AQA GCSE Biology | 8461

SPECIFICATION POINT 4.6.3.1

Theory of evolution (biology only)

Past-paper questions

Tier	**Foundation**
Question groups	**22**
Available paper years	**2007–2024**

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.

4.6.3.1 Theory of evolution (biology only)

Question 01

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.

4.6.3.1 Theory of evolution (biology only)

Question 01 · continued

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

4.6.3.1 Theory of evolution (biology only)

Question 02

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.

4.6.3.1 Theory of evolution (biology only)

Question 03

June 2008 | BLY1BP | Original Q5 | Legacy

QUESTION FIVE

This question is about evolution.

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

A extinction

B natural selection

C mutation

D variation

1	a theory put forward by Darwin
2	differences shown by individuals in the same species
3	a change in a gene
4	may be caused by new predators

4.6.3.1 Theory of evolution (biology only)

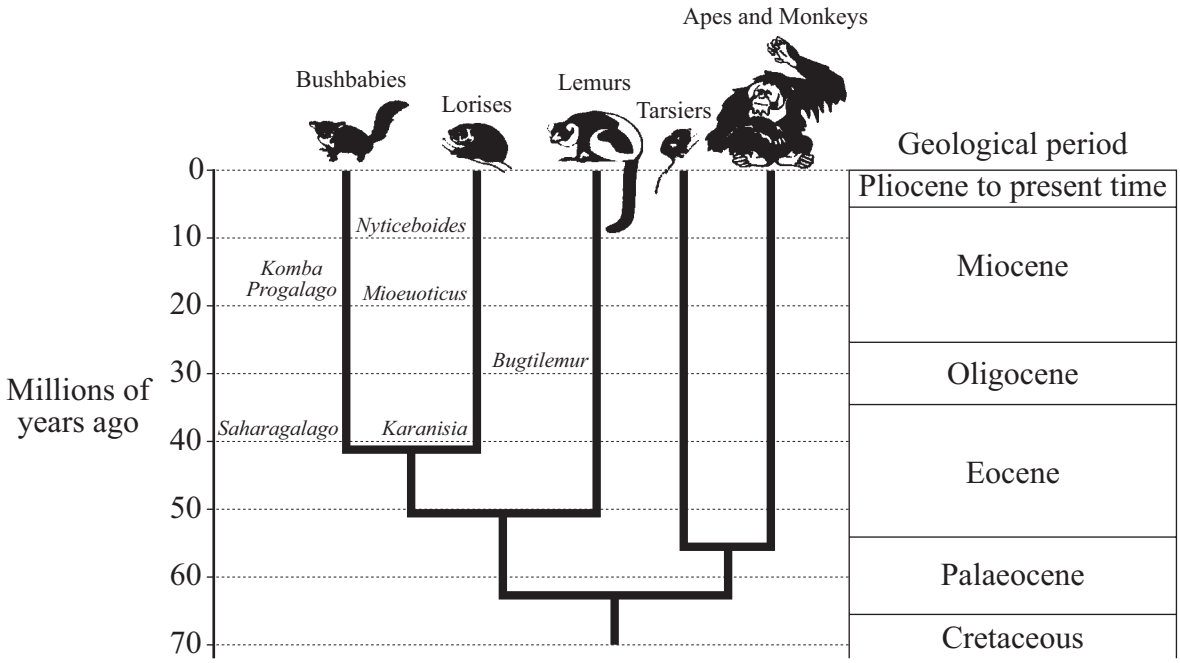
Question 04

June 2008 | BLY1F | Original Q4 | Legacy

4 The diagram shows an evolutionary tree for a group of animals called primates.

The names of extinct animals are printed in italics e.g. *Nycticeboides*.

The drawings show animals that are alive today.



4 (a) (i) How many million years ago did *Karanisia* first appear?

..... millions of years ago.

(1 mark)

4 (a) (ii) During which geological period did the Apes and Monkeys begin to evolve?

.....

(1 mark)

4 (a) (iii) Which group of primates alive today are the closest relatives of the Lorises?

.....

(1 mark)

4.6.3.1 Theory of evolution (biology only)

Question 04 · continued

for mark

4 (b) Darwin was the first scientist to state that humans and other primates had common ancestors.

Many people were against Darwin's ideas at that time.

Give **two** reasons why they were against his ideas.

1 .....

.....

2 .....

.....

