

EVERSHINE

echo series

FACT FINDER SCIENCE

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**PART
4**

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PREFACE

The environment around us inspires and integrates all spheres of education with our daily lives. The topics introduced in the books are in harmony with the world around. Science, it is believed, is the perception of the world around us.

This series of science takes the child from rote memory to self learning, making each learning experience unique. It is an attempt to encourage natural curiosity and power of observation.

The series introduces the young learners to the world of science in a simple language and systematic manner. The aim is to ensure that all learners acquire knowledge and understand the subject in a better way. The activities laid out in each book help the students to develop a scientific attitude.

The special features of the series are as follows :

- ❖ Use of simple language.
- ❖ Theme based study.
- ❖ Thinking skills and fun activities.
- ❖ Activities for children to enjoy.
- ❖ Summary at the end of each chapter for recapitulation.
- ❖ Teacher's guidelines for effective teaching.
- ❖ Practice model papers at the end of the book.

ABOUT THE AUTHOR

Ms. Ritu Khati is an educationist with an experience of more than thirty years. She has authored and designed several books. She has been actively involved with children instilling in them the ability to reason. She believes in encouraging the children to acquire an inquiring mind, to reflect on their own learning and ideas and to pursue imaginative activities. She treats her students as participants in learning. She is flexible in her thoughts and does not hesitate to implement new ideas and concepts.

She is a thorough professional and creates a positive mark in the life of the students and the people around.

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Food Making in Plants

1

We see different kinds of plants, trees, bushes, shrubs and grasses in our surroundings. Plants are necessary for life because they are the basic source of food.

Plants are the only living things which make their own food. They provide food for all other living things.

Human beings and other animals depend directly or indirectly on plants for their food.



Plants around us

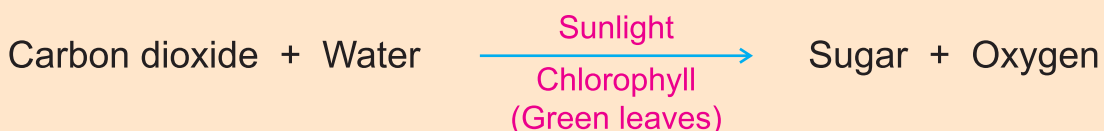


Food Making in Plants

Plants make their food in the leaves. The leaves of most plants are green. The green colour of the leaves is due to presence of a pigment called **chlorophyll**. Only green leaves that contain chlorophyll can prepare food for the plant. Therefore, the leaves are called the **kitchen** or the **food factory** of the plant.

Plants make food using water from the soil and carbon dioxide from the atmosphere. The energy needed to make food is taken from sunlight. The sun's energy is trapped by chlorophyll. The process by which plants make their food from water and carbon dioxide in the presence of sunlight is called **photosynthesis**. During photosynthesis, water and carbon dioxide are changed into **food** or **sugar** with the help of chlorophyll.

The word '**photosynthesis**' is derived from two Greek words '**photo**' means **light** and '**synthesis**' means **putting together**. The process of photosynthesis can be written as :

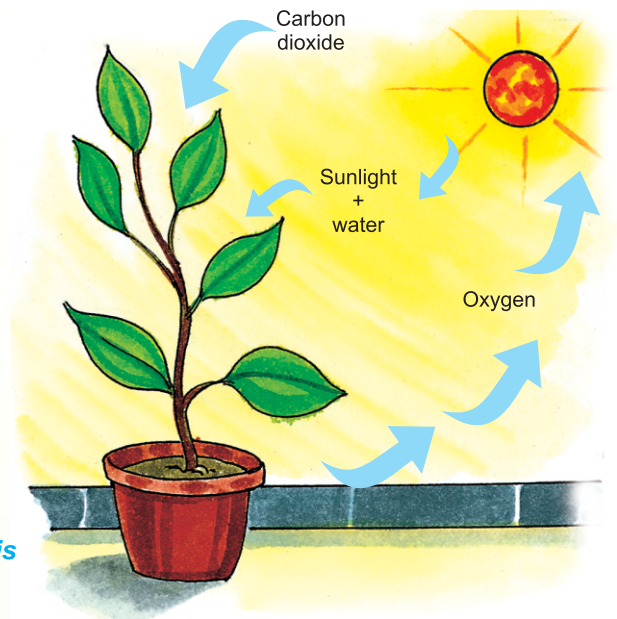


Green leaves put together water and carbon dioxide in the presence of sunlight to make food. Some part of the food is used by the plant, while the rest is stored as sugar or changed into starch. Sugar or starch may be stored in different parts of the plants such as the roots, leaves, stems, fruits and seeds.

