AQA GCSE Combined Science - Trilogy | 8464

SPECIFICATION POINT 4.6.4

Classification of living organisms

Past-paper questions

Tier	**Foundation**
Question groups	**5**
Available paper years	**2021–2024**

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.

4.6.4 Classification of living organisms

Question 01

November 2021 | 8464/B/2F | Original Q4

0 4 A fossil was found in rocks. The rocks were formed from mud.

The fossil is of the fungus *Ourasphaira giraldae*.

0 4 . 1 What is the genus of the fungus?

[1 mark]

Tick (✓) **one** box.

- Giraldae ☐
- Ourasphaira ☐
- Ourasphaira giraldae ☐

0 4 . 2 The mud around the fungus did **not** contain oxygen.

Which process did the mud around the fungus prevent?

[1 mark]

Tick (✓) **one** box.

- Decay ☐
- Geological activity ☐
- Photosynthesis ☐

Question 4 continues on the next page

4.6.4 Classification of living organisms

Question 01 · continued

0 4 . 3 The fossilised fungus is estimated to be 890 000 000 years old.

What is 890 000 000 in standard form?

[1 mark]

Tick (✓) **one** box.

- 8.9×10^6 ☐
- 8.9×10^7 ☐
- 8.9×10^8 ☐
- 8.9×10^9 ☐

0 4 . 4 Traditional classification divided organisms into kingdoms.

Who developed the traditional system of classification?

[1 mark]

Tick (✓) **one** box.

- Carl Linnaeus ☐
- Carl Woese ☐
- Charles Darwin ☐

Question 01 · continued

0 4 . 5 More recent classification methods use a three-domain system.

What is the name of the domain the fungus *Ourasphaira giraldae* is classified in?

[1 mark]

Tick (✓) **one** box.

Bacteria ☐

Eukaryota ☐

Plants ☐

0 4 . 6 Why has classification changed over time?

[1 mark]

Tick (✓) **one** box.

Electron microscopes allow more detail to be seen inside cells. ☐

Many more types of organisms have become extinct. ☐

Some fossils are buried so deep that they may never be discovered. ☐

0 4 . 7 The fungus *Ourasphaira giraldae* is now extinct.

Give **two** possible causes of extinction.

[2 marks]

1 _____

_____

2 _____

_____

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4.6.4 Classification of living organisms

Question 02

0 3 The theory of evolution by natural selection was suggested by Charles Darwin in 1859.

Evidence from fossils supports Darwin's theory.

0 3 . 1 What evidence supports the theory of evolution by natural selection?

[1 mark]

Tick (✓) **one** box.

- Knowledge of how DNA controls inheritance ☐
- Knowledge of how the dinosaurs became extinct ☐
- Knowledge of how the Earth was formed ☐
- Knowledge of what causes global warming ☐

Question 02 · continued

0 3 . 2 **Figure 3** shows a fossil fly preserved in amber.

The fossil formed when the amber solidified with the fly trapped inside.

Figure 3



Why has the fly been preserved?

[1 mark]

Tick (✓) **one** box.

