

Natural Selection and Evolution (H)

1. Which of these is a feature of an **artificial** classification system?

- A It shows evolutionary links between organisms.
- B It can be based on similarities in DNA.
- C It may compare the amino acids in proteins.
- D It uses a single difference or similarity between organisms.

Your answer

[1]

2. How does the fossil record provide evidence for evolution?

- A It provides information about **all** extinct organisms.
- B It shows that all organisms have evolved at the same rate.
- C It shows that many small changes can result in a large change in organisms over time.
- D It shows that changes in phenotype occurring during life can be passed on in the genes.

Your answer

[1]

3. Which of these is a **similarity** between selective breeding and natural selection?

- A Cause a change in organisms' genotypes but not phenotypes.
- B Humans decide which organisms will reproduce.
- C Only some organisms reproduce.
- D Take place over many thousands of years.

Your answer

[1]

4. Darwin and Wallace both developed theories of natural selection. Both of their theories were developed after making observations on islands.

What is the most likely explanation for this?

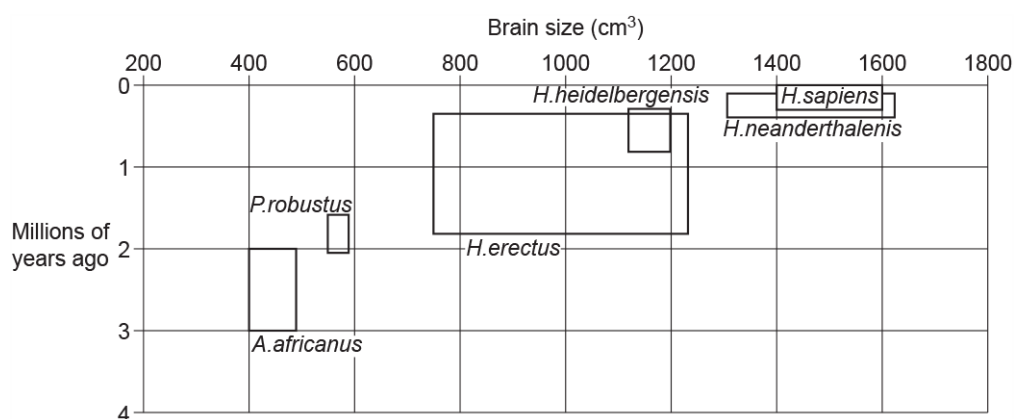
- A Conditions on neighbouring islands are very similar.
- B Different characteristics were observed in organisms on islands compared to the mainland.
- C There are no selection pressures for organisms on islands.
- D There is no competition for food on islands.

Your answer

[1]

5. Humans belong to the species *H. sapiens*.

H. sapiens have evolved from a number of possible ancestors. The graph shows five of these ancestors.



What conclusion about human evolution can be made from the graph?

- A A larger brain meant that the species were better adapted to their environment.
- B *H. sapiens* outcompeted the other species which then became extinct.
- C In general, the more recently a species first appears, the larger its brain size.
- D There is no correlation between brain size and when a species first appeared.

Your answer

[1]

6. What is meant by the term phylogenetics?

- A Classifying organisms using many common characteristics.
- B Constructing diagrams to predict how characteristics are inherited.
- C The study of evolutionary relationships based on molecular studies.
- D Using a single common feature to determine evolutionary relationships.

Your answer

[1]

7. Which statement **best** describes the development of the theory of evolution by natural selection?

- A Darwin and Mendel working together
- B Darwin and Wallace working independently
- C Darwin and Wallace working together
- D Mendel working on his own

Your answer

[1]

8. Which approach would be used to classify organisms by phylogenetics?

- A Compare the structure of the organisms' internal organs
- B Look at DNA base sequences
- C Look at the behaviour of the organisms
- D Study fossils

Your answer

[1]

9 (a). Zebras (**Fig. 17.1**) have evolved to live in hot grassland in Africa.

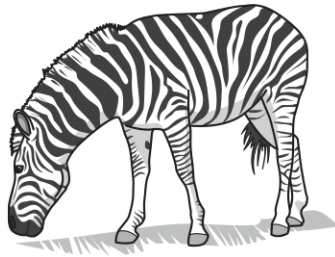


Fig. 17.1

Scientists have tried to find out why zebras have evolved stripes on their body.

One theory is that the stripes help to keep the zebra cooler than other colours. Scientists did an experiment to test this theory. They covered barrels of cold water with the skin of different animals. Then they measured the temperature of the water several hours later.

The results are shown in **Fig. 17.2**.

