AQA GCSE Biology | 8461

SPECIFICATION POINT 4.6.2.2

Evolution

Past-paper questions

Tier	**Higher**
Question groups	**48**
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.

4.6.2.2 Evolution

Question 01

January 2007 | BLY1H | Original Q6 | Legacy

6 The drawings show two different species of butterfly.



Amauris



Hypolimnas

- Both species can be eaten by most birds.
- *Amauris* has a foul taste which birds do not like, so birds have learned not to prey on it.
- *Hypolimnas* does **not** have a foul taste but most birds do not prey on it.

(a) Suggest why most birds do **not** prey on *Hypolimnas*.

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(2 marks)

(b) Suggest an explanation, in terms of natural selection, for the markings on the wings of *Hypolimnas*.

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(3 marks)

5

4.6.2.2 Evolution

Question 02

March 2007 | BLY1A | Original Q1 | Legacy

QUESTION ONE

Avian influenza (bird flu) is caused by a virus which was first identified in 1900. Recently there have been concerns that new strains of the virus may be able to infect humans.

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

A antibiotics

B natural selection

C pandemic

D resistance

Avian influenza cannot be treated with . . . **1** . . . .

The influenza virus may develop . . . **2** . . . to the drugs used as a result of . . . **3** . . . .

This may cause a . . . **4** . . . of the disease.

4.6.2.2 Evolution

Question 03

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.

4.6.2.2 Evolution

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

4.6.2.2 Evolution

Question 04

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

4.6.2.2 Evolution

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

4.6.2.2 Evolution

Question 05

June 2007 | BLY1B | Original Q8 | Legacy

QUESTION EIGHT

The limbs of animals have changed during the course of evolution.

Diagram 1 shows the ancestral limb plan for the forelimbs of all vertebrates (animals with backbones).

Diagram 1

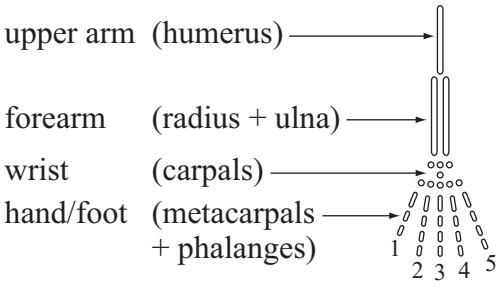
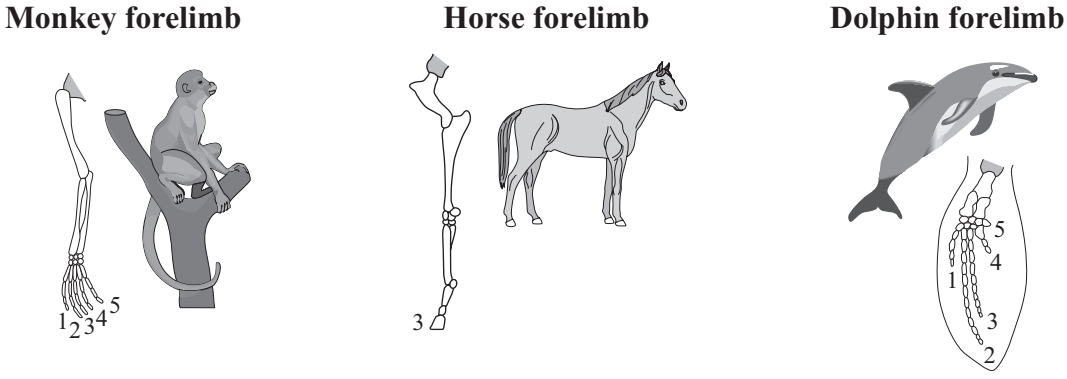


Diagram 2 shows the arrangement of the bones in the forelimbs of three mammals, a monkey, a horse and a dolphin.

Diagram 2



8A What does the pattern in the arrangement of the bones of the three mammals indicate about their evolutionary relationship?

1 They have adapted themselves to different forms of movement.

2 Mammals share a common ancestor with other vertebrates.

3 The bones remain in the same position in all vertebrates.

4 Evolution has caused the bones to change shape in different mammals.

4.6.2.2 Evolution

Question 05 · continued June 2007 | BLY1B | Original Q8 | Legacy

8B The bones of the front flippers of the dolphin are adapted for . . .

1 increasing surface area for exchange of gases.

2 supporting a large surface area of body tissue.

3 bearing the weight of the animal.

4 defending itself against predators.

8C The advantage to the horse of the evolution of its forelimbs is that . . .

1 its balance is improved.

2 the bones line up at the elbow joint.

3 the leg is longer so that the horse can run faster.

4 the carpals have become fused together.

8D Which process causes changes in the limb structure of animals?

1 competition

2 mutation

3 natural selection

4 variation

4.6.2.2 Evolution

Question 06

June 2007 | BLY1H | Original Q8 | Legacy

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

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(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.

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(2 marks)

4

4.6.2.2 Evolution

Question 07

November 2007 | BLY1B | Original Q3 | Legacy

QUESTION THREE

Rabbits and hares are closely related species.

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

3A Extinction may be caused by . . .

1 an increase in variation.

2 a lack of new competitors.

3 fossilisation.

4 changes in the environment.

3B 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.

3C 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

4.6.2.2 Evolution

3D 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

Turn over for the next question

4.6.2.2 Evolution

Question 08

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.

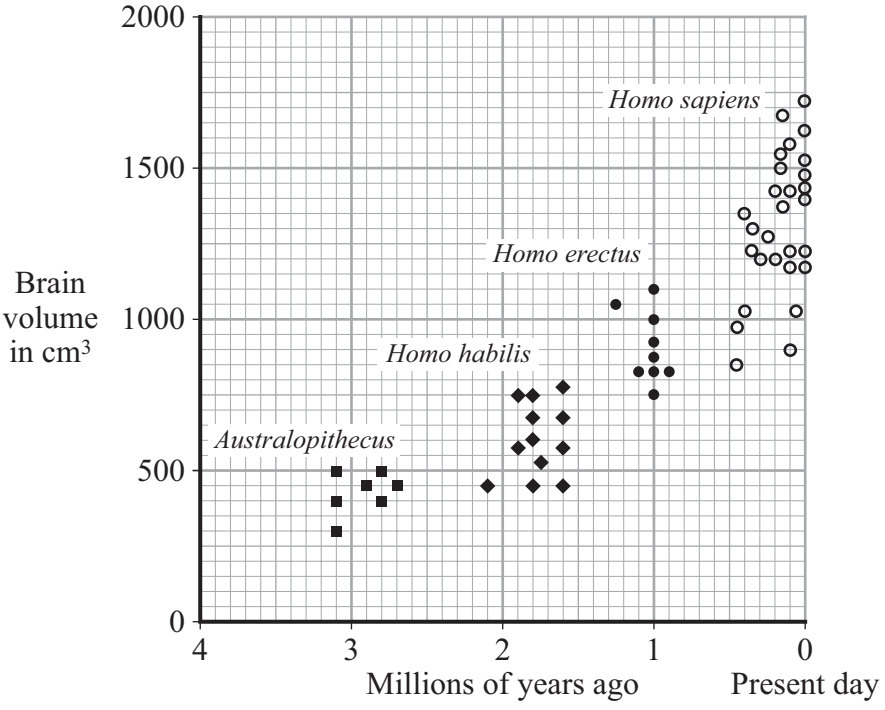
3 religious leaders.

4 members of parliament.

Question 08 · 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*.

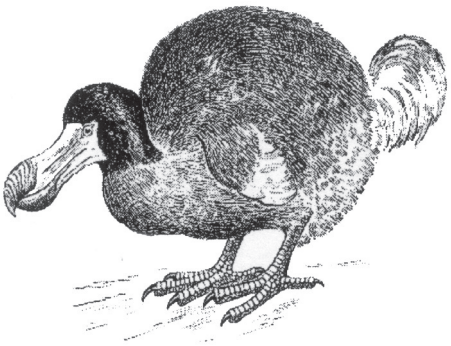
4 mean brain volume has increased during the evolution of humans.

4.6.2.2 Evolution

Question 09

January 2008 | BLY1H | Original Q7 | Legacy

7 The dodo is an extinct bird. The drawing shows an artist's impression of the bird.



Dodo – a flightless bird

The dodo lived on a small island in the middle of the Indian Ocean. Its ancestors were pigeon-like birds which flew to the island millions of years ago. There were no predators on the island. There was a lot of fruit on the ground. This fruit became the main diet of the birds. Gradually, the birds became much heavier, lost their ability to fly and evolved into the dodo.

