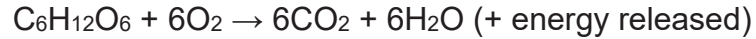


Knowledge Organiser Y8: Respiration and Photosynthesis

The Respiratory System

Aerobic Respiration

glucose + oxygen → carbon dioxide + water (+ energy released)



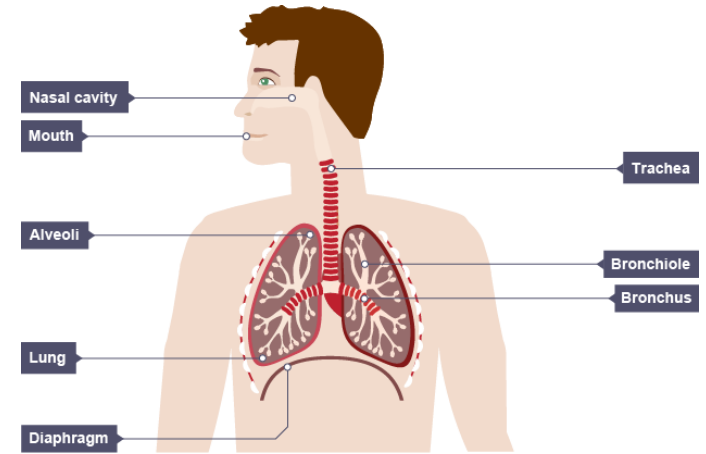
Anaerobic Respiration

glucose → lactic acid + energy released

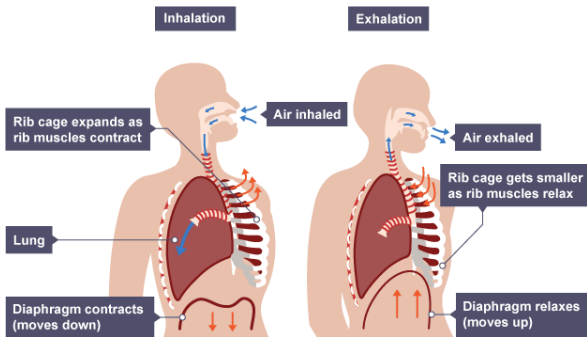
Glucose

Glucose (from our diet) is absorbed into the blood once it reaches the small intestine.

It then travels in the blood to the body's cells.



Breathing

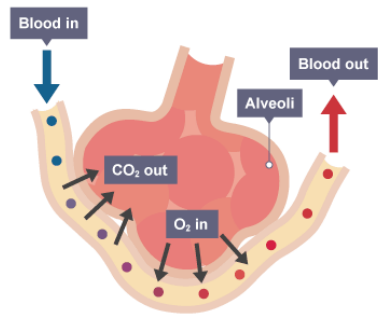


The impact of exercise

Muscles need energy to contract. While exercising, the muscles need additional energy therefore:

- The **breathing rate and volume of each breath increases** to bring more oxygen into the body and remove the carbon dioxide produced.
- The **heart rate increases**, to supply the muscles with extra oxygen and remove the carbon dioxide produced.

Gas Exchange



Gas exchange occurs at the **alveoli** in the lungs and takes place by **diffusion**. **Diffusion** is the movement of gas from an area of high concentration to an area of low concentration.

The alveoli are surrounded by **capillaries**. Both the capillaries and alveoli walls are **very thin** - just one cell thick. They are made of **semi-permeable membranes** which allow oxygen and carbon dioxide to pass through them.

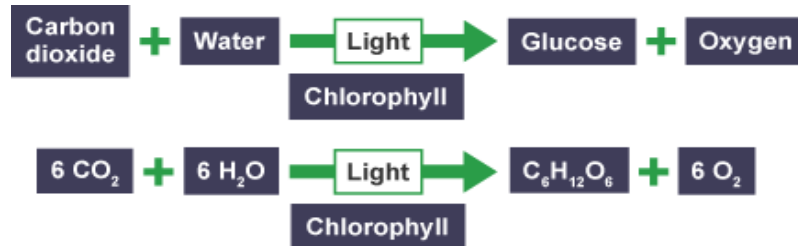
Smoking

Tobacco smoke contains many harmful substances. These include:

Tar	Causes cancer of the lungs, mouth and throat.
Smoke	Damages the cilia (cells in the trachea and bronchi with hairs that move mucus containing microbes out of the lungs). As a result of this, smokers cough to move the mucus and are more likely to get bronchitis.
Nicotine	Nicotine is addictive. It also increases the heart rate and blood pressure, and makes blood vessels narrower than normal. This can lead to heart disease.
Carbon Monoxide	Carbon monoxide is a gas that takes the place of oxygen in red blood cells. This reduces the amount of oxygen that the blood can carry.

