AQA GCSE Combined Science - Trilogy | 8464

SPECIFICATION POINT 4.6.4

Classification of living organisms

Mark schemes and examiner comments

Tier	**Higher**
Question groups	**7**
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.

4.6.4 Classification of living organisms

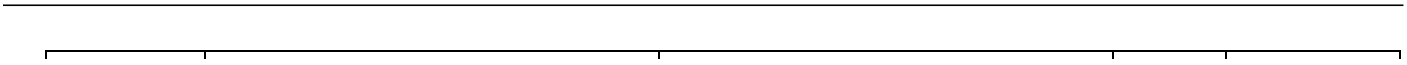
Answer 01 · Mark scheme

Question	Answers	Extra information	Mark	AO / Spec. Ref.
03.1	they survive in high temperatures they survive where it is acidic		1 1	AO2 4.7.1.4
03.2	C		1	AO3 4.7.1.4
03.3	because it has (high / optimum) activity at high temperature or 65 °C **and / or** low pH or pH 3 or high acidity	mark dependent on C correct for question **03.2** allow it is the only enzyme that is active between 55 °C and 75 °C **and / or** below pH4	1	AO2 4.7.1.4
03.4	any **three** from: • based on DNA / chemical evidence (the three domains are) • (Archaea) –primitive / simple bacteria • Prokaryota / Bacteria – true / modern bacteria • Eukaryota – includes (protists, fungi,) plants and animals	allow Eukaryota - includes organisms with cells having a nucleus if no other mark awarded allow for **1** mark mention of Archaea, Prokaryota / Bacteria and Eukaryota **or** three correct descriptions	3	AO1 4.6.4
03.5	(these microorganisms) live in extreme conditions	allow (most Archaea) are extremophiles	1	AO2 4.6.4
Total			8	

4.6.4 Classification of living organisms

Answer 01 · Mark scheme

June 2018 | 8464/B/2H | Original Q3



4.6.4 Classification of living organisms

Answer 02 · Mark scheme

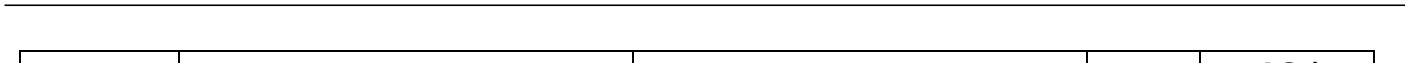
November 2020 | 8464/B/2H | Original Q6

Question	Answers	Extra information	Mark	AO / Spec. Ref.
06.1	archaea	allow archea or archaia as phonetic spelling	1	AO1 4.6.4
06.2	horizontal line from –415 to –65 (labelled ammonites)	allow -410 to -420 for -415 (to -65) allow oblique line	1	AO2 4.6.3.3
06.3	ammonites = 350 (million years) **and** trilobites = 266 (million years) 84 million (years) or 84 000 000	allow range 345 to 355 allow correct calculation from their answer for ammonites allow answers in standard form	1 1	AO2 4.6.3.3
06.4	68 and 96 [(96-68) ÷ 68] × 100 41.17647… **or** 41.2 **or** 41	allow +/- half a small square	1 1 1	AO2 4.6.3.3
Total			**7**	

4.6.4 Classification of living organisms

Answer 02 · Mark scheme

November 2020 | 8464/B/2H | Original Q6



4.6.4 Classification of living organisms

Answer 03 · Mark scheme

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

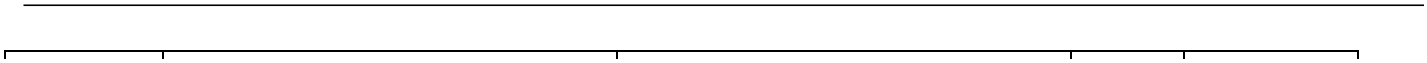
Question	Answers	Extra information	Mark	AO / Spec. Ref.
03.1	*Ourasphaira*	ignore italics ignore capitalisation do **not** accept *Ourasphaira giraldae*	1	AO2 4.6.4
03.2	the mud stopped oxygen reaching the fungus		1	AO2 4.6.3.2
03.3	any **one** from: • 2.1×10^8 (years) • 210 000 000 (years)		1	AO2 4.6.3.2
03.4	any **one** from: • fossil(s) of the fungus may have been destroyed (by geological activity) • fossil(s) of the fungus may not have been found (yet) • dating methods are not precise / accurate • the time at which an organism / fungus evolves from ancestors is difficult to pinpoint	ignore some destroyed ignore some not found (yet) allow point of speciation is not known	1	AO3 4.6.3.2
03.5	eukaryota	allow eukaryote(s)	1	AO1 4.6.4

