AQA GCSE Biology | 8461

SPECIFICATION POINT 4.6.4

Classification of living organisms

Mark schemes and examiner comments

Tier	**Higher**
Question groups	**8**
Available paper years	**2008–2025**

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 November 2008 | BLY1BP | Original Q3 | Legacy

Three	**1**	**2**	**1**	**2**

Answer 02 · Mark scheme November 2011 | BLY1AP | Original Q9 | Legacy

Nine	**4**	**3**	**1**	**4**

The AQA UMS Conversion Calculator can be found at the following web address:

http://www.aqa.org.uk/umsconversion

4.6.4 Classification of living organisms

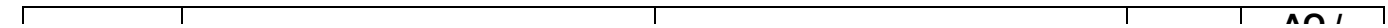
Answer 03 · Mark scheme

Question	Answers	Extra information	Mark	AO / spec ref.
6(a)(i)	idea of poor sleeping	allow as a sleeping pill	1	AO1 1.3.1d
6(a)(ii)	(for) morning sickness (in pregnant women)	ignore sickness unqualified ignore leprosy	1	AO1 1.3.1d
6(a)(iii)	limb abnormalities / defects	accept description e.g. short / no arms / legs ignore disabled / deformed	1	AO1 1.3.1d
6(a)(iv)	drug not tested / trialled on pregnant animals / women	allow not tested for treatment of morning sickness	1	AO3 1.3.1b,d
6(b)(i)	changes to chemical processes	ignore addiction	1	AO1 1.3.1h
6(b)(ii)	dependency on (some) legal drugs is more than / equal to on (some) illegal drugs example of a named legal drug for which dependency is equal to **or** greater than a named illegal drug	allow idea of no / little consistency between dependency and classification allow two pairs of named examples for 2 marks	1 1	AO3 1.3.1e
6(b)(iii)	any **one** from: • the harm it does / harmfulness • effect on health • side effects	ignore cost / addiction / dependency accept (severity of) withdrawal symptoms accept named health effects e.g. mental illness **or** effect on heart / circulatory system	1	AO3 1.3.1f,g
Total			**8**	

4.6.4 Classification of living organisms

Answer 03 · Mark scheme

June 2014 | BL1HP | Original Q6 | Legacy



4.6.4 Classification of living organisms

Answer 04 · Mark scheme

Question	Answers	Extra information	Mark	AO / Spec. Ref.
7(a)(i)	organisms that can breed / mate **or** organisms that can reproduce together	allow converse points re. 2 different species	1	AO1 2.8.1f
	successfully	allow produces fertile offspring for 2 marks allow can reproduce to form fertile offspring for 2 marks	1	
7(a)(ii)	any **two** from: • fossils show how species have changed **or** show changes over time • older fossils are simpler (than later ones or present day species) • fossils have features similar to present-day species	allow fossils enable us to compare old species with present-day species	2	AO1 2.8, 2.8.1a/d

7(b)	any **six** from: • (geographical) isolation (prevents interbreeding) • similar environmental conditions required similar adaptations / favoured similar mutations • an example of a suitable similar adaptation is explained • lack of predators / dinosaurs allowed survival without flight **or** plentiful food near ground allowed survival without flight • genetic variation / mutation (in each population) • natural selection / better adapted survive • favourable alleles passed on	allow ref. to continental drift allow description via example allow survival of the fittest allow genes / mutations	6	AO1/2 2.8.1f

Total		**10**

4.6.4 Classification of living organisms

Answer 05 · Mark scheme

June 2018 | 8461/2H | Original Q9

<table>
<tr><th>Question</th><th>Answers</th><th>Extra information</th><th>Mark</th><th>AO / Spec. Ref.</th></tr>
<tr><td>09.1</td><td><table><tr><th>Classification group</th><th>Name</th></tr><tr><td>Class</td><td>Mammalia</td></tr><tr><td>Order</td><td>Primates</td></tr><tr><td>Family</td><td>Lemuroidea</td></tr><tr><td>Species</td><td>catta</td></tr></table></td><td>all 4 correct = 2 marks
2 or 3 correct = 1 mark
0 or 1 correct = 0 marks</td><td>2</td><td>AO1
4.6.4</td></tr>
<tr><td>09.2</td><td>Lemur catta</td><td>ignore capitalisation / non-capitalisation of initial letters

ignore italics / non-italics
ignore underlining / non-underlining</td><td>1</td><td>AO2
4.6.4</td></tr>
<tr><td>09.3</td><td>carried by (favourable) currents on masses of vegetation</td><td>allow description of currents from Figure 13
ignore swimming</td><td>1</td><td>AO2
4.6.3.2</td></tr>
</table>

