# Year 10 Trilogy Biology 4: Bioenergetics Knowledge Organiser

## 1. Photosynthesis

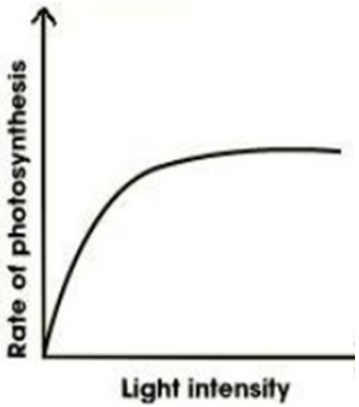
$$6CO_2 + 6H_2O \xrightarrow[\text{Chlorophyll}]{\text{Sunlight}} C_6H_{12}O_6 + 6O_2$$

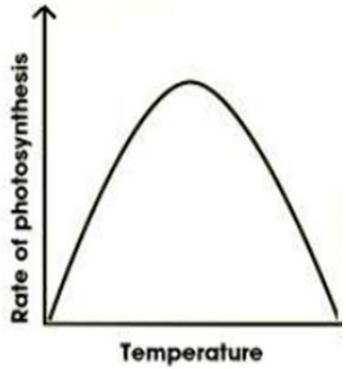
**Carbon Dioxide + Water** $\xrightarrow[\text{Chlorophyll}]{\text{Sunlight}}$ **Glucose + Oxygen**

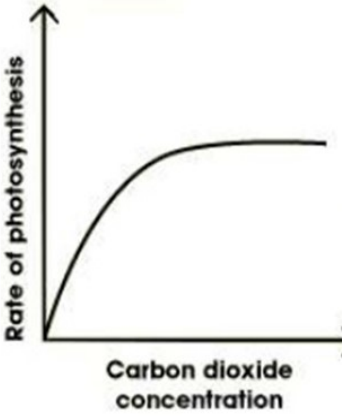
| | |
|---|---|
| Photosynthesis | An endothermic reaction where sunlight is absorbed and used to convert carbon dioxide and water into glucose and oxygen |
| Uses of glucose | •Respiration •Converted into starch •Produce fat or oil •Produce cellulose cell walls •Produce amino |

## 2. Rate of photosynthesis

| Factor | Affect on photosynthesis | Reason |
|---|---|---|
| Light | Increases | More energy for the reaction |
| Carbon dioxide | Increases | More reactants (provided there is no limiting reactant) |
| Amount of chlorophyll | Increases | More energy for the reaction |
| Temperature | Increases then decreases | Initially more energy but then enzyme denatures |
| Limiting factor | The factor that can limit the rate of a reaction | |




## 3. Aerobic respiration

| | |
|---|---|
| Respiration | An exothermic reaction which continuously happens in living cells |
| Purpose | Transfer energy for: •Chemical reactions •Movement •Warmth |
| Aerobic | With oxygen |

$$C_6H_{12}O_6 + 6O_2 \Rightarrow 6CO_2 + 6H_2O + ATP$$

Glucose Oxygen Carbon Dioxide Water Energy

| | |
|---|---|
| Anaerobic | Without oxygen |
| Anaerobic respiration in muscle cells | glucose à lactic acid |
| Anaerobic respiration in yeast cells (fermentation) | glucose à ethanol + carbon dioxide |
| Lactic acid | A chemical that when built up in muscles causes fatigue |
| Oxygen debt HT ONLY | The amount of oxygen the body needs after exercise to remove the lactic acid |

## 4. Metabolism

| | |
|---|---|
| Metabolism | The sum of all the reactions in a cell or the body |
| Includes: | •Conversion of glucose to starch, glycogen and cellulose •Formation of lipids from glycerol and 3 fatty acids •Use of glucose and nitrates to make proteins (PLANTS) •Respiration •Breakdown of protein |