(a) Suggest an explanation for the evolution of the pigeon-like ancestor into the flightless dodo.

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(4 marks)

4.6.2.2 Evolution

Question 09 · continued

BLANK

(b) The dodo became extinct about 80 years after Dutch sailors first discovered the island in the eighteenth century.

Scientists are uncertain about the reasons for the dodo's extinction.

Suggest an explanation for this uncertainty.

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.....

(1 mark)

5

Turn over for the next question

4.6.2.2 Evolution

Question 10

June 2008 | BLY1BP | Original Q2 | Legacy

QUESTION TWO

This question is about evolution.

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

A mutation

B natural selection

C extinction

D variation

Evolution occurs by . . . **1** . . . .

It is a very slow process.

Individual organisms of a particular species have differences in their genes, so may show a wide . . . **2** . . . .

These organisms breed and pass on their genes to the next generation, so passing on their useful characteristics.

More rapid change in a species may result from . . . **3** . . . .

A new disease might cause . . . **4** . . . of the species.

4.6.2.2 Evolution

Question 11

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.

4.6.2.2 Evolution

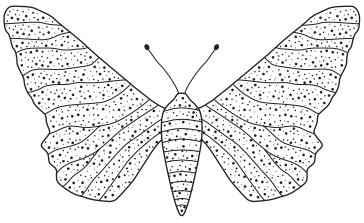
Question 12

June 2008 | BLY1BP | Original Q9 | Legacy

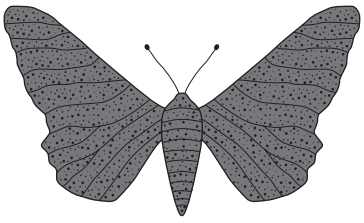
QUESTION NINE

Before the mid-nineteenth century, almost all peppered moths in England were light coloured and were not easy to spot as they rested on light-coloured tree bark and lichens.
The burning of coal during the Industrial Revolution produced gases that killed many of the lichens and blackened the environment with soot.
It was during this period that the first sighting of the dark-coloured peppered moths were reported in 1848.
By 1895, the percentage of dark-coloured moths in industrial cities such as Manchester had risen from about 2% to around 95%.
Birds are the main predators for both types of moth.

The picture below shows the two forms of peppered moth.



Pale form
(light-coloured)



Dark form
(dark-coloured)

9A The most likely reason for the increase in the proportion of dark moths compared with pale moths in cities was . . .

1 better resistance to poisonous gases produced by burning coal.

2 birds preferred to eat the paler form.

3 good camouflage when resting on a blackened surface.

4 pollutants caused a reduction in the number of birds that eat moths.

9B In the past, some scientists have suggested that moths become darker in colour as a result of exposure to certain pollutants.

This is an example of . . .

1 a prediction.

2 a hypothesis.

3 an investigation.

4 an observation.

Question 12 · continued

9C Scientists agree that the observed changes in the most common colour of the moths is an example of the process of natural selection.

This means that . . .

1 male moths in polluted areas select the colour of the female whose eggs they fertilise.

2 the darker moths have a better chance of survival in polluted areas and will be more common in the next generation.

3 the moths can select which colour to display in polluted areas to make themselves least visible.

4 the moths choose the colour of the trees that they rest on.

9D Some scientists suggested that the darker moths had migrated (moved) into cities from the countryside.

To find out if this is correct we would need to know the numbers of . . .

1 dark moths that lived in the cities and in the countryside at the start of the Industrial Revolution and later in the nineteenth century.

2 pale and dark moths that lived in the cities at the start of the Industrial Revolution and later in the nineteenth century.

3 pale moths that lived in the countryside at the start of the Industrial Revolution.

4 pale moths that lived in the cities at the start of the Industrial Revolution and later in the nineteenth century.

END OF TEST

4.6.2.2 Evolution

Question 13

June 2008 | BLY1H | Original Q5 | Legacy

5 The photograph shows a Crossbill.



A Crossbill feeds by using its bill (beak) to force apart the scales on conifer cones. It then uses its tongue to extract the seeds. If the bill is clipped it grows back again.

Scientists were interested in the evolution of the bill of the Crossbill.

In an investigation, they clipped the bills of several Crossbills so that their bills no longer crossed.

They observed that Crossbills with clipped bills took much longer to get seeds.

Use information from the investigation to suggest an explanation for the evolution of the bill in the Crossbill.

In your explanation, use the ideas of *selection, competition* and *mutation*.

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(4 marks)

4

4.6.2.2 Evolution

Question 14

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

4.6.2.2 Evolution

Question 15

November 2008 | BLY1BP | Original Q3 | Legacy

QUESTION THREE

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

3A 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.

3B Scientists think that the earliest life forms first appeared on Earth . . .

1 about 1 billion years ago.

2 about 3 billion years ago.

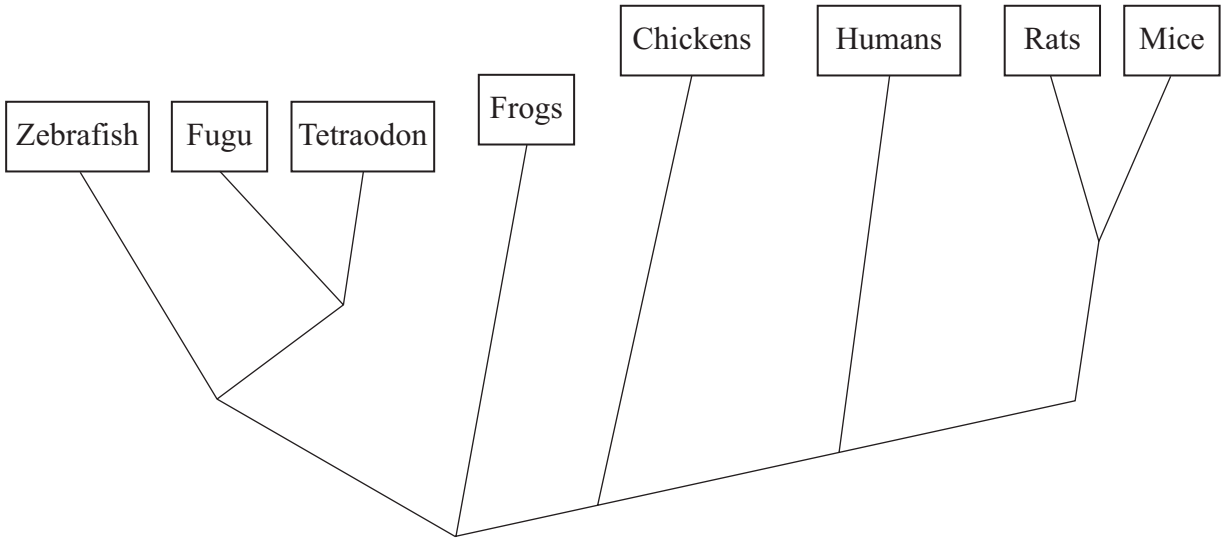
3 about 10 billion years ago.

4 about 30 billion years ago.

4.6.2.2 Evolution

Question 15 · continued

The diagram shows an evolutionary tree.



3C The evolutionary tree represents . . .

1 facts about evolution.

2 hearsay about evolution.

3 predictions about evolution.

4 a guess about evolution.

3D 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.

4.6.2.2 Evolution

Question 16

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.

4.6.2.2 Evolution

Question 16 · continued

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

4.6.2.2 Evolution

Question 17

June 2009 | BLY1AP | Original Q6 | Legacy

QUESTION SIX

Antibiotics are used to treat many types of infection.

6A Antibiotics kill . . .

1 bacteria only.

2 viruses only.

3 both bacteria and viruses.

4 all types of pathogens.

In recent years there has been a rapid increase in the number of infections in hospitals caused by antibiotic-resistant bacteria such as MRSA.

6B Bacteria such as MRSA have become resistant to antibiotics mainly because of . . .

1 overcrowding in hospitals.

2 lack of hand-hygiene amongst medical staff.

3 use of infected surgical instruments.

4 overuse of antibiotics.

6C Pathogens can be removed from hands by just washing them with soap and water.

