AQA GCSE Combined Science - Trilogy | 8464

SPECIFICATION POINT 4.7.3.5

Global warming

Mark schemes and examiner comments

Tier	**Foundation**
Question groups	**9**
Available paper years	**2018–2025**

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.

4.7.3.5 Global warming

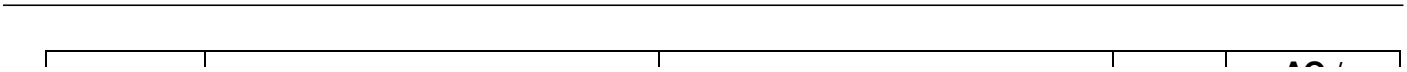
Answer 01 · Mark scheme June 2018 | 8464/B/2F | Original Q1

Question	Answers	Extra information	Mark	AO / Spec. Ref.
01.1	food mates		1 1	AO1 4.7.1.1
01.2	any **one** from: (early arrivals) • get more food • get the healthiest mates • more space / material for nests • chicks will hatch earlier and have more time to mature • less competition • more resources	allow converse for late arrivals allow more likely to get a mate	1	AO3 4.7.1.4 4.7.1.1 4.7.1.3
01.3	any **one** from: • carbon dioxide • methane	allow correct chemical formulae allow water vapour, nitrogen oxides, CFCs, ozone ignore water	1	AO1 4.7.3.5
01.4	any **one** from: • rising sea levels • examples of climate change • extinction of some species • habitat loss	 eg flooding, drought, desertification, melting ice caps, storms / hurricanes ignore references to temperature	1	AO1 4.7.3.5
01.5	burning fossil fuels farming cows		1 1	AO2 4.7.3.5
01.6	sulfur dioxide		1	AO2 4.7.3.2
Total			**8**	

4.7.3.5 Global warming

Answer 01 · Mark scheme

June 2018 | 8464/B/2F | Original Q1



4.7.3.5 Global warming

Answer 02 · Mark scheme

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

Question	Answers	Extra information	Mark	AO / Spec. Ref.
04.1	any **two** from: • (same) number of scoops / sweeps each time • scoop / sweep (at same) distance from the edge of pond • scoop (at same) depth • (same) size of net • (same) gauge / mesh size of net	allow any idea of controlling sweeps eg for same time allow scoop / sweep at the same place	2	AO2 4.7.2.1
04.2	64		1	AO2 4.7.2.1
04.3	19 to 122	allow 122 to19 **or** 103	1	AO2 4.7.2.1
04.4	water fleas were not evenly spread (around the edge of the pond)	allow any description of this such as more water fleas near the vegetation	1	AO3 4.7.2.1
04.5	more water fleas live near the edge of the pond	allow more water fleas live where there is vegetation allow converse if student's calculated answer to question **04.2** was less than 12	1	AO3 4.7.2.1
04.6	35		1	AO2 4.7.2.1
04.7	37.5 (%)	allow 38 (%)	1	AO2 4.7.2.1

4.7.3.5 Global warming

Answer 02 · Mark scheme

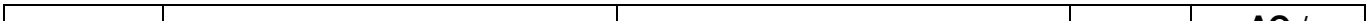
June 2018 | 8464/B/2F | Original Q4

Question	Answers	Extra information	Mark	AO / Spec. Ref.
04.8	there was a high(er) level of pollution (in the pond in 2016)	allow converse for 2014	1	AO3 4.7.2.1
	because there are no / fewer mayfly nymphs **or** because there are fewer freshwater shrimps	data must be comparative	1	
04.9	any **two** from: • famine / food insecurity • water shortage • landfill sites filling up • acid rain • deforestation / habitat destruction • extinction of species **or** reducing biodiversity • natural resources running out	ignore global warming and any water pollution references such as sewage or eutrophication	2	AO3 4.7.3.2 4.7.3.3 4.7.3.4 4.7.3.5 4.7.3.1
Total			**12**	

4.7.3.5 Global warming

Answer 02 · Mark scheme

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



4.7.3.5 Global warming

Answer 03 · Mark scheme June 2019 | 8464/B/2F | Original Q7

Question	Answers	Extra information	Mark	AO / Spec. Ref.
07.1	methane	allow CH_4 **or** water (vapour) **or** H_2O allow correct example such as CFCs, nitrous oxide, ozone	1	AO1 4.7.3.5
07.2	any **two** from: • ice caps melting • rise in sea levels • desertification • extreme weather • change in species distribution • change in migration patterns • loss of biodiversity • coral bleaching • crop failure **or** food insecurity • loss of habitat qualified	ignore references to increased temperature and greenhouse gas / effect allow storms **or** droughts **or** flooding allow some species become extinct / endangered allow correct examples such as polar bears losing ice ignore forest fires	2	AO1 4.7.3.5

