[NCERT Exemplar]

a. Stomata b. Lamina c. Midrib d. Veins

15. Two organisms are good friends and live together. One provides shelter, water, and nutrients while the other prepares and provides food. Such an association is termed as.

[NCERT Exemplar]

a. Saprophyte b. Parasite c. Autotroph d. Symbiosis

1. c	2. c	3. c	4. b	5. c	6. b	7. b	8. b
9. a	10. b	11. b	12. b	13. c	14. a	15. a	

II. Multiple choice questions

1. Human beings can be categorised as.

a. Parasite b. Heterotrophs c. Autotropha c. Saprotrophs

2. Ultimate source of energy is

a. Chemical energy b. wind energy c. Solar energy d. water energy

1. b	**2. c**

I. Fill in the blanks.

1. Plants like cuscuta takes food from _____ plant.
2. _____ is produced and _____ is utilised during photosynthesis.
3. All green plants are called _____.
4. Chlorophyll is the site of reception of _____ energy during photosynthesis.
5. The organisms which depend on other for their food are called _____.
6. The components of food are called _____.
7. Tiny pores present on the surface of the leaves are called _____.
8. Algae are _____.
9. The bacteria Rhizobium lives in the roots of _____.

10. The symbiotic relationship between algae and fungi is called _____.

1. Host	2. Oxygen, carbon dioxide	3. Autotrophs	4. Light
5. Heterotrophs	6. Nutrients	7. Stomata	8. Autotrophs
9. Legumes (Pulses)	10. Lichens		

II. Fill in the blanks.

Fill in the blanks of the paragraph given below with the words provided in the box.

Chlorophyll, energy, food, carbon dioxide, water, photosynthesis

Note: A word can be used more than once.

Leaves have a green pigment called _____ (a) _____ which captures _____(b) _____ from sunlight. This _____ (c) _____ is used in the process of _____(d) _____ and along with other raw materials like _____(e) _____ and (f) _____ synthesize _____(g) _____.

a. Chlorophyll	b. Energy	c. Energy	d. Photosynthesis
e. Carbon dioxide	f. water	g. Food/ carbohydrates	

III. Fill in the blanks.

1. Solar energy is stored by leaves with the help of _____.

2. Plants like cuscuta take food from _____ plant.

3. _____ is the site of reception of light energy in leaves.

1. Chlorophyll	2. Host	3. Chlorophyll

I. Match the following

Column I	Column II
1. Insectivorous	a. Symbiont
2. Autotrophs	b. Cuscuta
3. Man	c. Pitcher plant
4. Lichen	d. Green plants
5. Parasite	e. Heterotrophs

1. c	2. d	3. e	4. a	5. b

II. Match the following

Column A	Column B
a. Cells	i. Green pigment
b. Sun	ii. Exchange of water and gases
c. Stomata	iii. Structural units of bodies
d. Transpiration	iv. Loss of water through leaves
e. Chlorophyll	v. Ultimate source of energy

a. iii	b. v	c. ii	d. iv	e. i

III. Match the following

1. Column I	Column II
a. Mango tree	i. Insectivorous plant
b. Mushroom	ii. Heterotroph
c. Pitcher plant	iii. Autotroph
d. Cuscuta	iv. Saprophyte
e. Elephant	v. Saprophyte

a. iii	b. iv	c. i	d. v	e. ii

2. Column I	Column II
a. Chlorophyll	i. Bacteria
b. Nitrogen	ii. Heterotrophs
c. Amarbel	iii. Pitcher plant
d. Animals	iv. Leaf
e. Insects	v. Parasite

a. iv	b. i	c. v	d. ii	e. iii

I. True or False

1. Carbon dioxide is released during photosynthesis.
2. Plants which synthesize their food themselves are called saprotrophs.
3. The product of photosynthesis is not a protein.
4. Solar energy is converted into chemical energy during photosynthesis.

1. False	2. False	3. True	4. True

II. True or False

1. Food is not essential for all living organisms.
2. All green plants are autotrophs.
3. Sun is the ultimate source of energy.
4. Cuscuta is a saprotroph.
5. Alga is a parasite.

1. False	2. True	3. True	4. False	5. False

Quiz Time

1. **How do plants prepare their own food?**
2. **Why our body cannot make food from carbon dioxide, water and minerals like plants do?**
3. **How do water and minerals absorbed by roots reach the leaves?**
4. **Without which process life would be impossible on the earth?**
5. **Which pigment makes green plants capable of utilising the solar energy?**
6. **Which gas is released during photo synthesis which is essential for life?**
7. **Which is the ultimate source of energy for all living organisms?**
8. **There are some plants with deep red, violet or brown leaves. Whether these leaves also carry out photosynthesis?**
9. **Which organisms form slimy and green patches in ponds or in other stagnant water bodies?**
10. **Whether mosquitoes, bed bugs, lice and leeches that suck our blood are also parasites?**
11. **The pitcher plant is green and carries out photosynthesis, then why does it feed on insects?**

Answer

1. Plants prepare their own food by the process of photosynthesis using water, carbon dioxide and sunlight.
2. Our body can have the raw materials required for the synthesis of food but our body does not have chlorophyll which can capture the energy of sunlight.
3. The water and minerals absorbed by the roots are transported to the leaves by the vessels present in xylem. They form a continuous passage or pipe line throughout the root, the stems, the branches and the leaves.
4. Photosynthesis
5. Chlorophyll
6. Oxygen
7. The sun
8. Photosynthesis takes place in these leaves also because they also contain chlorophyll masked

by the large amount of red, brown and other pigments.

9. Algae

10. Yes, because they deprive the host of valuable nutrients. So, they are called parasites.

11. The feed on insects to get nitrogenous nutrients which they do not get from the soil.

NCERT Corner

Intext Questions

1. Boojho wants to know how plants prepare their food?

Plants can make their food themselves by a process known as photosynthesis.

2. Paheli wants to know why our body cannot make food from carbon dioxide, water and minerals like plants do.

We have no chlorophyll.

3. Boojho wants to know how water and minerals absorbed by roots reach the leaves.

Water and minerals are transported to the leaves by the vessels which run like pipes throughout the roots, stems, and leaves for the plant. They constitute a continuous path or passage for the nutrients to reach the leaves.

4. Paheli wants to know what is so special about the leaves that they can synthesise food but other parts of the plant cannot.

For the simple reason that leaves possess a green pigment known as chlorophyll.

5. Can we say that the insectivorous plants are partial heterotrophs ?

Yes.

6. Can you guess why algae are green in colour ?

Algae have chlorophyll which imparts to them the green colour.

7. From where do the plants obtain nitrogen ?

Soil has in it some bacteria which convert gaseous nitrogen into a useful form and pass it into the soil. These soluble forms get absorbed by the plants along with water.

