AQA GCSE Combined Science - Trilogy | 8464

SPECIFICATION POINT 4.7.2.1

Levels of organisation

Mark schemes and examiner comments

Tier	**Foundation**
Question groups	**8**
Available paper years	**2019–2025**

Using this booklet

1. Booklet answer numbers match the question booklet.
2. Use the original question number within marking tables.
3. Examiner comments are included where available.

Name: _____ **Date:** _____

Where a precise marking extract is unavailable, the full source document is included in an appendix. Any missing mark scheme is explicitly identified.

4.7.2.1 Levels of organisation

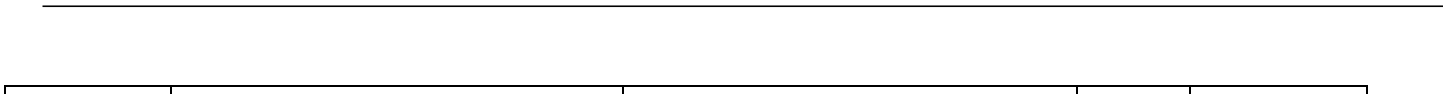
Answer 01 · Mark scheme June 2019 | 8464/B/2F | Original Q2

Question	Answers	Extra information	Mark	AO / Spec. Ref.
02.1	description of any correct method to achieve randomness e.g. random number generator	ignore throwing quadrat / frame	1	AO3 4.7.2.1 10.2.7
02.2	frame / square	allow rectangle ignore internal squares / grid	1	AO1 4.7.2.1 10.2.7
02.3 mark with **2.4** and **2.5**	9(.0)		1	AO2 4.7.2.1 10.2.7
02.4 mark with **2.3** and **2.5**	15 000 (m^2)		1	AO2 4.7.2.1 10.2.7
02.5 mark with **2.3** and **2.4**	9.0 × 15 000 135 000	answer must be consistent with answers in questions **02.3** and **02.4**	1 1	AO2 4.7.2.1 10.2.7
02.6	any **two** from: • herbivores / animals • competing (with other plants) • (human) trampling / playing • (plant) disease / pathogen • mowing	allow being eaten	2	AO1 4.7.1.2 4.7.1.3
02.7	less light / water for photosynthesis **or** fewer ions / nitrates / minerals (1) so fewer proteins (1)	ignore Sun allow fewer magnesium (ions) allow less nutrients idea of fewer only needed once to gain both marks allow fewer ions / nitrates / minerals / nutrients so less growth for **2** marks	1 1	AO3 AO2 4.7.1.3 4.7.1.2
Total			**10**	

4.7.2.1 Levels of organisation

Answer 01 · Mark scheme

June 2019 | 8464/B/2F | Original Q2



4.7.2.1 Levels of organisation

Answer 02 · Mark scheme June 2019 | 8464/B/2F | Original Q5

Question	Answers	Extra information	Mark	AO / Spec. Ref.
05.1	secondary consumer		1	AO2 4.7.2.1
05.2	increase		1	AO3 4.7.1.1
05.3 view with **05.2**	(because) the blackflies are not being eaten	allow idea of other predators (of blackflies) if 'stay the same' selected in question **5.2**	1	AO3 4.7.1.1
05.4	biomass decreases as you go up / along the food chain	allow converse	1	AO3 4.7.2.1
05.5	label biomass in g(rams) three bars plotted correctly	 allow ± half small square allow **1** mark for 2 bars correct ignore width and spacing of bars	1 2	AO2 4.7.2.1
05.6	organisms / species are always being added / removed so population sizes not (fairly) constant	allow example of an environmental change e.g. gardener did not water for a month	1 1	AO2 4.7.1.1
Total			**9**	

