AQA GCSE Combined Science - Trilogy | 8464

SPECIFICATION POINT 4.7.3.2

# Waste management

## Past-paper questions

| | |
|---|---|
| Tier | **Foundation** |
| Question groups | **4** |
| Available paper years | **2018–2024** |

## 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.

### 4.7.3.2 Waste management

**Question 01**

June 2018 | 8464/B/2F | Original Q4

**0 4** A class of eight students measured the population of water fleas living at the edge of a large pond.

This is the method each student used.

1. Put some pond water in a white tray.
2. Take a pond net and scoop at the edge of the pond a few times.
3. Empty the pond net into the water in the tray.
4. Count the number of water fleas in the tray.

**Figure 6** shows a student working.

**Figure 6**



**0 4 . 1** The students did **not** control some variables.

Give **two** variables the students should have controlled to make this a valid method.

**[2 marks]**

1 _____

_____

2 _____

_____

Question 01 · continued



The eight students then used a different method to obtain valid results.

**Table 2** shows their results.

**Table 2**

| Student | Number of water fleas per 1000 $cm^3$ pond water |
|---|---|
| **A** | 66 |
| **B** | 37 |
| **C** | 51 |
| **D** | 102 |
| **E** | 40 |
| **F** | 122 |
| **G** | 75 |
| **H** | 19 |

**0 4 . 2** Calculate the students' mean value for the population of water fleas at the edge of the pond.

**[1 mark]**

Mean population = _____ water fleas per 1000 $cm^3$ pond water

**0 4 . 3** What was the range of the students' results?

**[1 mark]**

Range = _____

**0 4 . 4** Suggest **one** reason why such a wide range of results was found.

**[1 mark]**

Question 01 · continued



**0 4 . 5** The teacher then sampled the centre of the pond eight times.

His mean value was 12 water fleas per 1000 $cm^3$ pond water.

What conclusion can you make about the distribution of water fleas in the pond?

Use the students' mean value from question **04.2** to compare with the teacher's mean value.

**[1 mark]**

Scientists counted some different invertebrates living in a pond in 2014 and in 2016

**Table 3** shows the results.

**Table 3**

| Invertebrate species | Number of invertebrates | |
|---|---|---|
| | 2014 | 2016 |
| Bloodworms | 13 | 48 |
| Freshwater shrimps | 24 | 9 |
| Mayfly nymphs | 32 | 0 |
| Water snails | 19 | 24 |

**0 4 . 6** Calculate the change in the number of bloodworms between 2014 and 2016

**[1 mark]**

Change = _____ bloodworms

**0 4 . 7** Calculate the number of shrimps in the pond in 2016 as a percentage of the number of shrimps in the pond in 2014

**[1 mark]**

Percentage = _____ %

4.7.3.2 Waste management

Question 01 · continued



**0 4 . 8** Invertebrate species found in a pond can be used as an indicator of the pollution level.

**Table 4** shows which species can survive in different levels of pollution.

**Table 4**

| Invertebrate species | Pollution level | | |
|---|---|---|---|
| | Low | Medium | High |
| Bloodworms | ✓ | ✓ | ✓ |
| Freshwater shrimps | ✓ | ✓ | ✗ |
| Mayfly nymphs | ✓ | ✗ | ✗ |
| Water snails | ✓ | ✓ | ✓ |

**Key**
✓ = Can survive
✗ = Cannot survive

What conclusion can you make about the change in the level of pollution in the pond between 2014 and 2016?

Give **one** reason for your conclusion.

Use the data in **Table 3** and **Table 4**

**[2 marks]**

**0 4 . 9** Water pollution and global warming are two problems that have been caused by the rapid increase of the human population.

Suggest **two** other problems caused by the rapid increase of the human population.

**[2 marks]**

1

2

12

4.7.3.2 Waste management

Question 02

November 2020 | 8464/B/2F | Original Q3

**0 3** Mineral ions are important chemicals in an ecosystem.

**0 3 . 1** Plants take in nitrate ions dissolved in water.

Which part of a plant takes in nitrate ions?

**[1 mark]**

_____

**0 3 . 2** Name **two** chemicals that are cycled between plants, the soil and the air.

Do **not** refer to nitrogen or nitrates in your answer.

**[2 marks]**

1 _____

2 _____

4.7.3.2 Waste management

Question 02 · continued



**0 3 . 3** All the chemicals in a plant are recycled when the plant dies.

Describe how:

- microorganisms recycle chemicals
- the chemicals are used again by new plants.