4.7.3.5 Global warming

Answer 03 · Mark scheme

June 2019 | 8464/B/2F | Original Q7

Question	Answers	Mark	AO/ Spec. Ref
07.3	**Level 2:** Scientifically relevant facts, events or processes are identified and given in detail to form an accurate account.	4–6	AO1 4.7.2.2 4.4.1.1
	Level 1: Facts, events or processes are identified and simply stated but their relevance is not clear.	1-3	4.4.1.3 4.4.2.1
	No relevant content	0	
	Indicative content Photosynthesis • (carbon dioxide is) taken in through stomata / leaves • (carbon dioxide is) used in photosynthesis • to make glucose / carbohydrate • (glucose used) to make other carbon compounds or named example such as proteins, lipids • (glucose) stored as starch Feeding • plants are eaten / consumed by animals • which use the carbon compounds to make other carbon compounds Decay • when plants / animals die they are decomposed / decayed • by microorganisms • which use the carbon compounds to make other carbon compounds Respiration • plants / animals / microorganisms respire • (respiration) releases carbon dioxide back into the atmosphere Level 2 answers must consider photosynthesis and at least one other process in the carbon cycle. Level 2 answers must include some accurate detail.		
Total		**9**	

4.7.3.5 Global warming

Answer 04 · Mark scheme

November 2021 | 8464/B/2F | Original Q5

Question	Answers	Extra information	Mark	AO / Spec. Ref.
05.1	any **one** from: • less / decreased / reduced photosynthesis • (more) burning / combustion (of wood) • decomposition / decay (of wood)	allow burning / combustion (of fossil fuel in machinery)	1	AO1 4.7.3.4
05.2	methane	allow water (vapour) allow other correct greenhouse gases eg nitrous oxide(s), nitrogen oxide, ozone, hydrofluorocarbons, perfluorocarbons, sulfur hexafluoride	1	AO1 4.7.3.5
05.3	any **two** from: • respiration (by animals) • fuel burnt / used for transport • fuel burnt / used to heat / light buildings (in intensive farming) • fuel burnt / used to process / cook (meat)	ignore burning / combustion unqualified	2	AO2 4.7.3.5 4.7.3.4 4.7.2.2

4.7.3.5 Global warming

Answer 04 · Mark scheme

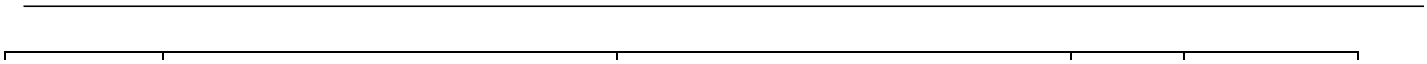
November 2021 | 8464/B/2F | Original Q5

Question	Answers	Mark	AO / Spec. Ref.
05.4	**Level 2:** Scientifically relevant features are identified; the way(s) in which they are similar / different is made clear and (where appropriate) the magnitude of the similarity / difference is noted.	3–4	AO3 4.7.3.5
	Level 1: Relevant features are identified and differences noted.	1–2	
	No relevant content	0	
	Indicative content General • all diets cause carbon dioxide to be released Typical diet • releases more carbon dioxide than diet A **and** B • releases 750 (kg per person per year) more carbon dioxide than diet A • releases 1750 (kg per person per year) more carbon dioxide than diet B Diet A • releases less carbon dioxide than typical diet • releases more carbon dioxide than diet B • releases 1000 (kg per person per year) more carbon dioxide than diet B comparisons can be given in terms of correct data or calculations or proportions for example, typical diet releases 8 times more carbon dioxide than diet B For **Level 2** both comparison of all three diets **and** quoting data or calculation are required.		
Total		**8**	

4.7.3.5 Global warming

Answer 04 · Mark scheme

November 2021 | 8464/B/2F | Original Q5



4.7.3.5 Global warming

Answer 05 · Mark scheme

June 2022 | 8464/B/1F | Original Q2

Question 2

Question	Answers	Extra information	Mark	AO / Spec. Ref.
02.1	cells contain (many) chloroplasts	allow positioned nearest to the light **or** at the top of the leaf allow cells are closely packed **or** no gaps between cells allow chlorophyll for chloroplast	1	AO1 4.1.1.3 4.2.1 4.2.3.1 4.4.1.1

Question	Answers	Extra information	Mark	AO / Spec. Ref.
02.2	stomata		1	AO1 4.2.3.1 4.2.3.2

