

Organisms

3. Breathing

CONCEPT 1

LESSON GUIDE

HOW WE BREATHE

PRECISE LEARNING POINTS

KNOW

I know how to label a diagram of the human body to identify the key parts essential for breathing.

APPLY

I can apply my knowledge to explain the mechanism for breathing.

EXTEND

I can extend my knowledge to explain how a change in pressure brings about breathing.

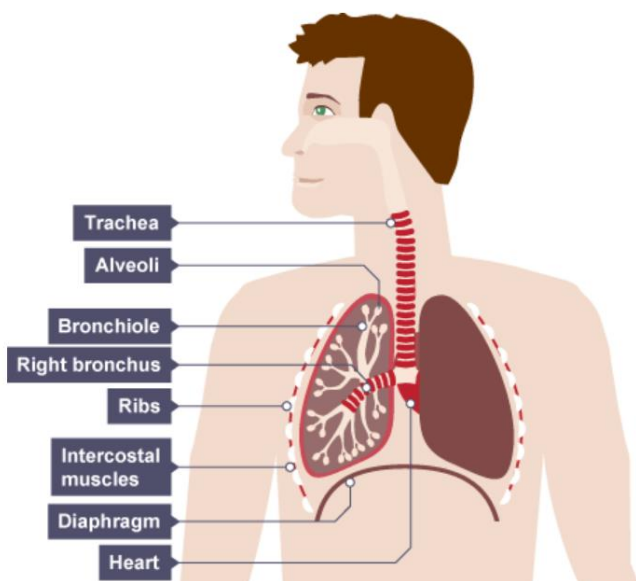
NOTES

Breathing ensures constant supplies of oxygen are absorbed from the air around us into our blood stream. It also ensures the removal of a waste product, called carbon dioxide, from our bloodstream and out into the air surrounding us. Without a constant supply of oxygen from breathing, we could not carry out respiration which releases energy in cells that we need to survive.

Our breathing system is adapted to carry out breathing efficiently and without the need for conscious thought.

It is made up of the following important structures: Nasal cavities, trachea, bronchi, bronchioles, alveoli, lungs, and diaphragm, rib cage and intercostal muscles.

The diagram below shows the organisation of these structures in the breathing system.



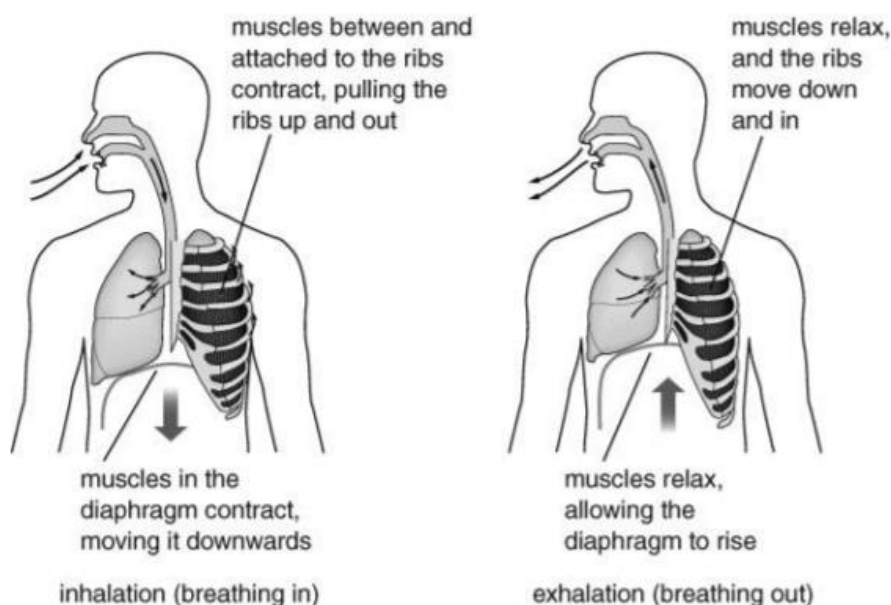
Structures in the respiratory system

Structure	Function
Nasal Cavities	Warms and moistens incoming air, filters out some dust and microbes.
Trachea	Warms, moistens, filters air and delivers air into the bronchus in the lungs.
Bronchi	Passageway for air to the left and right lung. Warm, moisten and filter air.
Bronchioles	Smaller branches of bronchi delivering air to the alveoli. Warm, moisten and filter air.
Alveoli	Thin, elastic air sacs that enable gas exchange with the bloodstream.
Diaphragm	Muscle that contracts to lower pressure in lungs for inhalation and relaxes to increase pressure for exhalation.
Ribs and intercostal muscles	Muscles move ribs up and out to increase the volume in the chest cavity and down and in to decrease volume in the chest cavity.

The Breathing Mechanism

Breathing in and out happens due to movements of the rib cage and diaphragm. For **inhalation (breathing in)** to happen, the intercostal muscles contract pulling the rib cage up and out. The diaphragm also contracts. This **increases** the **volume** of the chest cavity.

For **exhalation (breathing out)**, the opposite happens. **The volume** in the chest cavity **decreases** as the rib cage moves down and in when intercostal muscles relax, and the diaphragm also relaxes.



Inhalation

Air moves due to differences in **air pressure**. Air will move from higher to lower air pressure. When your chest cavity increases in volume this reduces the pressure in the lungs as the **air particles** are more spread out. Just before you breathe in, the chest movements cause the pressure in the lungs to drop **below atmospheric pressure**. This causes air to rush into your lungs from outside.

Exhalation

When your chest cavity decreases in volume, this increases the air pressure in your lungs as the air particles are closer together. Just before you breathe out, chest movements cause pressure in your lungs to increase **above atmospheric pressure** so air rushes out of your lungs.