CHAPTER 10

BONES, MUSCLES, AND SKIN

SECTION 10–1 Organization and Homeostasis (pages 336–343)

This section tells how an animal’s body is organized and describes the four types of tissue in animals. It also describes how the body maintains stable internal conditions.

► Levels of Organization (pages 336–337)

1. Is the following sentence true or false? Each part of an organism has a specific job to do, and all of the different parts work independently of each other. __________________

2. List the levels of organization in organisms, starting with the smallest.
   a. _____________  b. _____________
   c. _____________  d. _____________

► Cells: Structure and Function (page 337)

3. The basic unit of structure and function in a living thing is a(n) _____________.

4. Circle the letter of the outside boundary of an animal cell.
   a. cytoplasm  b. nucleus  c. tissue  d. cell membrane

5. The control center that directs the cell’s activities and contains information that determines the cell’s characteristics is the _____________.

6. What is the cytoplasm? ____________________________

__________________________
CHAPTER 10, Bones, Muscles, and Skin (continued)

7. Is the following sentence true or false? Cells carry on the processes that keep organisms alive. ______________

8. What is a tissue? _______________________________________________________________________

9. Complete the table to show the functions and examples of the tissues in the human body. See Figure 2 on page 338.

<table>
<thead>
<tr>
<th>Tissue</th>
<th>Function</th>
<th>Example</th>
</tr>
</thead>
<tbody>
<tr>
<td>Muscle</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Nerve</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Connective</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Epithelial</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

> Organs and Organ Systems (page 339)

10. A structure that is made up of different kinds of tissues is a(n) ______________.

11. Circle the letter of the organ.
   a. muscle cell    b. blood    c. lungs    d. digestive system

12. What is an organ system? __________________________________________________________________

13. Organs in the circulatory system include the ______________ and ______________.
Match the organ system with its function. See Figure 3 on page 475.

<table>
<thead>
<tr>
<th>Organ Systems</th>
<th>Functions</th>
</tr>
</thead>
<tbody>
<tr>
<td>14. endocrine</td>
<td>a. Takes oxygen into the body</td>
</tr>
<tr>
<td>15. circulatory</td>
<td>b. Fights disease</td>
</tr>
<tr>
<td>16. excretory</td>
<td>c. Removes wastes</td>
</tr>
<tr>
<td>17. respiratory</td>
<td>d. Controls body process with chemicals</td>
</tr>
<tr>
<td>18. digestive</td>
<td>e. Takes food into the body and breaks it down</td>
</tr>
<tr>
<td>19. immune</td>
<td>f. Carries materials to and from body cells</td>
</tr>
</tbody>
</table>

▶ **Maintaining Stable Internal Conditions** *(pages 340–341)*

20. Is the following sentence true or false? The different body systems work together and depend on one another. ________________

21. The process by which an organism’s internal environment is kept stable in spite of changes in the external environment is called ________________.

22. How do an animal’s kidneys regulate water balance?

   ___________________________________________________________________

   ___________________________________________________________________

23. How do pores in the leaves of plants help control water balance?

   ___________________________________________________________________

   ___________________________________________________________________

24. How does perspiration help maintain constant body temperature?

   ___________________________________________________________________

   ___________________________________________________________________

25. An organism’s ________________ is the action or change in behavior that occurs as a result of a stimulus.

26. Hunger is a(n) ________________ stimulus.
CHAPTER 10, Bones, Muscles, and Skin (continued)

Stress and Homeostasis (pages 342–343)

27. What is stress? ____________________________________________________________

28. An event, such as an argument or an upcoming oral report, that causes stress is a(n) _________________.

29. Is the following sentence true or false? Stress does not affect homeostasis.

______________

30. What is adrenaline? ______________________________________________________

__________________________________________________

31. Complete the flowchart to show the effects of adrenaline on the body.

Adrenaline's Effects

Breathing ________________, sending more oxygen to body cells to provide energy for the muscles.

Extra oxygen gets to cells rapidly because the heart beats ________________.

Arms and legs get ________________ blood flowing to them.
The skin and digestive system get ________________ blood.

The pupils of the eyes get ________________, so it is easier to see.
32. What do the reactions of adrenaline prepare the body for? __________

33. Is the following sentence true or false? The alarm stage of stress lasts for a long time. __________

34. Is the following sentence true or false? Even if a stressful situation does not go away, the body can still restore homeostasis. __________

35. What can happen to your body if you do not deal with stress? ________

36. Circle the letter of each sentence that is true about dealing with stress.
   a. It is important to ignore stressful situations so that they will go away.
   b. If you accept that you have a problem and deal with it, then your stress will decrease.
   c. You can avoid stress entirely.
   d. Talking to family members and friends about the stressful situation will help.