Question	Answers	Extra information	Mark	AO / Spec. Ref.
02.3	(real length) $= \frac{28}{400}$ (real length in mm =) 0.07 (real length in µm =) 70	 allow answer given for length in mm correctly multiplied by 1000	1 1 1	AO2 4.1.1.1 4.1.1.2 4.1.1.5 RPA1

Question	Answers	Extra information	Mark	AO / Spec. Ref.
02.4	diffusion		1	AO1 4.1.3.1

Question	Answers	Extra information	Mark	AO / Spec. Ref.
02.5	A Reason any **one** from: • steeper (diffusion) gradient • bigger difference in concentration of carbon dioxide inside and outside the cell	no marks if wrong cell chosen allow higher concentration of carbon dioxide outside the cell than inside the cell allow particles / molecules for carbon dioxide	1 1	AO3 AO2 4.1.3.1

Question	Answers	Extra information	Mark	AO / Spec. Ref.
02.6	(number / amount of) bubbles time	allow volume of gas / oxygen allow suitable time eg 1 / 5 / 10 minutes	1 1	AO1 4.4.1.2 RPA5

4.7.3.5 Global warming

Answer 05 · Mark scheme

Question	Answers	Extra information	Mark	AO / Spec. Ref.
02.7	any **two** from: • temperature (of water) • light intensity **or** distance of light (from pondweed) • concentration of carbon dioxide (in water)	do **not** accept colour of light ignore time allow amount of light ignore light unqualified allow amount / mass of sodium hydrogen carbonate (in water) allow type / size of plant ignore volume of water / solution	2	AO3 4.4.1.2 RPA5

Question	Answers	Extra information	Mark	AO / Spec. Ref.
02.8	y-axis labelled: rate of photosynthesis in arbitrary units		1	AO2 4.4.1.2 RPA5
	suitable scale		1	
	all **bars** plotted correctly	allow ± ½ a small square the bars can be in any order	1	
	all bars labelled correctly		1	

4.7.3.5 Global warming

Answer 05 · Mark scheme

June 2022 | 8464/B/1F | Original Q2

Question	Answers	Extra information	Mark	AO / Spec. Ref.
02.9	blue		1	AO3 4.4.1.2 RPA5

Total Question 2		**17**

4.7.3.5 Global warming

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

4.7.3.5 Global warming

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

4.7.3.5 Global warming

Answer 07 · Mark scheme

June 2024 | 8464/B/1F | Original Q5

Question 5

Question	Answers	Extra information	Mark	AO / Spec. Ref.
05.1	(reactants) water (products) oxygen	 allow H_2O allow O_2	 1 1	AO1 4.4.1.1

Question	Answers	Extra information	Mark	AO / Spec. Ref.
05.2	$C_6H_{12}O_6$		1	AO1 4.4.1.1 4.4.2.1

Question	Answers	Extra information	Mark	AO / Spec. Ref.
05.3	any **two** from: • respiration • to convert to starch • to produce / store fat / oil • to produce cellulose • to produce amino acids **or** to produce protein	 allow energy (source) do **not** accept energy produced / made / created do **not** accept energy for respiration allow produce / store starch ignore used for growth of the plant	2	AO1 4.4.1.3 4.4.2.3

4.7.3.5 Global warming

Answer 07 · Mark scheme

June 2024 | 8464/B/1F | Original Q5

Question	Answers	Extra information	Mark	AO / Spec. Ref.
05.4	higher / increase in temperature **or** more carbon dioxide	allow warmer allow combustion / burning releases carbon dioxide	1	AO3 AO2 4.4.1.2 4.4.1.3 4.4.2.3
	(so) more photosynthesis	allow faster photosynthesis	1	
	(so) more glucose / sugar made		1	
	(so) more protein / cellulose made		1	

Total Question 5	9

4.7.3.5 Global warming

Answer 08 · Mark scheme

June 2024 | 8464/B/2F | Original Q6

Question 6

Question	Answers	Extra information	Mark	AO / Spec. Ref.
06.1	domain		1	AO1 4.6.4

Question	Answers	Extra information	Mark	AO / Spec. Ref.
06.2	offspring are genetically identical		1	AO1 4.6.1.1

Question	Answers	Extra information	Mark	AO / Spec. Ref.
06.3	a gamete contains half of the number of chromosomes		1	AO1 4.6.1.1 4.6.1.2

4.7.3.5 Global warming

Answer 08 · Mark scheme

Question	Answers	Extra information	Mark	AO / Spec. Ref.
06.4	any **one** from: • similar / same structure / characteristics / phenotype (as potatoes)	allow named similar structure / characteristics such as same shape / leaves / flowers / taste allow studied with microscopes ignore 'look the same / similar' unqualified	1	AO1 4.6.4
	• similar DNA / genes	allow DNA analysis allow analysis of genetic material allow similar genetic material ignore genetic information do **not** accept same DNA / genes		
	• similar / same biochemistry			
	• same first part of binomial (name)	allow same first part of Latin / scientific name		