4.7.2.1 Levels of organisation

Answer 02 · Mark scheme

June 2019 | 8464/B/2F | Original Q5

4.7.2.1 Levels of organisation

Answer 03 · Mark scheme

November 2020 | 8464/B/2F | Original Q5

Question	Answers	Extra information	Mark	AO / Spec. Ref.
05.1	plant hedgerows around his fields plant many different crops in his fields		1 1	AO3 4.7.3.6
05.2	any **one** from: • repeat in each area • do more quadrats (to take more readings) • count the number of individuals of each species • remove leaf litter and search in tray • do a timed search of the leaf litter • do on the same day or time of day		1	AO3 4.7.2.1 RPA 7
05.3	the trees provide habitat(s) or shelter so (more) food / camouflage / shade available	allow described allow places to hide or cooler or wetter environment	1 1	AO2 4.7.2.1 RPA 7
05.4	ring drawn around 20		1	AO3 4.7.2.1 RPA 7
05.5	(removing trees) decreases the number of invertebrate species		1	AO3 4.7.2.1 RPA 7

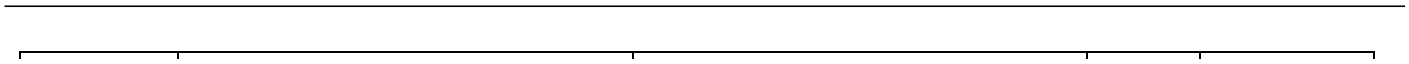
4.7.2.1 Levels of organisation

05.6	(less trees means) more light (and) more water / minerals in soil (so) reduced competition **OR** (less trees means) more light (1) (so) (more) photosynthesis (1) (so) (more) glucose (for growth) (1)		1 1 1	AO2 4.7.1.2 4.4.1.1 4.4.1.3
Total			**10**	

4.7.2.1 Levels of organisation

Answer 03 · Mark scheme

November 2020 | 8464/B/2F | Original Q5



4.7.2.1 Levels of organisation

Answer 04 · Mark scheme

November 2021 | 8464/B/2F | Original Q3

Question	Answers	Extra information	Mark	AO / Spec. Ref.
03.1	nut(s) → bird(s) → cat(s)	allow **1** mark for organisms in correct order (left to right) but arrows incorrect or missing allow **2** marks for cat(s) ← bird(s) ← nut(s) do **not** accept cat(s)bird(s) nut(s) do **not** accept cat(s) →bird(s) →nut(s)	2	AO2 4.7.2.1
03.2	answer must be consistent with food chain given in question **03.1**	if no answer to question **03.1** allow bird(s)	1	AO2 4.7.2.1
03.3	food pathogens		1 1	AO1 4.7.1.3
03.4	13.60 (mm)	allow 13.6 (mm)	1	AO2 4.6.2.2
03.5	structural		1	AO2 4.7.1.4
03.6	variation mutation reproduction generation	must be in this order	1 1 1 1	AO2 4.6.2.2

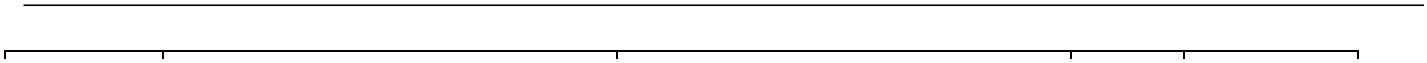
4.7.2.1 Levels of organisation

03.7	birds have a shorter life cycle than humans		1	AO3 4.6.3.1 4.6.3.4
03.8	bacteria can become resistant to antibiotics		1	AO1 4.6.3.1 4.6.3.4
Total			**13**	

4.7.2.1 Levels of organisation

Answer 04 · Mark scheme

November 2021 | 8464/B/2F | Original Q3



4.7.2.1 Levels of organisation

Answer 05 · Mark scheme

June 2022 | 8464/B/2F | Original Q2

Question 2

Question	Answers	Mark	AO / Spec. Ref.
02.1	**Level 2:** The method would lead to the production of a valid outcome. All key steps are identified and logically sequenced.	3–4	AO1 4.7.2.1 RPA 7
	Level 1: The method would not lead to a valid outcome. Some relevant steps are identified, but links are not made clear.	1–2	
	No relevant content	0	
	Indicative content • place quadrat randomly / systematically • description of how randomness is achieved **or** description of how systematic placement is achieved • count number of buttercups in quadrat • record number • repeat quadrat (in another location in the same wet soil area) • (repeat) at least 5 times • calculate a mean number of buttercups per quadrat • the area of the wet soil area is 100 m^2 • estimate the buttercup population using the area of the quadrat		

