

# NATURE WORLD

Environmental Studies

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Class  
**4**



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## Preface

"Earth provides enough to satisfy every man's needs, but not every man's greed." To teach about these environmental situations, EVS has become an integral part of education and curriculum. On the whole, **Nature World** series, serves the purpose of all types of NCERT syllabus taught in various public or convent schools.

**Nature World** is a series of 6 books for classes 0 to 5th, designed to enrich the school students from primary level with brainy skills in a systematic manner.

The salient features of the series are :

- Simple language is used to understand easily.
- Enriched with colourful illustrations that give the feel of learning environment in the classroom.
- 'Teacher's Tip' will help teacher to make understand the students each topic in detail.
- 'Wrap Up' is the collection of short lines of important topics that makes the learning easy.
- Time to Work, Creative Activity, Life Skills, etc. are the exercises that will help the teacher to know the caliber of each and every student.

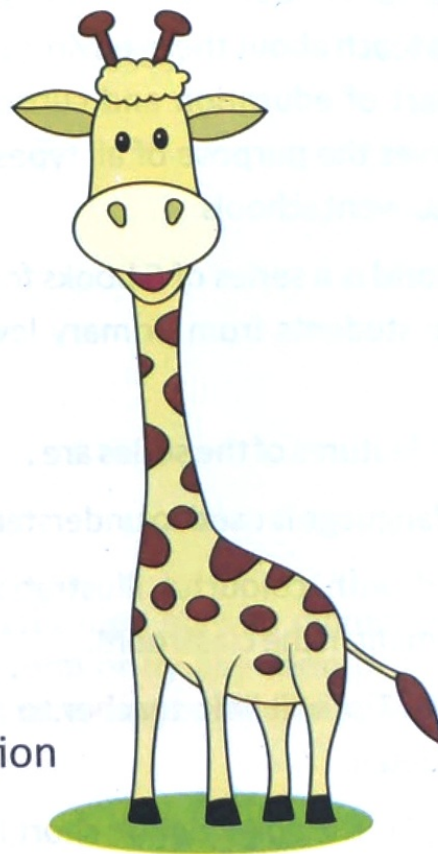
Though all efforts have been done in designing and developing an authentic book, but your valuable suggestions are always welcomed to improve this series further in the interest of the students.





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# Plants : Food Producers

Plants are important to us. They produce all of the food that animals, including people eat. Even meat is obtained in the presence of plants. The animals that give us meat, such as chickens and goats, eat grass, leaves or some other plant parts. If they do not eat plants, they will die. So all the food that we eat comes from plants.



Animals depend on plants for food

Plants also give us fresh air, shelter, fuel, medicines and many other things.

## DIFFERENT PLANTS HAVE DIFFERENT LEAVES

Most leaves are flat, broad or blade like, they may also be present in many other shapes, including round, oval or feathery. In size, leaves range from several millimetres to 15 to 18m long, as in some palm trees.

Different leaves have different colours. Green leaves derive their colour from a green pigment chlorophyll. The presence of additional pigments causes other leaf colours such as red in coleus and purple in cabbage.



Different types of leaves



Leaf of coleus



Leaf of cabbage



## PARTS OF A LEAF

There are three main parts of a leaf:

**The base :** It is the point at which the leaf is joined to the stem.

**The stalk or petiole :** It is the thin section joining the base to the lamina. It is generally cylindrical or semicircular in form.

### The lamina or leaf blade:

It is the broad, flat part of the leaf. Food making process occurs in the blade. Leaf blade has a mid vein or midrib and many side veins. Veins carry food and water in leaf. They also support the blade, much like the metal ribs that support the fabric of umbrella.

The outer surface of the leaf has many tiny pores. These openings are called **stomata**. These stomata enable the carbon dioxide to enter and the oxygen leaves the leaf. A leaf has many stomata. However, these pores are so small that they make less than 1 percent of the leaf's surface.