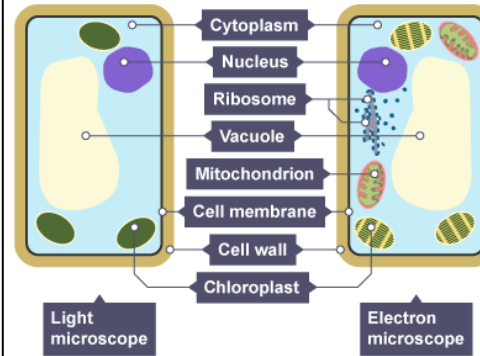
Knowledge Organiser Y8: Respiration and Photosynthesis

Photosynthesis



Photosynthesis takes place in the **chloroplasts** of plant cells.

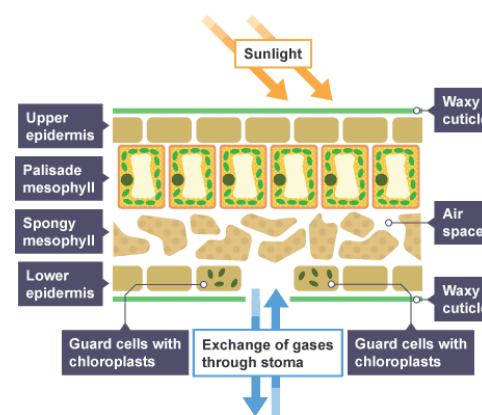
Chlorophyll is the green pigment in chloroplasts that absorbs the light needed for photosynthesis.



The **leaf** is where most photosynthesis takes place:

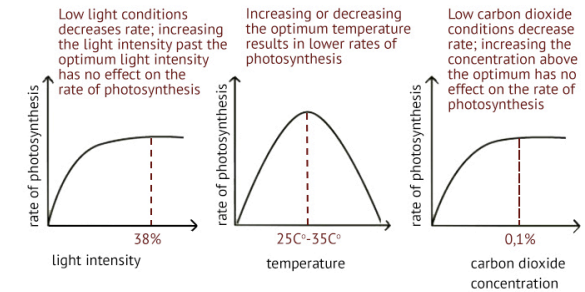
Adaptation	Explanation
Thin	Short distance for carbon dioxide to diffuse into leaf cells.
Large surface area	Maximise light absorption.
Stomata and guard cells	Control gas exchange. Stomata are tiny holes on the underside of a leaf. Guard cells control the opening and closing of the stomata.
Large amount of chloroplasts in palisade cells	To absorb light energy.
Palisade cells packed closely	To maximise light absorption.
Spongy mesophyll loosely packed	Increases surface area for gas exchange.

Structure of a Leaf

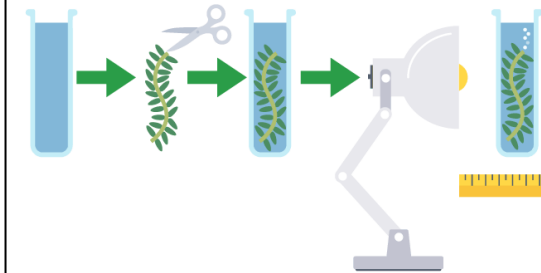


Limiting Factors

The rate of photosynthesis is affected by three main factors: temperature, light intensity and carbon dioxide concentration. A limiting factor is any factor that slows down the rate of photosynthesis if there is not enough of it.



Investigating the Rate of Photosynthesis



Independent: Light Intensity

Dependent: Number of bubbles in 1 min

Control: Type of pondweed/Length of Pondweed/Time/Temperature/ Carbon Dioxide Levels