CONTENTS

SCIENCE

CHAPTER 1

Nutrition in Plants

Introduction

- Mode of nutrition
- Autotrophic nutrition
  - Photosynthesis
- Heterotrophic nutrition
  - Parasitic plants
  - Insectivorous plants
  - Saprophytic plants
  - Symbiotic plants
- Replenishment of nutrients

We have already learnt in the previous class that all living beings need food. We have learnt that various components of our food are carbohydrates, fats, proteins, vitamins, minerals, roughage and water. These components of food are called nutrients. They provide us with energy and help us to perform various life activities.

Plants can prepare their own food, but animals and human beings cannot do so and obtain food from plants or animals that eat plants. Thus, animals and humans directly or indirectly depend upon plants for food.

MODE OF NUTRITION IN PLANTS

The process of taking in food by an organism and its utilisation by the body is called nutrition. All living organisms need energy to perform various activities. They get this energy from food. The food which they eat is broken down into simple substances to get energy. The mode of nutrition in all living organisms can be divided into two categories based on their food habits.

- Autotrophic
- Heterotrophic

AUTOTROPHIC NUTRITION

The mode of nutrition in which organisms make their own food from simple inorganic substances is called autotrophic nutrition (auto = self, and troph = nourishment). We have already studied that green plants make their own food through a process called photosynthesis. Hence green plants are called autotrophs.

HETEROTROPHIC NUTRITION

The mode of nutrition in organisms that cannot make their own food and depend upon others is called heterotrophic nutrition (heteros = others). Animals including man which depend on plants for their food are called heterotrophs.

We shall now learn how green plants make their own food? Which parts of the plant make the food? From where do they get the raw materials? How is the food transported to the various parts of the plant?

PHOTOSYNTHESIS

In green plants, leaves prepare the food. They are the food factories of the plant. Since the leaves prepare food, it is necessary that the raw materials must reach there. They make their own food from carbon dioxide and water in the presence of chlorophyll (a green pigment) and sunlight. This process is called photosynthesis (Photo = light, synthesis = to combine)

We can write the reaction as

$$\text{Carbon dioxide} + \text{water} \xrightarrow[\text{chlorophyll}]{\text{sunlight}} \text{glucose} + \text{oxygen}$$

The following four things are required for photosynthesis :

CHLOROPHYLL

It is the green pigment present in the leaves. It is found in structures called chloroplasts. It helps leaves to capture the energy of the sunlight, which in turn is used to synthesise food from carbon dioxide and water.

SUNLIGHT

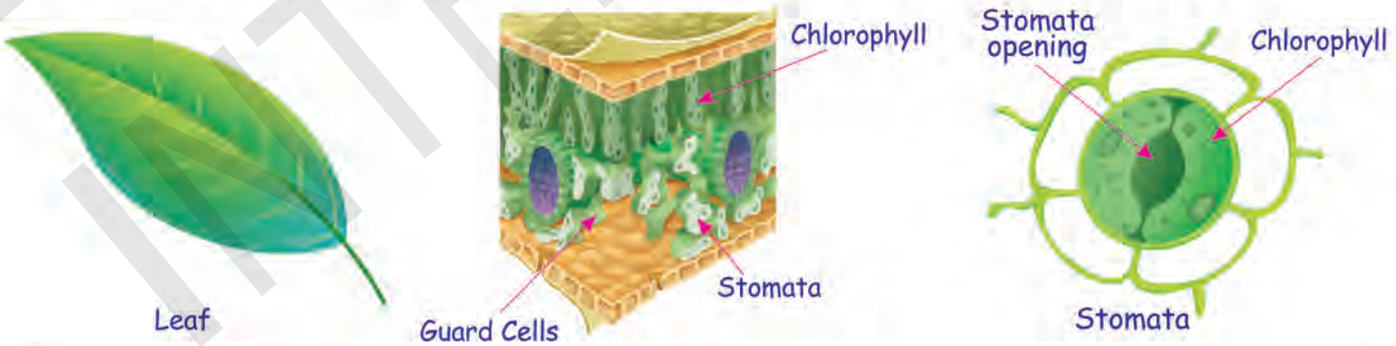
Light energy is absorbed by the chlorophyll.

CARBON DIOXIDE

The leaves absorb carbon dioxide from air through tiny pores present on their surface called stomata. They are surrounded by guard cells, which regulate the opening and closing of the stomata.

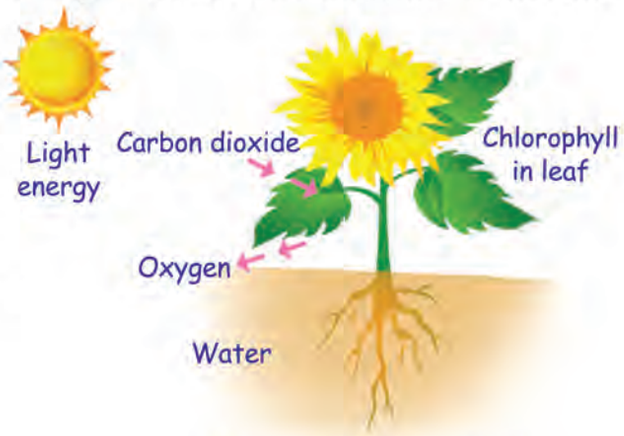
WATER

Water and minerals from the soil are absorbed by the roots and transported to the leaves.



This transportation takes place through pipe like vessels present in the roots, the stems, the branches and the leaves.

During photosynthesis solar energy of the sun is converted into chemical energy. This shows that sun is the ultimate energy for all living organisms. You must have seen from the above equation, that oxygen is a by-product of photosynthesis, which is so essential for the survival of all living organisms. The carbohydrate is converted into starch.



Process of Photosynthesis

CACTUS PLANTS

The desert plants like cacti have spines instead of leaves. This is to reduce loss of water by transpiration. Cacti have green stems which carry out photosynthesis.

Photosynthesis can take place in green stems and green branches also.

Activity – 1

Take two potted plants with green leaves. Keep one plant in the sun and the other in a dark room. Perform the iodine test with the leaves of both the plants after 48 hours. Now keep both the pots of plants in sunlight. Repeat the iodine test after 3–4 days. Note down your observations? What do you conclude?

