SCIENCE FOUNDATIONS

Evolution and adaptation

Difficulty level: Intermediate

Science Foundations

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Overview of the concept

This is how you explain why Arctic foxes have white winter coats and desert cacti store water, because traits that help survival get passed on more often over generations (this is called natural selection). A doctor sees the same idea when bacteria become resistant to an antibiotic that used to kill them. A gardener breeding drought-tolerant tomatoes is selecting for adaptations on a human timescale. Knowing evolution tells you why living things fit their homes so well, and why they keep changing when the home changes.



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Worked examples

EXAMPLE 1

Q Is a polar bear's thick fur an adaptation?

SOLUTION

Ask what it does: thick fur keeps the bear warm in the cold.

Keeping warm improves survival and reproduction.

Conclude: yes, it is an adaptation.

The result is yes, thick fur is an adaptation.

EXAMPLE 2

Q Does one animal evolve during its lifetime?

SOLUTION

Recall the definition: evolution is change in a population over generations.

One animal's lifetime changes are not evolution.

Conclude: no, populations evolve.

The result is no, populations evolve, not individuals.

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Practice questions

1 Is a cactus storing water in its thick stem an adaptation?

- **A** Yes, it improves survival in a dry habitat
- **B** No, only animals have adaptations
- **C** No, it is learned behaviour
- **D** Yes, because the cactus chose to store water

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2 A long beak that helps a bird reach food: is it an adaptation?

- **A** Yes
- **B** No

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3

A bird learns to open a milk bottle by watching other birds. Is this an adaptation?

A No, it is learned behaviour

B Yes, it improves survival

C Yes, because the bird chose to learn it

D No, only plants have adaptations

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A population of moths becomes darker over 20 generations. Has evolution happened?

A Yes, the population changed over generations

B No, only one moth changed

C No, evolution needs millions of years

D Yes, because the moths wanted to change

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A giraffe stretches its neck during its life and its neck grows longer. Has the giraffe evolved? Explain why.

A. No, evolution is change in a population over generations, not change in one animal during its life

B. Yes, the giraffe changed during its life

C. Yes, stretching its neck changed its genes

D. No, giraffes cannot evolve

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6 Evolution definition?

- A Change in a population over generations
- B Change in one animal during its life
- C Change in the weather over a year
- D Change in a single gene in one cell

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7 Adaptation definition?

- A A trait improving survival or reproduction
- B A trait an animal learns in its life
- C A trait that makes an animal weaker
- D A trait that appears by chance alone

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Do organisms adapt by wanting to?

A Yes

B No

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Over what does evolution happen?

A Generations

B Days

C Hours

D Minutes

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What drives adaptation?

A Natural selection

B Random chance alone

C Animals wanting to change

D The weather

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ANSWER KEY

1. Yes, it improves survival in a dry habitat
2. Yes
3. No, it is learned behaviour
4. Yes, the population changed over generations
5. No, evolution is change in a population over generations, not change in one animal during its life
6. Change in a population over generations
7. A trait improving survival or reproduction
8. No
9. Generations
10. Natural selection

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