03.6	can survive in extreme environments cytoplasm contains DNA		1 1	AO1 AO2 4.6.4 4.1.1.1 4.1.1.2 4.6.2.4
03.7	any **three** from: • studies of internal / cell structures with light microscopes • studies of internal / cell structures with electron microscopes • chemical analysis • comparison of biochemical processes • DNA / genetic analysis • studies of evolution(ary relationships)	allow organelles for internal / cell structures if neither mark awarded allow studies of internal / cell structures (with microscopes) for **1** mark	3	AO1 4.6.4
Total			**10**	

4.6.4 Classification of living organisms

Answer 03 · Mark scheme

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



Answer 04 · Mark scheme

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

Question 6

Question	Answers	Extra information	Mark	AO / Spec. Ref.
06.1	<table><tr><td></td><td>eukaryote / eukaryota</td></tr><tr><td></td><td>animal(ia)</td></tr><tr><td>phylum / phyla</td><td></td></tr><tr><td></td><td></td></tr><tr><td></td><td></td></tr><tr><td>family</td><td></td></tr><tr><td></td><td></td></tr><tr><td></td><td></td></tr></table>	**2** marks for all 4 correct **1** mark for 2 or for 3 correct ignore italics and upper / lower case letters	2	AO1 AO2 4.6.4

Question	Answers	Extra information	Mark	AO / Spec. Ref.
06.2 view with Figure 5	*two readings from graph* 7.75 **and** 4.32	allow in range of 7.7 to 7.8 **and** 4.3 to 4.4 allow two readings from two identified points on the line, allowing a tolerance of ± ½ a small square	1	AO2 4.7.3.5
	calculation of gradient $\frac{3.43}{32}$	allow calculation of gradient using correct readings from graph, $\frac{dy}{dx}$	1	
	correct answer 0.1(071875)	allow correct answer using student's correct readings from graph	1	

4.6.4 Classification of living organisms

Answer 04 · Mark scheme

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

Question	Answers	Extra information	Mark	AO / Spec. Ref.
06.3	any **two** from: *in autumn* • no / fewer seals left on ice **or** all / most seals are in the sea • seals are adults / older so swim faster • more <u>competition</u> between polar bears	ignore seals are in the sea unqualified	2	AO3 4.7.3.5

Question	Answers	Mark	AO / Spec. Ref.
06.4	**Level 2:** A judgement, strongly linked and logically supported by a sufficient range of correct reasons, is given.	3–4	AO3
	Level 1: Some logically linked reasons are given. There may also be a simple judgement.	1–2	AO2
	No relevant content	0	
	Indicative content *may decrease because:* • global warming is melting sea ice • less sea ice each year so less habitat / hunting area • as ice / habitat disappears seals will decrease in number • having to swim longer distances to find seals, wastes energy • increased metabolic rate means more food is required • not building up fat stores in the autumn means fewer will survive each winter • decrease in mass / height may reduce hunting ability / strength • hunting in some / most areas continues • less likely to find mates • eventually the species may become extinct *may increase / maintain numbers if:* • more laws put in place to stop hunting **or** laws to stop hunting will allow bears to reproduce • quotas introduced to reduce hunting • nations / people work to reduce carbon dioxide emissions to halt global warming • (feeding / hunting) behaviour of polar bears changes For Level **2** both increase / maintenance **and** decrease of the polar bear population must be considered		4.7.1.1 4.7.3.5

Total Question 6		**11**

Answer 05 · Mark scheme

Question 4

Question	Answers	Extra information	Mark	AO / Spec. Ref.
04.1	Oncorhynchus	ignore capitals ignore italics do **not** accept *Oncorhynchus keta*	1	AO2 4.6.4

Question	Answers	Extra information	Mark	AO / Spec. Ref.
04.2	eukaryota	allow eukaryote	1	AO1 4.6.4

