AQA GCSE Biology | 8461

SPECIFICATION POINT 4.7.1.2

Abiotic factors

Past-paper questions

Tier	**Foundation**
Question groups	**4**
Available paper years	**2010–2025**

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.

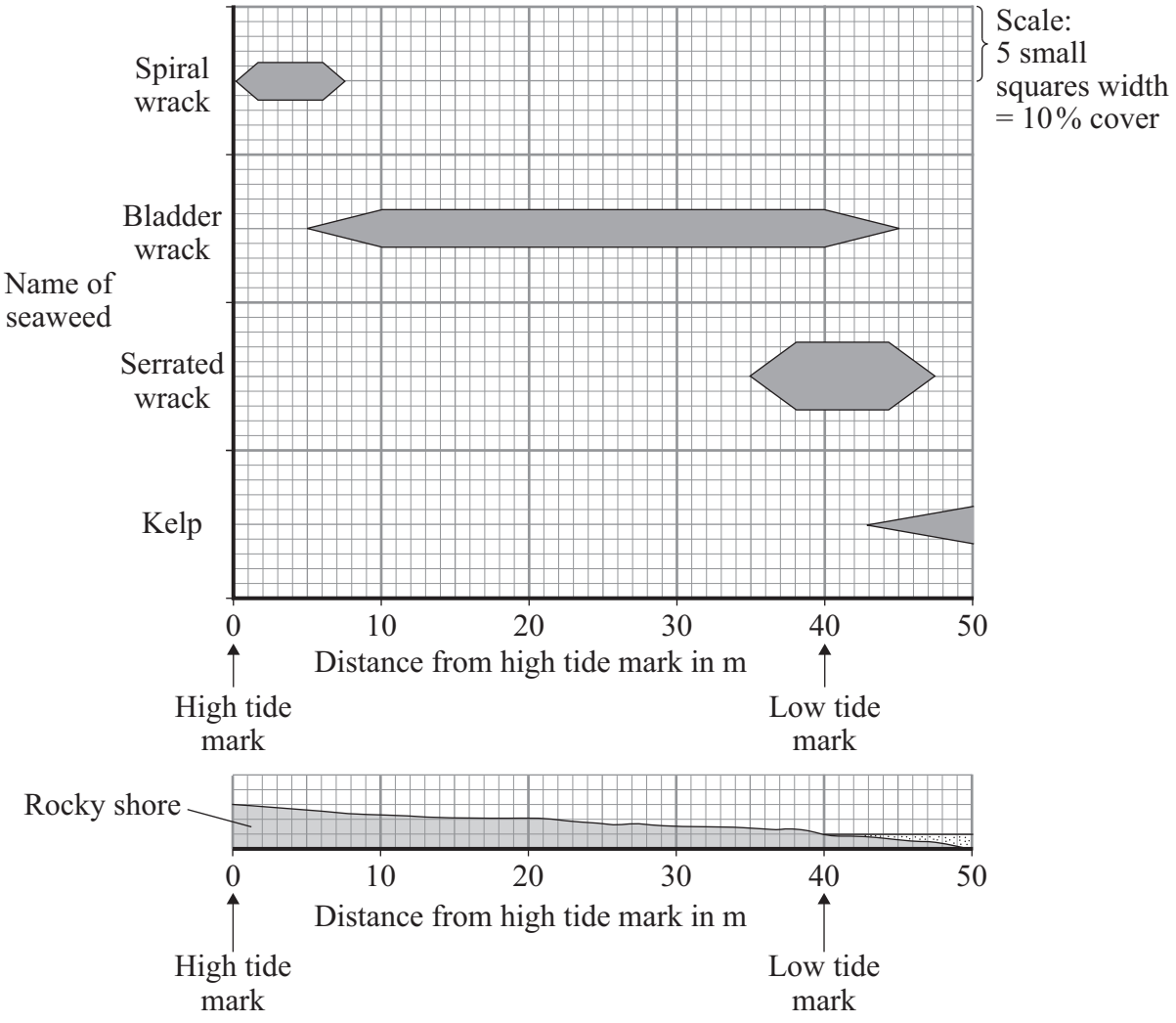
4.7.1.2 Abiotic factors

Question 01

March 2010 | BLY1BP | Original Q4 | Legacy

QUESTION FOUR

The diagram shows how much of four different seaweeds are found growing on different parts of a rocky shore.



