CBSE Class 7 Science Notes Chapter 2 Nutrition in Animals

All animals require food for obtaining energy, growth, repair of damaged parts and functioning of the body. The process of taking food by an animal and its utilisation in the body is called animal nutrition.

Plants can prepare their own food by the process of photosynthesis but animals get their food from plants, either directly by eating plants or indirectly by eating other animals that eat plants. Some animals eat both plants and other animals.

Animal nutrition includes nutrient requirements mode of intake of food and its utilisation in the body.

The components of food such as carbohydrates are complex substances which cannot be utilised by the body. So, they are broken down into simpler substances. The process of breakdown of complex components of food into simpler substances is called digestion. There are two methods of digesting food, i.e. physical method (including chewing and grinding of food in mouth) and chemical method (addition of digestive juices to the food by the body itself).

Different Ways of Taking Food
Different types of animals show different modes of nutrition. Some animals filter tiny food particles and feed upon them, while some swollen the animals they prey upon. The mode of nutrition in different animals depends upon the special structure or organ for taking food inside the body.

Various modes of feeding in different Animals

Name of the animal	Kinds of food	Modes of feeding
Snail	Algae	Scraping from rocks
Ant	Plant material and other animals	Biting and chewing
Eagle	Flesh of prey	Tearing
Humming Bird	Nectar from flower	Sucking
Lice	Blood from the skin of scalp	Sucking
Mosquito	Blood from animals	Sucking
Butterfly	Nectar from flower	Syphoning
Housefly	Filth and refuses	Sucking
Amoeba	Tiny aquatic animals	Capturing and Swallowing
Snake (Python)	Animal as a whole	Swallowing

Starfish
It is a marine animal which is covered by hard shells of calcium carbonate. It has a unique mode of nutrition. It opens

the shell of its prey and pops out its stomach through its mouth surrounding the soft body of its prey. The starfish after capturing its prey brings bach its stomach inside its own body. This food is then digested slowly by starfish.

Digestion in Humans

The food components pass through a continuous canal and get digested in each compartment. This is called an alimentary canal, it is 'the tract or canal running from mouth to anus of human being where digestion and absorption of food take place.'

The alimentary canal can be divided into various compartments:

- The buccal cavity
- Food pipe or oesophagus
- Stomach
- Small intestine
- Large intestine ending in the rectum
- The anus

The main digestive glands which secrete digestive juices are

- salivary gland
- liver
- pancreas

Various processes involved in utilisation of food in humans are

- The process of taking food into the body is called ingestion.
- The process by which the food containing large insoluble substances is broken down into small water-soluble substances is called digestion. There are two methods of digesting food, i.e. physical method (including chewing and grinding of food in mouth) and chemical method (addition of digestive juices to the food by the body itself).
- The process by which the digested food passes through the intestinal wall into the bloodstream is called absorption.
- The process by which the absorbed food is taken in body cells and used for energy, growth and repair is called assimilation.
- The process by which the undigested food is removed from the body is called egestion.

Carbohydrates, fats and proteins are large insoluble substances which cannot pass through the walls of our intestine and get absorbed in that form. Therefore, these substances are broken down into small water-soluble substances. This is done by the process of digestion.