Question	Answers	Extra information	Mark	AO / Spec. Ref.
02.2	an abiotic factor		1	AO2 4.7.1.2 RPA7

4.7.2.1 Levels of organisation

Answer 05 · Mark scheme

Question	Answers	Extra information	Mark	AO / Spec. Ref.
02.3	any **two** from: • light (intensity) • temperature • competition • herbivores / grazing • pollinators • trampling / mowing • wind (direction / strength) • soil pH **or** soil type • ions / minerals / nutrients in the soil • pathogens • herbicides	ignore rain / water / weather allow shade ignore sun allow other plants growing there allow pests **or** named pest allow insects or named pollinator allow named mineral allow infection ignore disease unqualified allow pesticides	2	AO2 4.7.1.2 4.7.1.3 RPA7

Question	Answers	Extra information	Mark	AO / Spec. Ref.
02.4	(the) dependent		1	AO2 4.7.1.2 RPA7

Answer 05 · Mark scheme

Question	Answers	Extra information	Mark	AO / Spec. Ref.
02.5 mark with 02.6	0.25 (m^2)		1	AO2 4.7.1.2 RPA7

Question	Answers	Extra information	Mark	AO / Spec. Ref.
02.6 mark with 02.5	8 ÷ 0.25 32 (buttercups per m^2)	allow ecf from question **02.5** allow 8 × 4	1 1	AO2 4.7.1.2 RPA7

Question	Answers	Extra information	Mark	AO / Spec. Ref.
02.7	any **two** from: • repeat • same volume of water • same mass / volume of soil • more acidity / pH levels • same number of bean seeds • same spacing / depth of seeds • same species / variety / type of bean seeds • same size boxes • same light (intensity) • same temperature	allow same amount of water allow same amount of soil } if neither marking point awarded, allow put them in the same place eg greenhouse	2	AO3 4.7.1.2 RPA7

4.7.2.1 Levels of organisation

Answer 05 · Mark scheme

June 2022 | 8464/B/2F | Original Q2

Question	Answers	Extra information	Mark	AO / Spec. Ref.
02.8	$\frac{11+12+11+17+19}{5}$ **or** $\frac{70}{5}$ 14 (cm)		1 1	AO2 4.7.1.2 RPA7

Question	Answers	Extra information	Mark	AO / Spec. Ref.
02.9	bean plants grow less well (in acid soil) **or** bean plants are shorter (in acid soil)	allow converse	1	AO3 4.7.1.2 RPA7

Total Question 2		16

4.7.2.1 Levels of organisation

Answer 06 · Mark scheme

June 2023 | 8464/B/2F | Original Q3

Question 3

Question	Answers	Extra information	Mark	AO / Spec. Ref.
03.1	line approximately perpendicular to river	allow on either side of river ignore length of line do **not** accept a line parallel to the river	1	AO2 4.7.2.1 RPA7

Question	Answers	Extra information	Mark	AO / Spec. Ref.
03.2	quadrat		1	AO1 4.7.2.1 RPA7

Question	Answers	Extra information	Mark	AO / Spec. Ref.
03.3	6 / six	ignore calculation / range given if mean is clear	1	AO2 4.7.2.1 RPA7

Question	Answers	Extra information	Mark	AO / Spec. Ref.
03.4	increases		1	AO3 4.7.2.1 RPA7

Question	Answers	Extra information	Mark	AO / Spec. Ref.
03.5	to know the uncertainty of the mean		1	AO3 4.7.2.1 RPA7

4.7.2.1 Levels of organisation

Answer 06 · Mark scheme

Question	Answers	Extra information	Mark	AO / Spec. Ref.
03.6	light intensity moisture levels		1 1	AO1 4.7.1.2 4.7.1.1

