2021 ASSESSMENT MATERIALS

GCSE
BIOLOGY

Biology Test 5: Ecology (Higher)

Total number of marks: 33

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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]

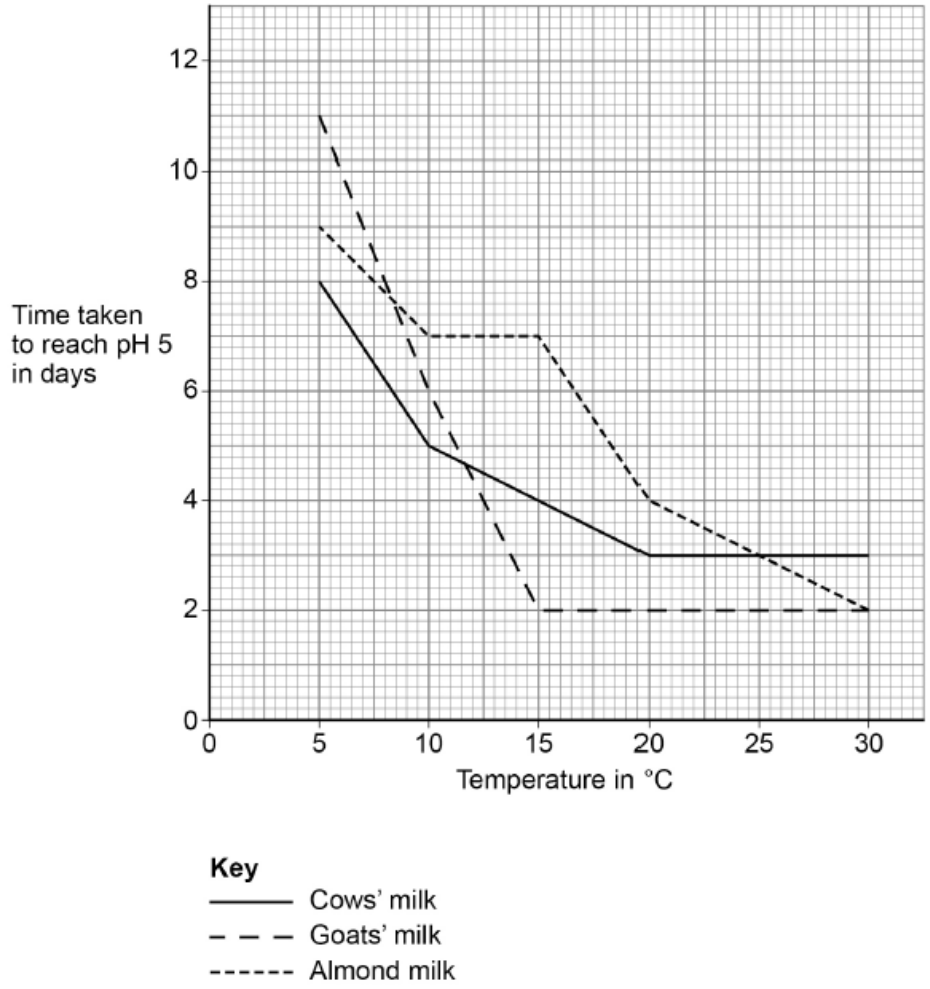
1 _____

2 _____

The student improved the investigation to produce valid results.

Figure 1 shows the results.

Figure 1



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 _____

_____

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 ☐

0 7 The limpet is a snail-like animal that lives attached to a rock on the seashore.

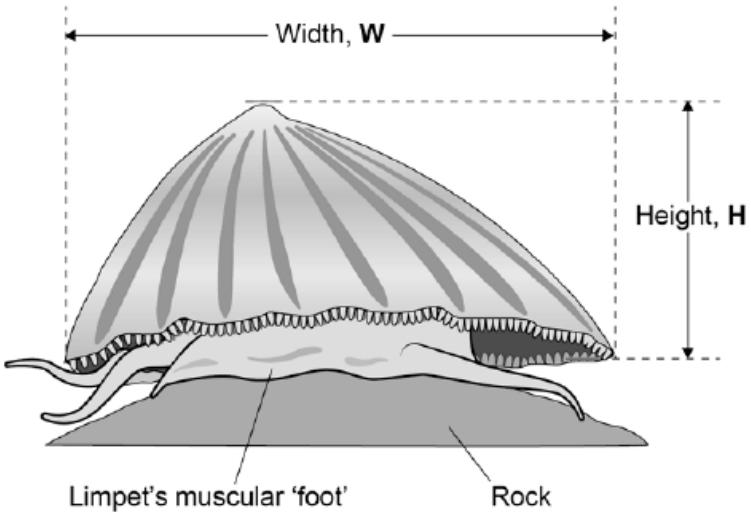
Some students investigated variation in the size of limpets living on two seashores:

- one shore was in a sheltered bay
- the other shore was exposed to the full force of the sea.

The students measured the heights (**H**) and widths (**W**) of 60 limpets on each shore.

Figure 7 shows a limpet and the measurements made by the students.

Figure 7



0 7 . 1 On each shore, the students measured a large number of limpets at random locations.

Explain why the students did this.

[2 marks]

Large number of limpets _____

_____

Random locations _____

_____

The students calculated $\frac{H}{W}$ for each limpet.

Table 3 shows the students' results.

Table 3

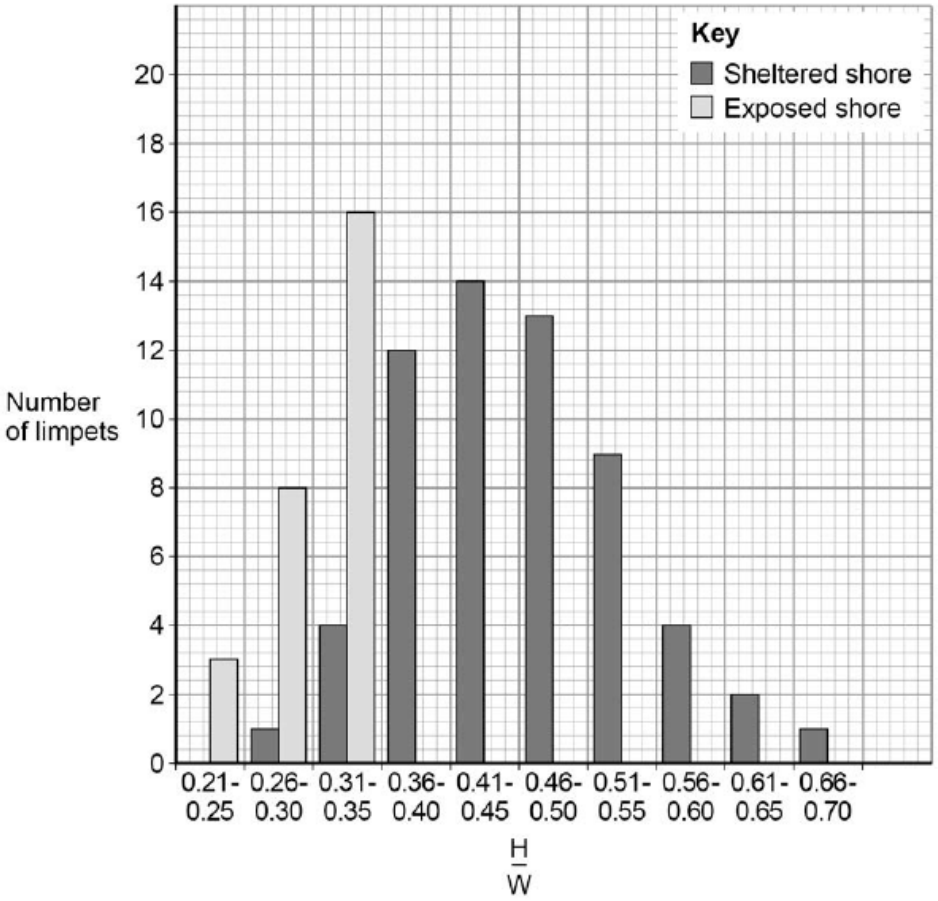
$\frac{H}{W}$	Sheltered shore		Exposed shore	
	Score	Number	Score	Number
0.21 – 0.25			|||	3
0.26 – 0.30	|	1	𝍸 |||	8
0.31 – 0.35	||||	4	𝍸 𝍸 𝍸 |	16
0.36 – 0.40	𝍸 𝍸 ||	12	𝍸 𝍸 𝍸 ||||	
0.41 – 0.45	𝍸 𝍸 ||||	14	𝍸 ||||	
0.46 – 0.50	𝍸 𝍸 |||	13	||||	
0.51 – 0.55	𝍸 ||||	9	|	
0.56 – 0.60	||||	4		
0.61 – 0.65	||	2		
0.66 – 0.70	|	1		

0 7 . 2 Complete **Table 3**.