(2 marks)

5

Turn over for the next question

4.6.3.1 Theory of evolution (biology only)

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

4.6.3.1 Theory of evolution (biology only)

Question 06

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)

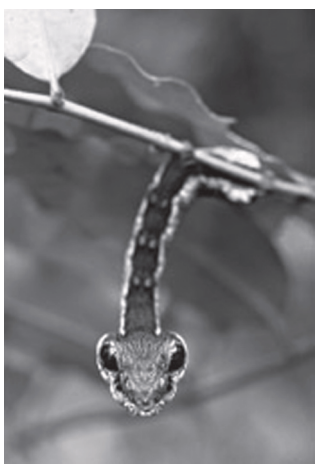
Question 4 continues on the next page

4.6.3.1 Theory of evolution (biology only)

Question 06 · 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)

4.6.3.1 Theory of evolution (biology only)

Question 06 · 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

4.6.3.1 Theory of evolution (biology only)

Question 07

November 2009 | BLY1BP | Original Q4 | Legacy

QUESTION FOUR

Organisms have changed since life began on Earth.

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

A evolution

B extinction

C natural selection

D reproduction

1	the theory that all living species developed from simple life forms over billions of years
2	genes being passed on from one generation to the next
3	a species dying out
4	organisms that are most suited to their environment survive to breed

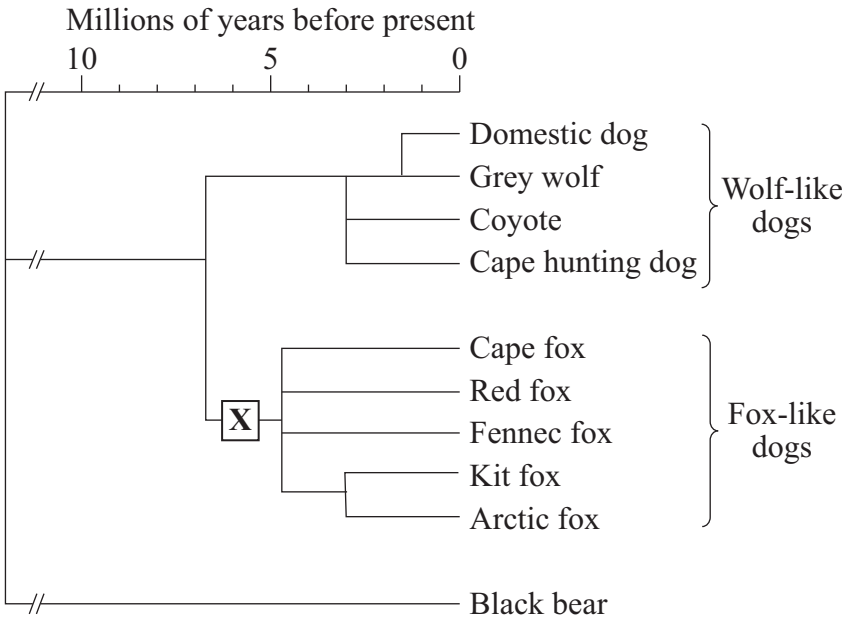
4.6.3.1 Theory of evolution (biology only)

Question 08

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

4.6.3.1 Theory of evolution (biology only)

Question 08 · continued

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.

4.6.3.1 Theory of evolution (biology only)

Question 09

6 Charles Darwin proposed the theory of natural selection.

6 (a) What is meant by natural selection?

.....

.....

.....

.....

(2 marks)

6 (b) The drawings show stages in the evolution of the human skeleton.

All the drawings are to the same scale.



Ape-like ancestor ⟶ Modern human

Use information from the drawings to describe **two** trends in the evolution of the human skeleton.

1 .....

.....

2 .....

.....

(2 marks)

4.6.3.1 Theory of evolution (biology only)

Question 09 · continued

for mark

6 (c) Darwin said that humans had evolved from ape-like ancestors.
Many people disagreed with him at the time.

Give **two** reasons why.

1 .....

.....

2 .....

.....

(2 marks)

6 (d) Lamarck's theory of evolution stated that useful changes which occur in an organism during its lifetime will be inherited by its offspring.

Give **one** way in which Darwin's theory differs from Lamarck's.

.....

.....

