GCSE
BIOLOGY

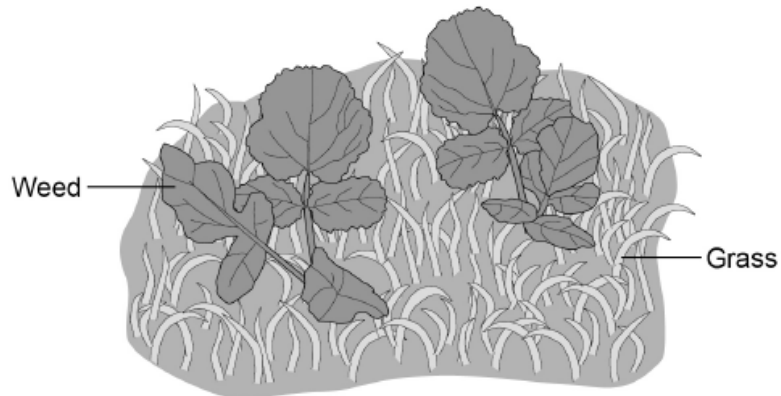Biology Test 5: Ecology (Foundation)

Total number of marks: 32

0 6 Some weed killers are selective.

Selective weed killers kill broad-leaved weed plants, but do **not** kill narrow-leaved grass plants.

Figure 8 shows some weeds growing on a grassy lawn.

Figure 8

Some students investigated the effect of a selective weed killer on the weeds growing in a lawn. They used 0.5 m × 0.5 m quadrats.

The lawn was 20 metres long and 10 metres wide.

This is the method used.

1. Divide the lawn into two halves, side **A** and side **B**.
2. Place 5 quadrats in different positions on side **A**.
3. Place 5 more quadrats in different positions on side **B**.
4. Count the number of weed plants in each quadrat.
5. Spray side **A** with weed killer solution.
6. Spray side **B** with the same volume of water.
7. Repeat steps 2-4 after 2 weeks.

0 6 . 1 Suggest a method the students should have used to place each quadrat.
[1 mark]

Use a random method to select coordinates where each quadrat will be placed.

0 6 . 2 Give the reason for the method you suggested in Question 06.1.
[1 mark]

The quadrats should be placed randomly to allow for a representative sample.

0 6 . 3 Explain why the students used water on one side of the lawn instead of weed killer.
[2 marks]

Water is used as a control to compare the weeds in the presence and absence of weedkillers.

Table 3 shows the students' results.

Table 3

Number of weeds per quadrat			
At start		After 2 weeks	
Side A (Weed killer)	Side B (Water)	Side A (Weed killer)	Side B (Water)
8	14	3	8
2	9	4	15
12	3	0	7
15	16	2	12
13	3	1	13
Mean 10	9	2	**X**

0 6 . 4 Calculate the mean value, **X**, in **Table 3**.

[1 mark]

$(8 + 15 + 7 + 12 + 13) \div 5 = 11$

Mean value, **X** = _____11_____

0 6 . 5 Calculate the percentage decrease in the number of weeds on side **A** after 2 weeks.

[2 marks]

Use the following equation:

$$\text{percentage decrease} = \frac{(\text{mean at start} - \text{mean after 2 weeks})}{\text{mean at start}} \times 100$$

$\frac{10 - 2}{10} \times 100 = 80\%$

Percentage decrease = _____80%_____

0 6 . 6   One student thought the results were **not** valid.

Suggest **one** improvement the students could have made to the method to make the results more valid.

Give the reason for your answer.

[2 marks]

Improvement The student should not divide the lawn into side A and side B.

Reason The content of the soil in each half on the lawn might be different and this will affect the growth of weeds.

Today, humans are cutting down large areas of tropical rainforests.

0 5 . 3   Suggest **one** use of the land after the trees have been removed.

building houses

[1 mark]

0 5 . 4   Why does the removal of trees cause an increase in carbon dioxide in the atmosphere?

[2 marks]

Tick (✓) **two** boxes.

There are fewer animals.	
There is less photosynthesis.	✓
There is less respiration.	
The soil dries out.	
The trees are burned.	✓

0 5 . 5   What effect would an increase in carbon dioxide in the atmosphere have on global air temperature?

[1 mark]

Tick (✓) **one** box.

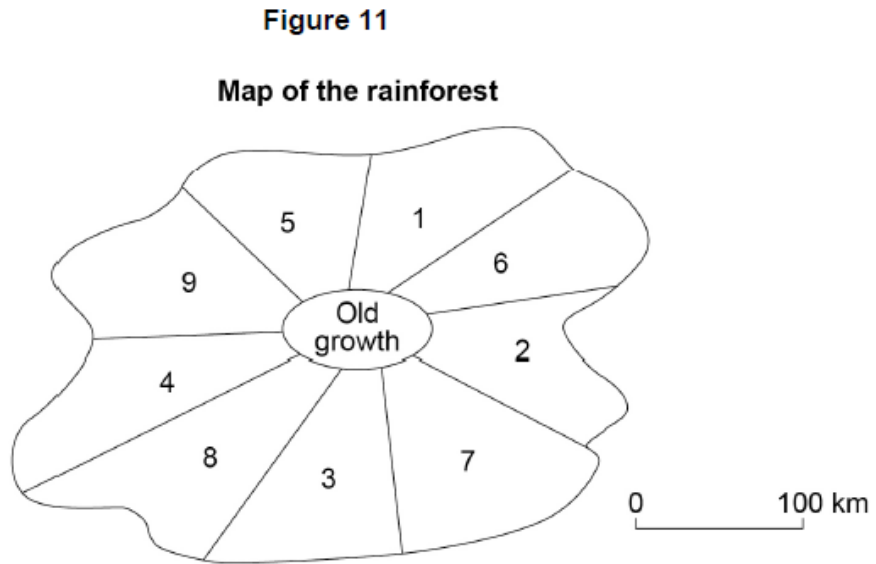|	
Decrease	
Increase	✓
Stay the same	

'Sustainable forestry' reduces the harmful effects of cutting down trees on the environment.