The amber has been kept at a constant temperature. ☐

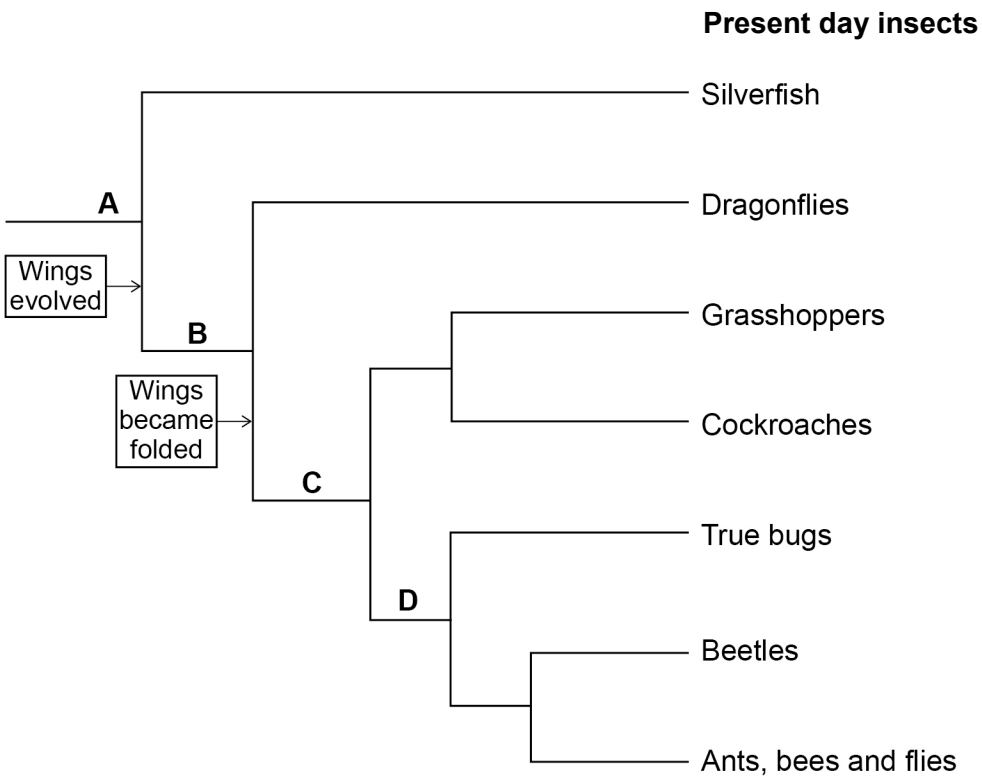
The fly was soft-bodied. ☐

There was no oxygen in the amber. ☐

Question 02 · continued

Figure 4 shows a simplified evolutionary tree for the insect group of animals.

Figure 4



0 3 . 3 Which present day insect evolved first?

[1 mark]

0 3 . 4 Animals **A**, **B**, **C** and **D** were ancestors of present day insects.

Which animal is the most recent ancestor of both grasshoppers and beetles?

[1 mark]

Tick (✓) **one** box.

A ☐ **B** ☐ **C** ☐ **D** ☐

0 3 . 5 Name the group of present day insects which have wings which do **not** fold.

[1 mark]

0 3 . 6 The house fly has the binomial name *Musca domestica*.

Table 2 shows part of the classification for the house fly.

Table 2

Classification group	Name
Kingdom	
Phylum	arthropoda
Class	
Order	diptera
Family	muscidae
Genus	
Species	

Complete **Table 2**.

Choose answers from the box.

[3 marks]

animalia	**domestica**	**Musca**	**insecta**

Question 3 continues on the next page

4.6.4 Classification of living organisms

Question 02 · continued

0 3 . 7 Carl Woese proposed the 'three-domain system' of classification.

Which domain are insects in?

[1 mark]

Tick (✓) **one** box.

Archaea ☐

Eukaryota ☐

Prokaryota ☐

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4.6.4 Classification of living organisms

Question 03

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

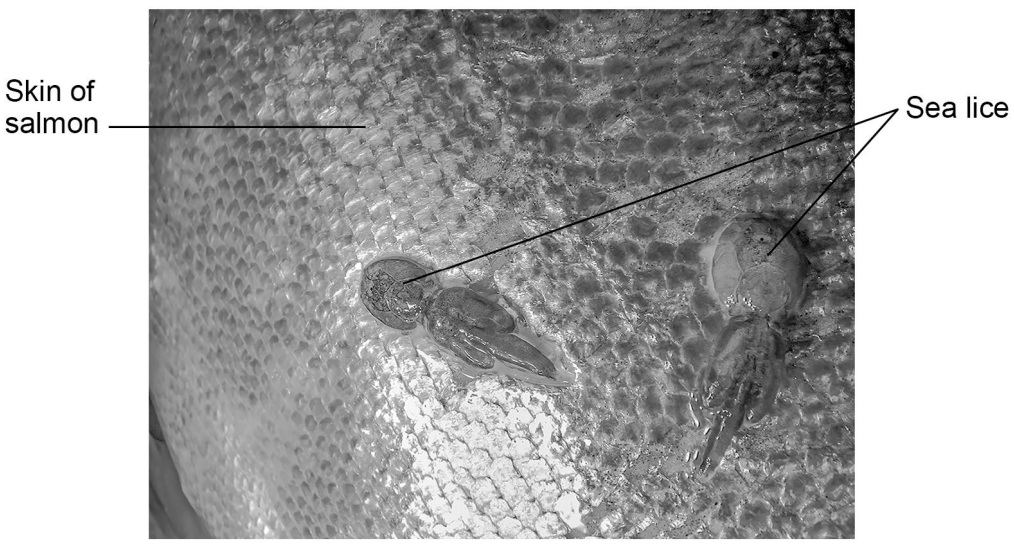
Table 3

Group	Classification for salmon
	Animalia
Phylum	Chordata
Family	Salmonidae
	Oncorhynchus
	keta

