**The Coleshill School Science department**

**Student Tracker**

| **Topic** | Bioenergetics |
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| Student Checklist | Revised | | Revised |
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# TOPIC 4 – BIOENERGETICS

| Carbon Dioxide | + | water | → (Light) | Glucose | + | Oxygen |
|---|---|---|---|---|---|---|
| $6CO_2$ | + | $6H_2O$ | → | $C_6H_{12}O_6$ | + | $6O_2$ |

## 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 ÷ Distance

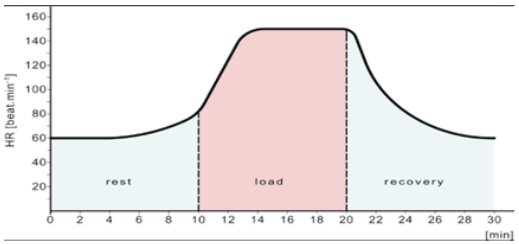
## Respiration & Metabolism

Respiration is the process of transferring energy from glucose, which occurs in every cell. Respiration is **EX**othermic, 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

| Glucose | + | Oxygen | → | Carbon Dioxide | + | Water |
|---|---|---|---|---|---|---|
| $C_6H_{12}O_6$ | + | $6O_2$ | → | $6CO_2$ | + | $6H_2O$ |

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|---|---|---|---|---|
| Animal | Glucose | → | Lactic Acid | |
| Plant | Glucose | → | Ethanol | Carbon Dioxide |

## 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

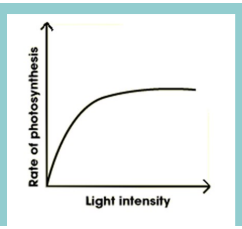
- Better more efficient use of lungs
- Positive psychological response to exercise
- Better more efficient heart
- Lower resting HR
- Quicker recovery response to exercise

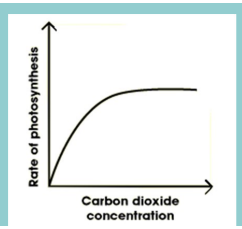
- Higher metabolism
- Larger lean muscle mass - higher need for energy to feed the muscle
- Increased amount of mitochondria
- Leaner body composition

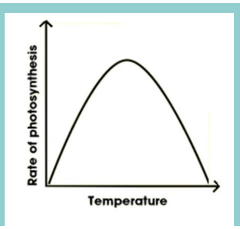
## Anaerobic Respiration in Humans

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