AQA GCSE Biology | 8461

SPECIFICATION POINT 4.6.3.1

Theory of evolution (biology only)

Past-paper questions

Tier	**Higher**
Question groups	**23**
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

March 2007 | BLY1B | Original Q8 | Legacy

QUESTION EIGHT

Read the passage.

EVOLUTION

Charles Darwin proposed his theory of evolution in 1859.

His theory of evolution by natural selection was only gradually accepted.

Other theories at the time included Lamark's theory. This stated that organisms inherited characteristics that had been developed during the lifetime of their parents.

8A Which of the following best describes Darwin's theory of evolution?

1 Individuals with characteristics suited to their environment are more likely to survive and reproduce.

2 Only individuals with characteristics suited to their environment will survive.

3 Species become extinct if they do not match the environment in which they live.

4 Species survive only if they have similar characteristics to their parents.

8B One reason why Darwin's theory of evolution by natural selection was only gradually accepted could have been because . . .

1 at that time scientists did not know how characteristics were inherited.

2 Darwin had not carried out any experiments.

3 Darwin was not an accepted scientist.

4 there was no scientific evidence to support the theory.

8C Darwin's and Lamark's theories are similar in that they both . . .

1 depend on information about the characteristics of organisms being passed from parent to offspring.

2 rely on parents being able to alter the characteristics of their offspring.

3 state that evolution depends on changes in the environment.

4 state that evolution happens very rapidly.

4.6.3.1 Theory of evolution (biology only)

8D When it was first put forward, the theory of evolution by natural selection was based on . . .

1 a series of controlled experiments.

2 hearsay.

3 observations of the natural world.

4 unreliable evidence.

Turn over for the next question

4.6.3.1 Theory of evolution (biology only)

Question 02

June 2007 | BLY1B | Original Q3 | Legacy

QUESTION THREE

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.

3A 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.

3B Which of the following is **not** a cause of extinction?

1 changes in the environment

2 mutation

3 new diseases

4 new predators

4.6.3.1 Theory of evolution (biology only)

3C 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.

3D 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 03

8 (a) What does the theory of evolution state?

.....

.....

.....

.....

(2 marks)

(b) *Daphnia* are microscopic water fleas. Midge larvae prey on *Daphnia*. The midge larvae release a hormone into the water. *Daphnia* respond to these hormones by growing larger protective 'helmet'-like structures.

Scientists were surprised to observe that the offspring of *Daphnia* females who had been exposed to these hormones always had larger helmets than offspring whose mothers had never been exposed to the hormones. The offspring with the large helmets went on to produce offspring with large helmets.

Explain why the scientists' observations seem to contradict the theory of natural selection.

.....

.....

.....

.....

(2 marks)

4

4.6.3.1 Theory of evolution (biology only)

Question 04

November 2007 | BLY1B | Original Q8 | Legacy

QUESTION EIGHT

This question is about evolution.

8A Darwin suggested the theory of evolution by natural selection.

Darwin's theory states that . . .

1 living organisms respond quickly to changes in the environment.

2 all living organisms are related to each other.

3 organisms mutate if environmental conditions change.

4 organisms with successful adaptations are more likely to survive.

8B Darwin suggested that humans and apes have a common ancestor.

This suggestion was most strongly opposed at the time by . . .

1 the general public.

2 teachers.

3 religious leaders.