The main advantage of this method, in terms of long-term infection control, is that . . .

1 it does not increase the proportion of antibiotic-resistant bacteria.

2 it is cheap.

3 it selectively kills the most dangerous types of bacteria.

4 soap has been used for many years with no resulting side effects.

4.6.2.2 Evolution

Question 17 · continued

6D An antibiotic-resistant strain of a bacterium develops as a result of natural selection.

Natural selection means that . . .

1 doctors select which antibiotic to use against the bacterium.

2 only a selection of bacteria can infect the human body.

3 bacteria select the most suitable person to infect.

4 only successful bacteria survive to reproduce.

Turn over for the next question

4.6.2.2 Evolution

Question 18

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** . . . .

4.6.2.2 Evolution

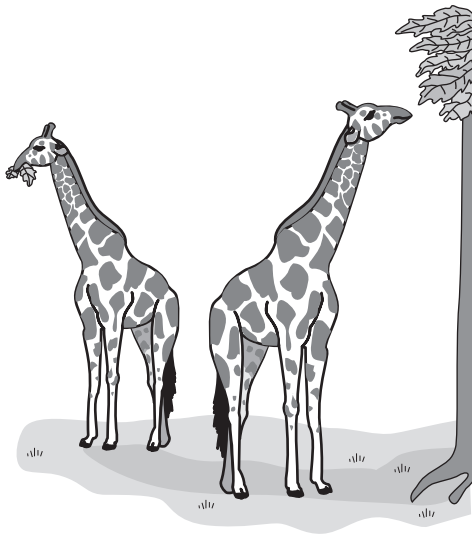
Question 19

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.

4.6.2.2 Evolution

Question 19 · 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

4.6.2.2 Evolution

Question 20

2 Charles Darwin proposed the theory of natural selection.

2 (a) What is meant by natural selection?

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.....

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(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)

4.6.2.2 Evolution

Question 20 · 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

4.6.2.2 Evolution

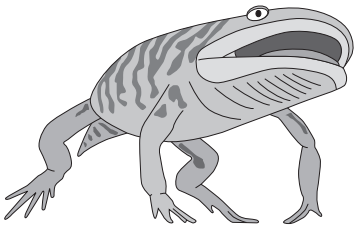
Question 21

March 2010 | BLY1BP | Original Q5 | Legacy

QUESTION FIVE

A new fossil find may be an evolutionary missing link in the amphibian family tree.

The drawing shows an artist's impression of a frogamander.



The 290 million year old fossil, nicknamed 'frogamander', was first collected in Texas by a scientist in the mid-1990s. It was rediscovered in a museum in 2004.

'It had a look of both frogs and salamanders', said the scientist who led a new study of the fossil. 'But I also recognised some primitive features, and I thought that this would be a critical piece of evidence in trying to work out the origins of modern amphibians.'

5A The frogamander needed pools of fresh water in order to breed. It is now extinct.

Which is the most likely cause of its extinction?

1 It was a small animal.

2 It could not run very fast.

3 It fed on small insects.

4 The climate became warmer.

5B Frogs and salamanders are different types of living amphibians.

The different characteristics of frogs and salamanders are directly due to . . .

1 new competitors.

2 changes to the diseases that affect them.

3 changes in their genes.

4 new predators.

4.6.2.2 Evolution

Question 21 · continued March 2010 | BLY1BP | Original Q5 | Legacy

5C Evolution is brought about by natural selection.

Natural selection always involves the survival of the . . .

1 oldest individuals.

2 most intelligent individuals.

3 individuals most suited to the environment.

4 individuals who can eat the widest range of food.

5D Scientists have not completed the evolutionary tree for amphibians yet because . . .

1 frogamanders have primitive features.

2 no-one has ever seen a frogamander.

3 there is not enough fossil evidence.

4 scientists do not know the mechanism of inheritance in amphibians.

4.6.2.2 Evolution

Question 22

June 2010 | BLY1BP | Original Q6 | Legacy

QUESTION SIX

Read the passage about sticklebacks.

> Small fish called sticklebacks originated in the oceans, but began populating freshwater lakes and streams about 20 000 years ago. Sticklebacks that live in freshwater have lost their body 'armour' over the past 20 000 years.
>
> Scientists have identified a mutant gene in sticklebacks that prevents the growth of 'armour'. This mutant gene is very common in freshwater sticklebacks, but is found in only about 1 % of seawater sticklebacks. Sticklebacks with the mutant gene are significantly longer than those without it.
>
> The scientists carried out an investigation in which they moved 200 seawater sticklebacks into freshwater. After a few years the frequency of the mutant gene in the offspring of these fish had increased significantly.

6A The mutant gene that prevents the growth of 'armour' is . . .

1 a strong gene.

2 a weak gene.

3 a changed gene.

4 a stable gene.

6B The change in the frequency of the mutant gene in sticklebacks which live in freshwater is a result of . . .

1 the greenhouse effect.

2 natural selection.

3 new diseases.

4 changes in the composition of freshwater.

4.6.2.2 Evolution

Question 22 · continued

6C Because they do not produce ‘armour’, the freshwater sticklebacks can . . .

1 produce more muscles and bones.

2 camouflage themselves.

3 move into deeper water.

4 move back into seawater.

6D The evidence from this investigation . . .

1 proves the theory of evolution.

2 supports the theory of evolution.

3 disproves the theory of evolution.

4 leads to an observation about the theory of evolution.

Turn over for the next question

4.6.2.2 Evolution

Question 23

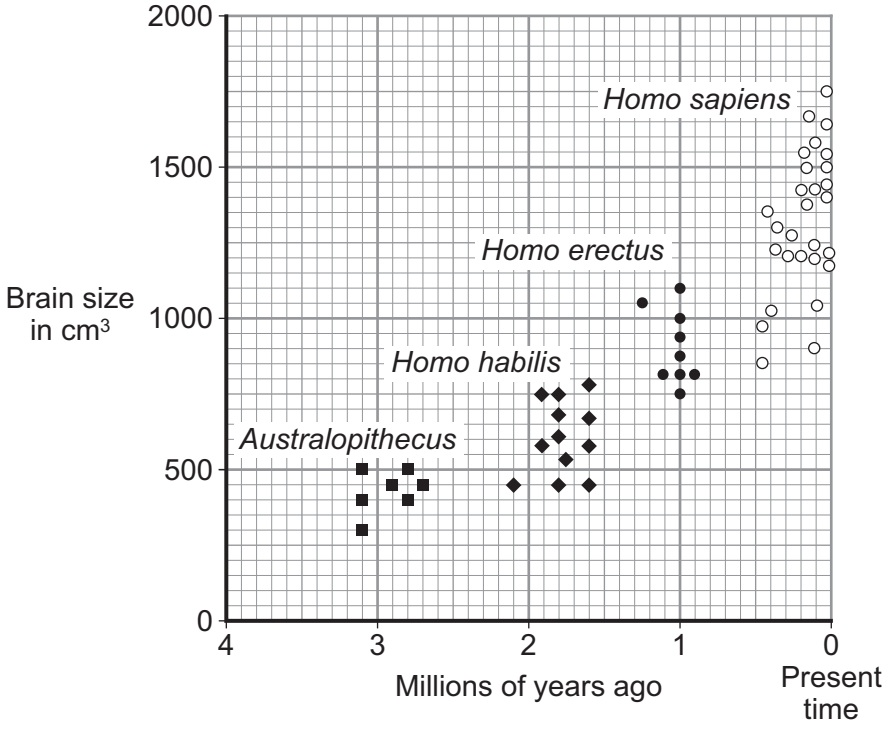
June 2010 | BLY1BP | Original Q7 | Legacy

QUESTION SEVEN

Modern humans belong to the species *Homo sapiens*. Many people think that modern humans evolved from more primitive species. Three of these primitive species were *Australopithecus*, *Homo habilis* and *Homo erectus*. These three species are now extinct.

Scientists investigated the brain size of several specimens from each of the species.

The graph shows their results.



7A The ranges of brain size of *Homo sapiens* and *Homo erectus* overlap by . . .

1 200 cm^3

2 250 cm^3

3 300 cm^3

4 1000 cm^3

7B From this data, the time over which *Australopithecus* existed was . . .

1 0.2 million years.

2 0.4 million years.

3 3.1 million years.

4 3.3 million years.

Question 23 · continued

7C Which one of the following is correct?

