

GCSE Combined Science: Trilogy

Worksheet: Classification of living organisms

TIME 30 min	TOTAL 27 marks	CALCULATOR Allowed	DIFFICULTY Easy, Medium
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Topics: Classification of living organisms

NAME	CLASS	DATE
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- Use black ink or black ball-point pen. Pencil should only be used for drawing.
- Answer all questions in the spaces provided.
- In all calculations, show clearly how you work out your answer.
- The marks for questions are shown in brackets.

0 1

Carl Linnaeus developed a system for classifying living things. Table 1 shows the groups in the Linnaean system, from the largest group to the smallest.

Table 1

Group
kingdom
phylum
.....
order
.....
genus
species

0 1 . 1

Name the **two** groups missing from Table 1.

.....

.....

.....

.....

[2 marks]

0 1 . 2

The domestic cat has the scientific name *Felis catus*.

What is the genus of the domestic cat?

.....

.....

.....

.....

[1 mark]

0 1 . 3

What is the name of the system of naming organisms using their genus and species?

Tick (✓) **one** box.

Binomial system

☐

Gene theory

☐

Three-domain system

☐

Evolutionary tree

☐

[1 mark]

0 2

Carl Linnaeus developed a system for classifying living things into groups.

0 2 . 1

Write these groups in order, from the largest group to the smallest.

class · family · genus · kingdom · order · phylum · species

.....

.....

.....

.....

[2 marks]

0 2 . 2

Complete the sentence.

In the binomial system, the first part of an organism's name is its
and the second part is its

.....

.....

.....

.....

[2 marks]

0 2 . 3

Which scientist developed the three-domain system of classification?

Tick (✓) **one** box.

Charles Darwin

☐

Carl Linnaeus

☐

Gregor Mendel

☐

Carl Woese

☐

[1 mark]

0 3

In 1990, Carl Woese proposed a new system of classification called the three-domain system.

0 3 . 1

Which domain contains fungi, plants and animals?

.....

.....

.....

.....
[1 mark]

0 3 . 2

One domain contains primitive bacteria that usually live in extreme environments.
Name this domain.

.....

.....

.....

.....
[1 mark]

0 3 . 3

The three-domain system was developed using evidence from chemical analysis.
Explain why this evidence led to a change in the classification system.

.....

.....

.....

.....

[2 marks]

0 3 . 4

Explain how improvements in microscopes affected the classification of living things.

.....

.....

.....

.....

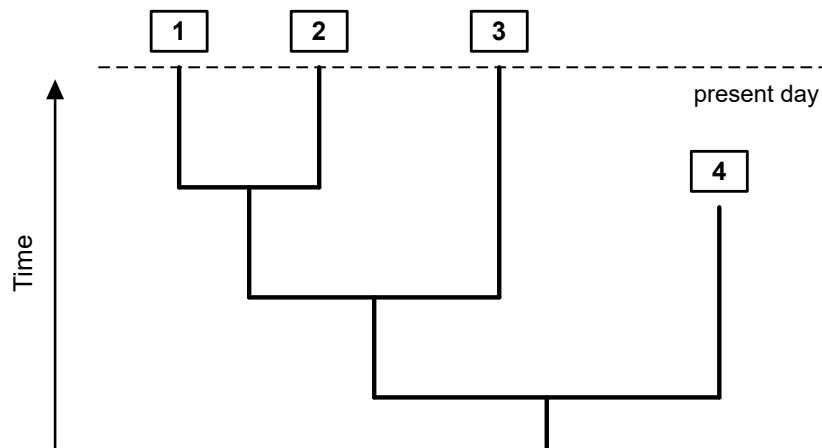
[2 marks]

0 4

Figure 1 shows an evolutionary tree for four species, A, B, C and D. The names of the species have been replaced by the numbers 1 to 4.

- Species A is extinct.
- Species B and species C shared a common ancestor more recently than any other two species.
- Species D is more closely related to species C than to species A.

Figure 1



0 4 . 1

Use the information to identify the species in boxes 1, 2, 3 and 4.

.....

.....

.....

.....

.....

.....

[3 marks]

0 4 . 2

What does each branch point on an evolutionary tree represent?

.....

.....

[1 mark]

0 4 . 3

Explain why scientists used fossil data to place species A on the tree, rather than the type of data used for species B, C and D.

.....

.....

[1 mark]

0 4 . 4

Species C and species D look very similar. Suggest why.

.....

.....

[1 mark]

0 5

Scientists compared the sequence of amino acids in the same part of one protein in four species of lizard, A, B, C and D. Table 2 shows the sequences. Each letter stands for one type of amino acid. The numbers in the top row show the position of each amino acid in the sequence.

Table 2

Species	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
A	T	Q	N	P	T	R	M	E	R	H	S	E	P	I	L
B	T	Q	N	L	T	R	M	E	R	H	S	E	P	I	L
C	Y	Q	N	P	T	N	M	V	G	H	S	I	P	I	L
D	T	Q	N	P	T	R	M	E	R	H	S	E	S	I	F

0 5 . 1

Count the number of differences between the amino acid sequence of species B and the sequence of each of the other species.
Give your answers in the order: species A, species C, species D.

.....

.....

.....

.....

Differences (A, C, D) =

[2 marks]

0 5 . 2

Which species is most closely related to species B? Give a reason for your answer.

.....

.....

.....

.....

[2 marks]

0 5 . 3

Explain why the number of differences in the amino acid sequence of a protein shows how closely related two species are.

.....

.....

.....

.....

[2 marks]

END OF QUESTIONS

Original practice questions written to match the specification. Not produced by, affiliated with or endorsed by AQA.

Mark scheme

GCSE Combined Science: Trilogy · Worksheet: Classification of living organisms · 27 marks

Question 1 (4 marks)

01.1 [2 marks]

Answer: Class; family

- class (between phylum and order) (1)
 - family (between order and genus) (1)
-

01.2 [1 mark]

Answer: *Felis*

- *Felis* (1)
-

01.3 [1 mark]

Correct: Binomial system

Question 2 (5 marks)

02.1 [2 marks]

Answer: kingdom, phylum, class, order, family, genus, species

- kingdom, phylum, class at the start (in that order) (1)
- order, family, genus, species at the end (in that order) (1)

Notes: All seven in the correct order scores 2 marks.

02.2 [2 marks]

Answer: genus; species

- genus (1)
 - species (1)
-

02.3 [1 mark]

Correct: Carl Woese

Question 3 (6 marks)

03.1 [1 mark]

Answer: Eukaryota

- eukaryota / eukaryotes (1)

03.2 [1 mark]

Answer: Archaea

- archaea (1)

03.3 [2 marks]

- chemical analysis showed that archaea are very different from (true) bacteria / organisms that look similar may not be closely related (1)
- (so) they were placed in a separate group / domain / the old system did not show how closely organisms are related (1)

03.4 [2 marks]

- better microscopes showed the internal structures / details of cells (1)
- (so) organisms could be grouped using more features / new classification models were proposed / some organisms were reclassified (1)

Question 4 (6 marks)

04.1 [3 marks]

Answer: 1 and 2: B and C (either order); 3: D; 4: A

- box 4: A (the branch that does not reach the present day) (1)
- box 3: D (1)
- boxes 1 and 2: B and C, in either order (1)

04.2 [1 mark]

- a common ancestor (of the species on the branches above it) (1)

04.3 [1 mark]

- A is extinct, so there are no living organisms to study (e.g. no DNA / current classification data), only fossils (1)

04.4 [1 mark]

- they share a fairly recent common ancestor / they live in similar environments, so natural selection has favoured similar characteristics (1)
-

Question 5 (6 marks)

05.1 [2 marks]

Answer: 1, 6, 3

- any two correct from: A = 1, C = 6, D = 3 (1)
- all three correct (1)

05.2 [2 marks]

- species A (1)
- it has the fewest differences (1) from species B, so they share the most recent common ancestor (1)

Notes: Allow ECF from the previous part.

05.3 [2 marks]

- the sequence of amino acids in a protein is controlled by the sequence of bases in the gene (DNA) (1)
 - closely related species share a more recent common ancestor, so there has been less time for mutations / differences to build up (1)
-