Question	Answers	Extra information	Mark	AO / Spec. Ref.
03.7	more / increased carbon dioxide (in air) **or** less carbon dioxide absorbed / used (by plants) (due to) less photosynthesis	 allow (due to) more decay / burning (of plants) allow **2** marks for less carbon dioxide used for photosynthesis if no other mark awarded allow **1** mark for carbon dioxide is used in photosynthesis	1 1	AO2 4.7.2.1 4.7.2.2 4.7.3.5

Total Question 3	9

4.7.2.1 Levels of organisation

Answer 07 · Mark scheme

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

Question 5

Question	Answers	Mark	AO / Spec. Ref.
05.1	alga(e) → limpet(s) → crab(s) direction of arrows must be correct	1	AO2 4.7.2.1

Question	Answers	Extra information	Mark	AO / Spec. Ref.
05.2	(50 (cm) × 50 (cm) =) 2500 (cm^2)	allow conversion cm to m (50 ÷ 100 =) 0.5 (m)	1	AO2 4.7.2.1 RPA7
	$(\frac{2500}{100 \times 100}$ =) 0.25 (m^2)	allow ¼ (m^2) allow (0.5 × 0.5 =) 0.25 (m^2) for **2** marks allow (½ × ½ =) ¼ (m^2) for **2** marks	1	

Question	Answers	Extra information	Mark	AO / Spec. Ref.
05.3	(1800 × $\frac{2}{100}$ =) 36 (m^2)	allow (1800 × 0.02 =) 36 (m^2)	1	AO2 4.7.2.1 RPA7
	($\frac{36}{0.25}$ =) 144 (quadrats)	allow (36 × 4 =) 144 (quadrats) allow a correct calculation of number of quadrats with an incorrect calculation of 2% of 1800 allow ecf from question **05.2**	1	

4.7.2.1 Levels of organisation

Answer 07 · Mark scheme

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

Question	Answers	Extra information	Mark	AO / Spec. Ref.
05.4	(location of sample will be) biased / chosen **or** (location of sample will be) limited by how far students can throw	allow students may aim for limpets allow students may aim to avoid limpets allow students may stand / start near groups of limpets	1	AO1 4.7.2.1 RPA7
	(therefore) results will not be representative (of (actual) abundance)	allow population size will be too high / low	1	

Question	Answers	Extra information	Mark	AO / Spec. Ref.
05.5	tape measure along two (perpendicular) sides (of sea shore) **or** allocate co-ordinates (to sea shore) **or** divide area into a grid		1	AO1 4.7.2.1 RPA7
	use random number generator	allow description of generating random number(s) for example pulling numbers from container do **not** accept throwing quadrats	1	

4.7.2.1 Levels of organisation

Answer 07 · Mark scheme

Question	Answers	Extra information	Mark	AO / Spec. Ref.
05.6	any **one** from: • water • tide • rocks • quicksand • named hazardous material on the sea shore eg needles, glass • sewage • animals	allow named example of a hazard allow sea allow waves allow slippery / uneven surfaces allow appropriate named animal for example crab / jellyfish	1	AO3 4.7.2.1 RPA7

Question	Answers	Extra information	Mark	AO / Spec. Ref.
05.7	any **one** from: • fertiliser • sewage • toxic chemicals	allow named toxic chemical eg herbicide / pesticide / insecticide / DDT / (crude) oil allow (micro)plastics allow (dissolved) carbon dioxide allow heavy metals allow thermal pollution	1	AO2 4.7.3.2

Total Question 5	11

4.7.2.1 Levels of organisation

Answer 08 · Mark scheme

June 2025 | 8464/B/2F | Original Q3

Question 3

Question	Answers	Extra information	Mark	AO / Spec. Ref.
03.1	quadrat		1	AO1 4.7.2.1 RPA7