Question 4 continues on the next page

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 ☐

4.6.4 Classification of living organisms

Question 03 · 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

Question 03 · 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 ☐

Question 03 · 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

Question 03 · 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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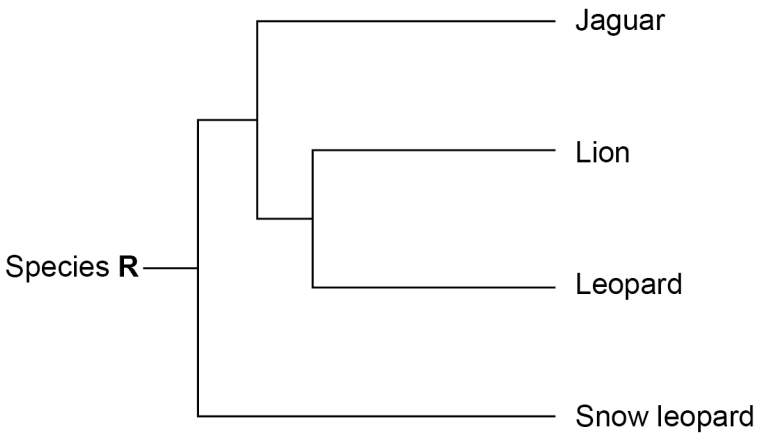
4.6.4 Classification of living organisms

Question 04

June 2024 | 8464/B/2F | Original Q4

0 4 **Figure 8** shows an evolutionary tree.

Figure 8



0 4 . 1 Which species in **Figure 8** is most closely related to lions?

[1 mark]

Tick (✓) **one** box.

Jaguar ☐

Leopard ☐

Snow leopard ☐

0 4 . 2 Tigers are more closely related to snow leopards than to jaguars.

Draw a line on **Figure 8** to show the evolution of tigers.

Label the line 'Tiger'.

[1 mark]

Question 04 · continued

0 4 . 3 What is represented by species **R** on **Figure 8**?

[1 mark]

Tick (✓) **one** box.

A species recently evolved from jaguars. ☐

A species that may evolve in the future. ☐

A species that the other species evolved from. ☐

0 4 . 4 Complete the sentence.

Choose the answer from the box.

[1 mark]

classification	**homeostasis**	**natural selection**

Evolution occurs by the process of _____.

0 4 . 5 Species can become extinct.

Give **two** possible causes of extinction.

[2 marks]

1 _____

_____

2 _____

_____

Question 4 continues on the next page

Question 04 · continued

0 4 . 6 Fossils are used to study the evolution of some species.

Suggest **one** reason why fossils are used to study evolution.

[1 mark]

Some bacteria have evolved to be resistant to penicillin.

Penicillin is an antibiotic.

0 4 . 7 How has the process of evolution produced bacteria that are resistant to penicillin?

Write the stages, **A**, **B**, **C**, **D** and **E** in the correct order.

The first stage has been completed for you.

[3 marks]

A The bacteria with mutations are more likely to survive.

B The population of bacteria is exposed to penicillin.

C The mutation for resistance to penicillin is passed on to offspring.

D Variation in the population of bacteria is caused by mutation.

E The surviving bacteria reproduce.

D → _____ → _____ → _____ → _____

Question 04 · continued

0 4 . 8 New antibiotics are **not** likely to control the spread of bacteria that are resistant to antibiotics.

What are **two** reasons why?

[2 marks]

Tick (✓) **two** boxes.

- Antibiotics kill all types of bacteria. ☐
- Antibiotic resistant bacteria will continue to evolve. ☐
- Bacteria reproduce very rapidly. ☐
- New antibiotics are cheap to produce. ☐
- Testing new antibiotics is quick. ☐

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Turn over for the next question

4.6.4 Classification of living organisms

Question 05

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

0 6 Potatoes are a food crop.

0 6 . 1 Potato plants are classified as eukaryota.

What type of classification group is eukaryota?

[1 mark]

Tick (✓) **one** box.

- Class ☐
- Domain ☐
- Kingdom ☐
- Phylum ☐

0 6 . 2 Potato plants can reproduce by asexual reproduction.

Which statement is true for asexual reproduction?

[1 mark]

Tick (✓) **one** box.

- Meiosis occurs. ☐
- Offspring are genetically identical. ☐
- Pollen and egg cells are produced. ☐

Question 6 continues on the next page

4.6.4 Classification of living organisms

Question 05 · continued

0 6 . 3 Flowers of potato plants contain gametes for sexual reproduction.

How is a gamete different from other cells in a potato plant?

[1 mark]

Tick (✓) **one** box.

A gamete contains one-quarter of the number of chromosomes. ☐

A gamete contains half of the number of chromosomes. ☐

A gamete contains double the number of chromosomes. ☐

0 6 . 4 Plants in the same genus as potatoes have been studied by scientists.

Describe **one** way a new plant species could be identified as being in the same genus as potatoes.

[1 mark]

4.6.4 Classification of living organisms

Question 05 · continued

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]

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