

Plants and their Food

Let's Begin

When you think of a plant, what colour do you think of? Which parts of the plant come to your mind? Why do you think leaves are of this colour? Let us find out.

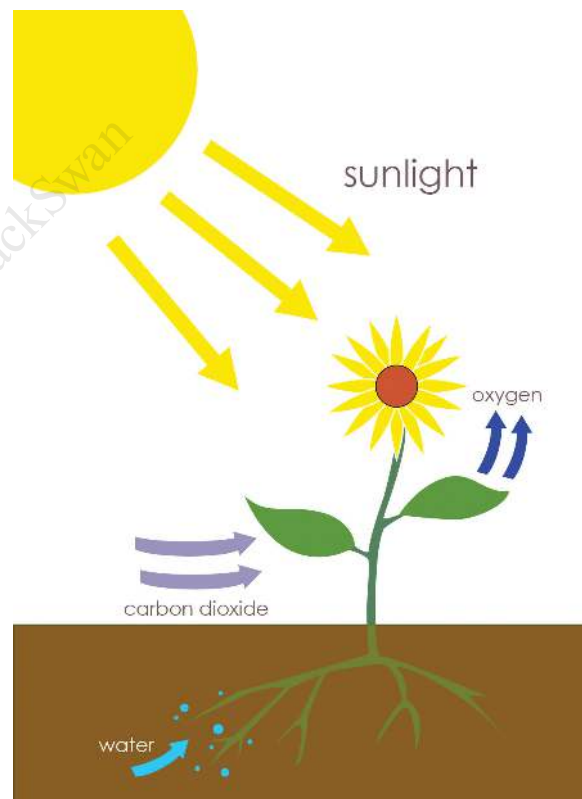
Plants have beautiful green leaves. Do you know why leaves are green? Leaves have a green substance called chlorophyll in them. Chlorophyll is essential to the process by which leaves make food. Green leaves are the food factories of a plant.

MAKING FOOD

Plants need water, sunlight and carbon dioxide to make food. The roots of the plant absorb water from the soil. Plants absorb carbon dioxide from the air.

Chlorophyll absorbs sunlight. In the leaves, water and carbon dioxide are put together using the energy from sunlight, and food is formed. This process is called photosynthesis (*photo* means light and *synthesis* means putting things together).

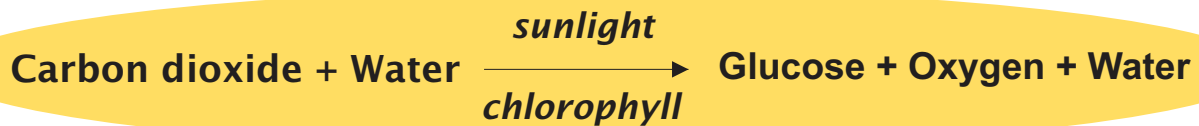
The food made by plants is **glucose**, which is a type of simple sugar. Glucose is converted to **starch** and stored by the plant.



photosynthesis

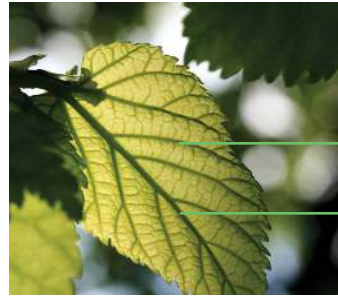
During photosynthesis, plants release oxygen into air. Oxygen is essential for animals and human beings.

The process of photosynthesis can be represented like this:



PARTS OF A LEAF

Hold a green leaf against the sunlight. Do you see a thick vein running across its middle? It is the main vein or **midrib**. There are also a number of small side veins running from the main vein.



side vein

main vein

The main vein has two types of tubes. One type carries water and minerals from the soil to the different parts of the leaf. The other type carries food prepared in the leaf to the different parts of the plant.

