



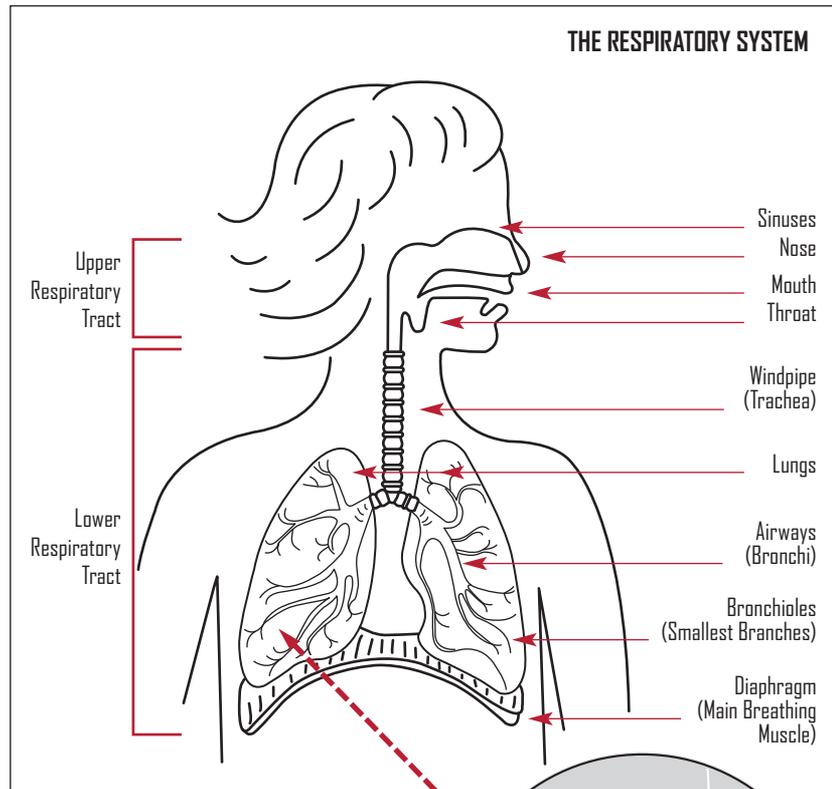
CF FACTS – THE RESPIRATORY SYSTEM

Breathing is automatic. A special part of our brain controls our breathing without us even having to think about it. Each time we take a breath, air that passes in and out of the **lungs*** provides our bodies with oxygen that we need to live.

The **respiratory system*** contains the parts of the body responsible for breathing—the act of taking in oxygen and releasing **carbon dioxide***. The respiratory system is divided into the upper and lower respiratory tracts.

THE UPPER RESPIRATORY TRACT

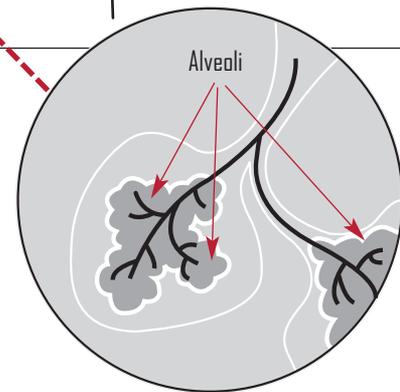
The **upper respiratory tract*** includes the nose, **sinuses***, mouth, and throat. The nose and sinuses help warm and filter the air we breathe. As the air passes through the nose, mouth and into the vocal cords in the throat, moisture is added to the air before it enters the **windpipe* or trachea***. (The windpipe is part of the **lower respiratory tract***.) The movement of air back and forth through the vocal cords is how we make sounds and talk.