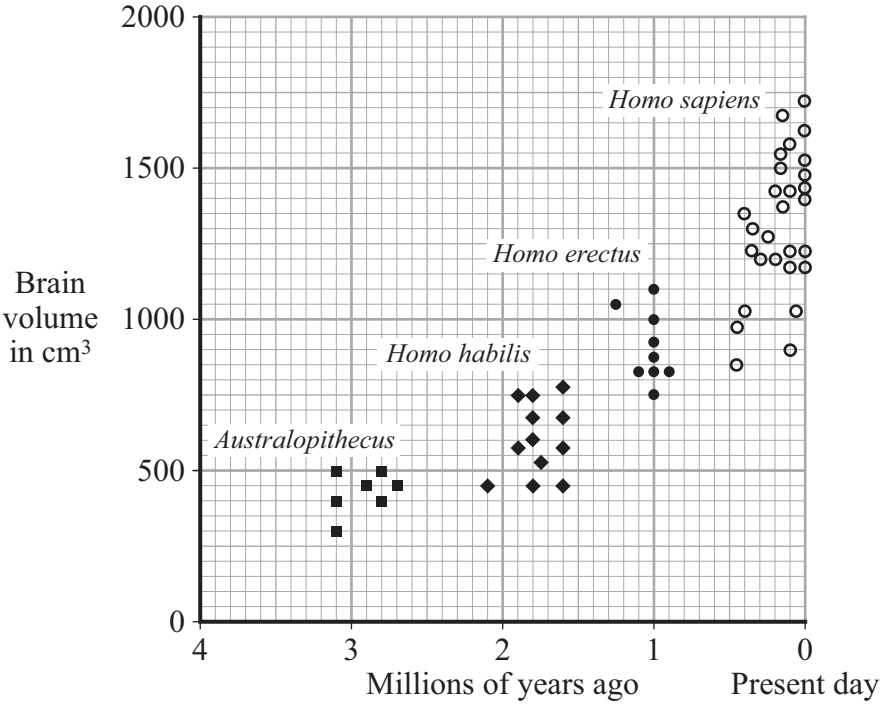
4 members of parliament.

4.6.3.1 Theory of evolution (biology only)

Question 04 · continued

Modern humans belong to the species *Homo sapiens*. Most scientists think that *Homo sapiens* is related to more primitive species. Three of these primitive species were *Australopithecus*, *Homo habilis* and *Homo erectus*. These three species are now extinct.

The graph shows the volume of the brain of several specimens from each of the species.



8C Which method of measuring the volume of the brain of the extinct species would give the most accurate results?

1 weighing the fossil skulls on an electronic balance

2 measuring the radius of the fossil skulls, then using this to calculate the volume

3 filling the fossil skulls with sand, then pouring the sand into a measuring cylinder

4 measuring the volume of water displaced by fossil skulls

8D The data suggests that . . .

1 *Australopithecus* had a mean brain volume of 500 cm^3.

2 all modern humans have bigger brains than their fossil ancestors.

3 *Homo sapiens* is more intelligent than *Homo habilis*.

4 mean brain volume has increased during the evolution of humans.

4.6.3.1 Theory of evolution (biology only)

Question 05

March 2008 | BLY1BP | Original Q3 | Legacy

QUESTION THREE

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

3A The idea that animals and plants have changed over millions of years is called . . .

1 adaptation.

2 mutation.

3 evolution.

4 extinction.

3B New explanations about changes in animals and plants are called . . .

1 observations.

2 hypotheses.

3 evidence.

4 issues.

3C 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.

4.6.3.1 Theory of evolution (biology only)

3D 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.

Turn over for the next question

4.6.3.1 Theory of evolution (biology only)

Question 06

June 2008 | BLY1BP | Original Q5 | Legacy

QUESTION FIVE

Darwin and Lamarck produced different theories for the mechanism of evolution.

5A For a theory to become accepted there must be . . .

1 valid evidence to support it.

2 an investigation carried out.

3 agreement by all scientists.

4 considerable hearsay evidence.

5B For Lamarck's theory to be accepted, it would have to be established that . . .

1 the environment could affect the expression of the offspring's characteristics.

2 parents could affect the appearance of their offspring.

3 changes in an organism during its lifetime can be inherited.

4 the environment could select the characteristics of the offspring.

5C Darwin's theory for the mechanism of evolution was only gradually accepted by the general public because . . .

1 there was no scientific evidence to support it.

2 it undermined the idea that a God created all life on Earth.

3 it was based on hearsay evidence.

4 it is a religious theory.

5D Many scientists did not accept Darwin's theory because . . .

