Chapter 38 Digestive and Excretory Systems

Section 38–1 Food and Nutrition  (pages 971–977)

Key Concepts

- What are the nutrients your body needs?
- Why is water such an important nutrient?

Food and Energy  (page 971)

1. Cells convert the chemical energy in glucose and other molecules into ________________.

2. The energy stored in food is measured in units called ________________.

3. Is the following sentence true or false? Your body can extract energy from almost any type of food. ________________

4. Besides supplying fuel, what are other important functions of food? ________________

5. What is the study of nutrition? ________________

Nutrients  (pages 972–975)

6. Substances in food that supply the energy and raw materials your body uses for growth, repair, and maintenance are called ________________.

7. List the six nutrients that the body needs.
   a. ________________    d. ________________
   b. ________________    e. ________________
   c. ________________    f. ________________

8. Circle the letter of each sentence that is true about water as a nutrient.
   a. Water is the most important of all nutrients.
   b. Every cell in the human body needs water.
   c. Many of the body’s processes take place in water.
   d. Water makes up the bulk of bodily fluids, including blood.
9. How is water lost from the body?

10. If enough water is not taken in to replace what is lost, ________________
    can result.

11. Complete the concept map.

   ![Concept Map]

12. Why do you need fiber in your diet?

13. Circle the letter of each choice that is a function of fat.
    a. Protecting body organs  c. Storing energy
    b. Insulating the body     d. Transporting oxygen

14. List four increased health risks associated with a diet high in fat.
    a. ________________________  c. ________________________
    b. ________________________  d. ________________________

15. Circle the letter of each choice that is a function of protein.
    a. Supplying raw materials for growth and repair
    b. Making up enzymes
    c. Helping the body absorb certain vitamins
    d. Producing cell membranes

16. The eight amino acids that the body is unable to produce are called
    ____________________ amino acids.
Match each vitamin with its function.

<table>
<thead>
<tr>
<th>Vitamin</th>
<th>Function</th>
</tr>
</thead>
<tbody>
<tr>
<td>17</td>
<td>A</td>
</tr>
<tr>
<td>18</td>
<td>D</td>
</tr>
<tr>
<td>19</td>
<td>E</td>
</tr>
<tr>
<td>20</td>
<td>C</td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td>a.</td>
<td>Preventing cellular damage</td>
</tr>
<tr>
<td>b.</td>
<td>Promoting bone growth</td>
</tr>
<tr>
<td>c.</td>
<td>Repairing tissues and healing wounds</td>
</tr>
<tr>
<td>d.</td>
<td>Promoting growth of skin cells</td>
</tr>
</tbody>
</table>

Match each mineral with a food that supplies it.

<table>
<thead>
<tr>
<th>Mineral</th>
<th>Food</th>
</tr>
</thead>
<tbody>
<tr>
<td>21</td>
<td>calcium</td>
</tr>
<tr>
<td>22</td>
<td>zinc</td>
</tr>
<tr>
<td>23</td>
<td>chlorine</td>
</tr>
<tr>
<td>24</td>
<td>iron</td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td>a.</td>
<td>Table salt</td>
</tr>
<tr>
<td>b.</td>
<td>Dairy products</td>
</tr>
<tr>
<td>c.</td>
<td>Eggs</td>
</tr>
<tr>
<td>d.</td>
<td>Seafood</td>
</tr>
</tbody>
</table>

Nutrition and a Balanced Diet (pages 976–977)

25. Which food category should make up the largest part of your diet? ________________

26. In addition to eating properly, one should try to get at least ________________ minutes of exercise each day.
Name______________________________ Class________________ Date ______________

Section 38–2 The Process of Digestion  
(pages 978–984)

Key Concepts
• What are the organs of the digestive system?
• What is the function of the digestive system?