The fossil data for . . .

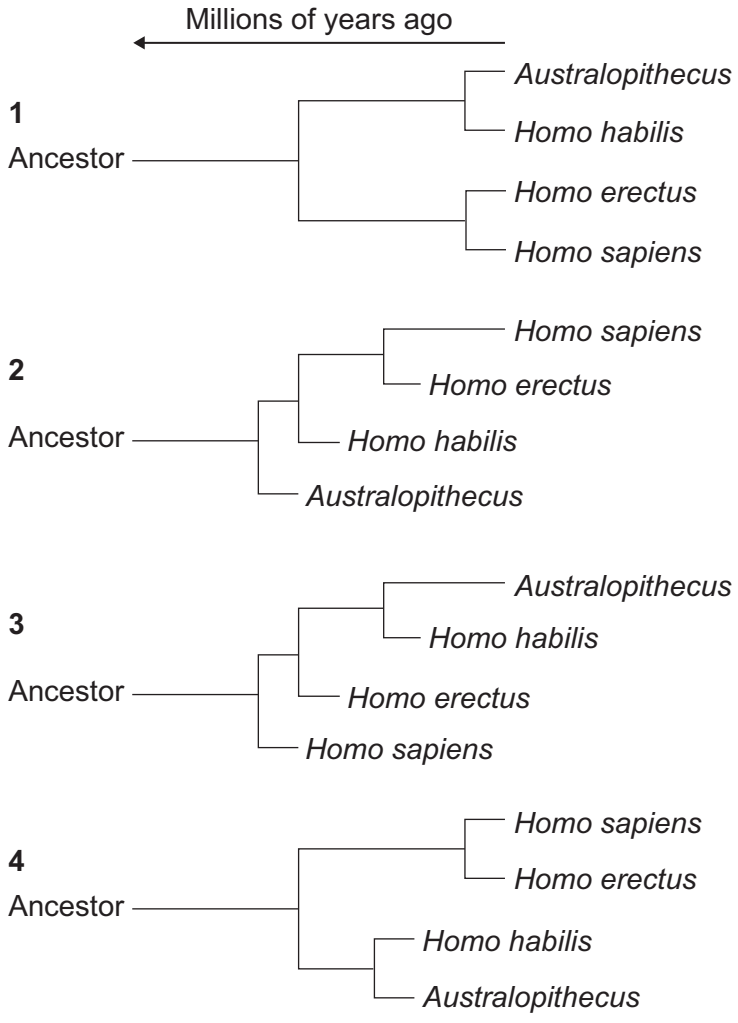
1 *Australopithecus* can be considered least reliable because the fewest number of skulls have been found.

2 *Homo habilis* can be considered to be most reliable because they were fossilised over the longest period of time.

3 *Homo erectus* can be considered most reliable because they were fossilised over the shortest period of time.

4 *Homo sapiens* can be considered least reliable because they were fossilised most recently.

7D Which evolutionary tree is supported by the evidence in the graph?



4.6.2.2 Evolution

Question 24

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

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(3 marks)

4.6.2.2 Evolution

Question 24 · continued

7 (b) Lamarck's theory.

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(2 marks)

5

Turn over for the next question

4.6.2.2 Evolution

Question 25

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.

4.6.2.2 Evolution

Question 25 · 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

4.6.2.2 Evolution

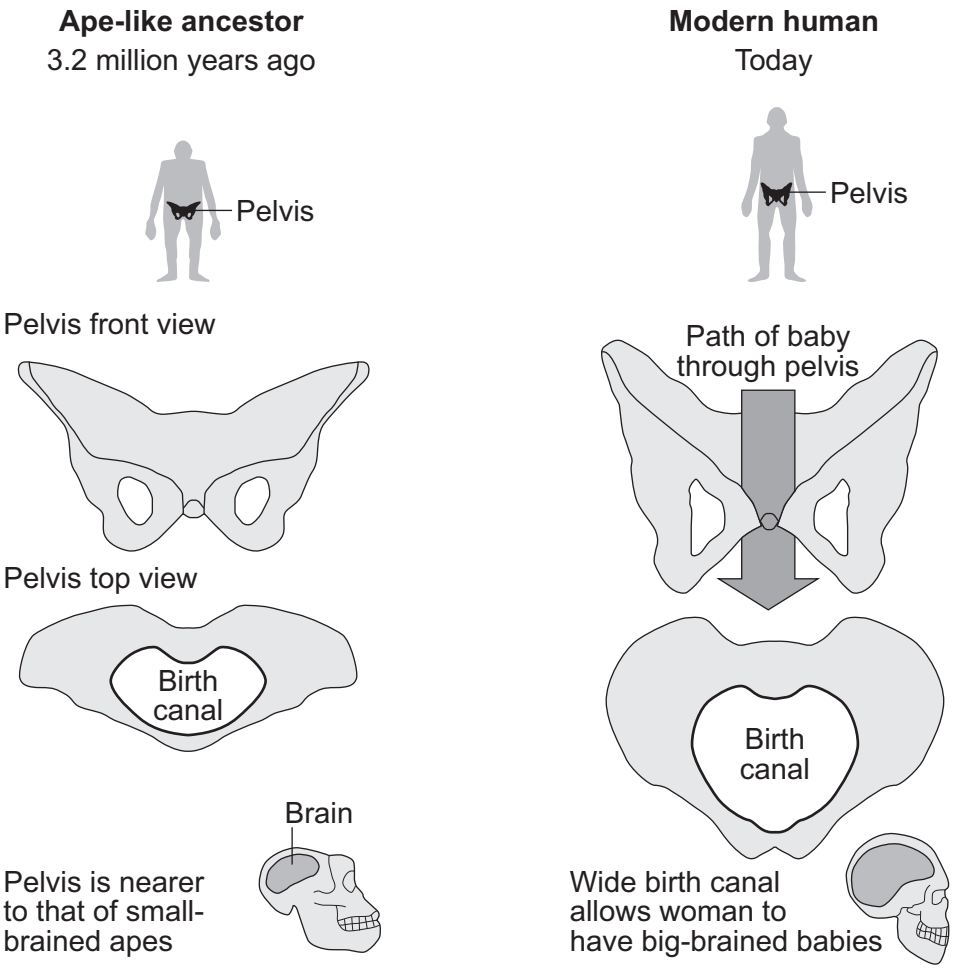
Question 26

7 Humans have evolved from ape-like ancestors by natural selection.

The drawing shows the pelvis of an ape-like ancestor and a modern human.

The skull and brain of the new born baby are also shown to the same scale.

Modern humans are much more intelligent than their ape-like ancestors.



4.6.2.2 Evolution

Question 26 · continued

Suggest an explanation for the evolution of the size and shape of the pelvis of modern humans.

Use information from the drawing to help you.

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(4 marks)

4

4.6.2.2 Evolution

Question 27

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** . . . .

4.6.2.2 Evolution

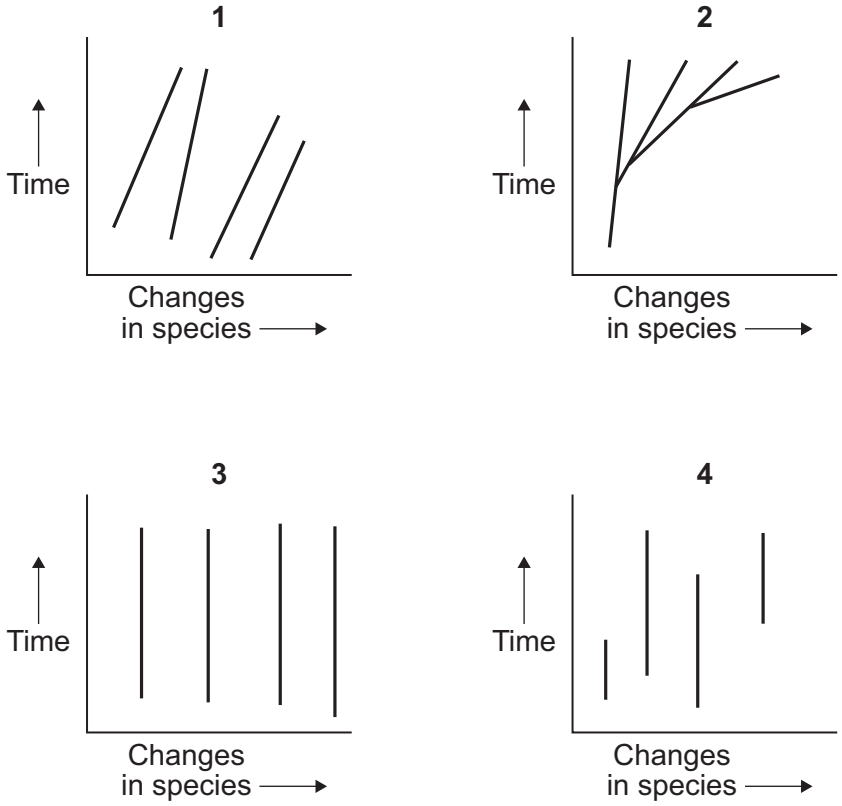
Question 28

June 2011 | BLY1BP | Original Q2 | Legacy

QUESTION TWO

Evolution takes place when species change over time.

