

For use with the unit: The Inside Story
Reading in the content area.
(L.A.A.2.2.1.4.1)

Breathing

Have you ever been out of breath? . . . out of breath? How can that be? If someone were out of breath, would the cells die since they do not have any oxygen? Would the lungs collapse since there is no air to hold them open? Before *we* get out of breath from reading all these questions, let's learn about breathing. Just how does the respiratory system work to supply oxygen to our cells and then remove the carbon dioxide from those same cells?

Our cells need oxygen to stay alive, but the air we breathe has a lot more in it than just oxygen. Our air is about 78% nitrogen, 21% oxygen, and .09 % argon. The other .01% is a combination of trace amounts of hydrogen, ozone, and carbon dioxide. The only part of the air that our bodies use is oxygen, so as we breathe, our bodies must separate the oxygen from the other gases. As we inhale, or take air in, we pull in all the gases in the air around us. As we exhale, or let air out, we push out the gases that our bodies can't use. Breathing is actually just a series of inhaling and exhaling, air with oxygen in, air with carbon dioxide out.

The respiratory system includes all the organs used in the process of delivering oxygen to each cell in the body and disposing of carbon dioxide, a gas given off as a waste product when cells use oxygen. Air first enters our bodies through the nostrils in our noses or through our mouths. The air then passes down the throat past the larynx, or voice box, and into the trachea, or windpipe. The trachea enters the chest cavity and divides into two branches called the bronchial tubes. Air passes from the trachea into the bronchial tubes and then into the alveoli.

The alveoli do the majority of work in the respiratory system. There are 300 million to 400 million alveoli, these grapelike groups of thin-walled sacs that are contained in the lung tissue. It is in the alveoli that the exchange of gases takes place. These small sacs are only one cell thick, and blood capillaries that are also only one cell thick surround them. Here the oxygen passes into the blood to travel to all our cells and the carbon dioxide from the cells brought by the blood passes into the alveoli. The carbon dioxide, along with the other gases not used by the body, follows the same route back out of our bodies only in reverse order. This mixture of gases travels up the alveoli, up the bronchial tubes, up the trachea, past the larynx, up the throat, and out the nostrils or mouth.

Breathing is more than just the movement of air; it is also the movement of muscles that force air into and out of our bodies. When inhaling, the muscles around the ribcage contract or squeeze the ribs up and out, pushing the large muscle under the ribs, the diaphragm, down flat. When we exhale, the diaphragm and muscles of the ribcage relax to their original position and air is pushed out of the lungs. All of this muscle action is involuntary, although we can voluntarily force ourselves to take deep or fast breaths.

So, have you ever been out of breath? No, your respiratory system makes sure you are taking in oxygen and getting rid of carbon dioxide at just the rate your body needs to keep your cells healthy.

Name _____

Date _____

Breathing

After reading the article, write the correct answer to each of these questions.

1. What is the main idea of this article?

2. What is the smallest organ of the respiratory system?

3. The article states that the alveoli do the majority of the work in the respiratory system. Write at least one detail from the article that supports this claim.

4. We often say that we have air in our lungs, but actually the air is not in the lung tissue, where is it?

Breathing
Answer Key

After reading the article, write the correct answer to each of these questions.

1. What is the main idea of this article?

How does the respiratory system work to supply oxygen to our cells and then remove the carbon dioxide from those same cells? (Main idea)

2. What is the smallest organ of the respiratory system?

Alveoli (Implicit)

3. The article states that the alveoli do the majority of the work in the respiratory system. Write at least one detail from the article that supports this claim.

It is in the alveoli that the exchange of gases takes place. (Explicit)

4. We often say that we have air in our lungs, but actually the air is not in the lung tissue, where is it?

The air is in the alveoli. (Implicit)

Breathing

Sample Outline

I. Air

- A. Nitrogen
- B. Oxygen
- C. Argon
- D. Other gases

II. Breathe

- A. Inhale
- B. Exhale

III. Respiratory system

A. Purpose

1. Oxygen to cells
2. Carbon dioxide away from cells

B. Organs

1. Nose, nostrils
2. Mouth
3. Throat
4. Larynx (voice box)
5. Trachea (windpipe)
6. Bronchial tubes
7. Alveoli

C. Muscles

1. Diaphragm
2. Ribcage