**Reading Skill Practice**

A concept map is a useful tool to show the relationships between concepts. This helps make the concepts easier to understand. Make a concept map to show the levels of organization in complex organisms. For more information about concept maps, see page 660 in the Skills Handbook of your textbook. Do your work on a separate sheet of paper.
This section describes the skeletal system and its function. It also tells how to keep your bones strong and healthy.

Functions of the Skeletal System (pages 344–346)

1. List the five major functions of the skeleton.
   a. 
   b. 
   c. 
   d. 
   e. 

2. Is the following sentence true or false? The structures of an organism’s organs and organ systems are related to the functions they perform.
   
3. The 26 small bones that make up the backbone are the 

4. Is the following sentence true or false? Since the backbone is just one long bone, it allows your body to easily bend and twist.
   
5. How does the skeleton help the body move?

6. Circle the letter of the bone that protects the brain.
   a. backbone  b. pelvic girdle  c. ribs  d. skull

7. The long bones of the arms and legs make 

8. Calcium and phosphorus are that are stored in bones.
9. Circle the letter of each sentence that is true about bones.
   a. Bones are very strong and lightweight.
   b. Concrete can absorb more force without breaking than can bone.
   c. Bones make up over half of an adult’s body weight.
   d. Bones are hard because they contain minerals.

10. When do bone cells form new bone tissue?

The Structure of Bones (pages 347–348)

11. Label the parts of the bone in the diagram below.

Match each part of a bone with its characteristics.

<table>
<thead>
<tr>
<th>Bone Parts</th>
<th>Characteristics</th>
</tr>
</thead>
<tbody>
<tr>
<td>12. marrow</td>
<td>a. Where blood vessels and nerves enter and leave the bone</td>
</tr>
<tr>
<td>13. outer membrane</td>
<td>b. Has small canals with blood vessels running through</td>
</tr>
<tr>
<td>14. compact bone</td>
<td>c. Strong, but lightweight layer because it has many small spaces within it</td>
</tr>
<tr>
<td>15. spongy bone</td>
<td>d. Soft connective tissue in the spaces in bone</td>
</tr>
</tbody>
</table>
CHAPTER 10, Bones, Muscles, and Skin  (continued)

How Bones Form  (page 348)

16. A connective tissue that is more flexible than bone is called ________________.

17. Circle the letter of each sentence that is true about how bones form.
   a. Much of an infant’s skeleton is bone.
   b. As the body grows, the cartilage in the skeleton is replaced with hard bone tissue.
   c. By the time the body stops growing, all of the cartilage has been replaced with bone.
   d. Cartilage covers the ends of many bones in the body of an adult.

Joints of the Skeleton  (pages 348–350)

18. What is a joint? ____________________________

19. What are the two kinds of joints in the body?
   a. ____________________________  b. ____________________________

20. Circle the letter of the bones that are held together by immovable joints.
   a. knee  b. ankle  c. ribs  d. shoulder blade

21. Complete the table to show the four types of movable joints.

<table>
<thead>
<tr>
<th>Movable Joints</th>
<th>Kind of Motion</th>
<th>Where It’s Found in the Body</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ball-and-socket</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Hinge</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Pivot</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Gliding</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
22. The bones in movable joints are held together by strong connective tissues called _________________.

➤ Taking Care of Your Bones (pages 350–351)

23. What can you do to keep your bones healthy? ________________

______________

______________

24. A condition in which the body’s bones become weak and break easily is called ________________.

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Reading Skill Practice

Photographs and illustrations help explain the ideas described in the reading. Look at Figure 10 on page 348. What idea is this photograph communicating? Do your work on a separate sheet of paper.

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SECTION 10–3 The Muscular System (pages 352–356)

This section tells about the three kinds of muscle tissue in the human body, how muscles work to move the body, and how to care for your muscles.

➤ Muscle Action (page 352)

1. List the two groups of muscles in the body and describe how they are controlled.
   a. ________________
   b. ________________

2. Circle the letter of the action that is controlled by involuntary muscles.
   a. smiling  b. breathing  c. walking  d. standing up
CHAPTER 10, \textit{Bones, Muscles, and Skin} (continued)

\textbf{Types of Muscles} (pages 353–355)

3. Complete the table to compare and contrast the three types of muscle tissue in the body.

<table>
<thead>
<tr>
<th>Types of Muscles</th>
</tr>
</thead>
<tbody>
<tr>
<td>Muscles</td>
</tr>
<tr>
<td>Skeletal</td>
</tr>
<tr>
<td>Cardiac</td>
</tr>
</tbody>
</table>

