Temperature and the rate of decay

Biology required practical | AQA GCSE Biology 8461 only (not Combined Science) | 14 questions, 35 marks

GCSE science required practicals

This practical online

Name: _____ **Date:** _____ **Score:** _____ / 35

Aim: To find out how temperature affects the rate at which lipase breaks down the fat in milk, by timing a pH change.

Equipment: Full-fat milk; Lipase solution; Sodium carbonate solution (makes the milk alkaline); Phenolphthalein indicator; Test tubes and a rack; Measuring cylinders or syringes; Water baths set at different temperatures; Thermometer; Stopwatch; Glass stirring rod; White tile behind the tubes.

Results

Mohammed and Grace timed how long it took the pink colour to disappear at five temperatures, doing three repeats at each.

Temperature in °C	Time 1 in s	Time 2 in s	Time 3 in s	Mean time in s
15	412	398	405	405
25	236	251	243	243
35	128	134	131	131
45	102	168	98	?
55	290	305	298	298

Questions

1 Name the independent variable and the dependent variable in Mohammed and Grace's investigation.

(2 marks)

2 Give one control variable and explain why it must be kept the same.

(2 marks)

Free for classroom and home use: print, photocopy and share. Not for resale or re-hosting.

3 Explain why the milk mixture and the lipase are put in the water bath separately for 5 minutes before they are mixed.

(2 marks)

4 Describe one hazard in this practical and how to reduce the risk.

(2 marks)

5 Explain why the pink colour disappears during the reaction.

(2 marks)

6 Identify the anomalous result. Explain how you know.

(2 marks)

7 Calculate the mean time at 45 °C. Do not include the anomalous result.

(2 marks)

8 Calculate the rate of reaction at 35 °C and at 45 °C using rate = 1000 / mean time.
Give your answers to 2 significant figures. Show your working.

(3 marks)

Free for classroom and home use: print, photocopy and share. Not for resale or re-hosting.

9 Describe how the rate of decay changes with temperature from 15 °C to 55 °C. (2 marks)

10 Explain why the rate at 55 °C is lower than at 45 °C. (3 marks)

11 **Higher tier**

How many times faster is the reaction at 35 °C than at 15 °C? Give your answer to 2 significant figures. (2 marks)

12 Grace repeated the test at 35 °C using a pH probe instead of the indicator. The pH fell from 9.5 to 7.7 in 3 minutes.

Calculate the rate of pH change in pH units per minute. (2 marks)

13 Mohammed and Grace found it hard to decide exactly when the pink colour had gone.

a. Is this a source of random error or systematic error? Explain your answer.

b. Suggest an improvement and explain why it helps. (3 marks)

Free for classroom and home use: print, photocopy and share. Not for resale or re-hosting.

14 Plan an investigation to find out how the concentration of lipase affects the rate of decay of the fat in milk.

(6 marks)

End of questions | Total 35 marks | The answers sheet has the full method as revision notes.

Free for classroom and home use: print, photocopy and share. Not for resale or re-hosting.