Question	Answers	Extra information	Mark	AO / Spec. Ref.
04.3	select fish that have / get least / less / no (attachment of) sea lice **and** breed (selected fish) together	ignore with desired genes	1	AO2
	select offspring that have least sea lice **and** breed (selected offspring) together	allow select offspring with desired characteristic **and** breed together	1	AO1
	repeat over many generations until all offspring have no sea lice (attached)	do **not** accept idea of repeating with the same parents	1	AO2 4.6.2.3

Question	Answers	Extra information	Mark	AO / Spec. Ref.
04.4	sea lice will not be feeding on salmon (skin / blood)	allow skin less likely to be damaged / infected	1	AO3 4.6.2.3
	(so) salmon grow larger / faster	allow (so) salmon lose less energy allow no / less need for pesticides / insecticides allow (so) not off-putting (to consumers / buyers) allow (so) more (likely to be) sold allow salmon with sea lice cannot be sold	1	
	(so) salmon can be sold for more money	allow more profit allow no need to remove lice	1	

Question	Answers	Extra information	Mark	AO / Spec. Ref.
04.5	all fish genetically similar	allow all fish have many / mostly same genes ignore inbreeding unqualified do **not** accept fish are clones do **not** accept fish are genetically identical	1	AO1 4.6.2.3
	(therefore) all may have (same) inherited disorder / defect **or** (therefore) prone / susceptible to same disease **or** (therefore) lack of variation to survive future environmental change		1	

Total Question 4	**10**

4.6.4 Classification of living organisms

Answer 06 · Mark scheme

Question 2

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

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

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

4.6.4 Classification of living organisms

Answer 06 · Mark scheme

Question	Answers	Extra information	Mark	AO / Spec. Ref.
02.4	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.
02.5	**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 2	10

4.6.4 Classification of living organisms

Answer 07 · Mark scheme

June 2025 | 8464/B/2H | Original Q5

Question 5

Question	Answers	Extra information	Mark	AO / Spec. Ref.
05.1	behaviour(al)	allow functional	1	AO2 4.7.1.4

Question	Answers	Extra information	Mark	AO / Spec. Ref.
05.2	any **two** from: • (new) predators • (new) disease / pathogen • competition for food • lack of mates	ignore habitat ignore competition unqualified allow hunters / poachers allow named example allow lack of food allow competition for mates	2	AO1 4.6.3.3 4.7.1.3

Answer 07 · Mark scheme

June 2025 | 8464/B/2H | Original Q5

Question	Answers	Extra information	Mark	AO / Spec. Ref.
05.3		allow skeleton **or** hard parts for bones throughout ignore compression ignore reference to oxygen		
	(plesiosaur) died and sank (to bottom of ocean / sea)		1	AO2
	any **two** from: • (plesiosaur died and) is buried in sediment / sand / mud / silt • (only) soft parts decayed / eaten **or** bones were not decayed / eaten • bone(s) / remains replaced by minerals	do **not** accept plesiosaur (died and) is buried in rock(s) allow mineralisation of bones allow bone(s) left imprint in mud / sand / sediment (that then hardened to rock) ignore bones turned to stone / rock	2	AO1 4.6.3.2

Answer 07 · Mark scheme

Question	Answers	Extra information	Mark	AO / Spec. Ref.
05.4	any **two** from: • fossil record may be incomplete • DNA will be destroyed by fossil formation • no evidence of soft tissues which are decomposed (before fossilisation) • only able to study phenotype (from fossils)	allow not all fossils have been found allow (some) fossils may have been destroyed allow there are not enough fossils (to study) allow chromosomes / genes / alleles will be destroyed by fossil formation allow fossils do not contain DNA / chromosomes / genes / alleles allow only able to study observable characteristics (of bones / skeleton)	2	AO2 4.6.2.1 4.6.3.2

Question	Answers	Extra information	Mark	AO / Spec. Ref.
05.5	<table><tr><th>Classification group</th><th>Name</th></tr><tr><td></td><td>eukaryota / eukaryote(s)</td></tr><tr><td></td><td></td></tr><tr><td>phylum / phyla</td><td></td></tr><tr><td></td><td></td></tr><tr><td>order</td><td></td></tr><tr><td>family</td><td></td></tr><tr><td></td><td></td></tr><tr><td></td><td></td></tr></table>	**2** marks for 4 correct **1** mark for 2 or 3 correct **No** marks for 1 correct ignore italics and upper / lower case letters	2	AO1 AO2 4.6.4