8. There are some plants which do not have chlorophyll. How do they survive and from where do they derive nutrition ?

They have a different mechanism for deriving nutrition from other organism. They are heterotrophs.

9. Do you see yellow tubular structures twining around the stem and branches of a tree ?

Yes. Its name is Cuscuta (Amarbel).

10. Are we and the other animals also parasites for the plants ?

No. Parasites feed on the host and get nutrition from it. They do not eat any body part of the host. But, man or other animals (like cow) eat plants or plant's product. So, man and the other animals are not parasites.

11. Paheli wants to know whether mosquitoes, bed bugs, lice and leeches that suck our blood are also parasites.

Lice are parasites. Mosquitoes cannot be called parasites since they suck blood to incubate their eggs and not for nutrition.

12. Have you seen or heard of plants that can eat animals ?

Yes.

13. Is it possible that such plants do not get all the required nutrients from the soil in which they grow ?

Yes.

14. Boojho is confused. If the pitcher plants are green and carry out photosynthesis, then why do they feed on insects. ?

These plants do not obtain sufficient protein. So to make up the protein deficiency, they feed on insects.

15. Boojho wants to know how these organisms acquire nutrients. They do not have mouths like animals do. They are not like green plants as they lack chlorophyll and cannot make food by photosynthesis.

These organisms obtain food from dead organisms.,

16. Paheli wants to know how fungi appear suddenly during the rainy seasons.

The fungal spores are usually present in the air . When they land on wet and warm things they germinate and grow. During rainy reason, there is much moisture in air. So, fungi spoil more things in rainy season.

17. Boojho wants to know if fungi cause diseases also ?

Yes. Fungi can be the root cause of many diseases such as skin diseases, intestinal problems, etc. However, some fungi are also used in medicines.

18. Can you figure out how we can protect our things from getting spoiled ?

We can protect our things by keeping them dry, Placing them into airtight cans.

19. Have you seen farmers spreading manure or fertilizers in the fields, or gardeners using them in lawns or in pots ? Do you know why they are added to the soil ?

Yes. They are added to replenish the nutrients in the soil.

Textbook Questions

1. Why do organisms need to take food?

Organisms need food to :

(i) Get energy to do work

(ii) Build up body

(iii) Repair damages in the body

(iv) Maintain the functions of the body

2. Distinguish between a parasite and a saprotroph.

Parasite	Saprotroph
(i) Parasites obtain nutrients from the living organisms.	They obtain nutrients from dead and decaying organisms.
(ii) Parasites mostly live on or in the host.	They live on dead and decaying stuff.

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

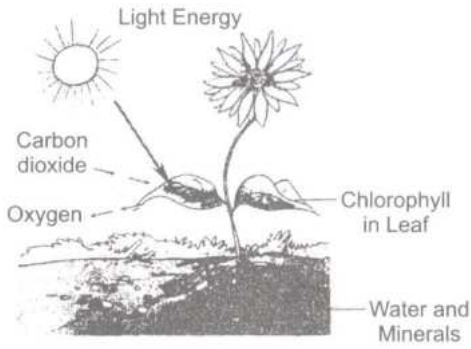
When iodine comes in contact with starch, a dark blue colour develops. By dropping iodine solution on the leaves, we can check the presence of starch.

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

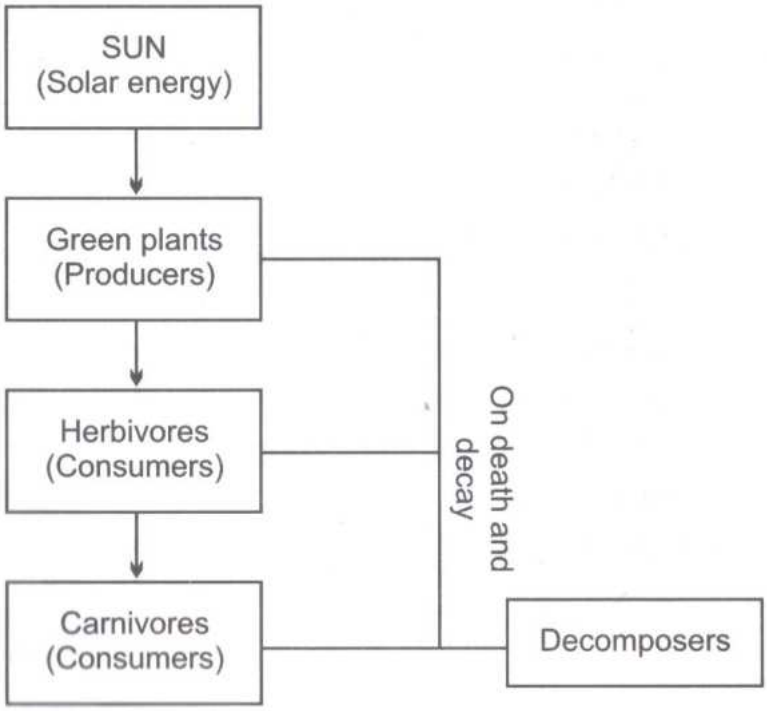
Among plants, the synthesis of food takes place by the process called photosynthesis. During photosynthesis, chlorophyll containing cells of the leaves consume carbon dioxide and water to synthesise carbohydrates in the presence of sunlight. The process can be represented by an equation :

$$\text{Carbon dioxide} + \text{Water} \xrightarrow[\text{chlorophyl}]{\text{Sunlight}} \text{Carbohydrate} + \text{Oxygen}$$

During this process, oxygen is released. The carbohydrates formed finally are converted into starch. The presence of starch in leaves indicates the occurrence of photosynthesis. The starch is also a carbohydrate.



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



I. Very Short Answer Type Question

1. What are nutrients?

The compounds or components of food which are necessary for our body are called nutrients.

2. Name the components of food.

Carbohydrates, fats, proteins, vitamins and minerals are the components of food.

3. From where human and other animals get their food?

Human and other animals get their food from plants and other animals.

4. What is the mode of nutrition of plants?

As the plants are autotrophs so their mode of nutrition is autotrophic.

5. What is the mode of nutrition of human and other animals?

The mode of nutrition of human and other animals is heterotrophic.

6. Whether food is made in all parts of a plant or only in certain parts?

The food is made mainly in leaves and some green parts of the plants.

7. What are the food factories of plants?

Leaves are the food factories of plants.

8. Name the process by which plants prepare their own food.

Photosynthesis

9. What are stomata?

The tiny pores present on the lower surface of leaves are called stomata.

10. Name the pigment which makes leaves green.

Chlorophyll

11. What is the function of chlorophyll?

Chlorophyll captures the energy of sunlight.

12. Which is the ultimate source of energy?

Sun is the ultimate source of energy.