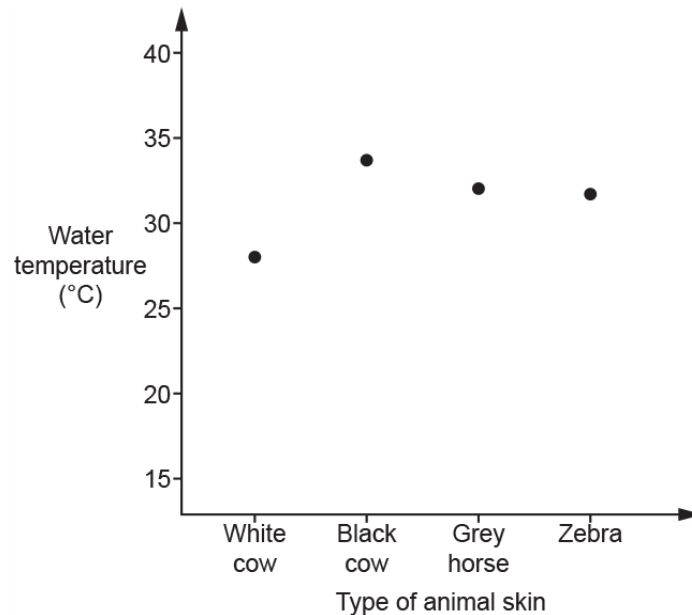


Fig. 17.2

- i. Do the results in **Fig. 17.2** support the theory that stripes keep zebras cool? Explain your answer.

[1]

- ii. The scientists were aiming to investigate if it was **only** the colour of the skin that affected temperature regulation.

Suggest **one** improvement the scientists could make to ensure they **only** investigate the **colour** of the skin.

Explain your answer.

[1]

- (b). Another theory says that the stripes make a zebra less likely to be bitten by insects.

To test this theory scientists made models of zebras and covered them with sticky tape. One model was black. The other models had different widths of stripes.

Fig. 17.3 shows the number of insects that stuck to the tape.

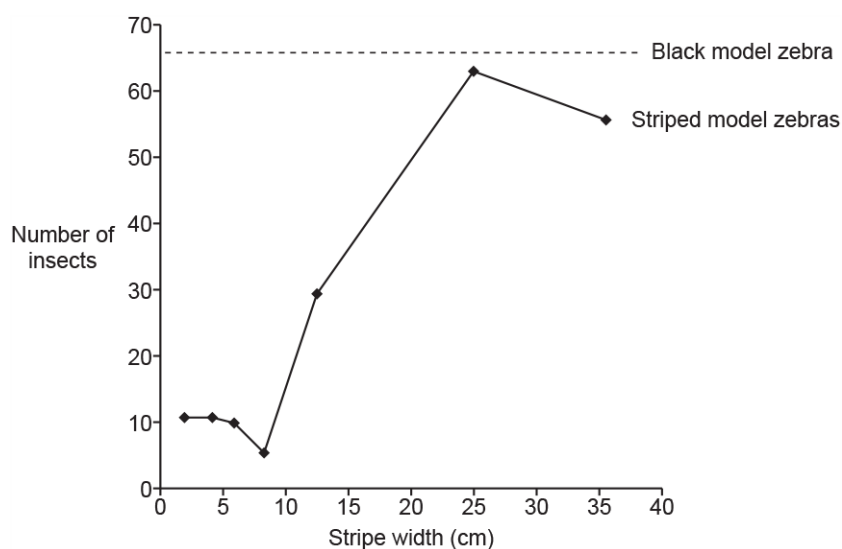


Fig. 17.3

- i. Describe what **Fig. 17.3** shows about the link between zebra stripes and protection from insects.

[2]

- ii. Horse blankets are used to cover horses when they are outside. Companies have started to produce horse blankets with zebra stripes.

Use the information in **Fig. 17.3** to suggest what width of stripe should be used to reduce insect bites.

Explain your answer.

----- **[1]**

- iii. Biting insects can spread pathogens between animals.

Use the theory of natural selection to explain how zebra stripes could have developed.

----- **[3]**

11. Hedgehogs are covered in small spines.

When they are frightened they often roll up into a ball and keep still.



i. In country areas, where badgers live, this is an advantage to the hedgehogs.

In cities, where there are many roads, this is a disadvantage.

Explain these two conclusions.

[2]

ii. Scientists have noticed that a new type of hedgehog is increasing in numbers in cities.

These hedgehogs do not roll up. They run away when frightened. The scientists think that genes control this behaviour.

Explain how this type of hedgehog may become more common in cities.

Use ideas about natural selection.

[4]

END OF QUESTION PAPER