(1 mark)

7

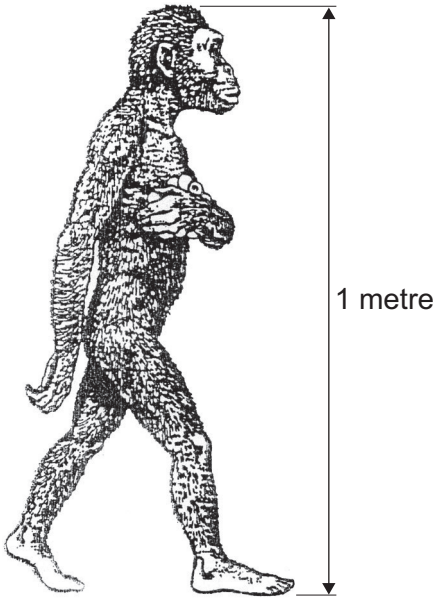
4.6.3.1 Theory of evolution (biology only)

Question 10

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.

4.6.3.1 Theory of evolution (biology only)

Question 10 · 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.

4.6.3.1 Theory of evolution (biology only)

Question 11

June 2010 | BLY1F | Original Q7 | Legacy

7 The photograph shows an *Anolis* lizard. This lizard lives on a tiny island.



Scientists investigated how the leg length of the *Anolis* lizards affected their survival. At the start of the investigation the *Anolis* lizards had a large range of leg lengths.

- The scientists placed six *Curly-tailed* lizards onto the island.
- The *Curly-tail* lizard is a predator of the *Anolis* lizard.
- After one year the population of *Anolis* lizards had halved.
- Nearly all the remaining *Anolis* lizards had long legs.

7 (a) Why did the population of *Anolis* lizards halve?

.....

.....

(1 mark)

7 (b) The remaining *Anolis* lizards had long legs.

Suggest an explanation for this.

.....

.....

.....

.....

.....

(2 marks)

4.6.3.1 Theory of evolution (biology only)

Question 11 · continued

7 (c) Answer each of these questions by placing a tick (✓) in the correct box.

7 (c) (i) Which theory is supported by evidence from this investigation?

Global warming	☐
Natural selection	☐
Sustainability	☐

(1 mark)

7 (c) (ii) Which scientist proposed this theory?

Darwin	☐
Lamarck	☐
Semmelweiss	☐

(1 mark)

5

4.6.3.1 Theory of evolution (biology only)

Question 12

June 2011 | BLY1BP | Original Q5 | Legacy

QUESTION FIVE

The modern theory of evolution is based mainly on Charles Darwin's work.

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

A extinction

B mutation

C reproduction

D variation

The range of characteristics we can see in a species is known as . . . **1** . . . .

This range of characteristics has been brought about by . . . **2** . . . .

Characteristics that give advantages are passed on during . . . **3** . . . .

Characteristics that are disadvantages may result in . . . **4** . . . .

4.6.3.1 Theory of evolution (biology only)

Question 13

June 2011 | BLY1F | Original Q7 | Legacy

7 Soay sheep live wild on an island off the north coast of Scotland. No people live on the island.



Over the last 25 years, the average height and mass of the wild Soay sheep have decreased.

The scientists think that climate change might have affected the size of the sheep.

7 (a) More Soay sheep are now able to survive winter than 25 years ago.

What change in the climate may have helped more Soay sheep to survive winters?

.....

.....

(1 mark)

7 (b) Complete the sentences.

7 (b) (i) Soay sheep show variation in size because of differences in their

..... .

(1 mark)

7 (b) (ii) The change in the size of the Soay sheep over 25 years can be explained by Darwin's theory of ..... .