13. What are the raw materials for photosynthesis?

(i) Water (ii) Carbon dioxide (iii) Chlorophyll (iv) Sunlight

14. What happens when there are no green plants on the earth?

In the absence of green plants there will not be any living organisms.

15. Name the units which make the bodies of living organisms.

The units are called cells.

16. Write the three main parts of the cells.

(i) Cell membrane (ii) Nucleus (iii) Cytoplasm

17. Name parts of plant other than leaves where photosynthesis can take place.

In some plants photosynthesis can take place in green stems and green branches.

18. What is algae?

The algae is an aquatic plant which is green due to presence of chlorophyll. It can prepare its own food.

19. What are the end products of photosynthesis?

Carbohydrates (glucose) and oxygen.

20. Name the elements which constitute carbohydrates.

Carbohydrates are made of carbon, hydrogen and oxygen.

21. What are proteins?

Proteins are the nitrogenous substances which contain nitrogen with carbon, hydrogen and oxygen.

22. Name the substances from which plants get nitrogen.

Fertilisers and manures.

23. What is cuscuta (Amarbel)?

Cuscuta is a leafless plant that has yellow stem. So, due to absence of chlorophyll it cannot synthesise its own food.

24. What is mode of nutrition of cuscuta?

Parasitic

25. Why cuscuta is called parasite?

Cuscuta is called parasite because it derives valuable nutrients from the plant on which it climbs and deprives the host plant from them.

26. Which plant hosts cuscuta?

The plant on which cuscuta climbs and from which it derives prepared food for its growth and development.

27. What are insectivorous plants?

The plants which trap insects and digest them to get nitrogenous food are called insectivorous plants.

28. Why insectivorous plants eat insects?

They eat insects to fulfill their needs of nitrogen.

29. Give an example of insectivorous plant.

Pitcher plant

30. What are saprotrophs?

The organisms which get nutrients in solution from dead and decaying matter (by digesting them from outside the body) are called saprotrophs.

31. What is the mode of nutrition of saprotrophs?

Saprotrophic mode of nutrition.

32. Give an example of saprotroph.

Mushroom (a fungi)

33. What is symbiotic relationship?

Some organisms live together and share shelter and nutrients. This is called symbiotic relationship.

34. Give an example of symbiotic relation- ship.

Lichens (relationship between an alga and fungus).

35. Can plants use nitrogen in the manner they can use carbon dioxide?

The plants cannot use nitrogen, (available in free form in the air), in the manner they can use carbon dioxide, available in free form in the air.

36. In which form plants use nitrogen?

Plants use nitrogen in soluble form (e.g. soluble nitrates).

37. Name the bacteria which converts atmospheric nitrogen into a soluble form.

Rhizobium bacteria.

38. Where do Rhizobium bacteria live?

They live in the roots of legumes such as gram, peas, and other pulses.

39. Give two examples of autotrophs?

1. Mango tree. 2. Neem tree.

40. What is mode of nutrition of human?

Heterotrophic.

41. Name the source of energy which is used by plants to prepare food.

Solar energy (Sun).

42. What are guard cells?

The cell which govern the opening or closing of Stomata are called guard cells.

43. Name the gas used in photosynthesis.

Carbon dioxide.

44. Name the gas released in photo- synthesis.

Oxygen.

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

Iodine.

II. Very Short Answer Type Question

1. State whether food is made in all parts of plants or only in certain parts.

The food is made mainly in leaves and some green parts of the plants.

2. What is the function of chlorophyll?

Chlorophyll captures the energy from the sunlight for the photosynthesis.

3. Write the equation of photosynthesis.

$$\text{Carbon dioxide} + \text{water} \xrightarrow[\text{Chlorophyll}]{\text{Sunlight}} \text{Carbohydrate} + \text{Oxygen}$$

$$CO_2 + H_2O \xrightarrow[\text{Chlorophyll}]{\text{Sunlight}} C_6H_{12}O_6 + O_2$$

4. Can plants use nitrogen in the manner they use carbon dioxide?

The plants cannot use nitrogen in the manner they use carbon dioxide. The need N_2 in soluble form.

5. In which form plants use nitrogen?

Soluble form (soluble nitrates).

6. Potato and ginger are both underground parts that store food. Where is the food prepared in these plants? [NCERT Exemplar]

In both the plants, shoot system and leaves are above ground. They prepare food through photosynthesis and transport it to underground part for storage.

7. A goat eats away all the leaves of a small plant (balsam), However, in a few days, new leaves could be seen sprouting in the plant again. How did the plant survive without leaves. [NCERT Exemplar]

The balsam plant survived on the food stored in the stem and roots.

8. Photosynthesis requires chlorophyll and a few other raw materials. Add the missing raw materials to the list given below. [NCERT Exemplar]

Water, minerals, ____(a)____, ____(b)____.

III. Very Short Answer Type Question

1. Why do organisms need to take food? [NCERT]

Organisms need food for obtaining energy to do work, and for growth and development of the body.

4. What is so special about the leaves that they can synthesise food but other parts of the plant cannot?

Leaves have the machinery for photosynthesis, i.e., chloroplasts, which contain green pigment.

3. What is the role of leaves In photosynthesis?

Leaves contain chlorophyll that traps solar energy and takes in carbon dioxide from the air through stomata, for photosynthesis.

4. What is the stored form of carbohydrates in plants?

Starch

5. Name a plant that has both autotrophic as well as heterotrophic mode of nutrition.

Pitcher plant

I. Short Answer Type Question.

1. A goat eats away all the leaves of a small plant (balsam). However, in a few days, new leaves could be seen sprouting in the plant again. How did the plant survive without leaves? [NCERT Exemplar]

Plants store the food that they produced by photosynthesis in the stem and roots. So, when goat ate away all the leaves of the plant, the plant fulfilled its requirement by the food stored in stem and roots.

2. Nitrogen is an essential nutrient for plant growth. But farmers who cultivate pulse crops like green gram, bengal gram, black gram, etc. do not apply nitrogenous fertilisers during cultivation. Why? [NCERT Exemplar]

Roots of pulses (leguminous plants) have a symbiotic association with a bacterium called Rhizobium which fixes nitrogen. Hence, farmers need not use nitrogenous fertilisers.

3. Sunlight, chlorophyll, carbon dioxide, water and minerals are raw materials essential for photosynthesis. Do you know where they are available? Fill in the blanks with the appropriate raw materials. **[NCERT Exemplar]**

(a) Available in the plant : _____

(b) Available in the soil : _____

(c) Available in the air : _____

(d) Available during day : _____

(a) Chlorophyll

(b) Water, minerals

(c) Carbon dioxide

(d) Sunlight

4. Wheat dough if left in the open, after a few days, starts to emit a foul smell and becomes unfit for use. Give reason. **[NCERT Exemplar]**

Carbohydrates in wheat dough encourage growth of yeast and other saprophytic fungi which break down carbohydrates, and emit a foul smell.

