

Evolution 3

Q:1 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.

(4 marks)

Q:2 The photograph shows an Anolis lizard. This lizard lives on a tiny island.



Scientists investigated how the leg length of the Anolis lizards affected their survival.

At the start of the investigation the Anolis lizards had a large range of leg lengths.

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

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

(1 mark)

(b) The remaining Anolis lizards had long legs.

Suggest an explanation for this.

(2 marks)

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

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

Global warming

Natural selection

Sustainability

(1 mark)

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

Darwin

Lamarck

Semmelweiss

(1 mark)

Q:3 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?

(a) Darwin's theory

(3 marks)

(b) Lamarck's theory.

(2 marks)

Q:4 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.

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

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

(1 mark)

(b) Complete the sentences.

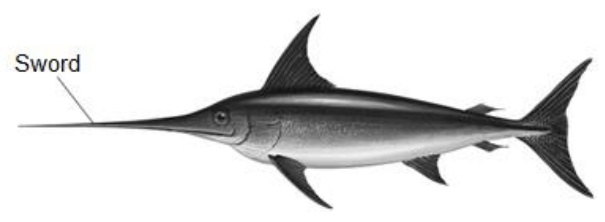
(b) (i) Soay sheep show variation in size because of differences in their

(1 mark)

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

(1 mark)

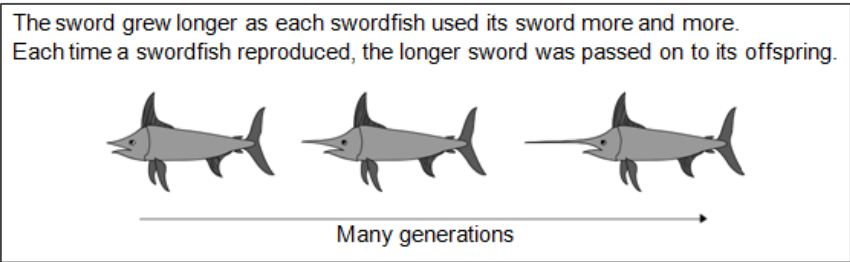
Q:5 The picture shows a modern swordfish.



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.



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

(1 mark)

(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)

(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)

Q:6 This question is about evolution in humans. Figure 7 shows:

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

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



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

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

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

[1 mark]

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

[1 mark]

(b) In a book, the brain volume of a different species, *Australopithecus africanus*, is stated to be about 600 cm³.

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

Estimate = _____ million years ago

[1 mark]

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

(c) (i) Complete the following sentence.

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

[1 mark]

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

Give one reason why.

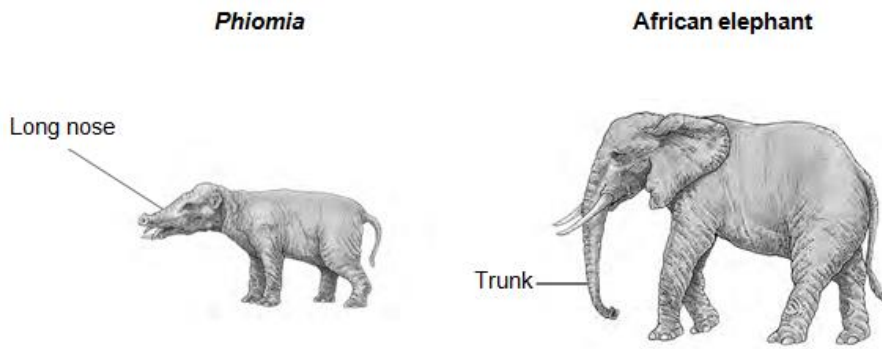
[1 mark]

Q: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.

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

[4 marks]

(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]

(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.

1 _____

2 _____

[2 marks]

(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]

Q:8 In the 1800s, Charles Darwin visited the Galapagos Islands.

On the islands he found many different species of bird called finches.

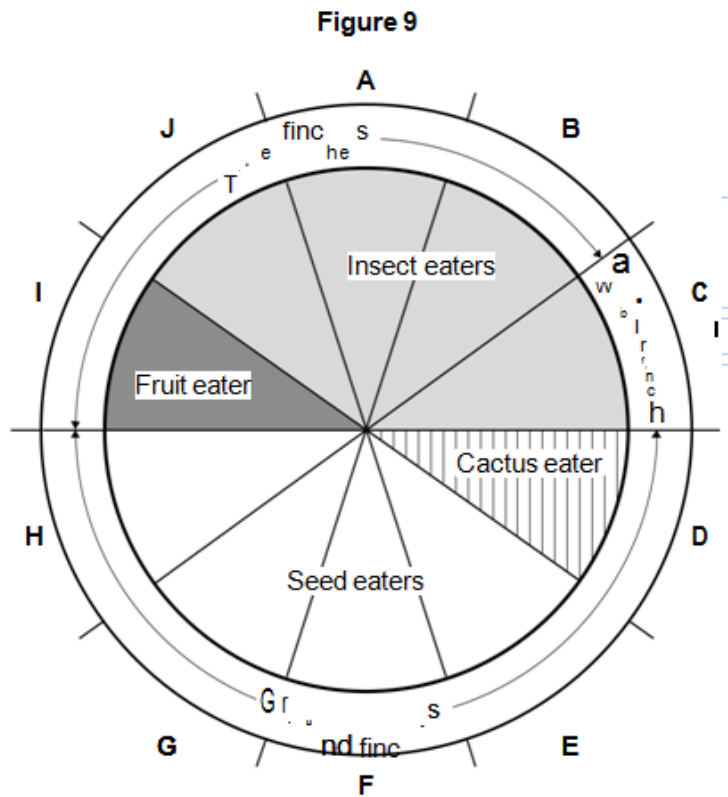
Darwin thought that all the different finch species had evolved from one species of finch that had reached the islands many years before.

(a) Complete the following sentence.

Darwin suggested the theory of evolution by natural _____

[1 mark]

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



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

Draw a ring around the correct answer.

4 5 6

[1 mark]

(b) (ii) Describe finch species G.

Use only information from Figure 9.

[2 marks]

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

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

What was the name of this scientist?

Tick (☑) one box.

Lamarck

Mendel

Semmelweis

[1 mark]

TOTAL MARKS=42