Chapter 37 Circulatory and Respiratory Systems

Section 37–1 The Circulatory System (pages 943–950)
This section describes the circulatory system and its functions.

Functions of the Circulatory System (page 943)
1. Why do large organisms require a circulatory system? Most of their cells are not in direct contact with the environment, so they cannot rely on diffusion. Therefore, they need a circulatory system to transport substances from one part of the organism to another.

2. What is a closed circulatory system? It is one that has a circulating fluid contained within a system of vessels.

3. List the three components of the circulatory system.
   a. Heart
   b. Blood vessels
   c. Blood

The Heart (pages 944–946)
4. Is the following sentence true or false? The heart is composed almost entirely of muscle. ______ true

Match each heart structure with its description.

<table>
<thead>
<tr>
<th>Structure</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>b</td>
<td>5. pericardium</td>
</tr>
<tr>
<td>a</td>
<td>6. myocardium</td>
</tr>
<tr>
<td>c</td>
<td>7. atrium</td>
</tr>
<tr>
<td>d</td>
<td>8. ventricle</td>
</tr>
</tbody>
</table>

9. The heart pumps about ______ 72 ______ times per minute.

10. Dividing the right side of the heart from the left side is a wall called a(an) ______ septum ______.

11. Is the following sentence true or false? The heart functions as four separate pumps. ______ false ______

12. Complete the compare-and-contrast table.

<table>
<thead>
<tr>
<th>Name of Circulatory Pathway</th>
<th>Side of Heart Involved</th>
<th>Route Blood Follows</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pulmonary circulation</td>
<td>Right side</td>
<td>From heart to lungs</td>
</tr>
<tr>
<td>Systemic circulation</td>
<td>Left side</td>
<td>From heart to rest of body</td>
</tr>
</tbody>
</table>

13. What happens to blood when it reaches the lungs? Carbon dioxide leaves the blood and oxygen is absorbed.
14. Why is the blood that enters the heart from the systemic circulation oxygen-poor?  
The cells of the body have absorbed much of the oxygen the blood once contained and loaded the blood with carbon dioxide.

15. Circle the letter of each sentence that is true about blood flow through the heart.  
   a. Blood enters the heart through the right and left atria.  
   b. Blood enters the heart through the right and left ventricles.  
   c. Blood flows from the ventricles to the atria.  
   d. Blood flows out of the heart through the right and left atria.

16. Flaps of connective tissue called _______ valves _______ prevent blood from flowing backward in the heart.

17. Each heart contraction begins in a small group of cardiac muscle cells called the ______ sinoatrial ______ node.

18. Cells that “set the pace” for the beating of the heart as a whole are also called the ______ pacemaker _______.

### Blood Vessels (pages 946–947)

19. Complete the concept map.

![Concept Map of Blood Vessels]

20. Circle the letter of each sentence that is true about arteries.  
   a. Most carry oxygen-poor blood.  
   b. They can expand under pressure.  
   c. They have thin walls.  
   d. The largest is the aorta.

21. Is the following sentence true or false? The smallest of the blood vessels are the capillaries. ______ true

22. What work is done in the capillaries? They bring nutrients and oxygen to the tissues and absorb carbon dioxide and other waste products.

23. What keeps blood flowing toward the heart in the largest veins? Valves keep blood flowing toward the heart.
Blood Pressure (pages 948–949)
24. The force of blood on the walls of arteries is known as ______ blood pressure ______.
25. Is the following sentence true or false? Blood pressure increases when the heart relaxes.
   ______ false ______

Match each type of blood pressure with the force it measures.

<table>
<thead>
<tr>
<th>Type of Pressure</th>
<th>Force It Measures</th>
</tr>
</thead>
<tbody>
<tr>
<td>b 26. systolic</td>
<td>a. Force of the blood when the ventricles relax</td>
</tr>
<tr>
<td>a 27. diastolic</td>
<td>b. Force of the blood when the ventricles contract</td>
</tr>
</tbody>
</table>

28. Is the following sentence true or false? A typical blood pressure reading for a healthy person is 140/80. ______ false ______
29. How does the autonomic nervous system regulate blood pressure?
   It releases neurotransmitters that cause the smooth muscles in blood vessel walls to relax when blood pressure is too high or to contract when blood pressure is too low.

30. How do the kidneys regulate blood pressure? They remove more water from the blood and thereby reduce blood volume when blood pressure is too high.

Diseases of the Circulatory System (pages 949–950)
31. A condition in which fatty deposits build up on the walls of arteries is called ______ atherosclerosis ______.
32. High blood pressure also is called ______ hypertension ______.
33. Is the following sentence true or false? High blood pressure increases the risk of heart attack and stroke. ______ true ______
34. Circle the letter of each sentence that is true about heart attack.
   a. It is caused by atherosclerosis in the coronary arteries.
   b. It occurs when part of the heart muscle begins to die.
   c. Its symptoms include nausea and chest pain.
   d. It requires immediate medical attention.
35. Is the following sentence true or false? A stroke may be caused by a clot in a blood vessel leading to the brain. ______ true ______
36. List three ways of avoiding cardiovascular diseases.
   a. Getting regular exercise
   b. Eating a balanced diet
   c. Not smoking