5. Name the following: **[NCERT]**

(a) A parasitic plant with yellow, slender and tubular stem.

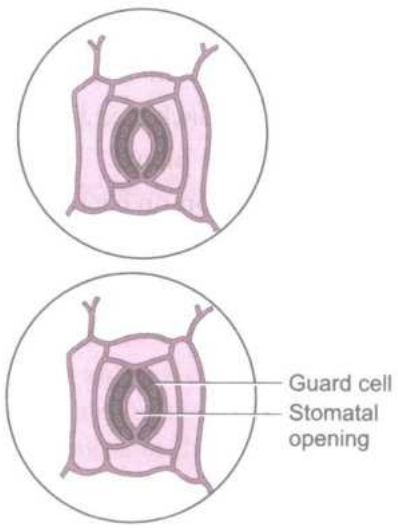
(b) A plant that has both autotrophic and heterotrophic mode of nutrition.

(c) The pores through which leaves exchange gases.

(a) Cuscuta (b) Pitcher plant (c) Stomata

6. Observe the diagram given below and label the following terms given in the box. **[NCERT Exemplar]**

Stomatal opening, guard cell



7. How do water and minerals absorbed by roots reach the leaves?

Water and minerals are transported to the leaves by the vessels which run like pipes throughout the roots, stem, branches and leaves. They form a continuous path or passage for the nutrients to reach the leaf.

8. How does growing pulses in the field help the soil?

Farmers add nitrogen containing manure or fertilisers to the soil to replenish the nutrients. Growing pulses in the soil replenishes nitrogen in the soil thus making the soil healthier.

9. Why is nutrition essential?

Nutrition is necessary for the proper functioning of the body and for growth and development.

10. Name the various conditions that affect photosynthesis.

Intensity of light, temperature and concentration of carbon dioxide affect the rate of photosynthesis.

11. How do plants get nitrogen to synthesise proteins?

Plants cannot take nitrogen present in the atmosphere. They absorb the nitrogen fixed in the soil by roots.

II. Short Answer Type Question.

1. Explain various modes of nutrition.

There are the following modes of nutrition.

i. Autotrophic mode of nutrition: The mode of nutrition in which organisms make their own food themselves from simple substances is called autotrophic mode of nutrition. For example: green plants.

ii. Heterotrophic mode of nutrition: The mode of nutrition in which the organisms cannot make their own food but depend on plants and other organisms for their foods is called heterotrophic mode of nutrition. For example: humans and other animals.

2. What are the functions of food?

Functions of food:

(i) It provides energy for doing physical work.

(ii) It helps in the growth and development of the body.

(iii) It helps to repair damaged tissues.

(iv) It protects our body from diseases.

3. 'All animals depend upon the plants for their food." Justify the statement.

All living organisms need food for energy. Plants can make their own food but animals cannot. Food is necessary for all the organisms. So, all the animals directly or indirectly depend upon the plants for their food.

4. Write the differences between holophytic nutrition and holozoic nutrition.

Holophytic nutrition: It is found in plants and lower forms of animals. They consume liquid food as they lack digestive system.

Holozoic nutrition: It is found in man and other higher forms of animals. They depend on solid food materials. They have a well developed digestive system.

5. Explain the structure of cell.

The units which constitute bodies of living organisms are called cells. They are microscopic. It is enclosed by a thin membrane called cell membrane. Most of the cells have a distinct centrally located spherical structure called nucleus. The nucleus is surrounded by a jelly like substance called cytoplasm.

6. Write the differences between autotrophic and heterotrophic mode of nutrition.

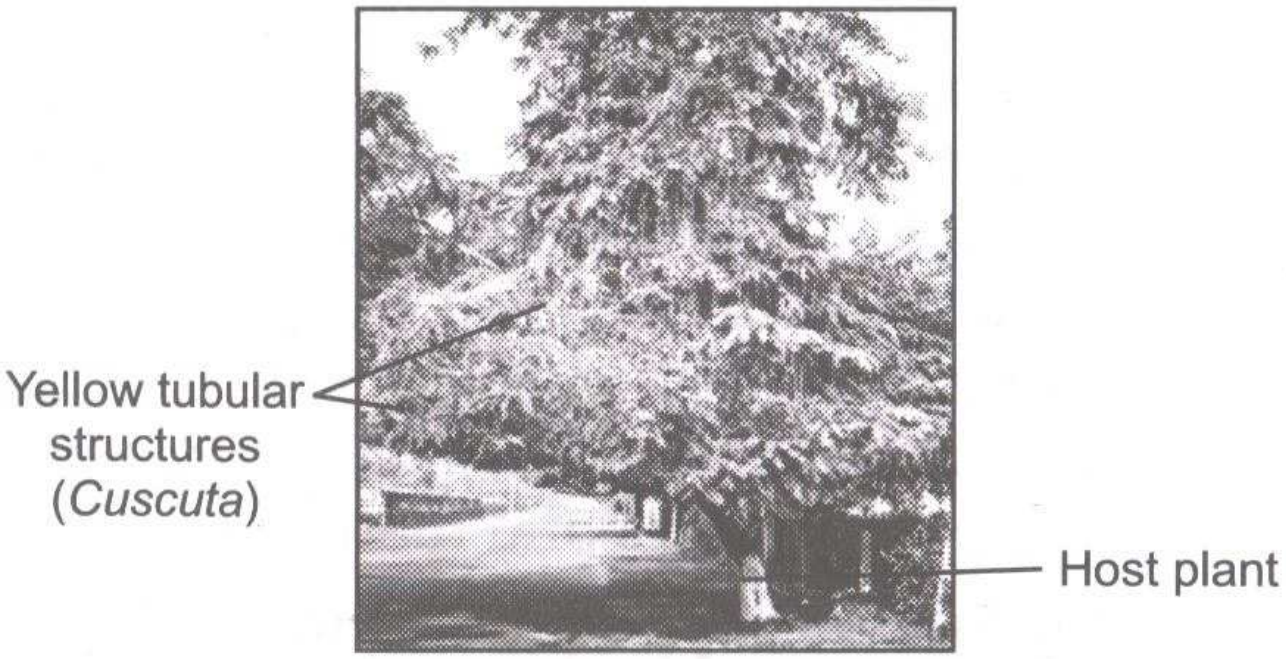
Autotrophic Nutrition	Heterotrophic Nutrition
1 Such type of nutrition is found in green plants.	1. It takes place in all organisms other than green plants.
2. The organism can make its food.	2. The organism cannot make its food.
3. In this mode of nutrition carbon dioxide and water is utilised to prepare food in presence of sunlight.	3. They cannot use carbon dioxide and water to prepare food in presence of sunlight.

