



# SCIENCE



Written by :  
Ritu Jain

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**New Edition**

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# Preface

Today's children will spend their adult lives in a multitasking, multifaceted, technology driven, diverse vibrant world, and thus they must arrive equipped to do so effectively.

This new edition of 'Science' has been completely prepared in accordance with National Curriculum framework. The most important aim of this series is to develop scientific attitude in children rather than providing information.

To fulfill our aim, the books are produced in large format, in full colour with attractive illustrations to enhance visual appeal. We hope that our attempt has been successful and a small step towards imparting necessary quality education to our children. Change is a way of life and our endeavour is to continue to evolve the series into a better product. Suggestions and comments are encouraged.

—Publisher





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## IN THIS CHAPTER

- *Photosynthesis*
- *Nutrition*
- *Parasitic and carnivorous plants*

## INTRODUCTION

All living organisms carry out various life activities for their subsistence on the earth. They all eat food, excrete wastes, reproduce, move, respond to various stimuli and grow. These activities are called life processes.

As we know that food is fuel for our body. We need energy to survive, to work, to play etc. Energy is stored in the form of chemical energy in food. Proteins, carbohydrates, vitamins, minerals and fats are components of food. These components of food are necessary for growth, strength of our body and are called nutrients.



Various sources of nutrients

Plants use energy of the sunlight to make food and release oxygen into the air. Most other organisms depend directly or indirectly on food made by the plants. The illustration of a food chain shows how directly or indirectly all kinds of animals depend on plants for food.

## **Nutrition**

The process by which an organism obtains substances that provide energy and help in growth, maintenance and repair of the body is called nutrition.

## Autotrophs

Different living organisms obtain nutrition in different ways. The organisms that make their own food by using simple substances from their surroundings are called autotrophs. Certain types of bacteria, unicellular algae and most plants are autotrophs.

## Heterotrophs

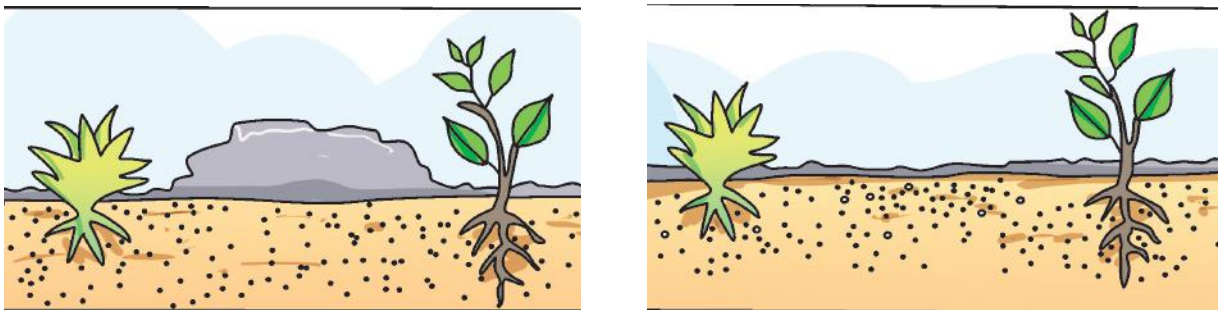
All kinds of animals and many types of micro-organisms and the total parasitic plants obtain energy from other living organisms.

They consume plants and other organisms as food. Some feed only on plants, some feed only on other animals and some eat both plants and animals. All such organisms that obtain nutrition by feeding on other living organisms are called heterotrophs.

## Saprophytes

Fungi are saprophytes. They grow on various kinds of organic materials. You will find them on a damp piece of leather or cotton clothes, over ripe fruits and pickles, especially during the rainy season.

Let us look how these organisms obtain nutrition?



Fungi live in the soil on decaying matter and convert it into plant nutrients

Saprophytes secrete digestive juices on the organic material they grow on. The digestive juices break down the organic material into simpler substances and convert it into a solution. The saprophyte then absorbs the solution and obtains nutrition from it.

The fungi living in the soil feed on decaying plant and animal matters and in the process release useful substances into the soil most of their substance are plant nutrients. They are necessary for the growth of the plants.



## Activity Time

**To observe the breadmoulds or fungi present on the organic matter :**

Take a slice of bread. Moisten it a little and leave it overnight in the open. What do you observe ?

