Edexcel Biology GCSE

Topics 6.1 to 6.6 - Photosynthesis

Flashcards

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 → glucose + oxygen

Write the symbol equation for photosynthesis

Write the symbol equation for photosynthesis

$$6CO_2 + 6H_2O \rightarrow C_6H_{12}O_6 + 6O_2$$

Why is photosynthesis important?

Why is photosynthesis important?

It produces glucose which has a wide range of uses:

- Used in respiration to release energy
- Converted to starch and stored - broken down to glucose when the plant requires energy
- Used to make complex organic molecules which are used for growth, making up an organism's biomass (transferred through food chains)

Where does photosynthesis take place?

Where does photosynthesis take place?

Within chloroplasts

What type of reaction is photosynthesis?

What type of reaction is photosynthesis?

An endothermic reaction that takes in energy (in the form of light)

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?

What is a limiting factor?

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

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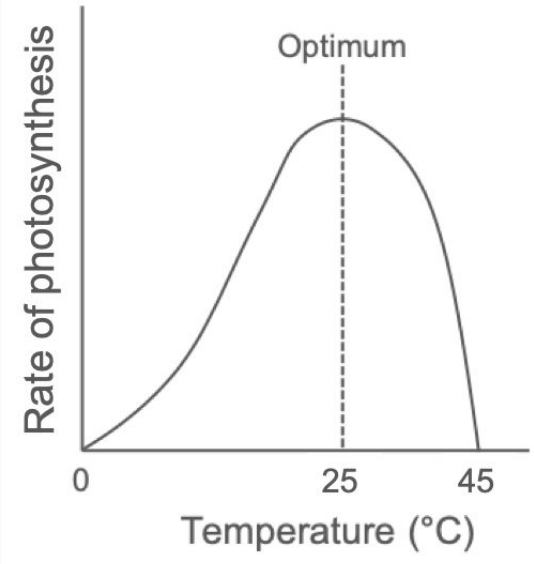

Explain how light intensity affects the rate of photosynthesis

Explain how light intensity affects the rate of photosynthesis

Rate of photosynthesis is directly proportional to light intensity ∴ 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

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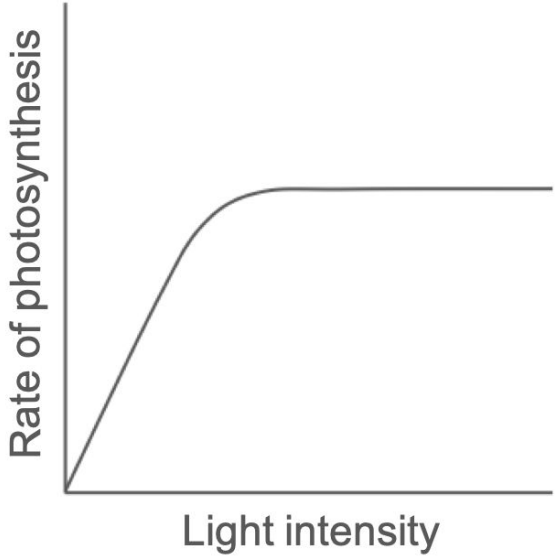

How can the effect of light intensity on the rate of photosynthesis be measured in the lab? (2) (higher)

How can the effect of light intensity on the rate of photosynthesis be measured in the lab? (2) (higher)

- Using a light meter

- Using the inverse square law where:

$$\text{light intensity} \propto \frac{1}{\text{distance}^2}$$

Why does the rate of photosynthesis decrease as the distance from a light source increases? (higher)

Why does the rate of photosynthesis decrease as the distance from a light source increases? (higher)

Light intensity is inversely proportional to the square of the distance from the light source. Thus, as the distance increases, light intensity decreases and the rate of photosynthesis decreases.

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 CO_2 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

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