In each of the diagrams below, the four lines show the changes in four different species.



Match statements, **A**, **B**, **C** and **D**, with diagrams **1**–**4**.

A each of the four species changes slowly over time

B none of the four species changes over time and some species die out

C none of the four species changes over time

D new species evolve over time

4.6.2.2 Evolution

Question 29

June 2011 | BLY1H | Original Q6 | Legacy

6 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.

Suggest an explanation for the evolution of the wild Soay sheep over the last 25 years.

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(4 marks)

4

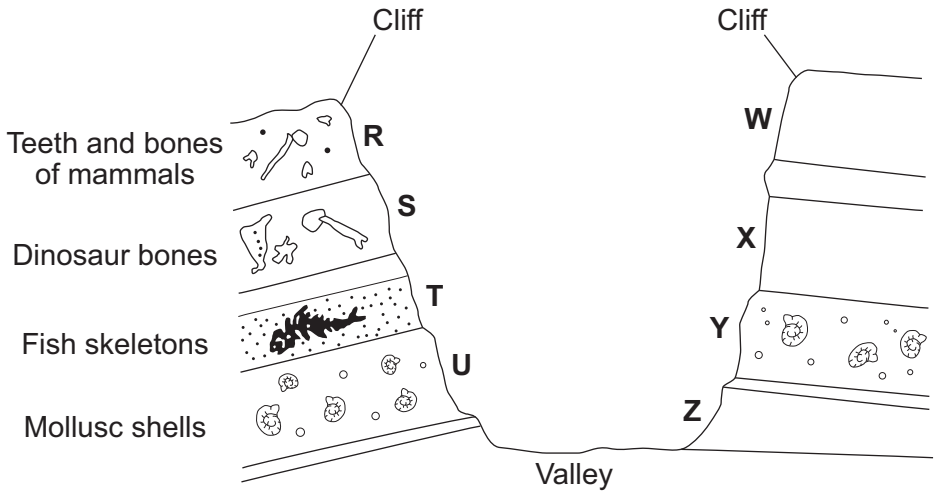
4.6.2.2 Evolution

Question 30

November 2011 | BLY1BP | Original Q3 | Legacy

QUESTION THREE

The diagram shows a section through rock layers containing fossils.



3A 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**

3B 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.

4.6.2.2 Evolution

3C 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.

3D 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

4.6.2.2 Evolution

Question 31

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.

4.6.2.2 Evolution

Question 32

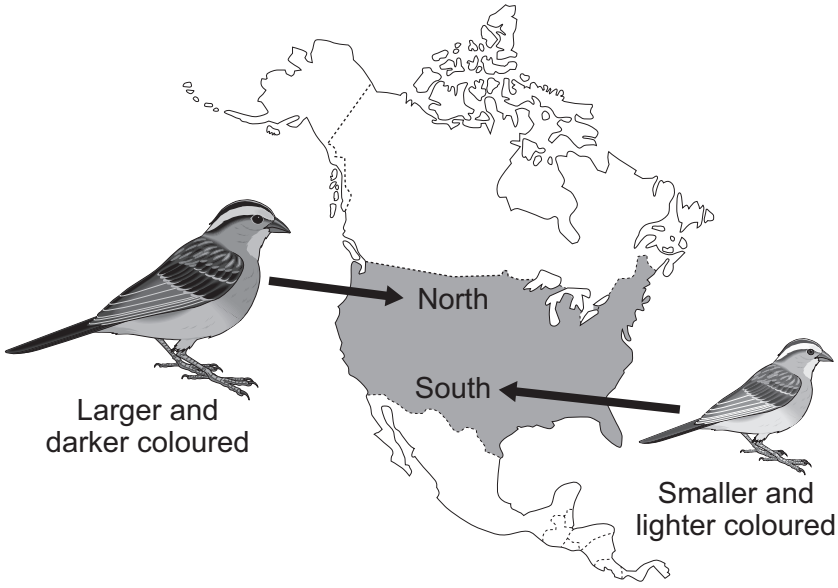
November 2011 | BLY1BP | Original Q9 | Legacy

QUESTION NINE

House sparrows arrived in North America from Europe in the nineteenth century. Since then, sparrows have spread to inhabit most of the continent.

House sparrows in the north of America are larger and darker coloured than house sparrows in the south of America.

The drawing shows where the two types of sparrow live.



9A The differences between the sparrows have been caused directly by changes in . . .

1 the environment.

2 the sparrows' predators.

3 the sparrows' genes.

4 human activities.

9B Being larger than the southern sparrow helps the northern sparrow to . . .

1 see prey from greater distances.

2 be less easily seen by predators.

3 live in a greater range of habitats.

4 conserve more heat.

4.6.2.2 Evolution

Question 32 · continued

9C The two sparrow populations have become distinctly different because they do **not** . . .

1 eat the same prey.

2 have the same predators.

3 interbreed.

4 have the same types of tree to nest in.

9D The information in this question . . .

1 proves that natural selection takes place.

2 shows that some acquired characteristics are inherited.

3 provides evidence for evolution.

4 shows that one of the types of sparrow is likely to become extinct in the near future.

END OF TEST

4.6.2.2 Evolution

Question 33

June 2012 | BL2HP | Original Q6 | Legacy

6 (a) How do fossils provide evidence that species alive today have evolved from simpler organisms?

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(3 marks)

6 (b) The photographs show two species of gull.

Herring gull (*Larus argentatus*)



Photograph: © John Howard/Science Photo Library

Lesser black-backed gull (*Larus fuscus*)



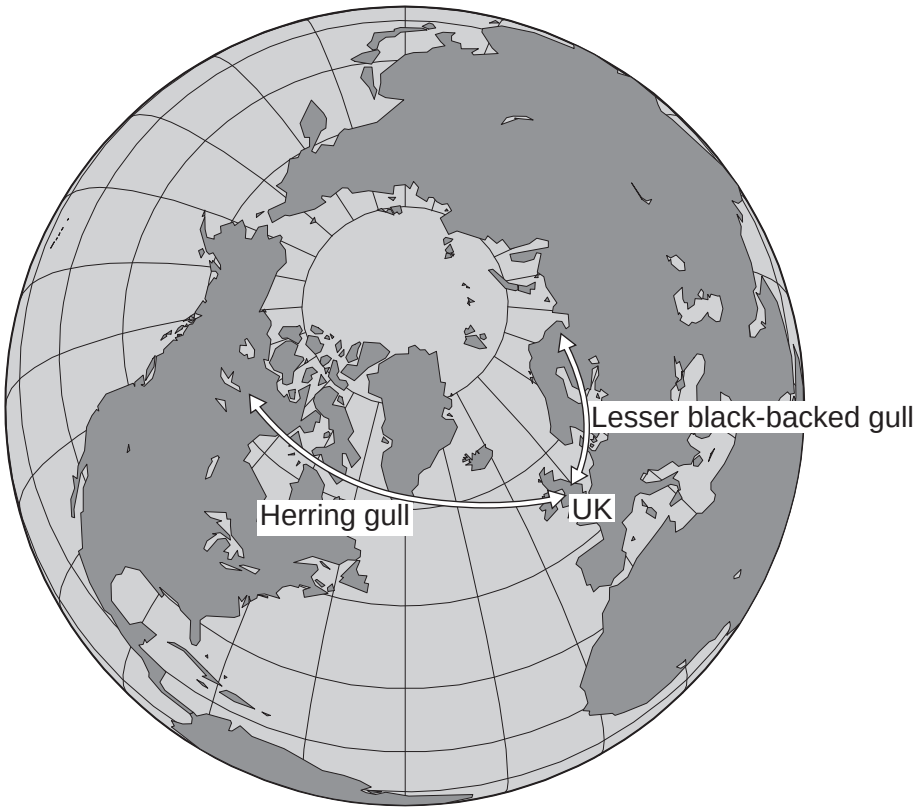
Photograph: © John Devries/Science Photo Library

Both species are now found in the UK but the two species cannot interbreed with each other. Scientists believe that these two species have evolved from a common ancestor.

