

WJEC Wales Biology GCSE

1.5 (a) to (d) - Photosynthesis

Flashcards

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What is photosynthesis?



What is photosynthesis?

A chemical reaction that takes place inside photosynthetic organisms (e.g. plants, algae) converting light energy into chemical energy



Write the word equation for
photosynthesis



Write the word equation for photosynthesis

carbon dioxide + water \rightarrow glucose + oxygen



Why is photosynthesis important?



Why is photosynthesis important?

- Produces glucose which is used in **respiration** to release energy
- Glucose used to make complex organic molecules which are required for **growth** by plants
- Animals rely on these organic molecules which are transferred between organisms through food chains
- Produces **oxygen** which is required by organisms for respiration



Where does photosynthesis take place?



Where does photosynthesis take place?

Within chloroplasts



What is required for photosynthesis?



What is required for photosynthesis?

- Carbon dioxide
- Water
- Light
- Chlorophyll



What is the role of carbon dioxide (CO_2)
in photosynthesis?



What is the role of carbon dioxide (CO_2) in photosynthesis?

Provides the carbon (C) and oxygen (O) found in glucose



What is the role of water (H_2O) in photosynthesis?



What is the role of water (H_2O) in photosynthesis?

- Provides the hydrogen (H) found in glucose
- Oxygen (O_2) is released as a by-product



Why is light required for photosynthesis?



Why is light required for photosynthesis?

Provides the energy required for chemical reactions in photosynthesis



What is chlorophyll?



What is chlorophyll?

A pigment found in chloroplasts that absorbs light



Describe the two main stages of
photosynthesis



Describe the two main stages of photosynthesis

1. Chlorophyll absorbs light energy which is used to split water into oxygen gas (waste product) and hydrogen ions
2. Carbon dioxide combines with hydrogen ions to form glucose



What factors affect the rate of photosynthesis?



What factors affect the rate of photosynthesis?

- Temperature
- Light intensity
- Carbon dioxide concentration



What is a limiting factor? (higher)



What is a limiting factor? (higher)

A variable that limits the rate of a particular reaction



Explain how temperature affects the rate of photosynthesis



Explain how temperature affects the rate of photosynthesis

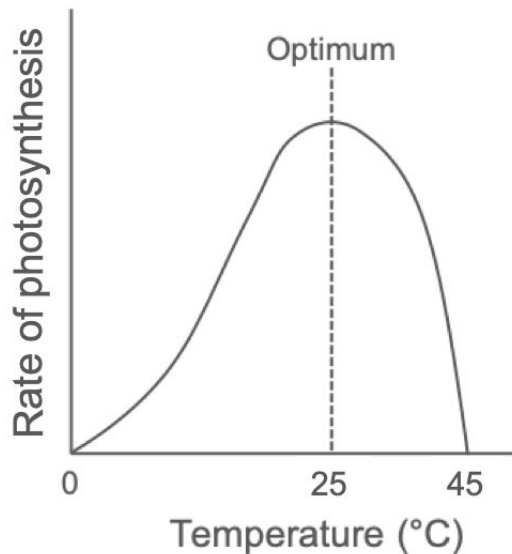
- Higher temperatures provide more KE for enzymes involved in photosynthesis so the rate increases as temperature rises
- The optimum temperature is usually 25°C
- If the temperature becomes too high (around 45°C) enzymes become denatured and the rate of photosynthesis decreases



Draw a graph to show the effect of increasing temperature on the rate of photosynthesis



Draw a graph to show the effect of increasing temperature on the rate of photosynthesis



Explain how light intensity affects the rate of photosynthesis



Explain how light intensity affects the rate of photosynthesis

Rate of photosynthesis is directly proportional to light intensity \therefore as light intensity increases, the rate of photosynthesis increases.