PHOTOSYNTHESIS IN PLANTS WITH COLOURED LEAVES

You must have seen plants with red, brown or violet leaves. These plants also contain chlorophyll. However, the amount of red, brown or yellow pigment present in these leaves masks the green colour. Photosynthesis takes place in these coloured leaves also.

Facts to know

Some plants like money plants, crotons have white and green part in the same leaf. Photosynthesis does not take place in the white part.

ALGAE

Have you seen green patches on the surface of ponds or lakes. These are due to the growth of organisms called algae. They are green in colour as they contain chlorophyll. They too can manufacture their own food through photosynthesis.

Synthesis of Nutrients Other Than Carbohydrates

As we have seen plants produce carbohydrates. They are made up of carbon, hydrogen and oxygen. They are used for the synthesis of proteins and fats. For the synthesis of proteins plants also require nitrogen. From where do they get this nitrogen from? Although nitrogen is present in air up to approx. 78%, plants cannot use this free nitrogen. There are some nitrogen-fixing bacteria in the soil which convert this free nitrogen into a form which can be used by the plants. The plants absorb this soluble form along with water through its roots. Farmers also add fertilizers, rich in nitrogen to the soil. Plants are then able to synthesise other components of food like fats and proteins.

Let's Remember

Give one word for each one of the following.

1. Define autotrophs and heterotrophs.
2. Where is chlorophyll found in plants?
3. Is man an autotroph or a heterotroph?
4. Where do you find guard cells?

HETEROTROPHIC NUTRITION

How do plants which do not contain chlorophyll derive their nutrition from? These plants depend on other plants for food as they cannot synthesise their own food. They use the heterotrophic mode of nutrition.

Heterotrophic plants are of four types :

1. Parasitic plants
2. Insectivorous plants
3. Saprophytic plants
4. Symbiotic plants

Facts to know

Giant Water lilies in Amazon can grow upto 6 feet in diameter.

Parasitic Plants

Plants which live on other living organisms and obtain their food from them are called parasitic plants. The organism from which a parasite derives its nutrient from is called a host.

Examples: Cuscuta (amarbel). It does not produce chlorophyll. It has yellow tubular structures which wrap around the stem and branches of a tree. It takes ready made food from the tree on which it climbs. Other example is mistletoe.

Cuscuta on host plant

Mistletoe on host plant

Pitcher plant showing pitcher and lid

Insectivorous Plants

There are some plants which can even eat insects. They are called insectivorous plants. These plants are usually green in colour and leaves of these plants are modified to trap the insects. **Examples:** Pitcher plant and Venus fly trap. In pitcher plant, the leaves are modified into a pitcher like-structure with a lid. The tip of the leaf is modified to form a lid which can open and close the mouth of the pitcher. The inside of the pitcher is lined with downward pointing hair that do not allow the trapped insect to escape. The lid closes, once an insect enters the pitcher. The pitcher secretes digestive juices that digest the insect. Have you wondered that if the pitcher plant is green, then why does it need to feed on insects? This is because the pitcher plants grow in areas where the soil is deficient in nitrogen. It gets nitrogen by trapping and eating insects.

Saprophytic Plants

Saprophytes are those organisms which cannot make their own food and obtain their nutrition from dead and decaying plant and animal matter. These plants have no leaves at all. They cannot carry out photosynthesis. Examples are mushrooms, mould and yeast.

Mushroom

You must have seen umbrella like structures growing on logs of wood during the rainy season. These structures are called Mushrooms. They secrete digestive juices on the dead and decaying matter and convert it into a solution. They then absorb the nutrients from it. The mode of nutrition in such plants is saprophytic nutrition and the plants are called saprophytes.

Activity – 2

Take a piece of bread and moisten it with water. Keep it in a closed box in a warm place, for 2–3 days. Observe the piece of bread. You will notice a white cottony growth on the piece of bread. This growth is due to a fungus called bread mould. They appear as cotton like threads if observed with a magnifying glass.

Bread mould

In the rainy season you must seen white patches on your unused shoes and bags which have been left in the hot and humid weather. These white patches are also due to fungi.
The spores of fungi circulate in the air. When they settle on wet and warm things they germinate and begin to grow.

Symbiotic Plants

Some plants live in association with other organisms and share shelter and nutrients. Both the plants gain from each other. Such plants are called symbiotic plants, and the relationship is called symbiotic relationship.

Symbiotic Relationship

Example: Certain fungi live in the root of trees. The tree provides nutrients to the fungi. The fungi in return provides certain nutrients from the soil to the tree.
Another example is of lichens– It is a green algae and a non green fungus. The algae is an autotroph and provides food to the fungus. Fungus provides shelter, water and minerals from the soil to the algae.

Lichens

Rhizobium-the roots of a leguminious plant

Facts to know

Mushroom is a fungi. All varieties of mushroom are not edible. Some are extremely poisonous.

Let's Remember

Give one word for each one of the following.

1. Do mushrooms have leaves?
2. Give examples of parasitic plants and insectivorous plants.
3. What do you mean by a host?
4. Which bacteria lives in the roots of leguminous plants?

REPLENISHMENT OF NUTRIENTS IN THE SOIL

Plants get nutrition from the soil. Since crops/plants are continuously grown in the soil, the amount of nutrients in the soil decline. Manures and fertilizers are added by the Farmers to replenish the nutrients in the soil. They contain nutrients like nitrogen, potassium, phosphorous, magnesium etc. These nutrients need to be added from time to time to maintain the fertility of the soil and for healthy crops and yield. Usually crops require a large amount of nitrogen. We can grow leguminous plants like gram, moong, beans, peas etc in the fields. Rhizobium bacteria which lives in the roots of leguminous plants can take in atmospheric

nitrogen and convert it into a soluble form in the soil. Rhizobium cannot prepare its own food. These leguminous plants provide food to it. Thus a symbiotic relationship exists between leguminous plants and Rhizobium. In this way, the farmers do not need to add nitrogen for

Glossary

nutrition	:	the mode of taking food by an organism and its utilisation by the body
autotrophic	:	the mode of nutrition in which organisms make food for themselves from simple substances
insectivorous	:	insect eating plants which usually grow in nitrogen deficient soil
chlorophyll	:	green pigment present in the leaves which help in the photosynthesis process
parasite	:	the organism which lives on or in other organism
host	:	the organism on which parasite grows or survives
stomata	:	the openings present in the leaves

Summary

- All living organisms need food. Food provides energy for growth and maintenance.
- Green plants are autotrophic as they prepare their own food by the process of photosynthesis.
- Four things are required for photosynthesis-carbon dioxide, water, sunlight and chlorophyll.
- During photosynthesis solar energy of the sun is converted into chemical energy which is stored in the leaves form of food.
- Some plants depend on other plants for food as they cannot synthesise their own food. They are called heterotrophs.
- Heterotrophic plants are of four types-parasitic, saprophytic, insectivorous and symbiotic plants.
- The nutrients in the soil need to be replenished regularly.