Did You Know ?

All the plants in the world together make about 150 billion tonnes of sugar or starch every year.

Food prepared by leaves is in the form of sugar and is stored in different parts of plant in the form of starch. Let us do an activity to test the presence of starch.



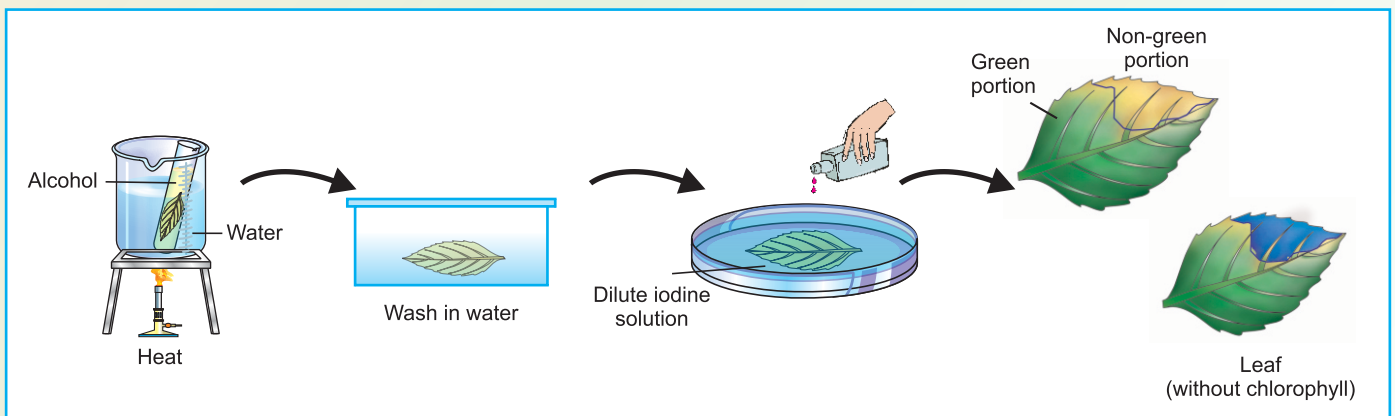
Process of photosynthesis



Activity 1

Take a green leaf from a plant. Boil it in water and then in alcohol in order to remove the green colour of the leaf. Green colour of the leaf is to be removed because it is not possible to perform the test on a green leaf. Any change in colour will not be seen against the green colour.

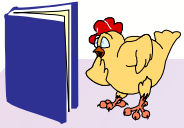
Then wash the leaf in cold water and place it on a glass plate. Now pour a few drops of iodine solution over it.



You will observe the leaf becomes **blue-black** in colour. This shows that leaf contains starch. (**Note**: Starch turns blue-black when iodine is added to it.)

Test For Starch

Dissolve a pinch of starch in hot water. Cool the solution. Add a few drops of iodine solution to this solution. The solution turns blue black. This test can detect small quantities of starch. No other substance gives blue black colour with iodine solution.