Introduction  (page 978)
1. What is the function of the organs of the digestive system? __________________________

The Mouth  (pages 978–979)
2. The physical breakdown of large pieces of food into smaller pieces is referred to as __________ digestion.
3. The breakdown of large food molecules into smaller molecules that can be absorbed into the bloodstream is called __________ digestion.
4. Label the drawing of the digestive system with the following structures: mouth, esophagus, stomach, liver, small intestine, and large intestine.
5. What is the role of teeth in digestion? 

The Esophagus (page 980)
Match each term with its definition.

<table>
<thead>
<tr>
<th>Term</th>
<th>Definition</th>
</tr>
</thead>
<tbody>
<tr>
<td>6. bolus</td>
<td>a. Contractions of smooth muscle that aid in swallowing</td>
</tr>
<tr>
<td>7. esophagus</td>
<td>b. Clump of chewed food</td>
</tr>
<tr>
<td>8. peristalsis</td>
<td>c. Food tube connecting the mouth and stomach</td>
</tr>
</tbody>
</table>

9. Is the following sentence true or false? The pyloric valve prevents the contents of the stomach from moving back up into the esophagus. 

The Stomach (pages 980–981)
10. Circle the letter of each sentence that is true about the stomach.
   a. It produces hydrochloric acid.
   b. It produces trypsin.
   c. It helps in the mechanical digestion of food.
   d. It produces amylase.

11. Is the following sentence true or false? Pepsin cannot work under the acidic conditions present in the stomach.

12. A mixture of stomach fluids and food is referred to as 

The Small Intestine (pages 981–982)
13. Where does most chemical digestion take place? 

14. Circle the letter of each sentence that is true about the pancreas.
   a. It produces amylase.
   b. It produces sodium bicarbonate.
   c. Its enzymes help break down lipids and nucleic acids.
   d. It produces lactase.

15. What role does the liver play in digestion? 

16. Bile is stored in a small pouchlike organ called the 

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Use the table to answer the questions.

<table>
<thead>
<tr>
<th>Enzyme</th>
<th>Site of Action</th>
<th>Site of Production</th>
<th>Nutrient Digested</th>
</tr>
</thead>
<tbody>
<tr>
<td>Amylase</td>
<td>Mouth</td>
<td>Salivary glands</td>
<td>Carbohydrate</td>
</tr>
<tr>
<td>Pepsin</td>
<td>Stomach</td>
<td>Lining of stomach</td>
<td>Protein</td>
</tr>
<tr>
<td>Lipase</td>
<td>Small intestine</td>
<td>Pancreas</td>
<td>Fat</td>
</tr>
<tr>
<td>Amylase</td>
<td>Small intestine</td>
<td>Pancreas</td>
<td>Carbohydrate</td>
</tr>
<tr>
<td>Trypsin</td>
<td>Small intestine</td>
<td>Pancreas</td>
<td>Protein</td>
</tr>
<tr>
<td>Lactase</td>
<td>Small intestine</td>
<td>Lining of small intestine</td>
<td>Carbohydrate</td>
</tr>
<tr>
<td>Maltase</td>
<td>Small intestine</td>
<td>Lining of small intestine</td>
<td>Carbohydrate</td>
</tr>
<tr>
<td>Sucrase</td>
<td>Small intestine</td>
<td>Lining of small intestine</td>
<td>Carbohydrate</td>
</tr>
<tr>
<td>Peptidase</td>
<td>Small intestine</td>
<td>Lining of small intestine</td>
<td>Protein</td>
</tr>
</tbody>
</table>

17. Where are the majority of digestive enzymes active? ________________

18. Which organ or gland produces the greatest number of different digestive enzymes? ________________

19. Which digestive enzyme has more than one site of action and production? ____________

20. Which digestive enzymes are active at a site different from the site where they are produced? __________________________________________

21. Which nutrient is digested by more enzymes than any other nutrient? ________________

Absorption in the Small Intestine (pages 982–983)

22. Name the two parts of the small intestine where nutrients are absorbed.
   a. ______________________
   b. ______________________

23. Projections that cover the folds of the small intestine are called ________________.

24. Is the following sentence true or false? Molecules of undigested fat and some fatty acids are absorbed by lymph vessels called lacteals. ________________

25. Is the following sentence true or false? The appendix plays an important role in human digestion. ________________

The Large Intestine (page 984)

26. What is the primary job of the large intestine? ________________

__________________________________________________________________________
27. A hole in the stomach wall is known as a(an) ____________________.

