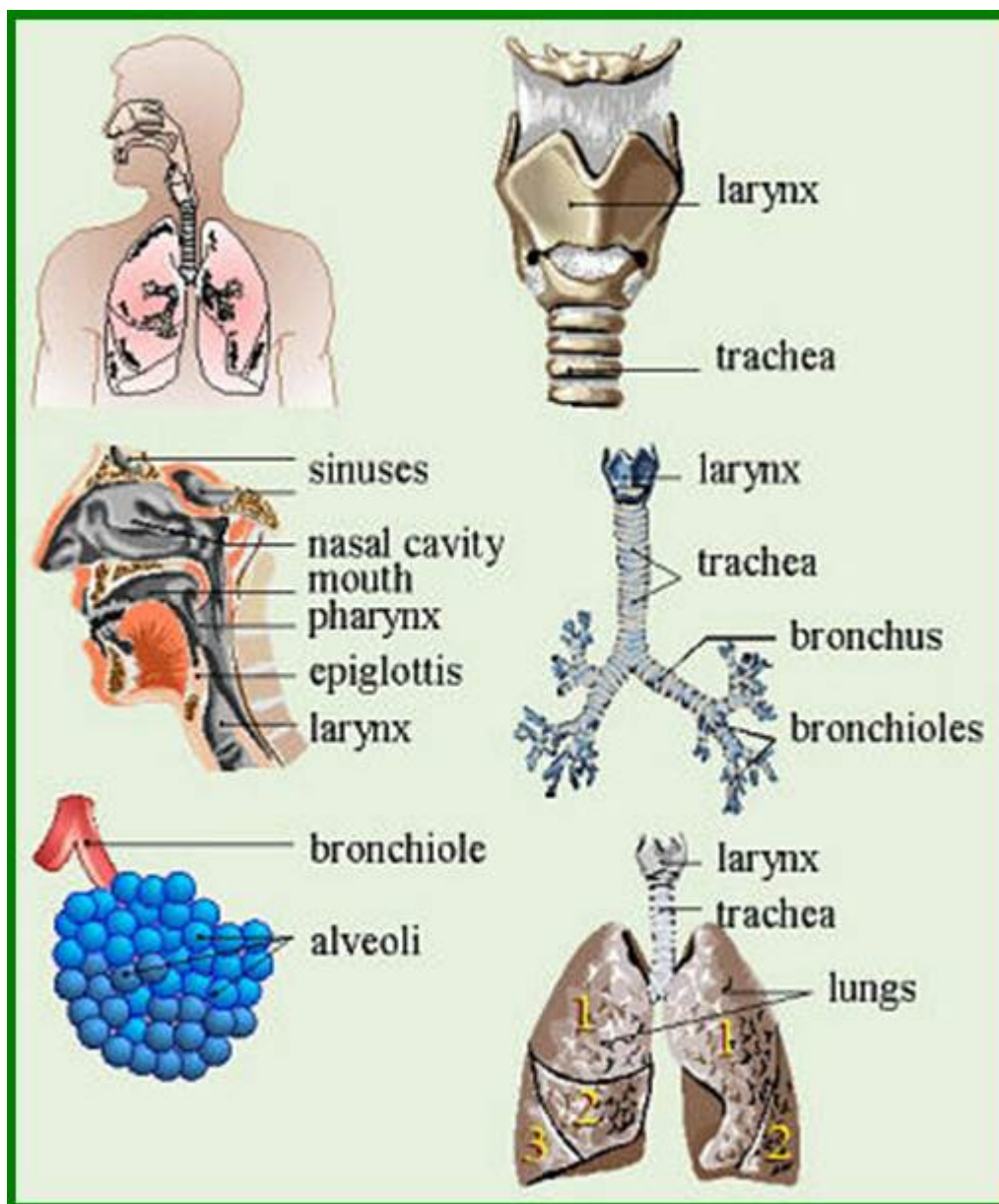


[PDF File](#)

## THE RESPIRATORY SYSTEM

In this unit you will trace the path of the vital process of taking in oxygen and excreting carbon dioxide. You will detail the organs as well as the parts of the organs involved in this process. Good luck!



# THE HUMAN RESPIRATORY SYSTEM

Take a nice deep breath. Inhale through the nose, exhale through your mouth.

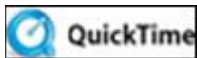
Aaaaahh..... Inhale, exhale. Inhale, exhale. Inhale, exhale.

Hey --- wake up ! Time to learn about the system of organs that's responsible for taking in oxygen and getting rid of carbon dioxide ... the respiratory system.

