AQA GCSE Combined Science - Trilogy | 8464

SPECIFICATION POINT 4.6.2.3

Selective breeding

Past-paper questions

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

Using this booklet

1. Answer the questions in order and show your working.
2. Original question numbers and marks are retained.
3. Print at actual size (100%) for measuring questions.
4. Use the companion answer booklet to check your work.

Name: _____ **Date:** _____

Whole questions are retained for context, so some parts assess other specification points. Current and legacy sources are labelled. Continue on extra paper if needed.

4.6.2.3 Selective breeding

Question 01

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

0 4 A cat breeder noticed that four kittens from one Siamese cat mother had a new blue colour at the tip of their tails.

0 4 . 1 What has caused the new colour to appear?

[1 mark]

Tick (✓) **one** box.

Fertilisation ☐

Mitosis ☐

Mutation ☐

0 4 . 2 The cat breeder wants to use selective breeding so that all new kittens have blue tail tips.

Describe the process of selective breeding the cat breeder could use.

[3 marks]

0 4 . 3 Suggest **one** reason why the cat breeder wants to have all new kittens with the blue tail tips.

[1 mark]

4.6.2.3 Selective breeding

Question 01 · continued

0 4 . 4 Siamese cats can suffer from heart defects.

Why might there be more Siamese cats with heart defects amongst the kittens with blue tail tips?

[1 mark]

Tick (✓) **one** box.

They are clones ☐

They are formed by mitosis ☐

They are formed by sexual reproduction ☐

They are produced by inbreeding ☐

With each pregnancy, the cat breeder expected that:

- 50% of the kittens would be male
- 50% of the kittens would be female.

The sex chromosomes in cats are inherited in the same way as in humans.

The sex chromosomes are X and Y.

0 4 . 5 Give the combination of sex chromosomes present in a male cat and in a female cat.

[1 mark]

Male cat _____

Female cat _____

4.6.2.3 Selective breeding

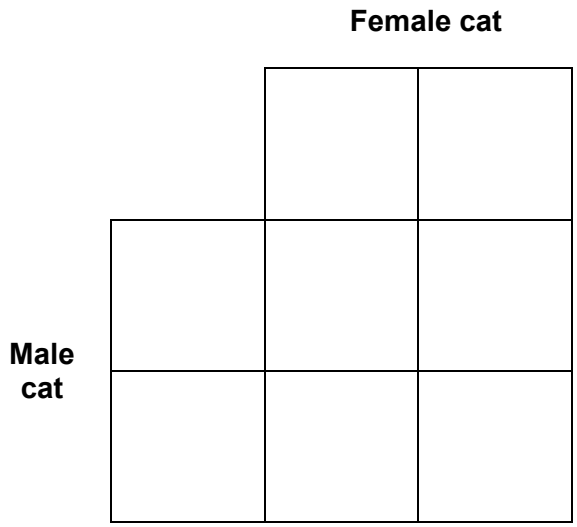
Question 01 · continued

0 4 . 6 The cat breeder expected 50% male kittens and 50% female kittens.

Complete the Punnett square in **Figure 3** to show why.

[2 marks]

Figure 3



0 4 . 7 In the first pregnancy there was one male kitten and three female kittens.

Give the reason why there were **not** two kittens of each sex.

[1 mark]

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4.6.2.3 Selective breeding

Question 02

0 4 Salmon are fish.

A species of salmon has the binomial name *Oncorhynchus keta*.

0 4 . 1 **Table 3** shows the classification for this species of salmon.

Complete **Table 3**.

Choose answers from the box.

[3 marks]

Class	**Domain**	**Genus**	**Kingdom**	**Species**

Table 3

Group	**Classification for salmon**
	Animalia
Phylum	Chordata
Family	Salmonidae
	Oncorhynchus
	keta

