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Respiration physiology

Respiration is the sequence of events that results in the exchange of oxygen and carbon dioxide between the atmosphere and the body cells. Every ٣ to ٥ seconds, nerve impulses stimulate the breathing process, which moves air through a series of passages into and out of the lungs.

The respiratory system has many functions. Besides helping you inhale (breathe in) and exhale (breathe out), it:

- Allows you to smell.
- Warms air to match your body temperature and moisturizes it to the humidity level your body needs.
- Delivers oxygen to the cells in your body.
- Removes waste gases, including carbon dioxide, from the body when you exhale.
- Protects your airways from harmful substances and irritants.

Parts of the Respiratory System

- Nose and nasal cavity Sinuses
- Mouth
- Throat (pharynx)
- Voice box (larynx)
- Windpipe (trachea)

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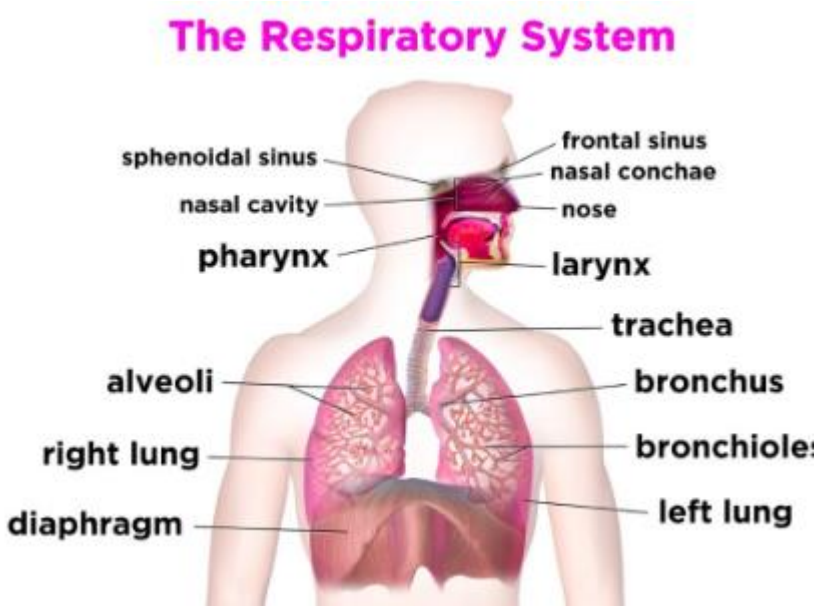
- Diaphragm
- Lungs
- Bronchial tubes/bronchi
- Bronchioles
- Air sacs (alveoli)
- Capillaries



mechanism of Breathing

Breathing (Pulmonary ventilation): The mechanism of breathing involves the inspiration and expiration of air with the movement of the diaphragm and intercostal muscles. During inhalation, external intercostal muscles contract. At the same time, the diaphragm contracts and flattens. These

actions increase the volume of the thoracic (chest) cavity, and the air (oxygen) is forced into the lungs. On the contrary, exhalation occurs when the thoracic cavity is reduced, and the air (carbon dioxide) is expelled out.

Inspiration' Process:

- Muscles contract.
- The ribs pull outside.
- Diaphragm contracts.
- The above steps result in the expansion of the chest cavity.
- A minimal amount of air is sucked into the lungs and gets filled into the expanded alveoli region.
- Inside the lungs, the pressure of air and the atmosphere is quite similar.
- Yet, when the lungs expand, the pressure of air will decrease inside the lungs.

Expiration' Process:

On the contrary, expiration is a process of exchanging gaseous matter inside the lungs, to expel the air outside.

- Rib muscles contract.
- Air pressure increases outside of the thoracic region.
- Internal intercostal muscles contract whereas the external intercostal muscles relax.
- The size of the thoracic cavity is reduced, hence ribs pull inwards.

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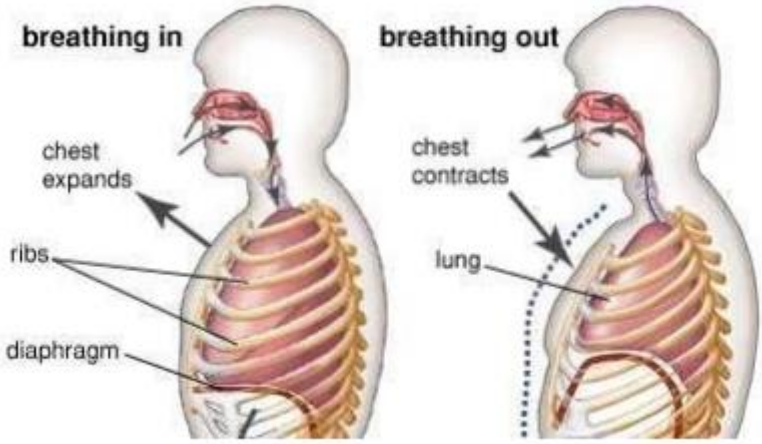
- Abdominal muscles will contract in shape.
- Lungs will compress due to the relaxation of the diaphragm.
- Henceforth, due to an increase in pressure, the air is pushed outside.



How Does the Respiratory System Clean the Air?

Your respiratory system prevents harmful substances from entering your lungs by using:

- Small hairs in your nose that act as an air-cleaning system and help filter out large particles.
- Mucus produced in your trachea and bronchial tubes to keep air passages moist and help catch dust, bacteria and other substances.
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- The sweeping motion of cilia (small hairs in your respiratory tract) to keep air passages clean. One of the reasons that cigarette smoke is dangerous is that it stops cilia from working properly.