

The Respiratory System

Read the text below. Then, answer the questions on pages 2 and 3.

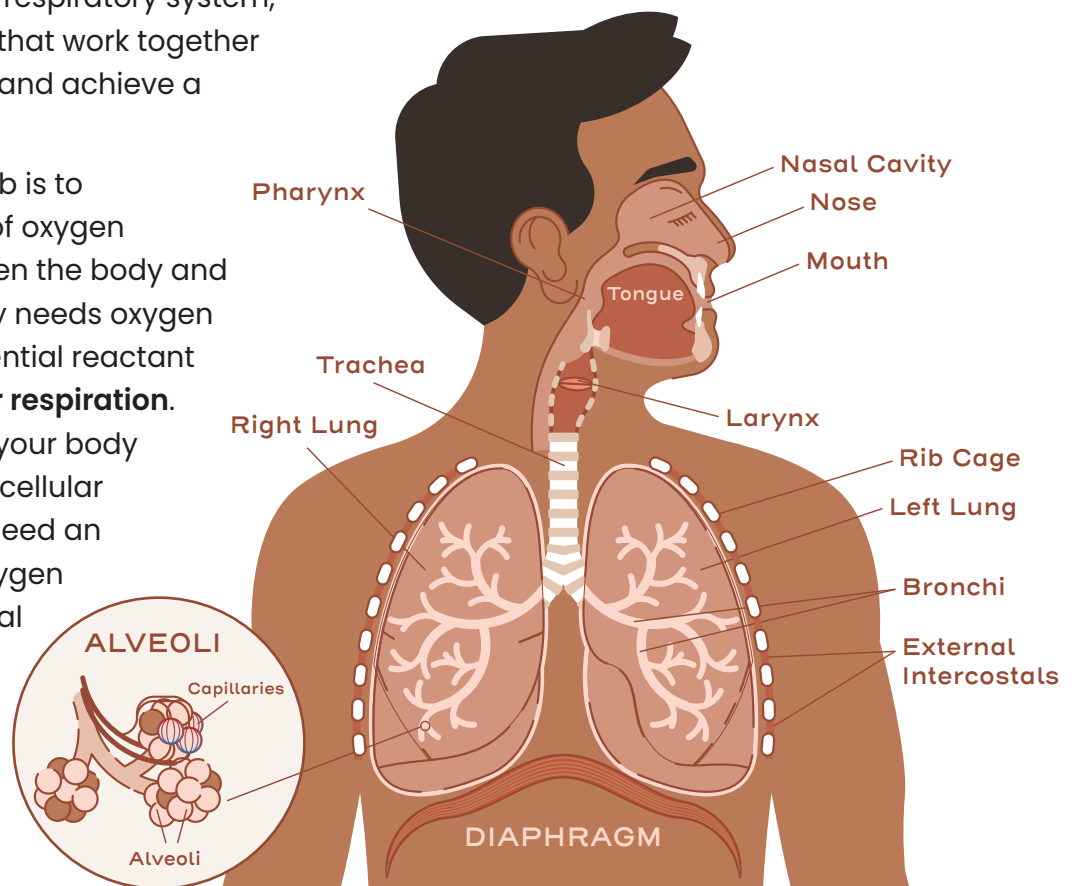
Take a deep breath in. Now, exhale. Did you know that there are tons of different cells, tissues, and organs in your body working together when you breathe? They are all part of an organ system known as the **respiratory system**.

To understand the respiratory system, we must first understand how the human body is organized. Organisms contain many layers of organization:

- **Cells** are the basic units of structure and function.
- **Tissues** are groups of similar cells that perform a common function.
- **Organs** contain two or more tissue types that work together to perform more complex functions.
- **Organ systems**, like the respiratory system, contain related organs that work together to coordinate activities and achieve a common function.

The respiratory system's job is to coordinate the exchange of oxygen and carbon dioxide between the body and the atmosphere. Your body needs oxygen because oxygen is an essential reactant in a process called **cellular respiration**. Cellular respiration is how your body makes energy. In order for cellular respiration to occur, cells need an uninterrupted supply of oxygen and the continuous removal of carbon dioxide, a waste product.

This exchange of gases is accomplished through breathing. **Quiet breathing**, which is the normal breathing that occurs when you are relaxed, begins with a dome-shaped organ underneath your rib cage called the **diaphragm**. The diaphragm is made up of muscle and tendon cells. The muscle cells are organized into muscular tissue, which allows the diaphragm to move, while the tendon cells are organized into connective tissue, which holds the different sections of the diaphragm together. When the muscular tissue contracts, the diaphragm flattens and increases the volume inside your chest cavity. This muscle contraction, in combination with the contraction of the muscles around your rib cage called the **external intercostals**, draws air into your body through your nose.