Why does the rate of photosynthesis eventually plateau even if light intensity continues to increase? (**higher**)



Why does the rate of photosynthesis eventually plateau even if light intensity continues to increase?
(higher)

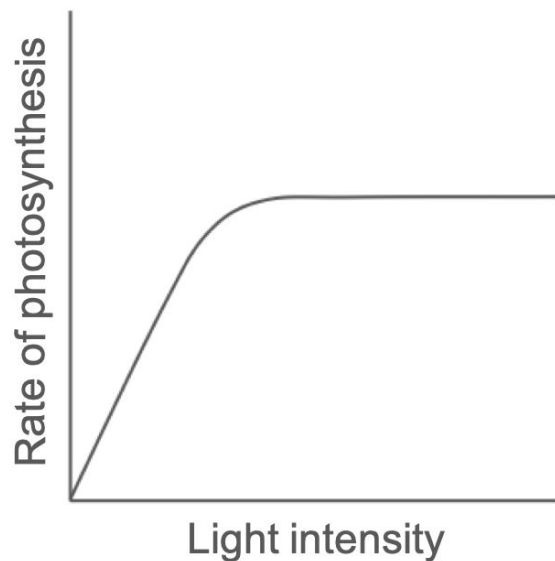
Another factor (temperature or CO_2 concentration) becomes limiting.



Draw a graph to show the effect of light intensity on the rate of photosynthesis



Draw a graph to show the effect of light intensity on the rate of photosynthesis



Explain how carbon dioxide concentration affects the rate of photosynthesis



Explain how carbon dioxide concentration affects the rate of photosynthesis

As carbon dioxide concentration increases, the rate of photosynthesis increases



Why does the rate of photosynthesis eventually plateau even if CO₂ concentration continues to increase?
(higher)



Why does the rate of photosynthesis eventually plateau even if CO_2 concentration continues to increase? (**higher**)

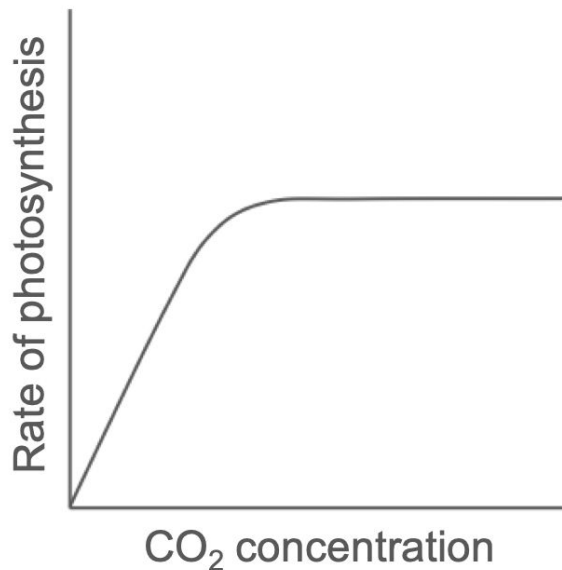
Another factor (temperature or light intensity) becomes limiting.



Draw a graph to show the effect of carbon dioxide concentration on the rate of photosynthesis



Draw a graph to show the effect of carbon dioxide concentration on the rate of photosynthesis



When does temperature become a limiting factor? (higher)



When does temperature become a limiting factor?
(higher)

When temperature drops too low on cold
winter days



When does light intensity become a limiting factor? (higher)



When does light intensity become a limiting factor?
(higher)

At night



When does carbon dioxide concentration become a limiting factor? **(higher)**



When does carbon dioxide concentration become a limiting factor? (**higher**)

- Atmospheric CO₂ concentrations generally remain constant
- ∴ CO₂ only becomes limiting when light intensity and temperature are not limiting factors



How is glucose used by the plant?



How is glucose used by the plant?

- Used in **respiration** to release energy
- Converted to starch or oils and **stored**
- Converted to **sucrose** and **transported** to other plant areas
- Converted to **cellulose** which is used in cell walls
- Formation of **proteins** which requires nitrates from the soil