A fluffy, green mass appears on the bread. These are fungi, called bread moulds, which feed on organic matter present in the bread kept in a moist condition.



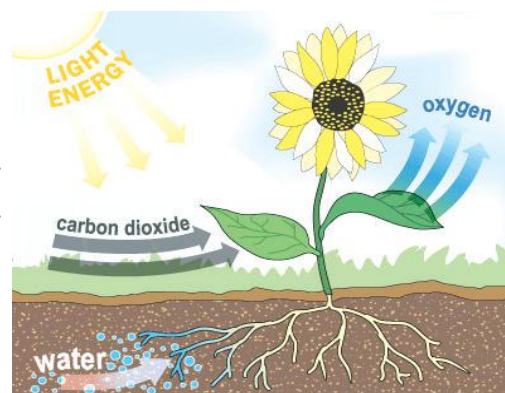


## PHOTOSYNTHESIS

Leaves are the food factories of plants. They make food by a process called photosynthesis.

Photosynthesis is a complex set of chemical reactions that take place in the plant cells. During the photosynthesis, light energy is converted into chemical energy.

In this process water and carbon dioxide combine to form sugar and oxygen is released as a by product. The given equation show the photosynthesis.



Photosynthesis



## LEAVES

Photosynthesis occurs in the cells of leaves. The leaves of a plant are arranged in such a way that all of them are able to trap sunlight. A leaf is flat and thin, to enable solar rays to easily penetrate and reach the leaf cells. The tiny structure called chloroplasts present inside the plant cell contain the green pigment called chlorophyll. Chlorophyll traps the solar energy falling on it and uses it to make food for the plant.



Leaf

The food made by the leaves is in the form of sugar. It is transported to all the parts like the roots, stem, flowers and fruits by a network of tubes called phloem. Next to the phloem towards the middle is another tube called xylem, through which water from the roots of the plants are brought up to the leaves. If you observe a green leaf under a microscope, you will see the network of leaf veins. Phloem tubes are part of the leaf veins. The excess sugar produced in the leaves is converted to starch and stored. It is used when the plant is not able to make enough food.

### **A Plant's Requirement to Prepare Food**

A plant require light to make food. They can photosynthesis in artificial light as well. The chlorophyll present in the leaves capture light.

### **Carbon Dioxide and Water**

Air enters the leaves through pores called stomata. Carbon dioxide present in air is then used by the plant. Water absorbed by the roots reaches the leaves through a bundle of tubes. These tubes are called xylem bundles.

The xylem bundles form a continuous network of tubes from the roots to the stem, branches and leaves.

### **Do You Know?**

Besides leaves, photosynthesis also takes place in other green parts of the plant—in green stems and green branches. The desert plants have scale or spine like leaves to reduce loss of water by transpiration. These plants have green stems which carry out photosynthesis.



The chemical reaction shows that during photosynthesis, oxygen is produced, which is released through stomata and gets mixed with the air outside.

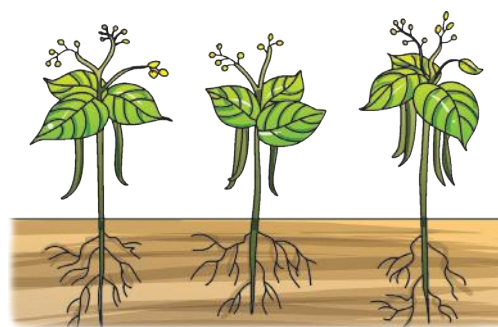
## Plants Use Glucose to Obtain Energies

Like all other living things, plants also need energy for growth, movement reproduction and respiration. When a plant needs energy, it breaks down glucose with the help of oxygen to release energy from it.



## Plant Nutrients Get Replenished in the Soil

Plant need certain nitrogenous substances and minerals to grow. In natural conditions, when plants and animals die they are decomposed by the organisms in the soil. The nutrients present in the plant and animal tissue get mixed with the soil. This makes the soil fertile. You have learnt that plants like beans and grams. Produce nitrogenous substances with the help of Rhizobium bacteria. After a crop such as maize or wheat, usually farmers grow a bean crop to increase the fertility of the soil. This practice is known as rotation of crops. Chemical fertilizers containing nitrogenous substances are also added to enrich the soil.



