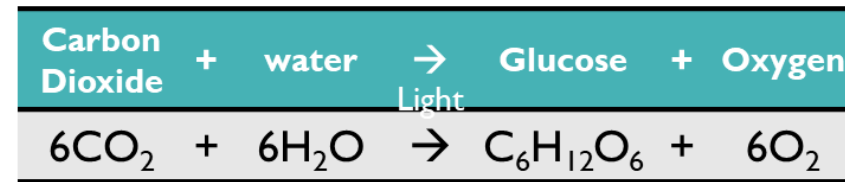




Student Checklist	Revised		Revised
Describe the word equation for photosynthesis		Describe where the body gets sugars, amino acids, fatty acids and glycerol from	
Recognise the formulas for carbon dioxide, water, oxygen and glucose		Explain how the body makes new proteins, carbohydrates and fats	
(HT Only) Balance the equation for photosynthesis		Explain what metabolism is and give examples.	
Explain why photosynthesis is an endothermic reaction			
State the limiting factors of photosynthesis as; light, water, carbon dioxide and temperature			
Explain how the limiting factors affect the rate of photosynthesis and recognise them from graphs			
Explain how to investigate the rate of photosynthesis using pondweed			
(HT Only) Explain how the limiting factors for photosynthesis interact			
(HT Only) Explain the economical importance of the limiting factors to greenhouses			
(HT Only) Explain and use the inverse square law in the context of photosynthesis			
Describe how glucose can be used in plants			
Describe the word equation for aerobic respiration			
(HT Only) Balance the equation for aerobic respiration			
Describe the word equation for anaerobic respiration			
Compare aerobic and anaerobic respiration in humans with regard to the need for oxygen and the amount of energy released			
Recognise equations for aerobic and anaerobic respiration of yeast			
Explain what type of respiration fermentation is and why it's economic importance			
Describe the changes that occur to heart rate, breathing rate and breath volume during exercise			
Define the term oxygen debt and explain what happens when muscles do not have enough oxygen			
(HT Only) Explain what happens to lactic acid when it builds up in the body			

TOPIC 4 – BIOENERGETICS



Photosynthesis

Photosynthesis produces glucose by using light, takes place within a plants chloroplasts, which contains chlorophyll that absorbs light. Photosynthesis is an **Endothermic** reaction, meaning that heat is transferred from the environment during the process.

Factors that Effect the Rate of Photosynthesis

1. Light – Not enough
2. Carbon Dioxide – Too little
3. Temperature – Too high or low

Rate of Photosynthesis

Inverse square law:
Light Intensity = $1 \div \text{Distance}^2$

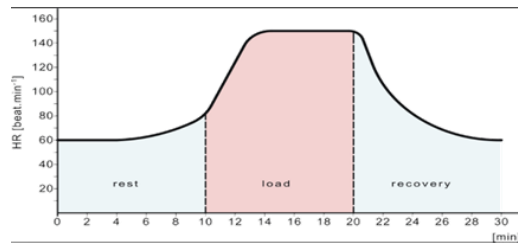
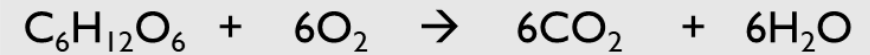


Respiration & Metabolism

Respiration is the process of transferring energy from glucose, which occurs in every cell. Respiration is **Exothermic**, heat is transferred to the environment.

Aerobic Respiration

Respiration using oxygen, happens all the time on plants and animals. Most aerobic respiration happens in the cells Mitochondria



Anaerobic Respiration

Anaerobic respiration happens when not enough oxygen is available, therefore 2 different equations are used – one for animals and one for plants

Response to exercise

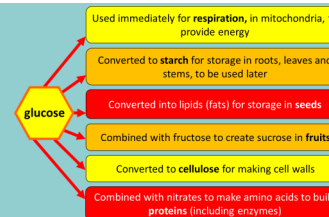
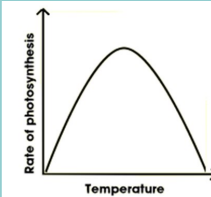
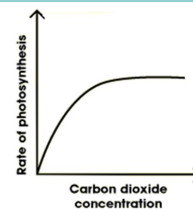
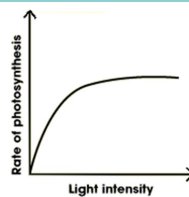
- Better more efficient use of lungs
- Positive psychological response to exercise
- Better more efficient heart
- Lower resting HR
- Quicker recovery response to exercise
- Higher metabolism
- Larger lean muscle mass - higher need for energy to feed the muscle
- Increased amount of mitochondria
- Leaner body composition



Anaerobic Respiration in Humans

Anaerobic respiration leads to an oxygen debt, which is a build up of Lactic Acid, which is converted from glucose, within the muscles during exercise. This Lactic Acid has to be removed after exercise as it causes harm to the muscles. It is flushed out using oxygen, to “repay” the debt. The Lactic Acid can also enter the blood stream and get sent to the liver where it is converted back to glucose.

Rate of Photosynthesis Graphs



Use of Glucose