Activity 2

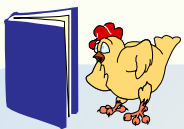
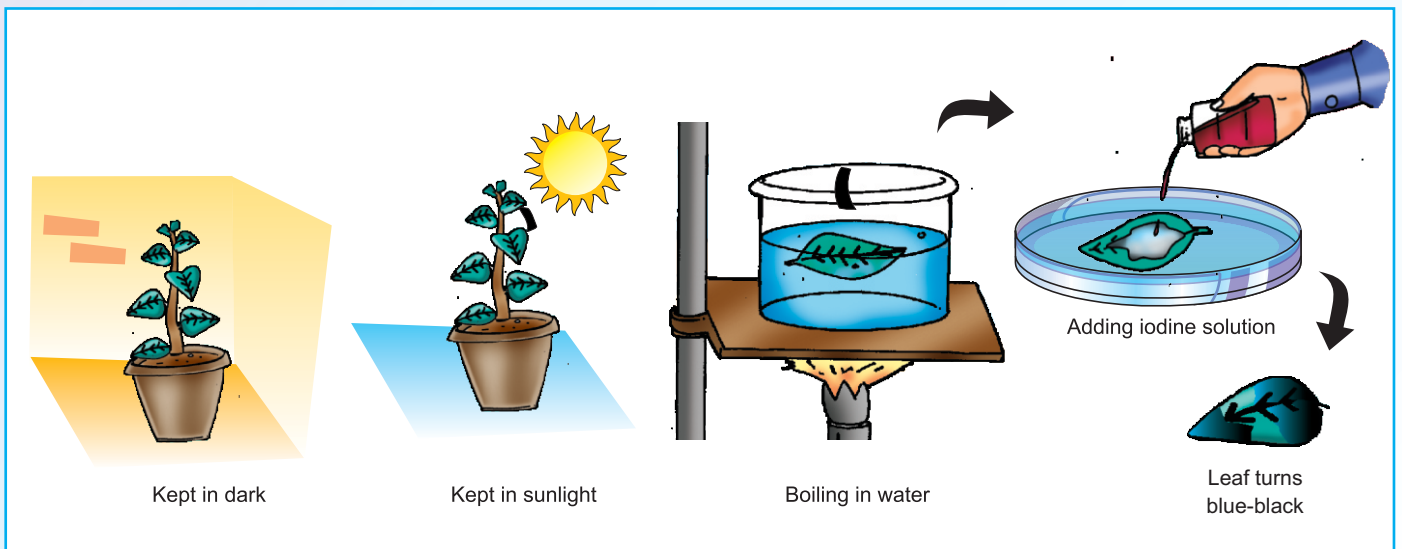
Sunlight is necessary for photosynthesis.

Take a potted plant and keep it in a dark room for two or three days. Now cover one of its leaves on the upper and lower sides with a black paper. Place the plant in the sunlight for a few hours. Pluck the covered leaf from the plant. Boil it in water and then in alcohol in order to remove the green colour of the leaf.

Then wash the leaf in cold water and place it on a glass plate. Now pour a few drops of iodine solution over it.

You will observe that the leaf which has been exposed to sunlight turns blue-black. There is no change in the colour of the covered part.

This shows that **sunlight is necessary for photosynthesis.**



Activity 3

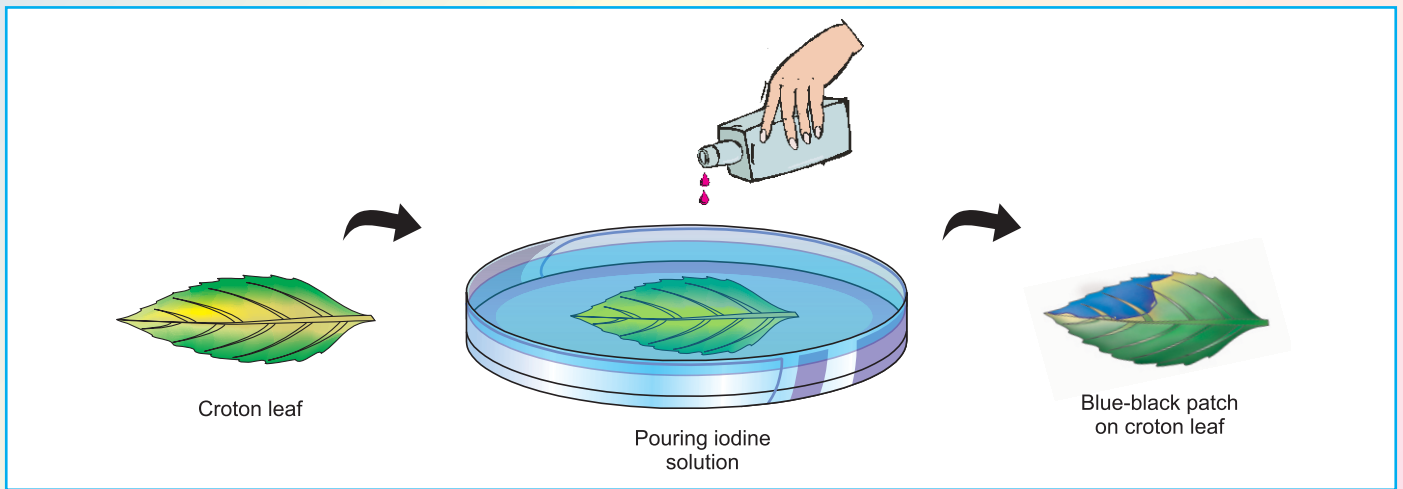
Chlorophyll is necessary for photosynthesis.

Take a coloured leaf of a croton plant. It contains both green and non-green areas. Mark the green and non-green areas of the leaf and draw its outline on a sheet of paper. Now remove the green colour of the leaf by boiling it in water and then in alcohol. Wash the leaf in cold water and place it on a glass plate.

