

DIRECTIONS: READ THE TEXT AND COMPLETE THE 5 QUESTIONS BELOW.
HIGHLIGHT KEY TERMS AND ANNOTATE KEY IDEAS AS YOU READ.
THIS IS YOUR ATTENDANCE AND IS DUE BY THE END OF THE LESSON.

1. What is the function of the digestive system?
2. What is chemical digestion?
3. Why must mechanical digestion start before chemical digestion?
4. Which organ does food pass through after leaving the mouth?
5. Look at figure 14: Trace the path of food through the digestive system. Make a list of each organ starting from the beginning till the end.

The Digestive Process Begins”

1 In 1822, a man named Alexis St. Martin was wounded in the stomach. Dr. William Beaumont saved St. Martin's life. The wound, however, left an opening in St. Martin's stomach that never healed completely. Beaumont realized that by looking through the opening in St. Martin's abdomen, he could observe what was happening inside the stomach. Beaumont observed that food changed chemically inside the stomach. He hypothesized that chemical reactions in the stomach broke down foods into smaller particles. Beaumont removed liquid from St. Martin's stomach and analyzed it. The stomach liquid contained an acid that played a role in the breakdown of foods into simpler substances.

Functions of the Digestive System

2 Beaumont's observations helped scientists understand the role of the stomach in the digestive system. The digestive system has three main functions. First, it breaks down food into molecules the body can use. Then, the molecules are absorbed into the blood and carried throughout the body. Finally, wastes are eliminated from the body. Figure 14 shows the organs of the digestive system, which is about 9 meters long from beginning to end.

What is chemical digestion?

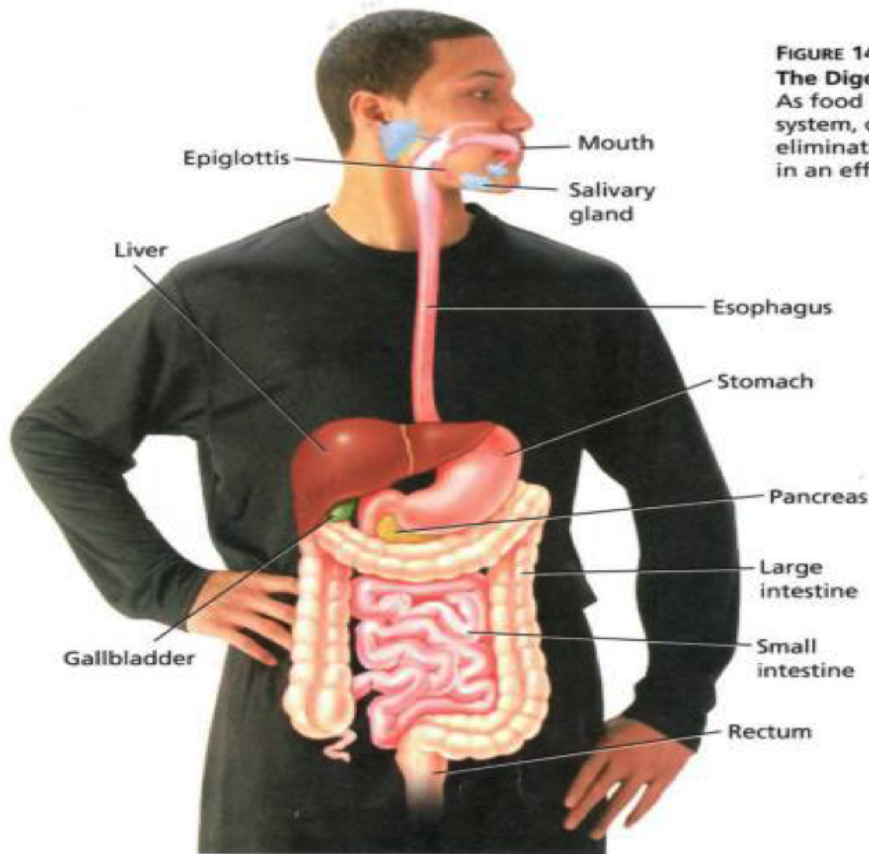


FIGURE 14

The Digestive System

As food moves through the digestive system, digestion, absorption, and elimination occur one after the other in an efficient, continuous process.