1 the mechanism of inheritance and variation was not known at that time.

2 no breeding experiments had been done.

3 there was no evidence of widespread variation amongst living organisms.

4 fossils had not yet been discovered.

4.6.3.1 Theory of evolution (biology only)

Question 07

November 2008 | BLY1BP | Original Q1 | Legacy

QUESTION ONE

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 08

March 2009 | BLY1BP | Original Q9 | Legacy

QUESTION NINE

There are several theories for the way in which evolution may have happened.

9A Lamarck's theory of evolution was based on the idea that . . .

1 organisms pass on the advantages that they acquire during their lifetime.

2 organisms acquire genes from their parents which may give them advantages.

3 the characteristics that organisms have are controlled by God.

4 offspring have a mixture of their parents' features.

9B In the 1860s there was much opposition to Darwin's theory of evolution.

Which of the following was **not** a reason for this opposition?

1 The theory conflicted with deeply held religious views.

2 Darwin did **not** have sufficient evidence to support his ideas.

3 Darwin was unable to make his ideas known to other scientists.

4 Nobody knew how inheritance worked.

9C When a new island is formed by volcanic action, the environment continues to undergo rapid change for many years. At first there will be no living things present.

A plant seed may be blown to the island by the wind. When this seed begins to grow, the plant may reproduce asexually.

What is the disadvantage of asexual reproduction to the plant species in this case?

1 Only one individual is needed for reproduction.

2 All the offspring will be genetically identical.

3 New plants will be produced quickly.

4 Dense groups of this species will reduce competition from other species.

4.6.3.1 Theory of evolution (biology only)

9D Darwin's theory of evolution through natural selection was based on a number of events.

These events are outlined below.

- **P** Those individuals which are most suited to the environment survive.
- **Q** There is an increase in variation between members of the species.
- **R** Genes that improve survival chances are passed on to the next generation.
- **S** Mutation results in new forms of genes.

Which is the correct sequence for these events?

1 **P → R → S → Q**

2 **Q → R → P → S**

3 **S → Q → P → R**

4 **R → S → Q → P**

END OF TEST

4.6.3.1 Theory of evolution (biology only)

Question 09

June 2009 | BLY1BP | Original Q2 | Legacy

QUESTION TWO

There are several theories of how new species of plants and animals have developed.

The statements below outline four of these theories.

- Creationism: Each organism is made independently. Evolution does not occur. Gaps in the fossil record support this idea.
- Intelligent Design: Living things work in too complex a way for them to have evolved by chance. A higher being has designed all living things.
- Lamarckism: Changes occur during the lifetime of an individual. These changes can be passed on to offspring.
- Darwinism: Variation exists between members of a population. Only the organisms best suited to a habitat survive. Survivors pass on their advantages to their offspring.

Use the above information and your own knowledge and understanding to answer this question.

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

A Creationism

B Intelligent Design

C Lamarckism

D Darwinism

The idea that Manx cats, which have no tails, are the offspring of a cat which originally lost its tail in an accident could be used to support . . . **1** . . . .

Unsuccessful competitors die and so do not reproduce, is part of the theory of . . . **2** . . . .

The complicated way in which cells work can be used to support . . . **3** . . . .

The observation that fossils of all the different kinds of animals appear suddenly in the rocks, with no evidence of ancestors, supports . . . **4** . . . .

4.6.3.1 Theory of evolution (biology only)

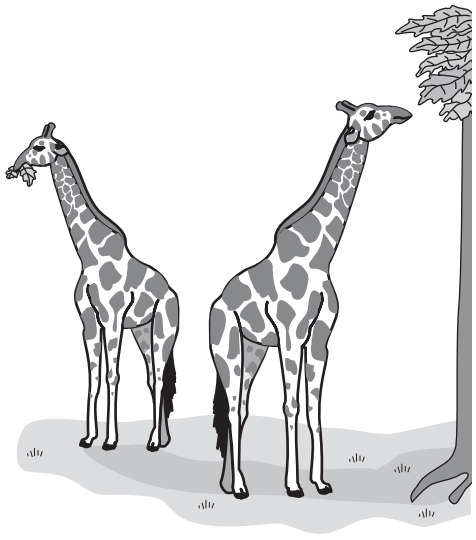
Question 10

November 2009 | BLY1BP | Original Q9 | Legacy

QUESTION NINE

Different people have different views about why giraffes have long necks.