Exercise

A. Multiple Choice Questions (MCQs)

Tick (✓) the right option.

1. During photosynthesis solar energy is converted into _____.

(a) light energy ☐ (b) mechanical energy ☐

(c) chemical energy ☐ (d) electrical energy ☐

2. By-product of photosynthesis is _____.
   (a) oxygen ☐ (b) water ☐
   (c) carbon dioxide ☐ (d) nitrogen ☐
3. This is a symbiotic plant _____.
   (a) mistletoe ☐ (b) venus fly trap ☐
   (c) lichen ☐ (d) mushroom ☐
4. This can convert free nitrogen into a soluble form _____.
   (a) mushroom ☐ (b) bread mould ☐
   (c) yeast ☐ (d) rhizobium ☐
5. Amarbel is an example of _____.
   (a) autotroph ☐ (b) parasite ☐
   (c) saprophyte ☐ (d) insectivore ☐

B. Write 'T' for true and 'F' fo false statements.

1. Oxygen is used for photosynthesis. ☐
2. All plants can prepare their own food. ☐
3. Saprophytes cannot prepare their own food. ☐
4. The mode of nutrition in lichens is symbiotic. ☐
5. Plants also need nitrogen for growth. ☐

C. Fill in the blanks with the correct words.

starch	soil	chlorophyll	energy	cacti

1. _____ is the green pigment present in the leaves.
2. Light _____ is absorbed by the chlorophyll.
3. The carbohydrate is converted into _____.
4. _____ have green stems which carry out photosynthesis.
5. Plants get nutrition from the _____.

D. Answer the following questions in short.

1. What is the difference between a parasite and a saprotroph?
2. Why cannot all plants prepare their own food?
3. What is the mode of nutrition of an algae?
4. What is common between a mushroom and a bread mould?
5. What are the requirements of photosynthesis?

E. Answer the following questions.

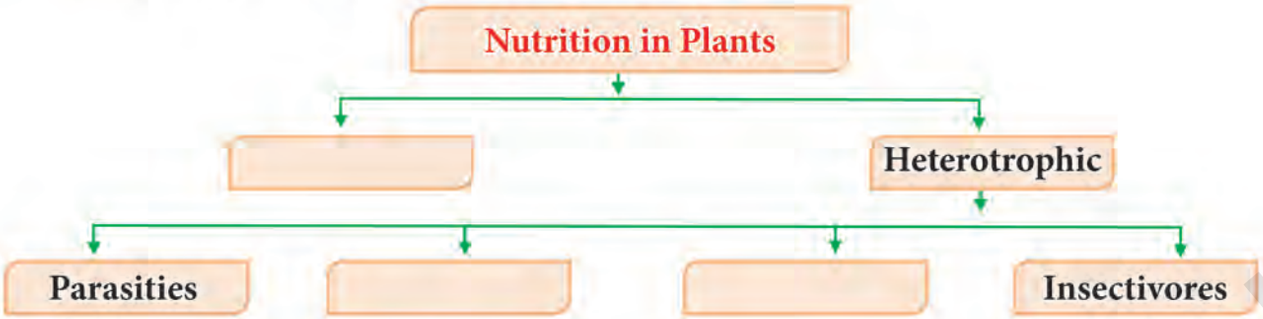
1. Describe the role of leaves in photosynthesis.
2. What is symbiosis? Explain with the help of an example.
3. How are the leaves of the pitcher plant modified to catch insects?
4. Why are saprophytes called cleaners of the environment?
5. Why do farmers grow leguminous crops after harvesting of cereals?

HOTS (Think and Answer)

1. Why do you think we say a pitcher plant is both an autotroph and a heterotroph?
2. What do your think will happen if you coat the leaves of a green plant with oil?

Let's Recall

Complete the following diagram.



Group Discussion

1. A plant without a chlorophyll cannot survive.
2. Insectivorous plants have different mode of nutrition than parasites.

Activity to do

Conduct an experiment to see that carbon dioxide is needed for photosynthesis.

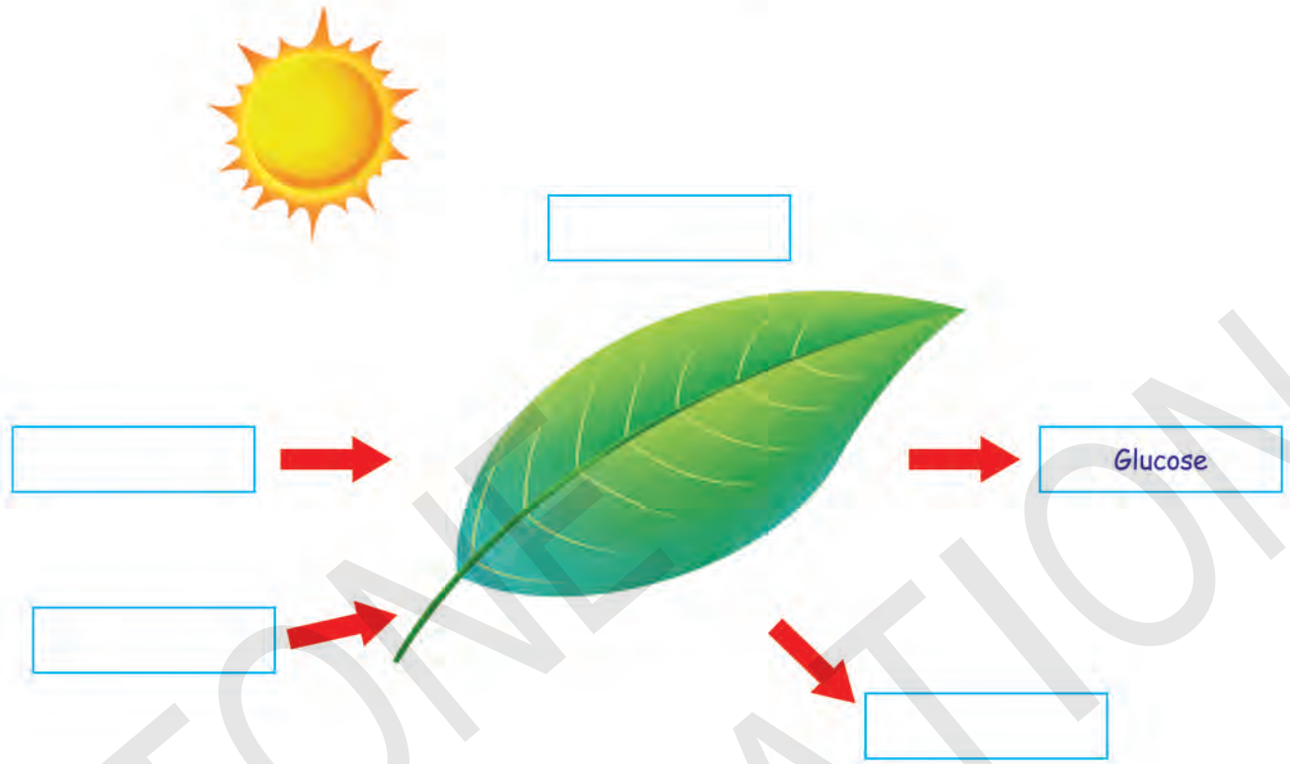
- Take a healthy potted green plant. Keep it in a dark room for 5-6 hours. Water it.
- Take a conical flask. Pour potassium hydroxide solution into it. This solution absorbs carbon dioxide from the air.
- Now place one of the leaves while on plant, inside the flask as shown in the figure. Do not break the leaf. Close the mouth with a cork.
- Keep the plant along with the flask in the sun.
- After a few hours, test this leaf which was in the flask and another leaf from the plant for starch.
- Note down your observations :
  What do you conclude?

