

# The Respiratory System

## Guide to Reading

### ● Building Vocabulary

As you read this lesson, make flashcards for each new term.

- respiratory system (p. 236)
- trachea (p. 237)
- epiglottis (p. 237)
- bronchi (p. 237)
- lungs (p. 237)
- diaphragm (p. 237)

### ● Focusing on the Main Ideas

In this lesson you will be able to

- **explain** why you need oxygen to live.
- **name** the parts of the respiratory system.
- **describe** the breathing process.
- **identify** problems of the respiratory system.

### ● Reading Strategy

**Sequencing** As you read the lesson, summarize the steps of the breathing process.

## Quick Write

Have you ever had a respiratory illness, like a cough or cold? Describe how you felt. Explain why you think a healthy respiratory system is important.

## You Need Oxygen to Live

The body needs oxygen to work properly. Body cells use oxygen to make energy from food. You use this energy for everything, from playing games to reading a book. How does oxygen get into your body? You breathe it in. How does oxygen get to your cells? It travels through your respiratory system. Your **respiratory system** includes *the organs that supply your blood with oxygen*. Blood carries the oxygen to your whole body.

### Parts of Your Respiratory System

The main parts of your respiratory system include the mouth and nose, the trachea, the lungs, and the diaphragm. **Figure 8.2** shows the respiratory system.

Air enters your body through your nose and mouth. *Cilia* (SIH-lee-uh) line the inside of your nose. These tiny, hair-like structures trap dirt and particles from the air you breathe.

◀ Daily exercise is important to maintaining the health of your respiratory system. **How do you exercise every day?**



The **trachea** (TRAY-kee-uh) is a passageway in your throat that takes air into and out of your lungs. You may know the trachea as the windpipe. The **epiglottis** (eh-pi-GLAH-tis) is a flap of tissue in the back of your mouth that keeps food out of your trachea. It covers the trachea when you eat and uncovers it when you breathe.

As you breathe in, your body takes in oxygen. As you breathe out, your body rids itself of carbon dioxide. Carbon dioxide is a gas, just like oxygen. As your cells burn oxygen, they make carbon dioxide as a waste product. The exchange of oxygen and carbon dioxide happens in your lungs. The **bronchi** (BRAHNG-ky) are two passageways that branch from the trachea, one to each lung. Your **lungs** are two large organs that exchange oxygen and carbon dioxide. Your **diaphragm** (DY-uh-fram) is a large, dome-shaped muscle below the lungs. It expands and compresses the lungs, enabling breathing.