Question	Answers	Mark	AO / Spec. Ref.
06.5	**Level 3:** Relevant points (reasons / causes) are identified, given in detail and logically linked to form a clear account.	5–6	AO3
	Level 2: Relevant points (reasons / causes) are identified, and there are attempts at logical linking. The resulting account is not fully clear.	3–4	AO2
	Level 1: Points are identified and stated simply, but their relevance is not clear and there is no attempt at logical linking.	1–2	AO1
	No relevant content	0	
	Indicative content allow reference to named crop throughout **effects of climate change** • climate change will change weather patterns / trends • climate change causes flooding **or** drought **or** temperature change • farming land decreased by sea level rise / flooding / desertification • current crops cannot grow / survive (in changing conditions) **benefits of GM** ○ GM may allow crops to grow in wider range of conditions ○ GM may allow crops to be resistant to wider range of pests / diseases ○ GM may allow crops to be stored for longer ○ GM may increase crop yield **or** increase growth rate ○ to feed the increasing human population ○ useful if less area available for farming ○ larger human population needs more land for housing **other relevant content** ▪ variation amongst current crops reduced by asexual reproduction **or** selective breeding ▪ rate of evolution (by natural selection) may be slower than rate of climate change For **Level 3**, answers must explain effect(s) of climate change **and** benefit(s) of GM with logical link.		4.6.2.4 4.7.3.2 4.7.3.5 4.7.3.6

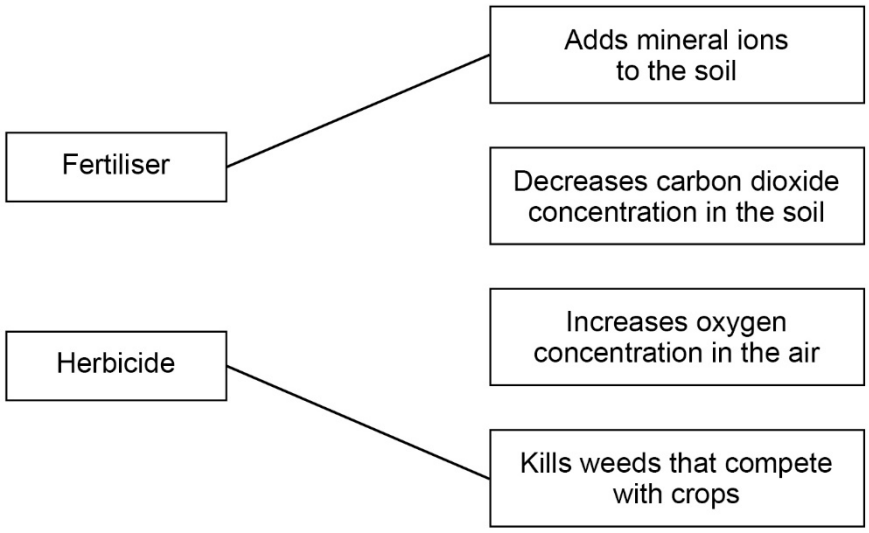
Total Question 6	10

4.7.3.5 Global warming

Answer 09 · Mark scheme

June 2025 | 8464/B/2F | Original Q2

Question 2

Question	Answers	Mark	AO / Spec. Ref.
02.1	 do **not** accept more than one line from a box on the left	1 1	AO1 4.7.1.1 4.7.1.2 4.7.3.2 4.6.2.4 4.7.3.3

Question	Answers	Extra information	Mark	AO / Spec. Ref.
02.2	owls		1	AO2 4.7.2.1

Question	Answers	Extra information	Mark	AO / Spec. Ref.
02.3	insects eat pests on the crop insects pollinate the crop		1 1	AO2 4.7.1.1 4.7.2.1

4.7.3.5 Global warming

Question	Answers	Extra information	Mark	AO / Spec. Ref.
02.4	any **one** from: • as a habitat for (beneficial) insects / animals • to keep (larger) animals out **or** to keep people out • (to increase) biodiversity • to reduce wind speed • as a habitat for predators of crop damaging organisms • to prevent / reduce soil erosion	allow as a shelter / space for (beneficial) insects / animals allow to protect (the crop) from (larger) animals allow to protect (the crop) from people ignore keep insects / birds out ignore to protect the crop unqualified ignore to stop pests eating the crop allow to increase the number of insects / plants allow descriptions of increasing biodiversity allow act as wind break ignore to reduce pests unqualified ignore so more (crop) can be grown	1	AO2 4.7.3.6 4.7.3.1 4.7.1.1