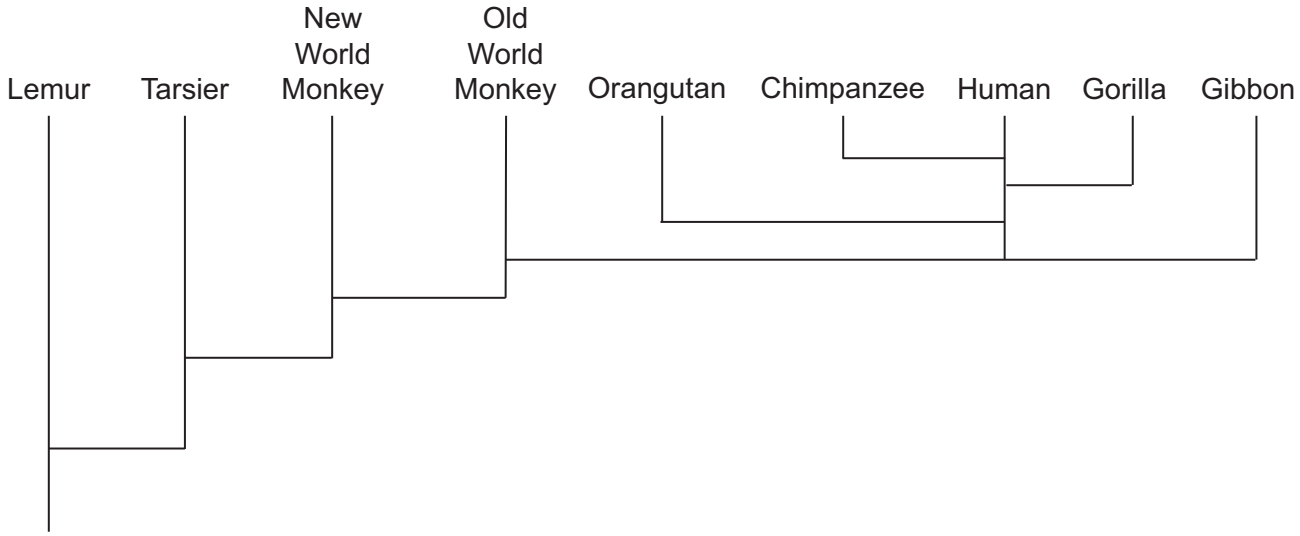
(1 mark)

3

4.6.3.1 Theory of evolution (biology only)

Question 14

3 The diagram shows the evolution of a group called the primates.



3 (a) Which primate evolved first?

.....

(1 mark)

3 (b) Name **two** primates that developed most recently from the same common ancestor as humans.

1 .....

2 .....

(2 marks)

3 (c) (i) The theory of evolution by natural selection was suggested in the 1800s.

Which scientist suggested this theory?

.....

(1 mark)

4.6.3.1 Theory of evolution (biology only)

Question 14 · continued

January 2012 | BL1FP | Original Q3 | Legacy

3 (c) (ii) Use words from the box to complete the passage about natural selection.

evolution	**environment**	**generation**
mutate	**survive**	**variation**

Individual organisms of a species may show a wide range of ..... because of differences in their genes.

Individuals with characteristics most suited to the ..... are more likely to ..... and breed successfully.

The genes that have helped these individuals to survive are then passed on to the next ..... .

(4 marks)

8

4.6.3.1 Theory of evolution (biology only)

Question 15

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 .....

.....

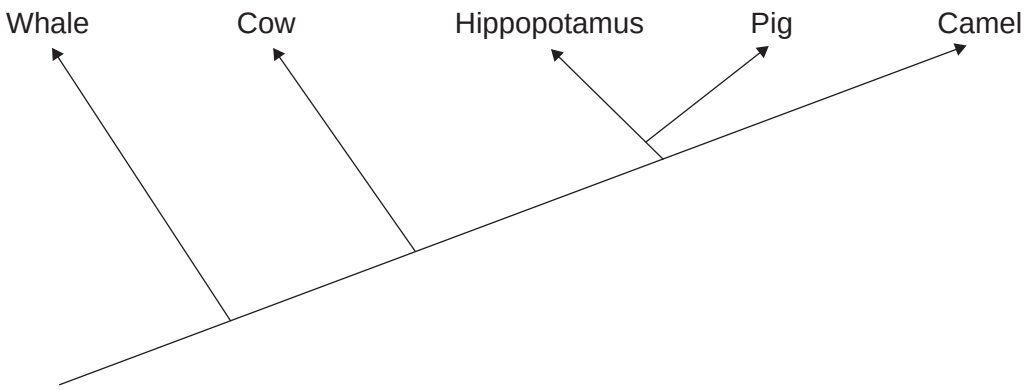
(2 marks)

4.6.3.1 Theory of evolution (biology only)

Question 15 · 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)

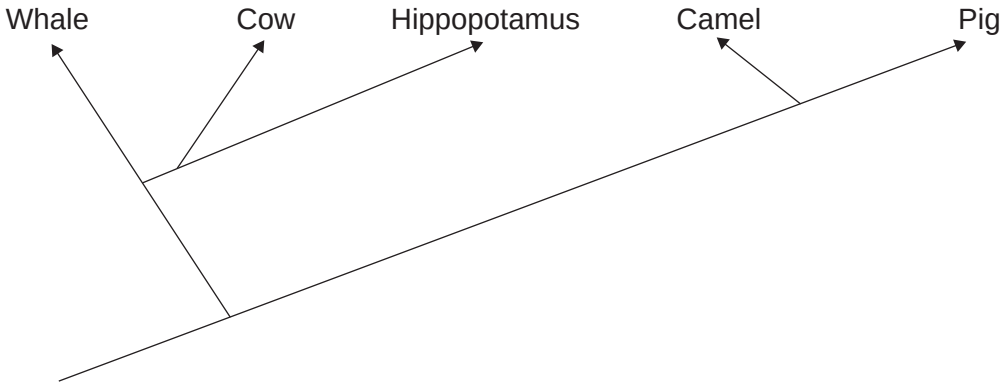
7 (c) (ii) Which **two** of the animals in **Diagram 1** are most closely related?

