Different Ways Of Taking Food

Nutrition in Animals

Animals cannot prepare their own food like plants do through photosynthesis. They obtain food by consuming plants or other animals. Some animals eat both plants and animals. Nutrition in animals involves the requirement of nutrients, the mode of food intake, and how the food is utilized in the body.

Modes of Feeding

Different animals have different ways of taking food. For example, bees and hummingbirds suck nectar, infants feed on mother's milk, snakes swallow prey whole, and some aquatic animals filter tiny food particles. Modes of feeding include scraping, chewing, siphoning, capturing and swallowing, sponging, and sucking.

Examples of Feeding Modes

Animals like snails scrape food, ants chew, butterflies siphon nectar, eagles capture and swallow prey, houseflies sponge liquids, and mosquitoes suck blood or plant juices.

Special Feeding Adaptations

Starfish feed on animals with hard shells by opening the shell and extending their stomach outside the body to digest the soft parts before pulling the stomach back in.

Solved Examples

Practice Set

- **Level 1:** Name two animals that use sucking as their mode of feeding.
- **Level 2:** Explain how a starfish feeds on shelled animals.
- **Level 3:** Compare the feeding modes of a butterfly and a housefly and explain how their mouthparts are adapted to their feeding habits.

Answer Key

- **Level 1:** Mosquito and butterfly use sucking as their mode of feeding.
- **Level 2:** Starfish opens the hard shell of its prey and extends its stomach out through its mouth to digest the soft body inside. After digestion, the stomach is pulled back into the body.
- **Level 3:** Butterflies use siphoning mouthparts to suck nectar from flowers, while houseflies use sponging mouthparts to soak up liquid food. Their mouthparts are specialized for their respective feeding methods.

Digestion In Humans

Human Digestive System

Food enters the body through the mouth and passes through a continuous alimentary canal ending at the anus. The canal includes the buccal cavity, oesophagus, stomach, small intestine, large intestine, rectum, and anus. Digestive glands like salivary glands, liver, and pancreas secrete digestive juices that break down complex food substances into simpler forms.

Alimentary Canal and Digestive Glands

The alimentary canal is a long tube where digestion occurs. The salivary glands produce saliva that begins carbohydrate digestion. The stomach secretes acid and enzymes to digest proteins. The liver produces bile to aid fat digestion, stored in the gall bladder. The pancreas secretes enzymes for digesting carbohydrates, proteins, and fats. The small intestine completes digestion and absorbs nutrients, while the large intestine absorbs water and salts.

Process of Digestion

Digestion involves ingestion, mechanical and chemical breakdown of food, absorption of nutrients, assimilation, and egestion of waste. The food is gradually digested as it moves through the digestive tract.

Solved Examples

Practice Set

- **Level 1:** Name the parts of the human alimentary canal.
- **Level 2:** Describe the role of the liver in digestion.
- **Level 3:** Explain how the small intestine is adapted for absorption.

Answer Key

- **Level 1:** Buccal cavity, oesophagus, stomach, small intestine, large intestine, rectum, anus.
- **Level 2:** The liver produces bile which helps in the digestion of fats by emulsifying them, making it easier for enzymes to act.
- **Level 3:** The small intestine has villi, finger-like projections that increase surface area for absorption. Each villus contains blood vessels to transport absorbed nutrients.

Mouth And Buccal Cavity

Teeth and Their Functions

Humans have two sets of teeth: milk teeth and permanent teeth. Teeth vary in shape and function: incisors cut food, canines tear food, premolars and molars crush and grind food. Teeth are rooted in sockets in the gums.

Saliva and Digestion

Saliva contains the enzyme amylase which begins the digestion of starch into sugars in the mouth. Chewing breaks food into smaller pieces, mixing it with saliva for easier swallowing and digestion.

Tongue and Taste

The tongue helps in mixing food with saliva, swallowing, and tasting. Different regions of the tongue detect sweet, sour, salty, and bitter tastes through taste buds.

Oral Hygiene and Tooth Decay

Improper cleaning of teeth leads to bacterial growth that produces acids, causing tooth decay. Regular brushing, flossing, and avoiding excessive sugary foods help prevent decay.

Solved Examples

Practice Set

- **Level 1:** What are the four types of teeth and their functions?
- **Level 2:** How does saliva aid digestion?
- **Level 3:** Explain the process and importance of maintaining oral hygiene.