7. What are lichens?

A chlorophyll containing partner, which is an algae and a fungus live together. The fungus provides shelter, water and minerals to algae and in return the alga provides food which is prepared by photosynthesis by alga.

8. How does cuscuta get its food?

Cuscuta does not have chlorophyll. It takes ready-made food from the plant on which it is climbing. The plant on which it climbs is called host. Cuscuta takes its food from the host plant and deprives the host of those valuable nutrients.



9. How does the fungus get its nutrition?

Fungus is a saprotroph. Its mode of nutrition is called saprotrophic mode of nutrition. It takes its food from dead and decaying organic matter. The digestive juices of fungus convert the dead materials into soluble form. Then it is absorbed.

10. In the absence of photosynthesis, life is impossible on the Earth. Explain.

Green plants produce food and oxygen during photosynthesis, non-green plants and all animals cannot produce food. So, all living organisms depend on green plants directly or indirectly. All organisms get their food from plants. Oxygen is essential for the survival of life which is released during photosynthesis. In this way, we can say that life would be impossible on the Earth in the absence of photosynthesis.

11. Why fertilisers and manures are required to be added to the soil periodically?

Plants absorb the minerals and other nutrients from the soil. So the amount of these substances are decreased in the soil. Fertilisers and manures contain nutrients like nitrogen, phosphorous and potassium. Therefore, to overcome the deficit of these nutrients in the soil we need to add these fertilisers and manures from time to time.

12. Write the importance of Rhizobium bacteria for the farmers.

Usually, crops require a lot of nitrogen to make proteins. They cannot utilize the atmospheric nitrogen. They can use it in soluble form. The Rhizobium bacteria convert atmospheric nitrogen into soluble form. In this way Rhizobium play an important role for the farmers because it helps farmers to save fertilisers and manures.

III. Short Answer Type Question-1

1. Classify the following into autotrophs and heterotrophs.

a. Green plants b. Fungus c. Human d. Algae

Autoprophs : a. Green plants, b. Human

Heterotrophs: a. Fungus, b. Human

2. What are stomata? Write their functions.

They tiny pores present on the surface of the leaves are called stomata.

They help in the exchange of the gases and to release excess of water by transpiration.

3. What are insectivorous plants? Give example.

The insect eating plants are called insectivorous plants. Such plants may be green or of some other colours.

The trap insect and digest them.

Example : Pitcher plant.

4. How to Rhizobium bacteria take nitrogen from atmosphere?

Rhizobium bacteria can take nitrogen from atmosphere and covert it into a soluble form which is used by that plant in which bacteria live.

5. Why is it true to say that insectivorous plants are partial heterotrophs ? Explain.

Insectivorous plants are green and can do photosynthesis so they are called autotrophs. But they also can trap insects and digest them. Due to this, they are called partial heterotrophs.

6. Unscramble the following terms related to modes of nutrition : (NCERT Exemplar)

(i) RASPAEIT, (ii) ROPEHYSTAP, (iii) TOROPHAUT, (iv) SIBIOMSIS.

(i) PARASITE, (ii) SAPROPHYTE, (iii) AUTOTROPH, (iv) SYMBIOSYS.

7. Nitrogen is an essential nutrient for plant growth. But farmers who cultivate pulse crops like green gram, bengal gram, black gram, etc. do not apply nitrogenous fertilizers during cultivation. Why ?

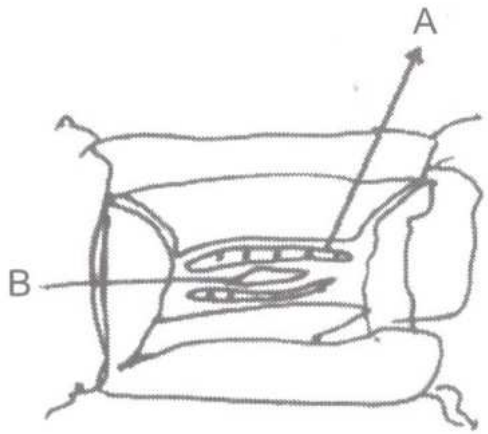
Roots of pulses (leguminous plants) have a symbiotic association with a bacteriom called Rhizobium which fines nitrogen. Hence, farmers need not use nitrogenous fertilizers.

III. Short Answer Type Question-2

1. (a) Identify the following figure and label the parts marked as A and B.

(b) Which position of stomata- open or closed, has been shown in the figure ?

(NCERT Exemplar)



(a) The figure is of the stomata on a leaf.

(A) Guard cell

(B) Stomata

(b) The position showed in the figure is of closed stomata.

2. (a) Draw a diagram of a pitcher plant to show the following parts :

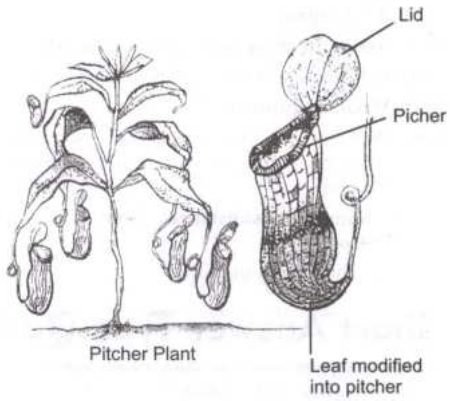
(i) Pitcher

(ii) Lid

(b) What is the mode of nutrition of this plant ?

(c) Is it an autotroph or partial heterotroph?

Ans. (a)



(b) Autotrophic and Heterotrophic both

(c) Partial heterotroph.

I. Long Answer Type Question

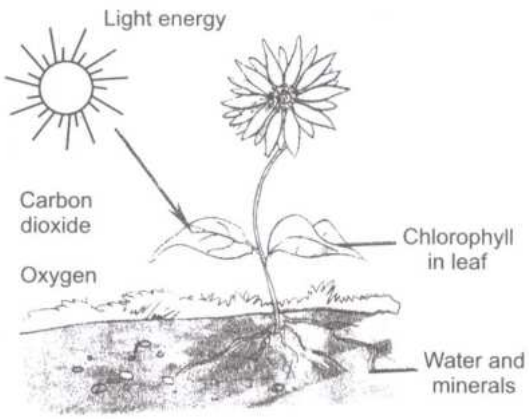
1. (a) Draw a schematic diagram showing photosynthesis.

(b) What are the products of photosynthesis ?

(c) Name the gases utilized and liberated in photosynthesis.

(d) Can all plants do photosynthesis ?

(a)



(b) Carbohydrates and oxygen.

(c) Liberated-oxygen, Utilised-carbon dioxide.

(d) All plants cannot do photosynthesis, only green plants can do photosynthesis.

2. Wild animals like tiger, wolf, lion and leopard do not eat plants. Does this mean that they can survive without plants? Can you provide a suitable explanation?