Now pour a few drops of iodine solution over it.

You will observe that only those areas of the leaf become blue-black which were marked green.

This shows that **chlorophyll is essential for photosynthesis**.



Structure of a Leaf

Most of the plants have broad and flat leaves. Look at the various types of leaves :



Banyan leaf



Peepal leaf



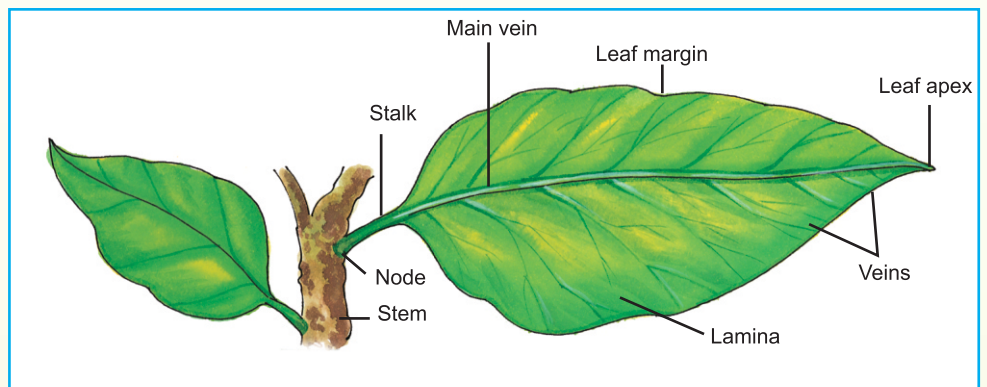
Mango leaf



Papaya leaf

You can identify the plants with the help of their leaves.

If you look at a leaf against the light, you will see a network of thin tubes called **veins**. Each leaf has a **main vein** running through its middle and a large number of side veins emerging from the main vein. These veins or tubes



Parts of a leaf

are connected with the veins of the stem. They carry water and minerals from the soil to the leaf. The food prepared in the leaves is also carried by veins to different parts of the plant.

Let us learn about the internal structure of a leaf. We cannot see the inner parts of a leaf with our eyes. We can see them with the help of a microscope.

Cut a thin section of the leaf. Put it on a glass slide. Now see it carefully under a microscope. You will see that it is made up of many tiny bags like structures. These tiny bags like structures are called **cells**.

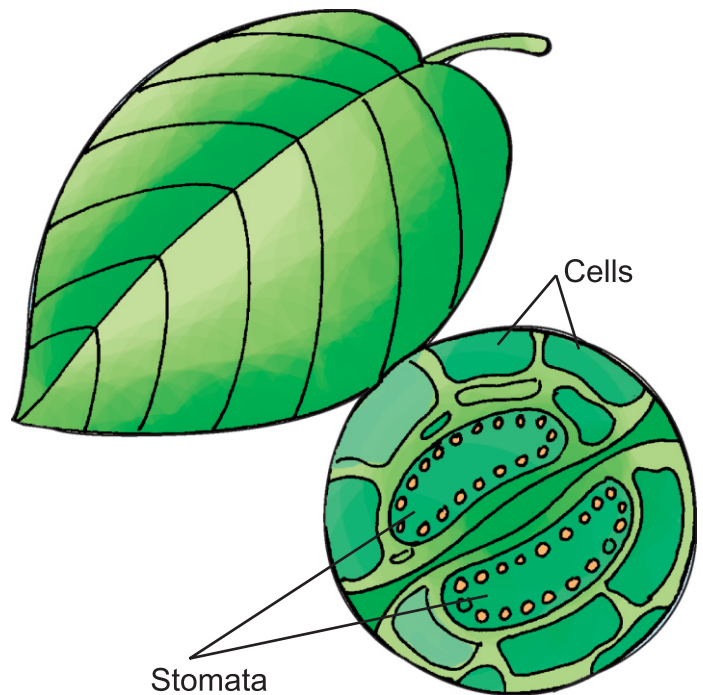
There are many layers of cells. These are arranged like a sandwich between the upper and the lower layers. These cells contain green pigment called **chlorophyll**. Chlorophyll has the power to absorb sunlight.

Air spaces are present in between the cells. These spaces are connected with millions of tiny pores which open on the outside. These tiny pores are called **stomata**.

Stomata are usually found on the lower surface of a leaf. Plants breathe air in and out through these stomata. Stomata also release excess water from the plant by the process called **transpiration**.

