

30.3 The Digestive System

Lesson Objectives

- Describe the organs of the digestive system and explain their functions.
- Explain what happens during digestion.
- Describe how nutrients are absorbed into the bloodstream and wastes are eliminated from the body.

Lesson Summary

Functions of the Digestive System The digestive system converts food into small molecules that can be used by body cells. Food is processed by the digestive system in four phases: ingestion, digestion, absorption, and elimination.

- Ingestion is the process of putting food into your mouth.
- Mechanical digestion** is the physical breakdown of large pieces of food into smaller pieces. During **chemical digestion**, enzymes break down food into molecules the body can use.
- Food molecules are absorbed into the circulatory system by cells in the small intestine.
- Materials the body cannot digest travel through the large intestine and are eliminated as feces.

The Process of Digestion During digestion, food travels through the mouth, esophagus, stomach, and small intestine.

- Mechanical digestion begins as teeth tear and grind food. Saliva contains **amylase**, an enzyme that breaks down starches into sugars. This begins the process of chemical digestion. Once food is chewed, it is pushed into the pharynx.
- The tube leading from the pharynx to the stomach is called the **esophagus**. Contractions of smooth muscles, called **peristalsis**, move food through the esophagus to the **stomach**, a large muscular sac that continues digestion.
 - Glands in the stomach lining release hydrochloric acid and the enzyme **pepsin**, which breaks proteins into smaller polypeptide fragments.
 - Contractions of stomach muscles churn the stomach contents, which forms **chyme**, a mixture with an oatmeal-like consistency.
- As chyme moves out of the stomach, it enters the duodenum, the uppermost portion of the **small intestine**. Here, digestive fluids from the pancreas, liver, and lining of the duodenum are added to the chyme.

Absorption and Elimination Most nutrients from food are absorbed by the small intestine. The large intestine absorbs water and prepares waste for elimination from the body.

- The small intestine has fingerlike projections (**villi**) that are covered with microvilli, which absorb nutrients. Most nutrients are absorbed into the blood, but fats are absorbed into the lymph.
- When chyme leaves the small intestine, it enters the **large intestine**, or colon. The large intestine absorbs water and some vitamins that are produced by bacteria in the large intestine. The remaining waste material leaves the body through the anus.

Functions of the Digestive System

1. What is the function of the organs of the digestive system?

2. What are the four phases of digestion?

3. What is mechanical digestion?

4. How do absorbed food molecules travel to the rest of the body?

The Process of Digestion

Write the letter of the correct answer on the line at the left.

_____ 5. Where does chemical digestion begin?

A. the stomach

C. the mouth

B. the small intestine

D. the esophagus

_____ 6. Saliva eases the passage of food through the digestive system and contains

A. amylase.

C. sodium bicarbonate.

B. pepsin.

D. bile.

_____ 7. Which is the correct order of passage of food through the digestive system?

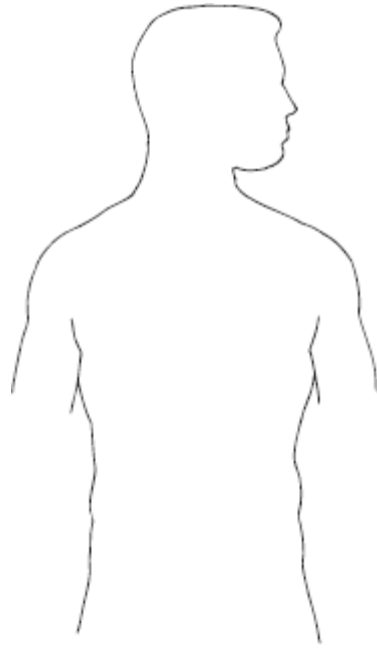
A. mouth, stomach, esophagus, large intestine, small intestine

B. mouth, stomach, esophagus, small intestine, large intestine

C. mouth, esophagus, stomach, small intestine, large intestine

D. mouth, esophagus, stomach, large intestine, small intestine

10. Draw and label the digestive system. Include the salivary glands, mouth, epiglottis, esophagus, stomach, liver, gallbladder, small intestine, and large intestine.



Absorption and Elimination

For Questions 11–16, complete each statement by writing the correct word or words.

11. The folded surface and fingerlike projections of the _____ provide a large surface area for absorption of nutrient molecules.
12. The fingerlike projections are called_____.
13. Capillaries in the villi absorb the products of_____and_____digestion.
16. Once chyme leaves the small intestine, it enters the large intestine, or_____.
17. The small intestine is longer than the large intestine. How did the large intestine get its name?
- _____
- _____
18. What is the primary function of the large intestine?
- _____
- _____
19. What happens to waste materials when they leave the colon?
- _____
- _____
20. What role does the large intestine play in maintaining homeostasis?
- _____
- _____
- _____
- _____