

**GCSE Biology A (Gateway)**

**J247/01 B1-B3 and B7 Foundation (Foundation Tier)**

**Question Set 10**

1

The fat in milk is broken down by the enzyme lipase.

A group of students investigate the effect of temperature on this breakdown of fat.

In their investigation they use an indicator called phenolphthalein.

Phenolphthalein is pink in alkali conditions but colourless in pH values below 8.

**Step 1** One student puts 5 drops of phenolphthalein and 5 ml of full fat milk into a test tube.

**Step 2** She adds 1 ml of lipase and stirs the mixture.

**Step 3** She measures the time for the pink indicator colour to disappear.

The other students repeat these three steps but at different temperatures.

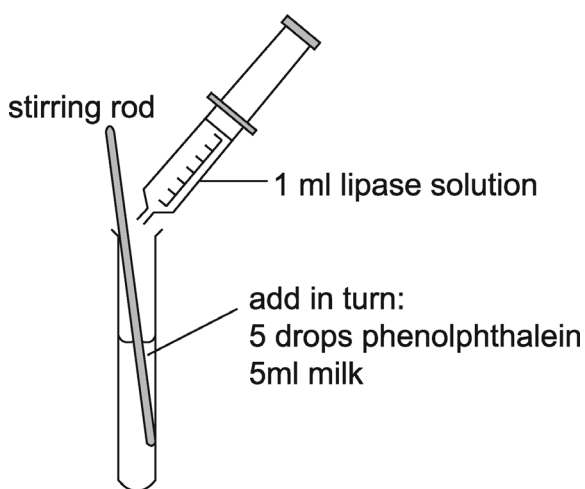


Table 1.1 shows the group's results.

Temperature (°C)	Time for pink colour to disappear (s)
20	480
40	240
60	270
80	960

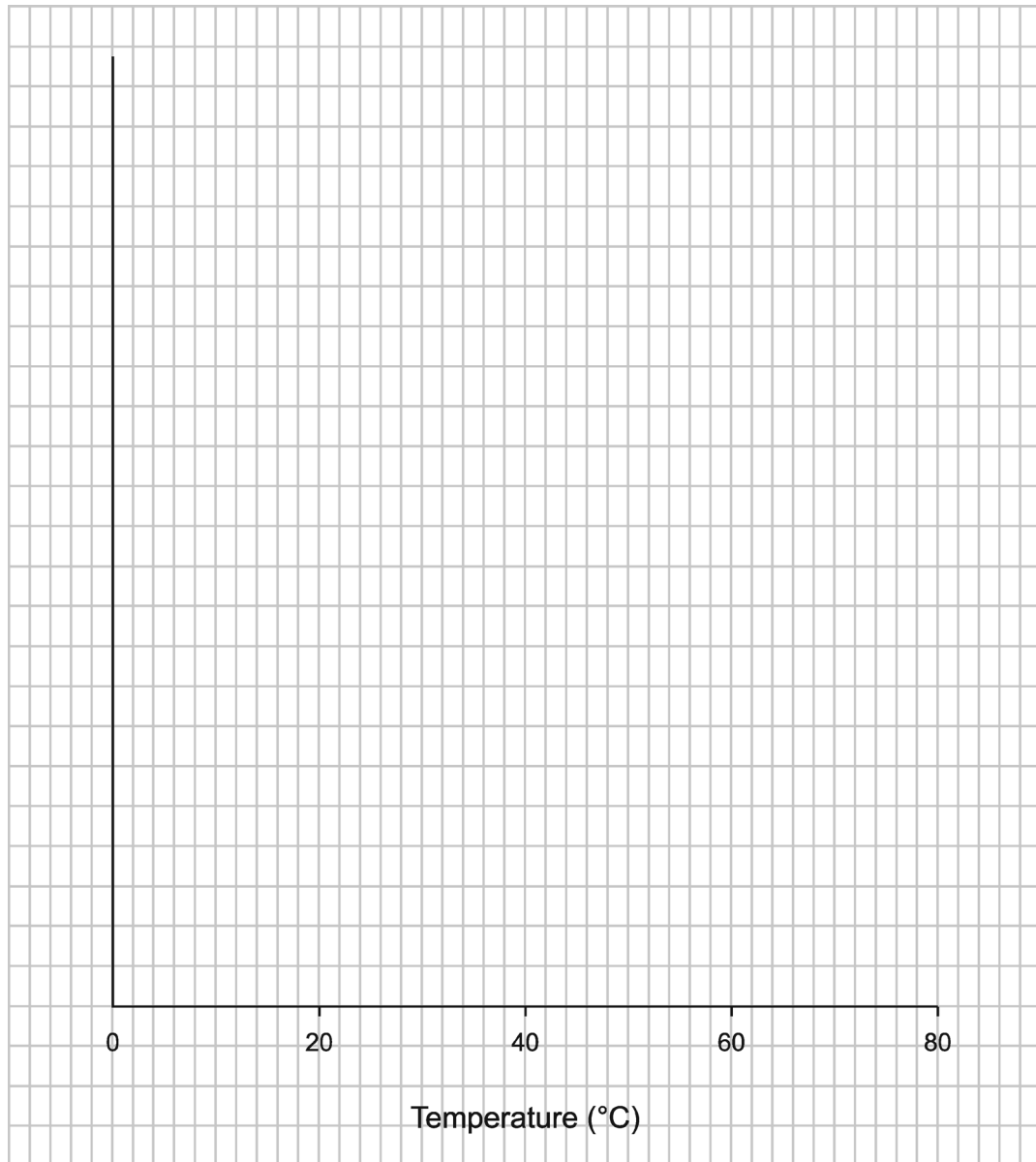
Table 1.1

(a) The pH falls as the fat in milk breaks down.

Explain why.

[2]

- (b) Plot a graph of the results in **Table 1.1** and draw a line of best fit.



[5]

- (c) Explain why the results at 20°C and 40°C are different.

[3]

- (d) Explain why the results at 80°C and 40°C are different.

[3]

- (e) (i) One student says that the results show that the optimum temperature for lipase is 40°C.

The teacher says that she **cannot** say for certain that it is 40°C.

Explain why.

[1]

- (ii) Give **two** modifications that the students could make to their method to find a more accurate value for the optimum temperature.

[2]

- (f) The students rounded each time to the nearest 10 seconds.

They rounded the times because they found it difficult to judge exactly when the pink colour had disappeared.

Describe and explain **two** ways the method could be improved to give more accurate measurements.

1.....

2.....

[2]

**Total Marks for Question Set 10: 18**

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