First, allow me to list the structures and organs that together make up the respiratory system. Your job is to write them down in the order that air passes through them as it is inhaled.

1. alveoli
2. bronchiole
3. bronchus
4. larynx
5. lung
6. pharynx
7. nasal cavity
8. nostril
9. trachea
10. diaphragm

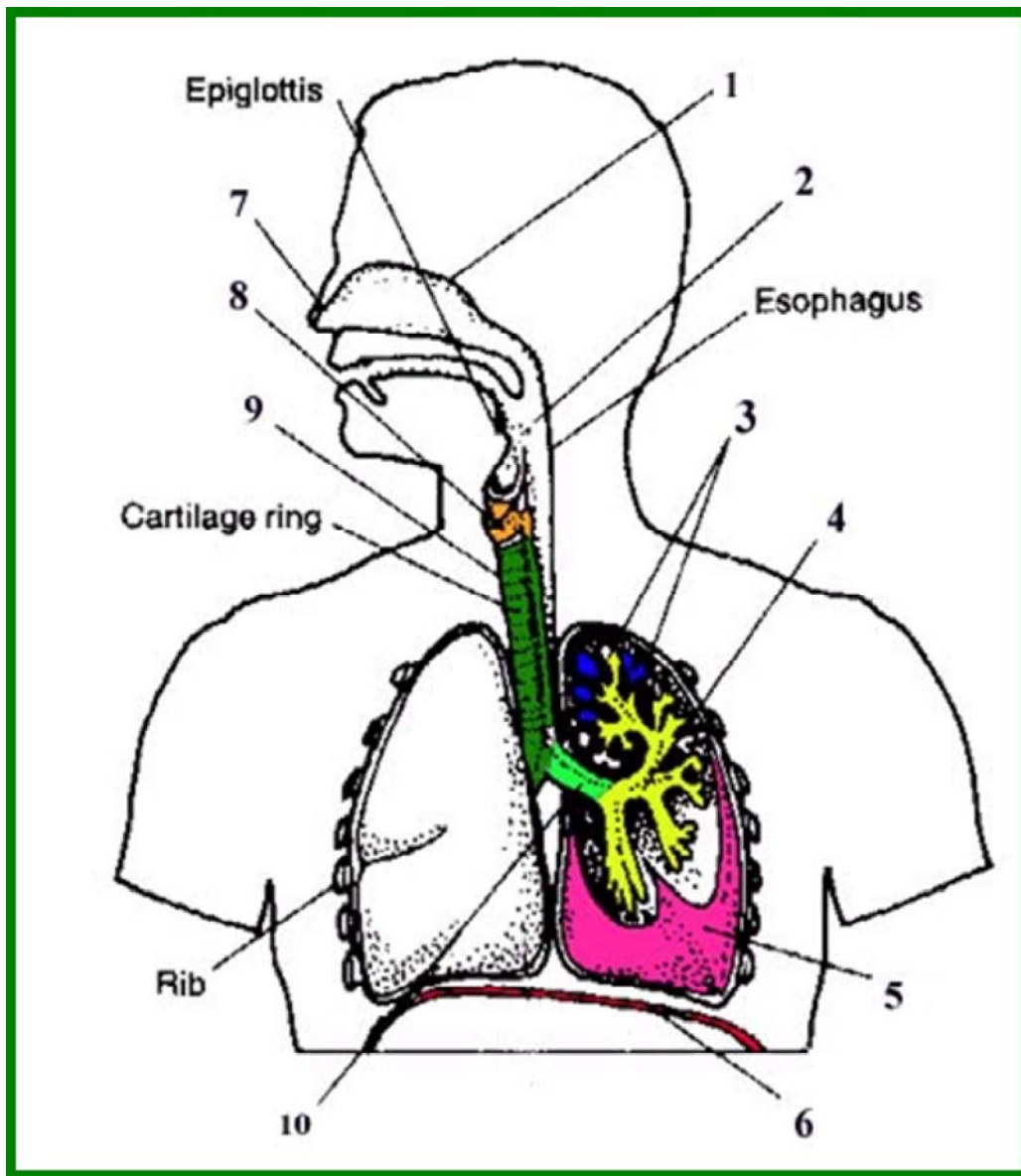
Now let's take a look at what those respiratory structures look like.