4.6.4 Classification of living organisms

Answer 07 · Mark scheme

June 2025 | 8464/B/2H | Original Q5

Question	Answers	Extra information	Mark	AO / Spec. Ref.
05.6	Cryptoclidus eurymerus	ignore italics and upper / lower case letters do **not** accept Cryptoclididae eurymerus	1	AO2 4.6.4

Total Question 5	**11**

Answer 01 · Examiner comments

June 2018 | 8464/B/2H | Original Q3

Question 3 (standard & standard / high demand)

03.1 Students were able to relate extremophiles to harsh conditions with 39% of students identifying one of the conditions and 54% identifying both.

03.2 64% of students identified enzyme C as the enzyme from bacteria in the cave.

03.3 Those students who selected the incorrect enzyme in question **03.2** were unable to get any credit for their answer to this question. Some who correctly picked enzyme C then incorrectly wrote about microbes living or surviving in the conditions rather than referring to enzymes still being active in these conditions.

Other students appeared to misunderstand the graph itself and presumed that the enzymes themselves had high temperatures or were acidic rather than the activity being greatest in those conditions. The word optimum was rarely used.

Those students who got the correct answer (28%) usually referred to 'enzyme activity at high temperatures'. Whereas the students who wrote about pH did not mention that the conditions were of low pH or high acidity, simply referring to it being acidic.

03.4 There were a few excellent answers from students who had a real understanding of this new aspect of the specification. However, in general students struggled with this question, with 12% not attempting it at all. 3% of students achieved three marks.

Many students did not know what the domains were. Students often wrote answers about kingdoms and phyla rather than the three domains. And there were many answers that suggested the domains were a way of classifying organisms in the environment with many references to producers, consumers, habitats, communities and abiotic and biotic factors. Many students confused the three-domain system with the Linnaeus system of classification and described that instead.

Other students described the thee-domain system as referring to the conditions of an organism's environment, referencing the previous questions' use of pH and temperature. Some students also described food chains or predator prey relationships. Students were often able to achieve two out of the three marks for their descriptions of Eukaryotes and Prokaryotes. However, they often did not describe Archaea as 'simple' or 'primitive' bacteria, but simply as extremophiles.

Not many students received credit for marking point one as they usually just referenced classification based on characteristics rather than DNA or chemical evidence. The compensation mark was the marking point most often awarded.

4.6.4 Classification of living organisms

Answer 01 · Examiner comments June 2018 | 8464/B/2H | Original Q3

03.5 24% of students answered this question correctly. Some did not recognise that the extreme conditions were the focus of the question and instead commented on the microorganism being found in the caves which had matching conditions to the graphs.

Common incorrect answers included that Archaea are primitive or old or that they survived in hot or dark or humid or acidic conditions without making reference to the fact that these conditions are extreme.

Answer 03 · Examiner comments November 2021 | 8464/B/2H | Original Q3

Question 3 (standard and standard/high demand)

Overall, there was a poor understanding of classification. Many students could not give the genus name when provided with the binomial. The calculation of the range required manipulation of figures in standard form, and was generally answered clearly. The most common incorrect answer was 2.1×10^7. Students gained credit whether or not their correct answer was given in standard form.

In **03.4**, many students did not move beyond the idea that had been given in the question, that humans were not alive when the fungus was alive and therefore there are no records of the fungus; this was insufficient. Some students could give the domain eukaryota, and phonetic spelling was allowed, as explained at the beginning of the mark scheme. **03.5** asked for recall of three types of evidence that are used now to classify living things. Despite being prompted not to refer to appearance, many responses did this, such as referring to size or external features.

Answer 04 · Examiner comments

Question 6 (standard, standard/high & high demand)

06.1 Phonetic spellings were allowed throughout. Many students knew one of the four words, with animalia/animal kingdom being the most common correct response. Students who got phylum correct often also knew family. Archaea was sometimes given incorrectly as the domain.