4.7.3.5 Global warming

Answer 09 · Mark scheme

Question	Answers	Extra information	Mark	AO / Spec. Ref.
02.5		allow converse if clearly referring to soil		
	water takes more time to drain (through)	allow there will be more water (in the peat compost) allow water drains / moves slow**er** allow water drains / moves more slowly ignore water drains slow / slowly	1	AO3 4.7.3.3
	(so) water is more likely to be taken up by plants **or** (so) do not need to water plants (as) frequently **or** (which is an advantage because) young plants cannot reach water that is deep (in soil / compost)	allow (so) there is more time for plants to take up water allow (so) reduces water use ignore references to cost allow **2** marks for water more likely to be taken up by plants before it drains away	1	

4.7.3.5 Global warming

Question	Answers	Extra information	Mark	AO / Spec. Ref.
02.6	(A) respiration	answer line takes precedence	1	AO1 4.7.2.2
	(B) photosynthesis		1	

Question	Answers	Extra information	Mark	AO / Spec. Ref.
02.7	(burning peat) releases / increases carbon dioxide	allow (burning peat) releases / increases CO_2 ignore burning releases carbon do **not** accept peat contains carbon dioxide	1	AO1 4.7.2.2 4.7.3.3 4.7.3.5
	(which) causes / increases global warming	allow (which) is a greenhouse gas allow (which) causes the greenhouse effect ignore (which) causes / increases climate change	1	

Question	Answers	Extra information	Mark	AO / Spec. Ref.
02.8	bacteria		1	AO1 4.7.2.2 4.7.3.3
	fungi		1	

4.7.3.5 Global warming

Answer 09 · Mark scheme

Question	Answers	Extra information	Mark	AO / Spec. Ref.
02.9	farming (cattle / biofuel / crops / animals)	allow examples of farming a crop / animal allow building allow named type of building eg houses / factories allow mining allow landfill allow reforestation / rewilding	1	AO1 4.7.3.4

Total Question 2	**15**

4.7.3.5 Global warming

Answer 04 · Examiner comments

November 2021 | 8464/B/2F | Original Q5

Question 5 (low & standard demand)

Few students could give one way that deforestation can increase carbon dioxide levels in the atmosphere. Methane was the most common correct answer given to **05.2**. Common incorrect responses included nitrogen, oxygen and hydrogen.

Students found it difficult to give two ways the production of meat releases carbon dioxide. The most common correct answer referred to fuel used to cook meat. Respiration of the animals was not a common response. Frequent misconceptions were that the animals release carbon dioxide when they are killed or cut open. Some responses were too vague at this level, therefore 'transport' was insufficient, but 'fuel is burnt or used to transport the animals/meat' was acceptable.

In **05.4** students were expected to compare the carbon dioxide released during the production of all three diets and use data from the graph. Students who did not compare all three diets and use the data could not access level 2 (for 3 or 4 marks). Responses that indicated only which diet released most or least carbon dioxide during production generally only gained 1 mark. If all three diets were compared and correct calculations of the differences from the graph were given, then 4 marks was awarded.

4.7.3.5 Global warming

Answer 05 · Examiner comments

June 2022 | 8464/B/1F | Original Q2

Question 2 (low & standard demand)

02.1 This question was not answered well. Students did not seem to understand the word adaptation. Some students talked about a protective layer to stop water getting in or out. There were many references to a large surface area, or to the palisade layer being thick or thin. All of these were ignored. A tenth of students scored the mark, usually for saying the layer contained chlorophyll or chloroplasts.

02.2 40% of students thought the small pores on a leaf are called guard cells. A third of students selected the correct answer, stomata.

02.3 More than half of the students scored full marks for calculating the real length of the cell in micrometres. An additional quarter of students scored two marks. This was either for:

- a correct substitution and calculation in mm, or
- a correct substitution and correct conversion of an incorrectly calculated length in mm.

8% of the students scored one mark either for a correct substitution, or for a correct conversion of mm to micrometres.

02.4 39% of students thought carbon dioxide moved in and out of cells by active transport. Slightly fewer selected the correct response, diffusion.

02.5 Very few students scored two marks. A quarter of the students scored a mark for identifying cell A as the cell into which carbon dioxide would move at the fastest rate. For the reason, a definition of diffusion was insufficient; a comparison was required. This would ideally be a comparison between the different cells in Figure 3, although a comparison between the concentration inside and outside the cell was allowed.

02.6 Just under half the students gave the two measurements that would be required to calculate the rate of photosynthesis. 36% of students scored one mark, usually for the number of bubbles produced. References to the distance of the lamp from the pondweed were ignored.