[1 mark]

Figure 8 shows some of the results.

Figure 8



0 7 . 3 Complete **Figure 8**.

[1 mark]

0 7 . 4 Compare the patterns in the results for the exposed shore and the sheltered shore.

Use information from **Figure 8**.

[3 marks]

0 7 **Figure 8** shows:

- a food chain for organisms in a river
- the biomass of the organisms at each trophic level.

Figure 8

Algae → Invertebrate animals → Small fish → Large fish

	Algae	Invertebrate animals	Small fish	Large fish
Biomass in g/m^2:	840	200	40	10

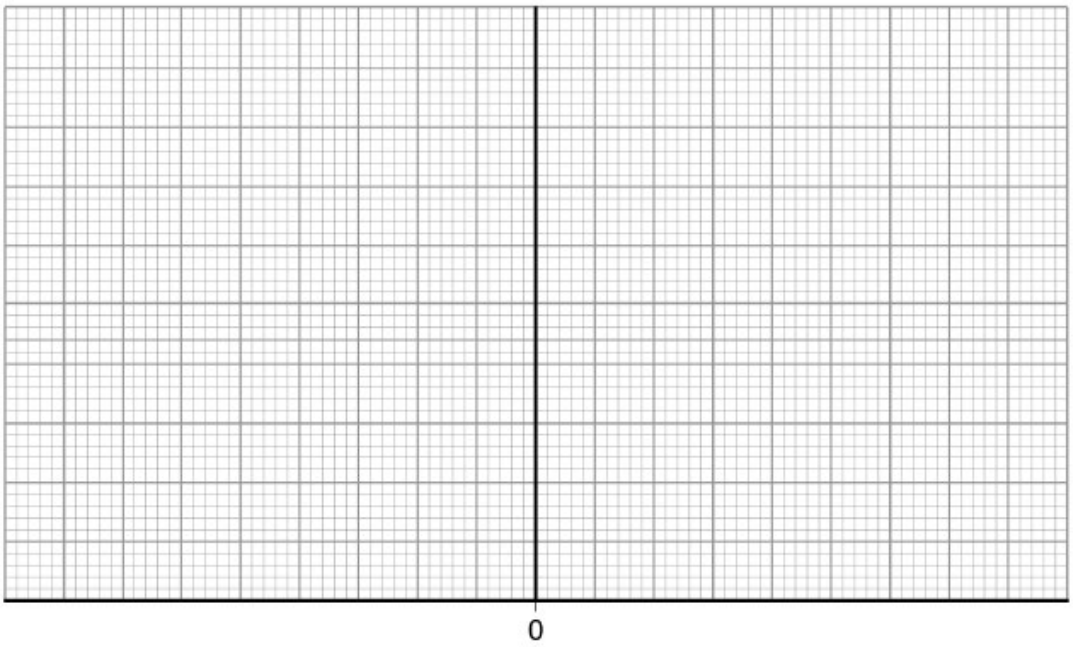
0 7 . 1 Draw a pyramid of biomass for the food chain in **Figure 8** on **Figure 9**.

You should:

- use a suitable scale
- label the x-axis
- label each trophic level.

[4 marks]

Figure 9



0 7 . 2 Calculate the percentage of the biomass lost between the algae and the large fish.

Give your answer to 2 significant figures.

[3 marks]

Percentage loss = _____

0 7 . 3 Give **one** way that biomass is lost between trophic levels.

[1 mark]

0 7 . 4 A large amount of untreated sewage entered the river. Many fish died.

Untreated sewage contains organic matter and bacteria.

Explain why many fish died.

[5 marks]