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### 2.1 Introduction

Animals cannot make their own food like plants. For their food, they are directly or indirectly dependent on the plants. Such animals are placed in the heterotrophic nutrition group. The food of animals is arranged in the order from grass to other animals. Grass, grains, insects and animals are included in it.

### 2.2 Classification of Animals

On the basis of nature of food, the animals are divided into following groups :

**1. Herbivores :** The animals which eat only plant products such as fruits, flowers, leaves, stems, roots, etc. are called **herbivores**. Grass-eating animals are also herbivores. Some examples of herbivores are parrot, rabbit, deer, monkey, langur, cow, buffalo, goat, etc.

**2. Carnivores :** The animals which hunt other animals and eat their flesh are called **carnivores**. Most of the carnivores have strong and muscular legs which help them to chase other animals. Their paws have strong and sharp claws, which help them to

catch their prey. Examples of carnivores are lion, tiger, leopard, otter, etc.



Parrot



Rabbit



Deer



Cow

### Herbivores



Lion



Cheetah



Leopard



Otter

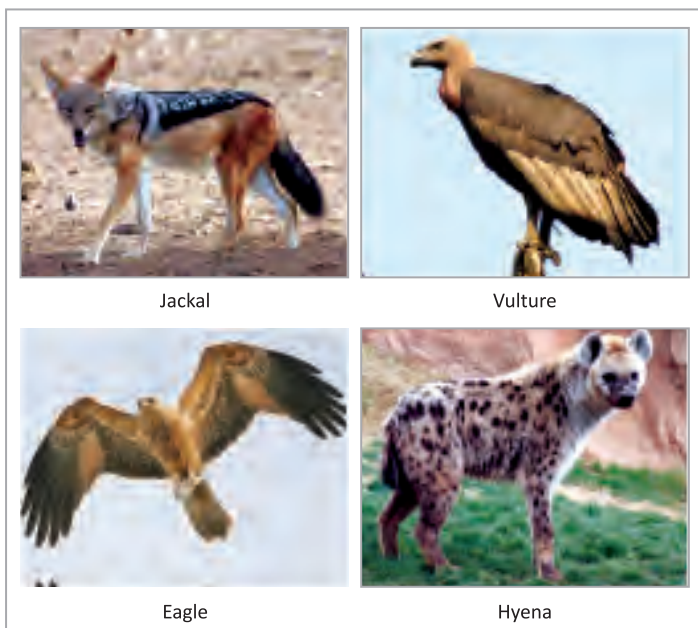
### Carnivores

**3. Omnivores :** The animals which eat both plants and animals are called **omnivores**. These animals eat all kinds of food. Whatever food is available to them, they eat it and digest it. Examples of omnivores are bear, dog, cat, crow, etc.



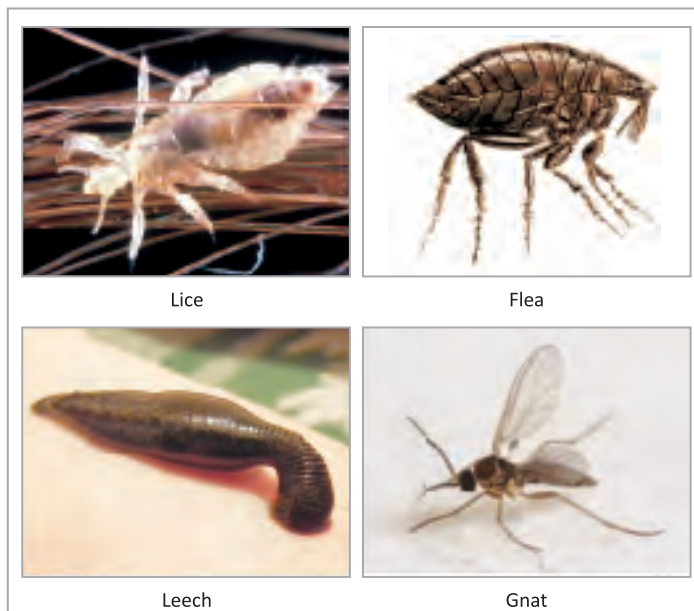
Omnivores

**4. Scavengers :** The animals which eat the flesh of dead animals are called **scavengers**. Scavengers keep the environment clean. Examples of scavengers are jackal, vulture, eagle, hyena, etc.



Scavengers

**5. Parasites :** Some organisms which live in or on the bodies of other living beings and get their food from them are called **parasites**. Examples of parasites are lice, flea, leech, gnat, etc.