02.7 17% of students scored two marks for two correct control variables. 61% of students scored at least one mark. The most common correct answers were amount of light and the size or type of pondweed.

02.8 Most students could draw a bar chart. 42% of students scored full marks, and an equal proportion scored three marks. A complete label, including units, was needed for the *y*-axis. A suitable scale was 1 cm for every arbitrary unit, although 2 units per cm was allowed. Bars had to be plotted and labelled with the colour of light, not with just a letter.

02.9 The vast majority of students correctly interpreted the results to conclude that blue light would be the best colour of light to grow plants in. The second most common response was green light, selected by less than a tenth of students.

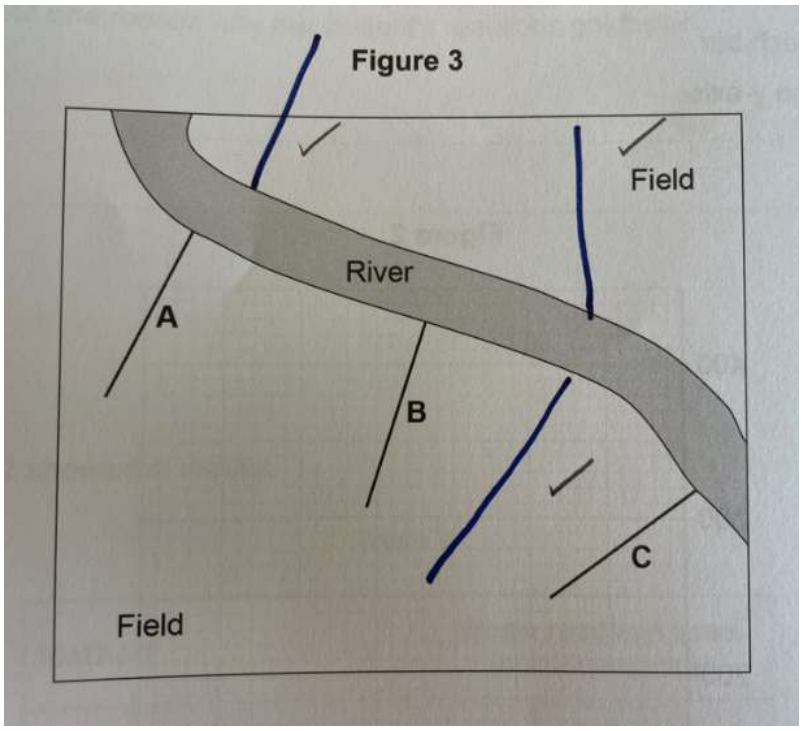
4.7.3.5 Global warming

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.

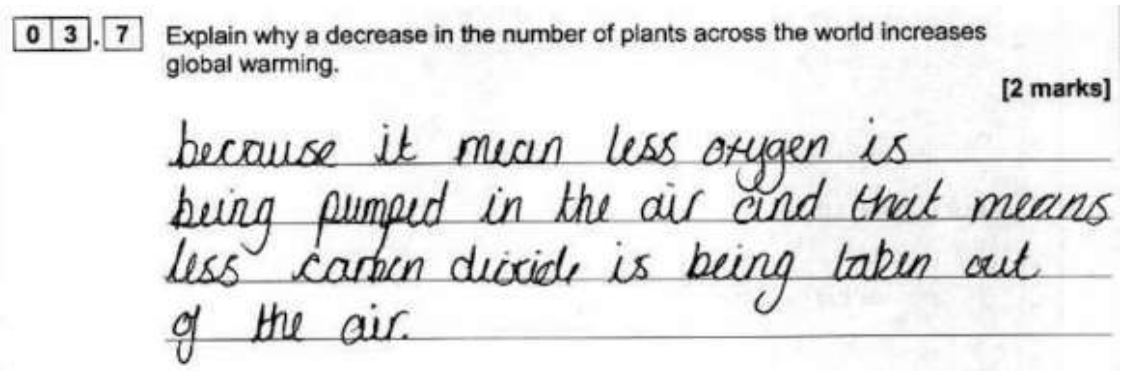
A significant number of students misunderstood the question and attempted to explain rather than describe the effect of moving away from the river.