06.2 Most students could take two correct readings from the graph. Most selected data from 1985 and 2017, but that was not necessary for full marks. Any two years could be used if indicated on the figure, or in the answer space. Clear answers often included lines drawn on the graph to help students read the data points. Some students tried to use individual data points, not the trend line, which was inappropriate.

06.3 Credit is never given for repeating information from the stem of the question. 16% of students could suggest a reason why polar bears find it harder to catch seals in autumn than spring.

06.4 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 scheme, giving a hierarchy of response. Within each level of response there are two marks.

Credit is never given for repeating information from the stem of the question. Students were expected to evaluate what might happen to the population of polar bears in the future. To access Level 2, students needed to consider both a decrease and an increase or maintenance of the population. Few students considered reasons that would lead to an increase or maintenance of the population.

As an evaluation question, the generic level descriptors refer to judgement. Students were not required to come to an overall or final judgement. Their judgement was be taken to mean the likely effect of any part of the indicative content on the population size anywhere within their response.

Use of statistics

Statistics used in this report may be taken from incomplete processing data. However, this data still gives a true account on how students have performed for each question.

Mark Ranges and Award of Grades

Grade boundaries and cumulative percentage grades are available on the Results Statistics page of the AQA Website.

4.6.4 Classification of living organisms

Answer 05 · Examiner comments

Question 4 (Standard, Standard/high and High demand)

04.1 Some students gave the binomial, which was incorrect.

A large number of students were giving incorrect names including the domain / Linnaean classification system (eg Archaea, Eukaryote, Family) or other classification groups (eg Animalia, Vertebrates, Mammal, Fish, Amphibian, Insect).

04.2 Students found it challenging to name the correct domain.

Common incorrect responses were archaea, prokaryotes, bacteria, insect, kingdom and animals. Some students gave the species or genus name. Many students gave classification groups again (ie Animalia, Mammal, Fish, Amphibian, Insect, Fungus). Some students named roles in a food web such as consumer, prey, predator, tertiary consumer. Some students named the domain as the water/sea/ocean.

Answer 05 · Examiner comments

June 2023 | 8464/B/2H | Original Q4

04.3 There were many responses that were too vague to score marks. In most cases, these repeated the question. References to selecting and breeding fish with the gene were common, and not creditworthy alone.

Some students implied that the parents were being bred repeatedly, rather than the next generation. Few students could describe when the selective breeding would be finished.

Some misconceptions were seen regarding genetic modification.

0 4 . 3 Some salmon have genes that result in fewer sea lice attaching to the skin.

Describe how fish farmers can selectively breed salmon that sea lice **cannot** attach to.

[3 marks]

They can catch the salmon that fewer sea lice attach to. They then bread the fish and breed the offspring until they produce salmon that sea lice cannot attach to.

This response gains marking point 1. It is then unclear that the offspring are being selected before breeding so no further marks were given.

04.4 Generally, students could state some advantage to salmon farmers, but few could give a full explanation.

Responses relating to the fish being 'healthier', 'fresher' or 'higher quality' were insufficient.

04.5 Students found this question challenging. When asked to explain the disadvantage of selective breeding, many students gave responses that could apply to any population (whether selectively bred or not), such as 'may get diseases' or 'may pass on inherited disorders). These were insufficient.

Some students ignored the 'Do not refer to cost or time in your answer' statement in the question and referred to how long selective breeding takes.

For marking point 1 some students incorrectly stated that genes / DNA / gene pool would be the same in all the salmon. So, 'smaller gene pool' / 'similar DNA' were equivalent to the marking point but 'same gene pool' / 'same DNA' did not gain credit.

There were different ways that students could be awarded marking point 2. In option 1 (marking point 2), the idea of an inherited disorder / defect was important, and it needed to be clear that this is across the whole population. Answers of 'all get the same disease' did not gain credit as they miss the idea of it being an inherited condition. An answer of 'one parent can pass on a genetic disorder' would not gain credit as it does not imply all the salmon having it and could apply with or without selective breeding.

4.6.4 Classification of living organisms

Answer 05 · Examiner comments June 2023 | 8464/B/2H | Original Q4

In option 2 (marking point 2), we were looking for the idea is that all salmon would be ‘prone / susceptible to’ ‘the same / a particular’ disease. So, ‘all likely to get the same diseases’ or ‘fish are likely to die from the same disease’ would be equivalent.