Parasites

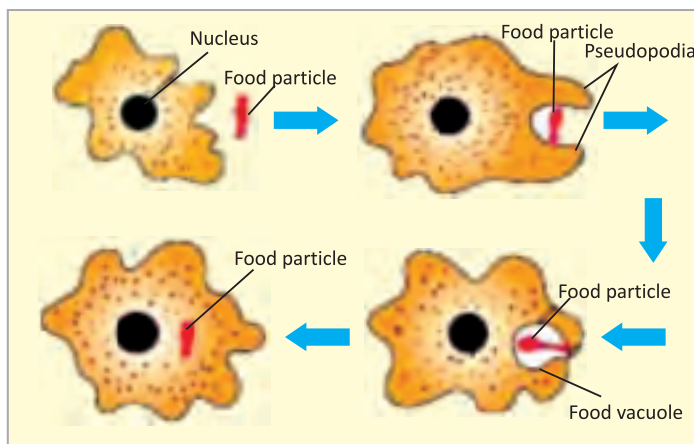
**Interesting Fact**

Humans come under the category of omnivores.

**2.3 Feeding and Digestion in Amoeba**

Amoeba is an aquatic protozoan. To move around in the aquatic atmosphere, the amoeba spreads out its cell membrane and cytoplasm. This spreading around is called **pseudopodia**. Amoeba's food are both microscopic plants and aquatic. Whenever it senses food or comes into contact with a food particle, it pushes out two pseudopodia around the food particle and engulfs it. This process of trapping of food is called **endocytosis**.

To digest the food, the lysosome secretes a digestive juice. The food which is digested is absorbed by the cell while the undigested food is expelled out of the body by contractile vacuole.



Nutrition in Amoeba



## Interesting Fact

Green plants make food for the entire animal kingdom. That is why they are called producers.

## 2.4 Nutrition in Animals

For animals, food is not only a source of energy but is very important for different functions of the body. It keeps on repairing the body tissues which, in turn, give rise to new cells and feed them. This process, carried out by the tissues is called **nutrition**, through which the animals get energy for their various body processes. Animals cannot make their own food. They come under the category of heterotrophs.

Nutrition in animals takes place in five steps :

**1. Ingestion :** The process by which an animal takes the food into the body is called ingestion.

**2. Digestion :** The process in which complex, insoluble and large food particles are changed into simple, soluble and small food particles is called digestion.

Enzymes play an important role in digestion process such as pepsin, trypsin, etc.

**3. Absorption :** The process in which the digested food is absorbed by the cells is known as absorption. In humans, the absorption takes place in small intestine.

**4. Assimilation :** The process in which simple, soluble and digested food is taken in by the cells and used to produce energy and growth of the body is called assimilation.

**5. Egestion :** The total eaten food is not digestible. The undigested food is harmful for body and health. The process in which this unwanted and unabsorbed food is removed from the body is called egestion.

In humans and other animals such as frog and cow, the nutrition process is the same, i.e. digestion process is the same in humans and animals.

## 2.5 Nutrition in Humans

Man is an omnivore who gets his food from both plants and animals. For his food, he is dependent on both plants and animals.

Food habits in humans are different and variable. Man picks up food by his hands and carries it to his mouth to complete the process of ingestion. Food is properly chewed by the teeth to break it into small pieces. The muscles of the gums help to chew the food. The saliva present in the mouth helps to digest the food. The enzyme called salivary amylase or

tylase helps enough to digest the food. Hence, the digestion of food begins from the mouth only. From the mouth, the food passes into the food pipe and then to the stomach. The digestion continues into stomach and the small intestine with the help of the enzymes. The process of digestion is completed in the small intestine itself.

## 2.6 Digestive System in Humans

An extremely developed food canal is found in the human body. This canal is alimentary canal. It begins from the mouth and ends at the anus.

