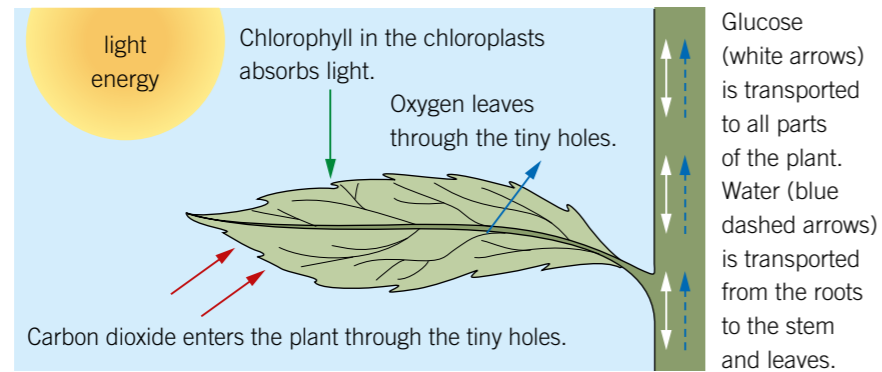


Photosynthesis

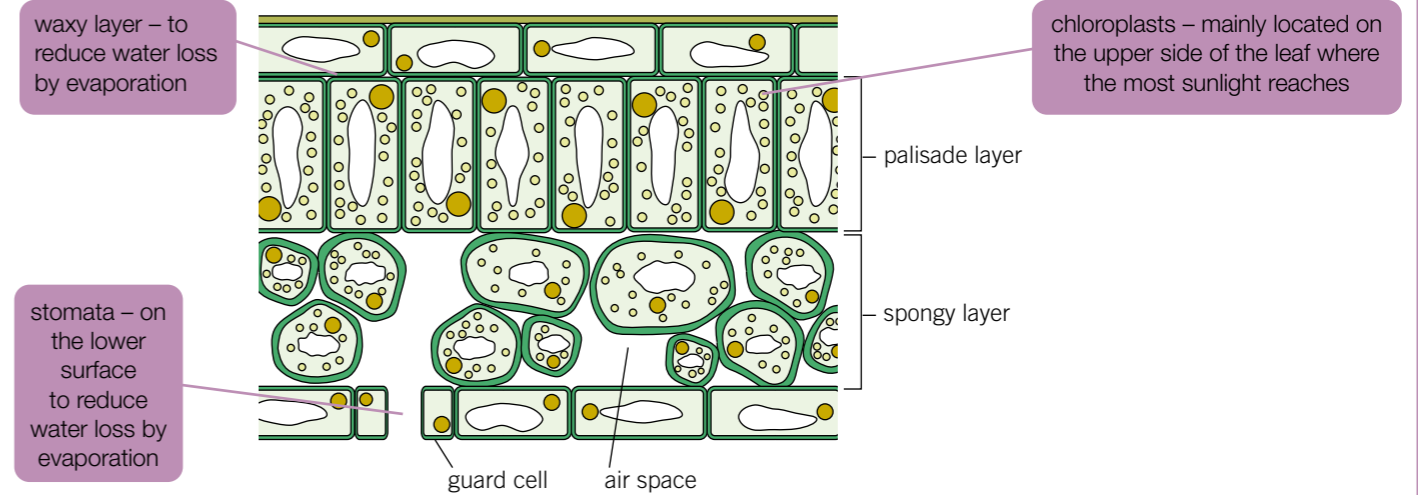
Photosynthesis is a chemical reaction that takes place in the **chloroplasts** to produce **glucose**.



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

If a plant does not have enough of a mineral, it may suffer from a mineral **deficiency**. Farmers can use **fertilisers** to add missing minerals to the soil.



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

Respiration

with oxygen

Aerobic respiration



- 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.

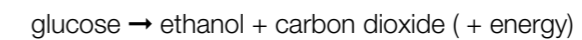
without oxygen

Anaerobic respiration (in animals)



- 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**.

Fermentation (in microorganisms)



- Yeast respire anaerobically – this fermentation is important in food production (e.g., bread, beer, and wine).

Key words

Make sure you can write definitions for these key terms.

aerobic anaerobic chlorophyll community consumer deficiency fermentation fertiliser producer mitochondria nitrate oxygen debt plasma
phosphate photosynthesis stomata