..... 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

4.6.3.1 Theory of evolution (biology only)

Question 16

5 In each question, draw a ring around the correct answer to complete the sentence.

5 (a) Our understanding of how genes are inherited is mostly because of

the work of

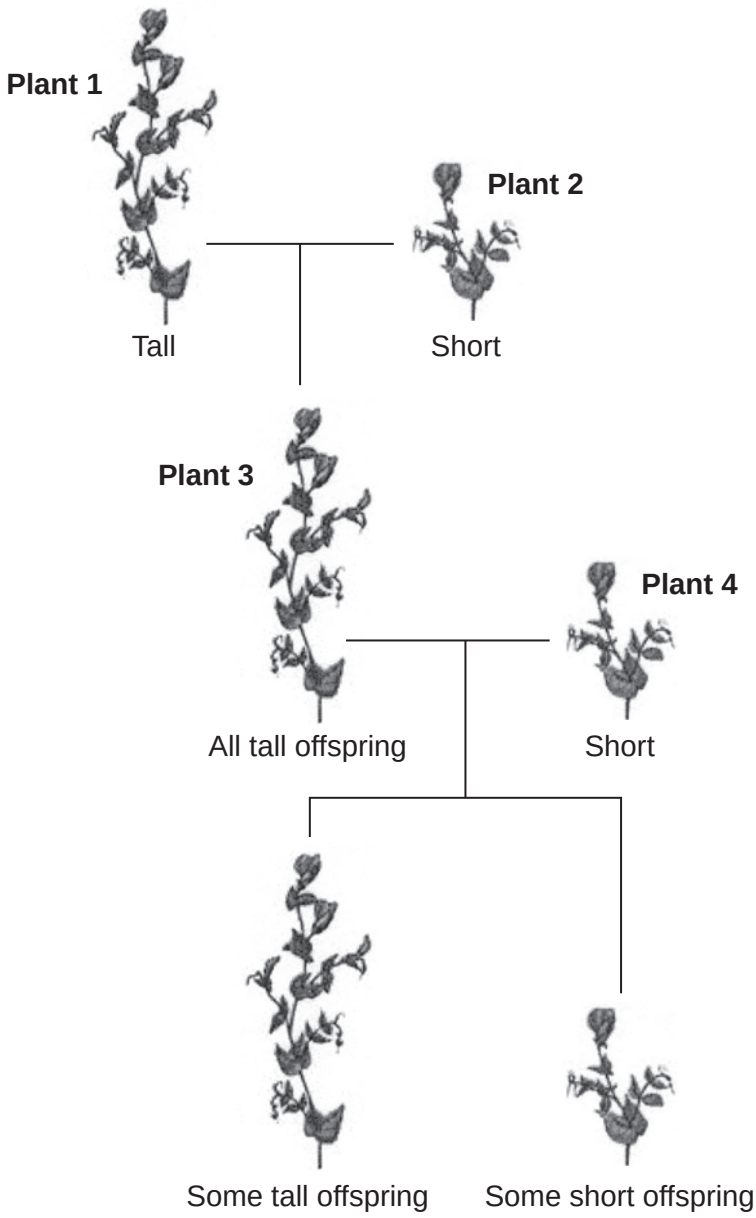
Darwin.
Lamarck.
Mendel.

(1 mark)

5 (b) A scientist investigated inheritance in pea plants.

The scientist crossed tall pea plants with short pea plants. **Diagram 1** shows the results.

Diagram 1



4.6.3.1 Theory of evolution (biology only)

Question 16 · continued

In the rest of this question, the following symbols are used to represent alleles.

T = allele for tall
t = allele for short

5 (b) (i) The 1st cross in **Diagram 1** produced 120 offspring. All of these offspring were tall.

This shows that **plant 1** contained the alleles

- **TT**.
- **Tt**.
- **tt**.