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/1F | Original Q5

Question 5 (low and standard demand)

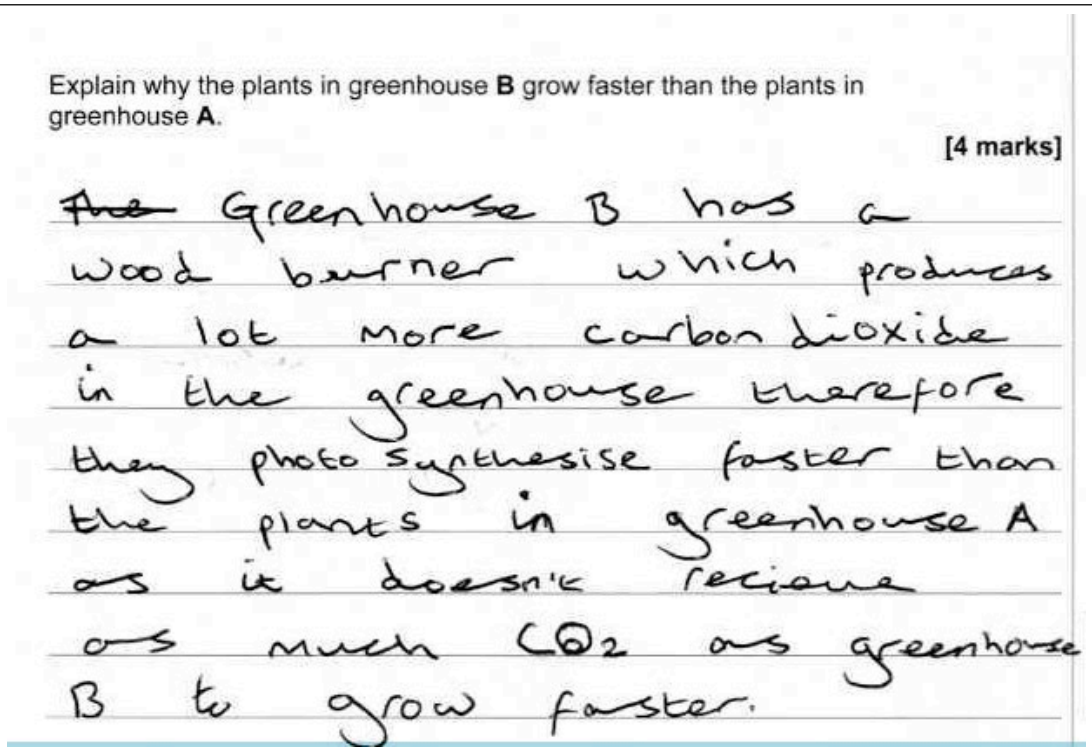
05.1 Just under two-thirds of students gave the correct reactant and product and very few (4%) gained only 1 mark. The most common reason for incorrect answers seems to be confusion between the reactants and products. Those students who correctly used formulae rather than the words were credited.

05.2 The vast majority (89%) of students identified the correct formula for glucose.

05.3 Students really struggled to gain credit in this question. Those who did gain credit usually met marking point 1 for respiration or energy: 'Used for energy' was the most common correct answer given. Convert/produce/make starch were also common responses which gained credit; however, many students simply wrote 'for storage', 'for food' or 'to store as food', which lacked the detail needed. Some students referenced fat and cellulose for marking point 3 and marking point 4, but very few students referenced amino acids or protein for marking point 5.

The most common incorrect answers were for growth and for repair.

05.4 Many students achieved a mark by stating that there is an increased temperature in greenhouse B, and that there is more carbon dioxide, or that combustion releases carbon dioxide. A reasonable number of students were then able to relate this to more photosynthesis or a faster rate of photosynthesis. A more limited number of students could relate this to an increase in glucose being made, but very few went on to relate this to more protein or cellulose being made.



Explain why the plants in greenhouse **B** grow faster than the plants in greenhouse **A**.

[4 marks]

~~The~~ Greenhouse B has a wood burner which produces a lot more carbon dioxide in the greenhouse therefore they photosynthesise faster than the plants in greenhouse A as it doesn't recieve as much CO_2 as greenhouse B to grow faster.

An example of a common 2-mark response, in which the student has given part of the answer but not gone on to relate the increase in photosynthesis to production of glucose, protein or cellulose.

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4.7.3.5 Global warming

Answer 08 · Examiner comments

June 2024 | 8464/B/2F | Original Q6

Question 6 (standard demand)

06.1 30% of students could select that the classification group 'Eukaryota' is a domain.

06.2 50% of students knew that asexual reproduction produces genetically identical offspring.

06.3 Just over 50% of students knew that a gamete contains half the number of chromosomes compared to the other cells in a potato plant.

06.4 Most students could describe how a new plant species could be identified as being in the same genus as potatoes. DNA analysis or similar characteristics were the most common correct answers.

Misconceptions were seen, such as the idea that the species would have identical DNA. On the Foundation tier, some answers were much too vague, such as 'by testing'.

