

B2 Chapter 9: Ecosystems

Knowledge organiser

Respiration

- Respiration is the process in which energy is released from the molecules of food which you eat
 - Respiration happens in the mitochondria of the cell
 - Aerobic respiration** involves oxygen, it is more efficient as all of the food is broken down to release energy
 $\text{glucose} + \text{oxygen} \rightarrow \text{carbon dioxide} + \text{water}$
 - The glucose is transported to the cells in the blood **plasma**
 - The oxygen is transported to the cells in **red blood cells**, by binding with **haemoglobin**
 - Carbon dioxide is a waste product and is transported from the cells to the lungs to be exhaled
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- Anaerobic respiration** is a type of respiration which does not use oxygen, it is used when the body cannot supply the cells with enough oxygen for aerobic respiration
 - Anaerobic respiration releases less energy than aerobic respiration
 $\text{glucose} \rightarrow \text{lactic acid} + \text{carbon dioxide}$
 - The **lactic acid** produced through anaerobic respiration can cause muscle cramps
 - Lactic acid will build up if there is not enough oxygen present in the blood supply to break it down. This is known as an **oxygen debt**

Fermentation

- Fermentation** is a type of anaerobic respiration which occurs in yeast
- Instead of producing lactic acid, yeast produces ethanol, which is a type of alcohol
 $\text{glucose} \rightarrow \text{ethanol} + \text{carbon dioxide}$
- This process can be used to form alcohol to drink or to allow bread and cakes to rise

Plant minerals

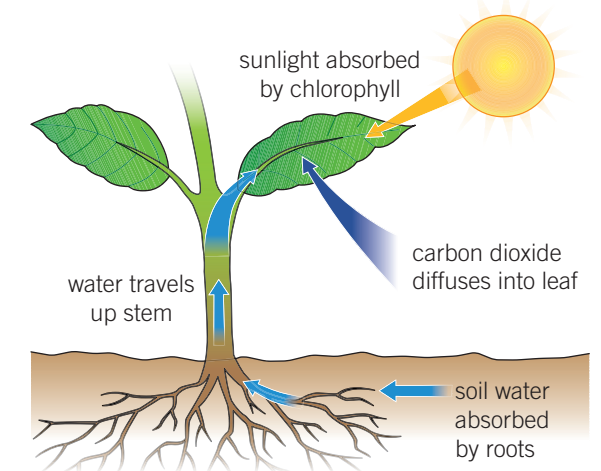
Plants need minerals for healthy growth, if they do not have enough of these minerals this is known as a **mineral deficiency**

| Mineral | What is it used for? | What happens if there is not enough? |
|----------------------------------------|----------------------------|-----------------------------------------|
| nitrates (contain nitrogen) | healthy growth | poor growth and older leaves yellow |
| phosphates (contain phosphorus) | healthy roots | poor growth, younger leaves look purple |
| potassium | healthy leaves and flowers | yellow leaves with dead patches |
| magnesium | making chlorophyll | leaves will turn yellow |

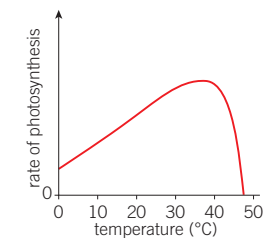
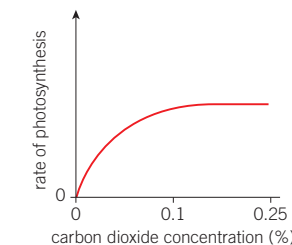
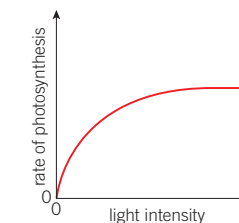
Fertilisers can be used to stop plants from suffering with mineral deficiencies

Photosynthesis

- Photosynthesis** is the process which occurs in the chloroplasts to produce glucose using sunlight
 $\text{glucose} + \text{carbon dioxide} \rightarrow \text{glucose} + \text{oxygen}$
- Any organism that can use photosynthesis to produce its own food is known as a **producer**, these are not just limited to plants but can include other organisms such as **algae**

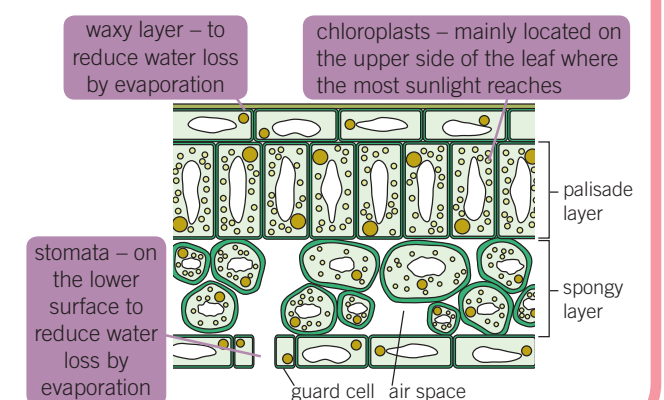


- The rate of photosynthesis can be affected by:
 - Light intensity – the higher the light intensity the higher the rate of photosynthesis up to a point
 - Carbon dioxide concentration – the higher the carbon dioxide concentration the higher the rate of photosynthesis up to a point
 - Temperature – the optimum temperature is the temperature at which photosynthesis occurs at the highest rate, before and after this the rate will be less