28. When something happens that interferes with the removal of water by the large intestine, a condition known as _________________ results.

Reading Skill Practice

When you read about a complex process, representing the process with a flowchart can help you better understand and remember it. Make a flowchart to show how food travels through the digestive system and is broken down into simpler molecules that the body can use. For more information on flowcharts, see Appendix A of your textbook. Do your work on a separate sheet of paper.
Section 38–3 The Excretory System (pages 985–989)

Key Concepts
• What are the functions of the kidneys?
• How is blood filtered?

Functions of the Excretory System (page 985)
1. The process by which metabolic wastes are eliminated is called ________________.
2. List four organs that are used for excretion.
   a. __________________ b. __________________
   c. __________________ d. __________________
3. List three ways that the kidneys help maintain homeostasis.
   a. __________________
   b. __________________
   c. __________________

The Kidneys (pages 986–988)
4. Circle the letter of each sentence that is true about the kidneys.
   a. They are the main organs of the excretory system.
   b. They are located on either side of the spinal column.
   c. They remove excess water and waste products from the urine.
   d. They receive blood through the renal vein.

Match each term with its definition.

<table>
<thead>
<tr>
<th>Term</th>
<th>Definition</th>
</tr>
</thead>
<tbody>
<tr>
<td>5. ureter</td>
<td>a. Saclike organ where urine is stored</td>
</tr>
<tr>
<td>6. urinary bladder</td>
<td>b. Functional unit of the kidney</td>
</tr>
<tr>
<td>7. renal medulla</td>
<td>c. Outer part of the kidney</td>
</tr>
<tr>
<td>8. renal cortex</td>
<td>d. Tube that carries urine from the kidney to the urinary bladder</td>
</tr>
<tr>
<td>9. nephron</td>
<td>e. Inner part of the kidney</td>
</tr>
</tbody>
</table>

10. Is the following sentence true or false? Nephrons are located in the renal medulla. ________________

11. What ends up in the collecting duct? ___________________________________________________________________

12. List the two processes involved in blood purification.
   a. __________________ b. __________________

13. The small network of capillaries in the upper end of the nephron is referred to as the ________________.

14. The glomerulus is enclosed by a cup-shaped structure called the ________________.
15. Complete the Venn diagram.

\[ \text{Filtration} \quad \text{Reabsorption} \]

\[ \text{Processes that take place in the nephron} \]

16. The materials that are filtered from the blood are collectively called the ________.

17. List six materials that are filtered from blood.
   a. ________
   b. ________
   c. ________
   d. ________
   e. ________
   f. ________

18. Which substances are removed from the filtrate and reabsorbed by the capillaries?

19. What happens during the process of secretion?

20. Circle the letter of each sentence that is true about urine.
   a. It is the material that remains after reabsorption.
   b. It contains only urea and water.
   c. It is concentrated in the loop of Henle.
   d. It is released from the body through the urethra.

**Control of Kidney Function** *(page 988)*

21. How are the activities of the kidneys controlled?

22. Is the following sentence true or false? As the amount of water in the blood increases, the rate of water reabsorption in the kidneys increases. ________________

**Homeostasis by Machine** *(pages 988–989)*

23. Is the following sentence true or false? Humans cannot survive with only one kidney. ________________

24. The removal of wastes from blood using a machine is called ________________.
Nutrients

Carbohydrates, fats, proteins, vitamins, minerals, and water are all nutrients that are important to body functions. Each serves a different function in the body.