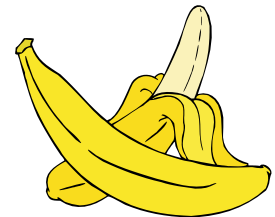
There are tiny pores on the undersurface of the leaf called **stomata** (singular: *stoma*). The leaf breathes through these stomata.

Stomata help the plant to absorb carbon dioxide and give out oxygen during photosynthesis. The excess water in a leaf evaporates as water vapour through the stomata.

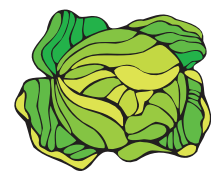
HOW DO PLANTS USE THEIR FOOD

Plants use their food for different purposes. They use food for energy and growth.

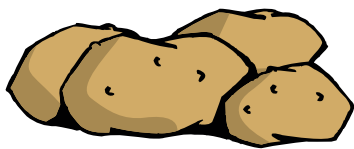
- ❖ Food is used to produce flowers, fruits and leaves.
- ❖ It is used to build new cells necessary for the growth of the plant.
- ❖ Extra food is converted into starch and stored in the different parts of the plant such as leaves, stems and roots for later use.
- ❖ These are the parts we eat as food.



banana
(fruit)



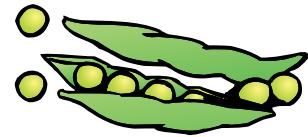
cabbage
(leaves)



potato (tuber or underground stem)



carrot (root)



peas (seeds)

UNUSUAL PLANTS

Some plants like the cactus do not have large green leaves. How do they make their food? Cacti are desert plants. Their leaves are modified into thorns. This happens to prevent excess water from being lost. Cacti make food in their fleshy green stems.

Some plants like the croton have leaves that are reddish in colour. But they also have chlorophyll. This helps them make their own food.

The mushroom is a type of living thing called a **fungus** (plural: *fungi*). Fungi do not have chlorophyll and cannot make their own food. They depend on other living things for food. Some types of fungi absorb food from living plants and animals. Others absorb food from dead plants and animals they grow on.



cactus



mushrooms

Activity

Leaves need sunlight for photosynthesis. Let us see if this is true with the help of a simple activity. Take the help of an adult while doing this activity.

Method

1. Place a plant away from sunlight in a dark corner in your house, for a day or two. The plant will use up all the food that it has stored.
2. Cover a part of one of the leaves with a piece of black paper.
3. Now, place the plant in bright sunlight for half a day.
4. Cut off the leaf covered with the black paper.



5. Remove the paper and put the leaf in boiling water.
6. Remove the leaf and place it in a test tube filled with alcohol. Place this test tube in a pot of boiling water. The leaf will become bleached and lose its green colour.
7. Take out the leaf and add a few drops of iodine solution to it.

Observation

Usually, when iodine is added to starch, it turns blue-black in colour. The leaf turns blue-black, except for the part that had been covered with black paper.

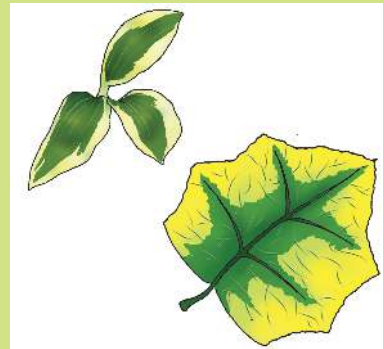
Conclusion

This shows that leaves need sunlight for photosynthesis.

Activity

Method

1. Pluck a leaf from a plant that has green-and-white leaves.
2. Draw its outline on a piece of paper and mark the areas that are white.
3. Boil the leaf in water first and then in alcohol. Then wash it under running water.
4. Place this leaf in a glass dish and add a few drops of iodine solution to it.



Observation

The parts of the leaf that were green turn blue-black, showing the presence of starch. The white parts (which did not have chlorophyll) do not turn blue-black.

Conclusion

This activity shows that leaves need chlorophyll for photosynthesis.

Activity

Here is a simple activity that you can do on your own to test whether the stem carries water to the other parts of the shoot.