The drawing shows giraffes feeding on tree leaves.



You will need to refer to statements **E1** to **E6** to answer the questions.

E1 According to Lamarck (1809), giraffes grew longer necks during their lifetime to reach foliage high up in trees during food shortages, and the longer neck developed was then passed on to offspring.

E2 According to Darwin (1872), some giraffes were born with longer necks than others and they could feed at higher levels than other animals. These survived best and reproduced, passing on the long neck feature to their offspring.

E3 Some research (in Africa) has shown that female giraffes spend up to 75% of their grazing time bent down eating low level bushes during food shortage in periods of dry conditions.

E4 Male giraffes fight with their necks. The ones with the biggest necks dominate other males.

E5 The dominant males mate most frequently with female giraffes.

E6 No fossils of short necked giraffes have yet been found.

4.6.3.1 Theory of evolution (biology only)

Question 10 · continued

9A The theory that long necks evolved through a process of natural selection is supported by . . .

1 **E1** and **E2**.

2 **E2**, **E4** and **E5**.

3 **E3**, **E4** and **E5**.

4 **E6**.

9B The information quoted in **E3** directly contradicts . . .

1 **E2**.

2 **E4**.

3 **E5**.

4 **E6**.

9C The piece of evidence given in **E6** . . .

1 proves that no short-necked giraffes have ever existed.

2 casts doubts on both Darwin's and Lamarck's theories.

3 could be used to support Darwin's theory.

4 could be used to support Lamarck's theory.

9D Lamarck's theory in **E1** is not a correct explanation.

We know this because . . .

1 both parent giraffes would need to have the longer necks for the feature to be inherited by their offspring.

2 characteristics acquired during an animal's lifetime cannot be passed on in its genes to its offspring.

3 male giraffes are about 1 metre taller than females of the same age.

4 the shape of animals cannot alter during their lifetime.

END OF TEST

4.6.3.1 Theory of evolution (biology only)

Question 11

2 Charles Darwin proposed the theory of natural selection.

2 (a) What is meant by natural selection?

.....

.....

.....

.....

(2 marks)

2 (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 11 · continued

for mark

2 (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)

2 (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 12

June 2010 | BLY1H | Original Q7 | Legacy

7 The photograph shows a flamingo.



- Flamingos feed on organisms that live in mud at the bottom of lakes.
- Leopards prey on flamingos.
- Flamingos find it difficult to fly if their feathers get wet.

Flamingos have evolved very long legs.

How would each of the following theories explain the evolution of these long legs?

7 (a) Darwin's theory

.....

.....

.....

.....

.....

.....

.....

.....

(3 marks)

4.6.3.1 Theory of evolution (biology only)

Question 12 · continued

7 (b) Lamarck's theory.

.....

.....

.....

.....

.....

.....

(2 marks)

5

Turn over for the next question

4.6.3.1 Theory of evolution (biology only)

Question 13

November 2010 | BLY1BP | Original Q9 | Legacy

QUESTION NINE

The drawings show two different species of butterfly.



Amauris



Hypolimnas

Many types of bird can eat both species.

- *Amauris* is poisonous to birds.
- *Hypolimnas* is **not** poisonous to birds.

There are many other examples of 'pairs' of poisonous species and non-poisonous species that look similar.

9A The most likely explanation for the similarity between poisonous and non-poisonous butterflies is that . . .

1 different species interbreed over many generations. This is how different species evolve.

2 the products of asexual reproduction can have slight differences. Environmental variation causes these differences.