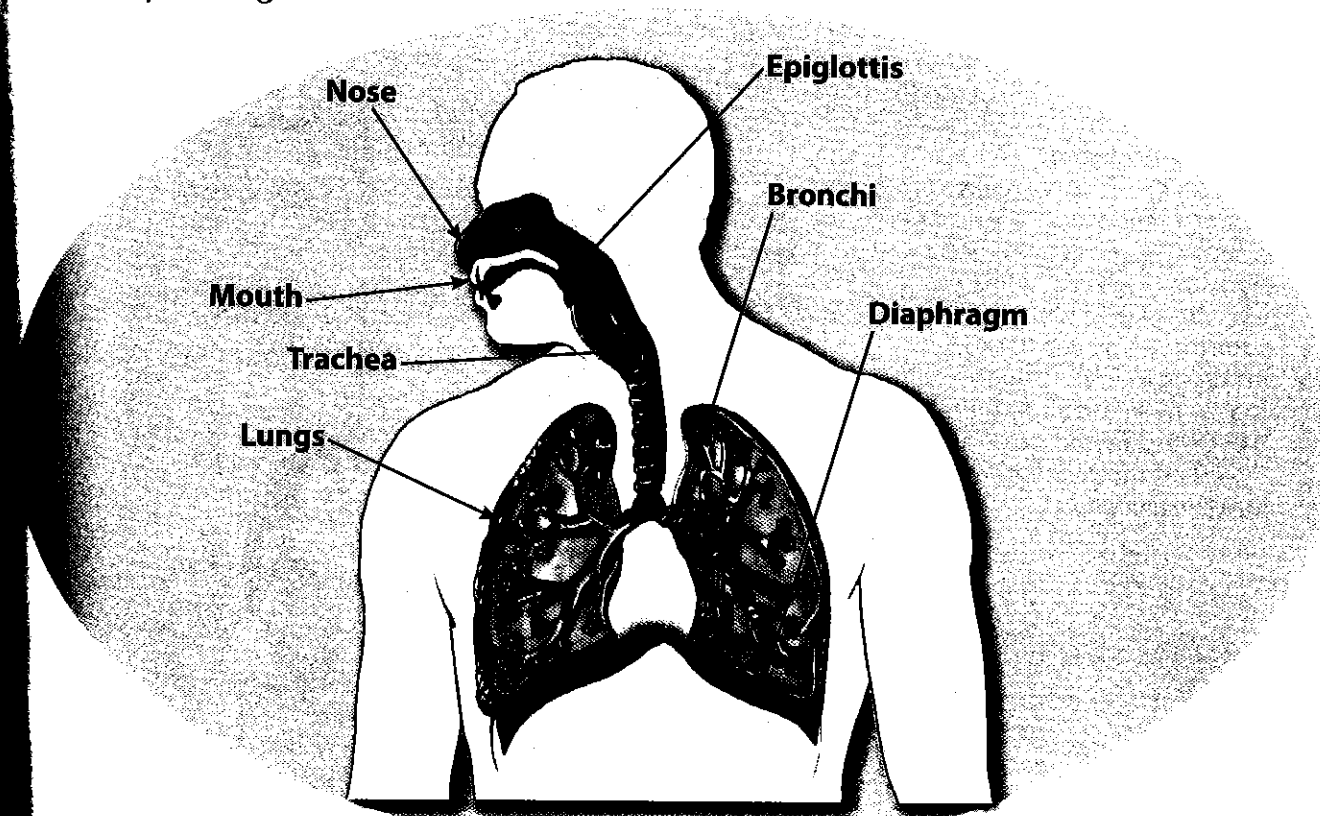
### Reading Check

**Explain** What is the function of the diaphragm?

▼ FIGURE 8.2

## PARTS OF THE RESPIRATORY SYSTEM

As you breathe, your lungs work with all the other parts of your respiratory system. Look at the diagram, and think about what happens when you cough. **Which parts of your respiratory system do you use when you cough?**



## The Breathing Process

Three processes happen in your body when you breathe. First, you inhale, or breathe in air. The diaphragm, a muscle below the lungs, moves down and your chest expands, letting air into your lungs. Second, oxygen from the air passes out of your lungs and into your blood. At the same time, the oxygen replaces carbon dioxide. Third, you exhale, or breathe out air. Your diaphragm pushes up, forcing air and carbon dioxide out of your lungs. **Figure 8.3** shows the steps of the breathing process.