**[6 marks]**

9

### 4.7.3.2 Waste management

**Question 03**

June 2022 | 8464/B/2F | Original Q6

**0 6** Water pollution is a problem for humans and wildlife.

Explain how human activities are polluting rivers, lakes and seas.

**[6 marks]**

6

4.7.3.2 Waste management

Question 04

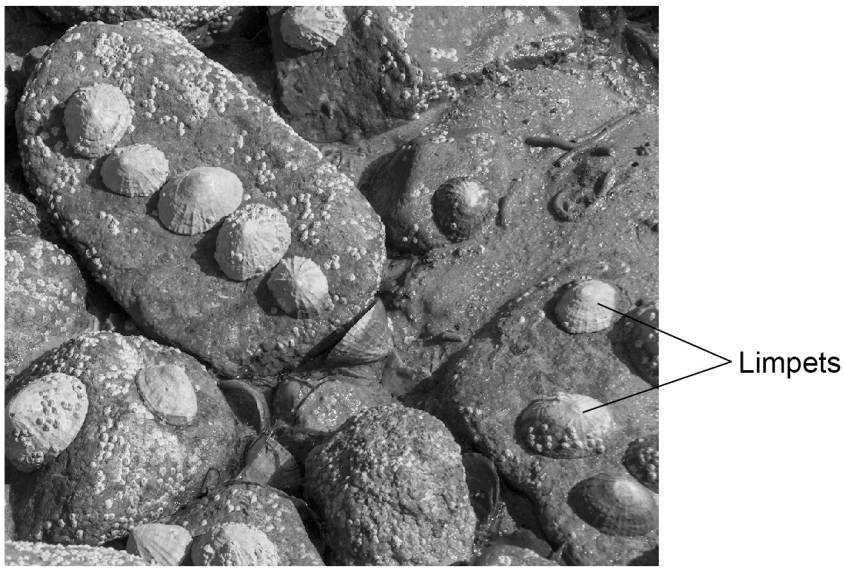
June 2024 | 8464/B/2F | Original Q5

**0 5** Limpets are small animals with shells.

Limpets attach to rocks on sea shores.

**Figure 9** shows limpets on rocks.

**Figure 9**




**0 5 . 1** Limpets eat algae.

Limpets are prey for crabs.

Give the food chain for algae, crabs and limpets.

**[1 mark]**

**Question 5 continues on the next page**

4.7.3.2 Waste management

Question 04 · continued

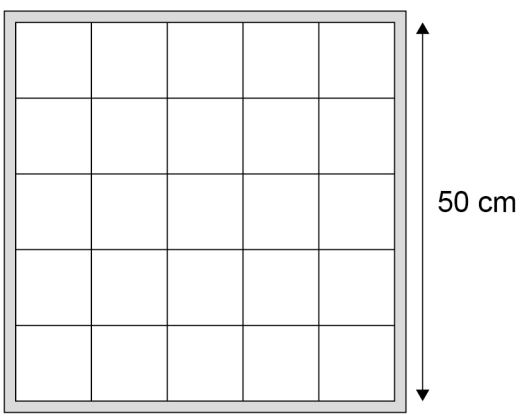


Students estimated the population of limpets on a sea shore.

The students were given a square quadrat.

**Figure 10** shows the quadrat.

**Figure 10**




**0 5 . 2** Calculate the area of the quadrat in $m^2$.

**[2 marks]**

Area of quadrat = _____ $m^2$

**0 5 . 3** The total area of the sea shore was 1800 $m^2$.

The students sampled 2% of the total area of the sea shore.

Calculate the number of times the students needed to use the quadrat for the 2% sample.

Use your answer from Question **05.2**

**[2 marks]**

Number of times = _____

**0 5 . 4** Explain why throwing a quadrat is **not** a random method to estimate population size.

Do **not** refer to safety in your answer.

**[2 marks]**

**Question 5 continues on the next page**

4.7.3.2 Waste management

Question 04 · continued



**0 5 . 5** Describe **one** method the students could use to plan where the quadrat should be randomly placed each time.

**[2 marks]**

**0 5 . 6** Suggest **one** hazard the students should be aware of when collecting data on the sea shore.

Do **not** refer to throwing quadrats in your answer.

**[1 mark]**

**0 5 . 7** Populations of limpets are monitored to assess the impact of pollution in water.

Suggest **one** type of pollution in water that may affect the population of limpets.

**[1 mark]**

**11**