

SECTION 4 The Respiratory System

BEFORE YOU READ

After you read this section, you should be able to answer these questions:

- What is the respiratory system?
- What are some respiratory disorders?

What Is the Respiratory System?

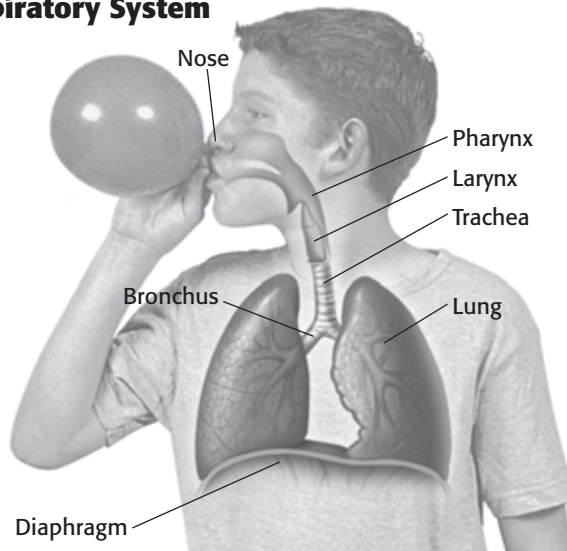
Breathing: you do it all the time. You're doing it right now. You probably don't think about it unless you can't breathe. Then, it becomes very clear that you have to breathe in order to live. Why is breathing important? Breathing helps your body get oxygen. Your body needs oxygen in order to get energy from the foods you eat.

The words *breathing* and *respiration* are often used to mean the same thing. However, breathing is only one part of respiration. **Respiration** is the way the body gains and uses oxygen and gets rid of carbon dioxide. ✓

Respiration is divided into two parts. The first part involves inhaling and exhaling, or breathing. The second part is cellular respiration. *Cellular respiration* involves the chemical reactions that let you get energy from food.

The **respiratory system** is the group of organs and structures that take in oxygen and get rid of carbon dioxide. The nose, throat, lungs, and passageways that lead to the lungs make up the respiratory system.

Parts of the Respiratory System



STUDY TIP

Compare Make a chart showing the features of the different parts of the respiratory system.

READING CHECK

1. Define What is respiration?

TAKE A LOOK

2. List What are the parts of the respiratory system?

SECTION 4 The Respiratory System *continued*

THE NOSE, PHARYNX, LARYNX, AND TRACHEA

Your *nose* is the main passageway into and out of the respiratory system. You breathe air in through your nose. You also breathe air out of your nose. Air can also enter and leave through your mouth. ✓

✓ **READING CHECK**

3. Describe What is the main function of the nose?

From the nose or mouth, air flows through the **pharynx**, or throat. Food and drink also move through the pharynx on the way to the stomach. The pharynx branches into two tubes. One tube, the *esophagus*, leads to the stomach. The other tube leads to the lungs. The larynx sits at the start of this tube.

The **larynx** is the part of the throat that contains the vocal cords. The *vocal cords* are bands of tissue that stretch across the larynx. Muscles connected to the larynx control how much the vocal cords are stretched. When air flows between the vocal cords, the cords vibrate. These vibrations make sound.

The larynx guards the entrance to a large tube called the **trachea**, or windpipe. The trachea is the passageway for air traveling from the larynx to the lungs. ✓

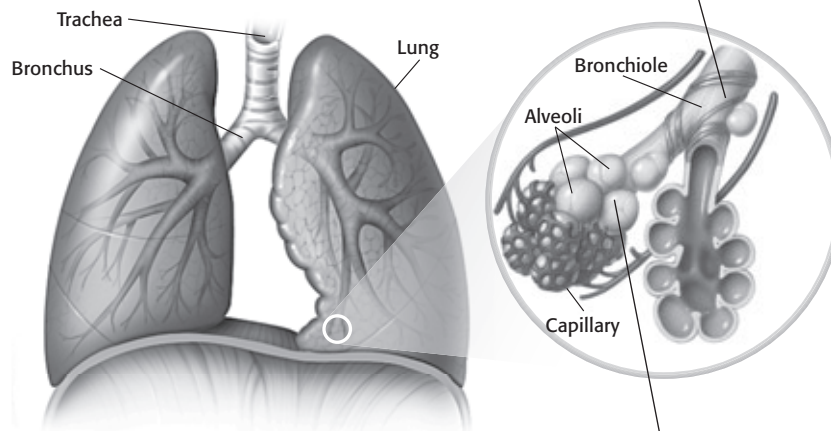
✓ **READING CHECK**

4. Identify What is the trachea?

THE BRONCHI AND ALVEOLI

Inside your chest, the trachea splits into two branches called **bronchi** (singular, *bronchus*). One bronchus connects to each lung. Each bronchus branches into smaller and smaller tubes. These branches form a smaller series of airways called *bronchioles*. In the lungs, each bronchiole branches to form tiny sacs that are called **alveoli** (singular, *alveolus*).