Method

Cut two small branches with leaves and flowers. Place one of them in a pot of water. Place the other in an empty pot.

Observation

After a few hours, you will notice that the branch placed in the empty pot has wilted. The branch that is kept in the pot of water remains fresh.

Conclusion

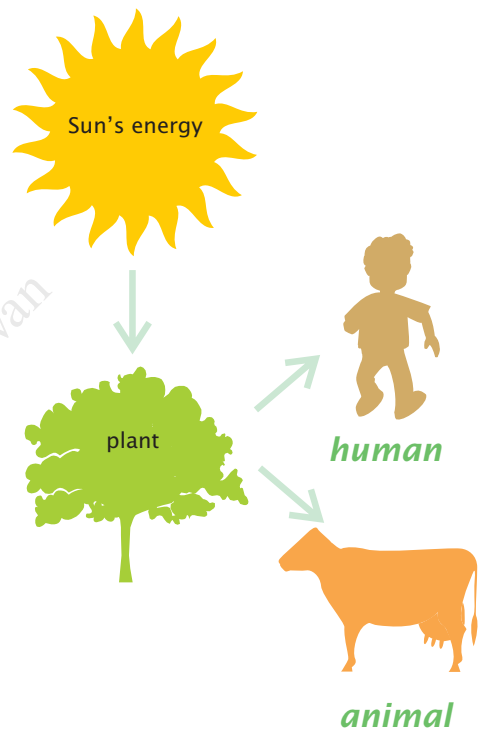
This shows that the stem carries water to all parts of the shoot.

HOW WE GET ENERGY FROM PLANTS

All living things need energy. We need energy for everything we do. We get this energy from food. The food that people and animals eat comes from plants.

We have learnt that during photosynthesis, leaves trap the Sun's energy to prepare food.

When we eat plants, this energy is passed on to humans and animals. Thus, energy is passed on from the Sun to plants and from plants to humans and animals through food.

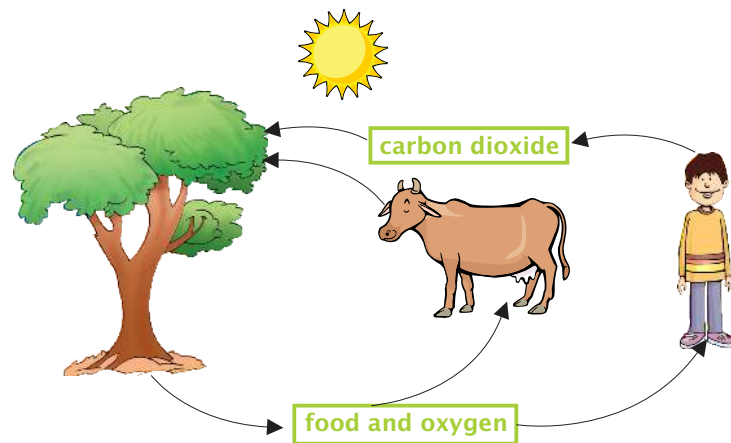


ANIMALS AND PLANTS DEPEND ON EACH OTHER

Animals and plants depend on each other in different ways.

- ❖ Animals feed on plants.
- ❖ Human beings also eat plants as food.
- ❖ Plants also give us oxygen.
- ❖ Animals and humans need oxygen to live.
- ❖ Animals and humans breathe out carbon dioxide.
- ❖ Plants depend on this carbon dioxide to prepare food.

Thus plants and animals, which includes humans, depend on each other.



BALANCE IN NATURE

We see that plants and animals depend on each other. But a proper balance needs to be maintained between them.

Imagine a sudden increase in the number of animals. They would not have enough food or oxygen.

Similarly, imagine a sudden increase or decrease in the number of plants of one type. There will be a sudden change in the number of animals that depend on them; they may become too many or too few in number.

So it is important that a balance in nature is maintained. For this to happen, we need to protect both plants and animals.