Use the diagram to match the names of seaweeds, **A**, **B**, **C** and **D**, with the statements **1–4** in the table.

A spiral wrack

B bladder wrack

C serrated wrack

D kelp

1	All of this seaweed is always covered by the sea.
2	This seaweed is found across the widest range of distance on the rocky shore.
3	This seaweed can survive the driest conditions.
4	At 45 metres from the high tide mark there is more of this seaweed than any other.

4.7.1.2 Abiotic factors

Question 02

June 2022 | 8461/2F | Original Q9

0 9 Earthworms:

- live in soil
- feed on dead and decaying plant matter
- have soft, moist skin
- exchange gases through their skin.

0 9 . 1 Give **two** abiotic factors and **two** biotic factors that could affect the size of an earthworm population.

[4 marks]

Abiotic factors

1 _____

_____

2 _____

_____

Biotic factors

1 _____

_____

2 _____

_____

4.7.1.2 Abiotic factors

Question 02 · continued

0 9 . 2 Students investigated the populations of earthworms in the soil in two different areas:

- Area **A**: a grass lawn
- Area **B**: a farmer's field.

Chemical **X** can be mixed with water and poured onto the soil.

The mixture brings earthworms to the surface of the soil but does **not** harm the earthworms.

Plan an investigation using chemical **X** to compare the number of earthworms per m^2 in areas **A** and **B**.

[6 marks]