**Reading Check** List What are the three steps of the breathing process?

▼ FIGURE 8.3

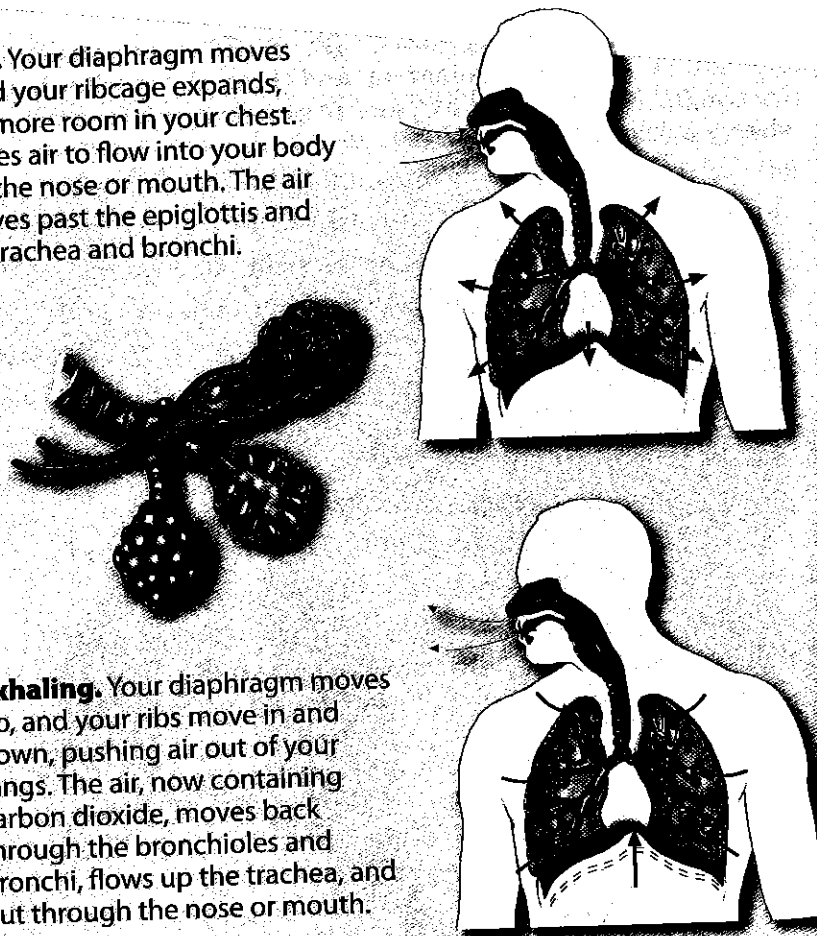
### How BREATHING WORKS

Your brain controls your respiratory system, so you breathe automatically. You don't have to think about breathing. **What chemical compound is contained in exhaled air?**

**1 Inhaling.** Your diaphragm moves down and your ribcage expands, creating more room in your chest. This causes air to flow into your body through the nose or mouth. The air then moves past the epiglottis and into the trachea and bronchi.

**2 Inside Your Lungs.** The bronchi divide into smaller passageways called bronchioles (BRAHNG-kee-ohlz). Air flows through the bronchioles into the alveoli, which are surrounded by capillaries. In the capillaries, oxygen moves from the air into the bloodstream, and carbon dioxide from the blood moves into the alveoli.

**3 Exhaling.** Your diaphragm moves up, and your ribs move in and down, pushing air out of your lungs. The air, now containing carbon dioxide, moves back through the bronchioles and bronchi, flows up the trachea, and out through the nose or mouth.



## Problems of the Respiratory System

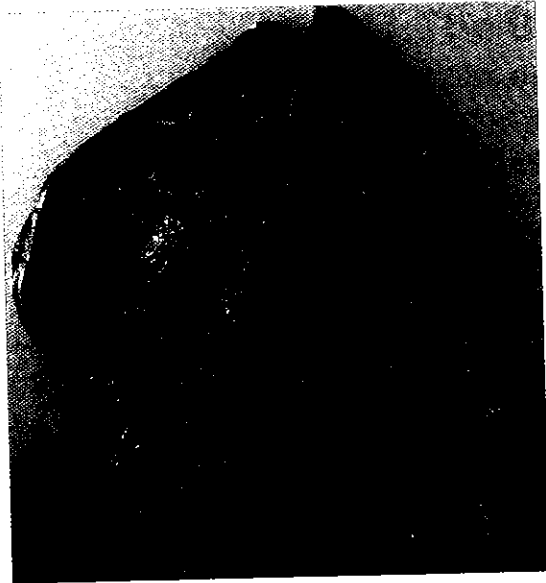
Tobacco use does not cause all the problems that can affect your respiratory system. However, it can make many of these problems worse. Tobacco smoke, chemicals, germs, and air pollution all are harmful to your health because they can damage the many parts of your respiratory system. **Figure 8.4** lists some of the problems they can cause.

▼ FIGURE 8.4

### DISEASES AND DISORDERS OF THE RESPIRATORY SYSTEM

People can take medicines to control some respiratory diseases, such as asthma. Without the right treatment, respiratory problems can become dangerous. **Explain how using tobacco contributes to emphysema.**

Disease or Disorder	Description	Treatment
<b>Asthma</b>	Disorder in which airways narrow; symptoms include wheezing or gasping, shortness of breath, coughing	Medication to relieve symptoms; avoiding activities or substances that trigger attacks
<b>Cold/Flu</b>	Illnesses caused by viruses; symptoms include fever, aches, cough, runny nose	Bed rest and liquids; vaccines can prevent some types of flu
<b>Emphysema</b>	Disease in which alveoli lose their ability to stretch; symptoms include extreme difficulty breathing; caused by smoking or severe and uncontrolled chronic asthma.	No known cure; pure oxygen can make breathing easier
<b>Lung Cancer</b>	Uncontrolled growth of cells that reproduce abnormally in lungs; often caused by smoking	Surgery, radiation, chemotherapy; survival rates are very low
<b>Mouth and Tongue Cancer</b>	Uncontrolled growth of cells in the mouth and tongue; can cause growths called tumors that show on the cheeks and lips; almost always caused by tobacco use	Surgery, radiation, chemotherapy; survival rates are very low if it spreads
<b>Pneumonia</b>	Bacterial or viral disease that affects the lungs; symptoms include fever, breathing difficulty, chest pain	Antibiotics for bacterial type; bed rest for viral type
<b>Tuberculosis</b>	Bacterial disease that affects the lungs; symptoms include tiredness, cough; can be fatal	Antibiotics



