



HOW WE BREATHE

Breathing in and out may be something you don't think about very much. This may change when you have a cold, an asthma attack, or an illness that makes it hard to breathe. To better understand things like chronic obstructive pulmonary disease (COPD) and asthma, let's see how breathing happens in normal, healthy lungs.

Your lungs are part of what is called the respiratory system, a group of organs and tissues that work together to help you breathe. The respiratory system's main job is to move fresh air with oxygen into your body while removing air with carbon dioxide from your body.

The respiratory system also does other things that are important for breathing, such as:

- Changing the air you breathe in to the right temperature and humidity
- Coughing, sneezing, or swallowing to keep you from breathing in harmful things, to keep your body safe

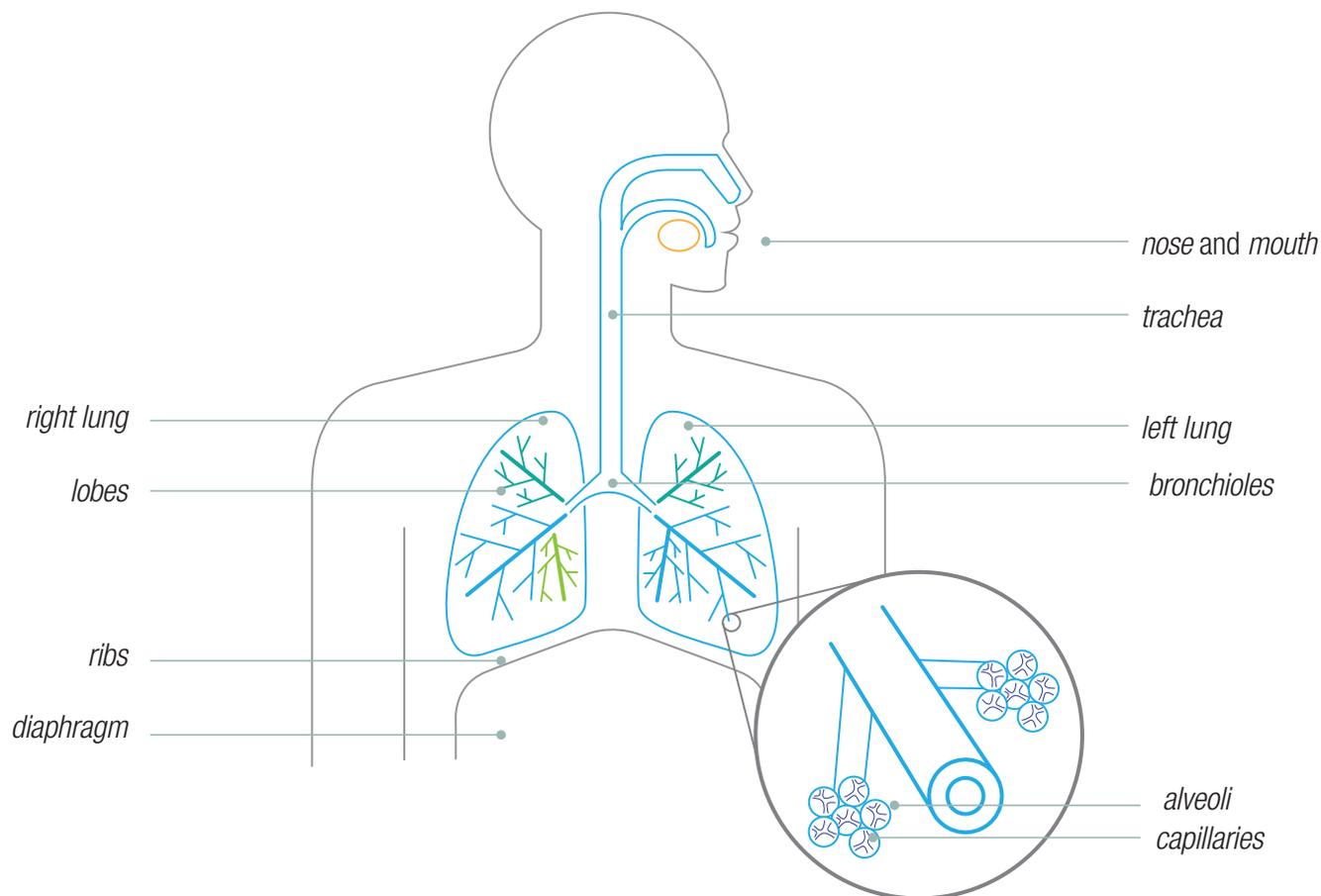
Breathing by the Numbers

Your lungs help you breathe **12 to 15 times** a minute when you are resting—that's over **6 million** breaths in **1 year** alone!

Think of the respiratory system as a pipe in which all parts are connected and each area affects another area.

Here are the parts of the respiratory system:

- Your *nose* and *mouth* bring air into the body. The hairs lining your nose help clean the air you breathe
- Your *throat*, also called the *pharynx*, brings the air from your nose and mouth down to your *windpipe* (also called the *trachea*), which connects the throat to the lungs by 2 main *bronchial tubes*, one for each lung
- These bronchial tubes branch further into *bronchioles*. At the end of the smallest branches are the *alveoli*, or air sacs—these are the destination of air that you breathed in
- *Capillaries* are tiny blood vessels in the walls of the alveoli. Blood passes through these capillaries, entering through your *pulmonary artery* and leaving via your *pulmonary vein*. While in the capillaries, blood gives off carbon dioxide through the capillary wall into the alveoli and takes up oxygen from the air in the alveoli
- You have 2 *lungs*. The right lung is divided into 3 *lobes*, or parts. The left lung is divided into 2 lobes. Air moves in and out of the lungs through the branches of the bronchial tubes
- *Cilia* are very small hairlike projections that line your bronchial tubes. The cilia move like waves and carry mucus and other foreign matter up and out of the lungs to your throat where it is either coughed up or swallowed. Mucus catches and holds the germs and dust that may have invaded the lungs. You get rid of mucus and foreign matter when you cough or sneeze
- Your *diaphragm* is a strong wall of muscle that separates your chest from your stomach. When the diaphragm moves down, it pulls air into the lungs
- Your *ribs* support and protect your chest. They move slightly to let your lungs expand and contract



The inside story of the lungs

When you take in a breath, the air is filled with oxygen. The air goes down your windpipe into the bronchial tubes. These tubes branch out further into thousands of smaller, thinner tubes called bronchioles when they reach the lungs. At the end of the bronchioles are groups of tiny, round air sacs called alveoli.

When the air you breathe in reaches the air sacs, the oxygen passes into tiny blood vessels called capillaries, which run through the alveoli's walls. At the same time, carbon dioxide, the waste that comes from the cells after they use the oxygen, moves out of the capillaries into the alveoli. This is called a gas exchange. Life-sustaining oxygen now fills the blood vessels and is delivered throughout your body. The air that contains the carbon dioxide then moves up and out of your lungs.

The bronchial tubes and air sacs are very stretchy. When you breathe in, each air sac fills up with air like a balloon. When you breathe out, the air sacs deflate.

Lung capacity decreases as you get older. You can help keep lungs healthy by not smoking, eating a healthy diet, exercising, and managing your stress.

