Component 1 The Respiratory System

Composition of air:

Inspired Air		Expired Air	
Nitrogen	78%	Nitrogen	78%
Oxygen	21%	Oxygen	16%
Carbon Dioxide	0.04%	Carbon Dioxide	4%

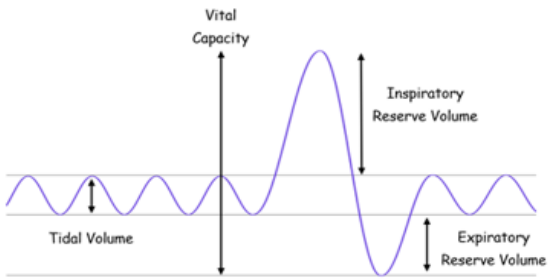
Oxygen levels go down in expired air. Oxygen is used for energy production and for recovery

Carbon dioxide increases in expired air. Carbon dioxide is a waste product of energy production, so there is more carbon dioxide to breath out

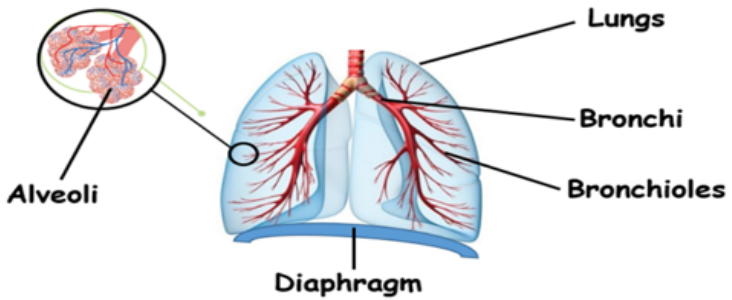
Nitrogen levels stay the same. The body does not use nitrogen for energy production

Lung volumes:

Lung volume	Explanation
Tidal Volume	The amount of air inspired (inhaled) or expired (exhaled) in a normal breath. Tidal volume at rest is 0.5 litres.
Vital capacity	The maximum amount of air the lungs can expire (breathe out) after the maximum inspiration (breathe in). Vital capacity is approximately 2.5 litres.
Expiratory Reserve Volume	The maximum volume of air that can be exhaled.
Inspiratory Reserve Volume	The maximum volume of air that can be inhaled.

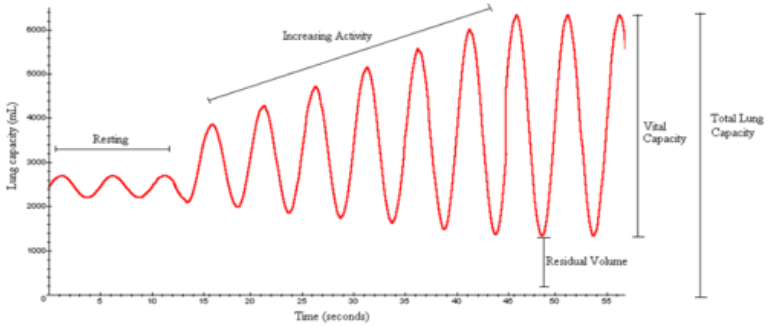


Components of the respiratory system:



Lungs: They allow air to be moved in and out of the body
Bronchi: Air travels to each lung via a bronchus
Bronchioles: Branch out throughout the lungs and carry the air from the bronchi to the alveoli
Diaphragm: A domed sheet of muscle that helps up breathe in and out
Alveoli: Tiny air sacs that allow the exchange of oxygen and carbon dioxide

Tidal volume during exercise:



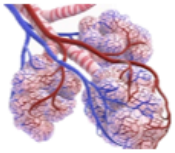
- When our body is at rest, breathing is low and shallow
- During exercise the demand for oxygen increases, oxygen is needed for energy production
- Breathing increases in depth and rate to meet the demand of oxygen
- Carbon dioxide is a by-product of aerobic energy production
- We need to remove the carbon dioxide and breathe it out
- To allow all of the above to happen tidal volume increase

Role of the diaphragm:

Inspiration – the diaphragm contracts and flattens to make more space in the chest so the lungs can expand to pull air in

Expiration – the diaphragm relaxes and returns to a dome shape, making the chest cavity smaller. This helps force air out of the lungs

Structure of alveoli:

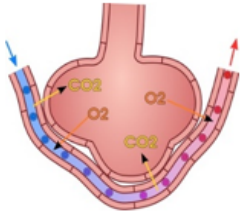


- Tiny air sacs
- Very thin walls
- Surrounded by cappilaries

Alveoli and gas exchange

Gas exchange:

Gases move from areas of high concentration to areas of low concentration. If there is more oxygen in the alveoli than the capillaries oxygen will move into the capillaries



Gas exchange alveoli to capillary

Alveoli have a high pressure of oxygen and the capillaries surrounding the alveoli have a low pressure of oxygen. Oxygen moves from the alveoli to the Capillaries

Gas exchange from capillaries to alveoli

Capillaries surrounding the alveoli have a high pressure of carbon dioxide and the alveoli have a low pressure of carbon dioxide. Carbon dioxide moves from the blood (capillaries) into the alveoli