10

4.7.1.2 Abiotic factors

Question 03

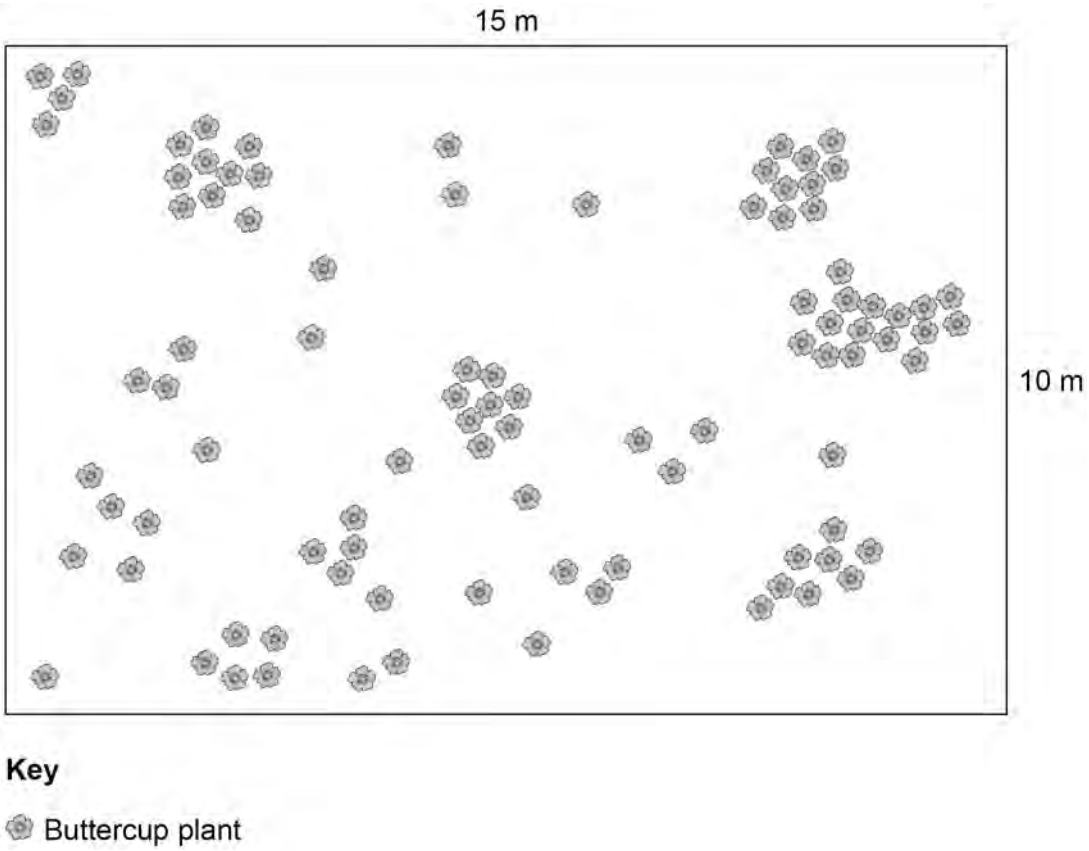
June 2023 | 8461/2F | Original Q2

0 2 Students estimated the population of buttercup plants growing on a lawn.

The lawn is a rectangle measuring 15 m × 10 m.

Figure 2 shows the lawn.

Figure 2



This is the method used.

1. Measure the length and width of the lawn.
2. Choose five locations to sample.
3. Place a 1 m × 1 m square frame at each location.
4. Record the number of buttercup plants in each square frame.

4.7.1.2 Abiotic factors

Question 03 · continued

0 2 . 1 Complete the sentences.

Choose answers from the box.

[2 marks]

15 cm ruler		**30 m tape measure**
balance	**quadrat**	**transect**

The length and width of the lawn should be measured

using a _____ .

The 1 m × 1 m square frame is called a _____ .

0 2 . 2 How should the students choose the five locations to sample?

[1 mark]

Tick (✓) **one** box.

Choose locations at random. ☐

Choose locations at the corners of the lawn. ☐

Choose locations with lots of buttercup plants. ☐

Choose locations with no buttercup plants. ☐

Question 2 continues on the next page

Table 1 shows the results.

Table 1

Sample number	Number of buttercup plants
1	2
2	7
3	0
4	0
5	1

The students used their results to calculate the population of buttercup plants.

0 2 . 3 Complete the sentences.

Choose answers from the box.

[2 marks]

area	mean	median	perimeter	volume

Multiply the length of the lawn by the width of the lawn to give the lawn's _____ .

Add up the total number of buttercup plants and divide by 5 to give the _____ .

4.7.1.2 Abiotic factors

Question 03 · continued

0 2 . 4 The students calculated that the population of buttercup plants on the lawn was 300.

How did the students use the results in **Table 1** to calculate the population?

[1 mark]

0 2 . 5 How could the students improve the accuracy of the estimate?

[1 mark]

Tick (✓) **one** box.

Count and record more samples. ☐

Select locations in the middle of the lawn. ☐

Use a square frame measuring 0.5 m × 0.5 m. ☐

0 2 . 6 One **abiotic** factor that affects the number of buttercup plants on the lawn is soil pH.

Give **one** other **abiotic** factor that could affect the number of buttercup plants on the lawn.

Do **not** refer to soil pH in your answer.

[1 mark]

8

4.7.1.2 Abiotic factors

Question 04

June 2025 | 8461/2F | Original Q9

0 9 Students investigated how many daisy plants were growing in a field at different distances from a tree.

This is the method used.