4.6.4 Classification of living organisms

Answer 05 · Mark scheme

June 2018 | 8461/2H | Original Q9

Question	Answers	Extra information	Mark	AO / Spec. Ref.
09.4	isolation of different populations		1	AO2 4.6.3.2
	habitat variation between lemur populations	allow examples – biotic (eg food / predators) or abiotic (eg temperature)	1	AO1 4.6.2.2 4.7.1.4
	genetic variation or mutation (in each population)		1	AO1 4.6.2.1 4.6.2.2 4.6.3.1 4.7.1.4
	better adapted survive (reproduce) **and** pass on (favourable) allele(s) to offspring	allow natural selection **or** survival of the fittest **and** pass on (favourable) allele(s) to offspring allow gene(s) / mutation as an alternative to allele(s)	1	AO1 4.6.2.2 4.6.3.1 4.7.1.1
	(eventually) cannot produce fertile offspring with other populations	allow cannot reproduce 'successfully' with other populations ignore cannot reproduce unqualified	1	AO1 4.6.3.1 4.6.2.2
Total			**9**	

4.6.4 Classification of living organisms

Answer 06 · Mark scheme

June 2019 | 8461/2H | Original Q5

Question	Answers	Extra information	Mark	AO / Spec. Ref.
05.1	same kingdom + phylum + class + order **or** same order **or** they have the top four groups the same	allow both Poales	1	AO3 4.6.4
05.2	**Rr / rR**	do **not** accept **RR** or **rr** ignore heterozygous do not accept homozygous	1	AO3 4.6.1.6 4.6.3.3
05.3	C^WC^W		1	AO3 4.6.1.6
05.4	parental genotypes / gametes correct for both parents: $C^R C^W$ $C^R C^W$ / C^R and C^W genotypes of offspring correctly derived in a Punnett square: C^RC^R C^RC^W C^WC^W correct identification of phenotypes from their cross: C^RC^R = red C^RC^W = pink C^WC^W = white	allow **R** and **W** throughout allow own symbols if defined allow correctly derived genotypes from incorrect gametes allow colours correctly identified from different offspring, only if pink and other colour(s) are given	1 1 1	AO2 4.6.1.6
05.5	answer correctly derived from Question **05.4** to match stated phenotypes	allow 50(%) if no offspring given in Question **05.4** allow to match genotypes if no phenotypes given	1	AO2 4.6.1.6

Answer 06 · Mark scheme

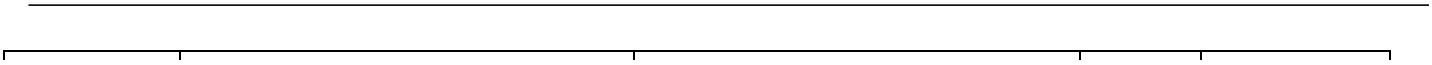
June 2019 | 8461/2H | Original Q5

Question	Answers	Extra information	Mark	AO / Spec. Ref.
05.6	*(several groups)* so many / several plants can be produced	allow each (group) will give a new plant	1	AO1 4.1.2.3 4.6.1.3 4.6.2.5
	(nutrients) for making protein / amino acids **or** for making chlorophyll **or for providing** energy **or for respiration**	allow other examples do **not** accept making energy ignore for growth	1	
	(add hormones) so differentiation occurs **or** so roots / shoots develop	allow for the formation of different tissues / organs / named allow to stimulate cell division	1	
	(sterile conditions) to prevent growth / entry of microorganisms / named type **or** prevent decay / disease	ignore to kill microorganisms ignore contamination unqualified	1	
	(temperature = 20 ^{o}C) so optimum / good growth	allow reference to enzymes working well ignore enzymes not denatured ignore reference to pathogens / microorganisms	1	
05.7	(all new plants have been) produced by asexual reproduction / mitosis **or** produced without (fusion of) gametes	ignore produced from one parent	1	AO2 4.1 4.1.2.2 4.6.1.1 4.6.2.5
	(so) all are genetically identical / clones **or** all are **C^RC^W /** heterozygous	allow all are the same genotype / alleles / genes / DNA	1	
Total			**14**	

4.6.4 Classification of living organisms

Answer 06 · Mark scheme

June 2019 | 8461/2H | Original Q5



4.6.4 Classification of living organisms

Answer 07 · Mark scheme

November 2021 | 8461/2H | Original Q9

Question	Answers	Extra information	Mark	AO / Spec. Ref.
09.1	Classification group Kingdom Phylum Class Order Family Genus Species	all 4 correct = **2** marks 2 or 3 correct = **1** mark 0 or 1 correct = **0** marks	2	AO1 4.6.4
09.2	Geospiza fortis	ignore underlining or attempted italics or upper and lower case letters	1	AO2 4.6.4
09.3	offspring have similar beak depths to parents	ignore same beak depths ignore positive correlation / described	1	AO3 4.6.2.1
09.4	parents of a given beak depth produce offspring with several beak depths	allow spread of results for a given parental beak depth about line of best fit allow range of phenotypes for a given parental beak depth	1	AO3 4.6.1.6

