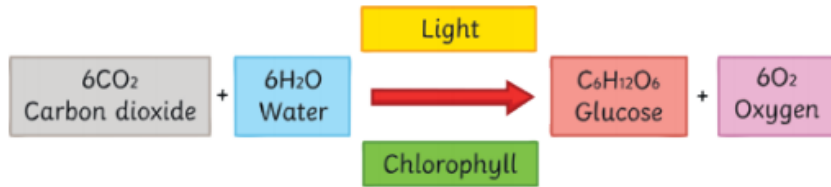


B8 - Photosynthesis

During **photosynthesis**, plants produce oxygen and **glucose** from **carbon dioxide** and water – using light energy.

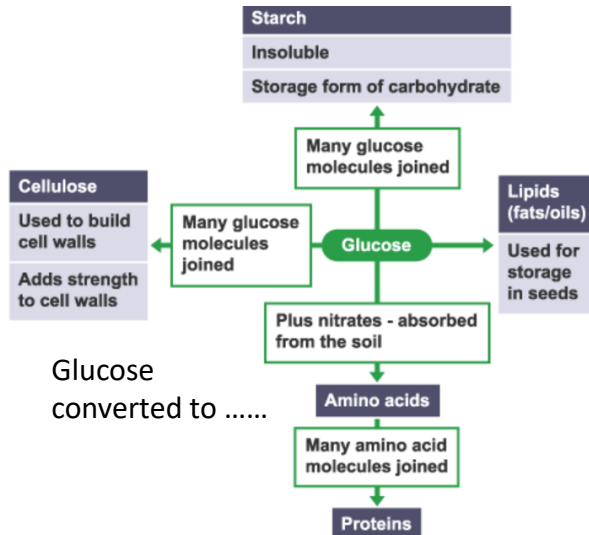


The light energy required is absorbed by a green **pigment** called **chlorophyll** in the leaves. Chlorophyll is located in **chloroplasts** in **plant cells**, particularly the **palisade** and spongy **mesophyll cells**.

The carbon dioxide required for photosynthesis comes from the air. It enters leaves through the **stomata**. Water enters the plant through the roots, and is transported to the leaves in the **xylem**

Several factors can affect the rate of photosynthesis:

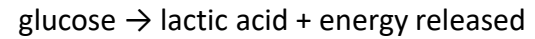
- light intensity
- carbon dioxide concentration
- Temperature



B9 – Respiration

Respiration releases energy – it is an **exothermic** process. Respiration using oxygen to break down food molecules is called **aerobic respiration**.

glucose + oxygen → carbon dioxide + water + energy released
 Most of the energy released happens in the **mitochondria**.
Organisms can respire without oxygen using **anaerobic respiration**.



Glucose in yeast cells is converted to carbon dioxide and **ethanol**, which we refer to simply as 'alcohol' during anaerobic respiration.
 glucose → ethanol + carbon dioxide + energy released

	Aerobic	Anaerobic
Presence of oxygen	Present.	Absent or in short supply.
Oxidation of glucose	Complete	Incomplete. The products of respiration still contain energy.
Products of respiration	Carbon dioxide and water. The products do not contain stored chemical energy.	Mammalian muscle: lactic acid. Yeast: ethanol and carbon dioxide. Some plants: ethanol and carbon dioxide. The products still contain stored chemical energy.
Amount of energy released	Relatively large amount.	Small amount, but quickly.

During long periods of vigorous activity:

- **lactic acid** levels build up
- glycogen reserves in the muscles become low as more glucose is used for respiration, and additional glucose is transported from the liver.

This build-up of lactic acid produces an **oxygen debt**.

Key vocabulary:

Photosynthesis - A chemical process used by plants to make glucose and oxygen from carbon dioxide and water, using light energy. Oxygen is produced as a by-product of photosynthesis. Algae subsumed within plants and some bacteria are also photosynthetic.

Chlorophyll - The green chemical inside the chloroplasts of plant cells. It enables photosynthesis to take place

Chloroplast - Contains the green pigment chlorophyll; the site of photosynthesis.

Palisade mesophyll - Plant tissue containing closely packed cells in the upper layer of a leaf.

Spongy mesophyll - The plant tissue in a leaf which has loosely packed cells and air spaces between them to allow gas exchange.

Stomata- Tiny holes in the epidermis (skin) of a leaf. They control gas exchange by opening and closing and are involved in loss of water from leaves.

Aerobic respiration -Respiration that requires oxygen.

Anaerobic - Without oxygen.

Lactic acid - A toxic chemical produced during anaerobic respiration.

Oxygen debt - The amount of extra oxygen required by the body for recovery after vigorous exercise

Videos



Quizzes

