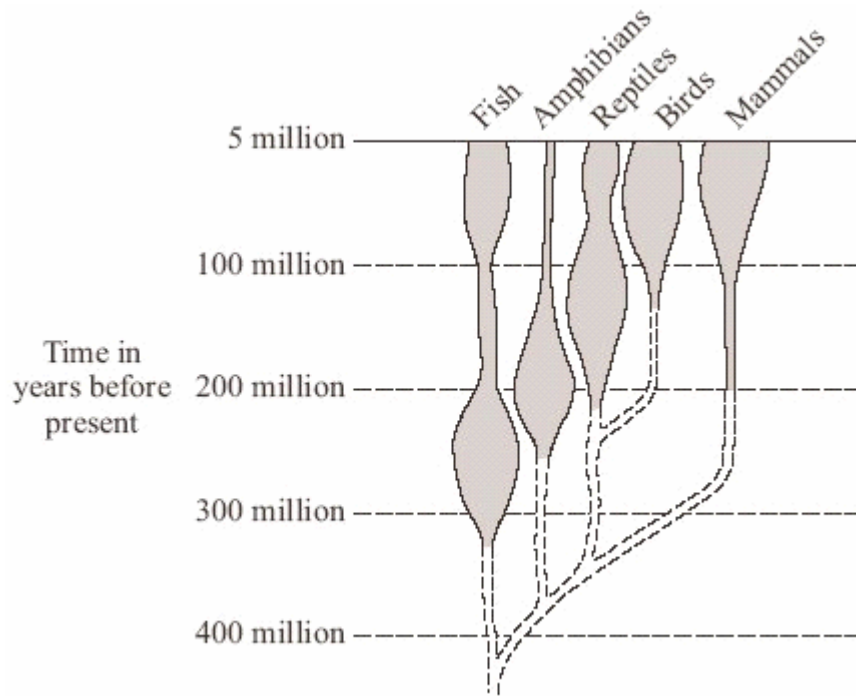


Evolution

1. The diagram shows how the number of species in different groups of vertebrates has changed between 400 million years ago and 5 million years ago.

The wider a block is, the more species there are.



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

- A** fish
- B** amphibians
- C** reptiles
- D** mammals

The group with most species 200 million years ago was . . . **1** . . . .

Birds are most closely related to . . . **2** . . . .

250 million years ago, the vertebrates on Earth were mainly . . . **3** . . . .

The group with most species 5 million years ago was . . . **4** . . . .

2. 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** . . . .

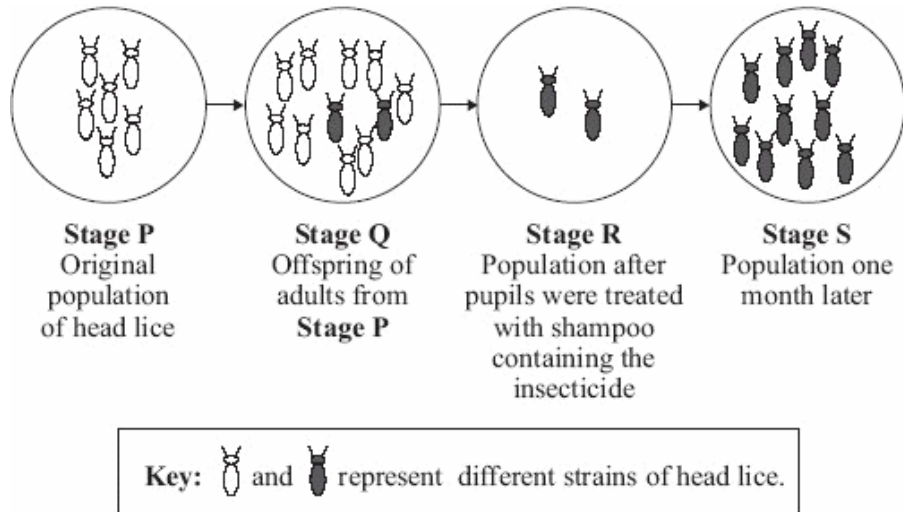
The observation that fossils of all the different kinds of animals appear suddenly in the rocks, with no evidence of ancestors, supports . . . **4** . . . .

Unit B1, B1.8.1

3. Head lice are insects that live in human hair. Hair can be treated with special shampoo containing an insecticide that kills head lice.

The diagrams show the development of the population of a new strain of head lice that appeared in the hair of pupils attending the same school.

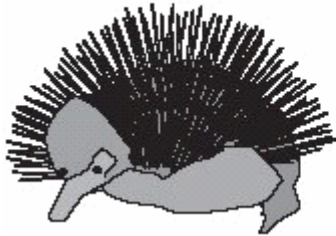
Each diagram represents the number of head lice that were found in the hair of the pupils of one class at intervals over several months.



- (a) A mutation that produced a new strain of head lice occurred . . .
- 1 during **Stage R**.
  - 2 between **Stage P** and **Stage Q**.
  - 3 between **Stage Q** and **Stage R**.
  - 4 between **Stage R** and **Stage S**.
- (b) The head lice in **Stage R** . . .
- 1 must be impossible to kill.
  - 2 must be unable to reproduce.
  - 3 have identical genes to those in **Stage P**.
  - 4 must be resistant to the insecticide in the shampoo.
- (c) The composition of the population of head lice at **Stage R** is due to . . .
- 1 competition.
  - 2 camouflage.
  - 3 genetic engineering.
  - 4 natural selection.
- (d) The head lice at **Stage S** will continue to multiply until . . .
- 1 all of them die through lack of food.
  - 2 all of them change back to the strain shown in **Stage P**.
  - 3 a new insecticide is developed.
  - 4 they suffer from overcrowding.

4. The pictures show an echidna and a hedgehog.

Echidna



Hedgehog



Read the information about echidnas and hedgehogs.

- Echidnas and hedgehogs look similar, but they are unrelated species.
- Echidnas live in Australia; hedgehogs live in many countries, including Britain.
- Both echidnas and hedgehogs are covered with sharp spines.
- Echidnas lay eggs; hedgehogs give birth to live babies.
- There is no evidence that echidnas have ever lived in Britain.
- There is no evidence that hedgehogs have ever lived in Australia.

(a) The information above indicates that echidnas and hedgehogs . . .

- 1 have a similar diet.
- 2 have a similar life expectancy.
- 3 evolved from the same ancestor.
- 4 evolved spines completely independently of each other.

(b) The information above suggests that echidnas and hedgehogs . . .

- 1 are adapted to similar environments.
- 2 have spines of the same length.
- 3 are the same colour.
- 4 have bodies that allow them to curl up into a ball.

(c) The outer covering of echidnas and hedgehogs is an adaptation for . . .

- 1 attracting mates.
- 2 camouflage.
- 3 defence.
- 4 insulation.

(d) The outer covering of the echidna and the hedgehog developed initially . . .

- 1 in response to changes in their environments.
- 2 as a result of being attacked by predators.
- 3 as a result of mutations.
- 4 as a result of variation.