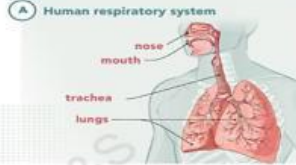


THE RESPIRATORY SYSTEM

The organs of the respiratory system

The **respiratory system** is made of organs that form a path through which air flows into and out of the body. Air enters the body through the nose or mouth and passes through the **trachea** to the **lungs**. These are all the main organs, however, many other organs are also part of the respiratory system.

Where are the lungs and how are they protected?



The function of the organs of the respiratory system

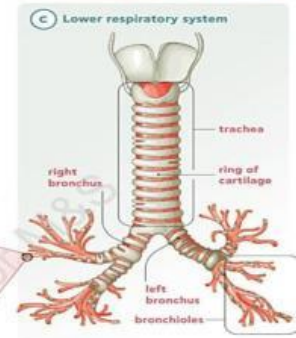
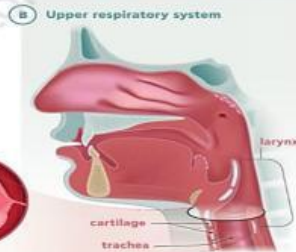
When we breathe in, air enters the body through the nose or the mouth. Hair and mucus in the nose trap some dust particles and microorganisms. Then air passes from the nose to the **larynx**. The larynx, also called the **voice box**, contains the **vocal cords**. Thanks to the vocal cords, we can talk or sing.

The strings of a guitar are an **analogy** for the vocal cords. Just like guitar strings, when the vocal cords vibrate, they produce a sound. The vocal cords vibrate when air flows over them.



The trachea, also called **windpipe**, is the widest tube in the respiratory system, which connects the larynx to the lungs. The trachea is surrounded by rings of **cartilage**, which make the trachea strong and flexible, so that the trachea stays open for air to pass through. The trachea also has the function of trapping dust particles and microorganisms that must not go deeper in the respiratory system. As we breathe in, some dust particles or microorganisms may pass together with the air to the trachea, where they are trapped by the mucus and moved out of the body with the help of the ciliated epithelial cells. The trachea divides into two tubes, the **bronchi**. The bronchi are also surrounded by rings of cartilage. Each bronchus leads to one of the two lungs, where it divides again and again into smaller tubes, called **bronchioles**.

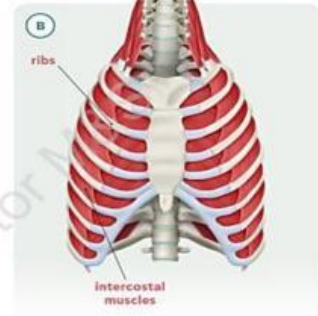
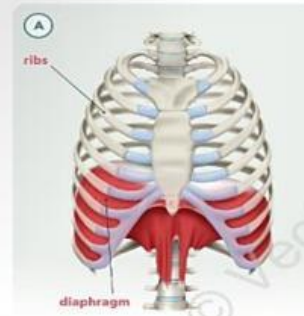
At the end of the bronchioles are tiny **air sacs**, called **alveoli**. In the alveoli, gas exchange between the air and the blood takes place.



4.2 Inhaling and exhaling

Muscles, part of the respiratory system

In addition to the organs of the respiratory system, there are two kinds of muscles that are also involved in breathing. These muscles are the **diaphragm** and the **intercostal muscles**. The diaphragm is a sheet of muscle that has a **domed** shape. It lies below the lungs and separates the **chest cavity** from the abdomen. The intercostal muscles are smaller muscles between the ribs.



Breathing

Breathing is the movement of air into and out of the lungs. This process is not carried out by the lungs themselves, but by the muscles of the respiratory system that help the lungs move.

When we **inhale**, the intercostal muscles contract and move the ribs upwards and outwards, while the diaphragm contracts, moves downwards and becomes flat. These movements increase the volume of the chest cavity and cause our lungs to become bigger, thus reducing the pressure of air inside them.

Air flows from the high pressure outside to the low pressure inside the lungs.

When we **exhale**, the intercostal muscles relax and move the ribs downwards and inwards, while the diaphragm relaxes and moves upwards returning to its domed shape. These movements decrease the volume of the chest cavity and cause our lungs to become smaller, thus increasing the pressure of air inside them. Because the pressure of air inside the lungs has become greater than the pressure of air in the atmosphere, the air is forced out of the lungs.