Inside your lungs, the bronchi branch into bronchioles.



The bronchioles branch into tiny sacs called alveoli. Gases can move between the alveoli and the blood that is in the capillaries.

TAKE A LOOK

5. Infer Which do you have the most of in your lungs: bronchi, bronchioles, or alveoli?

SECTION 4 The Respiratory System *continued*

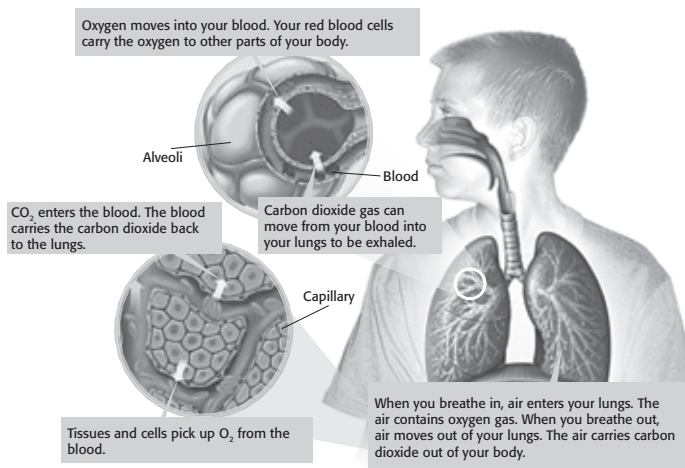
How Does Breathing Work?

Your lungs have no muscles of their own. Instead, your diaphragm and rib muscles do the work that helps you breathe. The *diaphragm* is a dome-shaped muscle underneath the lungs. When the diaphragm contracts and moves down, you inhale. At the same time, some of your rib muscles contract and lift your rib cage. The volume of your chest gets larger. As a result, air is sucked in.

Exhaling is this process in reverse. Your diaphragm relaxes, your rib muscles relax, and air moves out.

BREATHING AND CELLULAR RESPIRATION

In cellular respiration, cells use oxygen to release the energy that is stored in molecules of a sugar. This sugar is called *glucose*. When cells break down glucose, they give off carbon dioxide.



Critical Thinking

6. Predict Consequences

What would happen to a person whose diaphragm could not contract?

TAKE A LOOK

7. Explain How does oxygen gas get from the air into the cells in your body?

What Are Some Respiratory Disorders?

People who have *respiratory disorders* have trouble getting the oxygen they need. Their cells cannot release all the energy they need from the food they eat. Therefore, these people may feel tired all the time. They may also have problems getting rid of carbon dioxide. The carbon dioxide can build up in their cells and make them sick.

Respiratory Disorder	What it is
Asthma	A disorder that causes bronchioles to narrow, making it hard to breathe.
Emphysema	A disorder caused when alveoli are damaged.
Severe Acute Respiratory Syndrome (SARS)	A disorder caused by a virus that makes it hard to breathe.

Section 4 Review

SECTION VOCABULARY

<p>alveolus any of the tiny air sacs of the lungs where oxygen and carbon dioxide are exchanged</p> <p>bronchus one of the two tubes that connect the lungs with the trachea</p> <p>larynx the area of the throat that contains the vocal cords and produces vocal sounds</p> <p>pharynx in flatworms, the muscular tube that leads from the mouth to the gastrovascular cavity; in animals with a digestive tract, the passage from the mouth to the larynx and esophagus</p>	<p>respiration the exchange of oxygen and carbon dioxide between living cells and their environment; includes breathing and cellular respiration</p> <p>respiratory system a collection of organs whose primary function is to take in oxygen and expel carbon dioxide; the organs of this system include the lungs, the throat, and the passageways that lead to the lungs</p> <p>trachea in insects, myriapods, and spiders, one of the network of air tubes; in vertebrates, the tube that connects the larynx to the lungs</p>
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1. **List** What are three respiratory disorders?

2. **Define** What is cellular respiration?

3. **Compare** How is respiration different from breathing?

4. **Explain** The nose is the main way for air to get into and out of your body. How can a person still breathe if his or her nose is blocked?

5. **Describe** How do vocal cords produce sound?

6. **Explain** What are two ways that a respiratory disorder can make a person sick?