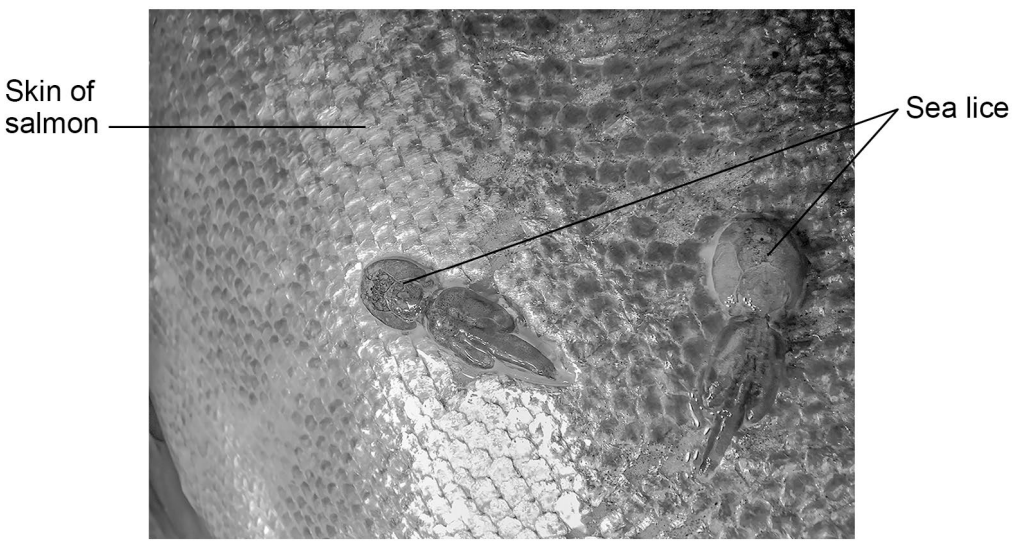
Question 4 continues on the next page

4.6.2.3 Selective breeding

Question 02 · continued

Figure 5 shows sea lice attached to the skin of a salmon.

Figure 5



Sea lice are small animals that feed on the skin and blood of salmon.

On a salmon farm, the salmon are fed with food made from soya plants.

0 4 . 2 Which food chain represents the salmon, sea lice and soya plants?

[1 mark]

Tick (✓) **one** box.

salmon → sea lice → soya plants ☐

sea lice → soya plants → salmon ☐

soya plants → salmon → sea lice ☐

4.6.2.3 Selective breeding

Question 02 · continued

0 4 . 3 What do the arrows in a food chain represent?

[1 mark]

Tick (✓) **one** box.

- The different numbers in the food chain ☐
- The predators in the food chain ☐
- The producers in the food chain ☐
- The transfer of energy in the food chain ☐

Question 4 continues on the next page

4.6.2.3 Selective breeding

Question 02 · continued

Some salmon are more resistant than other salmon to sea lice infections.

Salmon farmers selectively breed salmon.

0 4 . 4 Salmon farmers select salmon that are most resistant to sea lice and breed these salmon together.

What is the next stage in selectively breeding salmon that are resistant to sea lice?

[1 mark]

Tick (✓) **one** box.

- Breed together the offspring that are most resistant to sea lice. ☐
- Kill any offspring that are resistant to sea lice before the lice can attach. ☐
- Remove the gene for resistance to sea lice from the selected salmon. ☐

0 4 . 5 When is the process of selective breeding finished?

[1 mark]

Tick (✓) **one** box.

- After one generation have produced offspring ☐
- When all offspring are resistant to sea lice ☐
- When sea lice are living on all salmon ☐

4.6.2.3 Selective breeding

Question 02 · continued

0 4 . 6 Salmon that do **not** have sea lice are more profitable for the salmon farmer.

Suggest **one** reason why.

[1 mark]

0 4 . 7 What is a **disadvantage** of selectively breeding salmon?

[1 mark]

Tick (✓) **one** box.

All the salmon may suffer from the same diseases. ☐

Fewer sea lice will infect the salmon. ☐

The salmon will have a large variety of genes. ☐

Question 4 continues on the next page

4.6.2.3 Selective breeding

Question 02 · continued

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 _____

_____

2 _____

_____

0 4 . 9 GM salmon are often farmed a long distance from where wild, non-GM salmon live.

What is an advantage of farming GM salmon a long distance from where wild salmon live?

[1 mark]

Tick (✓) **one** box.

To give the GM salmon different conditions to wild salmon ☐

To increase the genetic differences between GM salmon and wild salmon ☐

To reduce the risk of GM salmon breeding with wild salmon ☐

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