Question	Answers	Extra information	Mark	AO / Spec. Ref.
03.2	7 × 4 28 (%)	allow $\frac{7}{25} \times 100$ allow **1** mark for a correct calculation from an incorrect attempt at counting squares (in the range 5 to 10) covered by buttercups	1 1	AO3 AO2 4.7.2.1 RPA7

Question	Answers	Extra information	Mark	AO / Spec. Ref.
03.3	distance from the tree		1	AO2 4.7.2.1 RPA7

Question	Answers	Extra information	Mark	AO / Spec. Ref.
03.4	percentage cover is affected by number and size of individual plants		1	AO3 4.7.2.1 RPA7

4.7.2.1 Levels of organisation

Answer 08 · Mark scheme

Question	Answers	Extra information	Mark	AO / Spec. Ref.
03.5	$\frac{12+8+4+12+4}{5}$ 8 (%)	allow $\frac{40}{5}$	1 1	AO2 4.7.2.1 RPA7

Question	Answers	Extra information	Mark	AO / Spec. Ref.
03.6	higher percentage cover 10 m from tree	allow ecf from question **03.5** with correct mathematical analysis of difference in incorrectly calculated mean allow converse if clearly referring to 1 m from tree **or** closer to the tree allow higher percentage cover further from tree allow more cover / buttercups further from tree allow cover is double further from tree allow twice as much / many further from tree	1	AO3 4.7.2.1 RPA7

4.7.2.1 Levels of organisation

Answer 08 · Mark scheme

Question	Answers	Extra information	Mark	AO / Spec. Ref.
03.7	any **two** from: • light • temperature • water / moisture • type of soil • pH (of soil) • minerals / ions • oxygen in soil • wind (strength / direction) • herbicide • competition from other plants • herbivores / grazers (of buttercups) • (number of) pollinators • time of year • size of tree / roots / canopy • disease / pathogen (of buttercups)	allow shade **or** less / more light allow (tree) leaves drop and cover buttercups ignore Sun allow rain allow acidity / alkalinity (of soil) allow salts **or** named examples of ions, such as nitrate allow fertiliser(s) ignore nitrogen / nutrients allow weedkiller allow animals / insects eat / damage buttercups allow season ignore time unqualified ignore (availability of) space ignore carbon dioxide ignore weather / climate if no other mark awarded allow **1** mark for biotic **and** abiotic	2	AO2 4.7.1.2 4.7.2.1 4.7.1.3 RPA7

4.7.2.1 Levels of organisation

Answer 08 · Mark scheme

Question	Answers	Extra information	Mark	AO / Spec. Ref.
03.8	any **two** from: • repeat at more distances **or** at another distance (from the tree) • repeat at each distance more (than 5) times • repeat for other trees • measure other (named) factor(s)	allow specific distances, between 0 m and 10 m or beyond 10 m allow repeat (at each distance) more than 5 times allow repeat at 1 m and 10 m more (than 5) times allow repeat the (whole) investigation ignore repeat 5 times	2	AO3 4.7.2.1 RPA7

Total Question 3	12

4.7.2.1 Levels of organisation

Answer 04 · Examiner comments November 2021 | 8464/B/2F | Original Q3

Question 3 (low demand)

Many students could not give the food chain. Some students obtained one mark out of two for having the organisms in the correct order, but used dashes or commas instead of arrows. More students could give the primary consumer in the food chain. Reading from the graph was generally answered well. Fewer students could complete the sentences about evolution.

Answer 05 · Examiner comments June 2022 | 8464/B/2F | Original Q2

Question 2 (low & standard demand)

02.1 This was an 'extended response' style of question. Such questions are marked holistically. There are overall generic descriptions for the two levels of response at the top of the mark scheme, giving a hierarchy of response. Within each level of response there are two marks.

For Level 2 (3–4 marks) the method needed to include sufficient detail to collect a representative sample (a valid outcome), such a random or systematic placement of quadrats, counting or recording the number of buttercups in a quadrat and repeating. The highest scoring responses also included more detail, such as is shown in the indicative content section of the mark scheme.