Root nodules

## Parasitic and Carnivorous Plants

Some plants depend on other plants for food and water. Such plants are called parasitic plants. The plant on which a parasitic plant grows is called a host plant. The parasitic plants have specialized roots that penetrate the host plant and absorb nutrients and water from it. A parasitic plants damages the host plants.



Mistletoe, a partial parasite



Cuscuta, a total parasite

Mistletoe and Cuscuta are parasitic plants. The cuscuta plants do not have chlorophyll therefore, they cannot make their own food. They depend totally on the host plant for food and water. They are called total parasites. They kill the plants on which they grow.

Mistletoe is a common parasites plant that grows on trees such as mango, teak and chiku. Mistletoe is not a total parasitic. It has chlorophyll and makes some of its food, but depends on the host plant for water and certain nutrients.



Carnivorous plants like the venusflytrap and pitcher plant are adapted to grow in soil that do not have enough minerals. These plants feed on insects to obtain minerals present in their bodies.



## Activity Time

### Carbon Dioxide is Necessary for Photosynthesis :

Select a potted plant with long leaves. Keep it in dark for 1-2 days to destarch it. Put a little concentrated solution of caustic potash in a bottle fitted with a tight stopper. Select a leaf from the plant. Insert half of it in the bottle and let the other half remain outside, as shown in the figure. Caustic potash absorbs carbon dioxide. The portion of the leaf in the bottle, therefore, will not get carbon dioxide, while the portion outside the bottle will. Cork the bottle and place it in sunlight for a few hours. Test the leaf for starch.



Which portion of the leaf turns blue black ? What do you conclude ?



### Know the Keywords :

**Nutrient :** A substance which an organism obtains from surroundings for deriving energy and materials for its growth and maintenance.

**Parasitic :** Organisms that obtain food from the body of their host.

**Stomata :** Tiny apertures present on the surface of leaves for gas exchange.



### Point to Remember

- The process by which an organism obtains substances that provide energy and help in growth, maintenance and repair of the body is called nutrition.
- Leaves are the food factories of plants. They make food by a process called photosynthesis.
- The tiny structure called chloroplasts present inside the plant cell contain the green pigment called chlorophyll.

## EXERCISE TIME

### A. Answer the following questions :

1. What is nutrition ?
2. How does a plant obtain water and carbon dioxide ?
3. What are the essential things required by a plant to carry out photosynthesis ?
4. Why do only leaves make food ?
5. Write a short note on parasitic plants.

### B. Fill in the blanks :

1. \_\_\_\_\_ are living organisms that obtain food from dead and decaying matter.

2. The chlorophyll in the leaf cells absorbs \_\_\_\_\_.
3. Oxygen is formed and released through the \_\_\_\_\_.
4. Leaves are the \_\_\_\_\_ of plants.
5. \_\_\_\_\_ is feel for our body.
6. \_\_\_\_\_ enters the stomata and carbon dioxide is taken into the leaf cells.

**C. Write 'T' for true and 'F' for false statements :**

1. A partial parasite cannot photosynthesis.
2. A carnivorous plant is a heterotroph.
3. Chlorophyll helps in trapping energy from the light.
4. A total parasitic plant has some chlorophyll.
5. Sugar is transported to the various parts of the plant by the xylem tubes.
6. Venus flytrap are carnivorous plants.

**D. Tick (✓) the correct option :**

1. Life on the earth depends on plants because they produce :
 

(i) nectar and flowers	<input type="radio"/>	(ii) wood and oil	<input type="radio"/>
(iii) oxygen and food	<input type="radio"/>	(iv) none of these	<input type="radio"/>
2. A heterotroph that obtains nutrients from decaying organic matter is called a :
 

(i) parasite	<input type="radio"/>	(ii) saprophyte	<input type="radio"/>
(iii) camphorate	<input type="radio"/>	(iv) all of these	<input type="radio"/>
3. The most plants and some unicellular algae are :
 

(i) autotrophic	<input type="radio"/>	(ii) heterotrophic	<input type="radio"/>
(iii) saprophyte	<input type="radio"/>	(iv) photosynthesis	<input type="radio"/>
4. A total parasitic plant has no :
 

(i) stem	<input type="radio"/>	(ii) flowers	<input type="radio"/>
(iii) chlorophyll	<input type="radio"/>	(iv) none of these	<input type="radio"/>



Creative Work

- **Observe various kinds of plants around you. You will find a variety of plants collect samples of the plants.**