THE LOWER RESPIRATORY TRACT

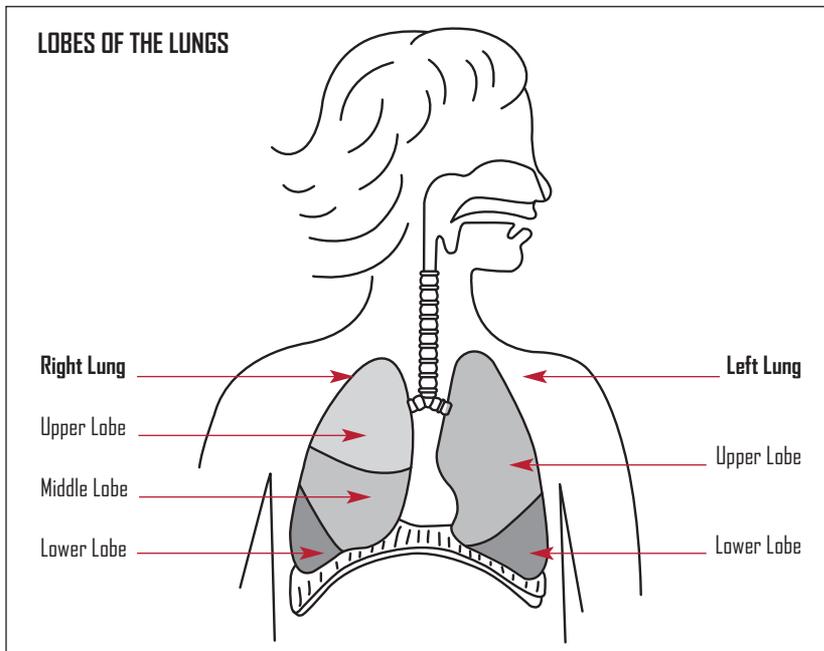
The lower respiratory tract includes the windpipe (trachea), airways, and lungs. The lungs and windpipe inside our chest are protected by the rib cage. When we breathe in, air flows down the trachea into our lungs. The trachea divides into two large airways called **bronchi***. Each of these tubes carries air to one of the two lungs. The airways divide like a tree in the lungs into smaller and smaller airways.

The smallest branches of the airways are called **bronchioles***. They carry the air deep into the lungs. The bronchioles end in tiny **air sacs*** called **alveoli***.



The alveoli are grape-like clusters of air sacs. There are millions of alveoli in the lungs. The alveoli give the lungs the look and texture of a sponge. The process of **gas exchange*** (breathing in oxygen and breathing out carbon dioxide) takes place in the alveoli.

*See CF Words to Know Glossary.



LOBES OF THE LUNGS

Each lung is made up of several sections called **lobes**.* The right lung has three lobes (upper, middle, and lower). The left lung has two lobes (upper and lower). The left lung is somewhat smaller because the heart also has to sit in the left side of the chest.

GAS EXCHANGE

The lungs provide oxygen for the whole body and get rid of carbon dioxide. Carbon dioxide is a gas that is part of the waste from our cells as they use oxygen. Our body needs to breathe out carbon dioxide to stay healthy. Oxygen is used for many functions in the cells. The air we breathe at sea level is made up of 21% oxygen. The air is thinner and contains less oxygen at high altitudes, such as in the mountains.

This exchange of carbon dioxide for oxygen takes place in the alveoli. The walls of the alveoli are very thin and are covered with tiny blood vessels. Oxygen passes through the walls of the alveoli

into the blood. At the same time, carbon dioxide moves from the blood into the air sacs. As we breathe out, carbon dioxide passes out of the alveoli into the bronchi and out of the lungs.

MUSCLES FOR BREATHING

To bring air into the lungs, the body uses several muscles. The main muscle used to breathe is the **diaphragm**.* This big muscle is just under the bottom of the lungs and separates the lungs from the **abdomen**.* When we breathe in, the diaphragm muscle pulls down. This creates suction in the chest that helps expand the lungs and draw air into the airways.

There are also muscles between the ribs and in the neck and the abdomen. These muscles are used more for coughing and when the lungs have to work harder than normal.