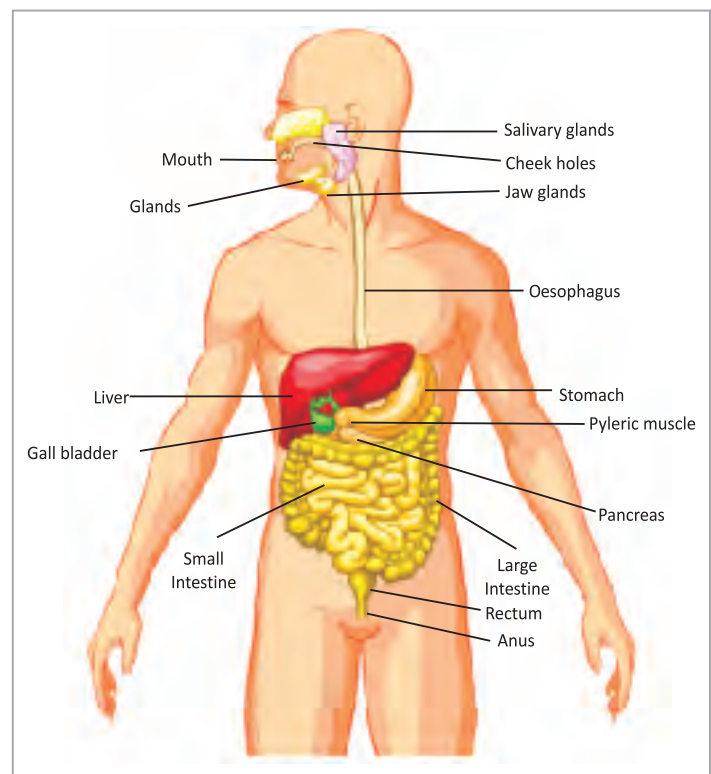
Different parts of the alimentary canal are oesophagus, stomach, small intestine, large intestine and anus. Liver and pancreas are which produce digestive juices.

### Functions of Different Parts the Alimentary Canal

**Mouth or Buccal Cavity :** The mouth plays an important role in digesting the food. The different kinds of teeth present in the mouth chew and crush the food eaten by us. There are three pairs of salivary glands present in our mouth which secrete saliva to digest the sugar.

**Oesophagus :** The swallowed food passes through the food pipe (oesophagus) and into the stomach.

**Stomach :** It is a bag shaped muscular structure which stores the food eaten at one time. The stomach secretes gastric juices which digest the proteins.



Human digestive system

**Duodenum** : It is the beginning of the small intestine. The gastric and bile juice mix with pulpy food here only. Most of the digestive process takes place in the small intestine only.

The digested food is absorbed by the walls of the small intestine.

**Large Intestine** : It stores the undigested food and absorb water from it to make the faeces solid.

**Anus** : It is located at the end of the alimentary canal. The faeces from the body is expelled through the anus.

#### Irregularities in Digestive System :

**Constipation** : It is the biggest hassle of the digestive system. Its causes may be undigested food or more of non-fibrous food. Fruits and raw vegetables have fibers in abundant quantity and help to prevent constipation. A balanced diet also helps to prevent constipation.

**Dyspepsia (Indigestion)** : It is a normal problem. It happens due to eating food fast and not chewing it properly. This condition develops because of excessive production of gastric juices which give rise to many acids.

Whenever someone belches, some acid comes out and causes a burning sensation in the chest. Continuation of this condition for a long time may cause stomach ache.

**Diarrhoea** : Sometimes, a person feels the need to pass watery stool frequently. This condition is known as diarrhoea.

It may be caused by carelessness while having food, indigestion, food poisoning or infection.

Diarrhoea should never be neglected. The person suffering from it should be taken to a doctor. He should also be given a solution of salt and sugar. This is called **Oral Dehydration Solution (ORS)**.

## 2.7 Digestion

Along with food, oxygen and water are raw materials, which our body utilises for the growth of the body and the repair of cells in the body. Most of the food eaten by us cannot be used by our body directly. First, it is digested. Digestion is the process in which food is broken down into simple substances. These substances are digested by the digestive system and are transported by the blood to different cells of the body.

## 2.8 Complete Process of Digestion

**Swallowing** : Ingestion of food into the stomach is called swallowing.

**Digestion** : The transformation of non-soluble components of food into soluble forms is called digestion.

**Absorption** : The dissolving of the food absorbed by the intestinal walls into the blood is called absorption.

**Assimilation** : The distribution of digested food to all the living tissues of the body is called assimilation. The food becomes a part and a division in our body.

