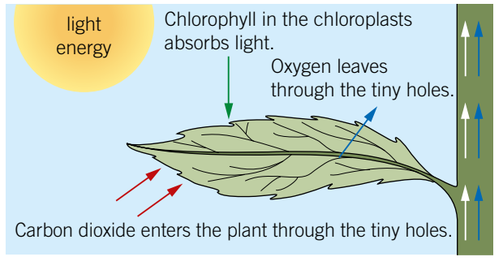
B2 Chapter 2: Ecosystem processes
Knowledge organiser

Activate
Question • Progress • Succeed

Photosynthesis

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

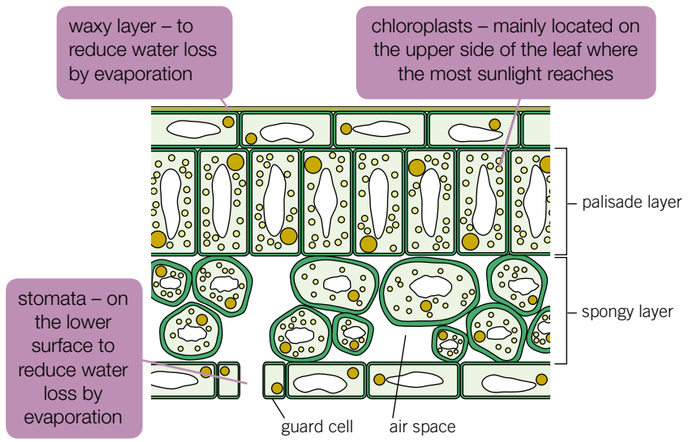
carbon dioxide + water ➞ oxygen + glucose



The minerals plants need for growth 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 and phloem transport water and glucose

Respiration

with oxygen

Aerobic respiration

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

- Respiration occurs in the **mitochondria** of cells to **transfer** 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**.

Fermentation (in microorganisms)

glucose ➞ ethanol + carbon dioxide (+ energy)

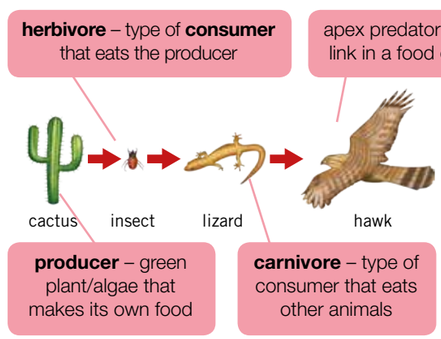
- Yeast respires anaerobically – this fermentation is important in food production (e.g., bread, beer, and wine).

Food chains and webs

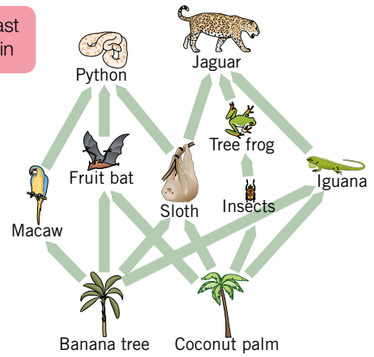
Food chains show the transfer of energy between organisms – the arrows represent the direction of energy transfer.

Food webs show how lots of food chains are connected in an ecosystem.

Food chain



Food web



Prey: an organism eaten by another organism.

Predator: an organism that eats another organism.

Bioaccumulation is the build up of chemicals, like insecticides, passed along a food chain.

Populations and ecosystems

The number of organisms that live in the same area is called a **population**. Populations of organisms are constantly changing – this affects other populations in a food web.

Interdependence is when living organisms depend on each other to survive, grow, and reproduce.

Ecosystem: all the organisms found in a particular location, and the area they live in.

Community: the organisms in an ecosystem. **Habitat**: the area a community lives in.

Niche: the particular place or role that an organism has within an ecosystem. This reduces competition for resources.

Chemosynthesis

Chemosynthesis is when bacteria use a variety of chemical reactions to make their own glucose. Chemosynthesis:

- uses chemicals as the source of energy
- often uses carbon dioxide as a reactant

For example, sulfur bacteria at the bottom of deep sea vents and nitrogen bacteria in the soil use chemosynthesis to produce glucose.

Key terms Make sure you can write definitions for these key terms.

aerobic *anaerobic* *bioaccumulation* *carnivore* *chemosynthesis* *chlorophyll* *community* *consumer* *deficiency* *ecosystem* *fermentation* *fertiliser* *food chain* *food web* *producer* *habitat* *herbivore* *interdependence* *mitochondria* *niche* *nitrate* *oxygen debt* *plasma* *phosphate* *photosynthesis* *population* *predator* *prey* *stomata*