Answer 07 · Mark scheme

Question	Answers	Extra information	Mark	AO / Spec. Ref.
09.5	colonisers of Isabela have a range of beak depths	allow colonisers of Daphne have a range of beak depths	1	AO2
	due to different combinations of alleles of several genes **or** due to different alleles of one gene **or** due to mutation		1	AO1
	large range of (sizes / species of) seeds / food (on Isabela) **or** large(r) seeds (on Isabela)	allow small range of (sizes / species of) seeds / food on Daphne **or** allow small(er) seeds on Daphne	1	AO2
	more competition for seeds / food (on Isabela)	allow less competition for seeds / food on Daphne ignore competition unqualified	1	AO2
	birds with larger beaks get enough food to (survive and) reproduce (on Isabela)	allow birds with smaller / medium beak sizes get enough food to (survive and) reproduce on Daphne	1	AO2
	(survivors) pass on (beneficial) alleles to offspring	allow pass on genes / mutation ignore pass on chromosomes / characteristics	1	AO1 4.6.2.1 4.6.2.2 4.7.1.1 4.7.1.3

4.6.4 Classification of living organisms

Answer 07 · Mark scheme

November 2021 | 8461/2H | Original Q9

Question	Answers	Extra information	Mark	AO / Spec. Ref.
09.6	Isabela is a large island with more species of plants **or** Isabela is a large island with more variety in seed / food sizes **or** Isabela is a large island with more plants / seeds / food		1	AO3 4.7.1.1 4.7.1.3
	less competition for seeds / food **or** enough seeds / food for both bird species		1	
Total			**13**	

Question 1

Question	Answers	Extra information	Mark	AO / Spec. Ref.
01.1	any **two** from: • (ichthyosaur 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	allow skeleton **or** hard parts for bones throughout ignore compression ignore reference to oxygen do **not** accept (icthyosaur 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	AO2 4.6.3.5

Question	Answers	Extra information	Mark	AO / Spec. Ref.
01.2	120 × 17 2040 (mm) 2.04 (metres)	allow conversion to metres at any stage allow correct conversion of incorrectly calculated length	1 1 1	AO2 4.6.3.5

Question	Answers	Extra information	Mark	AO / Spec. Ref.
01.3	phylum family	in this order only	1 1	AO1 4.6.3.5 4.6.4

4.6.4 Classification of living organisms

Answer 08 · Mark scheme

Question	Answers	Extra information	Mark	AO / Spec. Ref.
01.4	any **two** from: • ice age • global warming • volcanic activity • asteroid collision • new predators • (new) disease / pathogen • competition for mates • lack of habitat **or** habitat change	 } if neither of these, allow climate change for **1** mark ignore weather } if neither of these, allow catastrophic event **or** natural disaster for **1** mark allow named example allow hunters allow named example allow lack of mates ignore competition unqualified ignore environment change allow competition between **ichthyosaurs** for food ignore isolation ignore pollution ignore lack of food	2	AO1 4.6.3.6

Total Question 1	9

Answer 07 · Examiner comments

November 2021 | 8461/2H | Original Q9

Question 9 (standard, standard/high & high demand)

This question was about Galapagos Island finches. In **09.1**, one-quarter of students were able to give the names of all four of the taxa missing from the table. Once again, probably because there were no answer lines and answers had to be written in the table, a quarter of students did not attempt this question.

In **09.2**, fewer than one-third of students were able to select *Geospiza fortis* from the table as the binomial name of the medium ground finch. It was evident that many did not know that the binomial name consisted of genus + species, while some did not appreciate that binomial indicated a two-word answer: 'fortis' being a common response.

Very few students scored the mark in **09.3**. Most described a 'positive correlation' in the results or stated that the beak depths of the offspring were 'proportional to' those of the parents but did not mention that the offspring beak sizes were approximately the same as those of the corresponding parents. Around one in seven students scored a mark.

Just over 1% of students gave a creditworthy answer to **09.4**. Common incorrect answers were that there was 'a range' of beak depths in the offspring, not stating that this was so for each parental value. There were also vague references to 'anomalies' and 'outliers' and some gave numerical values that were beyond the scales on the graph.

09.5 also proved to be very difficult and it was evident that many students did not understand the question, assuming that it was about speciation which it was not. Better answers attempted to relate beak size to the sizes of seeds produced by plants on the two islands and whether or not there was competition from the second species. Mutations were correctly mentioned quite often as a cause of variation in beak size but this concept then had to be applied to selection on the basis of availability of suitable foods (seeds). The highest mark scored was 4 out of 6, with few gaining half-marks. More than half the students scored no marks at all.