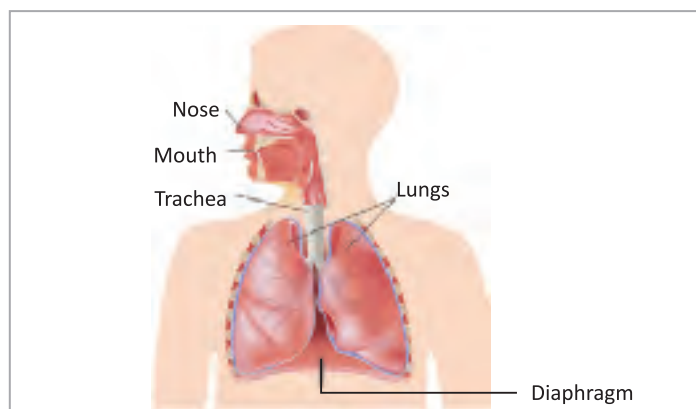
**Excretion** : The carrying out of undigested food from the body is called excretion.

## 2.9 Respiration in Humans

In respiration, a man inhales the air, containing oxygen, through the nose. This air passes the trachea, first enters in the left lung and then the right lung. At last, the air reaches the cavities with walls or alveoli which are called **air cavities**. There are many blood cells in the walls of the air cavities through which oxygen is diffused into the blood. Carbon dioxide is diffused from the blood to the pleural cavity. Blood has one another kind of cells which are called **Red Blood Cells (RBCs)**. These are red because of hemoglobin pigment. As soon as the blood diffuses or combines with the tissues, the tissues perform the exchange of respiration in all the organs. In this process, the waste carbon dioxide is moved from the blood to the air cavities. The next moment, this waste carbon dioxide gas is exhaled out of the body.

### Interesting Fact

On an average, an adult human being at rest, breathes in and out 15 to 18 times in a minute. During exercise, the breathing rate may increase up to 25 times per minute.



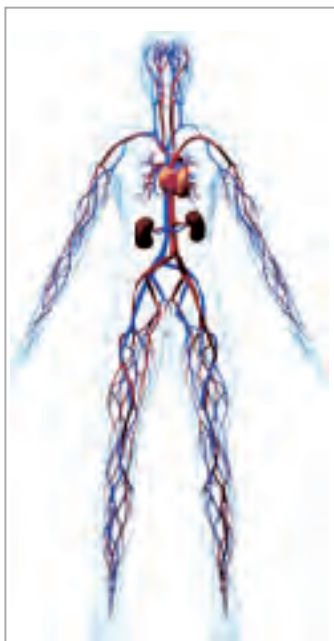
Respiratory System

## 2.10 Circulation in Humans

The transport of substances in humans is done by circulatory system. The circulatory system is basically made up of blood vessels, heart and blood.

**Blood Vessels :** These vessels are of three kinds : arteries, capillaries and veins.

**(i) Arteries :** After being pumped from the left ventricle, the blood reaches the largest vessel of the body, the aorta. The aorta transports the blood from the heart to the other parts of the body. Then the aorta divides into small arteries which reach all the parts of the body and form a net.



Human circulatory system

**(ii) Capillaries :** The net of the vessels carries the blood to all parts of the body but their walls are so thick that food and oxygen cannot pass through them. To perform the main work, i.e. transport of materials, the blood has to pass from thick arteries to capillaries with thin walls.

**(iii) Veins :** After delivering oxygen, the blood once again becomes thick, gets out of the blood capillaries and enters blood vessels called veins. Veins carry the blood back to the heart. Veins have one-way valves which prevent the blood from flowing in the opposite direction. That is why, in them, the blood always flows towards the heart.

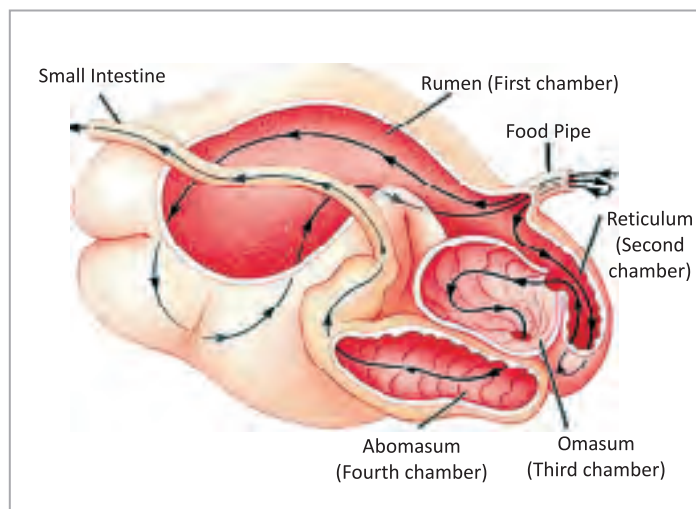
## 2.11 Digestion in Grass-eating Animals

Grass-eating or grazing animals are called **ruminants**. Cow, buffalo, goat and sheep are ruminants. Ruminants eat their food very quickly and swallow it without chewing it properly. There are four chambers in their stomach—rumen, reticulum, omasum and abomasum.