▲ The top photo is a healthy lung. The bottom photo is a cancerous lung. Healthy lungs provide oxygen to your body. **What happens to the cells in the lungs if they get lung cancer?**

## Respiratory Diseases

When did you last have a cold or the flu? These are two of the most common respiratory diseases. You usually get over a cold or the flu in a few days. Smoking does not cause colds or the flu. However, smoking makes it harder to get over a cold or the flu.

If your respiratory system is not healthy, you can develop chronic, or ongoing, disease, such as emphysema. Emphysema damages alveoli in the lungs. There is no cure for emphysema, but in most cases it can be prevented by not smoking tobacco.

Tobacco use can also aggravate or increase the symptoms of asthma. Asthma is a chronic respiratory disease that causes air passages to become narrow or blocked, making breathing difficult. A person with asthma suffers shortness of breath. He or she coughs and gasps for air. Some forms of asthma are triggered by strenuous exercise. Recent research indicates that asthma may be influenced by heredity.

Some diseases of the respiratory system are inherited, such as cystic fibrosis (CF). A person with CF also has trouble breathing. The disease causes the lungs to make abnormally sticky mucus. A person with CF may feel like he or she cannot breathe at all.

**Reading Check** Describe What are the symptoms of cystic fibrosis?

## Cancer

Smoking can cause cancer. Cancer is the uncontrolled growth of cells. Cancer can spread from one part of the body to another and attack healthy tissues and organs. All tobacco products contain substances that can cause cancer. Smoking can cause cancers of the mouth, throat, lung, kidney, and bladder. Lung cancer is the leading cause of death among people who smoke. Lung cancer is hard to diagnose and can spread quickly. A person who quits smoking can reduce the risk of developing cancer.

Smokeless tobacco can cause cancers of the mouth, head, and neck. Someone who uses smokeless tobacco has a higher risk of developing cancer than a smoker does. One-half to three-quarters of smokeless tobacco users develop mouth sores, or ulcers. These sores can disappear if the user quits. Quitting the use of smokeless tobacco reduces the risk of developing mouth cancer.

## Tips for Taking Care of Your Respiratory System

Your whole body depends on a healthy respiratory system. The following positive health practices can help you keep it that way:

- Avoid tobacco use.
- Stay away from people who smoke. Don't go places where the air is smoky.
- Take care of your body when you have a cold, the flu, or any other respiratory illness.
- Drink plenty of fluids.
- Take deep, full breaths often.
- Eat a healthful diet.
- Get outside and breathe fresh air.
- Pay attention to any allergy alerts, ozone alerts, and pollution alerts announced for your area.
- Be physically active on a regular basis.

**Reading Check** Name List two ways you can care for your respiratory system.

### Health Online

Visit [health.glencoe.com](http://health.glencoe.com) and complete the Interactive Study Guide for Lesson 2.

## Lesson 2 Review

### After You Read

Review this lesson for new terms, major headings, and Reading Checks.

### What I Learned

1. **Vocabulary** Define *trachea*.
2. **Explain** Why do you need oxygen to live?
3. **Identify** Name the different parts of the respiratory system.
4. **List** Name four respiratory illnesses.

### Thinking Critically

5. **Describe** How might quitting smokeless tobacco use affect the health of the mouth?

6. **Analyze** Why is it important to take care of your respiratory system when you have a cold or the flu?

### Applying Health Skills

7. **Communication Skills** Write a letter to a filmmaker. Ask the filmmaker to ban smoking scenes in movies. Explain why filmmakers should want to send out a tobacco-free message to everyone, especially children and teens. Use facts from this lesson in your letter.