Getting to Know: Respiratory

If you like to run, chances are that you are either a sprinter or a jogger. Both types of runners need oxygen to produce energy, but you may have noticed that they don't need the same amount. A jogger keeps a steady pace and maintains an even breathing rate. On the other hand, a sprinter runs very quickly for a short distance and often ends up breathing very heavily.

When you run, your body needs to produce a lot of energy.

To produce the energy our bodies need for running, we take in oxygen through the respiratory system. The *respiratory system* is a system of the body that takes in oxygen and releases carbon dioxide. Intense activities like sprinting require the respiratory system to work very hard because they demand a high amount of energy in a short period of time. Joggers use energy at a slower rate, so the respiratory system does not need to work as hard to sustain them when they run.

Runners are not the only people who need energy. Respiration is actually the key to getting the energy we need for everything we do.

What is the function of the respiratory system?

The *lungs* are the main organs of the respiratory system, and they are closely linked with the circulatory system. During inhalation, the lungs take in oxygen from the air and move it into the bloodstream. The circulatory system carries oxygen-rich blood throughout our bodies so that our cells can use it, along with glucose obtained through the digestive process, to produce energy. When energy is produced, carbon dioxide wastes are also created. During exhalation, the lungs collect carbon dioxide wastes from the blood and release them from the body.

How do the lungs work?

The human body has two lungs. Each time you breathe in, air flows through the *trachea* and into each lung through the *bronchial tube*. Each bronchial tube branches into many small extensions called *bronchioles*. At the end of each branch, tiny sacs called *alveoli* are used for gas exchange.

A very strong muscle called the *diaphragm* is beneath the lungs. The diaphragm is responsible for controlling the motion of inhaling and exhaling.

Misconception 1: ***The cells in the heart must need also oxygen. Do they get it from the blood pumping through the heart?***

The cells in the heart do not receive oxygen from the blood that is being pumped through the inside of the heart. There are special arteries, known as coronary arteries, on the outside of the heart. These arteries connect to blood vessels that supply oxygen to the heart.

Misconception 2: ***Do all living things breathe through their lungs?***

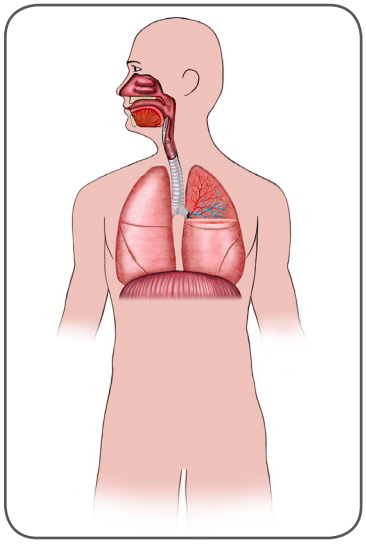
Not all living things use lungs for respiration. Aquatic organisms such as fish use gills to breathe in oxygen through water, whereas plants use organs called stomata for gas exchange.

How does gas exchange work?

Gas exchange in the body is based on the principle that gases tend to move from areas of higher concentration to areas of lower concentration. There are two types of gas exchange that take place in the body during respiration.

Gas exchange during breathing takes place in the alveoli, where carbon dioxide from blood cells diffuses into the lungs to be exhaled. This allows the same blood cells to pick up oxygen, which is then carried to every cell in the body.

A second process of gas exchange takes place between the bloodstream and the body cells. Cells will release carbon dioxide into the blood as a waste product. At the same time, oxygen in the blood will diffuse through the cell walls and into the cells. The cells will then use the oxygen to produce the energy that we need to live.



When you breathe, your lungs exchange oxygen for carbon dioxide.

Misconception 3: ***I always thought that only certain cells in the body produce energy. Is that true?***

Every single cell in the body needs to produce energy. To do so, all cells need the oxygen that is provided through respiration.

In this lesson, you will learn more about the respiratory system, how it functions, and how it is related to the other systems in the human body. As you complete the activities, think about all the different things that are going on inside your body every time you breathe.