The map on the next page shows a view of the Earth from above the North Pole.
The map also shows where these two species are found.

4.6.2.2 Evolution

Question 33 · continued



6 (b) Suggest an explanation for the development of these different species.

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(6 marks)

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4.6.2.2 Evolution

Question 34

7 Darwin suggested the theory of natural selection.

7 (a) Explain how natural selection occurs.

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(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.

4.6.2.2 Evolution

Question 34 · continued

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

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(2 marks)

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

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(2 marks)

7

4.6.2.2 Evolution

Question 35

January 2013 | BL2HP | Original Q7 | Legacy

7 *Howea forsteriana* and *Howea belmoreana* are two species of palm tree.

The two *species* grow together on a small island in the South Pacific.

7 (a) What is meant by the term *species*?

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(2 marks)

4.6.2.2 Evolution

Question 35 · continued

7 (b) The table gives some information about these two species of palm tree.

	Howea forsteriana	*Howea belmoreana*
Optimum pH of the soil for growth of the palm tree	pH 8	pH 6
Height above sea level of most common habitat	30 to 60 metres	above 120 metres
Month when most palm trees flower	October	December
Method of pollination	Wind carries pollen	Wind carries pollen

Scientists believe that these two species of palm tree began to evolve from a single species over 2 million years ago.

Suggest how these two different species developed.

In your answer you should use information from the table and your own knowledge.

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(5 marks)

7

4.6.2.2 Evolution

Question 36

June 2013 | BL1HP | Original Q8 | Legacy

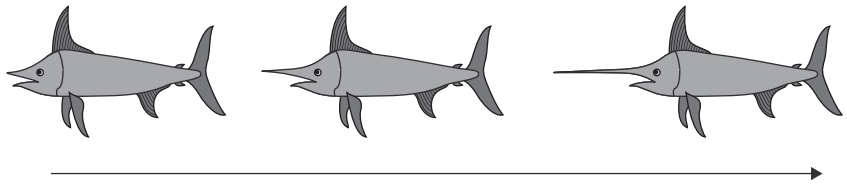
8 The picture shows a modern swordfish.



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)

4.6.2.2 Evolution

Question 36 · 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.

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(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.

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(1 mark)

6

4.6.2.2 Evolution

Question 37

June 2013 | BL2HP | Original Q8 | Legacy

8 The photographs show the flowers of two closely-related species of plant.

Species A



Species B



The drawings show chromosomes from one cell in the root of each plant during cell division.

Species A



Species B



8 (a) The drawings show that each chromosome has two strands of genetic material.

8 (a) (i) How does a chromosome become two strands?

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(1 mark)

4.6.2.2 Evolution

Question 37 · continued

8 (a) (ii) Explain why each chromosome must become two strands before the cell divides.

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(2 marks)

8 (b) For sexual reproduction, the plants produce gametes.

8 (b) (i) Name the type of cell division that produces gametes. .....

(1 mark)

8 (b) (ii) How many chromosomes would there be in a gamete from each of these two plant species?

Species A ☐ **Species B** ☐

(1 mark)

8 (b) (iii) It is possible for gametes from **Species A** to combine with gametes from **Species B** to produce healthy offspring plants.

How many chromosomes would there be in each cell of one of the offspring plants?

☐

(1 mark)

Question 8 continues on the next page

4.6.2.2 Evolution

Question 37 · continued

8 (c) (i) Look back at the information at the start of the question and the information from part **(b)**.

What evidence from these two pieces of information supports the belief that **Species A** and **Species B** evolved from a common ancestor?

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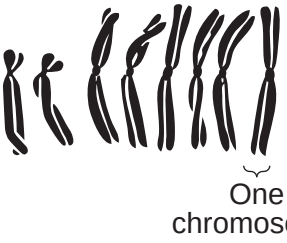
(2 marks)

8 (c) (ii) For successful gamete production to take place, chromosomes that contain the same genes must pair up.

The drawings showing the chromosomes of **Species A** and of **Species B** are repeated below.

Species A



Species B



The offspring plants cannot reproduce sexually.

Suggest an explanation for this.

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(2 marks)

10

4.6.2.2 Evolution

Question 38

June 2014 | BL1HP | Original Q7 | Legacy

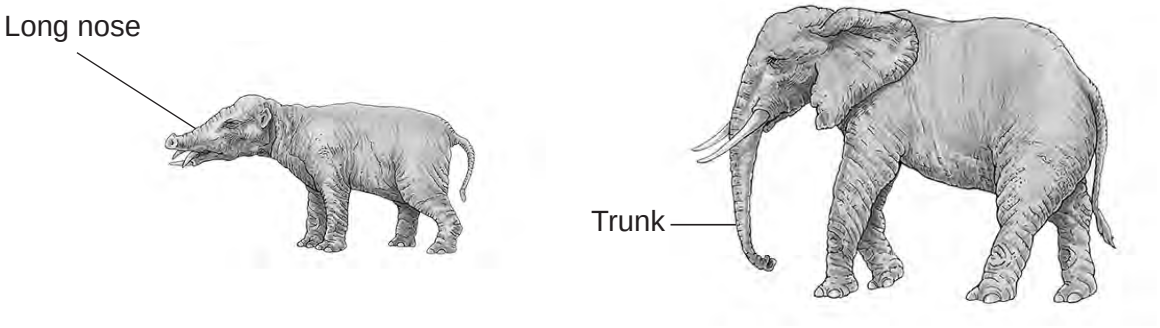
7 **Figure 5** shows:

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

Phiomia lived about 35 million years ago.

Figure 5

Phiomia **African elephant**



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]

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4.6.2.2 Evolution

Question 38 · 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]

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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 .....

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2 .....

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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]

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9

4.6.2.2 Evolution

Question 39

June 2015 | BL2HP | Original Q6 | Legacy

6 (a) Evidence about extinct species of animals and plants comes from fossils.

Figure 8 is a photograph of a fossil of a bird-like animal called *Archaeopteryx*. *Archaeopteryx* lived about 150 million years ago.

Figure 8



6 (a) (i) Suggest how the fossil of *Archaeopteryx* was formed.

[2 marks]

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6 (a) (ii) Scientists have found other fossils of the ancestors of modern birds, but the fossil record is very incomplete.

Suggest **two** reasons why there are gaps in the fossil record.

[2 marks]

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2 .....

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4.6.2.2 Evolution

Question 39 · continued

6 (b) There are many different species of bird on the Earth today.

Describe how these different species may have evolved from an ancestor such as *Archaeopteryx*.

[4 marks]

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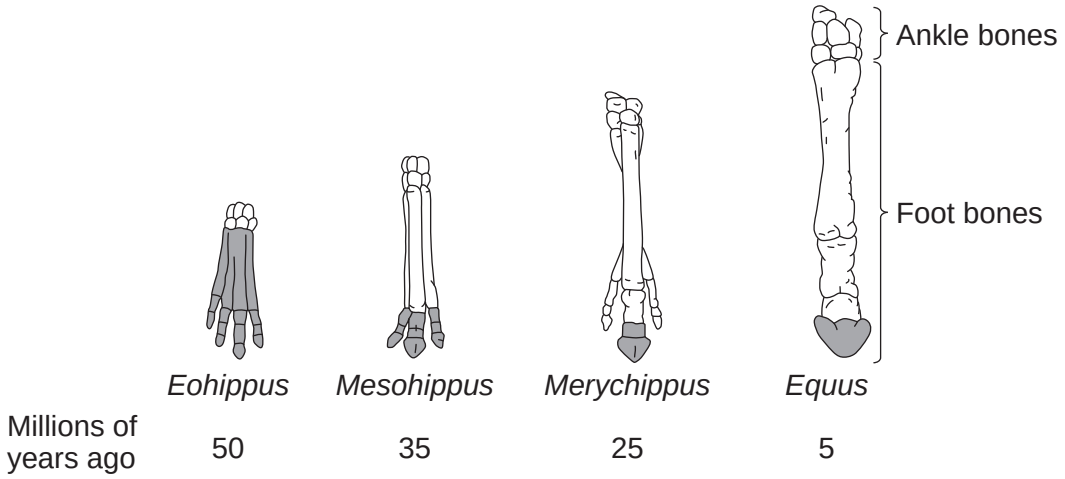
4.6.2.2 Evolution

Question 40

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



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]

4.6.2.2 Evolution

Question 40 · 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

4.6.2.2 Evolution

Question 41

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

4.6.2.2 Evolution

Question 42

June 2017 | BL2HP | Original Q7 | Legacy

7 There are nearly 9 million species of organisms alive on Earth today.

7 (a) (i) What is a species?