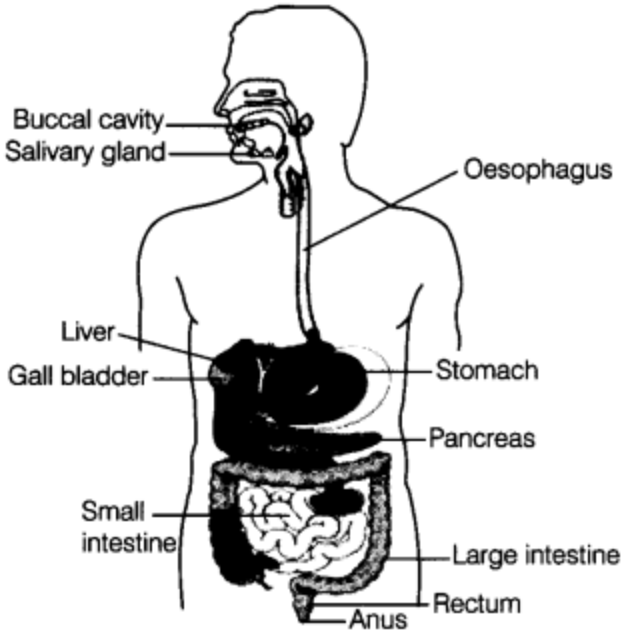
The carbohydrates get broken down into simple sugar called glucose, while fats in fatty acid and glycerol and proteins get broken down into amino acids during digestion. These simpler compounds are easily absorbed by the walls of small intestine into the blood.

Human Digestive System

The system that consists of the digestive tract along with glands is called the digestive system. Now, let us know what happens to the food in different parts of the digestive tract.

1. Mouth and Buccal Cavity

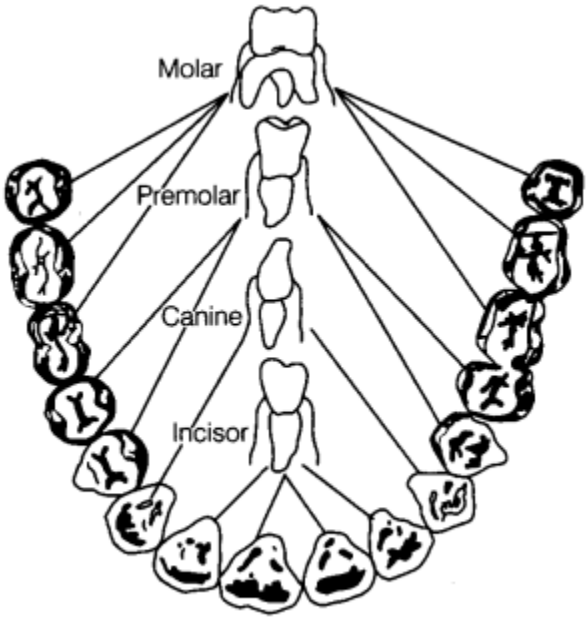
The process of ingestion starts from the mouth or buccal cavity. As we ingest, food the salivary glands present in the mouth start its digestion. The teeth present in the buccal cavity cut the food into small pieces by chewing and grinding it. Salivary glands secrete a watery liquid, saliva. This saliva contains digestive enzymes which help in partial digestion of food (starch). The tongue helps in mixing saliva with food. This partially digested food is swallowed by the tongue and passed down to oesophagus or food pipe.



Digestive system of human

Teeth

The food is cut by the teeth inside the mouth. Teeth mechanically break the food into small pieces. These teeth vary in appearance. Each tooth is rooted in a separate socket in the gums.



Types and arrangement of teeth

There are four types of teeth:

- Incisors These are four chisel-shaped incisors at centre of each jaw for biting and cutting the food.
- Canines These are two large pointed teeth just behind incisors in each jaw, for piercing and tearing the food.
- Premolars These are four (two on each side) large premolars with the flat surface behind the canines in each jaw, for grinding and chewing.
- Molars In an adult, these are six (three on each side) large molars with the flat surface behind the premolars in each jaw, for grinding.