Creative Task

Collect pictures of different Insectivorous plants and prepare an album. Learn about their habitat, either from a magazine or with the help of your teacher.

WORKSHEET-1

1. Label the diagram given below and name the process it shows.



2. Write the differences between a total parasite and a partial parasite.

_____

_____

_____

3. Complete this equation.

Carbon dioxide+water $\xrightarrow[\text{Chlorophyll}]{\text{sunlight}}$ _____ + _____

CHAPTER 2

Nutrition In Animals

Introduction

- Modes of procuring food
- Digestion in humans
- Teeth
- Care of teeth
- Digestive system in humans
- Digestion in grass eating animals
- Digestion in amoeba

In the previous chapter we have learnt about nutrition in plants and how they make their own food. Animals depend on plants either by directly eating them or eating animals which eat plants. Some living organisms can eat both plants and animals. The food we eat is used for growth, repair and functioning of the body. Animal nutrition includes nutrient requirement, mode of intake of food and its utilisation in the body. The main components of food are carbohydrates, proteins, fats, vitamins and minerals. Besides, our body also needs water and roughage. The food that we eat cannot be utilised as such. It has to be broken down into simple substances. The breakdown of complex components of food into simple substances is called digestion.

MODES OF PROCURING FOOD

Different organisms use different modes of procuring food.

Name of Animal	Mode of Feeding	Food
Mosquitoes, leeches	sucking	blood
Snakes, frogs	swallowing	animals/insects
Bees, humming bird	sucking	nectar
Rabbits, rats, squirrels	gnawing	seeds and fruits
Sea animals, sponges	sponging	suspended food particles

Butterflies, moths	siphoning	nectar
Cows, horses, goats	cutting/chewing	grass
Star fish	scraping	algae

Activity - 1

Find out more in detail how birds, silk worms, oysters, eagles, lice and houseflies feed. Fill in the table.

Name of the Birds	Food	Mode of taking in food
Silkworms		
Oysters		
Eagles		
lice		
Houseflies		

Facts to know

- A bee must visit 4000 flowers to make 1 table spoon honey.
- Humming birds consume double their weight in food daily.

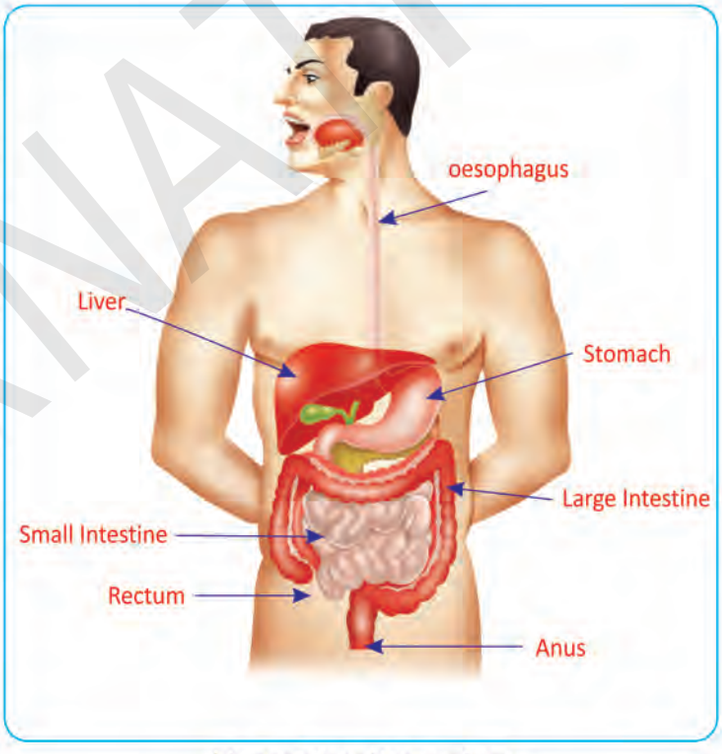
DIGESTION IN HUMANS

The process of digestion begins in the mouth. We take in food through the mouth. The digested food is utilized by the body. The unused part of the food is ejected out in the form of faces.

The digestive system is made of a long tube called the alimentary canal, which begins in the mouth (buccal cavity) and ends at the anus. The alimentary canal is about 9–10 meters long.

