Chapter 36 Skeletal, Muscular, and Integumentary Systems

Section 36–1 The Skeletal System (pages 921–925)

Key Concepts
- What are the functions of the skeletal system?
- What is the structure of a typical bone?
- What are the three different kinds of joints?

Introduction (page 921)
1. What forms the skeletal system? ________________________________

The Skeleton (page 921)
2. List the functions of the skeletal system.
   a. ____________________________  d. ____________________________
   b. ____________________________  e. ____________________________
   c. ____________________________
3. Is the following sentence true or false? Most bones act like levers on which muscles act to produce movement. ______________
4. How many bones are there in the adult human skeleton? ______________
5. Complete the concept map.

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6. What is the general function of the axial skeleton? ____________________________

Structure of Bones (page 922)
7. The two minerals that make up most of the mass of bone are ________________
and ________________.
8. Is the following sentence true or false? Bones are living tissue. ________________

Match each structure in a bone with its description.

<table>
<thead>
<tr>
<th>Structure</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>10. Compact bone</td>
<td>b. Soft tissue contained in bone cavities</td>
</tr>
<tr>
<td>11. Haversian canals</td>
<td>c. Tough layer of connective tissue surrounding bone</td>
</tr>
<tr>
<td>12. Spongy bone</td>
<td>d. Thick layer of dense bone beneath the periosteum</td>
</tr>
<tr>
<td>13. Bone marrow</td>
<td>e. Bone with a latticework structure</td>
</tr>
</tbody>
</table>

14. Cells that produce bone are called ________________________.

Development of Bones (pages 922–923)
15. The skeleton of an embryo is composed almost entirely of a type of connective tissue called ________________.
16. The network of fibers in cartilage is made from two proteins called ________________
and ________________.
17. Circle the letter of each sentence that is true about cartilage.
   a. It contains blood vessels.      c. It cannot support weight.
   b. It is dense and fibrous.       d. It is extremely flexible.
18. Cartilage is replaced by bone during the process of bone formation called ________________.
19. Is the following sentence true or false? By adulthood, all the cartilage in the body has been replaced by bone. ________________

Types of Joints (page 924)
20. What is a joint? ____________________________

21. List the three classifications of joints, based on their type of movement.
   a. ____________________________
   b. ____________________________
   c. ____________________________
22. What are examples of immovable joints?

23. Is the following sentence true or false? The joints between the two bones of the lower leg are slightly movable joints.

24. Identify the type of freely movable joint represented in each of the drawings below.

25. Is the following sentence true or false? Ball-and-socket joints permit the widest range of movement.

**Structure of Joints** (pages 924–925)

26. Circle the letter of each sentence that is true about the structure of joints.
   a. Cartilage protects the ends of bones as they move against each other at joints.
   b. Ligaments hold bones together at joints.
   c. Synovial fluid prevents the ends of bones from slipping past each other at joints.
   d. A bursa is a swelling caused by inflammation of a joint.

**Skeletal System Disorders** (page 925)

27. Inflammation of a bursa is called ________________.

28. A serious disorder that involves inflammation of one or more joints is ________________.
Section 36–2 The Muscular System (pages 926–931)

Key Concepts
- What are the three types of muscle tissue?
- How do muscles contract?
- Why is exercise important?

Types of Muscle Tissue (pages 926–927)
1. List the three different types of muscle tissue.
   a. __________________ b. __________________ c. __________________
2. Is the following sentence true or false? Each type of muscle has the same function.
   __________________
3. Is the following sentence true or false? Skeletal muscles are usually attached to bones.
   __________________
4. Circle the letter of each sentence that is true about skeletal muscles.
   a. They have striations.
   b. Most of them are consciously controlled by the central nervous system.
   c. Their cells have just one nucleus.
   d. Their cells are long and slender.
5. Circle the letter of each sentence that is true about smooth muscle cells.
   a. They are spindle-shaped.
   b. They can function without nervous stimulation.
   c. They have two or more nuclei.
   d. They are connected by gap junctions.
6. What are three functions of smooth muscles?
   __________________
   __________________
   __________________
7. Is the following sentence true or false? Cardiac muscle cells always have two nuclei.
   __________________
8. Complete the table that compares and contrasts the three types of muscle tissue.

<table>
<thead>
<tr>
<th>Muscle Tissue Type</th>
<th>Striated/Not Striated</th>
<th>What It Controls</th>
</tr>
</thead>
<tbody>
<tr>
<td>Skeletal</td>
<td>Striated</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Not striated</td>
<td>Involuntary movements</td>
</tr>
<tr>
<td>Cardiac</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Muscle Contraction (page 928)

9. Circle the letter of the choice that lists the muscle structures from largest to smallest.
   a. Myofibrils, filaments, muscle fibers
   b. Muscle fibers, myofibrils, filaments
   c. Muscle fibers, filaments, myofibrils
   d. Myofibrils, muscle fibers, filaments

Match each type of muscle filament with the protein it contains.