Answer Key

- **Level 1:** Incisors (cutting), canines (tearing), premolars (crushing), molars (grinding).
- **Level 2:** Saliva contains amylase which breaks down starch into sugars, starting digestion in the mouth.
- **Level 3:** Oral hygiene prevents bacterial growth that causes tooth decay. Brushing and flossing remove food particles and plaque, protecting teeth and gums.

Digestion In Grass-Eating Animals

Ruminants and Rumination

Grass-eating animals like cows and buffaloes are ruminants. They swallow grass quickly into the rumen where it is partially digested. Later, they regurgitate the cud and chew it thoroughly. This process is called rumination.

Role of Microorganisms

Bacteria in the rumen help digest cellulose, a carbohydrate found in grass, which many animals including humans cannot digest. Some animals have a caecum where cellulose digestion occurs with bacterial help.

Digestive System Adaptations

Ruminants have a multi-chambered stomach specialized for fermenting and digesting plant material. This allows them to extract nutrients from fibrous food.

Solved Examples

Practice Set

- **Level 1:** What is rumination?
- **Level 2:** How do bacteria help in digestion in ruminants?
- **Level 3:** Compare the digestion of cellulose in ruminants and humans.

Answer Key

- **Level 1:** Rumination is the process where ruminants regurgitate partially digested food (cud) and chew it again.
- **Level 2:** Bacteria in the rumen ferment cellulose, breaking it down into simpler substances that the animal can absorb and use.
- **Level 3:** Ruminants digest cellulose with the help of bacteria in the rumen, while humans lack these bacteria and cannot digest cellulose.

Feeding And Digestion In Amoeba

Structure of Amoeba

Amoeba is a single-celled organism with a cell membrane, nucleus, and vacuoles. It moves and feeds using pseudopodia, which are temporary projections of the cell.

Mode of Feeding

Amoeba captures food by surrounding it with pseudopodia, forming a food vacuole where digestion occurs. Digestive enzymes break down the food inside the vacuole.

Digestion and Egestion

After digestion, nutrients are absorbed into the cytoplasm for use. Undigested waste is expelled from the cell.

Solved Examples

Practice Set

- **Level 1:** What are pseudopodia?
- **Level 2:** Describe how Amoeba digests its food.
- **Level 3:** Explain the importance of food vacuoles in Amoeba.

Answer Key

- **Level 1:** Pseudopodia are temporary finger-like projections of the Amoeba used for movement and capturing food.
- **Level 2:** Amoeba engulfs food with pseudopodia forming a food vacuole where enzymes digest the food into simpler substances.
- **Level 3:** Food vacuoles contain digestive enzymes that break down food, allowing Amoeba to absorb nutrients and survive as a single-celled organism.

Quick Reference Table

Key Terms and Functions

- **Ingestion:** Taking in food through the mouth.
- **Digestion:** Breaking down complex food into simpler substances.
- **Absorption:** Nutrients passing into the blood from the intestine.
- **Assimilation:** Use of absorbed nutrients by body cells.
- **Egestion:** Removal of undigested waste as faeces.
- **Ruminants:** Animals with a multi-chambered stomach that chew cud.
- **Pseudopodia:** Extensions of Amoeba used for movement and feeding.
- **Saliva:** Contains amylase enzyme that starts starch digestion.
- **Villi:** Finger-like projections in the small intestine that increase absorption surface area.

Common Mistakes and Misconceptions

- Thinking all animals can make their own food like plants.
- Confusing the functions of different types of teeth.
- Believing digestion only happens in the stomach.
- Assuming all animals digest cellulose like ruminants.
- Not understanding that Amoeba digests food inside the cell, not externally.

Glossary

- **Alimentary Canal:** The continuous passage through which food passes in animals.
- **Amylase:** An enzyme in saliva that breaks down starch.
- **Cellulose:** A complex carbohydrate found in plant cell walls.
- **Food Vacuole:** A sac in Amoeba where food is digested.
- **Milk Teeth:** The first set of teeth in humans that fall out during childhood.
- **Permanent Teeth:** The second set of teeth that replace milk teeth.
- **Rumen:** The first stomach compartment in ruminants where fermentation occurs.
- **Villi:** Small projections in the small intestine that absorb nutrients.