It consists of the following compartments :

- The buccal cavity
- Oesophagus or food pipe
- Stomach
- Small Intestine
- Large intestine (caecum, colon and rectum) and
- The anus



Human digestive system

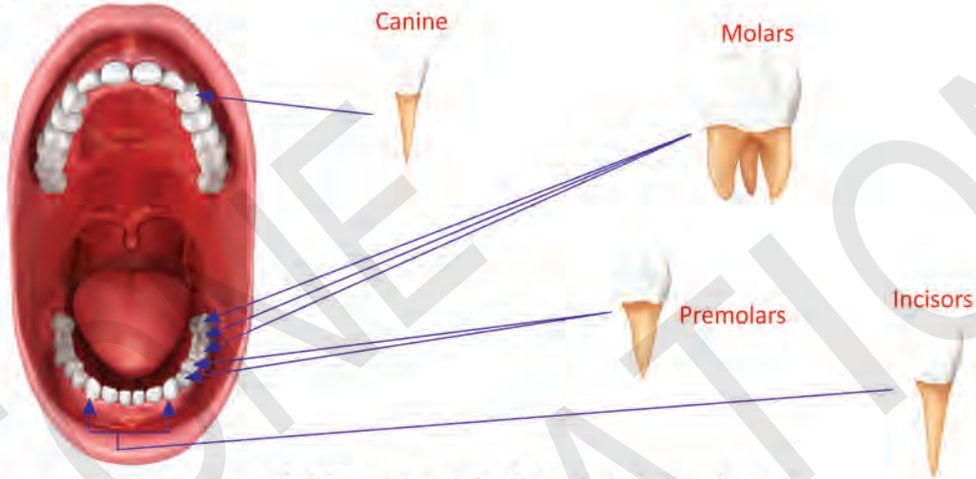
The alimentary canal is also known as the digestive tract. The food is completely digested as it passes from one compartment to another. Digestion involves both physical and chemical processes for converting the complex substances into simple ones. Mechanical digestion involves chewing and churning of food. In chemical digestion, digestive juices, secreted by various organs of the digestive tract like salivary glands, pancreas and liver break down the complex food into simpler ones.

The alimentary canal and the associated glands together constitute the digestive system.

Let us study the movement of food through the various compartments.

The Mouth and The Buccal Cavity

The process of taking in food into the body is called ingestion. The mouth contains the teeth, tongue and salivary glands. We have different types of teeth, which help us to break down food into smaller pieces.



Arrangement of different types of teeth in human beings.

Teeth are located in both the upper and lower jaw of the mouth cavity. Each tooth is rooted in a separate socket in the gums. The first set of teeth appear by the age of 2 years. They are 20 in member and are called milk teeth. The milk teeth fall and are replaced by a new set of 32 permanent teeth by the age of 12 years.

Based on the structure and function teeth are of four types.

Type of teeth	Name	Number of teeth		
		Lower jaw	Upper jaw	Total
Cutting or biting	incisor	4	4	8
Piercing or tearing	canine	2	2	4
Chewing and grinding	premolar	4	4	8
Chewing and grinding	molar	6	6	12
			Total	**32**

Let's Remember

Give one word for each one of the following.

1. What is ingestion?
2. The number of milk teeth a child has.
3. How many pairs of incisors are present in the mouth?
4. How many different types of taste can a taste bud detect?

Facts to know

- We eat about 500 kg of food every year.
- An adult stomach can hold 1.5 l of material.

Dental Care

Do you know that bacteria are present even in our mouth? All are not harmful. When we eat food, small pieces of food get stuck up between the teeth. If the teeth are not cleaned properly, harmful bacteria begin to grow and live in it. They act on the sugar present in the food, producing acid. These acids destroy the teeth. This damage to the teeth is called tooth decay. If timely care is not taken, cavities may form, there may be pain and in some cases tooth loss may occur. Chocolates, sweets, soft drinks and other sugar products are responsible for causing tooth decay.

How to prevent truth decay

Facts to know

Saliva contains 99% water.

- Brushing your teeth twice a day. Use a dental floss daily
- Massage your gums gently with a soft-brush
- Rinse your mouth with water after every meal
- Avoid eating sticky and starchy foods like sweets, chocolates, ice creams etc
- Eat raw vegetables like carrots and fresh fruits which help to clean the food naturally

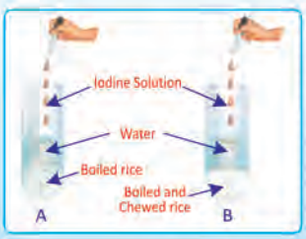
We must take proper care of our teeth to keep them healthy.

Mechanical digestion of food begins when teeth break the food into smaller pieces. This process is called mastication. There are three pairs of salivary glands in the buccal cavity. They secrete a digestive juice called saliva. You must have noticed that the mouth starts watering at the sight or smell of our favourite food. This watery liquid is saliva. The saliva mixes with the chewed food and makes it moist.

Thus saliva breaks down the starch into sugars.

Activity - 2

Take 2 test tubes and label them as A and B. Put some boiled rice in test tube A. In test tube B, put some boiled rice which has been chewed well. Add one teaspoon of water and 2–3 drops of iodine solution in each test tube. Observe blue colour is seen in test tube A, as boiled rice contains starch. The starch in boiled rice is converted into sugar by saliva during chewing. Therefore, no blue-black colour develops with iodine.

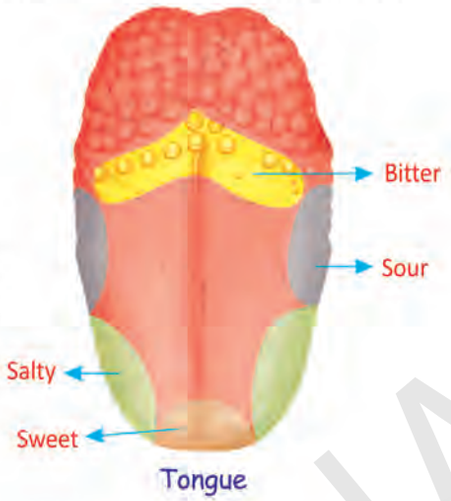


Tongue

Tongue is a flesh, muscular organ. It is attached at the back to the floor of the buccal cavity and free at the front. It can thus be moved in all directions. The main functions of the tongue are–

- It helps to mix saliva with the food
- It helps in swallowing food
- It tells the taste of the food with the help of taste buds
- It helps us in talking

The surface of the tongue is rough due to the presence of thousands of taste buds which help to detect four different types of taste-sweet, salty, sour and bitter. With the help of this activity, let us find out the different locations of different taste buds.



