UNDERSTANDING SCIENCE OF LIFE

Learn Invent and Forever Explore

4

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Contents

1 How Plants Make Food

Backtrack

In the earlier classes you have studied about:

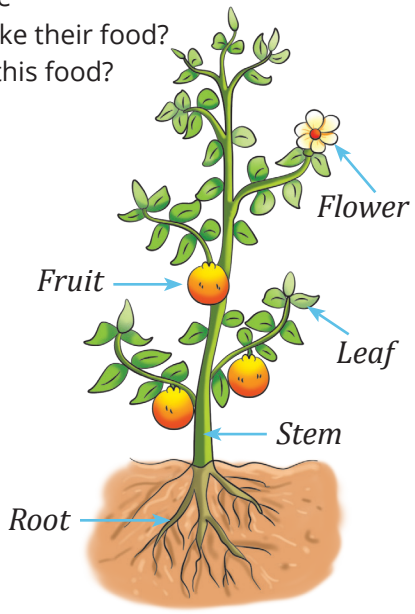
- Living and non-living things
- Uses of plants
- Functions of the parts of a plant

Up Ahead

- The green machine
- How do plants make their food?
- What happens to this food?

List the parts of a plant and mention one function of each.

Plant part	Function
1.	
2.	
3.	
4.	
5.	



PUT ON YOUR THINKING CAP

What do we need to grow big and strong? The right answer would be - 'food'. You know that we get our food from plants and animals. But have you sometimes wondered where do plants get their food from?

The Green Machine

Only green plants make food on their own. They make food for themselves, so that they may grow. Animals and humans too eat this food as it is good for health. Thus, plants are called **producers.**

Animals eat plants or other animals. They do not make their own food. They are called **consumers**[1]. Though human beings prepare their own food, they are also known as consumers as they are dependent on either plants or animals for their food.

In most of the plants, the leaves are green. This green colour is due to the presence of a green substance called **chlorophyll** (KLOR-uh-fil) which is present inside small **structures**[2] called **chloroplasts**, on the leaves and stems. But unfortunately, we cannot see these tiny structures.

INDIA IN SCIENCE

Janaki Ammal (1897–1984) was an Indian Botanist who created history for India by becoming the first Indian woman to receive a honorary doctorate overseas.

Botanist is a person who studies plants.

[1] **consume:** to eat [2] **structures:** arranged pattern

Mostly leaves prepare the food but in some plants the green stems also have to prepare food.

Chlorophyll is the most important substance for preparing food; that is why only green plants can make their own food.

What about all the plants which have red, purple and white colour? How do they make their food?

They too have chlorophyll which helps in making food, but as it is less in quantity the other colours look more **dominant**[3].

Croton

Poinsettia

How Do Plants Make Their Food?

While cooking food in our kitchen, we need some items, right? Even a plant needs a few things to make its food.

1. Chlorophyll: to **trap**[4] sunlight.
2. Carbon dioxide gas: which it takes from the air through small openings called **stomata** which are present mainly on the underside of the leaves.
3. Water: which the roots take in from the soil and send through **capillaries**[5] to the leaves.

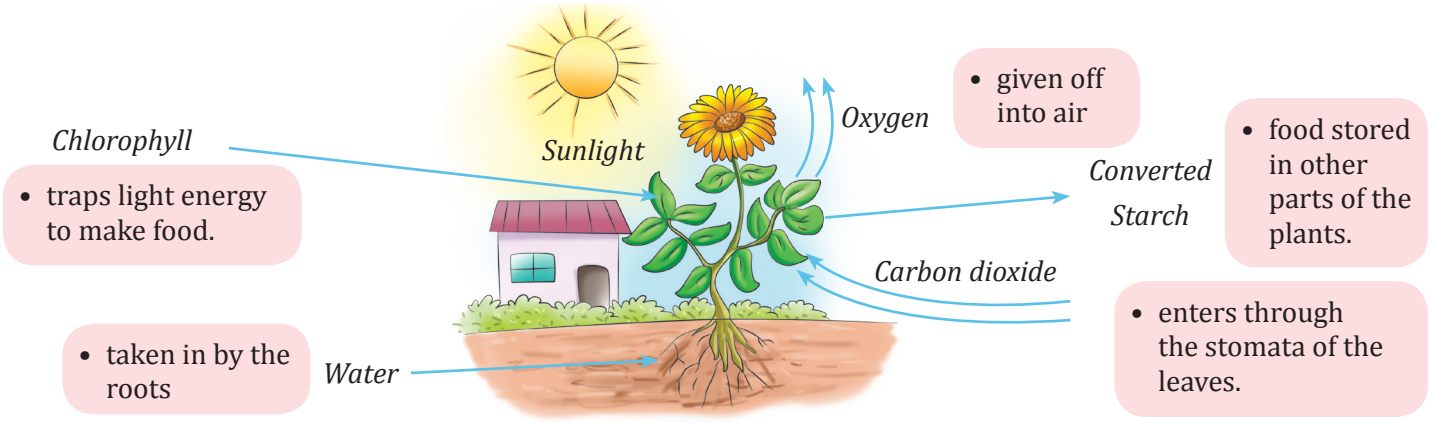
Scoop

Stomata are meant for exchange of gases.

Do you know that aquatic floating plants have the stomata openings on the upper side of leaves?

Using the energy from sunlight, leaves change the water and carbon dioxide into a type of sugar or starch which is food for the plant. Oxygen gas is also formed which is **released**[6] back into the **atmosphere**[7].

The process where sunlight, water, carbon dioxide and chlorophyll are used by green plants to make their food is called **photosynthesis** (foto-SIN-thuh-sis).