Milk Teeth and Permanent Teeth

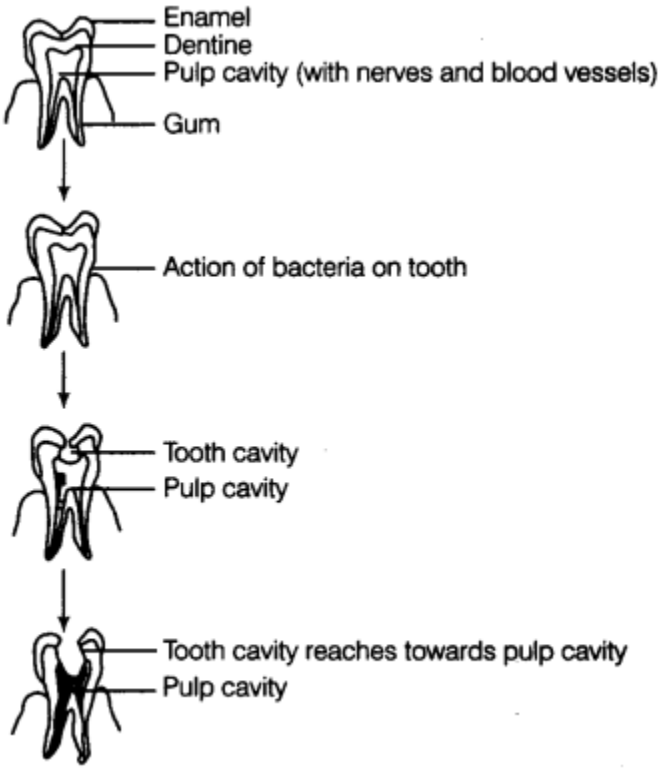
In human beings, teeth grow twice. The sets of teeth that grow during infancy (when one is a small baby), are called milh teeth. These are also called as temporary teeth. These teeth get loosen and fall off at the age of 6-8 years. When milh teeth fall off, a new sets of teeth grow in their place. This second set of teeth is called permanent teeth because these remain till the old age. But if these teeth fall down, no new teeth arise on its place.

Sweets and Tooth Decay

The tooth is covered by white, hard outer covering of tooth called enamel below which dentine is present. It is similar to bone which protects the pulp cavity having nerves and blood vessels. Bacteria are present in our mouth but they are not harmful to us. However, if we do not clean our teeth and mouth after eating, many harmful bacteria also begin to live and grow in it. These bacteria breakdown the sugars present from the leftover food and release acids. The acids gradually damage the teeth. This is called tooth decay.

Therefore, tooth decay is defined as the process of rotting of tooth and formation of cavity or holes in it which leads to the toothache.

When the holes or cavity reaches to the pulp cavity, it causes pain. If these cavities are not treated on time it causes severe toothache and may result in tooth loss.



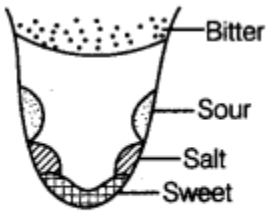
Gradual decaying of human tooth

Tooth decay can be prevented by adopting the following measures.

- One should rinse and clean its teeth thoroughly after every meal.
- We should clean our teeth with the help of datun or brush and toothpaste, twice a day.
- We should use dental floss which is a special strong thread. It is moved between two teeth to take out trapped food particles.
- Dirty fingers or unwashed objects must be avoided to put in the
- We should avoid the use of sweets, chocolates, toffees, ice-cream, be avoided.

Tongue

It is a muscular organ attached at the back to the floor of the buccal cavity. It is free from the front and can help in mixing saliva with the food, swallowing the food, talking or speaking and tasting with the help of taste buds for sweet, salt, sour and bitter food. Salivary glands secrete saliva which breaks down starch into sugars.

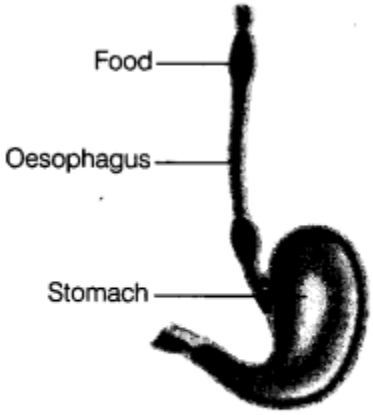


A tongue showing different regions for taste buds

2. The food pipe or Oesophagus

It is the tube-like structure which connects the mouth to the stomach and runs along neck and chest. It carries slightly digested food from the mouth to the stomach. Food is pushed downward by a wave like movement of the wall of foodpipe as a result of alternate contraction and relaxation. This movement is called peristalsis.