(NCERT Exemplar)

No, they cannot survive without plants. If there are no plants, herbivorous animals will not survive and ultimately animals like tiger, wolf, lion and leopard will have nothing to eat.

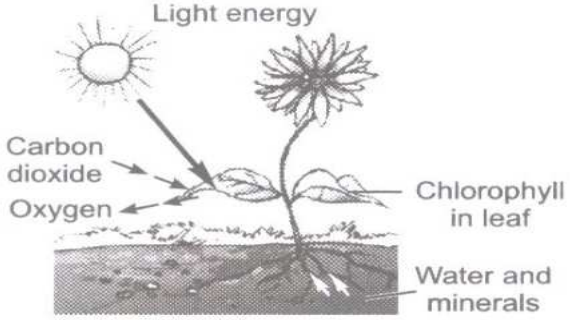
II. Long Answer Type Question

1. What is photosynthesis? Explain the process of photosynthesis in the plants.

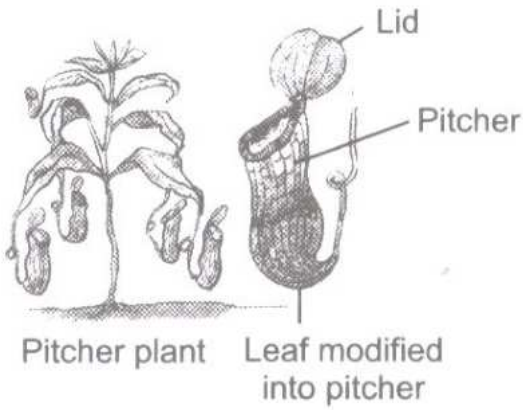
The green plants can prepare their own food. The excess amount of food is stored in the seed to nourish the little young plant. The unique way by which green plants make their own food is called photosynthesis (Photo = light, synthesis = to make). Every green part of the plant can prepare food but the leaves are the most prominent. The green leaves are called 'food factories' of the plant. If stem is green, it can also carry out photosynthesis. Green parts of a plant have green coloured bodies called chloroplasts. These chloroplasts have green pigment in them known as chlorophyll. Chlorophyll pigment traps light energy and uses it in making food. Plants receive light energy from the sun, carbon dioxide from the atmosphere and water from the soil. As a result of photosynthesis, plants synthesise carbohydrate and give out oxygen. Thus, the green plants convert these raw materials into food with the help of light energy.

$$\text{Carbon dioxide} + \text{Water} \xrightarrow[\text{Chlorophyll}]{\text{Sunlight}} \text{Carbohydrate (glucose)} + \text{Oxygen}$$

All green plants can make their own food from the inorganic substances. So, they are called autotrophs.



2. Explain the mechanism of eating insects by a pitcher plant.



The leaves of Lid the pitcher plants are modified into a pitcher like structure. The apex of the leaves form a lid which can open and close the mouth of the pitcher like structure of the leaves. Inside the pitcher there are hair which are directed downwards. When an insect lands in the pitcher the lid closes and the trapped insect gets entangled into the hair. The insect is digested by the digestive juices secreted in the pitcher. Such insect eating plants are called insectivorous plants. Such plants do not get all the required nutrients from the soil. So, they are called partial heterotrophs.

3. Explain the process, how nutrients are replenished in the soil?

The plants absorb mineral nutrients from the soil. So their amounts in the soil is decreased. The fertilizers and manures containing various nutrients like nitrogen, potassium and phosphorus. These nutrients need to be added from time to time to enrich the soil. The nitrogen gas is available in large amount in the soil, but cannot use it directly from the air. The bacterium Rhizobium lives in the roots of the leguminous plants. Rhizobium bacteria convert the non usable form of nitrogen into usable form. In this way the nutrients are replenished in the soil by using fertilizers, manures and by sowing leguminous crops.

III. Long Answer Type Question.

1. Wild animals like tiger, wolf, lion and leopard do not eat plants. Does this mean that they can survive without plants? Can you provide a suitable explanation?

It is true that these animals do not eat plants. They hunt and eat herbivorous animals like (deer, goat., bison, zebra, giraffe, etc. which are dependent on plants for food. If there are no plants, herbivorous animals will not survive and in that case animals like tiger, wolf, lion and leopard will have nothing to eat.

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

(i) 'lake two potted plants of the same kind.

(ii) Keep one in the dark (or in a black box) for 72 hours and the other in the sunlight.

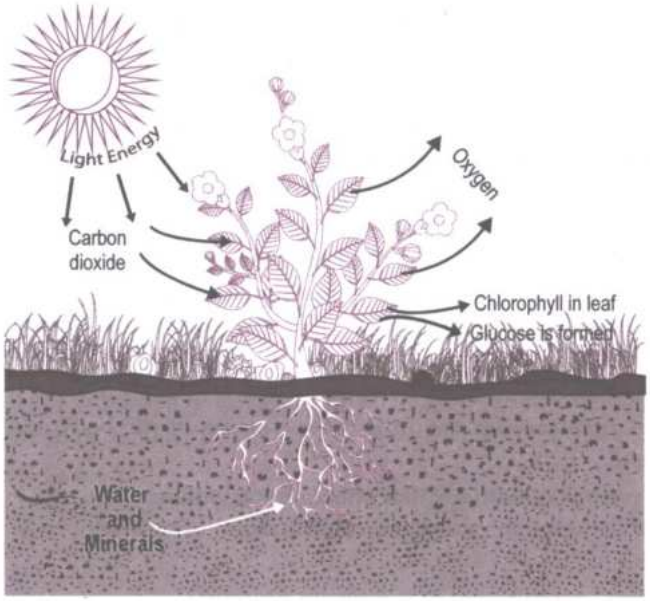
(iii) Take one leaf from each of the plants.

(iv) Put few drops of iodine solution on each of the leaves.

(v) The leaf kept in the sunlight will turn blue—black due to presence of starch. The leaf kept in the dark will not turn blue—black because of absence of starch.

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

[NCERT]



4. Distinguish between the following:

(a) Autotrophs and Heterotrophs

(b) Saprophytes and Parasites **[NCERT]**

(a)

S. No.	Autotrophs	Heterotrophs
(i)	These are plants that make their own food.	These depend on food made by plants.
(ii)	They contain the green pigment chlorophyll.	These do not have any green pigment.
(iii)	Example: All green plants.	Example: Deer, camel, etc.

(b)

S. No.	Saprophytes	Parasites
(i)	They obtain nutrition from dead and decaying plants and animals.	They obtain nutrition from the body of other organisms.
(ii)	Example: Mushroom, mould, etc.	Example: Dodder, Cuscuta, etc.