3 non-poisonous species look like the poisonous species, and so the non-poisonous butterflies are more likely to survive and breed.

4 poisonous butterflies have evolved a defence mechanism against predators.

9B In the nineteenth century, some people did not accept Darwin's theory of natural selection.

Which of the following was **not** a reason to reject the theory?

1 It undermined the idea that God made all animals and plants.

2 There was insufficient fossil evidence to convince some scientists.

3 The mechanism of inheritance was not known at the time.

4 Lamarck's theory that organisms can inherit acquired characteristics was already well established.

4.6.3.1 Theory of evolution (biology only)

Question 13 · continued

9C Fossils of early life-forms are not discovered very often because . . .

1 the early life-forms are all now extinct because of evolution.

2 the soft bodies of the early life-forms did not fossilise well.

3 the early life-forms have all evolved into more complex species.

4 the early life-forms are in rocks too deep in the Earth's crust and cannot be found.

9D Which of the following would **not** be a reason for the extinction of a species of butterfly?

1 the evolution of a new predator

2 the evolution of a disease organism

3 mutation in one individual butterfly

4 a 2°C rise in atmospheric temperature

END OF TEST

4.6.3.1 Theory of evolution (biology only)

Question 14

June 2011 | BLY1BP | Original Q1 | Legacy

QUESTION ONE

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 15

November 2011 | BLY1BP | Original Q7 | Legacy

QUESTION SEVEN

Darwin and Lamarck both suggested theories of evolution.

7A Darwin's theory was based on . . .

1 experiments.

2 hearsay.

3 observations.

4 guesswork.

7B Which of the following best describes Darwin's theory of evolution?

1 Species survive only if they have similar characteristics to their parents.

2 Only species that can reproduce sexually survive.

3 Individuals with characteristics suited to their environment are more likely to survive and reproduce.

4 Species become extinct if they are not completely adapted to the environment in which they live.

7C Darwin's theory of evolution by natural selection was only gradually accepted.

One reason why Darwin's theory was not fully accepted at that time was that . . .

1 he could not explain how characteristics were inherited.

2 he was not religious.

3 he was not an accepted scientist.

4 he did not produce any scientific evidence to support the theory.

7D One way in which Darwin's and Lamarck's theories are similar is that both theories state that . . .

1 parents change the characteristics of their offspring.

2 evolution depends on changes in the environment.

3 evolution happens very quickly.

4 some characteristics are passed from parent to offspring.

4.6.3.1 Theory of evolution (biology only)

Question 16

June 2012 | BL1HP | Original Q4 | Legacy

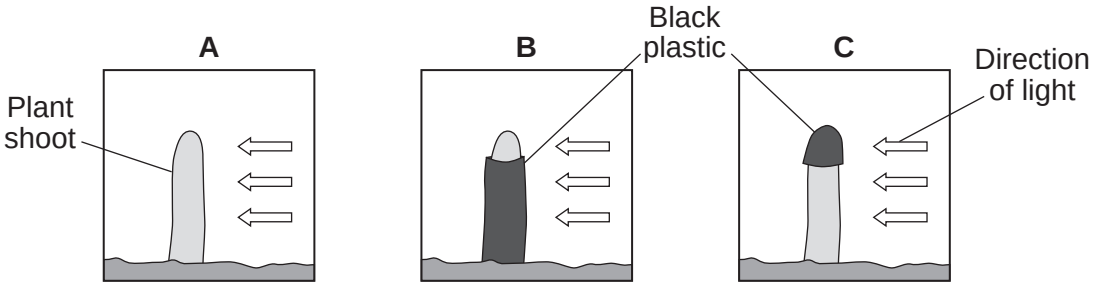
4 Charles Darwin investigated tropisms in plants.

Some students did an investigation similar to Darwin's investigation.