Tongue

Activity – 3

Prepare solutions of sugar(sweet), salt(salty), lemon juice (sour) and juice of karela or neem (bitter). With the help of a tooth pick, put a few drops of each solution in different areas of your tongue. Use a separate tooth pick, for each sample. Identify the areas of the tongue where you could feel sweet, salty, sour and bitter substances.

Salty and sweet buds are present at the tip, Sour taste-all the way back along the sides. Bitter taste-at the back of the tongue.

The wind pipe and the food pipe lie close together. But inside the throat the two share a common passage. During the act of swallowing , a flap like structure called **epiglottis** closes the opening of the wind pipe. This prevents the entry of food into the wind pipe. If we talk or eat in a hurry or laugh, the food particles can enter the wind pipe and we cough, get hiccups or feel a choking sensation.

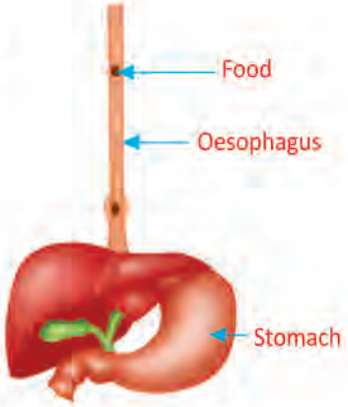
Facts to know

The food that you eat gets cold or warmed in the mouth, till it reaches the right temperature.

Oesophagus/Food pipe

The food which is swallowed enters into the food pipe or oesophagus. It runs along the neck and the chest. It is a hollow tube about 25 cm long, made up of muscles. Food is pushed down by the movement of the wall of the food pipe. No digestion takes place here. From the food

pipe, the food enters the stomach. You must have suffered from vomiting sometimes or the other. This is because at times the food is not accepted by the stomach and is vomitted out.



Stomach

It is like a large sac-like muscular organ. It is J shaped present in the upper abdomen. It is located on the left side. It receives food from the oesophagus. The other end opens into the small intestine. The gastric glands present in the inner lining of the stomach secrete mucous, digestive juices and hydrochloric acid.

The mucous protects the inner lining of the stomach from the action of the hydrochloric acid and enzymes. The hydrochloric acid kills the bacteria which enter along with the food. The acid makes the medium acidic to help digestive juices to act.

Facts to know

It takes your mouth, oesophagus, stomach, small and large intestine, gall bladder, pancreas and liver to digest a glass of milk.

The digestive juices help in the breakdown of proteins into simple substances. The food stays in the stomach for 2–4 hours. The semi digested food is called chyme. From the stomach the chyme goes into the small intestine.

Small Intestine

The small intestine is a long coiled narrow tube about 7.5 m long. It is located in the middle of the abdomen. Digestion of food is completed here. The small intestine receives digestive juices secreted by the liver and the pancreas.

Liver

It is the largest gland of our body. It is reddish brown in colour and is situated on the right side on the upper abdomen. It secretes bile juice which helps in the digestion of fats. Bile is stored in an organ called gall bladder, which is sac like. The gall bladder is connected to the liver with the bile duct.

Pancreas

Pancreas is a cream coloured gland located between the stomach and the first part of the small intestine. It produces pancreatic juice which acts on the carbohydrates, proteins and fats and helps in their breakdown into simpler forms.

The partly digested food reaches the lower part of the small intestine. The intestinal juices complete the process of digestion. The carbohydrates are broken down into sugars; proteins into amino acids ; and fats into fatty acids and glycerol.

Absorption

It is the process whereby digested food pass into the blood vessels in the intestinal wall. The nutrients present in the digested food are then absorbed by the finger like projections on the inner wall of the small intestine. These finger like projections are called villi. These villi increase the surface area of the small intestine for absorption of the digested nutrients. The villi have a network of very fine blood vessels called capillaries.

The surface of the villi absorb the digested nutrients, which are then transported through the blood vessels to the different organs where they are utilized to build proteins and other complex substances. This is called assimilation. In the cells, energy is released by the breakdown of glucose (the simplest sugar) into carbon dioxide and water.

The undigested and unabsorbed food enters the large intestine.

Large Intestine

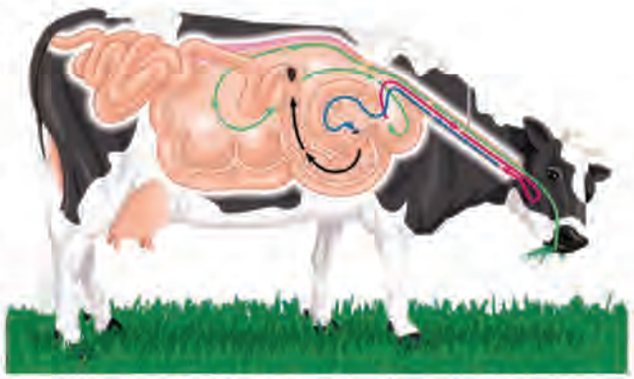
Large intestine is about 1.5 m long. Its main function is to absorb water and some salts from the undigested food material. The undigested waste from the large intestine passes into the rectum. The waste remains here as semi-solid faeces. The faecal matter is passed out through an opening called the anus. The process is called egestion.

Diarrhoea

It is the passage of frequent loose or liquid stools. It occurs due to infection, food poisoning or indigestion. It leads to loss of fluids from the body. This may cause dehydration and hence diarrhoea should not be neglected. The patient should be given oral rehydration solution (ORS). It is a mixture of boiled and cooled water, with a pinch of salt and sugar dissolved in it. It can easily be given at home.

DIGESTION IN GRASS-EATING ANIMALS

Herbivores eat mainly grass or green plants. Have you seen a cow eating grass? The cow, buffalo, horse etc. keep chewing continuously even when they are not eating. They swallow their food after chewing once and store it in the part of the stomach called rumen. Here, the food a is partially digested. It is called cud. When the animal is resting, the cud is brought back into the mouth in small lumps and chewed. This process is called rumination. The animals are called ruminants. During rumination cud mixes with the saliva and after chewing it goes into the stomach.