5. What is symbiosis? Explain with an example.

It is the mode of nutrition where two organisms live together for mutual benefit. For example, lichens. The association of algae and fungi is called lichen. Alga survives in water. Its need for water is fulfilled by the fungus which in turn consumes the food made by alga. The fungus in turn gives to the alga, water and minerals it obtains from the substratum on which it lives. This association of algae and fungi makes them look as if they are one single organism.

I. High Order Thinking Skills (HOTS) Questions

1. Except plants, why can't other living organisms prepare their food using CO_2, water and minerals?

Other living organism does not contain chlorophyll which is necessary for preparing food using CO_2, water and minerals.

2. A unique substance in leaves allows them to prepare the food while other parts of plants cannot. Write the possible reason for this.

Leaves contain chlorophyll which is essential for food preparation.

II. High Order Thinking Skills (HOTS) Questions.

1. Some plants have deep red, violet or brown leaves. Do these leaves also carry out photosynthesis?

The leaves other than green also have chlorophyll. The large amount of red, brown and other pigments mask the green colour. Photosynthesis takes place in these leaves also.

2. If the pitcher plant is green and carries out photosynthesis, then why does it feed on insects?

Pitcher plant does not get the sufficient nutrients from plants. Therefore, it fulfils its requirement by eating insects.

3. Why can't our body make food from carbon dioxide, water and minerals like plants do?

This is because our body cells do not contain the necessary apparatus for photosynthesis.

4. Why is the process of photosynthesis called an air purifying process?

During photosynthesis green plants take in carbon dioxide from the atmosphere and release oxygen as the end product. Thus, in the process they purify air.

I. Value Based Questions.

1. Vivek went to visit his grandfather in village where he saw that his grandfather's field of wheat is infected with fungus but no one is aware of this. Vivek told him that he should use an antifungal agent in his fields to stop this infection ?

(a) What is fungus ?

(b) Can fungus only cause disease or can it be helpful also ?

(c) What values are shown by Vivek ?

(a) Fungus are non-green plants that grow on dead and decaying matter for their food.

(b) Fungus are also useful as it can cure different type of infections.

(c) Vivek is sincere, curious and knowledge with a keen sense of applying it where necessary.

2. Ashish went to visit his grandfather in his village. He told her grandfather to plant crops like pulses, gram, beans, etc. for a year then follow with regular crops. It will increase the crop productivity.

(a) What will you name the process suggested by Ashish ?

(b) What are noted benefits of this process ?

(c) What values are shown by Ashish ?

(a) This process is called crop-rotation.

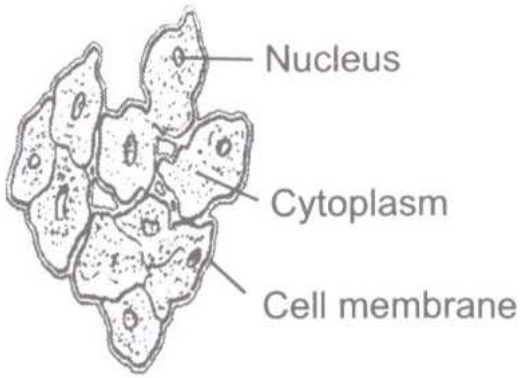
(b) Mineral content of soil will be restored.

(c) Ashish is sincere, observant and interested in applying his knowledge to situations.

Skill Based Question

1. Draw a diagram to show an animal cell and label the following parts.

i. Nucleus ii. Cytoplasm iii. Cell membrane



2. a. Indentify the following figure and label the parts marked as 1 and 2.

b. Which position of stomata – open or closed is shown in the figure?

a. The figure is of the stomata on a leaf labelling.

1. Guard cell 2. Stomata

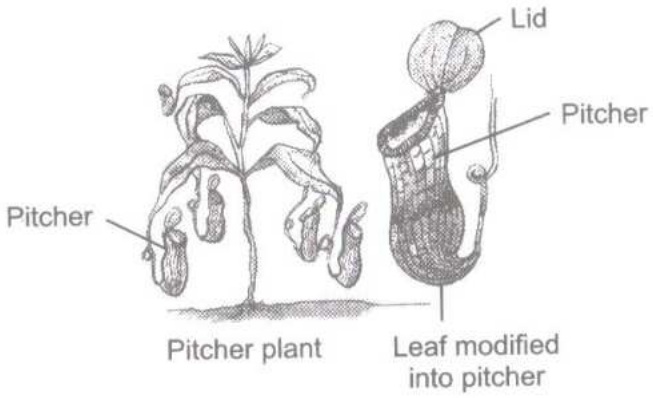
b. It shows the open position of stomata.

3. a. Draw a diagram of a pitcher plant to show the following parts.

i. Pitcher ii. Lid

b. What is the mode of nutrition of this plant?

c. Is it autotrophs or heterotrophs



b. the mode of nutrition of the pitcher plant is insectivorous.

c. It is partial heterotroph.

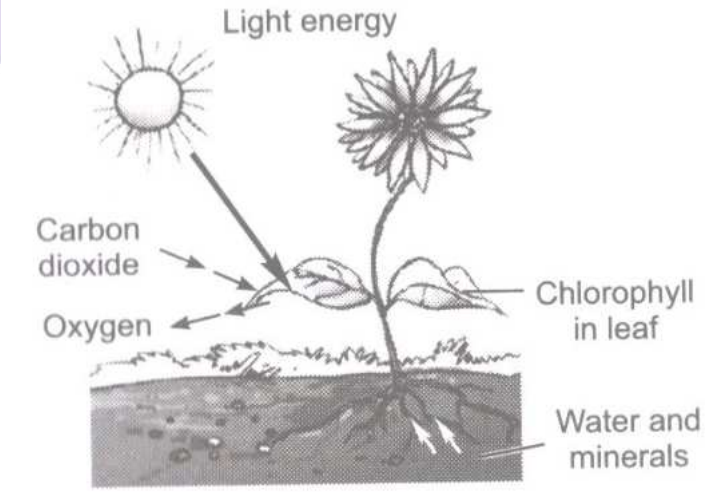
4. **a. Draw a schematic diagram showing photosynthesis.**

b. What are the products of photosynthesis?

c. Name the gases utilised and liberated in photosynthesis.

d. Can all plants do photosynthesis?

a.

