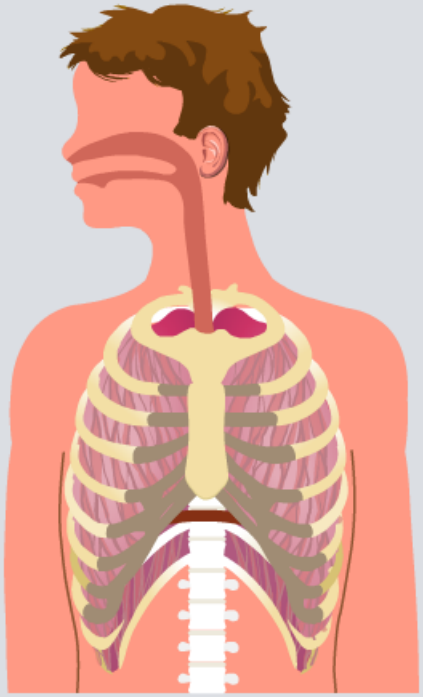
Ventilation



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Why do we breathe?

Animals need to maintain a concentration gradient across their exchange surfaces so that oxygen will diffuse into the blood and carbon dioxide will diffuse out.

Fish manage this by keeping a continuous stream of oxygenated water moving over their gills.

In animals such as mammals and birds, a concentration gradient is maintained in the alveoli by the mechanism of **ventilation**.

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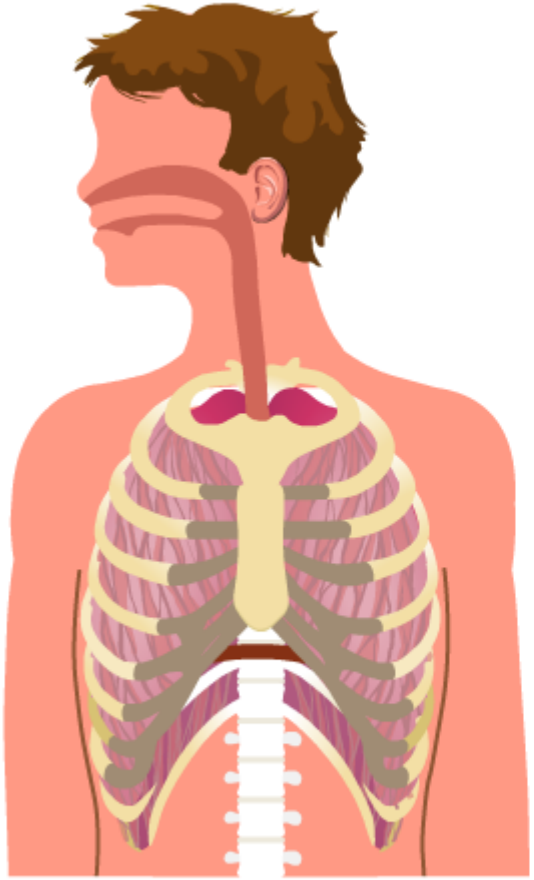
The mechanism of ventilation

Inhalation and exhalation

The muscles and bones of the thoracic (chest) cavity work together to increase and decrease the size of the lungs during breathing.

Click "**play**" to see an animation of ventilation, or click the buttons to find out more about each structure.