Some students repeated the question, which is never given credit. Many students could give the idea of counting the number of buttercups in a quadrat, and understood the need for repeats. Fewer students described placing the quadrat randomly or systematically. Throwing quadrats is not random, therefore could not be credited as part of a response.

02.2 44% of students knew that water in the soil was an abiotic factor in this investigation.

02.3 41% of students could give two factors that might affect the number of buttercups growing on the school field. Students were reminded not to refer to water, but this was frequently seen, along with references to dry soil and rain which were ignored.

The most common correct answers related to light intensity, temperature and trampling.

02.4 43% of students could identify that the number of buttercups was the dependent variable.

02.5 71% of students could calculate the area of the quadrat.

02.6 29% of students could use their answer from **02.5** to calculate the number of buttercups per m^2.

02.7 10% of students could give two improvements the students could make to give more valid results. The most common answers related to using the same number of seeds in each box or repeating the investigation. Answers such as measure the soil, or measure the acid, were insufficient.

4.7.2.1 Levels of organisation

Answer 05 · Examiner comments June 2022 | 8464/B/2F | Original Q2

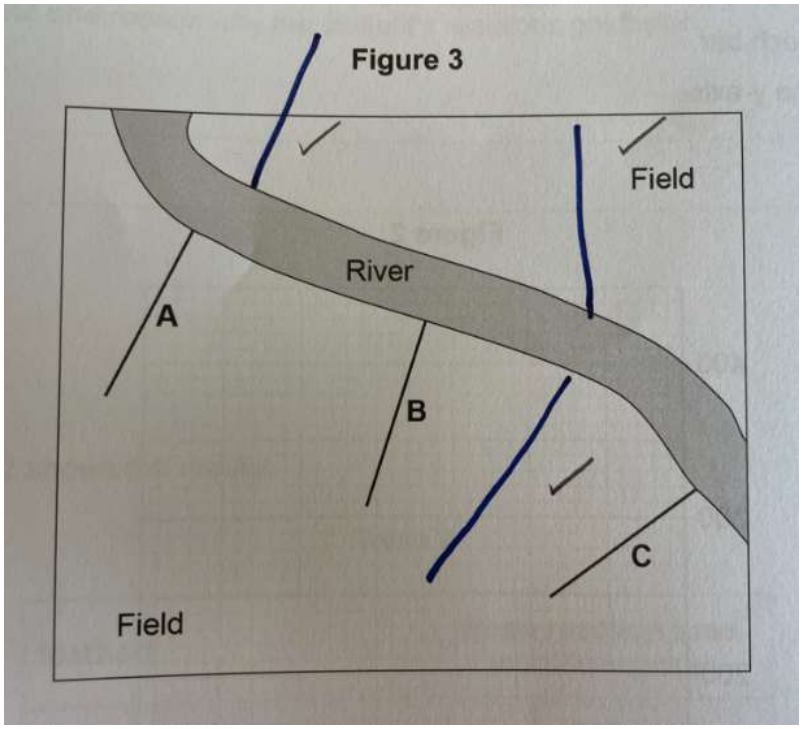
02.8 Most students could calculate the mean value. The most frequently seen incorrect answer indicated a potential issue with calculator use, such as 11+12+11+17+19÷5 = 54.8, where 19÷5 is occurring first, followed by the addition. Students should think about whether their answer to a calculation is sensible.

02.9 Students could describe the effect of acid soil on the growth of the bean plants in several ways and 60% of students were awarded this mark. Sometimes, responses were insufficiently detailed, such as acid soil affects the growth.

Answer 06 · Examiner comments June 2023 | 8464/B/2F | Original Q3

Question 3 (Low and Standard demand)

03.1 Many students could identify where to place a fourth transect for this investigation. Students could draw their transect either side of the river. Transects parallel to the river were incorrect. A significant number of students misunderstood the aim of the investigation and instead connected the existing three transects.



