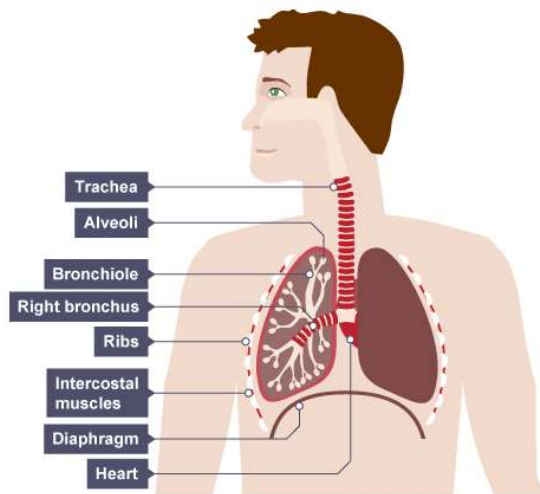


KNOWLEDGE ORGANISER

The human gas exchange system

Aerobic respiration needs oxygen, and it produces carbon dioxide as a waste product. 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



Structures in the respiratory system

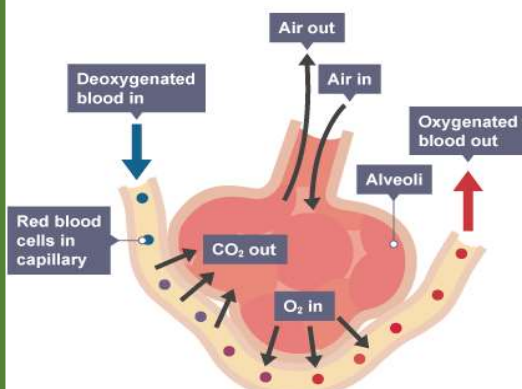
Features of the alveoli

The alveoli are adapted to make gas exchange in lungs happen easily and efficiently. Here are some features of the alveoli that allow this:

- they give the lungs a really big surface area
- they have moist, thin walls (just one cell thick)
- they have a lot of tiny blood vessels called capillaries

The gases move by **diffusion** from where they have a high concentration to where they have a low concentration:

- oxygen diffuses from the air in the alveoli into the blood
- carbon dioxide diffuses from the blood into the air in the alveoli



Smoking

Smoking is very harmful to health. It's estimated that nearly one in every five deaths (of adults aged over 35 in England) is connected to smoking.

Tobacco smoke contains many harmful substances. These include:

- tar**
- nicotine**
- carbon monoxide**



Most smokers started smoking before they became adults

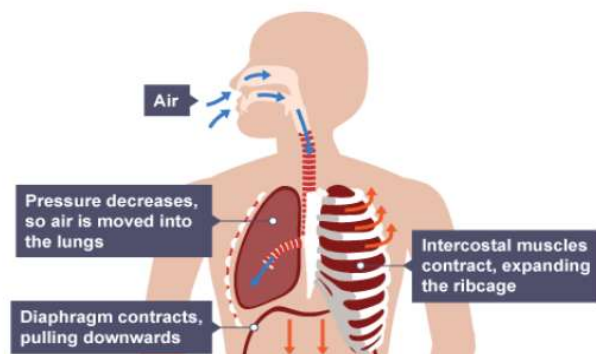
Ventilation

Ventilation or breathing involves movements of the ribs, **intercostal muscles** and **diaphragm** to move air into and out of the lungs:

- when we breathe in, we **inhale**
- when we breathe out, we **exhale**

The table describes the changes involved:

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



Drugs

A **drug** is a substance that has an effect on the body:

- medicines are drugs that help people suffering from pain or disease
- recreational drugs are taken by people because they like the effects they have on their bodies

Some recreational drugs are legal, such as tobacco and alcohol, although there are restrictions on who can buy them. Caffeine, found in coffee, is another recreational drug. Most other recreational drugs are **illegal**, and these include cannabis, ecstasy and heroin.

Recreational drugs can be classified as a depressant or a stimulant. Most recreational drugs can be addictive.