Functions of the Respiratory System

You are now to identify and label those same organs and structures that we listed just a minute ago?

|                           |                    |                 |                     |
|---------------------------|--------------------|-----------------|---------------------|
| <b>alveoli (air sacs)</b> | <b>bronchioles</b> | <b>bronchus</b> | <b>diaphragm</b>    |
| <b>larynx</b>             | <b>lung</b>        | <b>pharynx</b>  | <b>nasal cavity</b> |
| <b>nostril</b>            | <b>trachea</b>     |                 |                     |



Click on the [PDF](#) to see answers:

Notes:

- The esophagus is part of the digestive system. It is the tube leading to the stomach.
- The epiglottis is a flab of flesh (tissue) that covers the trachea (windpipe) when you swallow so that food doesn't "go down the wrong pipe". in other words, the epiglottis prevents choking.
- The lungs lie (well protected) behind the ribs in the chest cavity.
- a membrane called the *pleura* surrounds each lung

Here is a summary of the functions of each Respiratory Structure

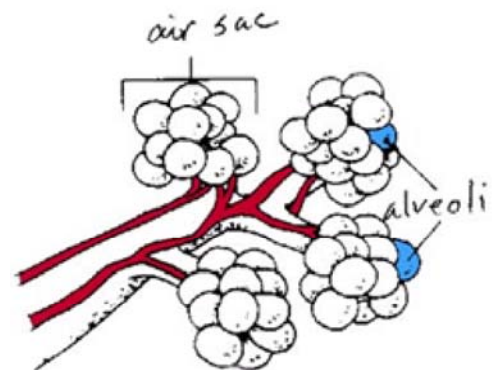
| STRUCTURE | FUNCTION  |
|-----------|---|
|           | warms, moistens, and filters air as it is inhaled |

|                     |   |
|---------------------|---|
| nose / nasal cavity |   |
| pharynx (throat)    | passageway for air, leads to trachea  |
| larynx              | the voice box, where vocal chords are located   |
| trachea (windpipe)  | tube from pharynx to bronchi<br>rings of cartilage provide structure, keeps the windpipe "open"<br>trachea is lined with fine hairs called <i>cilia</i> which filter air before it reaches the lungs                                  |
| bronchi             | two branches at the end of the trachea, each lead to a lung   |
| bronchioles         | a network of smaller branches leading from the bronchi into the lung tissue and ultimately to air sacs  |
| alveoli             | the functional respiratory units in the lung where gases (oxygen and carbon dioxide) are exchanged (enter and exit the blood stream)  |
| diaphragm           | This muscular structure acts as a floor to the chest (thoracic) cavity as well as a roof to the abdomen. It helps to expand and contract the lungs, forcing air into and out of them.   |
| lung                | The lungs are the essential organs of respiration. The main function of the lungs is to exchange carbon dioxide for oxygen and vice versa. Each lung is enclosed separately within two membranes, like a balloon inside a bag inside. |

### Let's take a closer look at the air sacs (alveoli) in the lungs.

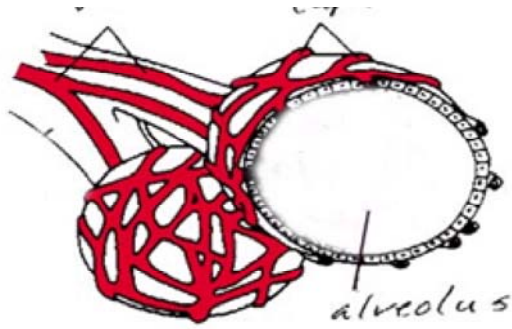
As the bronchioles branch out into smaller and smaller and smaller and smaller and smaller tubes, they eventually lead to microscopic clusters of alveoli, which are referred to as air sacs. You can think of the air sacs as a bunch of grapes, with each individual grape representing a single alveolus like this:

A close-up of the air sacs, which are located at the ends of the bronchioles. Each "air sac" is comprised of a cluster of alveoli. The red structures represent blood vessels leading to and from the air sacs.



This is an even closer look at an alveolus. Notice that the wall of an alveolus is only one cell thick. This allows gases to diffuse into and out of the alveoli.