(1 mark)

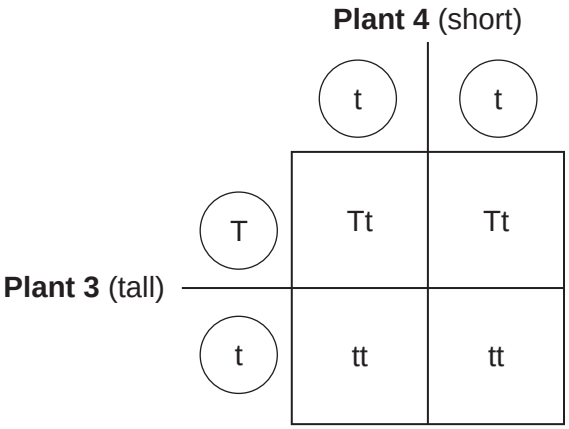
5 (b) (ii) **Plant 3** is tall because of

- a dominant allele.
- the environment.
- a recessive allele.

(1 mark)

5 (c) **Diagram 2** gives more information about the cross between **plant 3** and **plant 4**.

Diagram 2



This cross produced some tall offspring and some short offspring.

The ratio of tall to short offspring in **Diagram 2** is

- 1:1.
- 2:1.
- 3:1.

(1 mark)

Question 5 continues on the next page

4.6.3.1 Theory of evolution (biology only)

Question 16 · continued

5 (d) Two short plants were crossed. This cross produced 100 offspring.

The expected offspring would be

- 100 short plants.
- 50 tall plants and 50 short plants.
- 75 tall plants and 25 short plants.

(1 mark)

5

4.6.3.1 Theory of evolution (biology only)

Question 17

June 2014 | BL1FP | Original Q6 | Legacy

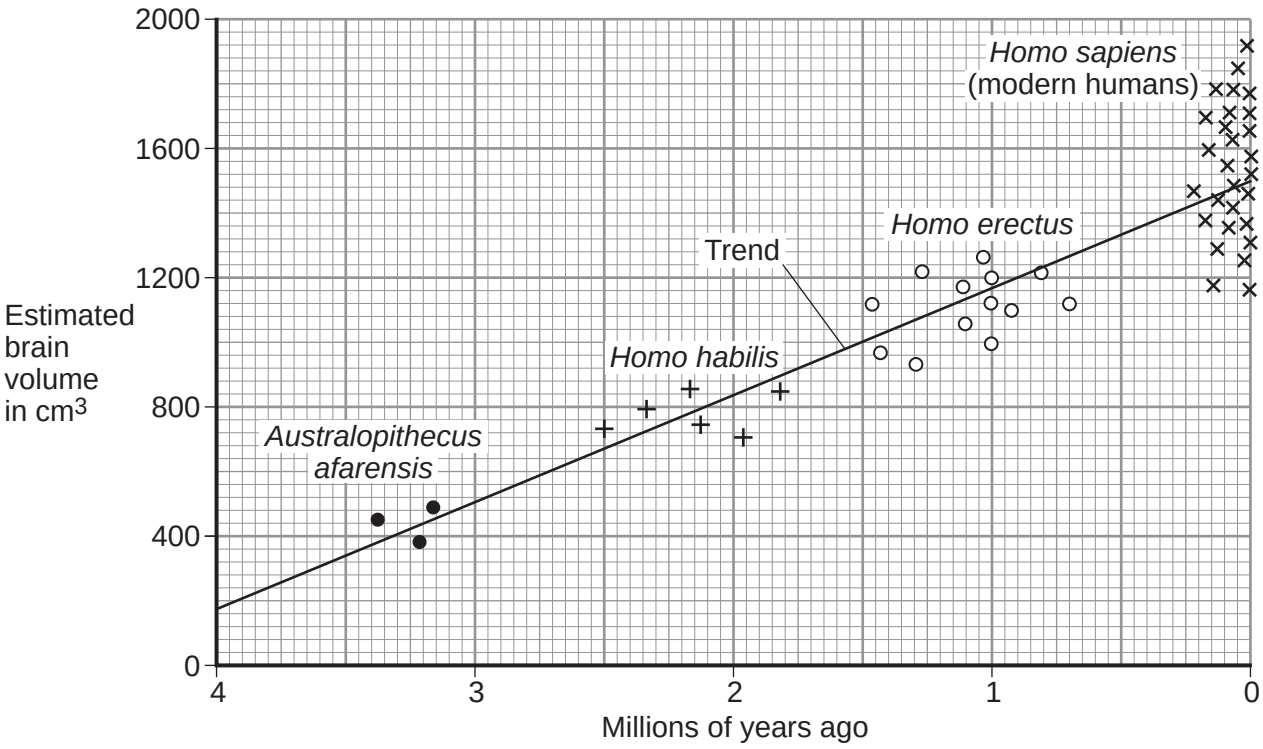
6 This question is about evolution in humans.