### Functions of a Leaf

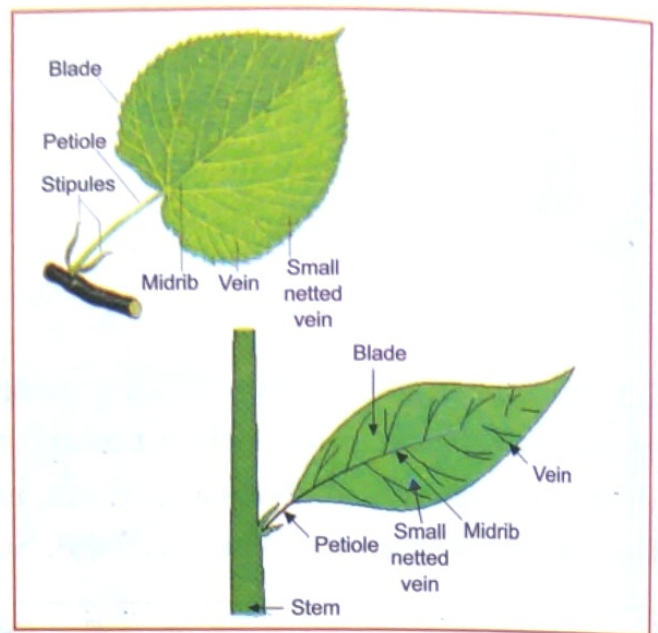
A leaf performs the following functions:

- Green leaves make their own food for the plant.
- Leaves breathe air in and out through stomata.
- Leaf veins supply every part of the blade with water and food, such as spinach, mint and cabbage.
- Some leaves store food so they can be eaten raw.
- Some leaves such as tulsi and neem are used to treat cold and skin diseases.

## FOOD MAKING PROCESS

Leaves provide plants with all their food as they turn sunlight into food energy. Chlorophyll makes this energy transformation possible. Leaves also make the oxygen (in the air) that we breathe.

Chlorophyll is a pigment found in the cells of leaves which is activated in the presence of light and is the substance that colours plants green. Chlorophyll is



Parts of a leaf



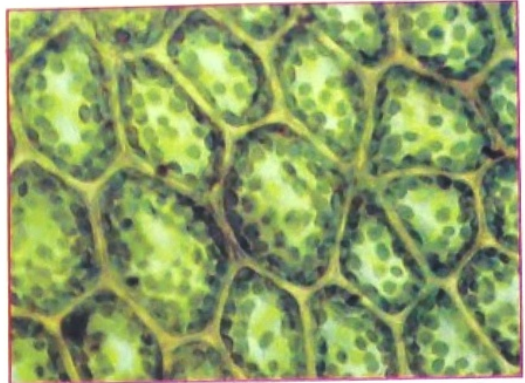
contained in leaves and has the property of capturing light energy.

Photosynthesis is the process by which plants make sugar from sunlight, water and carbon dioxide.

Sunlight enters through the top of the leaf and reaches the next layer of cells.

The light energy is trapped by the chlorophyll.

In the leaves, a process that uses water changes the light energy into a kind of chemical energy. This chemical energy is stored in the leaves.



Stomata

### Fact File

Without chlorophyll, a plant would not be able to make the food. Chlorophyll is a green pigment in green plants.

The leaves use the solar energy to make food. Air enters the leaf through the stomata and moves into tiny spaces around the food-making cells in the leaf. Carbon dioxide from the air passes through the cell walls and membranes of the cells. Carbon dioxide enters the food making cells where the previously stored chemical energy converts the carbon dioxide into sugar.

Tubes in the plant carry sugar from the leaf cells to other parts of the plant, such as roots, stems and fruits. Cells in these parts of the tree store some of the sugar.

## ROOTS

Roots are the underground part of a plant. There are many types of roots.

**Tap roots** are large and fleshy in appearance.

They grow deep into the ground to search for food. They are able to store food, which is particularly necessary for perennial plants during periods of dormancy.

**Fibrous roots** lie close to the surface of the soil. They collect precipitation before it sinks deep into the ground. They can often be found growing side by side with taproots.

**Adventitious roots** are those accessory roots which arise from any part of the plant but not the body root.

They develop to help the plant climb. They help develop modified underground stems, such as bulbs.





