

GCSE Combined Science: Trilogy

Worksheet: Fossils

TIME 35 min	TOTAL 31 marks	CALCULATOR Allowed	DIFFICULTY Easy, Medium
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Topics: Fossils

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

Fossils are the 'remains' of organisms from millions of years ago, which are found in rocks.

0 1 . 1

Which **two** of the following are ways in which fossils can form?

Tick (✓) **two** boxes.

An organism is completely broken down by decomposers ☐

Parts of an organism are replaced by minerals as they decay ☐

Parts of an organism do not decay because one or more of the conditions needed for decay are absent ☐

The organism's DNA is copied into the rock ☐

[2 marks]

0 1 . 2

Some fossils are preserved traces of organisms rather than parts of the organisms themselves.

Give **one** example of a preserved trace of an organism.

.....

.....

.....

[1 mark]

0 1 . 3

Scientists cannot be certain about how life began on Earth.
Give **two** reasons why.

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.....

[2 marks]

0 2

Fossils give scientists evidence about organisms that lived millions of years ago.

0 2 . 1

The statements describe how the fossil of a small reptile formed. They are in the wrong order.

- A** Erosion wore away the rock above, exposing the fossil.
 - B** The reptile died and was quickly buried in mud.
 - C** Minerals gradually replaced the bones as they decayed.
 - D** The soft parts of the body decayed, leaving the bones.
- Write the letters in the correct order.

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[2 marks]

Table 1

Fossil	How it was formed (P, Q or R)
A woolly mammoth found in frozen ground, with its skin still present	
The burrow of a worm, preserved in sandstone	
A tree trunk that has turned to stone	

Table 1 shows three fossils. Complete Table 1 by writing **P**, **Q** or **R** to show how each fossil was formed.

P Parts of the organism did not decay, because one or more of the conditions needed for decay were absent.

Q Parts of the organism were replaced by minerals as they decayed.

R The fossil is a preserved trace of the organism.

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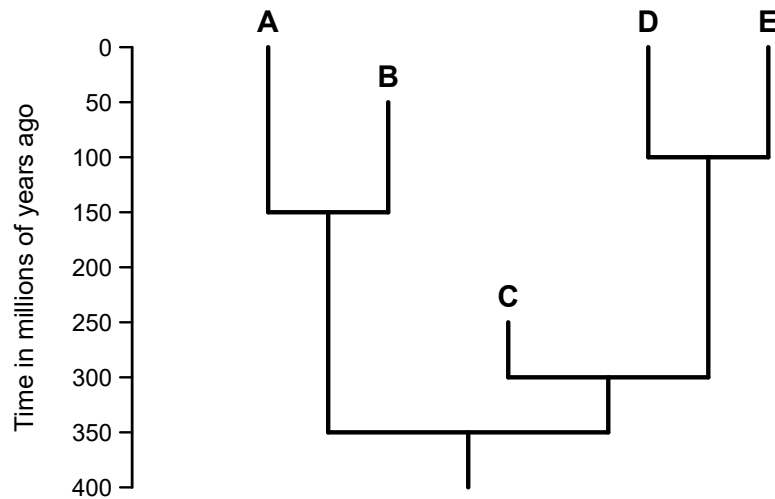
[3 marks]

0 3

Figure 1 shows an evolutionary tree for five species, A to E. Scientists drew the tree using fossils and evidence from living species.

A line that ends below the present day (0) shows a species that became extinct.

Figure 1



0 3 . 1

Which species became extinct most recently?

.....

.....

.....

[1 mark]

0 3 . 2

How many millions of years ago did species C become extinct?

.....

.....

.....

Time = million years ago

[1 mark]

0 3 . 3

Which **two** species shared a common ancestor most recently?
Give a reason for your answer.

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[2 marks]

0 3 . 4

Species B and C are known only from fossils.
Suggest why scientists are less certain about the positions of B and C on the tree than about the positions of A, D and E.

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[2 marks]

0 4

Scientists found three fossils at different sites:

- fossil A: an insect preserved in amber (hardened tree resin)
- fossil B: the bones of a mammal that have turned to rock
- fossil C: the footprints of a dinosaur in mudstone.

0 4 . 1

The insect in fossil A did not decay.
Explain why.

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[2 marks]

0 4 . 2

Describe how fossil B was formed.

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[2 marks]

0 4 . 3

Fossil C is a trace fossil.
Suggest **one** thing scientists could find out about the dinosaur from its footprints.

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[1 mark]

0 4 . 4

Fossils can show how much or how little organisms have changed as life developed on Earth.
Explain how.

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[2 marks]

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0 5

Layers of sediment built up on a lake bed at a steady rate of 1 cm every 1000 years and slowly turned into rock. Scientists found a fossil snail shell 30 m below the top of these rock layers.

1 m = 100 cm

0 5 . 1

Calculate the age of the fossil snail shell.

Give your answer in millions of years.

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Age = million years

[3 marks]

0 5 . 2

Give **one** reason why the age calculated may not be accurate.

.....

.....

[1 mark]

0 6

Layers of sediment built up on a sea bed at a steady rate of 1 cm every 1000 years and slowly turned into rock. Scientists found a fossil shark tooth 170 m below the top of these rock layers.
1 m = 100 cm

0 6 . 1

Calculate the age of the fossil shark tooth.
Give your answer in millions of years.

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Age = million years

[3 marks]

0 6 . 2

Give **one** reason why the age calculated may not be accurate.

.....

.....

[1 mark]

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: Fossils · 31 marks

Question 1 (5 marks)

01.1 [2 marks]

Correct: Parts of an organism are replaced by minerals as they decay; Parts of an organism do not decay because one or more of the conditions needed for decay are absent

01.2 [1 mark]

Answer: Footprints, burrows or rootlet traces

- footprints / burrows / rootlet traces (1)
-

01.3 [2 marks]

- many early forms of life were soft-bodied, so they left few traces / fossils (1)
 - (most of) the traces that did form have been destroyed by geological activity (1)
-

Question 2 (5 marks)

02.1 [2 marks]

Answer: B, D, C, A

- B first and A last (1)
- D before C: B, D, C, A (1)

Notes: B, D, C, A scores 2 marks.

02.2 [3 marks]

Answer: P; R; Q

- woolly mammoth: P (1)
 - worm burrow: R (1)
 - tree trunk: Q (1)
-

Question 3 (6 marks)

03.1 [1 mark]

Answer: B

- B (1)

03.2 [1 mark]

Answer: 250 million years ago

- 250 (1)

03.3 [2 marks]

- D and E (1)
- their branches join most recently / their common ancestor lived (100 million years ago), more recently than for any other pair (1)

03.4 [2 marks]

- fossils may be incomplete / only the hard parts are preserved (1)
- the DNA of extinct species usually cannot be compared (1)
- for living species, classification data (e.g. DNA / biochemical evidence) can be used (1)
- the fossil record has gaps / fossil dates are estimates (1)

Any 2 of the points above.

Question 4 (7 marks)

04.1 [2 marks]

- the amber prevented oxygen / air / water reaching the insect (1)
- (so) microorganisms / decomposers could not survive / decay the insect / the conditions needed for decay were absent (1)

04.2 [2 marks]

- the bones were buried (in sediment) and slowly decayed (1)
- (and were) replaced by minerals (which formed rock) (1)

04.3 [1 mark]

- its size / mass (1)
- whether it walked on two legs or four legs (1)
- how fast it moved (from the length of its stride) (1)
- whether it lived in groups (from several sets of tracks) (1)

Any 1 of the points above.

04.4 [2 marks]

- compare fossils from rocks of different ages (1)
- (with each other or with) living species, to see how similar / different their structures are (1)

Question 5 (4 marks)

05.1 [3 marks]

Answer: 3 million years

- $30\text{ m} = 3000\text{ cm}$ (1)
- $3000 \div 1 = 3000\text{ thousand years} / 3\,000\,000\text{ years}$ (1)
- 3 (million years) (1)

Notes: An answer of 3 scores 3 marks. Allow 1 mark for an answer that uses the correct method but does not convert metres to centimetres.

05.2 [1 mark]

- the rate at which the sediment built up may not have been constant (1)
- some layers may have been worn away / eroded (1)
- the layers may have been squashed / compressed as they turned into rock (1)
- the layers may have been disturbed / folded by geological activity (1)

Any 1 of the points above.

Question 6 (4 marks)

06.1 [3 marks]

Answer: 17 million years

- $170\text{ m} = 17\,000\text{ cm}$ (1)
- $17\,000 \div 1 = 17\,000\text{ thousand years} / 17\,000\,000\text{ years}$ (1)
- 17 (million years) (1)

Notes: An answer of 17 scores 3 marks. Allow 1 mark for an answer that uses the correct method but does not convert metres to centimetres.

06.2 [1 mark]

- the rate at which the sediment built up may not have been constant (1)
- some layers may have been worn away / eroded (1)
- the layers may have been squashed / compressed as they turned into rock (1)
- the layers may have been disturbed / folded by geological activity (1)

Any 1 of the points above.
