

Answer **all** questions in the spaces provided.

0 1

This question is about the decay of milk.

0 1 . 1

Name **two** types of microorganism that cause decay.

[2 marks]

1 _____

2 _____

0 1 . 2

Cows' milk is pH 6.6.

As milk decays, lipids in the milk are broken down.

One of the products of the breakdown of lipids causes the pH of milk to decrease.

Name the product that causes the pH to decrease.

[1 mark]



A student investigated the effect of temperature on the time taken for different types of milk to decay.

This is the method used.

1. Put cows' milk in six test tubes.
2. Keep each test tube at a different temperature.
3. Measure the pH of the milk in each tube every day for 12 days.
4. Record the number of days taken to reach pH 5.
5. Repeat steps 1 to 4 with goats' milk and with almond milk.

0 1 . 3 Give **one** way the pH can be measured.

[1 mark]

0 1 . 4 Give **two** control variables the student should have used in this investigation.

[2 marks]

1 _____

2 _____

Question 1 continues on the next page

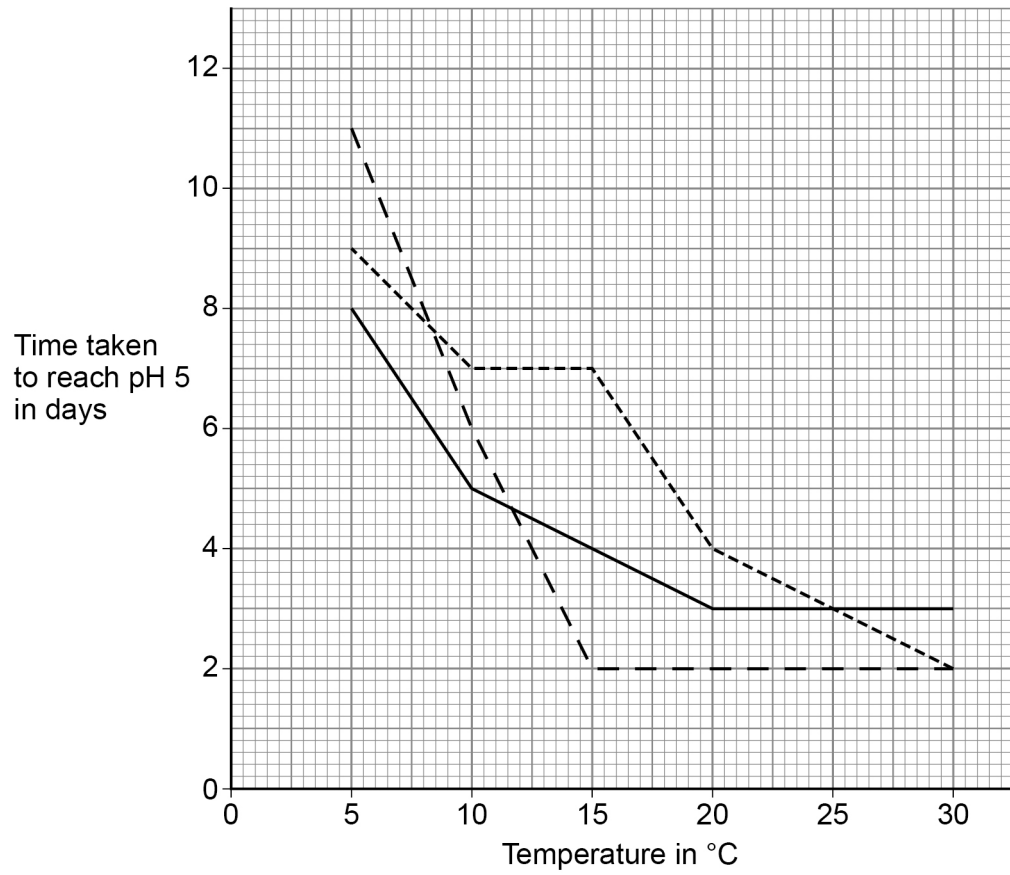
Turn over ►



The student improved the investigation to produce valid results.