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4.7.3.5 Global warming

Answer 08 · Examiner comments June 2024 | 8464/B/2F | Original Q6

06.5 Few students appeared to follow the direction of the question, beyond stating that GM crops can be made to grow even if the climate changes. Some students were aware of food insecurity as a result of climate change, and this could be given credit for the idea that current crops will not be able to grow/survive.

Few students made links between climate change and the possible benefits of GM crops. Lists of possible benefits of GM with no link to climate were limited to Level 1. Some students made very good attempts at this question and a few recognised some of the effects of climate change and were able to link these to the idea that current crops would struggle to grow in these conditions. This was an attempt at a logical link and achieved a Level 2 mark.

Some students further developed this idea, and clearly had a grasp of the question being asked, as they then went on to describe how GM would enable crops (or potatoes) to survive the conditions that climate change brings. They could further strengthen their account with suggestions that more crops could be grown or crops could be grown faster. These responses were detailed and logically linked accounts and were therefore Level 3 responses.

Some students wrongly gave explanations of causes of climate change.

0 6 . 5 Scientists have collected and stored seeds from species in the same genus as potatoes.

In the future, these seeds may be used for genetic modification of potato plants.

Genetically modified potato plants could help supply food to the human population as the climate changes.

Explain why genetic modification of crop plants may be important for the human population to survive climate change.

[6 marks]

the genetically modified plants can photosynthesise ~~more~~ better leading to more Oxygen in the ~~plant~~ planet as the plants are reducing the carbon dioxide amount

Genetically Modified plants can grow faster, so providing more food to the population

Genetically Modified plants can thrive better without the needs that any other plant need.

In the second paragraph, this student has given the idea that GM crops may grow faster and therefore provide more yield. This is indicated on the mark scheme as one idea for a benefit of GM crops in this context. There is no attempt to link this idea with effects of climate change, therefore the response is within Level 1 and 1 mark was awarded.

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4.7.3.5 Global warming

Contact us

Our friendly team will be happy to support you between 8am and 5pm, Monday to Friday.

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Answer 09 · Examiner comments

June 2025 | 8464/B/2F | Original Q2

Question 2 (Low and Standard demand)

02.1 The correct role of fertiliser was seen more frequently than that of herbicide, but many students did not seem familiar with either term.

02.2 Fewer than half of students could identify the secondary consumer in the food chain. 'Mice' was the most commonly selected answer, presumably with students focussing on the 'secondary' rather than understanding the term 'secondary consumer'.

02.3 Most often, students could identify that insects pollinating the crop would increase yield, but fewer students realised that insects eating pests on the crop would also increase crop yield.

02.4 Many students gave a correct suggestion about why farmers increase the size of hedgerows. Most frequently this was the idea of keeping animals or people out or increasing the number of insects. Reponses suggesting that this gives more space for crops to grow was a frequent misconception, along with incorrect ideas of what hedges are and how much of a barrier they represent, for example, preventing insects passing through or preventing the spread of disease. Some students mistakenly thought hedgerows would keep birds out. Overall, there was a lack of appreciation for the role of hedgerows in increasing biodiversity.

02.5 Student can never be given credit to repeating information in the question, so statements such as 'the water drains slow' could not be awarded mark point 1. If students went a little further to state that 'the water drains more slowly', the response was then comparative and the mark could be awarded.

Peat comes from peat bogs.

0 2 . 5 Peat can be used to produce garden compost.

Table 1 compares peat compost with a sample of soil.

Table 1

	Mineral ion concentration	Speed at which water drains through
Peat compost	Low	Slow
Soil	High	Fast

Young plants have short roots.

Explain **one** advantage of growing young plants in peat compost instead of in soil.

[2 marks]

They have a low mineral ion concentration
A slow speed at which water drains
through.

This student has not added any information that is not taken directly from Table 1, therefore no marks could be awarded. If the student had stated 'A slower speed at which water drains through' then the mark would be awarded for that comparative response.

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4.7.3.5 Global warming

Answer 09 · Examiner comments June 2025 | 8464/B/2F | Original Q2

02.6 'Transpiration' was frequently given as an incorrect answer. Presumably because students are more familiar with plants transpiring, than with plants respiring.

02.7 Students were provided with the information that peat contains carbon compounds and that burning peat contributes to climate change. Therefore, neither of those ideas could be awarded credit. The most common response that did not gain credit was that 'burning peat releases carbon and contributes to climate change'. Some students were incorrectly linking carbon dioxide with the ozone layer.

02.8 Nearly 50% of students could identify that both bacteria and fungi cause decay. The most common incorrect answer was 'algae'.

02.9 The wide mark scheme indicates the many and varied ways that students could answer this question. All the ideas on the mark scheme were seen. When the mark was not awarded, this was usually because students had not read or understood the question and they responded in terms of 'fewer trees giving out oxygen'.