**Aerial roots** grow out of the branches of huge trees. They grow towards the soil and support the tree. For example-aerial roots of banyan tree.



Tap root



Fibrous root



Aerial roots



Adventitious root

### Functions of Roots

The major functions of roots are:

- 1) To provide plants firm grip in soil;
- 2) Storage of energy resources such as the carrot and sugar beet;
- 3) Absorption of water and minerals from the soil; and
- 4) Conduction of water and minerals to and from the shoot.

The roots store the food (energy resources) of the plant. The food is either used by the roots themselves or digested, and the products of digestion are transported back up through the phloem to the above-ground portions of the plant.

### USE OF PLANTS

People grow plants in and around their homes. These are called **domestic plants**. The tulsi plant, african violet, rubber plant, money plant and cactus are examples of domestic plants.

In villages, people plant many trees like neem and banyan around their houses. Neem trees purify the air. Their leaves and bark are used to make medicines.

The bark and seeds of banyan trees are used as a tonic to cool the body and treat diabetes. Mint, coriander and curry plants are grown in the kitchen garden.



Indoor plants





A jasmine plant and rose plant are also planted in the varanda to spread fragrance all around. Mango, guava, banana, jamun and papaya are also planted around the house.



Outdoor plants



## WRAP UP

- Trees give us fresh air, shelter, fuel, medicines and many other things.
- Green leaves derive their colour from a green pigment chlorophyll.
- Photosynthesis is the process by which plants make sugar from sunlight, water and carbon dioxide.
- The plants grown by people around their houses are called domestic plants.



## Time to Work

### A. Tick (✓) the correct answers.

- |                                                               |                                      |                                    |                                         |                       |
|---------------------------------------------------------------|--------------------------------------|------------------------------------|-----------------------------------------|-----------------------|
| 1. This pigment makes the leaves look green.                  | <input type="radio"/> Chloroplast    | <input type="radio"/> Chromoplast  | <input type="radio"/> Chlorophyll       | <input type="radio"/> |
| 2. Tiny pores on the outer surface of leaves are called veins | <input type="radio"/> stomata        | <input type="radio"/> lemna        | <input type="radio"/>                   | <input type="radio"/> |
| 3. They grow deep into the ground to search for food.         | <input type="radio"/> taproot        | <input type="radio"/> fibrous root | <input type="radio"/> adventitious root | <input type="radio"/> |
| 4. In photosynthesis process, leaves need water & sunlight    | <input type="radio"/> carbon dioxide | <input type="radio"/> all of these | <input type="radio"/>                   | <input type="radio"/> |

### B. Give one word for the following.

- |                                             |       |
|---------------------------------------------|-------|
| 1. Green pigment in the leaves.             | _____ |
| 2. Food making process in leaves.           | _____ |
| 3. This gas is used by plants to make food. | _____ |





4. It sinks deep into the ground. \_\_\_\_\_
5. Tiny pores in outer surface of a leaf. \_\_\_\_\_

**C. Answer the following questions.**

1. How are plants important for us?  
\_\_\_\_\_
2. Why are most of the leaves green in colour?  
\_\_\_\_\_
3. Explain the main parts of a leaf with the help of a diagram.  
\_\_\_\_\_
4. Name the two types of roots. Explain each one of them.  
\_\_\_\_\_
5. Explain the process of photosynthesis.  
\_\_\_\_\_

## HOTS

Name two useful plants which are not mentioned in the chapter.



## Creative activities

### Finger paint leaves

#### What you need:

1. Paper plates
2. Finger paint
3. Paper
4. Leaves

#### Instructions:

- ⊙ Gather leaves of various kinds in the fall (or any time of the year).
- ⊙ Then at home dig out the finger paint.
- ⊙ Put a dab of paint onto several paper plates-one for each colour.
- ⊙ Then let the children dip a leaf in the paint and then press it onto paper.
- ⊙ Let it dry.
- ⊙ You could also use this idea to make a tree.



## Life Skills

Plants are very useful for us. We should grow more and more plants. It would help us with an increased amount of oxygen and a good production of food also.