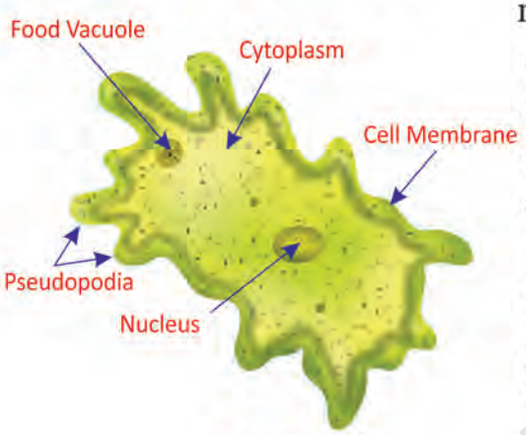


Digestive system of a ruminant

These animals eat grass which is rich in cellulose. These animals have a four-chambered stomach called rumen. The rumen contains a number of bacteria and other microbes which break down the cellulose. The cellulose of the grass is then digested in caecum, a large sac like structure between the small and the large intestine by symbiotic bacteria. These bacteria are not present in humans and hence they cannot digest cellulose.

Feeding and Digestion in Amoeba

Amoeba is a unicellular organism found in pond water. It has a cell membrane, a rounded nucleus and many bubble-like vacuoles in its cytoplasm. An amoeba has an irregular shape. Amoeba can change its shape as well as position. It has projections on its body called pseudopodia, false feet which help in capturing food and in movement.



Amoeba

Amoeba feeds on microscopic organisms. When it senses food, its pushes out the pseudopodia which engulf the tiny particles of food. The food is trapped in a food vacuole.

The digestive juices are secreted into the food vacuole; and help in breaking down food into simpler substances. The digested food is absorbed and assimilated and the amoeba grows in size. The undigested food is thrown out by the vacuole.

The basic process of digestion of food and release of energy is the same in all animals, though the mode of nutrition and digestion differs from animal to animal.

Let's Remember

Give one word for each one of the following.

1. Name the organs of the human alimentary canal.
2. What is bile juice?
3. What is the role of hydrochloric acid in the stomach?
4. What happens to the undigested food in the body?

Glossary

amino acid	: all proteins are made up of smaller sub-units called the amino acids
buccal cavity	: the cavity formed in the mouth between the floor of the tongue and teeth
fatty acid	: the constituent of a fat
salivary glands	: the glands that secrete saliva into the mouth
saliva	: it contains enzyms ptyalin that digests starch
ingestion	: the process of taking food into the body
egestion	: removal of waste from the body
assimilation	: building of proteins and other complex substances from absorbed substances

Summary

- The process of nutrition involves 5 stages namely ingestion, digestion absorption, assimilation and egestion.
- The human digestive system consists of the 1. Buccal cavity 2. Oesophagus 3. Stomach 4. Small Intestine 5. Large intestine, rectum and 6. Anus.
- The digestive glands include salivary glands, liver and pancreas. These glands secrete digestive juices. The wall of the stomach and the small intestine also secrete digestive juices.
- The digestion of food begins in the buccal cavity. The complex carbohydrates are converted into sugar. The digestion of proteins starts in the stomach. The digestion of food is completed in the small intestine. The bile juice secreted by the liver, the pancreatic juice secreted by the pancreas and the digestive juice from the intestinal wall complete the digestion of food.
- The digested food is then absorbed by the villi present in the small intestine. It is then transported to the different parts of the body through the blood vessels.

Exercise

A. Multiple Choice Questions (MCQs)

Tick (✓) the right option

1. Bitting teeth are called _____.
   (a) Incisors ☐ (b) Canine ☐
   (c) Premolar ☐ (d) Molar ☐
2. Digestion of food starts in the _____.
   (a) Stomach ☐ (b) Food pipe ☐
   (c) Mouth ☐ (d) Small intestine ☐
3. The digestive juice present in the saliva acts on _____.
   (a) Starch ☐ (b) Proteins ☐
   (c) Fibre ☐ (d) Minerals ☐
4. Bile juice is secreted by the _____.
   (a) Stomach ☐ (b) Liver ☐
   (c) Pancreas ☐ (d) None of these ☐

5. Most of the digestion takes place in the _____.

(a) Mouth ☐ (b) Stomach ☐

(c) Small intestine ☐ (d) Large intestine ☐

B. Write 'T' for true and 'F' for false statements.

1. Total number of canine in an adult is 8. ☐
2. Digestion of starch starts in the stomach. ☐
3. Food pipe is also called oesophagus. ☐
4. The taste buds are present in the mouth. ☐
5. Digestion of food is completed in the stomach. ☐

C. Fill in the blanks with the correct words.

9–10 ingestion liver utilised process

1. The food that we eat cannot be _____ as such.
2. The _____ of digestion begins in the mouth.
3. The alimentary canal is about _____ meters long.
4. The process of taking in food into the body is called _____.
5. _____ is the largest gland of our body.

D. Answer the following questions in short.

1. Name the different types of teeth in the human body along with their functions.
2. Why are ruminants able to digest cellulose and not humans?
3. What do you understand by the term assimilation?
4. What is the role of digestive juices produced by the pancreas?
5. How is the food prevented from entering the wind pipe?

E. Answer the following questions.

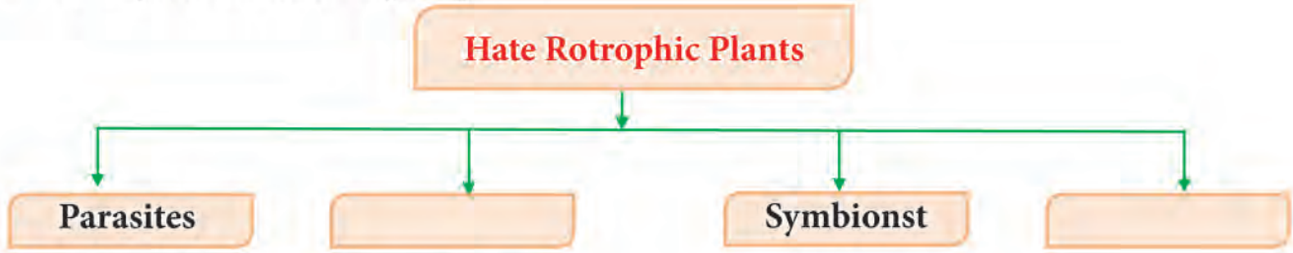
1. What are villi? Where are they located? What are their functions?
2. Describe a human tongue and its functions.
3. Draw an amoeba and explain the process of digestion in it.
4. What is bile? Where is it produced, stored and what are its functions?
5. Describe the process of digestion in ruminants.

