AQA GCSE Combined Science - Trilogy | 8464

SPECIFICATION POINT 4.6.2.3

Selective breeding

Mark schemes and examiner comments

Tier	**Foundation**
Question groups	**2**
Available paper years	**2019–2023**

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.

4.6.2.3 Selective breeding

Answer 01 · Mark scheme June 2019 | 8464/B/2F | Original Q4

Question	Answers	Extra information	Mark	AO / Spec. Ref.
04.1	mutation		1	AO1 4.6.2.1
04.2	any **three** from: • choose the cats with the blue tail • breed these cats together • choose offspring with blue tails and breed these together • repeat until all cats have blue tails	allow choose the cats with the desired characteristic allow breed for several generations	3	AO1 AO2 4.6.2.3
04.3	they are rare / beautiful / expensive	allow description e.g. the breeder will make (more) profit	1	AO3 4.6.2.3
04.4	they are produced by inbreeding		1	AO2 4.6.2.3
04.5	(male cat) XY **or** YX (female cat) XX	both required for the mark allow lower case letters	1	AO1 4.6.1.6
04.6	<table><tr><td></td><td>(X)</td><td>(X)</td></tr><tr><td>(X)</td><td>XX</td><td>XX</td></tr><tr><td>(Y)</td><td>XY</td><td>XY</td></tr></table>	allow 2 **or** 3 derivation squares correct for **1** mark	2	AO2 4.6.1.6
04.7	random (if X or Y goes into each sperm)	allow it is a chance event allow it is only a probability	1	AO3 4.6.1.6
Total			**10**	

4.6.2.3 Selective breeding

Answer 01 · Mark scheme

June 2019 | 8464/B/2F | Original Q4

4.6.2.3 Selective breeding

Answer 02 · Mark scheme

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

Question 4

Question	Answers	Mark	AO / Spec. Ref.
04.1	<table><tr><th>Group</th><th>Classification for salmon</th></tr><tr><td>Kingdom</td><td></td></tr><tr><td></td><td></td></tr><tr><td></td><td></td></tr><tr><td>Genus</td><td></td></tr><tr><td>Species</td><td></td></tr></table> ignore upper case and italics	1 1 1	AO2 4.6.4

Question	Answers	Mark	AO / Spec. Ref.
04.2	soya plants → salmon → sea lice	1	AO2 4.7.2.1

Question	Answers	Extra information	Mark	AO / Spec. Ref.
04.3	the transfer of energy in the food chain		1	AO1 4.7.2.1

Question	Answers	Extra information	Mark	AO / Spec. Ref.
04.4	breed together the offspring that are most resistant to sea lice		1	AO2 4.6.2.3

4.6.2.3 Selective breeding

Answer 02 · Mark scheme

Question	Answers	Extra information	Mark	AO / Spec. Ref.
04.5	when all offspring are resistant to sea lice		1	AO2 4.6.2.3

Question	Answers	Extra information	Mark	AO / Spec. Ref.
04.6	any **one** from: • salmon grow larger • salmon grow faster • salmon need less food • salmon lose less energy • do not have to remove sea lice • no / less need for pesticides • not off-putting (to consumers / buyers) • (salmon) more likely to be sold / bought • salmon less likely to be damaged / infected • no / less need for antibiotics / medication	allow converse for salmon that have sea lice if clearly stated allow no / less need for insecticides do **not** accept the idea of antibiotics / medication killing sea lice ignore sea lice are not feeding on salmon unqualified	1	AO3 4.6.2.3

Question	Answers	Extra information	Mark	AO / Spec. Ref.
04.7	all the salmon may suffer from the same diseases		1	AO3 4.6.2.3

4.6.2.3 Selective breeding

Answer 02 · Mark scheme

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

Question	Answers	Extra information	Mark	AO / Spec. Ref.
04.8	any **two** from: (GM salmon) • more profit(able) / cost-effective • cost less to feed • grow faster • do not need to be farmed / kept as long • feeds more people	answers must be comparative allow converse for non-GM salmon if clearly stated allow sell for more money / revenue ignore less food unqualified allow can be sold sooner allow sell twice as many (in 3 years) allow grow bigger (in 3 years) allow cheaper to buy salmon ignore reference to sea lice	2	AO3 4.6.2.4

Question	Answers	Extra information	Mark	AO / Spec. Ref.
04.9	to reduce the risk of GM salmon breeding with wild salmon		1	AO3 4.6.2.4

Total Question 4	12

4.6.2.3 Selective breeding

Answer 02 · Examiner comments June 2023 | 8464/B/2F | Original Q4

Question 4 (Low and Standard demand)

04.1 The most common correct answer was ‘kingdom’. Many students had a lack of knowledge of the difference between genus and species and hence frequently had these placed incorrectly in reverse position.

04.2 The majority of students could identify the correct food chain.

04.3 Few students knew what the arrows in a food chain represent, with many ticking ‘the predators in the food chain’.

04.4 Most students could identify the next stage in the process of selective breeding.

04.5 70% of students could identify when the process of selective breeding is finished, but a significant number thought it was finished after one generation have produced offspring.

04.6 The most common correct statements were:

- do not have to remove lice
- more likely to be bought
- not off-putting to customers.

Very few students referenced that antibiotics would not be required or that pesticides were not required.

The health or safety of the consumer being compromised was a common theme of many student responses that did not gain credit. Likewise, salmon are 'healthier' was a common statement that was too vague.

04.7 70% of students could identify a disadvantage of selective breeding.

04.8 Answers needed to be comparative to give an advantage of farming GM salmon instead of non-GM salmon. Many students simply copied the information provided, which is never given credit. For example, ‘The GM salmon **cost less to feed**’ was creditworthy, but an answer stating ‘The GM salmon need 25% less food to get to the same size’ would not be creditworthy since that information was given in the question.

4.6.2.3 Selective breeding

Answer 02 · Examiner comments June 2023 | 8464/B/2F | Original Q4

Other fish farmers have produced genetically modified (GM) salmon.

GM salmon grow large enough to sell in 18 months.

Non-GM salmon grow large enough to sell in 3 years.

GM salmon need 25% less food than non-GM salmon to get to the same size.

0 4 . 8 Suggest **two** advantages of farming GM salmon instead of farming non-GM salmon.
[2 marks]

1 grow large enough to sell in 18 months

2 25% less food than non-GM salmon to get to same size

0 4 . 8 Suggest **two** advantages of farming GM salmon instead of farming non-GM salmon.
[2 marks]

1 Spending less money on food

2 grow quicker so you can sell them quicker

The first response only repeats the information given in the question, therefore no mark was awarded. The second response gained 2 marks for bullet point 2 and bullet point 3.

04.9 70% of students could identify the risk of GM salmon breeding with wild salmon.