

Required Practical Enzyme Rate

GCSE Biology · Written to the shared content for AQA, Edexcel and OCR

Name _____ Class _____ Date _____

1. Worked example

Explain why iodine solution is used in this practical. (2 marks)

Step 1 · What iodine detects

Iodine turns blue-black when starch is present.

Step 2 · End point

When amylase has digested all the starch, the iodine stays orange-brown, so the time when this first happens shows how long digestion took.

Answer: It shows when starch has all been broken down (end point)

Check: The dependent variable is the time taken for starch to disappear.

2. Now try one with the steps

At pH 6 starch disappeared after 60 s. Calculate the rate using $\text{rate} = 1000 \div \text{time}$. (1 mark)

Step 1 · Substitute

Step 2 · Round

Answer:

3. Practice

Show your working. The marks tell you how much is expected.

1. State the independent variable in this investigation. [1]

2. State the dependent variable. [1]

3. Explain why a buffer solution is added. [1]

4. Give two control variables. [2]

5. Explain why the tubes are placed in a water bath. [1]
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6. The starch was digested in 40 s. Calculate the rate using $1000 \div \text{time}$. [1]
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7. The starch was digested in 150 s. Calculate the rate using $1000 \div \text{time}$, to 3 significant figures. [1]
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8. Explain why the amylase and starch solutions are left in the water bath for a few minutes before mixing. [1]
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9. Explain why a new, clean pipette is used for each sample. [1]
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10. At pH 9 no orange-brown colour appeared after 10 minutes. Suggest why. [2]
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11. Calculate the percentage decrease in rate from pH 7 (rate 25) to pH 8 (rate 10). [2]
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12. A student's results at pH 7 were 40 s, 40 s and 120 s. Calculate a suitable mean. [2]
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13. Suggest how the experiment could be changed to find the optimum pH more precisely. [2]
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14. Explain why the results of this practical cannot be used to say the exact optimum pH of all human amylase. [2]
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4. Before you hand it in

"The longest time shows the fastest enzyme."

The shortest time = the fastest rate. Use $\text{rate} = 1000 \div \text{time}$.

Mixing amylase and starch before adding buffer

Add buffer to the starch first, then add amylase and start the stop clock immediately.

Describing a pattern without data

Quote values: 'rate rose from 3.3 at pH 4 to 25 at pH 7'.