diaphragm

ribcage

external intercostal muscles

internal intercostal muscles

show all

anterior view | lateral view

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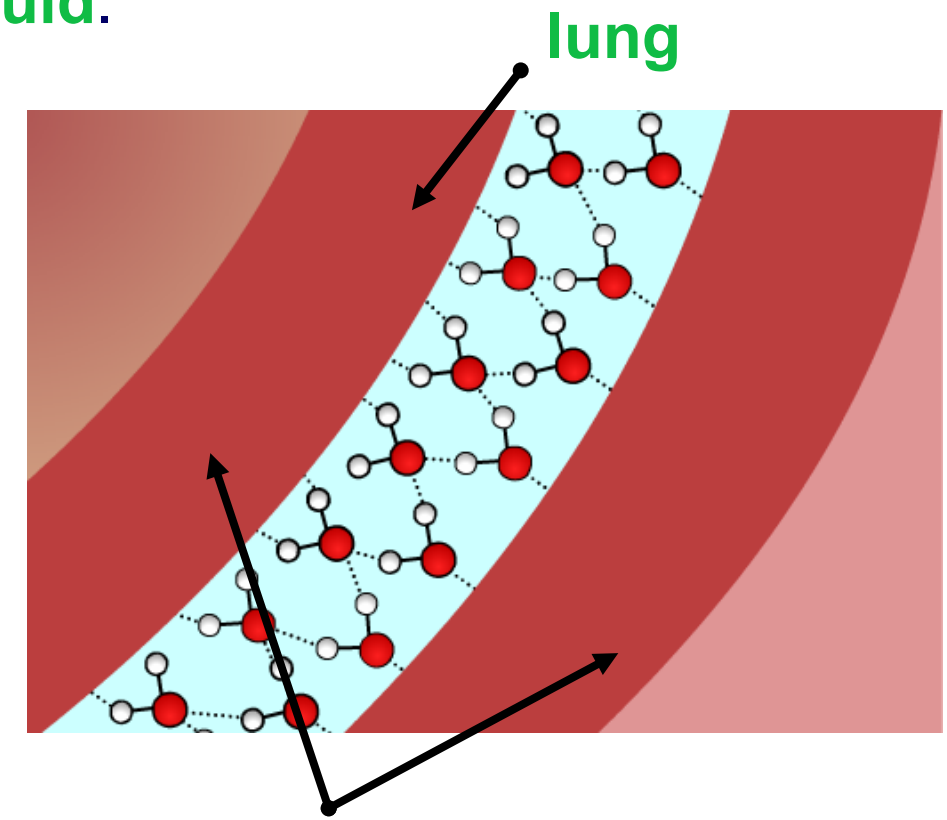
The pleural cavity

Each of the lungs is enclosed in a double membrane known as the **pleural membrane**. The space between the two membranes is called the **pleural cavity**, and is filled with a small amount of **pleural fluid**.

This fluid lubricates the lungs. It also adheres to the outer walls of the lungs to the thoracic (chest) cavity by water **cohesion**, so that the lungs expand with the chest while breathing.



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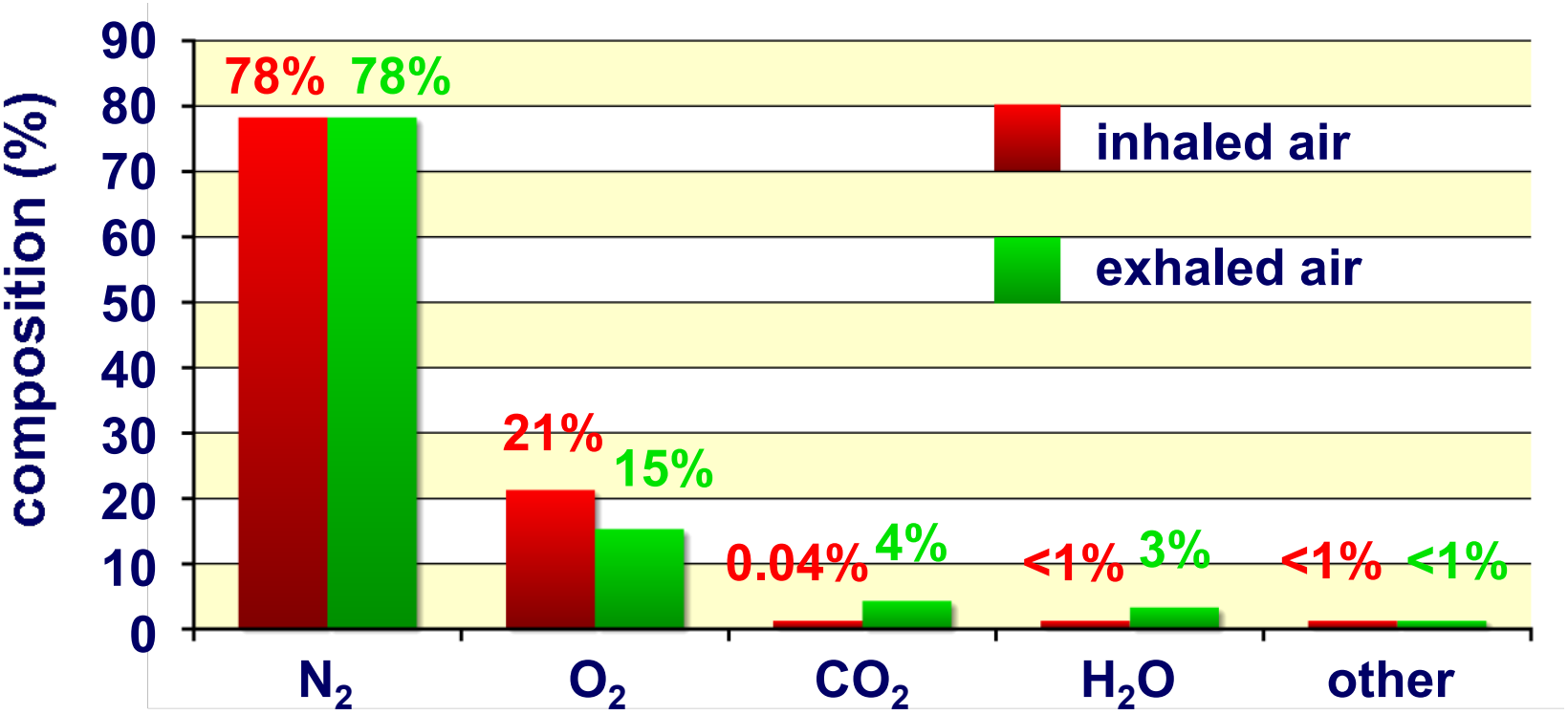
Composition of inhaled/exhaled air