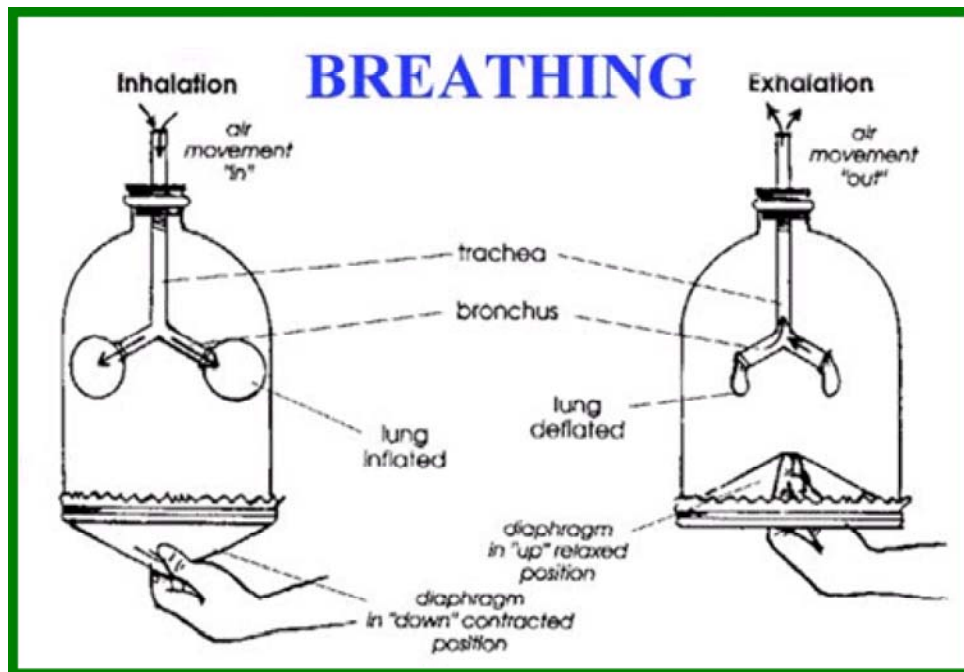
blood vessels      capillaries



Also notice that the alveoli are surrounded by capillaries so that oxygen and carbon dioxide can be exchanged between the lungs and the blood. Oxygen in the alveolus can diffuse into the bloodstream (and be transported throughout the body) and carbon dioxide in the bloodstream can enter the alveoli (and then be exhaled).

**And now a few words about breathing!**

There are no muscles in your lungs. They do not actively pump air in unit out, in unit out. The muscle responsible for breathing actually lies below the lungs. It is like a rubber sheet that separates your chest cavity unit your abdominal cavity. It's name is diaphragm. When you inhale, the diaphragm **contracts unit moves downward**, which creates more space in your chest cavity unit draws air into the lungs. When you exhale, the diaphragm **relaxes unit moves upward**, forcing air out of the lungs. A common demonstration of the mechanics behind breathing involves a bell jar, some glass tubing, and a couple of balloons. Like so:

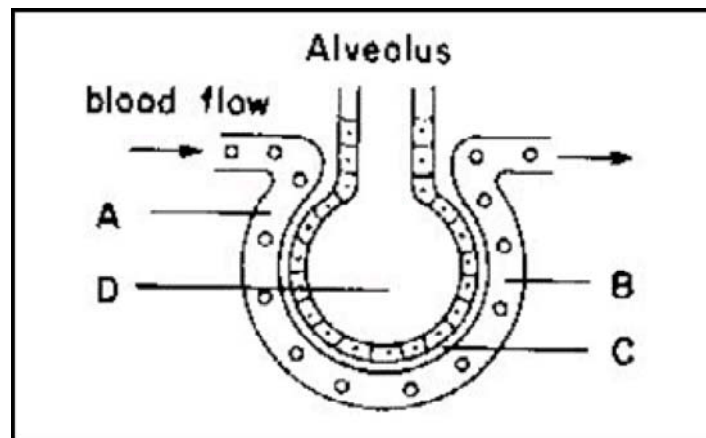


If you look closely at the right side of the diagram, which represent exhaling, you can see how the Heimlich maneuver works. The Heimlich maneuver is the "bear hug" that helps to dislodge food from the windpipe of a choking victim. By pushing upwards below the victims ribs, the diaphragm is forced up and air is forced out of the trachea, hopefully with enough "UmmppHH" to remove the blockage. See, biology can save your life.

One more tidbit: hiccups are muscle spasms in the diaphragm.

| <b>Malfunctions and Diseases of the Respiratory System</b> |   |
|--|---|
| asthma   | severe allergic reaction characterized by the constriction of bronchioles                 |
| bronchitis   | inflammation of the lining of the bronchioles   |
| emphysema  | condition in which the alveoli deteriorate, causing the lungs to lose their elasticity    |
| pneumonia  | condition in which the alveoli become filled with fluid, preventing the exchange of gases |
| lung cancer  | irregular and uncontrolled growth of tumors in the lung tissue                            |

Keep your lungs happy and healthy --- keep them SMOKE FREE.



To learn more about the Respiratory System click on the PDF link and print out the worksheet.

[PDF Respiratory Information](#)

[Respiratory Worksheet PDF File](#)



Answer questions 1-20

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Below are additional educational resources and activities for this unit.

[Unit 6 Respiratory System Graph](#)

[Unit 6 Respiratory System Matching](#)

[Unit 6 Respiratory System Matching Key](#)