Digestion

3 The process by which your body breaks down food into small nutrient molecules is called digestion. There are two kinds of digestion – mechanical and chemical. In mechanical digestion, foods are physically broken down into smaller pieces. Mechanical digestion occurs when you bite into a sandwich and chew it into small pieces. In chemical digestion, chemicals produced by the body break foods into their smaller chemical building blocks. For example, the starch in bread is broken down into individual sugar molecules.

Absorption and Elimination

4 After your food is digested, the molecules are ready to be transported throughout your body. Absorption (ab SAWRP shun) is the process by which nutrient molecules pass through the wall of your digestive system into your blood. Materials that are not absorbed, such as fiber, are eliminated from the body as wastes.

The Mouth

5 Have you ever walked past a bakery or restaurant and noticed your mouth watering? Smelling or even just thinking about food when you're hungry is enough to start your mouth watering. This response isn't accidental. When your mouth waters, your body is preparing for the delicious meal it expects. Both mechanical and chemical digestion begin in the mouth. The fluid released when your mouth waters is saliva (suh-LY-vuh). Saliva plays an important role in both kinds of digestion.

Mechanical Digestion in the Mouth

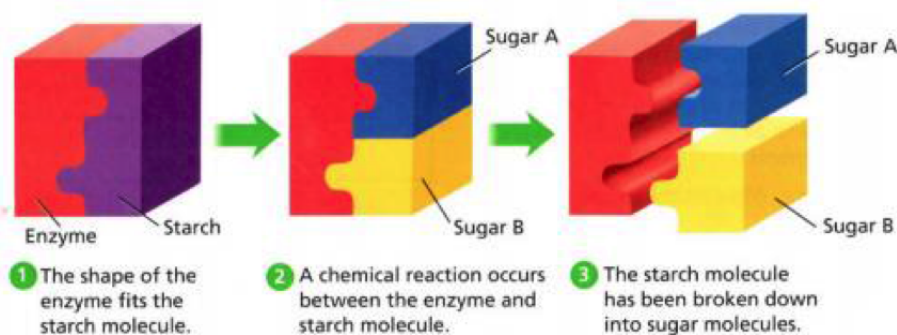
6 Your teeth carry out the first stage of mechanical digestion. Your center teeth, or incisors (in SY zurz), cut the food into bite-sized pieces. On either side of the incisors there are sharp, pointy teeth called canines (KAY nynz). These teeth tear and slash the food into smaller pieces. Behind the canines are the premolars and molars, which crush and grind the food. As the teeth do their work, saliva moistens the pieces of food into one slippery mass.

Chemical Digestion in the Mouth

7 As mechanical digestion begins, so does chemical digestion. If you take a bite of a cracker and suck on it, the cracker begins to taste sweet. It tastes sweet because a chemical in the saliva has broken down the starch molecules in the cracker into sugar molecules.

8 The chemical in saliva that digests starch is an enzyme. Enzymes are proteins that speed up chemical reactions in the body. Your body produces many different enzymes. Each enzyme has a specific chemical shape. Its shape enables it to take part in only one kind of chemical reaction. An example of enzyme action is shown in Figure 16.

FIGURE 16
How Enzymes Work
The shape of an enzyme molecule is specific to the shape of the food molecule it breaks down. Here, an enzyme breaks down a starch into sugars.



The Esophagus

9 If you've ever choked on food, your food may have "gone down the wrong way." That's because there are two openings at the back of your mouth. One opening leads to your windpipe, which carries air into your lungs. As you swallow, a flap of tissue called the epiglottis (ep uh GLAHT is) seals off your windpipe preventing the food from entering. The food goes into

the esophagus (ih SAHF uh gus), a muscular tube that connects the mouth to the stomach. The esophagus is lined with mucus, a thick, slippery substance produced by the body. Mucus makes food easier to swallow and move along.

10 Food remains in the esophagus for only about 10 seconds. After food enters the esophagus, contractions of smooth muscles push the food toward the stomach. These involuntary waves of muscle contraction are called peristalsis (pehr ih STAWL sis). Peristalsis also occurs in the stomach and farther down the digestive system. These muscular waves keep food moving in one direction.