Did You Know ?

Most leaves are broad and flat to catch maximum sunlight.



Internal structure of leaf showing stomata



How Do Plants Use Their Food ?

Plants prepare food with the help of water, carbon dioxide and sunlight. It is used in number of ways by the plants:

- ★ A part of food is used to produce new cells and to repair old cells.
- ★ A part of food is burnt to produce energy.
- ★ Some extra food is stored in the form of sugar or changed into starch. Starch and sugar are stored in different parts of the plant such as roots, stems, leaves, fruits and seeds.



Non-Green Plants

Some plants do not have chlorophyll. They are called **non-green plants**. Mushrooms and moulds are non-green plants. These plants cannot make their own food. They get their food from dead and decaying matter.



Mushroom



Moulds



Coleus plant



Croton plant

There are some plants which have hidden green colour. The leaves of croton and coleus plants appear dark red. They contain red substances that hide the green colour of chlorophyll. Since these leaves have chlorophyll, they carry on the usual process of photosynthesis.

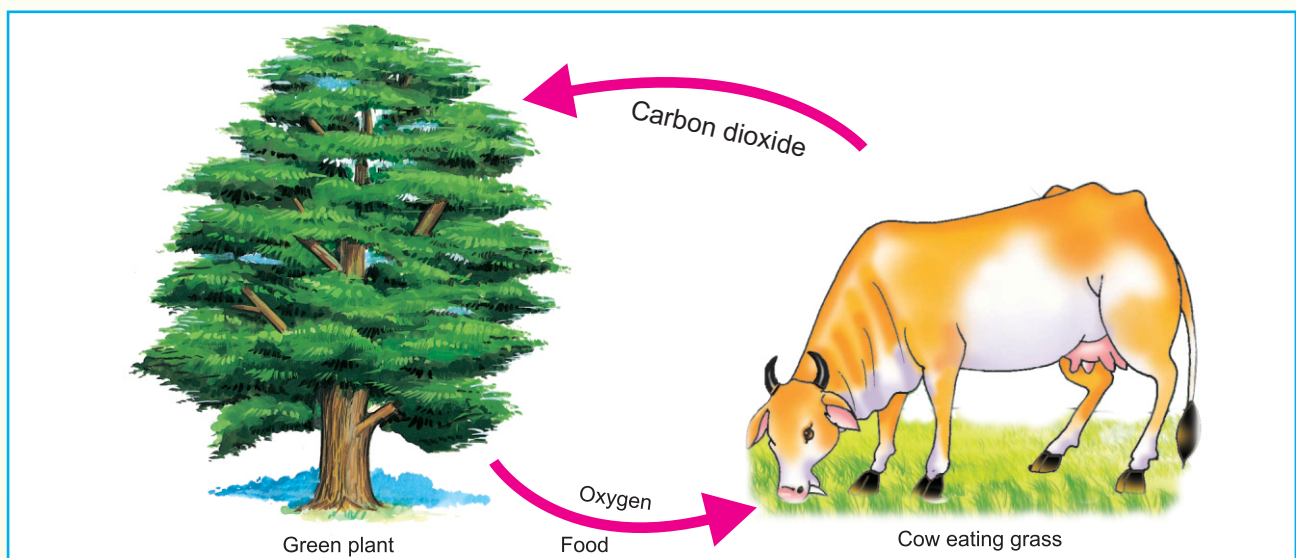


Energy Flow in Living Things

We need energy to do various activities. This energy comes from food.

During photosynthesis, green plants trap sun's energy to make food. This energy is passed on to humans and animals when they eat food. In return, humans and animals give out carbon dioxide in the atmosphere. This carbon dioxide is used by the plants. The cycle continues.

This is how the sun's energy flows in the world of living things.



Energy flow in living beings

■ Interdependence Between Plants and Animals

Animals and plants depend on each other for their survival. Animals and human beings need food for energy and oxygen to breathe. They get food and oxygen from plants.

Plants need carbon dioxide to make food. Animals and human beings give out carbon dioxide. Plants use this carbon dioxide to make food.

Water plants also help water animals to breathe in water for a long time. This is evident from the fact that fish live longer in an aquarium with water plants in it.

Thus, animals and plants depend on each other for their survival.



Balance in Nature

Think! What would happen if the population of animals increases suddenly? Well, plants would not be able to supply enough food and oxygen to all the animals.