Figure 7 shows:

- the estimated brain volume of different species of humans
- the time when the different species existed on Earth.

The data is plotted for modern humans (*Homo sapiens*) and for three types of extinct ancestors of humans.

Figure 7



Key
Each point plotted on the graph shows the estimate for one human.

6 (a) (i) As humans evolved, their brain volume changed.

What has happened to human brain volume over the past 4 million years?

[1 mark]

.....

.....

4.6.3.1 Theory of evolution (biology only)

Question 17 · continued

6 (a) (ii) Why is the evidence for estimated brain volume for *Homo sapiens* stronger than the evidence for *Australopithecus afarensis*?

[1 mark]

.....

.....

6 (b) In a book, the brain volume of a different species, *Australopithecus africanus*, is stated to be about 600 cm^3.

Use evidence from **Figure 7** to estimate when *Australopithecus africanus* lived on Earth.

[1 mark]

Estimate = ... million years ago

6 (c) Scientists believe that modern humans evolved by natural selection from *Australopithecus afarensis*.

6 (c) (i) Complete the following sentence.

[1 mark]

In the nineteenth century, the scientist who suggested the theory of evolution by natural selection was Charles ..... .

6 (c) (ii) In the nineteenth century, many people did **not** accept this scientist's theory.

Give **one** reason why.

[1 mark]

.....

.....

5

4.6.3.1 Theory of evolution (biology only)

Question 18

7 In the 1800s, Charles Darwin visited the Galapagos Islands.
On the islands he found many different species of bird called finches.
Darwin thought that all the different finch species had evolved from one species of finch that had reached the islands many years before.

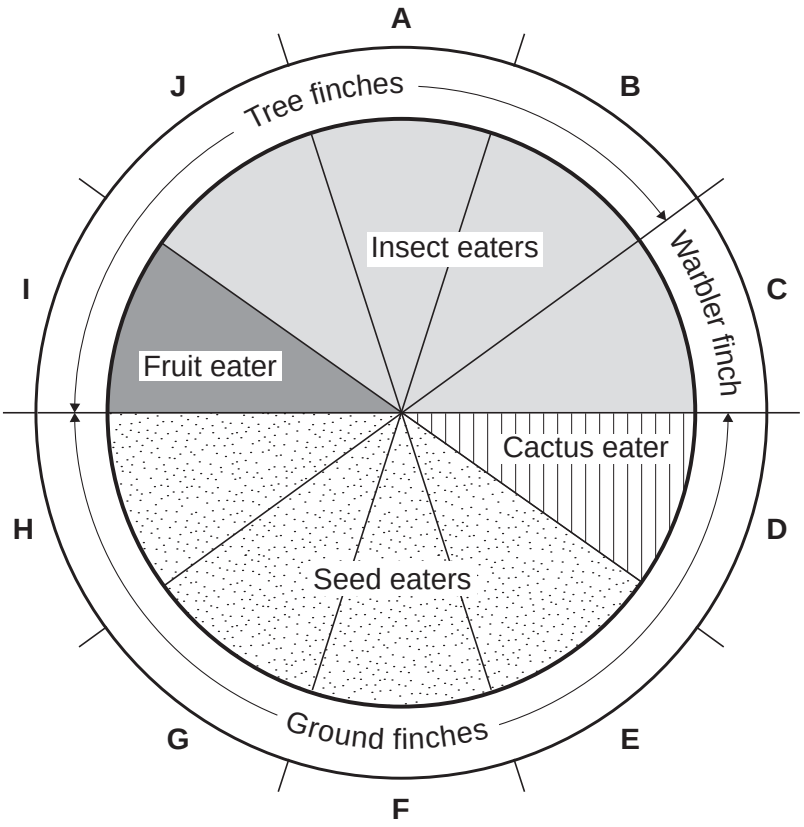
7 (a) Complete the following sentence.

[1 mark]

Darwin suggested the theory of evolution by natural ..... .

7 (b) **Figure 9** shows information about ten species of finch, **A – J**.

Figure 9



7 (b) (i) How many of the species of finch eat insects?

Draw a ring around the correct answer.