[2 marks]

7 (a) (ii) How do fossils provide evidence that species alive today have evolved from simpler organisms?

[2 marks]

7 (b) **Figure 7** shows three species of flightless birds that are alive today.

Each of the three species lives on a different continent.

Figure 7

Rhea (South America)



Emu (Australia)



Ostrich (Africa)



4.6.2.2 Evolution

Question 42 · continued

Many scientists now believe that each of these species evolved from an ancestral species of bird that could fly. This happened after the extinction of the dinosaurs, about 65 million years ago. Many of the dinosaurs were meat eaters.

Although these three birds are different species, they have many features in common.

Suggest how these different species of flightless birds might have evolved to have many features in common.

[6 marks]

10

4.6.2.2 Evolution

Question 43

June 2018 | 8461/2H | Original Q9

0 9 **Figure 12** shows a ring-tailed lemur.

Figure 12



Table 5 shows part of the classification of the ring-tailed lemur.

Table 5

Classification group	Name
Kingdom	*Animalia*
Phylum	*Chordata*
	Mammalia
	Primates
	Lemuroidea
Genus	*Lemur*
	catta

0 9 . 1 Complete **Table 5** to give the names of the missing classification groups.

[2 marks]

0 9 . 2 Give the binomial name of the ring-tailed lemur.

Use information from **Table 5**.

[1 mark]

4.6.2.2 Evolution

Question 43 · continued

Lemurs are only found on the island of Madagascar.

Madagascar is off the coast of Africa.

Scientists think that ancestors of modern lemurs evolved in Africa and reached Madagascar about 50-60 million years ago.

Today there are many species of lemur living on Madagascar.

Figure 13 shows information about water currents.

Figure 14 shows the distribution of three species of lemur on Madagascar.

Figure 13

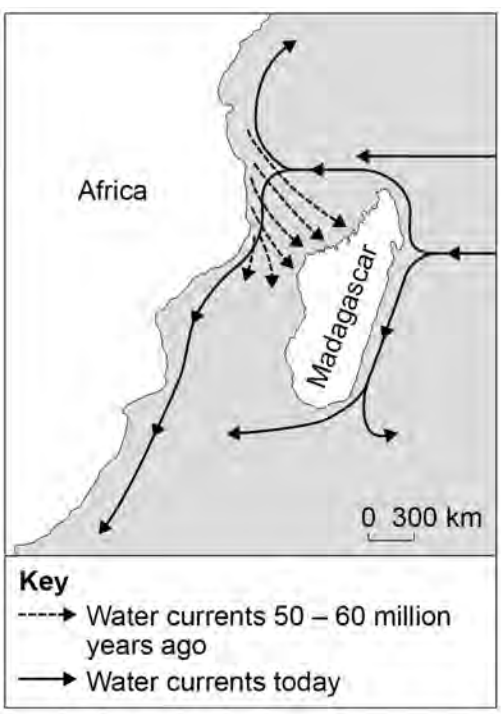
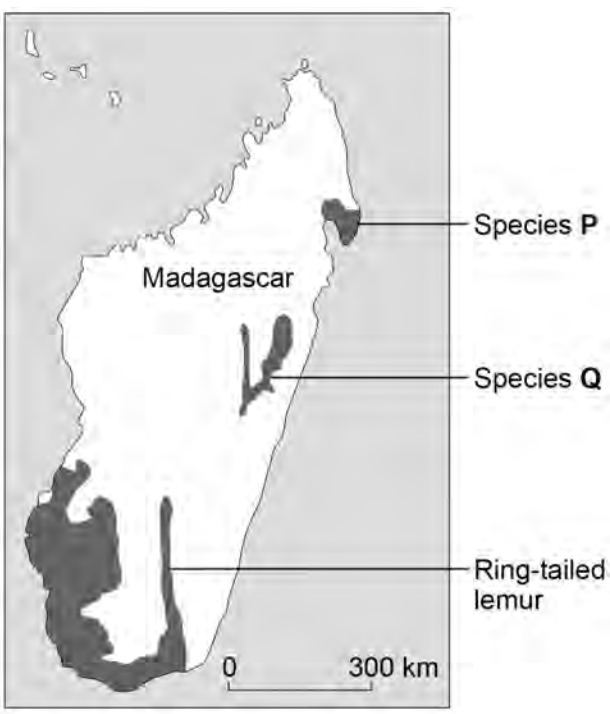


Figure 14



0 9 . 3 Suggest how ancestors of modern lemurs reached Madagascar.

[1 mark]

4.6.2.2 Evolution

Question 43 · continued

0 9 . 4 Describe how the ancestors of modern lemurs may have evolved into the species shown in **Figure 14**.

[5 marks]

9

4.6.2.2 Evolution

Question 44

November 2020 | 8461/1H | Original Q5

0 5 Many plants have evolved defence mechanisms.

Figure 8 shows part of a gorse plant and part of a deadly nightshade plant.

Figure 8



Gorse plant

Deadly nightshade plant

0 5 . 1 The gorse plant has evolved to have sharp thorns.

What type of defence response are thorns?

[1 mark]

0 5 . 2 How do thorns defend the gorse plant?

[1 mark]

0 5 . 3 The deadly nightshade plant has poisonous berries.

What type of defence response are poisonous berries?

[1 mark]

4.6.2.2 Evolution

Question 44 · continued

0 5 . 4 A scientist noticed that in one area the gorse plants had yellow leaves and had stunted growth.

One reason for yellow leaves and stunted growth is a deficiency of nitrate ions in the soil.

Explain **two** other possible reasons for the yellow leaves and stunted growth.

Do **not** refer to nitrate ions in your answer.

[5 marks]

Reason 1 _____

_____

Explanation _____

_____

_____

_____

Reason 2 _____

_____

Explanation _____

_____

_____

_____

Question 5 continues on the next page

Question 44 · continued

The gorse plant has nodules on its roots.

The nodules are part of the living root tissue.

Bacteria which convert nitrogen gas into soluble nitrate ions live in the nodule tissue.

Figure 9 shows the nodules on the roots.

Figure 9



0 5 . 5 Suggest how the nodules benefit the bacteria.

[2 marks]

0 5 . 6 Explain how the nodules benefit the gorse plant.

[2 marks]

4.6.2.2 Evolution

Question 44 · continued

0 5 . 7 For many years drugs have been extracted from plants.

Which plant material was chewed as a painkiller?

[1 mark]

Tick (✓) **one** box.

- Blackcurrant berries ☐
- Foxglove leaves ☐
- Rose petals ☐
- Willow bark ☐

13

Turn over for the next question

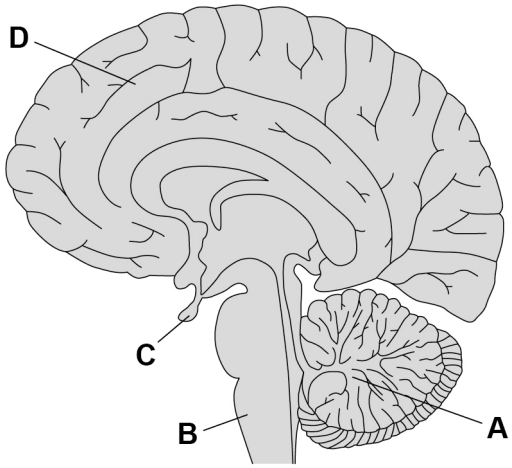
4.6.2.2 Evolution

Question 45

November 2020 | 8461/2H | Original Q6

0 6 **Figure 7** shows the brain.