The students:

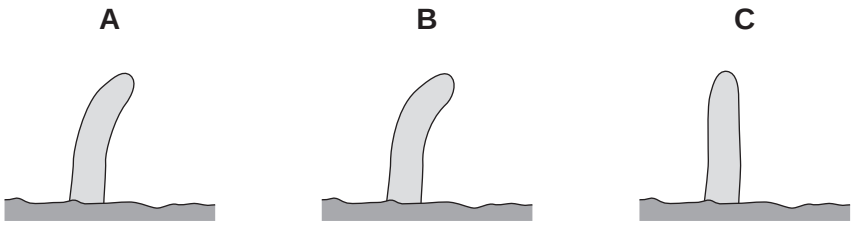
- grew seeds until short shoots had grown
- used black plastic to cover parts of some of the shoots
- put the shoots in light coming from one direction
- put boxes over the shoots to keep out other light.

The diagrams show how the investigation was set up.



Two days later the students took off the black plastic covers and looked at the shoots.

The diagrams show the results.



4 (a) Give **two** variables that the students should control in this investigation.

.....

.....

.....

.....

(2 marks)

4.6.3.1 Theory of evolution (biology only)

Question 16 · continued

4 (b) Shoot **A** bent towards the light as it grew.

Explain how.

.....

.....

.....

.....

.....

.....

.....

.....

(4 marks)

4 (c) What conclusions can be drawn from the results about:

4 (c) (i) the detection of the light stimulus

.....

.....

(1 mark)

4 (c) (ii) where in the shoot the response to the light takes place.

.....

.....

(1 mark)

8

4.6.3.1 Theory of evolution (biology only)

Question 17

7 Darwin suggested the theory of natural selection.

7 (a) Explain how natural selection occurs.

.....

.....

.....

.....

.....

.....

.....

(3 marks)

7 (b) Latitude is a measure of distance from the Earth's equator.

Scientists investigated the effect of latitude on:

- the time taken for new species to evolve
- the number of living species.

The table shows the scientists' results.

Latitude in degrees North of equator	Time taken for new species to evolve in millions of years	Relative number of living species
0 (at the equator)	3–4	100
25	2	80
50	1	30
75 (in the Arctic)	0.5	20

As latitude increases environmental conditions become more severe.

4.6.3.1 Theory of evolution (biology only)

Question 17 · continued

7 (b) (i) Describe the patterns shown by the data.

.....

.....

.....

.....

.....

.....

(2 marks)

7 (b) (ii) Suggest explanations for the patterns you have described in part **(b)(i)**.

.....

.....

.....

.....

.....

.....

(2 marks)

7

4.6.3.1 Theory of evolution (biology only)

Question 18

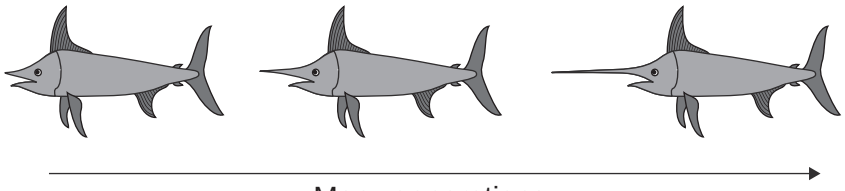
June 2013 | BL1HP | Original Q8 | Legacy

8 The picture shows a modern swordfish.



Ancestors of swordfish had short swords. Modern swordfish have long swords. Swordfish use their swords to injure prey. The injured prey are easier to catch.

The information in the box shows one theory of how the length of the sword of swordfish changed.

> The sword grew longer as each swordfish used its sword more and more.
> Each time a swordfish reproduced, the longer sword was passed on to its offspring.
>
> 
>

8 (a) Which scientist suggested the theory shown in the box?

.....

(1 mark)

4.6.3.1 Theory of evolution (biology only)

Question 18 · continued

8 (b) (i) Darwin suggested that evolution is a result of natural selection.

Describe how natural selection could result in modern swordfish with long swords developing from ancestors with short swords.

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

(4 marks)

8 (b) (ii) Scientists in the 1800s accepted both the theory shown in the box, and Darwin's theory.

Now most scientists only accept Darwin's theory.