Figure 1 shows the results.

Figure 1



Key

- Cows' milk
- - - Goats' milk
- Almond milk

0 1 . 5 Which type of milk stays fresh the longest at 10 °C?

[1 mark]



0 1 . 6 Describe the effect of temperature on the time taken for **goats'** milk to reach pH 5.

Use data from **Figure 1** in your answer.

[2 marks]

0 1 . 7 The time taken for cows' milk to reach pH 5 at 10 °C is less than the time taken for cows' milk to reach pH 5 at 5 °C.

Suggest **one** reason why.

[1 mark]

0 1 . 8 Suggest **two** reasons why the different types of milk took different lengths of time to reach pH 5.

[2 marks]

1 _____

2 _____

Question 1 continues on the next page

Turn over ►



0 1 . 9

The student said:

'The temperature milk is stored at affects how likely
the milk is to cause food poisoning.'

How can the investigation be developed to find out if the student is correct?

[1 mark]Tick (✓) **one** box.

Determine the types of bacteria present in the milk

Record the pH every 12 hours

Use more than three different types of milk

13



Question	Answers	Extra information	Mark	AO / Spec. Ref.
01.1	bacteria	allow singular	1	AO1
	fungi	allow mould ignore microbes / germs / decomposers do not accept viruses	1	4.7.2.2 4.7.2.3
01.2	fatty acid(s)		1	AO2 4.7.2.3 4.2.2.1 RPA10
01.3	any one from: <ul style="list-style-type: none"> • universal indicator (paper / solution) • pH meter 	allow UI (paper / solution) ignore pH paper unqualified allow pH probe ignore datalogger unqualified ignore Cresol red ignore phenolphthalein / litmus	1	AO1 4.7.2.3 RPA10
01.4	any two from: <ul style="list-style-type: none"> • volume of milk • exposure to air / oxygen • sterilise test tubes • treatment of milk before investigation • freshness / age of milk (at start) • time of day pH was measured 	allow amount of milk allow bungs on test tubes allow example such as pasteurised or not allow starting pH of milk	2	AO1 4.7.2.3 RPA10
01.5	almond (milk)		1	AO3 4.7.2.3 RPA10

01.6	<p>as temperature increases up to 15 °C the time taken (to reach pH 5) decreases</p> <p>above 15 °C the time taken (to reach pH 5) stays the same</p>	<p>allow converse</p> <p>if no other mark awarded allow 1 mark for as temperature increases the time taken (to reach 5 °C) decreases and then stays the same</p>	<p>1</p> <p>1</p>	<p>AO2 4.7.2.3 RPA10</p>
01.7	<p>any one from:</p> <ul style="list-style-type: none"> • bacteria / microbes / microorganisms / fungi dividing faster (when warmer) • reactions (in the bacteria) are happening faster (to decay milk) • (because there is) more (kinetic) energy • enzyme activity is higher (at 10 °C than at 5 °C) 	<p>allow converse if clearly describing 5 °C</p> <p>allow number of bacteria / microbes / microorganisms / fungi increasing (when warmer)</p> <p>allow more bacteria microbes / microorganisms / fungi</p> <p>allow particles move faster</p> <p>allow more collisions between particles</p> <p>allow enzymes work faster</p> <p>ignore enzymes work better</p>	<p>1</p>	<p>AO2 4.7.2.3 4.1.1.6 RPA10</p>
01.8	<p>any two from:</p> <ul style="list-style-type: none"> • different concentration / type of fat / lipid • different concentration / type of proteins / carbohydrate / sugar • different (amount / type of) bacteria present • may have been pasteurised by a different process • different starting pH 	<p>allow different amounts of fat / lipid</p> <p>allow different amounts of proteins / carbohydrate / sugar</p> <p>allow may have been treated in different ways (before the investigation)</p> <p>ignore different oxygen concentration</p>	<p>2</p>	<p>AO3 4.7.2.3 RPA10</p>

01.9	determine the types of bacteria present in the milk		1	AO3 4.7.2.3 RPA10
Total			13	