Figure 7



0 6 . 1 Which part of the brain becomes more active if a person balances on one leg instead of standing on two legs?

[1 mark]

Tick (✓) **one** box.

A ☐ **B** ☐ **C** ☐ **D** ☐

0 6 . 2 Name the part of the brain that is responsible for making a decision.

[1 mark]

_____

4.6.2.2 Evolution

Question 45 · continued

0 6 . 3 In most MRI scanners the person being scanned needs to stay completely still.

A functional MRI (fMRI) scanner allows a person to move while the scanner makes images of the person's brain activity.

Suggest how the fMRI scanner could help to find out more about the brain damage a person has.

[3 marks]

0 6 . 4 Describe how the brain receives information about light entering the eye.

You should include the names of structures in your answer.

[3 marks]

Question 6 continues on the next page

4.6.2.2 Evolution

Question 45 · continued

0 6 . 5 The eyes of some birds contain cells that detect ultraviolet (UV) light.

UV light is reflected by some fruits and the urine of small mammals.

Explain how birds that detect UV light have evolved from birds that could not detect UV light.

[6 marks]

14

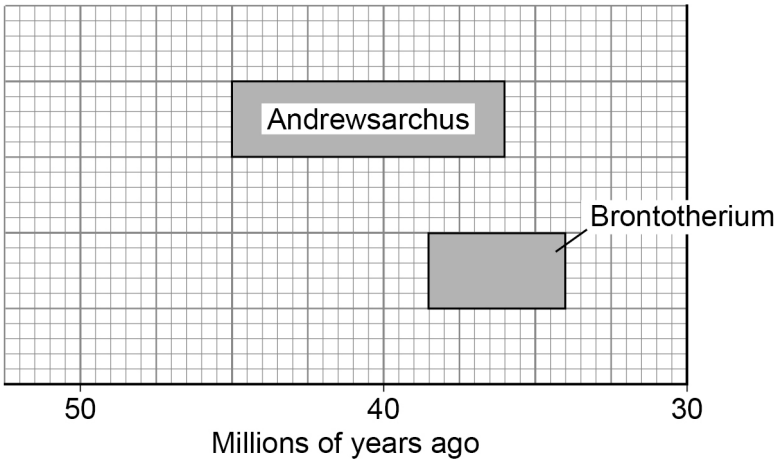
4.6.2.2 Evolution

Question 46

November 2020 | 8461/2H | Original Q8

0 8 **Figure 8** shows when two mammals existed in Asia.

Figure 8



0 8 . 1 Determine the number of years both Andrewsarchus and Brontotherium existed together.

[2 marks]

Time = _____ years

4.6.2.2 Evolution

Question 46 · continued

0 8 . 2 The oldest fossils of human ancestors found in this area are 700 000 years old.

Andrewsarchus was a carnivore and Brontotherium was a herbivore.

Suggest how the extinction of Andrewsarchus could have resulted in the extinction of Brontotherium.

[3 marks]

0 8 . 3 Information about extinct animals is often **not** clear because the fossil record is incomplete.

Give **three** reasons why the fossil record is **not** clear for older species.

[3 marks]

1

2

3

Question 8 continues on the next page

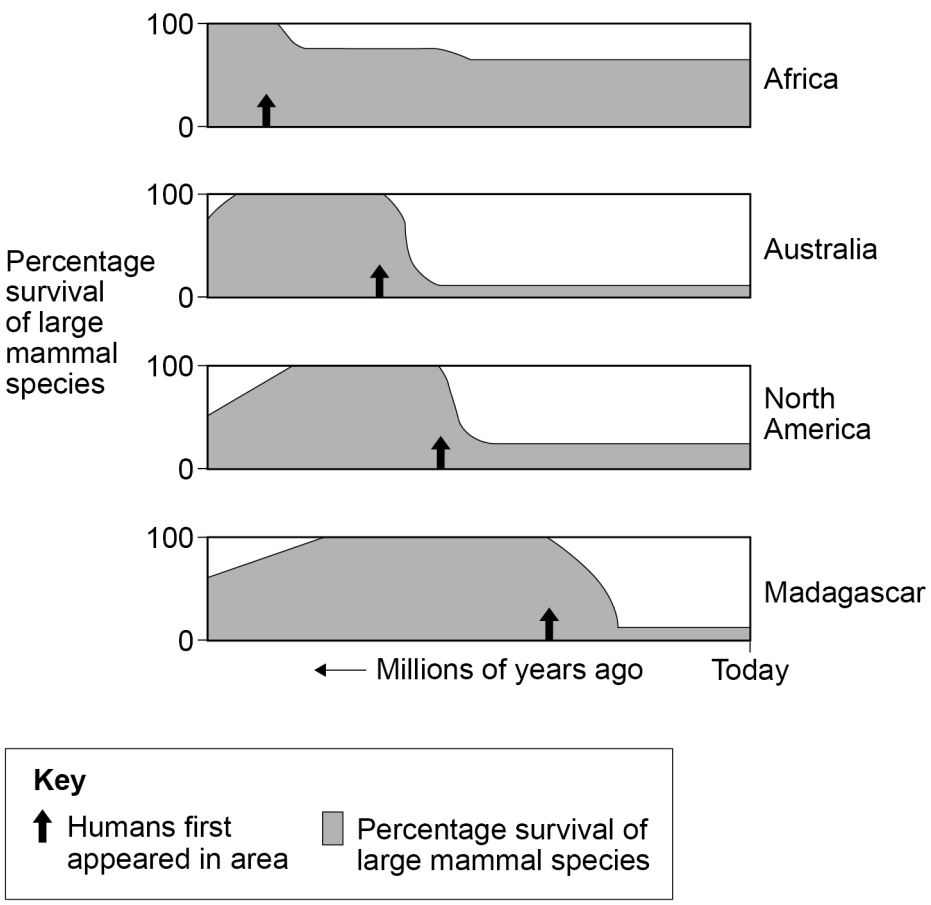
4.6.2.2 Evolution

Question 46 · continued

Figure 9 shows the percentage (%) survival of large mammal species in four areas of the world.

The time at which humans first appeared in each of the four areas is also shown.

Figure 9



4.6.2.2 Evolution

Question 46 · continued

A mass extinction is a rapid decrease in biodiversity on Earth.

0 8 . 4 A student stated:

'The data in **Figure 9** shows that humans caused mass extinctions.'

Evaluate the student's statement.

[6 marks]

Question 8 continues on the next page

4.6.2.2 Evolution

Question 46 · continued

November 2020 | 8461/2H | Original Q8

0 8 . 5 Give **one** disadvantage and **one** advantage of mass extinction events.

Answer in terms of evolution.

[2 marks]

Disadvantage _____

_____

Advantage _____

_____

16

4.6.2.2 Evolution

Question 47

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

4.6.2.2 Evolution

Question 48

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.

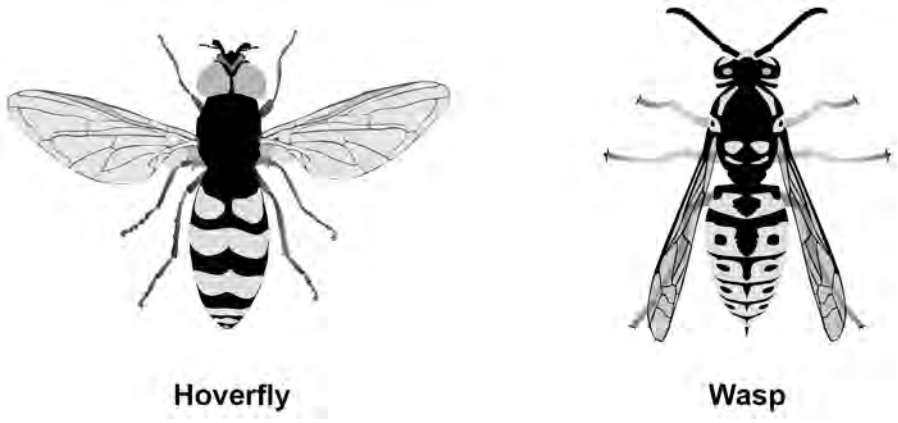
- Alexander Fleming and Carl Woese ☐
- Alfred Wallace and Alexander Fleming ☐
- Alfred Wallace and Charles Darwin ☐
- Charles Darwin and Carl Woese ☐

Question 48 · 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