[1 mark]

4 **5** **6**

4.6.3.1 Theory of evolution (biology only)

Question 18 · continued

7 (b) (ii) Describe finch species **G**.

Use **only** information from **Figure 9**.

[2 marks]

.....

.....

.....

.....

7 (c) When Darwin returned to the UK very few people believed his theory of evolution.

A different scientist suggested that the changes that occur in an organism during its lifetime can be inherited by its offspring.

What was the name of this scientist?

Tick (✓) **one** box.

[1 mark]

Lamarck ☐

Mendel ☐

Semmelweis ☐

5

4.6.3.1 Theory of evolution (biology only)

Question 19

June 2016 | BL1FP | Original Q6 | Legacy

6 Darwin's theory of natural selection states that all living things have evolved from simple life forms.

6 (a) Use the correct answer from the box to complete the sentence.

[1 mark]

three billion	**three million**	**three thousand**

Darwin's theory states that life began on Earth _____ years ago.

6 (b) Life evolved due to changes in genes. Changes in genes cause variation.

Complete the sentences.

[2 marks]

Changes in genes are called _____ .

Individuals with characteristics most suited to the environment are more likely to survive and _____ .

3

4.6.3.1 Theory of evolution (biology only)

Question 20

June 2017 | BL1FP | Original Q8 | Legacy

8 Charles Darwin developed the theory of evolution by natural selection in the 1800s.

8 (a) Describe the process of evolution by natural selection.

[3 marks]

8 (b) In the 1870s, cartoons of Darwin looking like a monkey were published in magazines.

The cartoons were published after Darwin wrote a book about his theory of evolution.

8 (b) (i) Suggest **one** reason why cartoons of Darwin looking like a monkey were drawn.

[1 mark]

8 (b) (ii) Give **two** reasons why Darwin's theory of evolution by natural selection was only gradually accepted.

[2 marks]

6

4.6.3.1 Theory of evolution (biology only)

Question 21

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



4.6.3.1 Theory of evolution (biology only)

Question 21 · 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

4.6.3.1 Theory of evolution (biology only)

Question 21 · 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

4.6.3.1 Theory of evolution (biology only)

Question 22

June 2024 | 8461/2F | Original Q9

0 9 Evolution of new species occurs by mutation and natural selection.

0 9 . 1 What is a mutation?

[1 mark]

0 9 . 2 Describe the process of natural selection.

[3 marks]

0 9 . 3 Which scientists suggested the theory of evolution by natural selection?

[1 mark]

Tick (✓) **one** box.

- Alexander Fleming and Carl Woese ☐
- Alfred Wallace and Alexander Fleming ☐
- Alfred Wallace and Charles Darwin ☐
- Charles Darwin and Carl Woese ☐

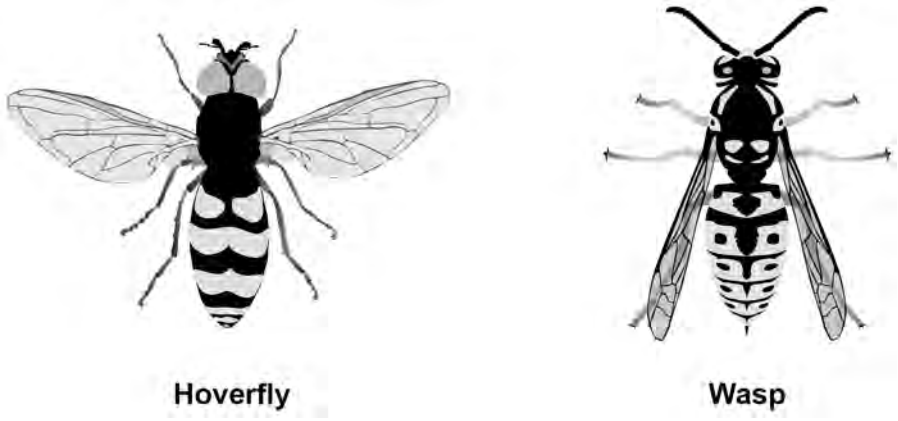
4.6.3.1 Theory of evolution (biology only)

Question 22 · continued

0 9 . 4 The hoverfly and the wasp are insects with bright yellow and black markings.

Figure 12 shows a hoverfly and a wasp.

Figure 12



The wasp has a sting to defend itself against predators.

The hoverfly does **not** have a sting.

Hoverflies and wasps live in the same habitat.

Explain how having yellow and black markings helps the **hoverfly** survive.

[3 marks]

8