**Respiratory values**

**Tidal Volume** – the amount of air inhaled and exhaled per breath. Resting value = 500ml

**Vital Capacity** – The maximum amount of air exhaled following a maximal breath in.

**Frequency** – The number of breaths taken per minute. Resting value – 12-20 breaths.

**Minute Ventilation** – The amount of air inhaled and exhaled per minute. Measured in litres.

**Gaseous exchange at the alveoli**

- Diffusion is the movement of molecules from an area of high concentration to a low one.
- The alveoli have thin moist walls to allow diffusion to occur.
- Capillaries are closely wrapped around the alveoli to reduce the distance of diffusion and increase efficiency.

During inhalation:
- The concentration of **oxygen** is air is higher than the alveoli.
- The concentration of **carbon dioxide** in the blood is higher than that in the air.

**During exercise**

Gaseous exchange increases as the intensity of the activity increases to cope with:

- An increase demand for oxygen at working muscles
- An increase in carbon dioxide production and the need to rid this waste product.

**Frequency** ↑ + **Tidal Volume** ↑

Training increases total lung capacity and vital capacity readings.

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**Composition of inhaled and exhaled air**

<table>
<thead>
<tr>
<th>Gas</th>
<th>Inhaled air</th>
<th>Exhaled air</th>
</tr>
</thead>
<tbody>
<tr>
<td>Oxygen</td>
<td>21%</td>
<td>16%</td>
</tr>
<tr>
<td>Carbon dioxide</td>
<td>0.04%</td>
<td>4%</td>
</tr>
<tr>
<td>Nitrogen</td>
<td>78%</td>
<td>78%</td>
</tr>
</tbody>
</table>