

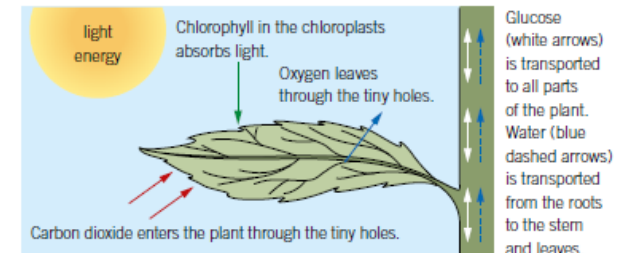
Box 1: Keywords

Word	Definition
Aerobic respiration	Chemical reaction where glucose reacts with oxygen to release energy, carbon dioxide and water
Anaerobic respiration	Chemical reaction that takes place without oxygen where glucose is converted into lactic acid and energy
Algae	Green unicellular or multicellular organism that does photosynthesis and lives in water
Chlorophyll	Green pigment that absorbs light for use in photosynthesis
fermentation	Chemical reaction used by plants and microorganism the break down glucose into ethanol, carbon dioxide and energy
Haemoglobin	A protein in red blood cells that carries oxygen
Photosynthesis	Process where plants make their own food glucose from carbon dioxide and water

Box 2: Key skills

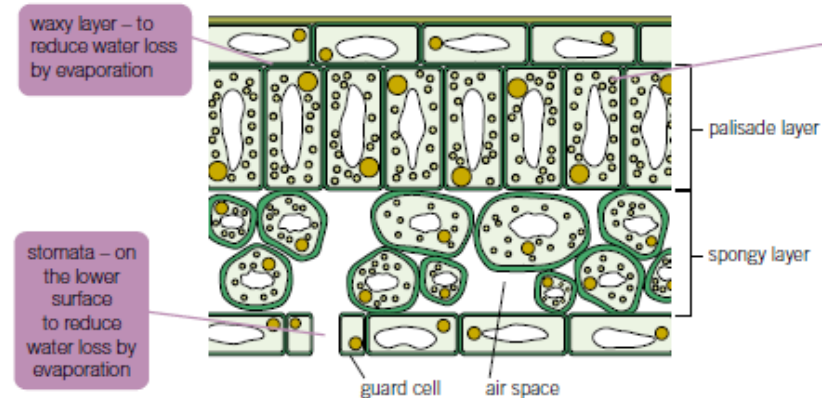
Box 3: Photosynthesis

Photosynthesis is a chemical reaction that takes place in the **chloroplasts** to produce **glucose**.
 $\text{carbon dioxide} + \text{water} \rightarrow \text{oxygen} + \text{glucose}$



The minerals plants need are:

- 1 **nitrates** for growth
- 2 **phosphates** for healthy roots
- 3 **potassium** for healthy leaves and flowers
- 4 **magnesium** for making chlorophyll



Leaves are specially adapted for photosynthesis:

- have lots of green **chlorophyll** - absorb sunlight for photosynthesis
- are thin - allow gases to diffuse in and out of the leaf
- have a large surface area - absorb as much light as possible
- have veins - xylem transports water and phloem transports glucose



Box 4: Respiration

with oxygen

Aerobic respiration

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

- Respiration occurs in the **mitochondria** of cells to produce energy.
- Glucose is absorbed from the small intestine into the blood **plasma**. It is transported to the cells where it diffuses in.
- Oxygen is breathed in and diffuses into the bloodstream. Oxygen is then carried by haemoglobin to the cells where it diffuses in.
- Carbon dioxide diffuses out of the cells into the blood plasma. It is transported to the lungs where it diffuses into the air sacs and is exhaled.

without oxygen

Anaerobic respiration (in animals)

glucose → lactic acid (+ energy)

- This occurs when there is not enough oxygen for aerobic respiration, such as during strenuous exercise.
- It transfers less energy than aerobic respiration.
- The lactic acid produced can cause muscle cramps. This causes increased inhalation to break down lactic acid – the oxygen needed is called the **oxygen debt**.

Box 5: Fermentation

Glucose → Ethanol and carbon dioxide (energy)

Type of anaerobic respiration that happens in plants and microorganisms like yeast.
Used to make bread (the carbon dioxide produces the gaps inside the bread), beer and wine.

If we could do this we would get drunk running a sprint!

Box 6: Pathway

Previous:- essential life processes that allow plants and animals to move, reproduce and grow

Future KS4 – Structural differences between cells that allow them to perform specific functions

Future KS5 – chemical processes of cellular respiration and photosynthesis

Careers:- Medical careers, food workers, farmers, brewers and chiefs

Box 7: Cross curricular links