1. Place a 20-metre tape measure on the ground, with the tree at 0 metres.

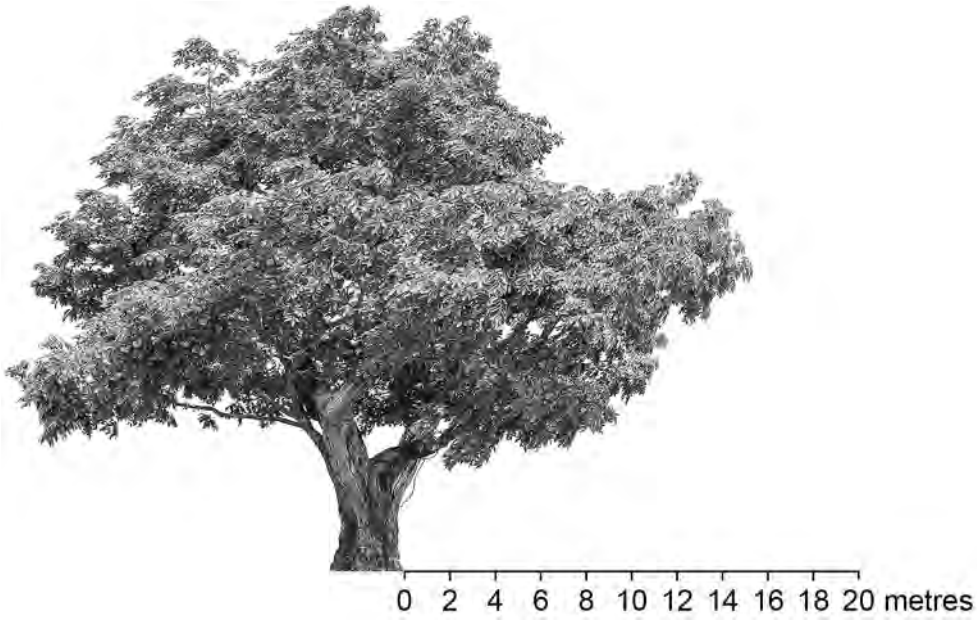
2. Place a 1 m^2 quadrat on the ground every 4 metres along the tape measure.

3. Count the number of daisy plants in each quadrat.

4. Take a soil sample from each quadrat to find the percentage of water in the soil.

Figure 14 shows the tree and the tape measure.

Figure 14



This is the method used for finding the percentage of water in each soil sample (step 4):

5. Weigh an empty container.

6. Place the soil sample in the container and weigh again.

7. Heat the container of soil in an oven at 100 °C for several hours.

8. Allow the container of soil to cool and weigh again.

9. Repeat steps 7 and 8 until there is no further change in mass.

4.7.1.2 Abiotic factors

Question 04 · continued

0 9 . 1 Suggest why the students repeated steps **7** and **8** until there was no further change in mass.

[1 mark]

Question 9 continues on the next page

Table 6 shows the results.

Table 6

	Distance from the tree in metres				
	4	**8**	**12**	**16**	**20**
Mass of fresh soil in grams	250	266	260	248	252
Mass of dried soil in grams	225	234	209	184	181
Mass of water lost from soil in grams	25	32	51	64	71
Percentage of water in soil	10	12	20	26	**X**
Number of daisies per m^2	0	7	15	28	32

0 9 . 2 Calculate percentage **X** in **Table 6**.

Give your answer to the nearest whole number.

[3 marks]

Percentage **X** (nearest whole number) = _____ %

0 9 . 3 Describe the effect of distance from the tree on the percentage of water in the soil between 4 metres and 16 metres.

Use **Table 6**.

[1 mark]

4.7.1.2 Abiotic factors

Question 04 · continued

0 9 . 4 A student concluded:

‘As the water content of the soil increases, so does the number of daisy plants.’

Describe **two** changes to the investigation that would increase the validity of the student’s conclusion.

[2 marks]

1 _____

_____

2 _____

_____

0 9 . 5 The percentage of water in the soil is an abiotic factor.

Suggest **three** other **abiotic** factors that might have caused more daisy plants to grow further away from the tree.

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

[3 marks]

1 _____

_____

2 _____

_____

3 _____

_____

10