In one breathing cycle, the air in the lungs loses only some of its oxygen content. This is why mouth-to-mouth resuscitation can be effective.



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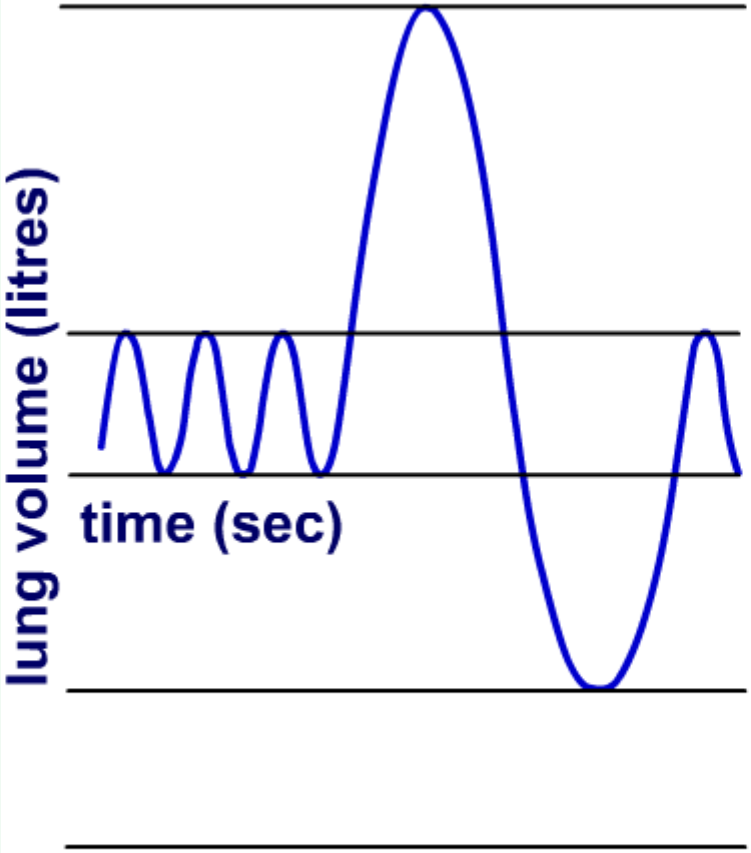
Spirometry

Measuring lung capacity

A **spirometer** is a device that measures the volume of air passing through it during breathing. Its results can be displayed on a **kymograph trace**.

Click on a button to find out more about different measurements.



- total lung capacity
- tidal volume
- inspiratory capacity
- expiratory capacity
- vital capacity
- residual volume

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Spirometric terms

Match these terms to their definitions

inspiratory capacity	the maximum volume of air inhaled after a normal exhalation
tidal volume	the maximum volume of air exhaled after a normal inhalation
residual volume	the volume of air breathed in and out in normal resting conditions
vital capacity	the maximum volume of air that can be inhaled or exhaled
expiratory capacity	the volume of air remaining in the lungs after a maximum exhalation

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