4. A strong connective tissue that attaches muscles to bone is a(n) \underline{__________}.

5. List two characteristics of skeletal muscles.
   a. \underline{______________________________________________________________________}
   b. \underline{______________________________________________________________________}

6. Is the following sentence true or false? Smooth muscles react more quickly and tire more easily than skeletal muscles. \underline{__________________}

7. The repeated contractions of cardiac muscle are called \underline{__________}.

\textbf{Muscles at Work} (page 355)

8. When do muscles contract, or become shorter and thicker? \underline{__________________}

9. Is the following sentence true or false? Muscle cells can extend, or get longer, as well as contract, or get shorter. \underline{__________________}
10. Why do skeletal muscles work in pairs to move a bone?

11. To bend the elbow, the biceps muscle ________________
and the triceps muscle returns to its _________________.

**Taking Care of Your Skeletal Muscles (page 356)**

12. Circle the letter of the sentence that is true about taking care of muscles.
   a. Exercise makes muscles thicker and stronger.
   b. Warming up muscles before exercise makes muscles more flexible.
   c. Muscles never get injured if you take proper care of them.
   d. Don’t rest an injured muscle, it will heal on its own.

13. What causes a muscle strain, or pulled muscle?

14. What happens when a muscle cramps?

**SECTION 10–4 The Skin (pages 358–364)**

*This section explains the structure of skin, what skin does, and how to keep skin healthy.*

**The Body’s Tough Covering (pages 358–359)**

1. Circle the letter of each sentence that is true about the skin.
   a. The skin lets disease-causing microorganisms and harmful substances into the body.
   b. The skin keeps water from escaping from the body.
   c. The skin helps the body maintain homeostasis.
   d. The skin gathers information about the environment.
2. Is the following sentence true or false? To cool the body, blood vessels in the skin enlarge to let more blood run through them to move body heat to the outside. ________________

3. Why are pain messages important to the body? ________________________
   ________________________
   ________________________
   ________________________

4. Skin cells produce ________________ in the presence of sunlight.

**The Epidermis (pages 360–361)**

5. The outermost layer of skin is the ________________.

6. Is the following sentence true or false? Nerves and blood vessels run through the epidermis. ________________

7. New cells that form deep in the epidermis gradually move upward to the surface of the skin, where after about ________________, the cells die.

8. Is the following sentence true or false? The layer of dead cells on the surface of the skin gives the most protection to the body. ________________

9. Is the following sentence true or false? Melanin, a pigment that gives skin its color, protects the skin from burning in sunlight. ________________

**The Dermis (page 361)**

10. The lower layer of the skin is the ________________.

11. What is the role of the layer of fat below the dermis? ________________
   ________________________
   ________________________
   ________________________

12. Circle the letter of each structure in the dermis.
   a. hairs  b. bones  c. sweat glands  d. oil glands
13. Perspiration reaches the surface of the skin through openings called ___________.

14. What are follicles? ____________________________________________

15. Is the following sentence true or false? Oil produced in glands around the hair follicles waterproofs the hair and keeps the skin moist. 

   ____________

► Caring for Your Skin (pages 362–364)

16. Complete the concept map to show how to keep your skin healthy.

   ![Concept Map]

17. What should you do to replace the water that the skin loses during perspiration? ____________________________________________

   ____________________________________________

18. A disease in which some body cells divide uncontrollably is called ____________. 

19. In what two ways does the sun damage your skin?

   a. ____________________________________________

   b. ____________________________________________

20. What is acne? ____________________________________________

   ____________________________________________
CHAPTER 10, Bones, Muscles, and Skin (continued)

WordWise

Use the clues below to identify key terms from Chapter 10. Write the terms on the line, putting one letter in each blank. When you finish, the word enclosed in the diagonal lines will reveal the name of the outermost layer of skin.

Clues

1. The basic unit of structure and function in a living thing
2. An opening in the dermis through which perspiration reaches the surface of the skin
3. A place in the body where two bones come together
4. A strong connective tissue that attaches muscle to bone
5. A group of similar cells that perform the same function
6. A soft connective tissue found in the spaces in bone
7. The process by which the body’s internal environment is kept in equilibrium.
8. A connective tissue that makes up the skeleton that is more flexible than bone
9. Muscles attached to the bones of the skeleton are ____ muscles.

Key Terms

1. __ __ __ __
2. __ __ __ __ __
3. __ __ __ __ __
4. __ __ __ __ __ __ __
5. __ __ __ __ __ __
6. __ __ __ __ __ __ __
7. __ __ __ __ __ __ __ __ __ __
8. __ __ __ __ __ __ __
9. __ __ __ __ __ __ __