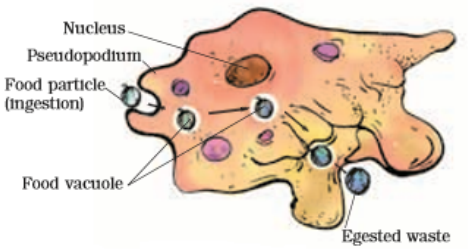
Board – CBSE	Class – 7	Topic – Nutrition in animals

Introduction

- In the previous chapter, we learned that plants can prepare their food by photosynthesis but animals cannot.
- Animals get their food from plants, either directly by eating plants or indirectly by eating animals that eat plants. So animals exhibit a heterotopic mode of nutrition.
- Again from the previous chapter, it is clear that all living organisms (both plants and animals) need certain nutrients to stay alive and grow and these nutrients are obtained from food.
- Since this Chapter is about nutrition in animals so in this chapter we will learn about the process of intake and utilization of food in animals.
- All the animals can be divided into three groups based on their food habits. These are:
- **Herbivores:** Those animals which eat only plants are called herbivores. Examples are Goat, Cow, and Deer, etc.
- **Carnivores:** Those animals which eat only other animals as food are called carnivores. Examples are Lion, Tiger, and Lizard, etc.
- **Omnivores**: Those animals which eat both, plants and animals are called omnivores. Examples are Man, Dog, and Crow, etc.
- **Process of nutrition in animals**
- **Holozoic nutrition:** It is a process by which animals take in their food. It involves different steps namely, ingestion, digestion, absorption, assimilation, and egestion. Human beings exhibit a holozoic mode of nutrition involving five basic steps.

  Ingestion: The process of taking food into the body is called ingestion++++++++++++++.
- **Digestion:** the process in which the food containing large, insoluble molecules is broken down into

- small, water-soluble molecules is called digestion.
- **Absorption:** The process in which the digested food passes through the intestinal wall into the blood
- stream is called absorption.
- **Assimilation:** The process in which the absorbed food is taken in by the body cells and used for energy, growth, and repair are called assimilation.
- **Egestion:** The process in which the undigested food is removed from the body is called egestion.
- **Nutrition in Simple organisms**
- In this section, we will learn about simple organisms like amoeba, paramecium, hydra, spider, and frog.
- **Nutrition in Amoeba**
- Amoeba is a microscopic organism that consists of only a single cell.
- Amoeba is mostly found in pond water.
- The figure given below shows the structure of the amoeba.



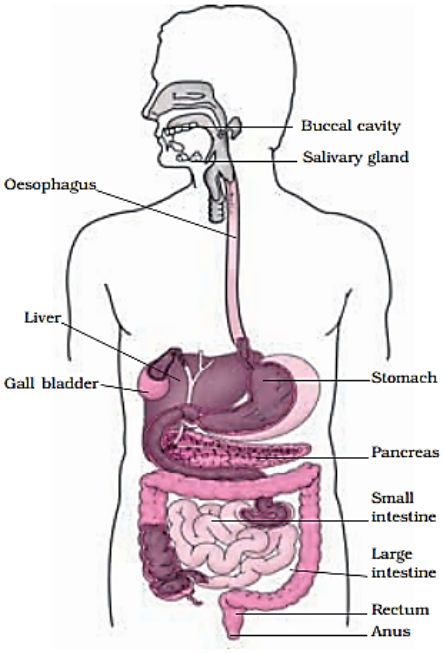
- Amoeba eats tiny plants and animals as food that floats in the water in which it lives.
- The mode of nutrition in Amoeba is **holozoic**.
- The process of obtaining food by Amoeba is called
- **phagocytosis.**
- Steps involved in the nutrition of Amoeba:

1. **Ingestion:** Amoeba ingests food by forming temporary finger-like projections called pseudopodia around them. The food is engulfed with a little surrounding water to form a food vacuole (‘temporary stomach’) inside the Amoeba.

2. **Digestion:** In Amoeba, food is digested in the food vacuole by digestive enzymes which break down the food into small and soluble molecules by chemical reactions.
3. **Absorption:** The digested simple and soluble substances pass out of the food vacuole into the surrounding environment.
4. **Assimilation:** The absorbed food materials are used to obtain energy through respiration and make the parts of the Amoeba cell which leads to the growth of Amoeba.
5. **Egestion:** The remaining undigested material is moved to the surface of the cell and thrown out of the body of the Amoeba.

Nutrition in Paramecium:

- Paramecium is also a tiny unicellular animal that lives in water.
- Ingestion: Paramecium uses its hair-like structures called **cilia** to sweep the food particles from the water and put them into the mouth.
- Ingestion is followed by other steps such as digestion, absorption, assimilation, and egestion which are the same as those we studied in **Amoeba**



Human Digestive system

- We take food through our mouth, digest and utilize it.

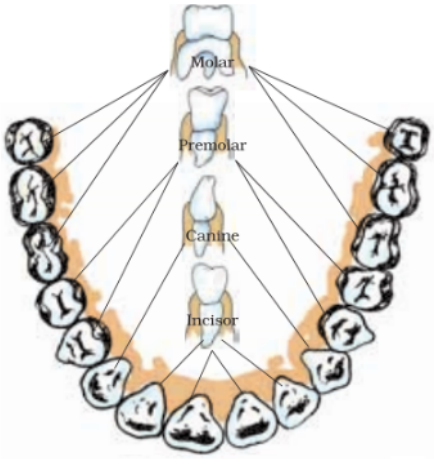
- The figure given below shows the human digestive system
- The human digestive system consists of the alimentary canal and its associated human digestive system glands.
- Various organs of the human digestive system in sequence are
  1. Mouth (Buccal Cavity)
  2. Oesophagus (food Pipe)
  3. Stomach
  4. Small intestine
  5. Large intestine
  6. Rectum
  7. Anus.
- **The glands which are associated with the human digestive system are**
  1. **Salivary glands**- Located in the mouth or Buccal Cavity
  2. **Liver**- It is the largest gland situated in the upper part of the abdomen on the right side.
  3. **Pancreas**- located just below the stomach

     The ducts of various glands open into the alimentary canal and pour secretion of their juices into the alimentary canal.