Leaves

- To best adapt for photosynthesis leaves have a number of adaptations
- They are thin to allow the most light through
- There is a lot of **chlorophyll** to absorb light
- They have a large surface area to absorb as much light as possible



Key terms

Make sure you can write definitions for these key terms.

aerobic respiration algae anaerobic respiration chlorophyll mineral deficiency fermentation fertiliser haemoglobin lactic acid magnesium
 nitrates oxygen debt phosphates photosynthesis plasma potassium producer red blood cells

Ecosystems part 2

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To transfer **energy** from glucose, aerobic respiration takes place inside the **mitochondria**.

Aerobic Respiration involves the use of **oxygen**

Equation:

Glucose + Oxygen → Carbon Dioxide + Water

If no oxygen is present, energy can be transferred from glucose using **Anaerobic**

Fermentation is when plants and microorganisms produce ethanol and carbon dioxide instead of **lactic acid**

When you finish exercising Anaerobically, you keep on breathing heavily. The extra oxygen you inhale breaks down the lactic acid. The oxygen needed for this process is called **oxygen debt**.

Oxygen is carried by the red blood cells in your body. Red blood cells contains **Haemoglobin**. The oxygen joins to the haemoglobin, and gets carried around the body in the blood vessels.

| Keyword | Definition |
|-----------------------|----------------------------------------------------------------------------------------------------------------------------------------------|
| Aerobic Respiration | Break down glucose with oxygen to release energy. |
| Haemoglobin | The substance in blood that carries oxygen |
| Anaerobic Respiration | Releasing energy from the breakdown of glucose without oxygen |
| Fermentation | A type of anaerobic respiration which glucose is converted to ethanol |
| Biotechnology | The use of biological processes or organisms to create useful products |
| Photosynthesis | The process plants use to make their own food, glucose. In photosynthesis carbon dioxide and water react together to make glucose and oxygen |
| Fertilisers | Chemicals containing minerals that plants need to build new tissues |

Ecosystems part 2

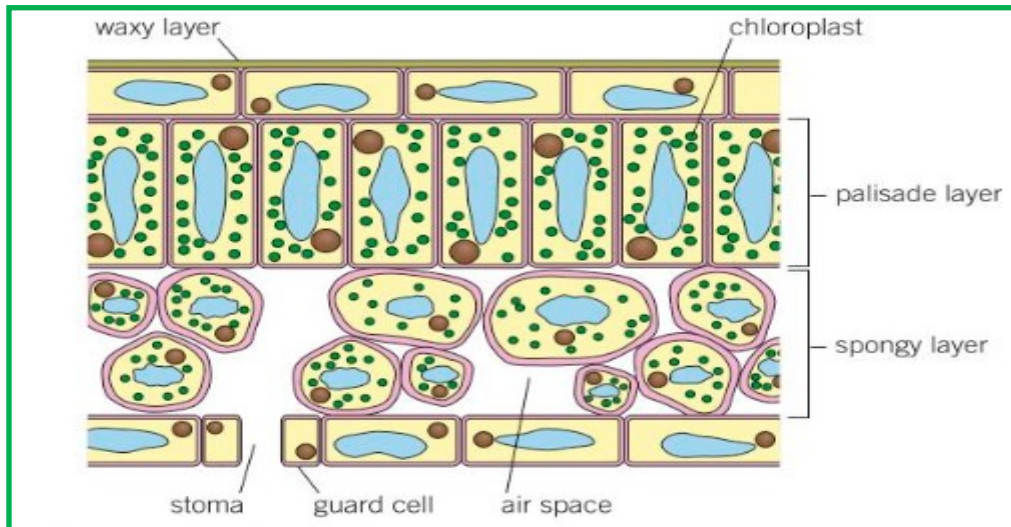
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Photosynthesis - takes place in the chloroplasts. **Chloroplasts** contain **chlorophyll**, which traps the **light** needed for photosynthesis.

Equation for photosynthesis:

Carbon dioxide + water → Glucose + oxygen

Plants need **minerals** for healthy growth. For example, **nitrates** are needed to make **amino acids**. Amino acids join together to form proteins which are used for growth.



Stomata allows gases to enter and leave a leaf.

Guard cells open the stomata during the day and close them during the night.

There are three limiting factors to photosynthesis:

Light

Carbon dioxide

Temperature