In our country, there are national parks and sanctuaries where animals and plants are safe. There are also programmes such as the **Van Mahotsav** (forest festival) to encourage people to plant more trees and protect them. People also are taught that cutting down trees is harmful for all of us.

For life on Earth to continue, there has to be a proper balance in nature.

Let's Remember

STOMATA (SINGULAR: STOMA)	pores through which leaves breathe
PHOTOSYNTHESIS	process by which plants make food
FUNGUS (PLURAL: FUNGI)	a type of living thing (for example, a mushroom)

Let's Sum Up

- ❖ Green leaves are where a plant makes food. A substance called chlorophyll makes them green.

- ❖ Plants make food with chlorophyll, carbon dioxide, water and sunlight.
- ❖ The process of preparing food by leaves is called photosynthesis.
- ❖ A leaf has a main vein and several side veins.
- ❖ Plants use food for energy and to grow.
- ❖ Excess food is stored as starch in roots, stem and leaves.
- ❖ It is these plant parts that we eat as food.
- ❖ Energy is passed on from the Sun to plants to humans and animals.
- ❖ Animals and plants depend on each other.
- ❖ A balance in nature is critical for life on Earth.

Let's Understand

A. Choose the correct answer.

1. The green pigment present in green plants is _____.
a. chlorine b. chlorophyll c. chloroethane
2. Chlorophyll absorbs _____ from the surroundings.
a. water b. sunlight c. carbon dioxide
3. The food prepared by plants is stored in plants as _____.
a. glucose b. sucrose c. starch
4. The tiny pores through which leaves absorb carbon dioxide are called _____.
a. stomata b. glaucoma c. glands
5. The program that helps to promote planting trees is _____.
a. Van Mahotsav b. Brahmotsav c. Sanctuary Mahotsav

B. Fill in the blanks.

1. During _____, leaves trap Sun's energy to prepare food.
2. Plants store extra food prepared by them in their _____, _____ and _____.
3. All living things get _____ from the food they eat.
4. When we eat food, the energy from the _____ is transferred to us.
5. _____ are living things that depend on other living or decaying matter for food.

C. Name the following.

1. The gas given out by plants when they make their food
2. The simple sugar that plants make as food
3. The main thick vein found in the central part of a leaf
4. What the leaves of a cactus plant are modified into
5. A fungus

D. Answer the questions.

1. What does “photosynthesis” mean?
2. What are the different functions of the stomata?
3. What are the different ways in which plants use the food made during photosynthesis?
4. Why is a cactus leaf modified? How does it make its own food?
5. Explain how you will show that plants need chlorophyll to make food.
6. What activities of humans can upset the balance in nature?

Let's Think



FA

Plants need chlorophyll, sunlight, water and carbon dioxide for photosynthesis. Can a plant carry out photosynthesis at night?

Let's Learn



FA

Field trip

Visit a nearby nursery for plants. Observe the different plants. Note down the types of leaves they have. Identify the various parts of a leaf. Draw a picture of one leaf and label its parts.

Project

Do you know that we can see the stomata of a leaf? You need help from your teacher for this activity.

You will need a leaf, some clear nail polish, some clear sticky tape and a microscope.

1. Take a leaf and apply clear nail polish on its underside.
2. Allow the nail polish to dry completely.
3. Cover the polish with clear sticky tape so that it covers it completely.
4. Gently peel the nail polish off the leaf with the help of the sticky tape.
5. Tape this peeled portion onto a clean microscope slide, place it under the viewing lens of the microscope and observe the stomata.

Know Your Values

We all celebrate birthdays by giving chocolates to our friends. Let us go one step further and donate a sapling to our school. Bring a sapling to school and take permission from your teacher or principal to plant it. Take care of it by watering it regularly.

Know Your Heritage

The Chipko Movement

Sundarlal Bahuguna was the leader of the Chipko Movement, which started in the 1970s in the Himalayas, to protect our forests from being cut down. Similar movements soon started in the Vindhya and the Western Ghats.