The first chamber is called **rumen** and is the largest chamber. The chewed food first reaches the rumen where the cellulose digesting bacteria changes it into a soft pulp.

From the rumen, this pulp moves to **reticulum** where the cellulose changes into the cud. When the ruminant rests and the cud reaches the mouth once again, where it is chewed once again and is mixed with the saliva. This process is called chewing the cud.

After the food is chewed once again, it is swallowed once again. Now this half-digested food reaches the next chamber, **omasum**, which is the smallest chamber of the stomach.



Stomach of ruminants

**Abomasum** is the last chamber. The actual digestion of the food by the secretion of the gastric juice, takes place here.

In ruminants, the front incisor teeth are sharp and used to cut the grass.

The molars and premolars, used to chew the food, are flat and broad.

**Teeth :** The teeth cut, crush and grind the food to give it a pulpy form. Teeth play an important role in digesting the food. They are hard, bony extensions.

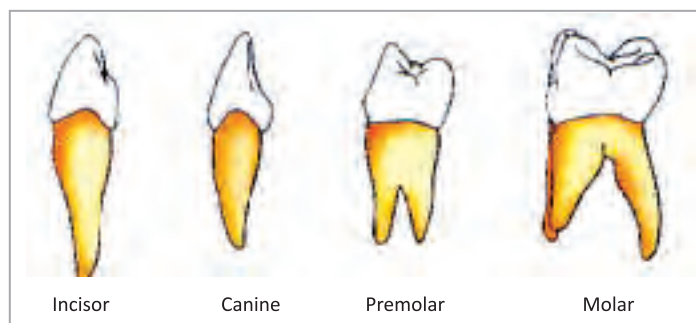
A human child, up to the age of 12 years, has only twenty teeth.

An adult human being has 32 teeth, 16 in the upper jaw and 16 in the lower jaw. In each jaw, 8 teeth are on the left side and 8 are on the right side. The teeth perform the following functions :

**Incisor :** These are in the front part of each jaw and are shaped like a chisel. That is why they are called cutting and breaking teeth.

**Canine :** These teeth are not developed in humans. They help to tear flesh of the prey.

**Premolar :** These are two in number and are situated behind the canines. Their surface is plane. They help to crush the food. They have two roots.



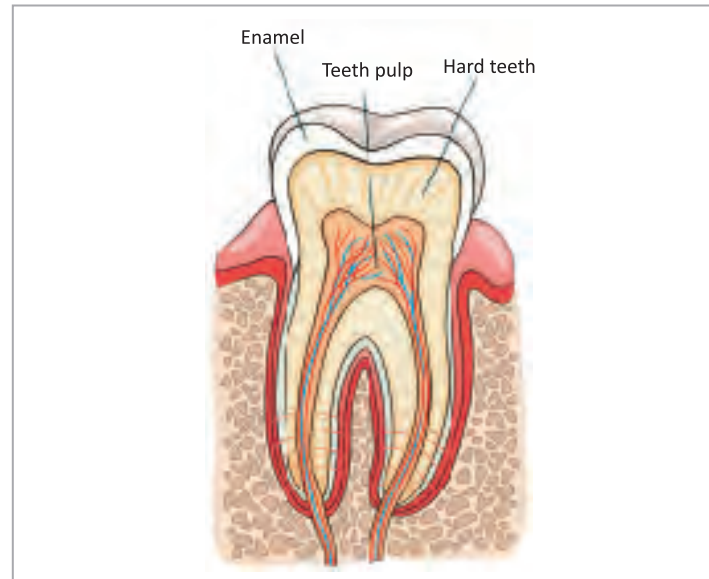
Types of teeth



**Molar** : On each side and at the end of each jaw are three molars which help to grind the food. These have three roots.

**Tooth Decay** : After the food is eaten, some food particles stuck between the teeth and make acid, which affects the tooth enamel. This is the first stage of tooth decay. Thus, one must brush teeth regularly and for any kind of teeth problem, one must consult the dentist immediately.

**Milk Teeth** : The teeth which come out between the age of 6 to 24 months are called **milk teeth**. These are the first set of teeth. The second set of teeth are called **permanent teeth**. These begin to appear from the age of 6 years and continue till 20 years.