Give **one** reason why.

.....

.....

.....

(1 mark)

6

4.6.3.1 Theory of evolution (biology only)

Question 19

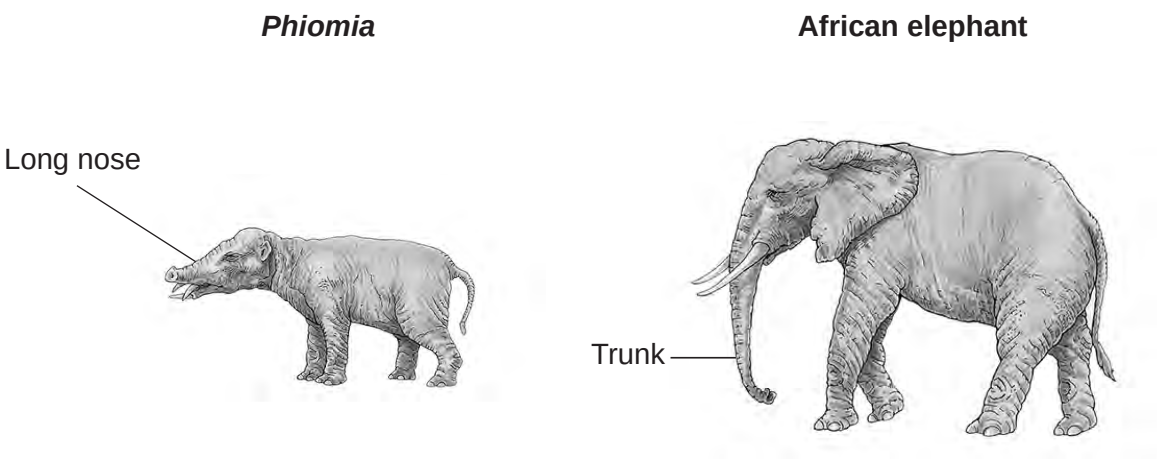
June 2014 | BL1HP | Original Q7 | Legacy

7 **Figure 5** shows:

- *Phiomia,* an ancestor of elephants
- a modern African elephant.

Phiomia lived about 35 million years ago.

Figure 5



Both *Phiomia* and the African elephant reach up into trees to get leaves.

In the 1800s, Darwin and Lamarck had different theories about how the long nose of *Phiomia* evolved into the trunk of the African elephant.

7 (a) (i) Use Darwin's theory of natural selection to explain how the elephant's trunk evolved.

[4 marks]

.....

.....

.....

.....

.....

.....

.....

.....

4.6.3.1 Theory of evolution (biology only)

Question 19 · continued

7 (a) (ii) Lamarck's theory is different from Darwin's theory.

Use Lamarck's theory to explain how the elephant's trunk evolved.

[2 marks]

.....

.....

.....

.....

7 (b) (i) In the 1800s, many scientists could **not** decide whether Lamarck's theory or Darwin's theory was the right one.

Give **two** reasons why.

[2 marks]

1 .....

.....

2 .....

.....

7 (b) (ii) Before the 1800s, many people had a different idea to explain where all the living things on Earth came from.

What idea was this?

[1 mark]

.....

.....

9

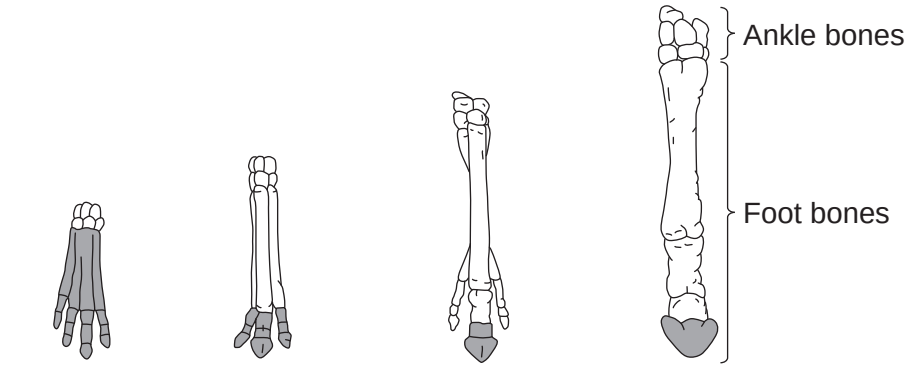
4.6.3.1 Theory of evolution (biology only)