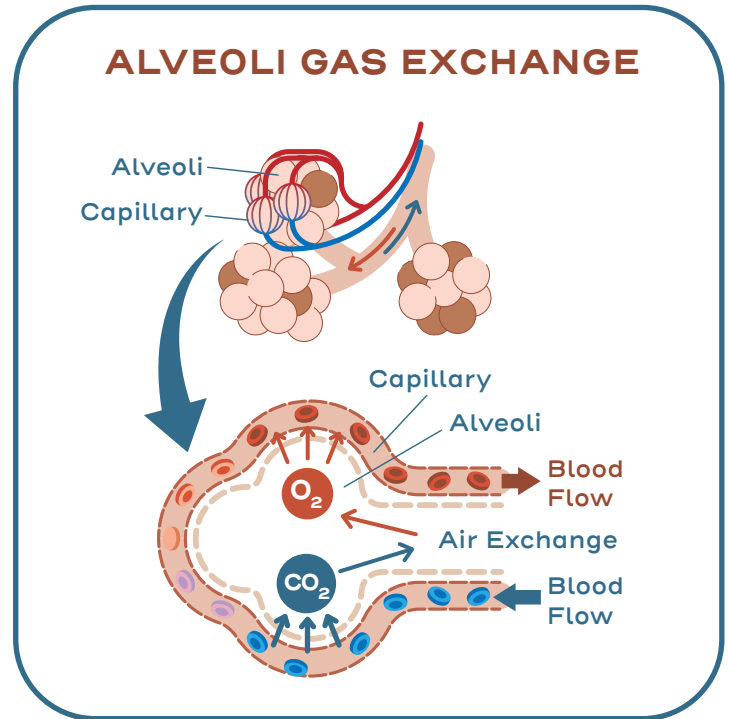


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Keep going! Read the text below. Then, answer the questions that follow.

Air then travels through your **nasal cavity**, **pharynx** (or *throat*), **larynx** (or *voice box*), and **trachea** (or *windpipe*) before it enters your **lungs**. Inside your lungs, the air continues to travel through branch-like structures called **bronchi** before it reaches the **alveoli**. Alveoli look like small sacs, and they are covered in small blood vessels called **capillaries**. Gas exchange takes place at the alveoli. Carbon dioxide moves from the blood to the alveoli, while oxygen from the air moves from the alveoli to the blood. When you exhale, your diaphragm and external intercostals relax, and the carbon dioxide is pushed out of your lungs and into the atmosphere through your nose.

The respiratory system works together with other organ systems in your body to keep you alive. For example, once oxygen passes from the alveoli into the capillaries, it is the job of the **cardiovascular system** to circulate the oxygenated blood throughout your body and to deliver carbon dioxide waste to the lungs for disposal.



Additionally, the respiratory system works together with the **nervous system** to achieve quiet breathing. The brain triggers the muscles involved in breathing to relax and contract without conscious thought. In other words, you don't have to think about breathing—your body makes it happen automatically!

Show what you know! Use the reading to answer the questions below.

1. Write these terms in order from smallest to largest: **organ system**, **cell**, **organ**, and **tissue**.

2. Why is the diaphragm considered an organ, instead of a cell, tissue, or organ system?

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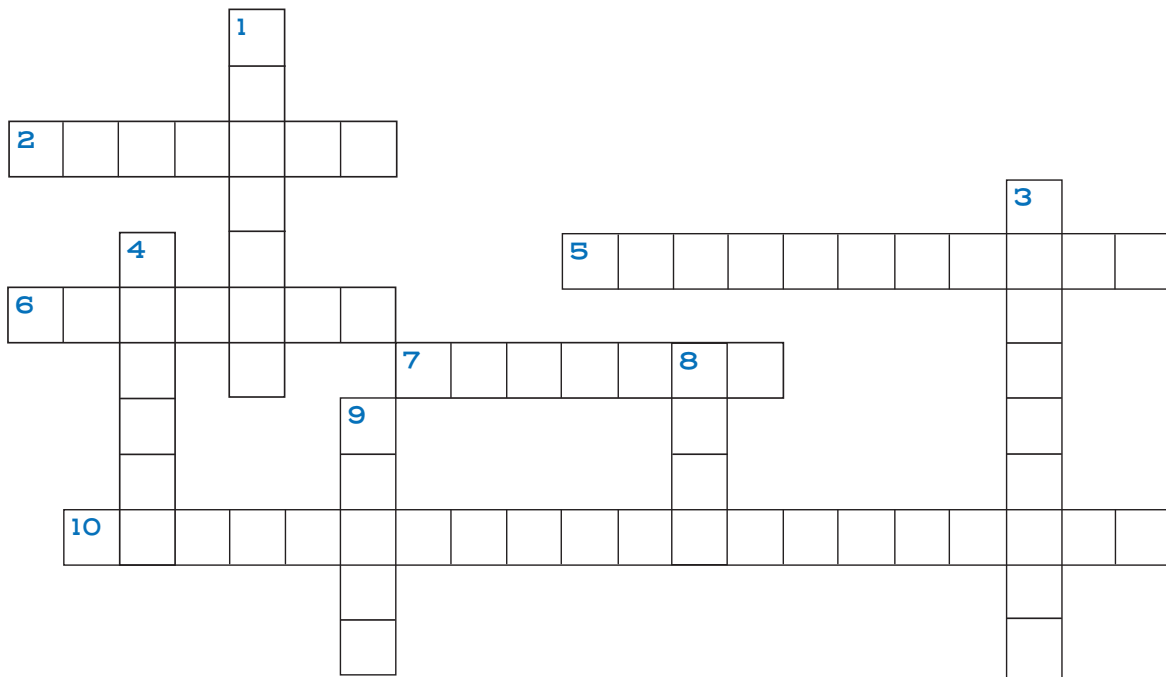
Keep going! Answer the questions below.

3. How does the diaphragm help the alveoli do their job during respiration?

4. Describe one way the respiratory and cardiovascular systems work together.

5. Describe one way the respiratory and nervous systems work together.

6. Use the vocabulary terms from the passage to complete the crossword puzzle.



Across

- 2. small sacs; site of gas exchange
- 5. small blood vessels
- 6. windpipe
- 7. throat
- 10. muscles around the rib cage

Down

- 1. branch-like structures in the lungs
- 3. dome-shaped organ under the rib cage
- 4. voice box
- 8. where air enters the body
- 9. pair of organs inside the rib cage