[3] **dominant:** more prevailing [4] **trap:** to catch [5] **capillaries:** small thin veins in the leaves
[6] **released:** setting free [7] **atmosphere:** the air around us

Young Scientist

If you have a garden with green grass, you can try this experiment. Take a big round piece of cardboard and place it on a grassy area which normally gets enough sunlight. To make sure that it doesn't move, place a couple of stones on it. After a few days, remove the cardboard and see whether there is a difference in the grass when compared to the grass around it. Share your observation with the class.

Zoom Ahead

Photo means 'light' and *synthesis* means 'mixing together'. Photosynthesis does not occur at night! So how do the plants get the energy to live at night?

They use the stored food in the leaves, stem, fruits, seeds and roots.

Scoop

Many scientists contributed to the discovery and understanding of photosynthesis throughout the ages. Jan Ingenhousz was one of the first person to show that light is most important during photosynthesis.

What Happens To This Food?

The food prepared in the leaves is then taken to other parts of the plant. Some of it is used by the plant for:

- its growth
- repairing any damage to its parts
- growing flowers and fruits

Energy Booster

Get three kinds of flowers and the leaves of those plants. Place them in front of your partner and see if he/she can match the leaf with the flower. Similarly, you will have to match the leaf with the flower that your partner gets.

The rest gets stored in fruits, roots, seeds or stem of the plant as **starch**. Some leaves also store food.

Workout

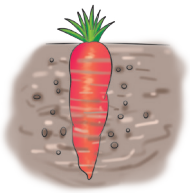
Fill up and Learn!

1. _____ is a colourless gas in the air that is taken by plants during photosynthesis and released when humans and animals breathe.
2. _____ is the green pigment in plants that captures light used in photosynthesis.
3 _____ is a gas that plants release; humans and animals need this to survive.
4 _____ is the process that plants use to convert carbon dioxide, water and energy from the sun into starch for food.

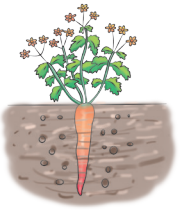
Some plants make extra food and also store water when there is enough sunlight and water in the ground. They do this to **survive**[8] through the winter time or dry periods when they may not get enough sunlight or enough water from the ground.

[8] **survive:** to remain alive

Carrot in first summer is swelling with food



In winter the leaves die down but the root is full of food reserve



In the second year the food reserve is used up to help produce the flowers and seeds

Now is it clear that plants make food for themselves? Some of them are edible[9] in raw or cooked form. That is why we have kitchen gardens and farms full of edible vegetables to fulfill our energy needs.

So, now we understand how important it is for us to save plants and grow new ones. Plants give oxygen that we need to breathe and live. We breathe out carbon dioxide which is used by the plants for photosynthesis.

Scoop

Van Mahotsava is an annual tree planting festival in the first week of July. We can help by planting trees, watering them and not allowing anyone to cut trees.

GO GREEN
AND KEEP OUR ENVIRONMENT CLEAN

Olympiad Questions

1. The lotus plant has stomata openings on the
   a) underside of leaf b) upper side of leaf
   c) on the stem d) on the flower petals

In a Nut Shell

- Green plants make food on their own so they are called Producers.
- Human beings and animals are called Consumers as they depend on plants and other animals for their food.
- Leaves are green because of the presence of Chlorophyll.
- The process where sunlight, water, carbon dioxide and chlorophyll are used by green plants to make their food is called photosynthesis.
- Some plants make extra food and store water to survive through the winter time or dry periods.

water, sugar, carbon dioxide, light, oxygen

Photosynthesis is a process where plants use _____ from the sun to convert _____ from the air and _____ from the soil into _____ to feed the plant and _____ which is released into the atmosphere.

[9] **edible:** that which can be eaten

Wordstock

oxygen, chlorophyll, carbon-dioxide, stomata, choloroplasts, capillaries, structures

Eureka!

I. Choose the correct answer.

1. The part of a plant which makes the food in the plant
   a) roots b) flowers c) fruits d) leaves
2. Which substance takes in sunlight?
   a) roots b) flowers c) chlorophyll d) fruits
3. Which of these is not needed for photosynthesis?
   a) sunlight b) oxygen c) water d) carbon dioxide
4. The tiny openings on leaves for exchange of gases are called
   a) stomata b) chloroplast c) chlorophyll d) fruits.

II. Explain briefly in 2-3 lines.

1. Why are most plants green in colour?

   _____

   _____

2. What are the requirements for photosynthesis to take place in a plant?

   _____

   _____

3. What is the function of stomata in the leaf?

   _____

   _____

4. Where do plants store the extra food they make?

   _____

   _____

III. Explain in detail.

1. How are plants and animals dependent on each other?
2. What happens to the food made by plants?

- Does the same food that is prepared by the leaves get stored in other parts of the plant?
- Find out how leaves change their colour in autumn.
- Plants are the best chefs and they make food which also feed us. Do you think we can live if all plants die?

SCIENCE LAB

Take a chart and draw **various**[10] shapes of leaves that you can find. Name the plant also under the shape that you draw. For example: Banana leaf, peepal leaf etc.

My Chapter Report

SKILL	SKILL LEVEL	TEACHER			PARENT		
Concept	Able to recognize the ingredients required to make food by plants.	1	2	3	1	2	3
	Able to understand that only green plants make their own food.	1	2	3	1	2	3
Mental Activity	Able to recall 5 plants which make food by other means.	1	2	3	1	2	3
	Able to recall the functions of various parts of plant that help in photosynthesis.	1	2	3	1	2	3
Applications in real life	Able to appreciate the importance of green plants and Sun for all life on Earth by caring for them.	1	2	3	1	2	3

[10] **various:** more than one