Section 37–3 The Respiratory System (pages 956–963)
This section identifies the structures of the respiratory system and explains how we breathe. It also describes how smoking affects the respiratory system.

What Is Respiration? (page 956)
1. The process by which oxygen and carbon dioxide are exchanged between the lungs and the environment is known as _______ respiration _______.

The Human Respiratory System (pages 956–958)
2. What is the basic function performed by the human respiratory system? It brings about the exchange of oxygen and carbon dioxide.

3. Label each of the following structures in the drawing of the human respiratory system: nose, pharynx, larynx, trachea, bronchus, and lung.

4. Circle the letter of the choice that lists the respiratory structures from largest to smallest.
   a. Alveoli, bronchioles, bronchi
   b. Bronchioles, bronchi, alveoli
   c. Bronchi, bronchioles, alveoli
   d. Bronchi, alveoli, bronchioles

5. What prevents food from entering your trachea? A piece of cartilage called the epiglottis covers the entrance to the trachea when you swallow.
Match each structure of the respiratory system with its description.

<table>
<thead>
<tr>
<th>Structure</th>
<th>Description</th>
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<tbody>
<tr>
<td>6. pharynx</td>
<td>a. Tiny air sacs where gas exchange occurs</td>
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<td>7. trachea</td>
<td>b. Tiny projections that sweep trapped particles and mucus away from the lungs</td>
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<td>8. cilia</td>
<td>c. Tube that serves as a passageway for both air and food</td>
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<td>9. larynx</td>
<td>d. Large passageways in the chest that lead to the lungs</td>
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<td>10. bronchi</td>
<td>e. Structure at the top of the trachea that contains the vocal cords</td>
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<td>11. alveoli</td>
<td>f. Passageway between the pharynx and bronchi</td>
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Gas Exchange (page 958)

12. Gas exchange occurs in the ______ alveoli _______.

13. Describe the process of gas exchange. Oxygen dissolves in the moisture on the inner surface of the alveoli and then diffuses across the thin-walled capillaries into the blood. Carbon dioxide in the bloodstream diffuses in the opposite direction.

14. Circle the letter of each sentence that is true about gas exchange.
   a. It is a very efficient process.
   b. Exhaled air usually contains no oxygen.
   c. The lungs remove about half of the oxygen of inhaled air.
   d. The lungs increase the carbon dioxide content of inhaled air by a factor of 100.

15. Why is hemoglobin needed? Because hemoglobin greatly increases the oxygen-carrying capacity of the blood, without it the body would need far more blood to carry the same amount of oxygen.

Breathing (pages 959–960)

16. The movement of air into and out of the lungs is called ______ breathing _______.

17. The large, flat muscle at the bottom of the chest cavity is the ______ diaphragm _______.

18. Is the following sentence true or false? The force that drives air into the lungs comes from air pressure. ______ true _______

19. What happens when you inhale? The diaphragm contracts and the rib cage rises. This expands the volume of the chest. This creates a partial vacuum, and atmospheric pressure causes the lungs to fill with air.

20. Circle the letter of the choice that describes what happens when pressure in the chest cavity becomes greater than atmospheric pressure.
   a. Air rushes into the lungs.
   b. Air cannot escape from the lungs.
   c. The diaphragm contracts.
   d. Air rushes out of the lungs.
Chapter 37, Circulatory and Respiratory Systems  (continued)

How Breathing Is Controlled  (pages 960–961)
21. The part of the brain that controls breathing is the __________ medulla oblongata __________.
22. Is the following sentence true or false? Cells in the breathing center monitor the amount of oxygen in the blood. __________ false __________
23. Why do airplane passengers in emergency situations often have to be told to begin breathing pressurized oxygen? They have no more carbon dioxide in their blood than usual, so the breathing center does not sense a problem.

Tobacco and the Respiratory System  (pages 961–963)
24. List three of the most dangerous substances in tobacco smoke.
   a. Nicotine __________ b. Carbon monoxide __________ c. Tar __________
25. Is the following sentence true or false? Nicotine is a stimulant drug that increases pulse rate and blood pressure. __________ true __________
26. Why is carbon monoxide dangerous? It blocks the transport of oxygen by hemoglobin, depriving the heart and other organs of the oxygen they need to function.
27. List three respiratory diseases caused by smoking.
   a. Chronic bronchitis __________ b. Emphysema __________ c. Lung cancer __________
28. Circle the letter of each sentence that is true about chronic bronchitis.
   a. It is characterized by swollen bronchi.
   b. It occurs only in heavy smokers.
   c. It can make stair climbing and similar activities difficult.
   d. It is unrelated to smoking.
29. What is emphysema? It is a loss of elasticity in the lungs.
30. Circle the letter of each sentence that is true about lung cancer.
   a. Its most important cause is smoking.
   b. It is often deadly.
   c. It cannot spread to other parts of the body.
   d. It is usually detected early enough for a cure.
31. Circle the letter of each way that smoking affects the cardiovascular system.
   a. It constricts the blood vessels.
   b. It causes blood pressure to rise.
   c. It makes the heart work harder.
   d. It causes heart disease.
32. Inhaling the smoke of others is called **passive smoking**.

33. Why is passive smoking particularly harmful to young children? **Their lungs are still developing.**

34. Why is it so hard to quit smoking? **Nicotine is a powerful, addictive drug.**

35. What is the best solution for dealing with tobacco? **The best solution is not to begin smoking.**

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**WordWise**

Match each definition in the left column with the correct term in the right column. Then, write the number of each term in the box below on the line under the appropriate letter. When you have filled in all the boxes, add up the numbers in each column, row, and two diagonals. All the sums should be the same.

**Definition**

A. Fluid lost by the blood into surrounding tissue
B. Thick layer of muscle in walls of heart
C. Stimulant drug in tobacco smoke
D. Passageway leading from the trachea to a lung
E. Protein in red blood cells
F. Small group of heart cells that set the pace for the heartbeat
G. Lower chamber of the heart
H. Disease in which tissues of the lungs lose elasticity
I. Condition in which fatty deposits build up on the walls of arteries

**Term**

1. **myocardium**
2. **ventricle**
3. **pacemaker**
4. **atherosclerosis**
5. **hemoglobin**
6. **lymph**
7. **bronchus**
8. **nicotine**
9. **emphysema**

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