Very few students went the option 3 (marking point 2) route, to explain how there would be a lack of variation to survive future environmental change.

Evidence of misconceptions was common, such as the suggestion that salmon are prone to developing genetic diseases. This was stated in terms that suggested genetic diseases are communicable or develop later in life.

References to ethics suggested that students are confused between selective breeding with genetic modification. Some responses referred to the unethical nature of killing fish or sea lice being a disadvantage (despite the whole point of salmon farming being to kill salmon for food). References to mutations implied that some students view any mutation as harmful or negative. Many students gave references to sea lice evolving or becoming extinct. Some misconceptions were seen around selective breeding involving chemicals, resulting in fish not being organic.

Answer 06 · Examiner comments

Question 2 (standard demand)

02.1 More than 50% of students could select that the classification group 'Eukaryota' is a domain.

02.2 Almost all students knew that asexual reproduction produces genetically identical offspring.

02.3 More than 80% of students knew that a gamete contains half the number of chromosomes compared to the other cells in a potato plant.

02.4 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.

02.5 Most students followed the direction of the question, 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.

Lists of possible benefits of GM were limited to Level 1 if there was no link to climate change. Most students made very good attempts at this question and many 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.

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4.6.4 Classification of living organisms

Answer 06 · Examiner comments June 2024 | 8464/B/2H | Original Q2

Some students gave explanations of causes of climate change, but this did not answer the question.

Some students responded in terms of 'how' GM crops can be produced, mentioning enzymes and vectors. This was not answering the question and therefore could not be given credit. These responses often gained marks from the rest of their explanation.

0 2 . 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]

As climate changes occurs the global temperature could get warmer. This means that agriculture will become harder and it will become harder for crops to be grown under hot conditions. This means that genetically modified crops could be modified to withstand greater heat and be produced in bigger yields. These crops could be produced with more nutrients and be bigger so that humans could get more energy in the future where there will be limited resources.

The student has described two effects of climate change (global temperature getting warmer and that it will be harder for crops to be grown). They then give two relevant benefits of GM linked to these ideas. This meets and exceeds the description for entry into Level 3, for both logical linking and detail, therefore 6 marks were awarded.

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Answer 07 · Examiner comments

June 2025 | 8464/B/2H | Original Q5

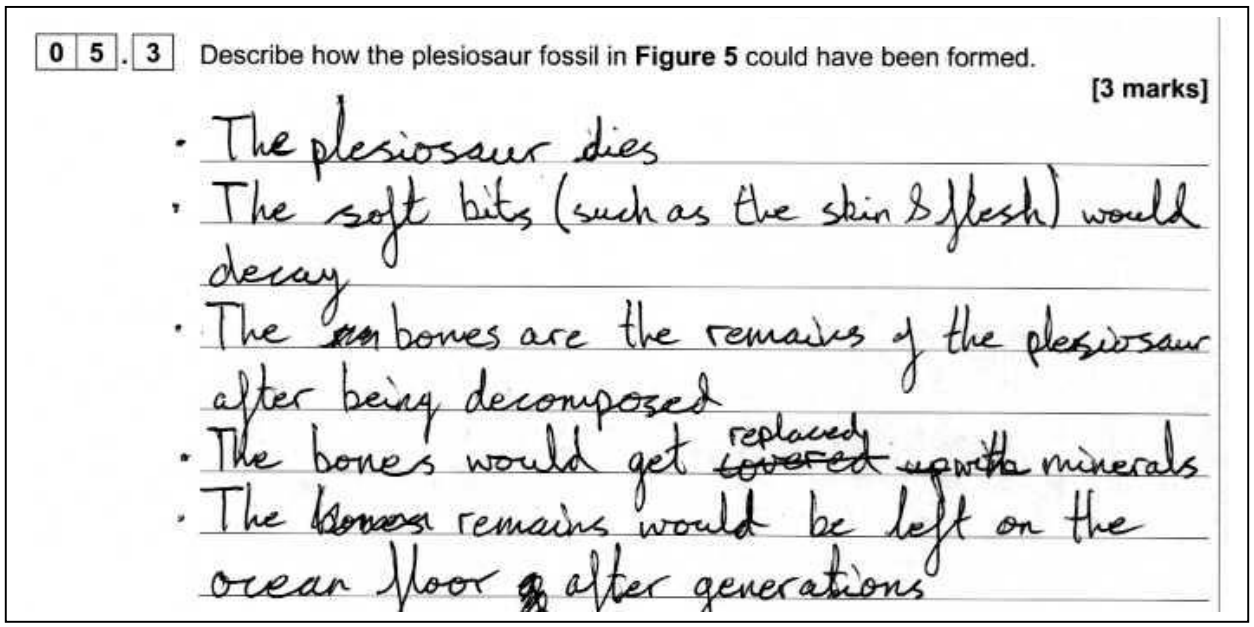
Question 5 (Standard and Standard/High demand)