HOTS (Think and Answer)

1. Why do you think adults tell us not to talk or laugh while eating food?
2. Why do you think we must drink a lot of water when we have diarrhoea?

Let's Recall

Complete the following diagram.

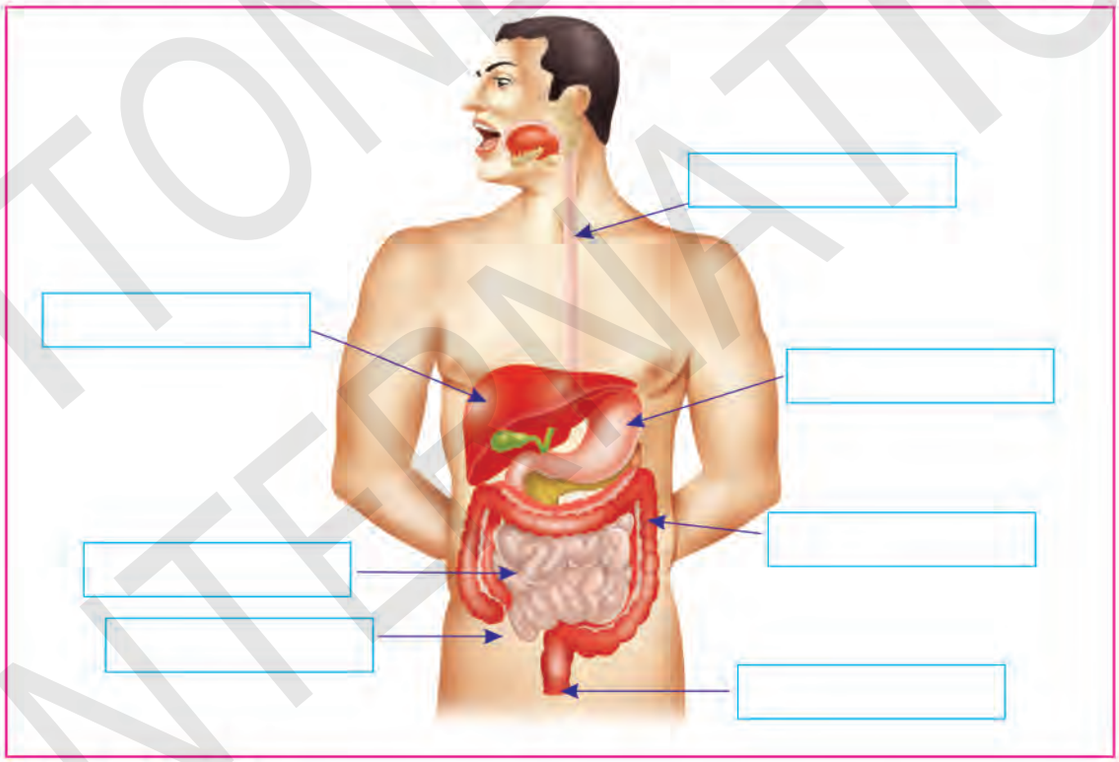


Group Discussion

1. Discuss the role of bile in digestion.
2. Discuss the role of villi in absorption.
3. Discuss the role of different types of teeth in digestion.

Activity to do

1. Make a model of the digestive system with the help of modelling clay. Make organs such as liver, stomach, pancreas and large intestine with clay. Rubber tubing can be used to make the oesophagus and small instestines.
2. Label the various parts of the digestive system. Write one function of each part.



Creative Task

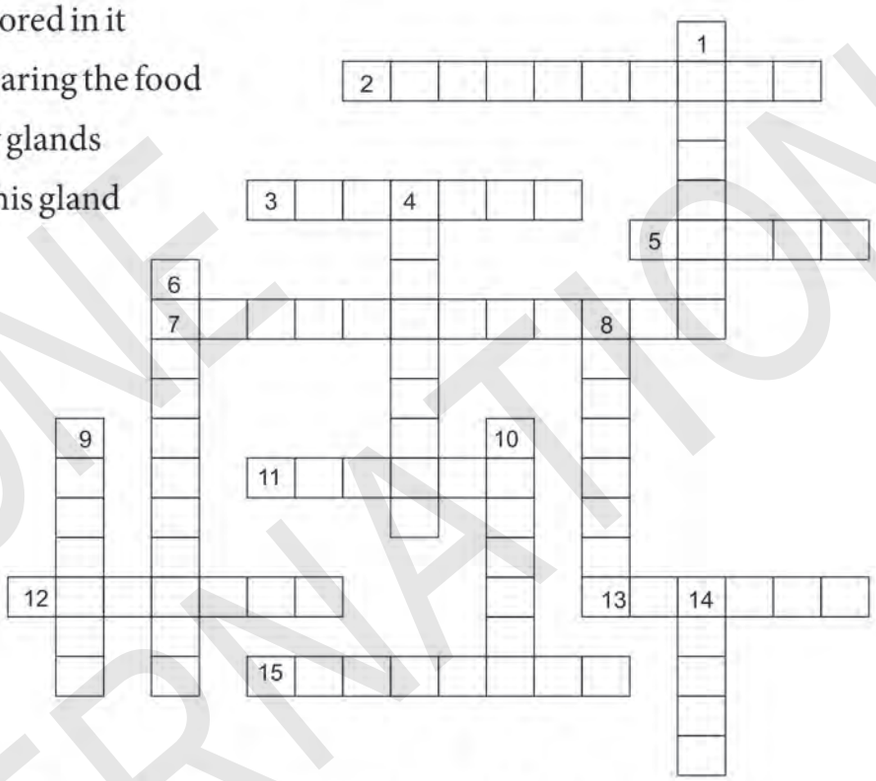
Imagine and create toothpaste enhanced with special herbs which will keep the teeth white and shining. Give it a name and properties.

WORKSHEET-2

Complete the crossword with the help of the clues provided.

Across

2. The tube that connects stomach to mouth
3. Part of throat which is a common passage for food and air
5. Finger-like projections in small intestine
7. The process by which absorbed food is utilized
11. Undigested food gets stored in it
12. The teeth that help in tearing the food
13. It is secreted by salivary glands
15. Trypsin is secreted by this gland



Down

1. The process by which undigested food is removed from the body
4. Animals which chew cub
6. Chewing of food
8. Flat teeth which help in biting
9. This part of the digestive tract secrets hydrochloric acid
10. This enzyme is present in saliva
14. It produces bile