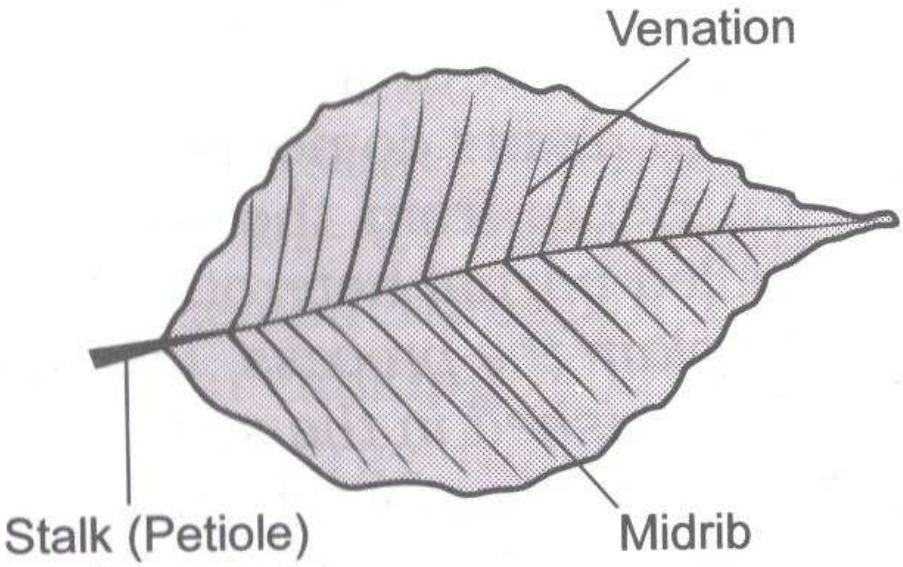


b. The products of photosynthesis are carbohydrates and oxygen.

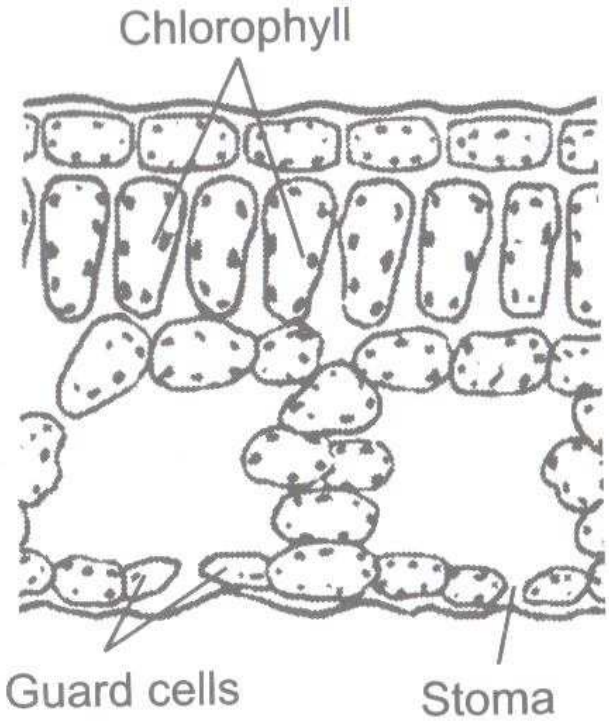
c. The oxygen is liberated and carbon dioxide is utilised in photosynthesis.

d. All plants cannot do photosynthesis, only green plants which contain chlorophyll pigment can do photosynthesis.

5. Draw a labelled diagram of a common leaf.

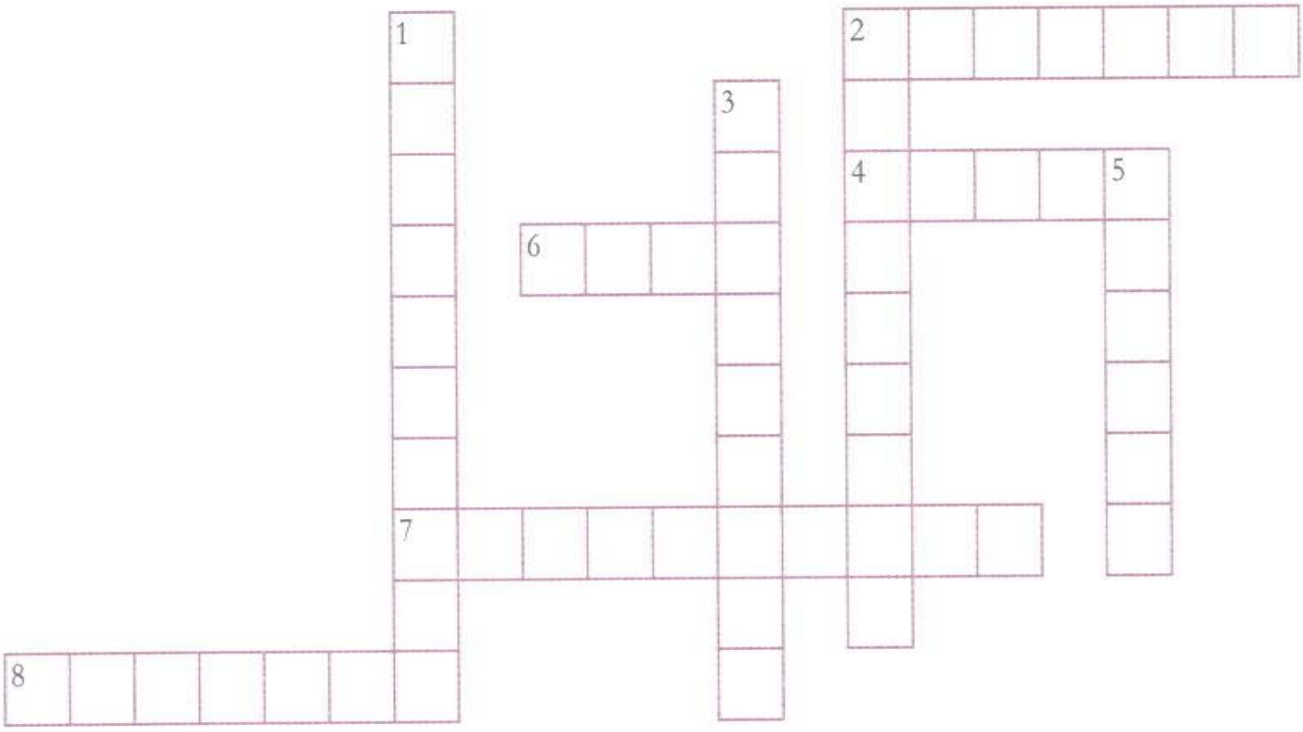


6. Draw a diagram of a section of leaf and label its various parts.



Cross word Puzzle

1. Solve the crossword puzzle with the clues given below.



Across

2. Tiny openings in a leaf that help in exchange of gases.

4. An example of a non-green plant that is parasitic.

6. A plant that supports a parasite.

7. An association between two organisms in which, one lives and derives food from the other.

8. An example of a symbiotic organism.

Down

1. Green plants that can make their own food.

2. An association between two organisms in which both benefit from each other.

3. The process of taking in food by an organism and the utilisation.

5. An example of a total parasitic plant.

Across

2. Stomata

4. Mould

6. Host

7. Parasitism

8. Lichens

Down

1. Autotrophs

2. Symbiosis

3. Nutrition

5. Dodder