Layers of teeth

### Highlights

- Animals cannot make their own food.
- Animals are directly or indirectly dependent on plants for their food.
- Animals are called heterotrophs.
- Herbivores eat only plant products.
- Carnivores eat the flesh of other animals.
- Omnivores eat both plants and animals.
- Scavengers eat the flesh of dead animals.
- Scavengers keep the environment clean.
- Parasites are dependent on other animals for their food.
- Amoeba is an aquatic protozoan.
- Nutrition in animals takes place in five steps.
- Breaking of large pieces of food into smaller pieces is called digestion.
- Irregularity in digestion may cause disease like diarrhoea.
- Circulatory system provides oxygen and food to the body.
- Ruminants chew the cud.
- Milk teeth grow between the age of 6 to 24 months.
- Permanent teeth begin appearing from the age of 6 years and continue till 24 years.

## Exercise



### A. Tick (✓) the correct options :

1. What are plant-eating animals called?

(a) Omnivores

(b) Herbivores

(c) Carnivores

(d) Scavengers

2. What are flesh-eating animals called?

(a) Herbivores

(b) Omnivores

(c) Carnivores

(d) All of these

3. What are animals which eat both plants and animals called?
 

(a) Omnivores	<input type="checkbox"/>	(b) Scavengers	<input type="checkbox"/>
(c) Herbivores	<input type="checkbox"/>	(d) Carnivores	<input type="checkbox"/>
4. What are animals which get their food from the bodies of other animals called?
 

(a) Scavengers	<input type="checkbox"/>	(b) Carnivores	<input type="checkbox"/>
(c) Parasites	<input type="checkbox"/>	(d) All of these	<input type="checkbox"/>
5. Which of the following is a ruminant?
 

(a) Dog	<input type="checkbox"/>	(b) Cat	<input type="checkbox"/>
(c) Goat	<input type="checkbox"/>	(d) Jackal	<input type="checkbox"/>
6. How many kinds of nutrition are there?
 

(a) One	<input type="checkbox"/>	(b) Two	<input type="checkbox"/>
(c) Three	<input type="checkbox"/>	(d) Four	<input type="checkbox"/>
7. These help to tear the food.
 

(a) Incisors	<input type="checkbox"/>	(b) Canines	<input type="checkbox"/>
(c) Premolars	<input type="checkbox"/>	(d) Molars	<input type="checkbox"/>
8. How many chambers does a ruminant's stomach have?
 

(a) One	<input type="checkbox"/>	(b) Two	<input type="checkbox"/>
(c) Three	<input type="checkbox"/>	(d) four	<input type="checkbox"/>

**B. Fill in the blanks :**

1. In our lifetime, there are \_\_\_\_\_ sets of teeth.
2. Plants are called \_\_\_\_\_.
3. The number of premolars is \_\_\_\_\_.
4. \_\_\_\_\_ is an example of a parasitic animal.
5. \_\_\_\_\_ keep the environment clean.

**C. Write whether True or False :**

1. On the basis of food, animals are classified into five divisions. \_\_\_\_\_
2. Lice, flea and leech are examples of scavengers. \_\_\_\_\_
3. In animals, nutrition takes place in four steps. \_\_\_\_\_
4. Food habits in humans keep on changing. \_\_\_\_\_
5. Most of the digestion takes place in small intestine. \_\_\_\_\_
6. Excretion of undigested food is called circulation. \_\_\_\_\_
7. An adult human has 32 teeth. \_\_\_\_\_

**D. Very Short Answer Questions :**

1. Where is the food absorbed in humans?
2. How many kinds of nutrition is there in humans?
3. What are those animals called which chew the cud?
4. Which juice is secreted by the stomach?
5. Of which class of animals is the human?

**E. Short Answer Questions :**

1. Define assimilation.

2. Blood vessels are of how many kinds?
3. What is tooth decay?
4. What is internatlization?
5. What is diarrhoea?
6. How many teeth does an adult human have?

**F. Long answer Questions :**

1. Explain respiration process in humans.
2. Explain feeding and digestion in amoeba.
3. Give details about the functions of different parts of alimentary canal.
4. Write a brief note on teeth.
5. Explain in detail the digestion process in ruminants.
6. Write a brief note on irregularities in digestion.
7. Explain the circulatory system in humans.



**Project Work**

- Make a labelled chart about the respiratory system of humans and hang it in your class.
- Label the given diagram of digestive system in humans.