The chewed food that enters the oesophagus from mouth and is passed down to stomach is called bolus. Sometimes, food is not accepted by our stomach and is vomited out because the food moves in the opposite direction, i.e. from stomach to mouth by anti-peristaltic movement in oesophagus.



Movement of food in oesophagus

Our windpipe (that carries air from nostril to our lungs) and foodpipe runs adjacent to each other. Air and food share a common passage in the throat. When we swallow food, a flap-like valve closes the passage of the windpipe and guides the food into the foodpipe. But if we laugh or talk while eating, the windpipe remains open and food particle enters into the windpipe and we experience hiccups, cough or choking si characteristic ‘gulping sound’ repeatedly and coughing clears the blockage of windpipe

3. The Stomach

The stomach was first discovered by an American doctor William Beaumont in 1822 accidentally in the man named Alexis St. Martin. It is a thick walled bag-like structure which is present on the left side of the abdomen. Its shape is like flattened U and it is the widest part of the alimentary canal. The semi-digested food from oesophagus enters into stomach where further digestion takes place.

The churning of food into stomach takes place for three hours. The food is broken down into smaller pieces and forms semi-solid paste. The inner lining of stomach secretes mucus, hydrochloric acid and digestive enzymes or juices. The function of mucus is to protect the lining of stomach from the action of hydrochloric acid. The secretion of hydrochloric acid makes the medium acidic inside the stomach. It kills the harmful bacteria present in the food and also helps in the digestion of proteins in the stomach. The partially digested food which moves from stomach to the small intestine is called chyme.

4. The Small Intestine

It is highly coiled long tube with length of about 7.5 metres. The small intestine is a narrow tube which receives secretions from the liver and pancreas. The wall of small intestine also secretes digestive juices. The complete digestion of food takes place inside the small intestine and the food components are also absorbed here.

The largest gland of the body, i.e. liver is the reddish-brown coloured gland, situated in the upper part of the abdomen on the right side. It secretes bile juices which is stored in a sac-like structure called as gall bladder. The bile helps in the digestion of fats. It breaks the fat molecules into tiny droplets so that its further breakdown into simpler compounds, becomes easy. The complete digestion of fats is done by pancreatic juice.

The pancreas is a large cream coloured gland which is located just below the stomach and secretes pancreatic juices. It breaks down fats into simpler compounds like fatty acid and glycerol, carbohydrate into simple sugars and proteins into simpler amino acids. The intestinal juices secreted by the walls of small intestine also help in the digestion of carbohydrate and proteins into simpler and water soluble substance. Now, the food is said to be digested. This digested food is now absorbed by the walls of small intestine.

Absorption in the Small Intestine

The blood vessels in the walls of the intestine absorb the digested and water soluble substance to produce energy for growth and development of animals. The inner walls of small intestine have thousands of finger-like outgrowths called villi. These villi help in increasing the surface area of small intestine for the absorption of digested food. Villi possess a network of thin and small blood vessels close to its surface. These blood vessels absorb the digested food material and transport it to the different organs of the body where these are used to build repair the body and to provides energy.

The glucose breaks down into carbon dioxide and water and releases huge amount of energy with the help of oxygen inside the cell. Fatty acid and glycerol help in building the component of cells and form fats which is stored in the body as food reserve while amino acid is used in growth and repair of the body. The undigested food material is not absorbed by the small intestine and it passes from here to the large intestine.

5. Large Intestine

It is a 1.5-meter long tube. It is wider and shorter than the small intestine. The undigested semi-solid food is passed from small intestine to large intestine. The large intestine absorbs water and salt from the undigested food. The remaining waste material then passes to the rectum and remains there for some time in the form of semi-solid faeces. This waste faecal matter is then removed through the anus from the body by the process called egestion.