Digestion in the mouth

- We take food through our mouth and the process of taking food into the body is called **ingestion**.
- The mouth or **buccal cavity** contains teeth, tongue, and salivary glands.
- Digestion begins in the mouth when we chew the food with the help of our teeth.
- The teeth cut the food into smaller pieces, chew, and grind it.
- Chewing breaks down the food into smaller pieces and mixes them with saliva. This process is called **mastication.**
- The salivary glands secrete a watery liquid called **saliva**. Saliva is a digestive juice that helps to partially digest the starch present in the food.
- The tongue helps in mixing saliva with the food.

- **The tongue** is a muscular organ that helps you eat food. It mixes saliva with the food during chewing and helps in swallowing it.



Arrangement of teeth and different type of teeth

- We also taste food with our tongue as it has taste buds that detect different tastes of food.

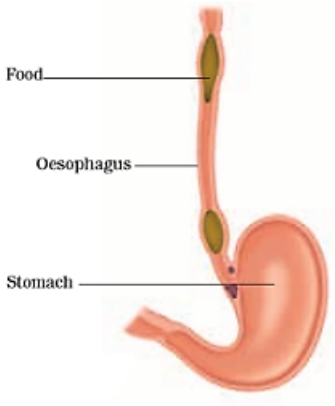
Teeth

- Teeth are used for cutting, grinding, and tearing the food before you swallow it.

You have different types of teeth to do the job.

- **Milk teeth: -** A child has only 20 teeth, 10 in each jaw. These are known as milk teeth. They begin to fall at the age between 6 to 8 and then a new set of teeth grows.

- **Permanent teeth: -** This set contains 32 teeth, 16 in each jaw. There are 4 incisors, 2 canines, 4 premolars, and 6 molars in each jaw. As shown below in the figure:
  1. Your front teeth are **incisors**. They are used for biting and cutting.
  2. Next to incisors are **canines**. These are pointed and are used for piercing and tearing pieces of food.
  3. The teeth at the back of your mouth are broad with an almost flat surface. These teeth crush and grind food and are called the **premolars and molars**. Molars are larger than premolars
  4. The white substance that covers your teeth is called **enamel**.



The food pipe/Oesophagus

- The swallowed food passes into the food pipe or **Oesophagus** as shown below in the figure
- This figure shows the movement of food in the food pipe which runs along the neck and chest.
- So, the esophagus leads from your mouth to the stomach. It is made up of muscles.
- Food is pushed down by the movement of the wall of the food pipe.
- This movement called **peristalsis** takes place throughout the alimentary canal and pushes the food downwards.

Stomach

- **The stomach** is the thick-walled bag present on the left side of the abdomen. (see human digestive system figure)
- It is the widest part of the alimentary canal. Oesophagus brings slightly digested food from the mouth into the stomach.
- The stomach walls contain three tubular glands in their walls which secrete gastric juice.
- The gastric juice contains three substances: Hydrochloric acid, the enzyme pepsin, and mucus.
- The hydrochloric creates an acidic medium that facilitates the action of the enzyme pepsin that is the digestion of protein into simple substances.
- The acid kills many bacteria that enter along with the food.

- The mucus helps to protect the stomach wall from its secretions of hydrochloric acid.
- The partially digested food then goes from the stomach into the small intestine.

Small intestine

- The small intestine is highly coiled and is about 7.5 m long.
- After leaving the stomach food enters the small intestine and the last steps of digestion take place in the small intestine.
- It receives secretions from the liver and pancreas and the wall of the small intestine also secrets juices.
- **Liver: -** Liver is the largest gland in the body and is situated in the upper part of the abdomen on the right side. It secrets bile juice that is stored in the **gall bladder**
- **Pancreas: -** It is the large cream-colored gland located just below the stomach. The pancreatic juice acts on carbohydrates, fats, and proteins and converts them into a simple form.
- The partly digested food now reaches the lower part of the small
- The walls of the small intestine contain glands that secrete intestinal juice.
- The enzymes present in it finally convert the proteins into amino acids, complex carbohydrates into glucose, and fats into fatty acids and glycerol.

Absorption:

- The small intestine is the main region for the absorption of digested food.
- The inner surface of the small intestine has numerous finger-like projections called villi which increase the surface area for rapid absorption of digested food.
- The digested food which is absorbed through the walls of the small intestine goes into our blood.

Assimilation:

- The blood carries digested and dissolved food to all the parts of the body where it becomes assimilated as part of the cells and is utilized for obtaining energy, building up new tissues, and the repair of old tissues.

Egestion:

- The unabsorbed food is sent into the large intestine where more villi absorb water from this material.
- The rest of the material is removed from the body via the anus.
- The exit of this waste material is regulated by the anal sphincter.

Digestion in grass-eating animals

- Buffaloes and other grass-eating animals swallow grass and store it in a separate part of the stomach called **Rumen.** These animals have a complicated stomachs**.**
- In the **rumen,** food is partially digested and is called **cud.**
- Later cud returns to the mouth in small lumps and the animals chew it. This process is called **rumination** and these animals are called **ruminants.**

  The grass is rich in cellulose and we humans cannot digest it.