Question 20

June 2016 | BL1HP | Original Q5 | Legacy

5 **Figure 4** shows changes in the foot bones of four ancestors of modern horses over the past 50 million years.

Figure 4



	Eohippus	*Mesohippus*	*Merychippus*	*Equus*
Millions of years ago	50	35	25	5

Key: The shaded bones are the bones which touched the ground.

5 (a) Describe **two** changes to the bones in the feet of horses that have taken place over the past 50 million years.

[2 marks]

5 (b) *Eohippus* lived in swampy areas with soft mud.

Since this time the ground in the habitat has become drier and harder.

All of the horse ancestors were preyed upon by other animals.

5 (b) (i) Explain **one** advantage to *Eohippus* of the arrangement of bones in its feet.

[2 marks]

4.6.3.1 Theory of evolution (biology only)

Question 20 · continued

5 (b) (ii) The changes in the arrangement of the foot bones of horses support Darwin's theory of evolution by natural selection.

Explain how the arrangement of the foot bones of *Eohippus* could have evolved into the arrangement of the foot bones of *Equus*.

[4 marks]

8

4.6.3.1 Theory of evolution (biology only)

Question 21

June 2017 | BL1HP | Original Q2 | Legacy

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

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

[3 marks]

2 (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.

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

[1 mark]

2 (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 22

June 2023 | 8461/2H | Original Q9

0 9 A wide variety of species exists on Earth.

Most scientists accept Darwin's theory of evolution by natural selection as the explanation for this variety of species.

Explain how our understanding of evolution has developed due to:

- fossil evidence
- increased understanding of the mechanisms of genetics.

[6 marks]

6

4.6.3.1 Theory of evolution (biology only)

Question 23

June 2024 | 8461/2H | Original Q1

0 1 Evolution of new species occurs by mutation and natural selection.

0 1 . 1 What is a mutation?

[1 mark]

0 1 . 2 Describe the process of natural selection.

[3 marks]

0 1 . 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 ☐

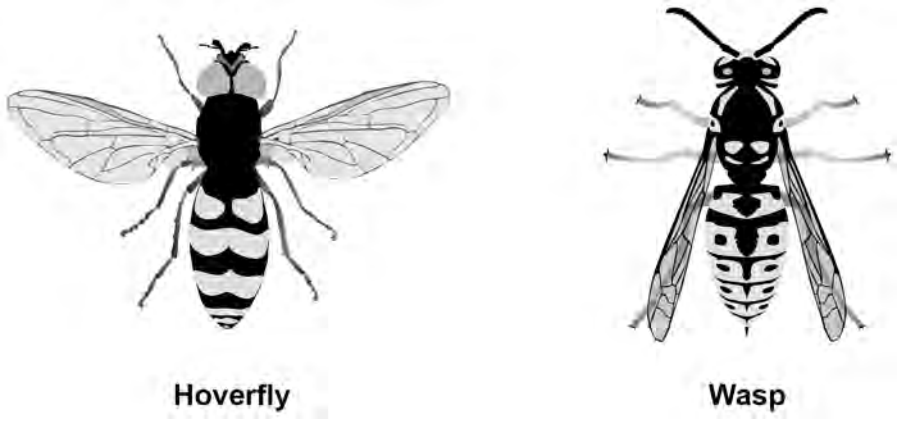
4.6.3.1 Theory of evolution (biology only)

Question 23 · continued

0 1 . 4 The hoverfly and the wasp are insects with bright yellow and black markings.

Figure 1 shows a hoverfly and a wasp.

Figure 1



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