Diarrhoea

It is a condition in which a person passes out watery stools frequently. It is a disease which is caused by an infection, food poisoning or indigestion. It usually occurs In children and may be fatal. In this condition, there is a loss of water and salts from the body of a person through frequent watery stools. This loss of water from the body of a person through watery stool is called dehydration and it may be fatal under severe conditions. Diarrhoea should never be neglected. In order to prevent dehydration, the person suffering from diarrhoea should be given a solution of sugar and salt in the clean water for several times in a day.

This solution is called Oral Rehydration Solution (ORS). The ORS makes up the loss of water and salt in the body and sugar provides energy which helps in the recovery of disease. The dehydration of body can be prevented during diarrhoea by giving ORS solution regularly to the patients. In the mean time, the doctors should be called for medicines to cure of diarrhoea.

Digestion in Grass-Eating Animals

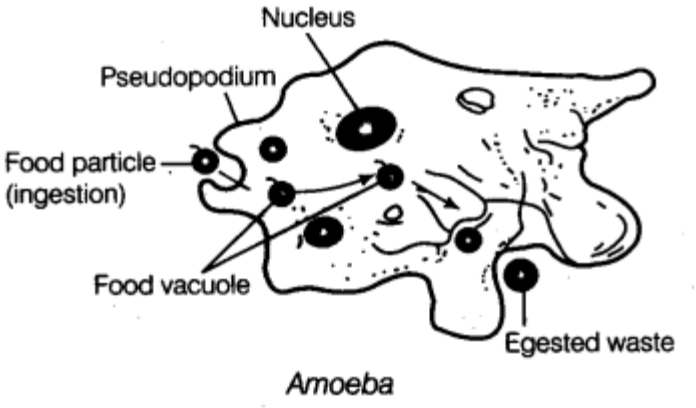
The herbivorous animals such as cow, buffaloes, etc eat grass. These animals quickly swallow the grass and store it in a part of stomach called rumen. The food is not chewed completely. Rumen possess cellulose digesting bacteria which breakdown the food by fermentation. This partially digested food or grass present in the rumen of cow is called cud.

This cud is brought back into the mouth of the cow from the rumen into small lumps and animal chews it again. This process is called rumination and animals are called ruminants.

When this cud is thoroughly chewed in the mouth of the cow, it is swallowed again. This time the chewed cud does not go back to rumen but enter into the other compartments of cow's stomach and then into the small intestine for complete digestion and absorption of food. The cellulose digesting bacteria are not present in the body of human being, therefore human beings and other carnivore cannot digest cellulose present in plant food items.

Feeding and Digestion in Amoeba

Amoeba is a microscopic single-celled organism, which is found in pond water. It is a very simple animal and cannot be seen by naked eyes. Amoeba has a cell membrane, a rounded dense nucleus and many small bubble-like vacuoles in its cytoplasm. These vacuoles are of two types, i.e. food vacuole and contractile vacuole. Food vacuole contains food surrounded by water while contractile vacuole contains liquid or water and controls water regulation activity in Amoeba. Its shape is not fixed, i.e. it constantly changes its shape and position. The body of Amoeba has finger-like projections, called pseudopodia or false feet. It captures food and helps in locomotion of Amoeba.



Amoeba

The food of Amoeba are microscopic organisms like tiny plants and animals present in pond water. When Amoeba senses its food, it pushes out pseudopodia around the food particle and engulfs it. The two pseudopodia join around the food particle and trap the food particle with a little water forming vacuole around food, thus the food gets trapped. Digestive juices present inside the vacuole, acts on the food and break it into simpler substances. This digested food is then absorbed and is used for growth, maintenance and multiplication of Amoeba. The undigested food residue is expelled outside by the vacuole. The basic process of digestion of food and release of energy is as similar to the other organisms.