A third of students scored any marks in **09.6**, mainly for stating that competition for food might be reduced on the larger island. However, most did not relate this to the potentially greater abundance or greater variety of plants and seeds on the larger island and many did not qualify the concept of competition with it being for food, despite the relationship between beak size and seed size having been given in the stem before **09.5**.

Concluding Remarks

Overall, this November's paper was broadly comparable in demand to last year's, but this year's students appeared to be weaker on average and so found a number of questions more difficult.

Areas of the Specification about which knowledge was acceptable were:

- 4.6.1.5 DNA structure
- 4.7.4.1 Trophic levels.

Particular areas of the Specification about which knowledge seemed limited were:

- 4.5.2.4 Control of body temperature
- 4.5.3.4 Hormones in human reproduction
- 4.6.1.6 Genetic inheritance
- 4.6.4 Classification of living organisms
- 4.7.1.2 and 4.7.1.3 Abiotic factors and biotic factors
- 4.7.2.2 and 4.7.2.3 How materials are cycled and decomposition .

Students struggled to apply knowledge and understanding of Specification sections:

- 4.6.1.6, 4.6.2.1 and 4.6.3.1 Genetic inheritance, variation and evolution
- 4.7.5.3 Sustainable fisheries.

This year, as in previous years, certain general problems have been perpetuated, such as:

- not paying sufficient attention to information given in the introductory stem to a question
- needless repetition of information given in the stem of the question
- imprecise use of technical vocabulary
- not giving a comparative answer to a comparative question
- not necessarily paying attention to both sides of an argument in an evaluation question
- poor layout of working in mathematical problems, struggling with the interconversion of units and lack of consideration regarding whether the answer obtained is reasonable
- failing to answer a question where there were no answer lines, but where the answer needing to be inserted into a table or diagram.

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 08 · Examiner comments

June 2025 | 8461/2H | Original Q1

Question 1 (Standard demand)

01.1

This question required students to apply their knowledge of fossil formation to the specific example of an ichthyosaur fossil.

4.6.4 Classification of living organisms

Answer 08 · Examiner comments

Only two steps in the fossilisation process were required to score full marks, so misunderstanding or omission of one step, was not critical. Almost a third of students achieved both marks.

Many students showed good knowledge of the first step in fossil formation, often referring to sediment, or an appropriate synonym; however, some also referred to the dead animal being buried in 'rock' or in 'rocks' which disqualified this idea. Whether this burying occurred before or after decay was not important in the award of the mark.

Although many students were aware that the dead ichthyosaur had decayed, they were often imprecise in terms of what had decayed. Many described the whole 'body' or the 'tissues' decaying, which implied that both soft and hard material decays. Some were able to recover this point with statements such as 'the body decays, leaving the bones behind'. Very few students referred to the soft tissues being eaten (by detritivores).
Students were commonly well versed in the idea of mineralisation of bones.
There were some excellent answers showing that students had revised this topic well, often giving all three points on the mark scheme in clear and concise detail.

01.2
Students were provided with the length of the fossil image and the relevant magnification factor and were required to calculate the real length of the fossil.
The majority of students completed this calculation well with a pleasing 80% gaining all 3 available marks. The most common error was in converting millimetres to metres, where a conversion factor of 100 was not uncommon. Some students completed the conversion in two steps, first converting to centimetres, then to millimetres, perhaps showing a lack of confidence in their maths, at the start of the paper.
A not uncommon error was for students to use the magnification equation, with the two values as numerator and denominator. It was rare then, for students to attempt to convert their answer to metres.

01.3
Students were required to recall the classification hierarchy, completing a partial classification using given terms.
This was very well attempted with nearly 90% of students gaining both marks. It was clear that many students had remembered the sequence by using a mnemonic, often written alongside the question. However, less successful students occasionally confused population for phylum, presumably due to the same initial letter.

01.4
Students were required to suggest causes for the extinction of ichthyosaurs, and over 80% of students gained at least one of the available marks.
Although this should not be an unfamiliar question to students who have practised from previous examination papers, the context of the information provided meant that some general answers were insufficient. The information in the question was that ichthyosaurs lived in the sea, consequently 'drought' was not credited. Similarly, the information provided stated that ichthyosaurs were in competition with other predators for food, thus a 'lack of food' was ignored, as was the presence of 'predators'. For this last idea, a mark could only be awarded if any predators were described as being 'new'.

4.6.4 Classification of living organisms

Answer 08 · Examiner comments June 2025 | 8461/2H | Original Q1

The question was well answered, common correct responses included reference to ‘disease’, ‘natural disasters’ and ‘habitat loss’, although all of the possible answers were seen frequently.