

Breathing

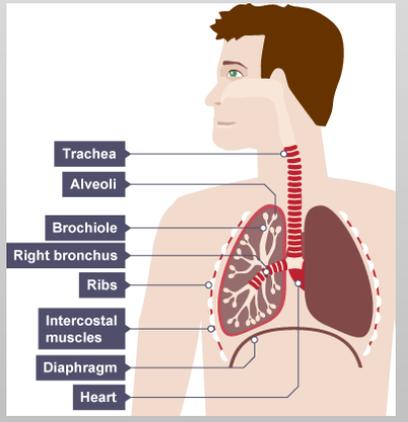
- Ventilation is the scientific name for breathing in and out.
- When we breathe in, we **inhale**
- when we breathe out, we **exhale**

	Inhaling	Exhaling
Diaphragm	Contracts and moves downwards	Relaxes and moves upwards
Intercostal muscles	Contract, moving the ribs upwards and outwards	Relax, moving the ribs downwards and inwards
Volume of ribcage	Increases	Decreases
Pressure inside the chest	Decreases	Increases
Movement of air	Moves into the lungs	Moves out of the lungs

Structure of the Lungs

The human **respiratory system** contains the organs that allow us to get the oxygen we need and to remove the waste carbon dioxide we do not need. It contains these parts:

- two **lungs**
- tubes leading from the mouth and nose to the lungs
- various structures in the chest that allow air to move in and out of the lungs



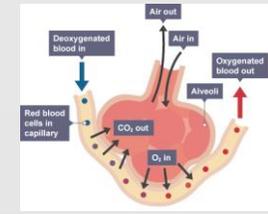
Alveoli sac

- Gas exchange in the lungs happens in the alveoli.
- The gases move by diffusion from a high concentration to a low concentration.
- Oxygen diffuses from the alveoli sacs and into the blood when we inhale.
- Carbon dioxide diffuses from the bloodstream into the air in the alveoli.

Some of the features of alveoli include:

- thin walls (just one cell thick)
- large surface area
- moist surface
- many blood capillaries

These all help with gas exchange.



Respiration

Respiration is a chemical reaction which happens in cells to release energy. The energy released is needed for the life processes.

Respiration takes place in the mitochondria in cells.



Aerobic respiration

Glucose + oxygen → carbon dioxide + water + energy

Anaerobic respiration occurs when no oxygen is available and produces lactic acid which builds up and causes pain and fatigue. This can only be used for a short period of time.

Glucose → Lactic acid + Energy

Aerobic respiration releases more energy than anaerobic respiration.

Exercise

Exercise has immediate effects on the **respiratory system**.

It causes an increase in the:

- breathing rate
- tidal volume (the volume of air breathed in or out in one breath)

Regular exercise has some additional effects, including an increase in the:

- strength of the diaphragm and intercostal muscles
- vital capacity (volume of air that can be forcibly exhaled after inhaling fully)

Smoking

Cigarette component	What it does	Effect on health
Smoke	Damages cilia	Coughing to move the mucus and can lead to bronchitis.
Nicotine	Increases the heart rate and blood pressure, and makes blood vessels narrower than normal.	This can lead to heart disease.
Tar	Coats the inside of the lungs, including the alveoli causing coughing.	Damages the alveoli, making it more difficult for gas exchange to happen. Causes cancer of the lungs, mouth and throat.
Carbon monoxide	Reduces amount oxygen the red blood cells can carry	The circulatory system has to work harder, causing heart disease

Key Words

- Ventilation
- Inhale
- Exhale
- Alveoli
- Energy
- Lactic acid
- Aerobic and anaerobic respiration
- Fatigue
- Cilia