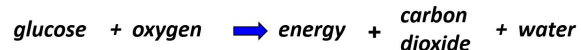


# GCSE Physical Education – Aerobic/Anaerobic and long term effects of exercise

**Aerobic and Anaerobic exercise** – two methods of energy production by the body (Energy: the capacity to do work)

Two factors determine which method is used: **Intensity & duration**

**Aerobic energy production** – takes place in the presence of oxygen



Exercise intensity is moderate/low for a sustained period of time. *i.e. marathon runner/endurance cycling*

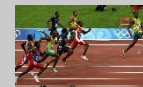


By products are released as sweat and CO<sub>2</sub> exhaled.

**Anaerobic energy production** – takes place in the absence of oxygen



Intensity of anaerobic activity is high as muscle contraction are powerful & quick *i.e. 100m sprinter/long jump*



By product (lactic acid) builds up and causes fatigue.

## Cardiovascular system

Cardiac equation – Cardiac output (Q) = Stroke Volume (SV) x Heart Rate (HR)

### Long term effects of exercise

1. Cardiac hypertrophy – (left ventricle) this is the increased size of the heart due to training. This impacts on the cardiac equation above.

**Lower resting HR** - **Increased maximum Q** - **Increased SV**

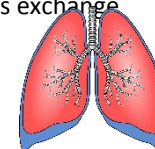
2. Increased elasticity in the walls of arteries and veins – more efficient constriction and dilation.
3. Increased number of red blood cells – has capacity to carry more oxygen to working muscles.
4. More efficient 'vascular shunt'
5. More capillaries
6. Lower blood pressure at rest



## Respiratory system

### Long term effects of exercise

1. Increased capillarisation – better blood supply around the alveoli.
2. Increased number of alveoli – results in better gaseous exchange (oxygen delivery and waste product removal)
3. Increased strength of diaphragm and intercostal muscles – this increased tidal volume and vital capacity.
4. Increase in vital capacity



## Skeletal system

### Long term effects of exercise

1. Increased bone density – strong bones reduce the risk of injuries.
2. Increased strength of ligaments and tendons – allows the body to change direction quickly without injury occurring.



## Muscular system

### Long term effects of exercise

1. Muscular hypertrophy – increase in muscle size and strength/endurance.
2. Increase size and number of mitochondria – produces more energy aerobically.
3. Increased tolerance to lactic acid – reduces muscle fatigue.



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Term	Definition/notes/concept

Keywords: