AQA GCSE Biology | 8461

SPECIFICATION POINT 4.6.3.4

Evidence for evolution

Past-paper questions

Tier	**Foundation**
Question groups	**25**
Available paper years	**2007–2025**

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.

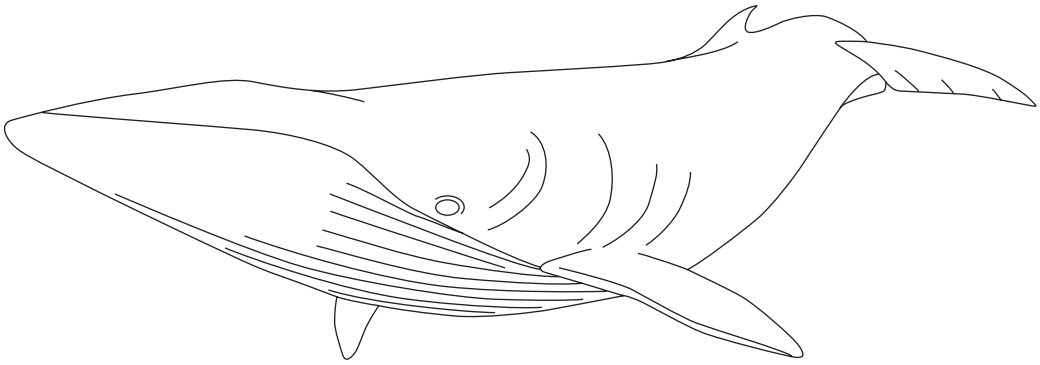
4.6.3.4 Evidence for evolution

Question 01

January 2007 | BLY1F | Original Q1 | Legacy

1 (a) **Figure 1** shows a minke whale. Whales live in the sea.

Figure 1



Write down **two** ways in which the body of the whale is adapted for swimming.

1 .....

.....

2 .....

.....

(2 marks)

(b) **Figure 2** shows the skeleton of a minke whale.

Figure 2

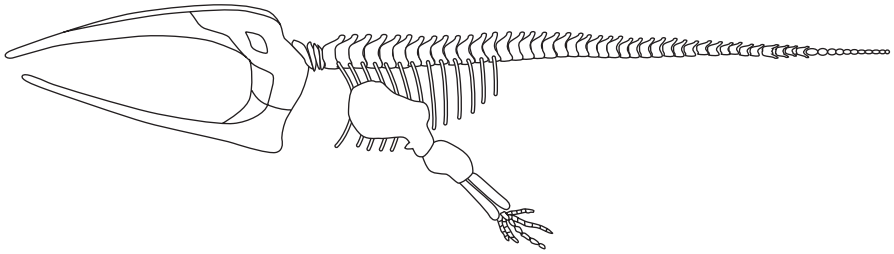
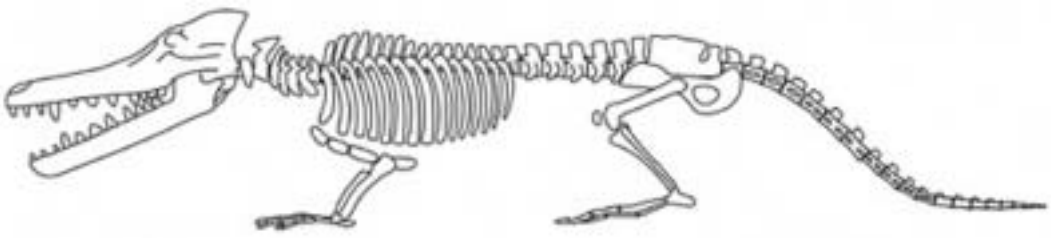


Figure 3 shows the fossil skeleton of an extinct whale.

Figure 3



4.6.3.4 Evidence for evolution

Question 01 · continued

BLANK

(i) Apart from size, give **two** differences between the skeleton of the minke whale and the fossil skeleton of the extinct whale.

1 .....

.....

2 .....

.....

(2 marks)

(ii) In each of the sentences below, draw a ring around the correct answer.

Life on Earth first developed more than three [billion / million / thousand] years ago.

Fossils [disprove / give evidence for / prove] the theory of evolution.

(2 marks)

6

4.6.3.4 Evidence for evolution

Question 02

June 2007 | BLY1B | Original Q8 | Legacy

QUESTION EIGHT

One theory of evolution states that all different species of living organisms alive today have evolved from much simpler life forms. These simpler life forms first appeared more than three billion years ago.

The remains of extinct animals and plants may form fossils that can be found in rocks.

Fossils are studied to find out how present-day species have changed from earlier species.

8A The presence of fossils supports the theory of evolution because . . .

1 fossil organisms are found in different layers of rocks.

2 fossil organisms have features in common with present-day organisms.

3 present-day organisms have evolved from fossil organisms.

4 adaptation to the environment by fossil organisms caused the development of new species.

8B Which of the following is **not** a cause of extinction?

1 changes in the environment

2 mutation

3 new diseases

4 new predators

8C Darwin's theory of evolution via natural selection was only gradually accepted because . . .

1 books were expensive.

2 Darwin was not a scientist.

3 Lamark had a better theory.

4 the causes of variation were not known at that time.

4.6.3.4 Evidence for evolution

8D Scientists are uncertain about the origin of life on Earth because . . .

1 fossils last for only a few million years.

2 humans evolved later than most other organisms.

3 new competitors caused the extinction of the earliest organisms.

4 the earliest organisms had soft bodies.

Turn over for the next question

4.6.3.4 Evidence for evolution

Question 03

November 2007 | BLY1B | Original Q8 | Legacy

QUESTION EIGHT

Rabbits and hares are closely related species.

They are thought to have descended from a common ancestor that is now extinct.

8A Extinction may be caused by . . .

1 an increase in variation.

2 a lack of new competitors.

3 fossilisation.

4 changes in the environment.

8B The evidence that rabbits and hares have evolved from a common ancestor would be shown by . . .

1 comparing modern rabbits and hares with other related species.

2 studying the fossil record of rabbits and hares.

3 studying the fossils of predators of rabbits and hares.

4 comparing the behaviour of rabbits and hares.

8C Rabbits and hares both feed on plants and have teeth adapted for this.

Which one of the following is **not** a possible factor for the development of the specialised teeth of rabbits and hares?

1 adaptation to the environment

2 changes in the environment

3 evolution of predators

4 natural selection

8D What is a mutation?

1 a change in the physical appearance of an organism

2 a change in a gene

3 a form of natural selection

4 a change in the environment

4.6.3.4 Evidence for evolution

Question 04

March 2008 | BLY1BP | Original Q8 | Legacy

QUESTION EIGHT

Darwin and Lamarck were two scientists who had different ideas about how animals and plants have changed over time.

8A The idea that animals and plants have changed over millions of years is called . . .

1 adaptation.

2 mutation.

3 evolution.

4 extinction.

8B New explanations about changes in animals and plants are called . . .

1 observations.

2 hypotheses.

3 evidence.

4 issues.

8C In Darwin's and Lamarck's lifetimes, many other scientists did not believe their explanations because of lack of . . .

1 bias.

2 hypotheses.

3 evidence.

4 issues.

8D Most scientists now accept Darwin's explanation because of the discovery of fossils.

This makes his explanation more . . .

1 accurate.

2 valid.

3 theoretical.

4 biased.

4.6.3.4 Evidence for evolution

Question 05

November 2008 | BLY1BP | Original Q5 | Legacy

QUESTION FIVE

This question is about Darwin's and Lamarck's theories of evolution.

Match statements, **A**, **B**, **C** and **D**, with the numbers **1–4** in the table.

A observed that all species change over time

B had sufficient evidence to prove evolution

C thought that natural selection operated on variations present at birth

D thought that the changes that happen during an organism's lifetime are inherited by their offspring

1	only Darwin
2	only Lamarck
3	Darwin and Lamarck
4	neither Darwin nor Lamarck

4.6.3.4 Evidence for evolution

Question 06

November 2008 | BLY1BP | Original Q8 | Legacy

QUESTION EIGHT

All species of living organisms have evolved from simple life forms.

8A There is very little evidence for the evolution of the earliest life forms.

This is because the remains of most early life forms . . .

1 have been destroyed by geological activity.

2 are buried under deep layers of rock.

3 are under the sea.

4 are too small to survive.

8B Scientists think that the earliest life forms first appeared on Earth . . .

1 about 1 billion years ago.

2 about 3 billion years ago.

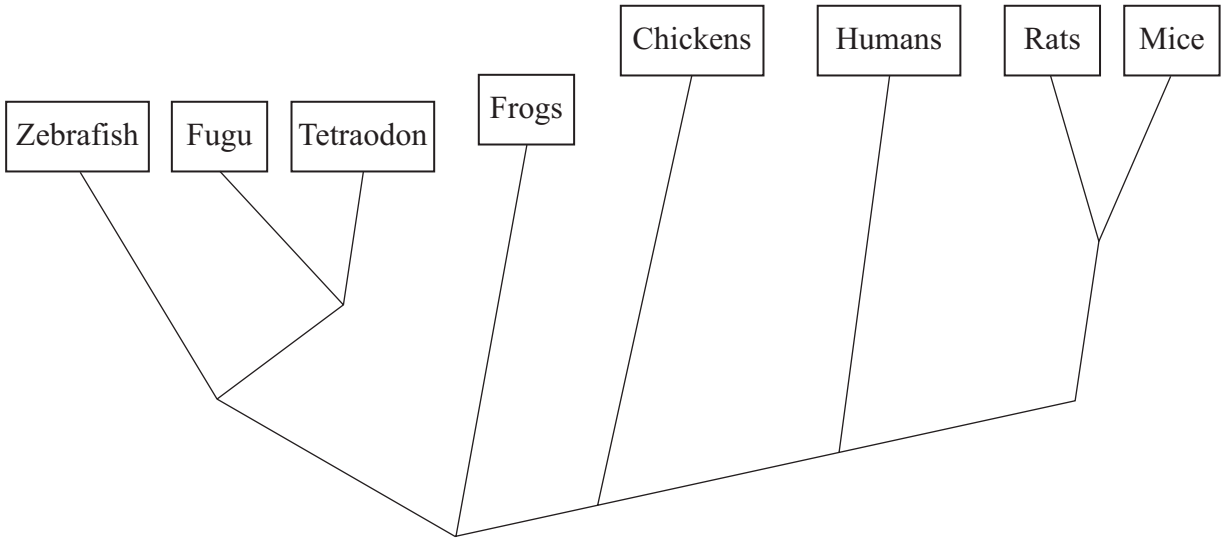
3 about 10 billion years ago.

4 about 30 billion years ago.

4.6.3.4 Evidence for evolution

Question 06 · continued

The diagram shows an evolutionary tree.



8C The evolutionary tree represents . . .

1 facts about evolution.

2 hearsay about evolution.

3 predictions about evolution.

4 a guess about evolution.

8D Differences between the rats and mice are mainly due to . . .

1 their environment.

2 their genes.

3 their different diet.

4 their ability to reproduce quickly.

4.6.3.4 Evidence for evolution

Question 07

January 2009 | BLY1F | Original Q4 | Legacy

4 Animals have adaptations that enable them to survive.

4 (a) The photograph shows an echidna.



© Noeline Kelly/Corbis

The echidna has pointed spines on its back.

Explain how these spines might help the echidna to survive.

.....

.....

.....

.....

.....

(2 marks)

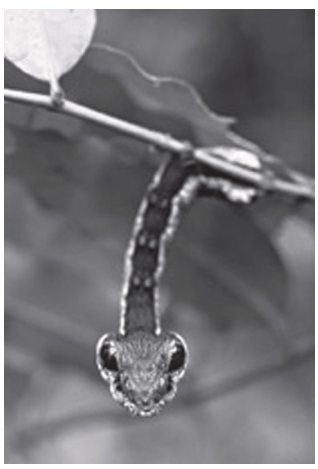
Question 4 continues on the next page

4.6.3.4 Evidence for evolution

Question 07 · continued

for mark

4 (b) The photograph shows a caterpillar.



© S.J. Krasemann / Peter Arnold / Still Pictures

Explain how the caterpillar's appearance might help it to survive.

.....

.....

.....

.....

.....

(2 marks)

4.6.3.4 Evidence for evolution

Question 07 · continued

for mark

4 (c) Draw a ring around the correct answer to complete each sentence.

4 (c) (i) Evolution can be explained by a theory called

genetic engineering
mutation
natural selection

.

(1 mark)

4 (c) (ii) This theory was suggested by a scientist called Charles

Darwin
Lamarck
Semmelweiss

.

(1 mark)

4 (c) (iii) This scientist said that all living things have evolved from

monkeys
dinosaurs
simple life forms

.

(1 mark)

4 (d) Many religious people oppose the theory of evolution.

Give **one** reason why.

.....

.....

(1 mark)

8

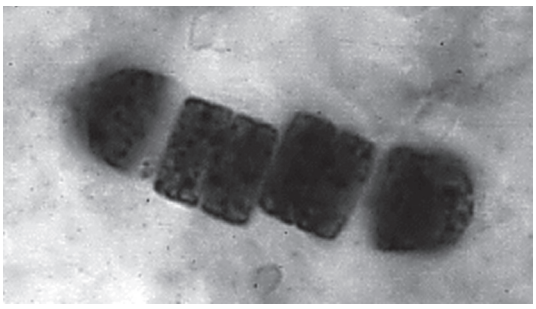
4.6.3.4 Evidence for evolution

Question 08

March 2009 | BLY1BP | Original Q6 | Legacy

QUESTION SIX

The photograph shows a fossil which was formed 3 billion years ago.



J.W. Schopf, University of California, *www.ucmp.berkeley.edu*

6A There were probably other types of organism in the area when this fossil was being formed.

Why did these other organisms **not** become fossils?

1 They could move very quickly.

2 They had soft bodies.

3 They evolved.

4 They became extinct.

6B Only a few rocks contain fossils that are more than 3 billion years old.

This is because . . .

1 many fossils have been destroyed.

2 fossils only last for 3 billion years.

3 most of the Earth's rocks are under the oceans.

4 the Earth was created 3 billion years ago.

4.6.3.4 Evidence for evolution

6C The species that formed this fossil could have died out because . . .

1 it had no method of reproduction.

2 it was crushed by rocks.

3 its ancestors had not become fossils.

4 its environment changed.

6D The theory of evolution states that all living things . . .

1 have evolved from simple life forms.

2 will become extinct.

3 are genetically different.

4 evolved from apes.

Turn over for the next question

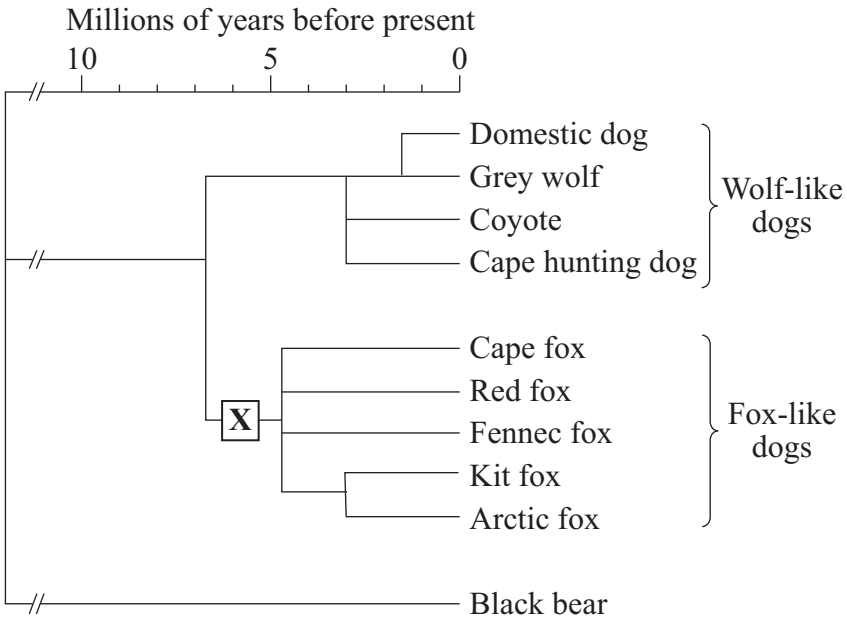
4.6.3.4 Evidence for evolution

Question 09

November 2009 | BLY1BP | Original Q6 | Legacy

QUESTION SIX

The evolutionary tree shows how different species of dog have evolved.



6A How many million years ago did the domestic dog become a separate species?

1 1.6

2 3.9

3 6.8

4 10

4.6.3.4 Evidence for evolution

Question 09 · continued November 2009 | BLY1BP | Original Q6 | Legacy

6B Which animal is most closely related to the Arctic Fox?

1 Black bear

2 Kit fox

3 Cape fox

4 Fennec fox

6C The letter **X** in the diagram refers to . . .

1 an extinct animal that had characteristics similar to those of the fox-like dogs.

2 a living animal that is a cross between a fox and a dog.

3 an extinct animal with characteristics similar to a domestic dog.

4 an endangered species.

6D One reason why Darwin's theory of evolution was only gradually accepted was that . . .

1 natural selection had not been discovered.

2 there were no fossils.

3 it went against the idea that God made all of the animals and plants.

4 Darwin had no evidence for evolution.

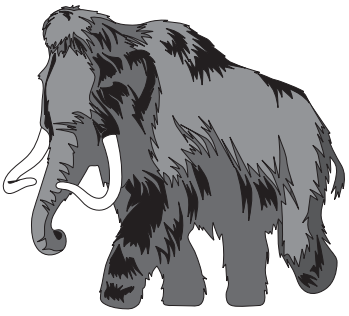
4.6.3.4 Evidence for evolution

Question 10

November 2009 | BLY1BP | Original Q8 | Legacy

QUESTION EIGHT

Woolly mammoths are extinct mammals that are related to modern elephants.



8A There are several possible reasons for the extinction of the woolly mammoth.

Which one of these was the most likely cause of their extinction?

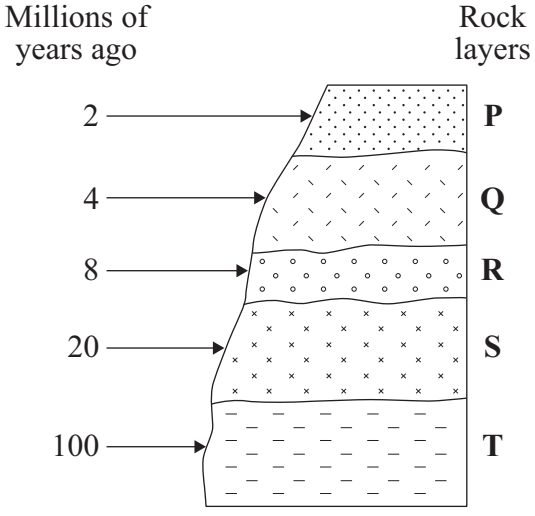
1 continents moving apart

2 an increase in the number of plant species

3 formation of new mountain ranges

4 an increase in the temperature of the Earth

The diagram shows the rocks in a cliff, which were exposed when other rocks wore away.
The times when these rocks were formed are shown.



4.6.3.4 Evidence for evolution

Question 10 · continued November 2009 | BLY1BP | Original Q8 | Legacy

8B Woolly mammoths lived on Earth between 4.8 million years ago and 4 thousand years ago.

In which layers of rock could woolly mammoth fossils be found?

1 **T** and **S** only

2 **Q** only

3 **R**, **S** and **T** only

4 **P** and **Q** only

8C Living things are thought to have developed over 3 billion years ago. We cannot be sure what these living things looked like.

This is because . . .

1 no rocks were being formed 3 billion years ago, so there are no fossils.

2 geological activity has destroyed many of the fossils.

3 there are no records because humans had not evolved then.

4 scientists are unable to agree on their appearance.

8D Recently, a pregnant female woolly mammoth was discovered preserved in ice. The cells of this mammoth are still in good condition. Scientists plan to transfer the nucleus from a mammoth skin cell into an elephant egg cell from which the nucleus has been removed. After the cell is given an electric shock, it will be transferred to the womb of a female elephant.

What term is used to describe this process?

1 tissue culture

2 sexual reproduction

3 adult cell cloning

4 taking cuttings

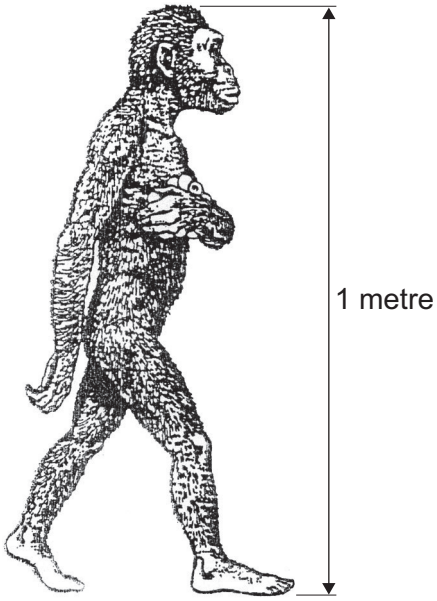
4.6.3.4 Evidence for evolution

Question 11

June 2010 | BLY1BP | Original Q6 | Legacy

QUESTION SIX

The drawing shows what we think an extinct human-like animal looked like. The animal has been nicknamed 'Lucy'.



6A There are many differences between Lucy and modern humans.

One difference is that modern humans have . . .

1 shorter legs.

2 a more upright posture.

3 a more protruding jaw.

4 less body hair.

4.6.3.4 Evidence for evolution

Question 11 · continued

6B What caused the differences between Lucy and modern humans?

1 temperature increases in the environment

2 mutations in the genes

3 new diseases

4 competition with each other for food

6C Scientists have found evidence for the existence of Lucy by . . .

1 doing genetic engineering.

2 extracting DNA from apes.

3 watching modern apes.

4 studying fossils.

6D Darwin's theory of evolution states that all species of living things have evolved from simple life forms.

It took a long time for Darwin's theory of evolution to be widely accepted because . . .

1 books were expensive.

2 Darwin was not a scientist.

3 Lamarck had a better theory.

4 the causes of variation were not known at that time.

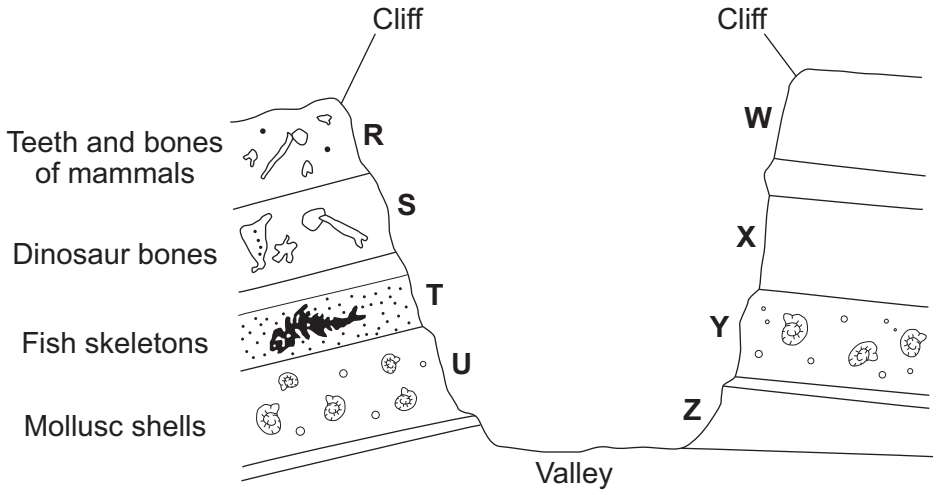
4.6.3.4 Evidence for evolution

Question 12

November 2011 | BLY1BP | Original Q8 | Legacy

QUESTION EIGHT

The diagram shows a section through rock layers containing fossils.



8A Which layers of rock are probably the same age?

1 **R** and **W**

2 **S** and **X**

3 **T** and **Z**

4 **U** and **Y**

8B Which of these statements about rocks and fossils is true?

1 Older fossils are usually found in deeper rocks.

2 Rocks of the same age in a particular area will contain fossils of totally different life forms.

3 The deeper the rock, the more different types of fossil are found.

4 Fossils are never found in surface layers of rocks.

8C There are few fossils of the earliest organisms on Earth.

This is because . . .

1 fossils last for only a few million years.

2 the organisms had soft bodies.

3 the organisms quickly became extinct.

4 new predators ate the organisms.

4.6.3.4 Evidence for evolution

Question 12 · continued November 2011 | BLY1BP | Original Q8 | Legacy

8D The fossils in the rock layers support the theory of evolution because . . .

1 the same fossil organisms are found in different layers of rocks.

2 fossil organisms have features in common with present-day organisms.

3 present-day organisms have evolved from fossil organisms.

4 the environment caused the changes in the fossil organisms.

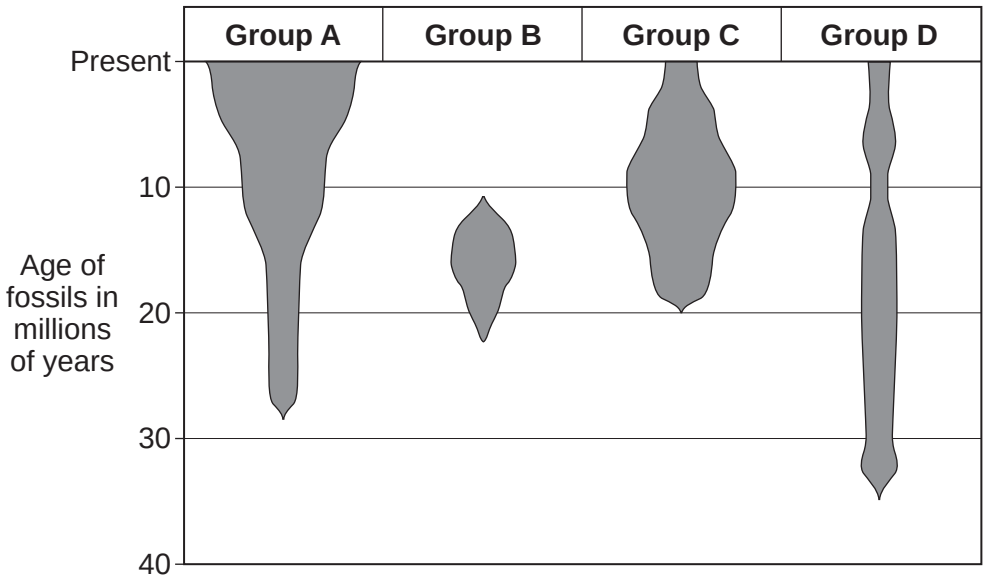
Turn over for the next question

4.6.3.4 Evidence for evolution

Question 13

June 2012 | BL2FP | Original Q3 | Legacy

3 In the Grand Canyon, scientists have found fossils of several different groups of organisms.
The diagram shows the number and age of the fossils that the scientists found.
The width of each shaded area shows the number of fossils found.



3 (a) What is a fossil?

.....

.....

.....

.....

(2 marks)

3 (b) (i) Which group of organisms, **A**, **B**, **C** or **D**, was the first to evolve? ☐

(1 mark)

3 (b) (ii) Which group of organisms, **A**, **B**, **C** or **D**, is now extinct? ☐

(1 mark)

4.6.3.4 Evidence for evolution

Question 13 · continued

3 (b) (iii) Give **one** environmental factor that might have caused this group of organisms to become extinct.

.....

.....

(1 mark)

3 (c) Scientists suggested that, 10 million years ago, organisms of **Group C** were more common than organisms from any of the other groups.

What is the evidence for this in the diagram?

.....

.....

(1 mark)

3 (d) The scientists suggested that the four groups of fossilised organisms evolved from a common ancestor.

Which of the following would provide the best evidence that their suggestion is correct?

Tick (✓) **one** box.

Statement	Tick (✓)
All the groups lived in the same area.	
Fossils from each group were found in the same rock layer.	
Members of the groups have similar physical structures.	

(1 mark)

7

4.6.3.4 Evidence for evolution

Question 14

January 2013 | BL1FP | Original Q7 | Legacy

7 (a) Complete the sentences about evolution.

Draw a ring around the correct answer to complete each sentence.

7 (a) (i) Darwin suggested the theory of evolution by

artificial
natural
asexual

selection.

(1 mark)

7 (a) (ii) Darwin's theory of evolution says that all species of living things have evolved from

artificial
complex
simple

life forms.

(1 mark)

7 (a) (iii) Most scientists believe that life first developed about

three billion
three million
three thousand

years ago.

(1 mark)

7 (b) Darwin's theory of evolution was only slowly accepted by other people.

Give **two** reasons why.

1 .....

.....

2 .....

.....

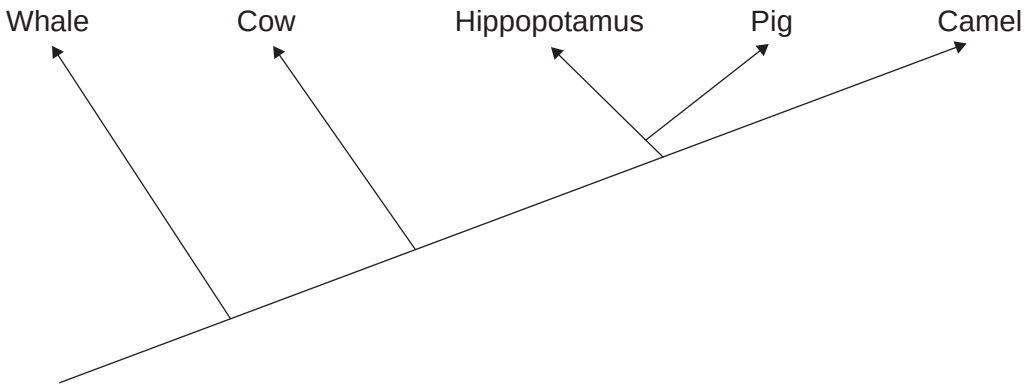
(2 marks)

4.6.3.4 Evidence for evolution

Question 14 · continued

7 (c) **Diagram 1** shows one model of the relationship between some animals.

Diagram 1



7 (c) (i) Complete the sentence.

The model shown in **Diagram 1** is an evolutionary ..... .

(1 mark)

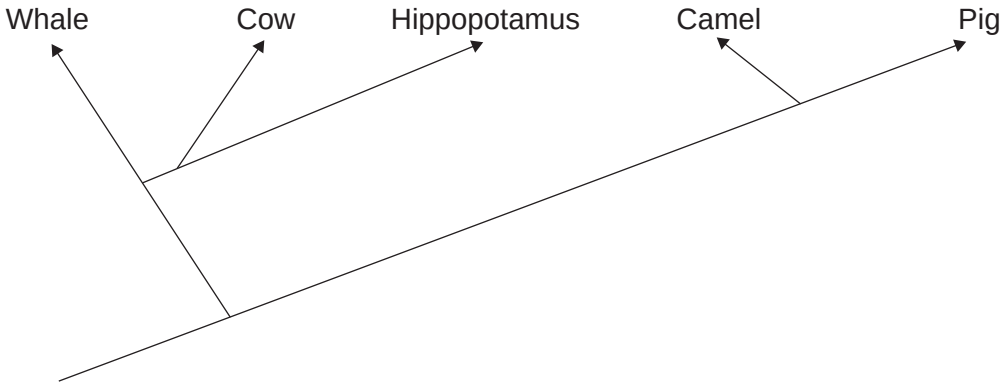
7 (c) (ii) Which **two** of the animals in **Diagram 1** are most closely related?

..... and .....

(1 mark)

7 (c) (iii) **Diagram 2** shows a more recent model of the relationship between the animals.

Diagram 2



Suggest **one** reason why scientists have changed the model of the relationships between the animals shown in the diagram.

Draw a ring around the correct answer.

more powerful computers | **new evidence from fossils** | **new species discovered**

(1 mark)

8

4.6.3.4 Evidence for evolution

Question 15

January 2013 | BL2FP | Original Q3 | Legacy

3 The photograph shows a fossil footprint. The fossil was found in a rock at the bottom of a shallow river.

Scientists believe this is the footprint of a dinosaur. The dinosaur was alive 110 million years ago.



3 (a) (i) Suggest how the fossil shown in the photograph was formed.

.....

.....

(1 mark)

3 (a) (ii) Fossils may also be formed by other methods.

Describe **one** other method of forming a fossil.

.....

.....

(1 mark)

3 (b) Dinosaurs are now extinct.

Give **two** factors that can cause extinction.

1 .....

.....

2 .....

.....

(2 marks)

4.6.3.4 Evidence for evolution

Question 15 · continued

3 (c) How can fossils give evidence for evolution?

.....

.....

(1 mark)

3 (d) Scientists are uncertain about how life began on Earth.

Why?

.....

.....

(1 mark)

6

Turn over for the next question

4.6.3.4 Evidence for evolution

Question 16

June 2013 | BL2FP | Original Q2 | Legacy

2 Evolution is the development of new species over time.
Evidence for evolution comes from *fossils*.

2 (a) (i) What is a *fossil*?

.....

.....

.....

.....

(2 marks)

2 (a) (ii) How can fossils give evidence for evolution?

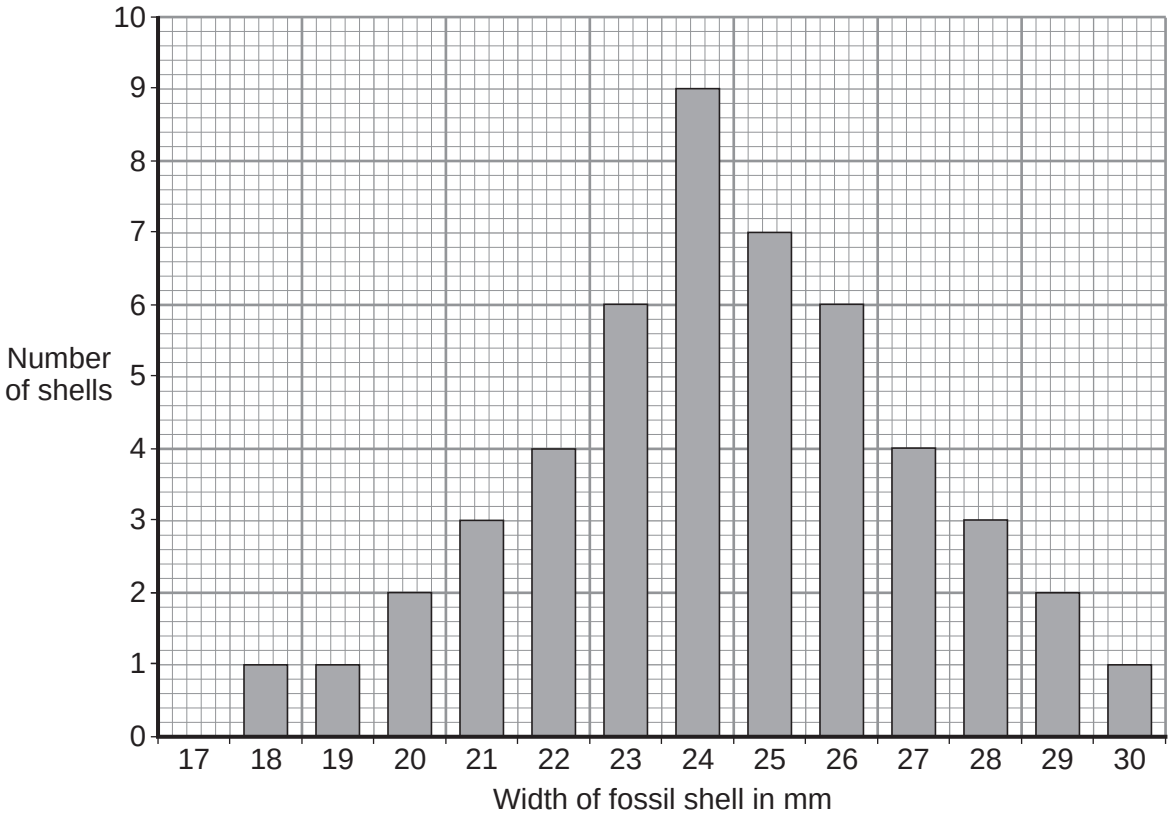
.....

.....

(1 mark)

2 (b) A species of snail lived 400 million years ago.
Scientists measured the width of 49 fossil shells of this snail.

The bar chart shows the scientists' results.



4.6.3.4 Evidence for evolution

Question 16 · continued

2 (b) (i) What is the range of the values for the width of the fossil shells for this species?

From ..... to .....

(1 mark)

2 (b) (ii) The scientists **cannot** be sure that this is the full range of fossil shell widths for this species.

Why?

.....

.....

(1 mark)

2 (c) This species of snail became extinct 380 million years ago.

Give **one** possible reason why species become extinct.

.....

.....

(1 mark)

6

4.6.3.4 Evidence for evolution

Question 17

June 2014 | BL2FP | Original Q4 | Legacy

4 **Figure 6** shows a fossil of a sea animal called a Plesiosaur.
The Plesiosaur was alive about 135 million years ago.

Figure 6



4 (a) How can fossils give evidence for evolution?

Tick (✓) **one** box.

[1 mark]

Newer fossils are simpler than older fossils. ☐

Fossils show change over time. ☐

All fossils show the bones of animals. ☐

4 (b) Plesiosaurs lived in the sea. There was mud at the bottom of the sea.

Suggest how the fossil shown in **Figure 6** may have been formed after the animal died.

[3 marks]

.....

.....

.....

.....

.....

.....

4.6.3.4 Evidence for evolution

Question 17 · continued

4 (c) **Figure 7** shows what scientists think a living Plesiosaur may have looked like.

Figure 7



Scientists think that the Plesiosaur had smooth skin, with no scales.

The scientists **cannot** be certain what the skin of a Plesiosaur was like.
Suggest why.

[1 mark]

.....

.....

4 (d) Plesiosaurs are now extinct.

Give **two** possible reasons why.

[2 marks]

1 .....

.....

2 .....

.....

7

4.6.3.4 Evidence for evolution

Question 18

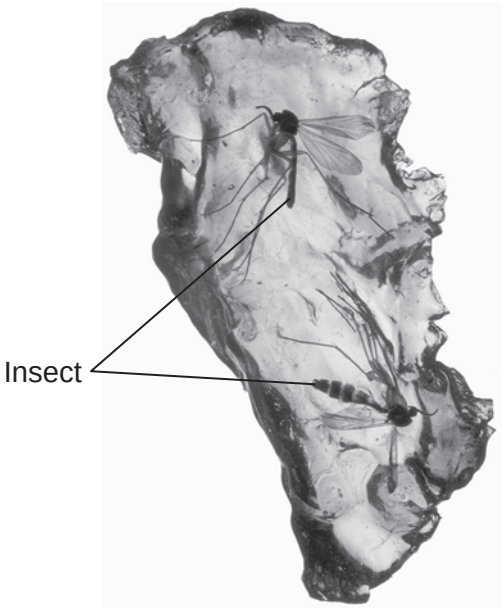
June 2015 | BL2FP | Original Q6 | Legacy

6 Fossils give us information about organisms from a long time ago.

6 (a) Amber is a solid, glass-like material. Amber is formed from a thick, sticky liquid which oozes out of pine trees.

Figure 6 shows two fossil insects in amber.

Figure 6



6 (a) (i) Suggest how the insects came to be preserved in the amber.

[2 marks]

.....

.....

.....

.....

6 (a) (ii) Give **two** other ways fossils are formed.

[2 marks]

1 .....

.....

2 .....

.....

4.6.3.4 Evidence for evolution

Question 18 · continued June 2015 | BL2FP | Original Q6 | Legacy

6 (b) The fossil record shows that many organisms, including the dinosaurs, became extinct 65 million years ago.

One theory was that volcanic activity might have caused this mass extinction. Many scientists believe that this extinction was caused when an asteroid collided with the Earth.

6 (b) (i) A new scientific theory may replace an old theory.

Why might this happen?

[1 mark]

Tick (✓) **one** box.

Evidence from amber is unreliable. ☐

Internet evidence is more reliable than fossil evidence. ☐

New technology provides more valid evidence. ☐

6 (b) (ii) Give **three** reasons, other than volcanic activity and collision with an asteroid, why a species may become extinct.

[3 marks]

1 .....

.....

2 .....

.....

3 .....

.....

8

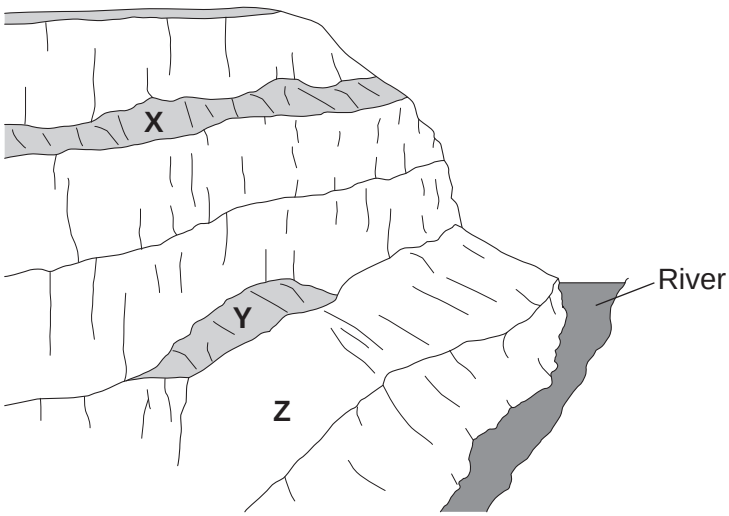
4.6.3.4 Evidence for evolution

Question 19

June 2017 | BL2FP | Original Q2 | Legacy

2 (a) **Figure 2** shows layers of rock in the Grand Canyon.

Figure 2



Scientists found fossils of three different species of animal, **X**, **Y** and **Z**, at the positions shown in **Figure 2**.

2 (a) (i) What is a fossil?

[2 marks]

2 (a) (ii) Scientists think that animal **Y** was alive at an earlier time than animal **X**.

How does **Figure 2** provide evidence for this?

[1 mark]

4.6.3.4 Evidence for evolution

Question 19 · continued

2 (a) (iii) Which **two** of the following are evidence that animal **Y** may have evolved from animal **Z**?

[2 marks]

Tick (✓) **two** boxes.

The fossils of animals **X**, **Y** and **Z** are the same size. ☐

The fossils of animals **Y** and **Z** have many features in common. ☐

The fossils of animals **Y** and **Z** have the same skin colour. ☐

The fossil of animal **Y** is more complex than the fossil of animal **Z**. ☐

The fossil of animal **Y** is more similar to the fossil of animal **X** than to the fossil of animal **Z**. ☐

2 (b) Animals **X**, **Y** and **Z** are all now extinct.

2 (b) (i) Give **two** possible causes of extinction.

[2 marks]

1 _____

_____

2 _____

_____

2 (b) (ii) Scientists cannot be sure about what caused animals **X**, **Y** and **Z** to become extinct.

Suggest why.

[1 mark]

_____

_____

8

4.6.3.4 Evidence for evolution

Question 20

June 2018 | 8461/2F | Original Q3

0 3 Fossils give evidence about organisms that lived a long time ago.

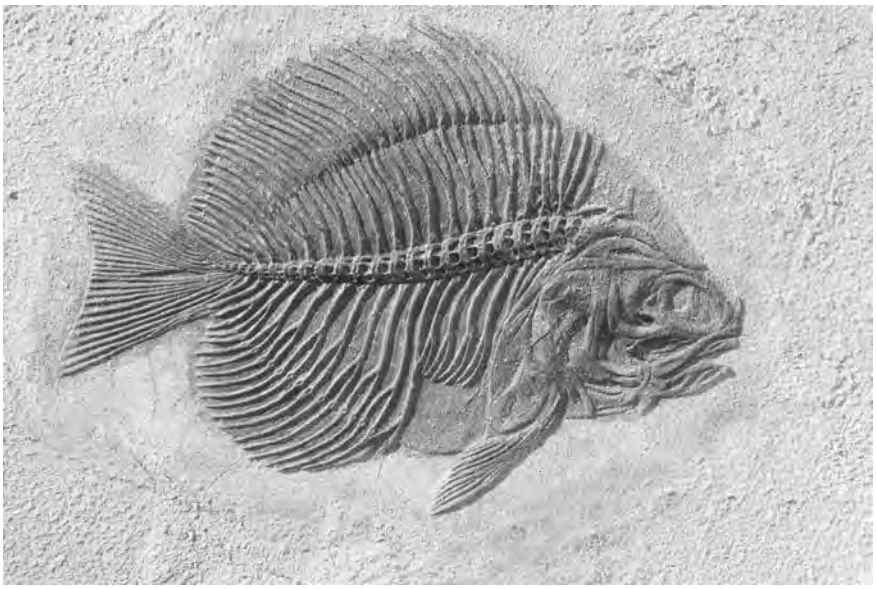
0 3 . 1 Scientists have found very few fossils of the earliest life forms.

Give **one** reason why.

[1 mark]

Figure 3 is a photograph of a fossilised fish.

Figure 3



0 3 . 2 Suggest how the fossil in **Figure 3** was formed.

[2 marks]

4.6.3.4 Evidence for evolution

Question 20 · continued

0 3 . 3 The species of fish shown in **Figure 3** is now extinct.

Give **two** possible causes of extinction.

[2 marks]

1 _____

_____

2 _____

_____

Modern fish species have evolved from fish that lived a long time ago.

Evolution is caused by mutation and natural selection.

0 3 . 4 What is a mutation?

[1 mark]

Tick **one** box.

- A change in a gene ☐
- Accidental damage to an organism ☐
- An organism with a new characteristic ☐
- The loss of a species ☐

0 3 . 5 Describe the process of natural selection.

[3 marks]

_____

_____

_____

_____

_____

_____

9

4.6.3.4 Evidence for evolution

Question 21

November 2020 | 8461/2F | Original Q6

0 6 **Figure 8** shows what the extinct Siberian rhinoceros (*Elasmotherium sibiricum*) might have looked like.

Figure 8



0 6 . 1 What is the genus of the Siberian rhinoceros?

[1 mark]

Tick (✓) **one** box.

Elasmotherium ☐

Elasmotherium sibiricum ☐

sibiricum ☐

4.6.3.4 Evidence for evolution

Question 21 · continued

The 'three-domain system' of classification places all living organisms in one of three domains.

0 6 . 2 Which domain was the Siberian rhinoceros in?

[1 mark]

Tick (✓) **one** box.

Archaea ☐

Eukaryota ☐

Prokaryota ☐

0 6 . 3 Who developed the 'three-domain system' of classification?

[1 mark]

Tick (✓) **one** box.

Carl Woese ☐

Charles Darwin ☐

Gregor Mendel ☐

0 6 . 4 The horn of the Siberian rhinoceros is estimated to have been 150 cm long.

Suggest **one** advantage of this adaptation to the Siberian rhinoceros.

[1 mark]

Question 6 continues on the next page

4.6.3.4 Evidence for evolution

Question 21 · continued

0 6 . 5 The only parts of the Siberian rhinoceros that have been found are fossilised bones.

Give **one** reason why **only** the bones of the body of the Siberian rhinoceros became fossils.

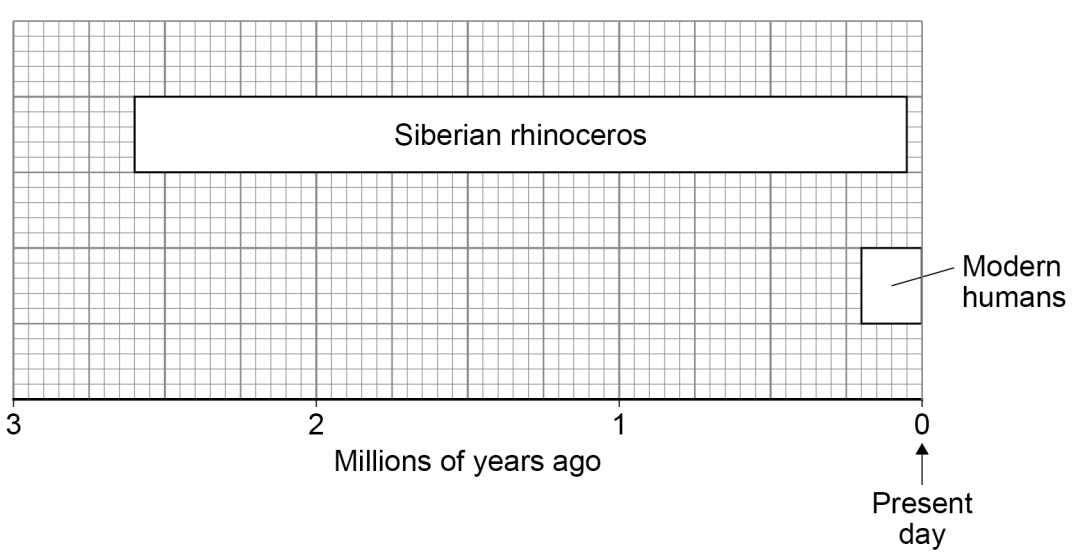
[1 mark]

0 6 . 6 Suggest how scientists can estimate when the Siberian rhinoceros was alive.

[1 mark]

Figure 9 shows when the Siberian rhinoceros existed and when modern humans existed.

Figure 9



4.6.3.4 Evidence for evolution

Question 21 · continued

0 6 . 7 How many million years ago did the Siberian rhinoceros become extinct?

[1 mark]

_____ million years ago

0 6 . 8 Determine the time in years when both the Siberian rhinoceros and modern humans existed together.

Use **Figure 9** and your answer to Question **06.7**.

[3 marks]

_____

_____

_____

_____

Time = _____ years

0 6 . 9 Suggest **two** factors that may have caused the extinction of the Siberian rhinoceros.

[2 marks]

1 _____

_____

2 _____

_____

12

4.6.3.4 Evidence for evolution

Question 22

November 2021 | 8461/2F | Original Q1

0 1 The theory of evolution states that organisms alive today evolved by natural selection from other species that are now extinct.

0 1 . 1 Which **two** scientists proposed the theory of evolution by natural selection?

[2 marks]

Tick (✓) **two** boxes.

- Alexander Fleming ☐
- Alfred Russel Wallace ☐
- Carl Linnaeus ☐
- Carl Woese ☐
- Charles Darwin ☐

Fossils provide evidence for evolution.

Figure 1 shows a fossil footprint of a dinosaur.

Figure 1



4.6.3.4 Evidence for evolution

Question 22 · continued

0 1 . 2 What is a fossil?

[2 marks]

0 1 . 3 How was the fossil in **Figure 1** formed?

[1 mark]

Tick (✓) **one** box.

Body parts were replaced by minerals. ☐

The animal walked on mud. ☐

The animal was frozen in ice. ☐

0 1 . 4 Dinosaurs are extinct.

Give **two** causes of extinction.

[2 marks]

1

2

Question 1 continues on the next page

4.6.3.4 Evidence for evolution

Question 22 · continued

0 1 . 5 Which **two** of the following provide evidence for evolution?

[2 marks]

Tick (✓) **two** boxes.

Bacteria can become resistant to an antibiotic. ☐

Early forms of life lived in the ocean. ☐

Older fossils are simpler than more recent ones. ☐

Older layers of rock are closer to the surface. ☐

9

4.6.3.4 Evidence for evolution

Question 23

0 7 Living organisms can be classified into groups.

Trilobites are animals that lived in the sea 400 to 500 million years ago.

Table 3 gives the classification of two species of trilobite.

Table 3

Classification group	Trilobite A	Trilobite B
	Animalia	*Animalia*
Phylum	*Arthropoda*	*Arthropoda*
Class	*Trilobita*	*Trilobita*
Order	*Ptychopariida*	*Ptychopariida*
Family	*Alokistocaridae*	*Marjumiidae*
	Elrathia	*Modocia*
Species	*kingii*	*typicalis*

0 7 . 1 Complete **Table 3**.

[2 marks]

Choose answers from the box.

Community	**Genus**	**Kingdom**	**Mammal**	**Population**

4.6.3.4 Evidence for evolution

Question 23 · continued

0 7 . 2 Which scientist invented the classification system given in **Table 3**?

[1 mark]

Tick (✓) **one** box.

Darwin ☐

Lamarck ☐

Linnaeus ☐

Mendel ☐

0 7 . 3 What is the binomial name of trilobite **A**?

Use information from **Table 3**.

[1 mark]

Tick (✓) **one** box.

Arthropoda kingii ☐

Elrathia kingii ☐

Trilobita kingii ☐

Question 7 continues on the next page

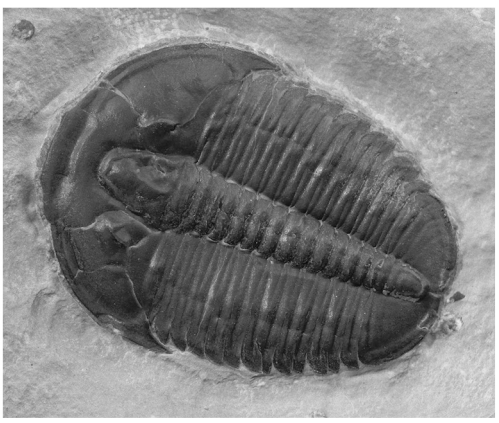
4.6.3.4 Evidence for evolution

Question 23 · continued

Figure 10 shows fossils of the two species of trilobite.

Figure 10

Trilobite A



Trilobite B

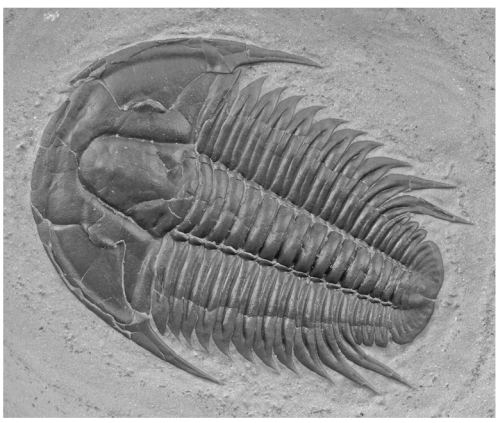
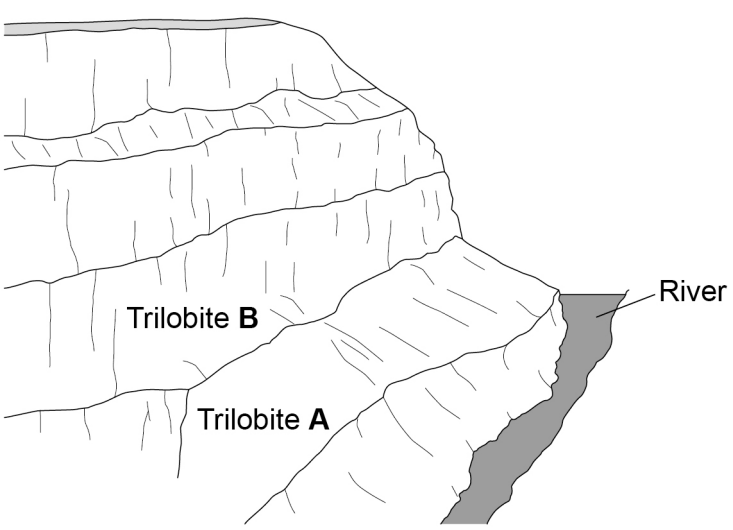


Figure 11 shows:

- layers of rock in a cliff
- where the trilobite fossils were found.

Figure 11



4.6.3.4 Evidence for evolution

Question 23 · continued

A scientist made the hypothesis:

'Trilobite **B** may have evolved from trilobite **A**.'

0 7 . 4 What **two** pieces of evidence from **Figure 10** and **Figure 11** support the scientist's hypothesis?

[2 marks]

Tick (✓) **two** boxes.

Trilobite **A** and trilobite **B** were in the same type of rock. ☐

Trilobite **A** was found in older rocks than trilobite **B**. ☐

Trilobite **B** has a smaller mass than trilobite **A**. ☐

Trilobite **B** is a different colour from trilobite **A**. ☐

Trilobite **B** is more complex than trilobite **A**. ☐

0 7 . 5 Trilobites are animals that lived in the sea.

Complete the sentences about how the fossils of trilobites **A** and **B** were formed.

Choose answers from the box.

[3 marks]

acids	**bones**	**hard parts**	**minerals**
rocks	**sediments**	**soft parts**	

The animal dies and falls to the sea bed.

The animal is buried in _____.

The _____ of the animal decay.

The remains which do **not** decay are replaced by _____.

4.6.3.4 Evidence for evolution

Question 23 · continued June 2022 | 8461/2F | Original Q7

0 7 . 6 Trilobites **A** and **B** are now extinct.

Give **three** possible causes of extinction.

[3 marks]

1 _____

_____

2 _____

_____

3 _____

_____

0 7 . 7 Suggest **one** reason why scientists **cannot** be sure what caused the trilobites to become extinct.

[1 mark]

_____

_____

13

4.6.3.4 Evidence for evolution

Question 24

June 2023 | 8461/2F | Original Q4

0 4 Some farmers keep cows indoors in large sheds.

Other farmers keep cows outdoors in fields of grass.

Figure 6 shows cows being kept indoors and outdoors.

Figure 6

Cows kept indoors



Cows kept outdoors



Table 3 shows the energy inputs and energy outputs for keeping cows.

Table 3

	Energy in kJ/m^2/year	
	Indoors	**Outdoors**
Input as food	10 000	5 950
Input as fossil fuel	6 000	50
Output as meat and milk	40	2

0 4 . 1 Calculate the total energy input for keeping cows **outdoors**.

Use data from **Table 3**.

[1 mark]

Total energy input = _____ kJ/m^2/year

4.6.3.4 Evidence for evolution

Question 24 · continued

0 4 . 2 The total energy input for keeping cows **indoors** is 16 000 kJ/m^2/year.

Calculate the percentage efficiency of keeping cows **indoors**.

Use the equation:

$$\text{percentage efficiency} = \frac{\text{energy output}}{\text{total energy input}} \times 100$$

[2 marks]

Percentage efficiency = _____ %

0 4 . 3 The percentage efficiency of keeping cows outdoors is 0.03%.

Why is it more energy efficient to keep cows indoors than to keep cows outdoors?

[2 marks]

Tick (✓) **two** boxes.

- Cows are more stressed indoors. ☐
- Cows move less indoors. ☐
- It is noisier indoors. ☐
- It is warmer indoors. ☐
- There is less light indoors. ☐

Diseases in cows can cause problems for farmers.

0 4 . 4 Suggest why diseases spread more quickly when the cows are kept indoors.

[1 mark]

Question 24 · continued

One species of bacterium causes a disease in cows.

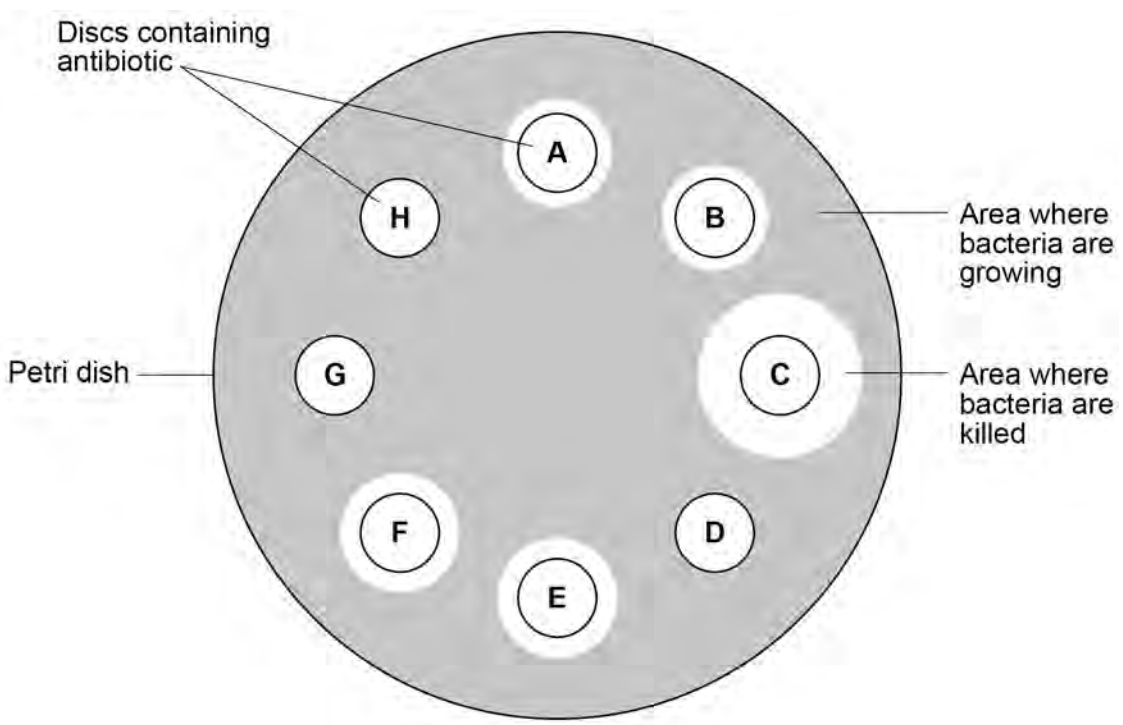
Scientists investigated the effect of eight different antibiotics on the growth of this species of bacterium.

The scientists put discs containing the different antibiotics onto a Petri dish containing the bacteria.

Antibiotics **A** to **H** were used in the investigation.

Figure 7 shows what the Petri dish looked like after 2 days.

Figure 7



0 4 . 5 This species of bacterium is resistant to some of the antibiotics.

Give the letter of **one** antibiotic the bacterium is resistant to.

[1 mark]

_____

4.6.3.4 Evidence for evolution

Question 24 · continued

0 4 . 6 Complete the sentence.

Choose the answer from the box.

[1 mark]

carbohydrate	DNA	lipid

Antibiotic resistance in a single bacterium is caused by a change in the bacterium's _____ .

0 4 . 7 Complete the sentence.

Choose the answer from the box.

[1 mark]

excretion	feeding	reproduction

A change in one bacterium can cause millions of bacteria to become resistant to the antibiotic.

This is because bacteria have a high rate of _____ .

0 4 . 8 Suggest why the production of millions of antibiotic-resistant bacteria is a problem for farmers.

[2 marks]

_____

_____

_____

_____

11

4.6.3.4 Evidence for evolution

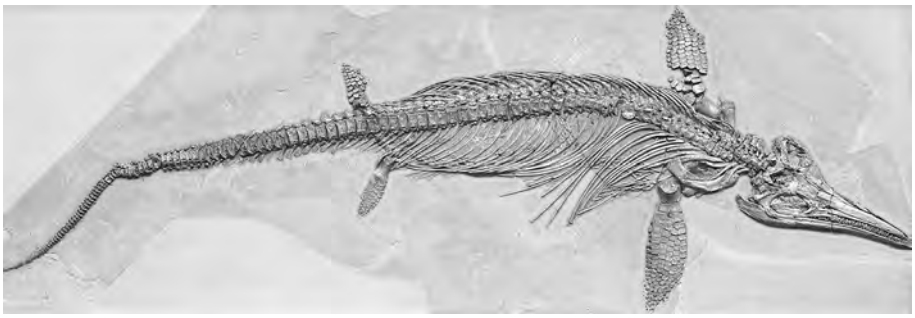
Question 25

June 2025 | 8461/2F | Original Q8

0 8 Ichthyosaurs are reptiles that lived in the sea millions of years ago.

Figure 13 shows the fossilised remains of an ichthyosaur.

Figure 13



0 8 . 1 Suggest how the fossil in **Figure 13** was formed after the ichthyosaur died.

[2 marks]

0 8 . 2 The length of the image of the ichthyosaur in **Figure 13** is 120 mm.

The real length of the ichthyosaur was 17 times longer than the image in **Figure 13**.

Calculate the real length of the ichthyosaur.

Give your answer in metres.

[3 marks]

Real length of ichthyosaur = _____ metres

4.6.3.4 Evidence for evolution

Question 25 · continued

0 8 . 3 **Table 5** gives the classification of the ichthyosaur in **Figure 13**.

Table 5

Classification group	Name
Kingdom	Animalia
	Chordata
Class	Reptilia
Order	Ichthyosauria
	Ichthyosauridae
Genus	Ichthyosaurus
Species	intermedius

Complete **Table 5**.

[2 marks]

Choose answers from the box.

Community	Family	Mammal	Phylum	Population

0 8 . 4 Ichthyosaurs were predators.

Ichthyosaurs are now extinct.

Scientists think that extinction of the ichthyosaurs was caused by increased competition with other predators for food.

Suggest **two other** possible causes of extinction of the ichthyosaurs.

[2 marks]

1 _____

_____

2 _____

_____

9