Figure 11 shows a method of 'sustainable forestry'.

Numbers 1–9 show different parts of a rainforest.

Figure 11

Map of the rainforest

The trees are cut down in the sequence 1 – 2 – 3 – 4 – 5 – 6 – 7 – 8 – 9

- The trees are cut down in only one area at any one time.

- It takes 30 years to cut down the trees in each area.

- The trees in the 'Old growth' area are never cut down.

| 0 | 5 |.| 6 | How many years would it take to cut down the trees in all of the numbered areas in **Figure 11**?

[2 marks]

9 x 30 = 270

Number of years = 270

0 5 . 7   The rainforest contains:

- 750 species of trees

- 400 species of birds

- 150 species of butterflies

- many other species of plants and animals.

Explain how the pattern of cutting down trees shown in **Figure 11** stops the biodiversity of the rainforest being reduced.

[4 marks]

The species of trees can be conserved in the old growth area as trees in that area are not cut down. Animals can move to neighbouring areas when trees in one area are being cut. Trees have time to regrow as it takes many years to cut down all trees in the rainforest.

0 8   This question is about the decay of milk.

0 8 . 1   Name **two** types of microorganism that cause decay.

[2 marks]

1   bacteria

2   fungi

0 8 . 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]

fatty acids

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 8 . 3   Give **one** way the pH can be measured.

[1 mark]

using a universal indicator

0 8 . 4   Give **two** control variables the student should have used in this investigation.
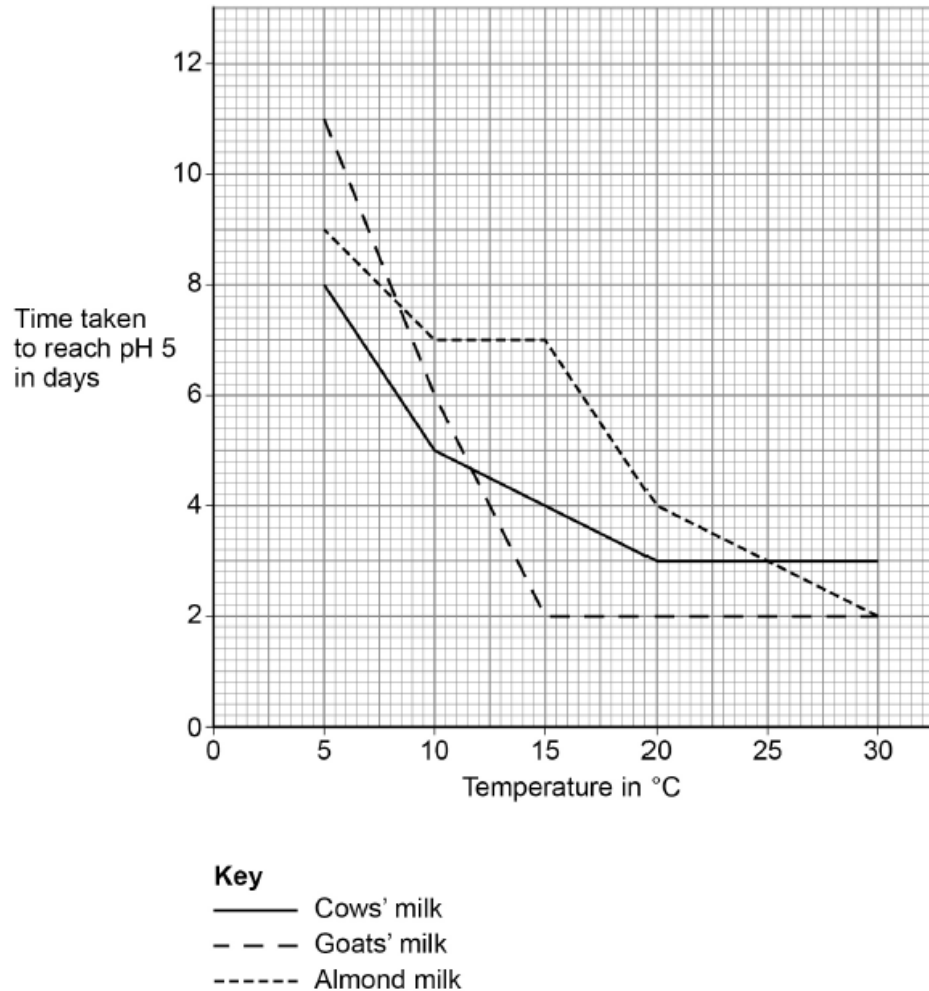
[2 marks]

1 the availability of oxygen

2 volume of milk in each test tube

The student improved the investigation to produce valid results.

Figure 11 shows the results.

Figure 11

Key

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

0 8 . 5 Which type of milk stays fresh the longest at 10 °C?

[1 mark]

almond milk

0 8 . 6 Describe the effect of temperature on the time taken for **goats'** milk to reach pH 5.

Use data from **Figure 11** in your answer.

[2 marks]

Between 5°C to 15°C, time taken for goats' milk to reach pH 5 decreases proportionally as temperature increases. At 15°C and above, the time taken to reach pH5 is constant at 2 days.

0 8 . 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.

At higher temperature, microorganisms are more active so the rate of decomposition is higher.

[1 mark]

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

[2 marks]

1 the initial pH of the different types of milk are different

2 the amount of lipid in each type of milk is different

0 8 . 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	