05.1 This was a poorly answered question with only one third of students giving the correct answer. Environmental, structural and physical were commonly seen wrong answers. Many students didn't give a type of adaptation as the question had asked but instead described the adaptations of the Plesiosaur.

05.2 The majority of students scored 2 marks with marking points 1 and 3 most commonly seen. Many students referred to lack of food or lack of prey as alternatives to competition for food.

A commonly seen error was just stating 'food availability' without linking it to a shortage. Competition unqualified was also another regularly seen answer but did not receive credit as students needed to describe what the competition was for. There was some confusion with abiotic factors such as temperature, oxygen, climate change or space being given by some students.

05.3 Two thirds of students gained one or more mark. Only 8% of students gained three marks. The marking point that the plesiosaur 'died and sank' was rarely seen and this was usually the reason 2-mark answers didn't pick up the 3rd mark as in the example below which scored 2 marks as there was no reference to sinking after dying.



0 5 . 3 Describe how the plesiosaur fossil in **Figure 5** could have been formed.

[3 marks]

- The plesiosaur dies
- The soft bits (such as the skin & flesh) would decay
- The bones are the remains of the plesiosaur after being decomposed
- The bones would get ~~covered~~ replaced up with minerals
- The bones remains would be left on the ocean floor after generations

Many students were awarded bullet point 1, for the idea of being buried / covered in sediment (or similar) but some responses incorrectly referred to being buried in rocks which did not allow the mark to be awarded.

Bullet point 2 was often misunderstood as there were lots of references to the body or plesiosaur or bones decaying as students failed to appreciate that only the soft parts decay when fossils form, despite the photograph.

Bullet point 3 was awarded infrequently. Sometimes students had the idea of imprints forming in the 'rock' rather than in mud / sand / sediment. The most commonly seen approach which scored the mark was the idea that minerals replace the bones.

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References to compression or pressure, a lack of decay due to a lack of oxygen and references to other factors needed for decay (such as microbes or higher temperature) were often seen but these were insufficient in the context of this question.

Some students referred to how the fossil could be found and assembled by scientists rather than how the fossil formed, indicating that some students misunderstood the question. Incorrect references to natural selection and evolution were also seen.

05.4 Students found this question challenging. Insufficient responses included 'there not being any plesiosaurs alive' or 'none still living to study', that 'no-one saw them' or 'you couldn't tell how old the fossils were'. There were some vague statements given such as 'lack of evidence'.

Many students referred to DNA not being present but failed to link this idea to DNA being destroyed during the formation of fossils.

05.5 Fewer than 25% of students could complete all four spaces in the classification of the plesiosaur, but a further 30% gained one mark for two or three correct words in the correct spaces. There was frequent evidence of students knowing the first letter of the group, but they got no further, or created words based on this known first letter. Mnemonics were regularly seen, but often without fully correct corresponding responses.

0 5 . 5 **Table 1** shows part of the classification of a plesiosaur.

Complete **Table 1**.

[2 marks]

Table 1

Classification group	Name
Domain	Predator
Kingdom	Animalia
Phylum	Chordata
Class	Reptilia
	Plesiosaur
	Cryptoclididae
Genus	Cryptoclidus
Species	eurymerus

King Phillip Came over for Good Soup

The student has learnt a mnemonic, but cannot put this to good use. A response of one word correct out of four did not gain a mark due to the level of demand of this question.

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