*Use the words below to complete the table. The first one has been done for you.*

<table>
<thead>
<tr>
<th>Nutrient</th>
<th>Function in Body</th>
</tr>
</thead>
<tbody>
<tr>
<td>water</td>
<td>essential for many body processes; makes up the bulk of blood, lymph, and other fluids; helps with temperature regulation</td>
</tr>
<tr>
<td></td>
<td>main energy source for the body; some help food and wastes move through digestive system</td>
</tr>
<tr>
<td></td>
<td>material for producing membranes and hormones; help the body absorb some vitamins; protect body organs; insulate the body; store energy</td>
</tr>
<tr>
<td></td>
<td>raw materials for growth and repair; used for regulation and transport</td>
</tr>
<tr>
<td></td>
<td>organic molecules that help regulate body processes</td>
</tr>
<tr>
<td></td>
<td>inorganic nutrients used for making bones, teeth, and hemoglobin; essential in small amounts for other body processes</td>
</tr>
</tbody>
</table>

*Use the table to answer the question.*

1. Which nutrients are needed for growth and repair?
MyPyramid

MyPyramid is a guide to healthful eating. It divides food into six groups. It also suggests how many servings from each group make up a healthful diet.

Use what you know as well as the information in MyPyramid to write the letter of the description that best matches the food group.

<table>
<thead>
<tr>
<th>Description</th>
<th>Food Group</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. This group contains calcium-rich foods. Calcium is needed for bone density and helps maintain normal blood pressure.</td>
<td>a. vegetables</td>
</tr>
<tr>
<td>2. This group provides the best source of protein but also contains fat.</td>
<td>b. fruits</td>
</tr>
<tr>
<td>3. This group contains a wide variety of vegetables and minerals that can reduce the risk of heart disease and cancer.</td>
<td>c. milk</td>
</tr>
<tr>
<td>4. This group contains a variety of nutrients, including vitamin C.</td>
<td>d. meat and beans</td>
</tr>
</tbody>
</table>

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The Digestive System

When you eat food, digestion begins in your mouth. Food then travels through the digestive tract. Other organs, such as the liver and salivary glands, produce secretions that help with digestion but are not part of the digestive tract.

Use the words below to label the diagram.

<table>
<thead>
<tr>
<th>esophagus</th>
<th>mouth</th>
<th>stomach</th>
</tr>
</thead>
<tbody>
<tr>
<td>large intestine</td>
<td>small intestine</td>
<td></td>
</tr>
</tbody>
</table>

Use the diagram to answer the questions.

1. Through which organ does food pass first? Circle the correct answer.

   esophagus       stomach
The Small Intestine

The inner surface of the small intestine is covered with circular folds. The folds are covered with fingerlike projections called villi (singular villus). Each villus holds blood and lymph vessels that absorb nutrients and carry them to the body.

Use the words below to label the diagram.

| capillaries | lymph vessel | villi |

Use the diagram to answer the questions.

1. Where do nutrients enter the bloodstream?

______________________________________

2. How is the surface of the small intestine wall adapted for its function?

______________________________________

______________________________________
Structure of the Nephron

Nephrons are structures within the kidneys that filter wastes out of blood. Most of the filtration occurs in the glomerulus, a network of capillaries inside a structure called Bowman’s capsule. Some of the material filtered out is reabsorbed into the blood.

Use the words below to label the diagram.

| Bowman’s capsule capillaries | collecting duct glomerulus | loop of Henle |

Answer the question. Circle the correct answer.

1. Which of the following is reabsorbed into the bloodstream?
   - water
   - urine
Chapter 38 Digestive and Excretory Systems  Graphic Organizer

**Concept Map**

Using information from the chapter, complete the concept map below. If there is not enough room in the concept map to write your answers, write them on a separate sheet of paper.

1. **Organs of the Digestive System**
   - include:
     - Esophagus
     - Stomach
     - Liver and pancreas
     - Large intestine

2. **Mechanical and chemical means**
   - to:
     - Transfer chewed food to the stomach

3. **Mechanical and chemical means**
   - to:
     - Produce enzymes and bile for chemical digestion

4. **Chemical means and absorption**
   - to:
     - Complete chemical digestion and absorb nutrients from chyme

5. **Begin digestion with chewing and saliva excretions**

6. **Absorption**
   - to:

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