Teach, *continued*

Answers to Caption Questions

Figure 11: the diameter relative to the small intestine

READING TOOLBOX

Key Term Fold Check students' work for accuracy. Ask students to also include definitions for the subheads, such as Chemical Digestion and Mechanical Digestion. LS Verbal

Math Skills

Graphing Provide students with the following average lengths of the digestive organs: esophagus, 25 cm; stomach, 25 cm; small intestine, 6 m; and large intestine, 1.5 m. Then have students prepare a bar graph to compare the average lengths of these organs. LS Logical

Close

Formative Assessment

The enzyme pepsin is involved in the digestion of _____.

A. starches (Incorrect. Starches are digested by amylase enzymes.)

B. fats (Incorrect. Fats are digested by lipases.)

C. monosaccharides (Incorrect. Monosaccharides are already broken down into absorbable units.)

D. proteins (Correct! Proteins are digested by the enzyme pepsin.)



Figure 11 Stretched out, the large intestine, which appears orange in this X ray, is about 1 m (3.3 ft) long. **What does *large* refer to in this organ?**

READING TOOLBOX

Key-Term Fold On the back of your key-term fold, write a definition in your own words for the key terms in this section.

Removing Waste

A large volume of food, drink, and secretions flows through the digestive system each day. But a small amount of material leaves the body as waste. Almost all of the fluids and solids are absorbed during their passage through the small intestine. After three to six hours in the small intestines, the remaining components of food move into the large intestine. No digestion takes place in the large intestine, but mineral ions and water are absorbed through its wall.

Large Intestine The diameter of the large intestine is about three times the diameter of the small intestine. The large intestine, including the colon and the rectum, would be about 1 m (3.3 ft) long if it were stretched out. It is not coiled like the small intestine. As **Figure 11** shows, the colon is composed of three relatively straight segments.

Most of the large intestine's contents are dead cells, mucus, digestive secretions, bacteria, and yeast. In humans, a thriving colony of bacteria live in the colon. These microbes synthesize vitamin K and several B vitamins, which your body cannot easily get from food. Bacteria also help transform and compact undigested materials into feces, the final waste product.

The final segment of the large intestine is the rectum. Solids pass into the rectum as a result of peristalsis in the large intestine. From the rectum, the solid feces are eliminated from the body through the anus. **All components of food that are not absorbed leave the body as wastes.** Undigested material passes through the large intestine and is expelled through the anus in 12 to 24 hours.

Water Balancing water absorption in the intestine is important. Diarrhea (watery feces) occurs when wastes rush through the large intestine before the remaining water can be absorbed. Diarrhea can lead to dehydration. Constipation (hard feces) results when food remains in the colon for a long period of time, and so too much water is absorbed from food. Hard feces are difficult to pass.

Reading Check ***What are the contents of the large intestine?***

Section 2 Review

KEY IDEAS

1. **Explain** the purpose of the digestive system.
2. **Distinguish** between the chemical digestion that occurs in the mouth and in the stomach.
3. **Describe** the role of the small intestine.
4. **Compare** the structure and function of the small intestine with those of the large intestine.

CRITICAL THINKING

5. **Recognizing Relationships** How would the inability to make saliva affect digestion?
6. **Applying Information** How would a person's diet change after an operation to remove the gallbladder? Explain your answer.

WRITING FOR SCIENCE

7. **Report** It was once believed that stress and spicy foods caused ulcers. Recently, scientists found that the bacterium *Helicobacter pylori* causes of up to 90% of all ulcers. Research how *H. pylori* can cause ulcers to form and how these ulcers can be treated.

Answers to Section Review

1. to take in food, break it down into molecules the body can use, and get rid of waste
2. Amylase in saliva breaks down starch into simple sugars. Pepsin in gastric juice breaks down proteins into peptide chains.
3. Digestion is completed in the duodenum. Absorption of nutrients occurs in the rest of the small intestine.
4. small intestine: has a smaller diameter, is longer and coiled, and digests and absorbs nutrients; large intestine: has a larger diameter, is shorter with straighter segments, and compacts waste and absorbs water
5. Food would be dry and difficult to swallow. Starchy foods would not taste sweet after chewing because amylase would not be present.
6. It would not change because the gallbladder just stores bile. Bile would still be secreted by the liver, and it would go directly into the small intestine.
7. *H. pylori* burrow into the stomach or duodenum lining and allow acid to get to the tissue below the protective mucous coating. The acid and bacteria irritate the lining, causing an ulcer. Antibiotics are a routine treatment.