The three lines on the image above are examples that were acceptable for 'approximately perpendicular to river'. Note that we have ticked each line to indicate the lines have been drawn. The lines could be drawn by hand or with a ruler and could extend beyond the boundary of the image (as shown in the top left). Lines that extended well into, or across, the river were incorrect.

Answer 06 · Examiner comments

June 2023 | 8464/B/2F | Original Q3

03.2 The majority of students knew that a quadrat was required.

03.3 Most students could interpret the graph to state the correct mean. Some students attempted to calculate the mean of the mean at each distance, which was incorrect.

03.4 Due to the way the question was phrased, we assumed 'it' referred to the plant species. Many students could state that the mean number of plant species increased further from the river. This was expressed in a variety of ways. 'Wider range / diversity' or 'bigger / higher numbers' or 'bigger / higher mean' all gained the mark. A simpler response such as 'There are more' or 'We see more plants' was also sufficient for the mark.

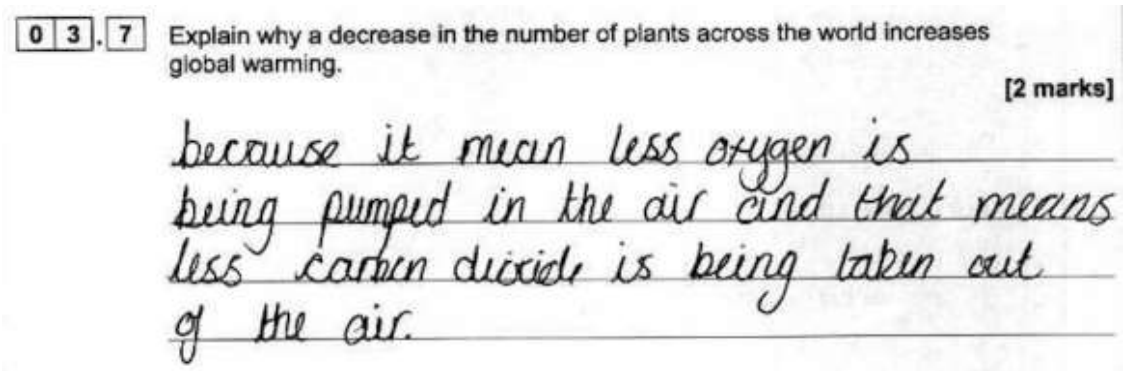
A significant number of students misunderstood the question and attempted to explain rather than describe the effect of moving away from the river.

03.5 40% of students could identify why it is useful to know the range of results.

03.6 50% of students could identify two abiotic factors from the list provided.

03.7 Some students could state that plants use carbon dioxide during photosynthesis. This was awarded 1 mark (in the absence of either marking point) but was insufficient to answer the question fully.

A common misconception was that global warming is linked to the oxygen concentration in the air. Incorrect references to ozone were also frequently seen. There were incorrect references to plants 'breathing' and respiration was sometimes stated as the process involved.


0 3 . 7 Explain why a decrease in the number of plants across the world increases global warming.

[2 marks]

because it mean less oxygen is being pumped in the air and that means less carbon dioxide is being taken out of the air.

Many students made an incorrect link between oxygen and global warming. Marking point 1 was awarded here but with no reference to photosynthesis, decay or burning marking point 2 could not be awarded.

Answer 07 · Examiner comments

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

Question 5 (standard demand)

05.1 Many students could give the food chain in the correct order with appropriate arrows showing the flow of energy. Responses that used commas or hyphens, rather than arrows, did not gain the mark. Some students tried to give extra information, such as identifying the producer and primary consumer, but this was not required.

05.2 Students demonstrated problems converting from centimetres to metres. Responses often stated that 50 cm = 5 m.

Calculation of area was sometimes a challenge, with frequently seen responses such as 50 + 50 + 50 + 50 = 200, indicating confusion between area and perimeter.

Students were most frequently awarded just the first mark, for (50 × 50 =) 2500. Most then divided 2500 by 100 or 1000 to give an incorrect answer.