Similarly, if there is a sudden increase in the number of plants, animals would not be able to supply enough carbon dioxide to all the plants. So there should be a balance between animals and plants in nature.

To maintain the balance in nature, we should increase the number of plants by planting new trees.

Programmes like **Vanmahotsava** and **Chipko Movement** make people aware of the harm caused by senselessly cutting down of trees.

These movements promote the planting of new trees. So, today need is to protect animals and plants to maintain a balance in nature.



Balance in nature

Key Words

- Photosynthesis** : the process by which plants make their food from water and carbon dioxide in the presence of sunlight
- Chlorophyll** : a pigment present in green leaves
- Stomata** : tiny pores present on the surface of leaves



Let Us Remember

- ☹ Plants are the only living things which make their own **food**.
- ☹ Leaves are green in colour due to presence of **chlorophyll**.

- ☹ The leaves prepare food for the plants. Therefore, the leaves are called the **kitchen** or **the food factory of the plant**.
- ☹ Green plants require **water**, **carbon dioxide** and **sunlight** to make their food.
- ☹ The process of food making in the leaves of plants is known as **photosynthesis**.
- ☹ Plant make food in the form of **starch** or **sugar**.
- ☹ **Mushrooms** and **moulds** do not make their own food. They get their food from dead and decaying matter.
- ☹ The **flow of energy** from the sun to plants and then to animals helps both of them to live.
- ☹ Plants and animals **depend** on each other for their survival.



[A] Answer the following questions :

1. What is the function of leaves ?
2. Which materials are needed by a leaf to make food ?
3. Why do we call the leaf as the 'kitchen of the plants' ?
4. What is photosynthesis ?
5. How will you prove that starch is present in the leaves ?

[B] Complete the words :

- | | |
|----------------------------------|--------|
| 1. The flat part of a leaf | L..... |
| 2. The green pores in a leaf | S..... |
| 3. The green pigment in a leaf | C..... |
| 4. Food making process in plants | P..... |
| 5. Food prepared by leaves | S..... |

[C] Fill in the blanks :

1. The plants make their _____ in the leaves.
2. The green colour of the leaves is due to presence of _____.
3. Food prepared by plants is stored in the form of _____.
4. Animals and plants _____ on each other.
5. There should be a _____ in nature.

[D] Mark tick (✓) for the correct and cross (×) for the wrong statement :

1. Plants are the only living things which make their own food.
2. Plants produce their own food in their roots.



3. Food is stored in plants mostly in the form of starch.
4. Carbon dioxide is given out during photosynthesis.
5. Mushrooms get their food from dead and decaying plants.

[E] Match the following columns :

Column A

- 1 Food factories
- 2 Chlorophyll
- 3 Stomata
- 4 Veins
- 5 Moulds

Column B

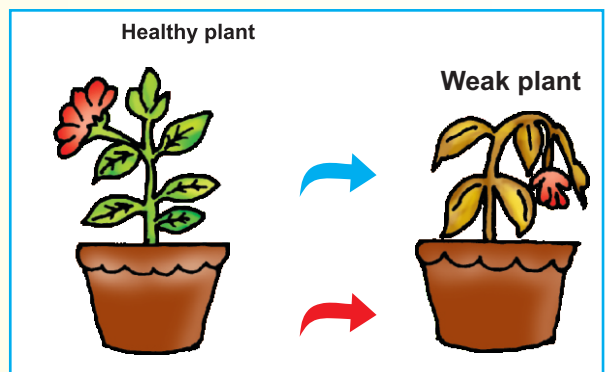
- a Tiny pores in the leaves
- b Non-green plants
- c Green leaves
- d Green pigment present in leaves
- e Tube like structures

[F] Give reasons for the following :

1. Leaves are green in colour.
2. The leaves of a plant kept in the dark do not produce starch.
3. Moulds and mushrooms do not prepare their own food.
4. Fish die in a tank without water plants.

More To Do

1. Take a healthy potted plant. Apply a heavy layer of vaseline on both sides of one of the leaves. Leave other leaves without applying vaseline. Expose all the leaves to sunlight. Observe the leaves daily for a week. Note down the differences between the leaves without vaseline coating and having vaseline coating.
2. Put a baby plant in a dark cupboard. Leave it there for about a week. Look at it. What do you observe ?
You will find that it becomes yellow and very weak. Why ?



Teacher's Guidelines



1. The main aim of this lesson is to make students understand how green leaves prepare food.
2. Explain the internal structure a leaf and develop some basic scientific skills like making observations, drawing conclusions, etc among the students.