AQA GCSE Combined Science - Trilogy | 8464

SPECIFICATION POINT 4.7.1.1

Communities

Past-paper questions

Tier	**Higher**
Question groups	**2**
Available paper years	**2024–2024**

Using this booklet

1. Answer the questions in order and show your working.
2. Original question numbers and marks are retained.
3. Print at actual size (100%) for measuring questions.
4. Use the companion answer booklet to check your work.

Name: _____ **Date:** _____

Whole questions are retained for context, so some parts assess other specification points. Current and legacy sources are labelled. Continue on extra paper if needed.

4.7.1.1 Communities

Question 01

0 4 Rat populations can increase rapidly.

When rat populations are large there is competition between rats.

0 4 . 1 When rats compete, the basal metabolic rate of the rats increases.

Basal metabolic rate is controlled in the same way in humans and in rats.

Describe how basal metabolic rate is increased.

[2 marks]

Question 4 continues on the next page

4.7.1.1 Communities

0 4 . 2 The size of a rat population can increase quickly.

One female rat and one male rat can produce 20 offspring every 2 months.

Warfarin is a poison that has been used to control rat populations.

Rat populations can become resistant to warfarin by the process of evolution.

A population of rats was given warfarin for 4 months.

Table 1 shows information about resistance to warfarin in the rat population for a year after warfarin was first given.

Table 1

Number of months since warfarin was first given	Was warfarin being given?	Percentage (%) of rat population resistant to warfarin
0	Yes	1
2	Yes	24
4	Yes	81
6	No	99
8	No	92
10	No	85
12	No	70

4.7.1.1 Communities

Question 01 · continued

Rats with resistance to warfarin have a smaller mean mass than rats that are **not** resistant to warfarin.

Smaller rats are often at a disadvantage when competing against larger rats.

Explain the trends in the data when warfarin was being given and when warfarin was no longer given.

Use **Table 1**.

[6 marks]

8

4.7.1.1 Communities

Question 02

0 5 Otters are mammals that live in river ecosystems.

Figure 5 shows an otter.

Figure 5



0 5 . 1 Define the term 'ecosystem'.

[1 mark]

4.7.1.1 Communities

Question 02 · continued

0 5 . 2 Otters are an important species for the stability of the river community.

Describe **two** ways animal species may be important for the stability of a whole community.

[2 marks]

1 _____

_____

2 _____

_____

Question 5 continues on the next page

4.7.1.1 Communities

Sewage was accidentally added to a river.

The sewage moved with the river water and affected:

- the number of bacteria in the water
- the concentration of dissolved oxygen in the water.

Samples of river water were analysed at different distances from where the sewage was added.

Table 2 shows the results.

Table 2

Distance from where sewage was added in km	Number of bacteria × 1000/mm^3	Concentration of dissolved oxygen in mg/dm^3
0.0	4	5.4
1.0	75	4.8
2.0	125	4.3
3.0	145	3.8
4.0	160	3.3
5.0	216	2.7

0 5 . 3 The number of bacteria at 5.0 km was greater than the number of bacteria where the sewage was added.

Calculate how many times greater.

[1 mark]

Number of times greater = _____

4.7.1.1 Communities

Question 02 · continued

0 5 . 4 A student concluded:

'number of bacteria ∝ concentration of dissolved oxygen'

Explain why the student's conclusion is **not** correct.

Use **Table 2**.

[2 marks]

0 5 . 5 Otters:

- live in water and on the land
- eat mainly fish.

The concentration of dissolved oxygen has decreased in a river where otters live.

Explain how the decrease in the concentration of dissolved oxygen in the river water will affect the population of otters.

[3 marks]

9