05.3 Marks were often awarded for allowing error carried forward from the previous question.

Many students only calculated 2% of the area of the shore and then stopped. Therefore, only the first mark was awarded.

Some students who did not gain marks had attempted to calculate 2% of their answer to the previous question, indicating they had not understood the context.

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4.7.2.1 Levels of organisation

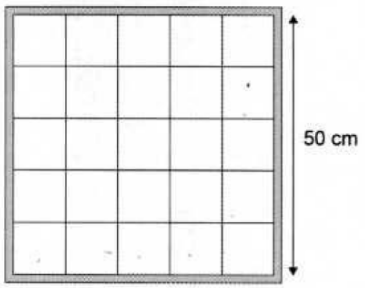
Answer 07 · Examiner comments June 2024 | 8464/B/2F | Original Q5

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 m².

[2 marks]

50 × 50 cm

Area of quadrat = 2500 m²

0 5 . 3 The total area of the sea shore was 1800 m².

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]

2% of 2500 500

1% = 250

Number of times = 50

For question 05.2, marking point 1 was awarded.

For question 05.3, the student has attempted to calculate 2% of the quadrat area, which is not a logical approach, therefore no marks can be given.

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4.7.2.1 Levels of organisation

Answer 07 · Examiner comments June 2024 | 8464/B/2F | Original Q5

05.4 Most students could give a reason for not throwing the quadrat and gain the first mark. Usually, students stated throwing could be biased. Very few could explain why this was a problem. References to the effect it would have on the population estimate were rare.

Some students demonstrated the misconception that throwing quadrats is an appropriate sampling method. Others stated that the issue is that the quadrat could sample the same area twice, which was not correct, because that could also occur with a random method.

05.5 Some students had knowledge of using a random number generator on their calculator or phone and could describe the use of coordinates on the shore.

Many students incorrectly referred to throwing in random directions or being blindfolded. These are never appropriate methods for sampling. Others demonstrated the misconception that choosing locations with the most limpets would be appropriate. Some confusion between quadrats and transects was seen.

05.6 On the Foundation tier, many students gave a risk, such as drowning, rather than a hazard. Common incorrect answers referred to the quadrat being washed away, or gave descriptions of ways to reduce risk, such as ‘wear sensible shoes’.

05.7 Most students could name one type of pollution that may affect the population of limpets. The most frequently seen answers were plastic and sewage. Common responses that were not awarded the mark were chemicals, crabs and waste.

4.7.2.1 Levels of organisation

Answer 08 · Examiner comments

June 2025 | 8464/B/2F | Original Q3

Question 3 (Low and Standard demand)

03.1 80% of students could identify the equipment as a quadrat.

03.2 Some students counted all squares containing some buttercup plants and therefore reached a number of 10 small squares. They could gain one mark with a correct calculation of the final answer of 40, but only if appropriate working was shown. It is possible that this error indicates a lack of practical experience of Required Practical Activity 7 and the wide range of ways that abundance and distribution of a species can be sampled.

03.3 Two thirds of students could identify the independent variable.

03.4 Just over half of students identified the advantage of calculating percentage cover instead of counting the number of buttercup plants in an area.

03.5 Most students could calculate the mean. When only one mark was awarded, for correct working, but the final answer was incorrect, it appears calculator skills are the issue, with students putting all the numbers into the calculator at once and therefore only dividing the final number by 5. For example, 12 + 8 + 4 + 12 + 4 ÷ 5 = 36.8.

03.6 Nearly two thirds of students could give one conclusion from the results. Some students did not answer the question, and instead gave a reason for the results, such as 'more sunlight further from the tree'.

03.7 Students most frequently referred to water or rain or light. Some students gave light and shade, which were the same marking point, therefore only gained one mark.

03.8 Students struggled to suggest improvements to the method. Most students who did gain a mark gave bullet point 1 on the mark scheme for the idea of varying the distances more. Responses suggesting changing the method to throwing quadrats were surprisingly common. As has been included in previous examiner reports, throwing quadrats is never an appropriate method.

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