<table>
<thead>
<tr>
<th>Type of Filament</th>
<th>Protein It Contains</th>
</tr>
</thead>
<tbody>
<tr>
<td>10. thick</td>
<td>a. Actin</td>
</tr>
<tr>
<td>11. thin</td>
<td>b. Myosin</td>
</tr>
</tbody>
</table>

12. The filaments are arranged along the muscle fiber in units called ________________.

13. Is the following sentence true or false? When a muscle is relaxed, there are only thin filaments in the center of a sarcomere. ________________

14. How does a muscle contract according to the sliding-filament model of muscle contraction? ________________

15. The energy for muscle contraction is supplied by ________________.

Control of Muscle Contraction (page 929)

16. Complete the flowchart to show the missing steps in the stimulation of a muscle cell by a neuron.

```
Diffusion of acetylcholine across synapse
produces
Impulse in membrane of muscle cell
causes
affects
Regulatory proteins
allow
```

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17. Is the following sentence true or false? Impulses from motor neurons control the contraction of skeletal muscles. ______________ 
18. The point of contact between a motor neuron and a skeletal muscle cell is a(an) ______________. 
19. What terminates a muscle contraction? ______________ 

20. Is the following sentence true or false? A single motor neuron can form synapses with many muscle cells. ______________ 
21. What is the difference between a strong muscle contraction and a weak muscle contraction? ______________ 

How Muscles and Bones Interact (page 930)
22. Is the following sentence true or false? Individual muscles can pull in only one direction. ______________ 
23. Circle the letter of the term that refers to the tough connective tissue joining skeletal muscle to bone. 
   a. cartilage  
   b. ligament  
   c. tendon  
   d. bursa  
24. If bones are like levers, what functions as a fulcrum? ______________ 
25. What does it mean for muscles to “work in opposing pairs”? ______________ 

Exercise and Health (page 931)
26. Why is regular exercise important? ______________ 

Reading Skill Practice
When you read a section with many details, writing an outline may help you organize and remember the material. Outline Section 36–2 by first writing the section headings as major topics in the order in which they appear in the book. Then, beneath each major topic, list important details about it. Title your outline The Muscular System. Do your work on a separate sheet of paper.
Section 36–3 The Integumentary System
(pages 933–936)

Key Concept
• What are the functions of the integumentary system?

Introduction (page 933)
1. Circle the letter of each choice that is part of the integumentary system.
   a. skin
c. cartilage
b. bones
d. nails

The Skin (pages 933–936)
2. The most important function of the skin is _________________.
3. List the four functions of the integumentary system.
   a. ________________
   b. ________________
   c. ________________
   d. ________________
4. The largest component of the integumentary system is the _________________.
5. The outer layer of skin is called the _________________.
6. Is the following sentence true or false? The inner layer of the epidermis is made up of dead cells. ________________
7. Label the structures of the skin.
Match each term with its definition.

<table>
<thead>
<tr>
<th>Term</th>
<th>Definition</th>
</tr>
</thead>
<tbody>
<tr>
<td>8. keratin</td>
<td>a. Tough, fibrous protein</td>
</tr>
<tr>
<td>9. melanin</td>
<td>b. Inner layer of the skin</td>
</tr>
<tr>
<td>10. dermis</td>
<td>c. Dark brown pigment</td>
</tr>
</tbody>
</table>

11. Circle the letter of each sentence that is true about melanocytes.
   a. Melanocytes are cells that produce melanin.
   b. Most people have roughly the same number of melanocytes in their skin.
   c. All melanocytes produce about the same amount of melanin.
   d. Most people have the same distribution of melanocytes in their skin.

12. Is the following sentence true or false? The epidermis contains blood vessels.

13. Circle the letter of each type of structure that is found in the dermis.
   a. blood vessels
   b. nerve endings
   c. glands
   d. hair follicles

14. How does the dermis help regulate body temperature?

15. List the two types of glands contained in the dermis.
   a. 
   b. 

16. How does sweat help keep you cool?

17. What is the function of sebum?
18. The basic structure of human hair and nails is ________________.

19. List the two functions of head hair.
   a. ______________________________________________
   b. ______________________________________________

20. How does hair in the nose and ears and around the eyes help protect the body?
   ______________________________________________

21. Hair is produced by cells called ____________________.

22. Is the following sentence true or false? Hair is composed of cells that have died.
   __________

23. What causes hair to grow? __________________________

24. What is the nail root? ______________________________

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