

Natural Selection

KS3 Biology · Follows the national curriculum

Name _____ Class _____ Date _____

1. Worked example

List the steps of natural selection.

Step 1 · 1. Variation

Individuals in a population vary, partly because of differences in their genes.

Step 2 · 2. Competition

There are more offspring than the environment can support, so they compete for food, mates and space, and face predators and disease.

Step 3 · 3. Survival of the best adapted

Individuals with the most useful features are more likely to survive and reproduce.

Step 4 · 4. Inheritance

They pass on the genes for those features to their offspring.

Step 5 · 5. Change

Over many generations, the useful features become more common. This is evolution.

Answer: Variation → competition → survival of best adapted → inheritance → change over generations

Check: Individuals don't evolve; populations do, over many generations.

2. Now try one with the steps

Use natural selection to explain why dark peppered moths became common in Manchester by 1900.

Step 1 · Variation

Step 2 · Environment changed

Step 3 · Survival and breeding

Answer:

3. Practice

Show your working. The marks tell you how much is expected.

1. Who published the theory of evolution by natural selection in 1859? [1]

2. What do organisms compete for? [1]
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3. What is evolution? [1]
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4. Why are some individuals more likely to survive than others? [1]
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5. Why must a useful feature be inherited for natural selection to work? [1]
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6. Name the scientist who developed the theory of natural selection at the same time [1]
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7. Give ONE piece of evidence for evolution. [1]
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8. Explain why pale peppered moths became more common again after the Clean Air Act (1956). [3]
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9. Explain why giraffes with longer necks were more likely to survive in a drought. [3]
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10. Rabbits with thicker fur survive cold winters better. Use the idea of competition to explain why. [2]
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11. In a model of moths on sooty bark, the percentage of dark moths went 5, 8.6, 14.3, 22.9 over three generations. What was the percentage after 3 generations? [1]
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12. A bacterial population of 1000 contains 1 resistant cell. After an antibiotic kills all others, the resistant cell doubles every 20 minutes. How many resistant bacteria after 2 hours? [2]

13. Explain why 'a giraffe stretched its neck and its babies were born with long necks' is NOT natural selection. [2]

14. Explain why natural selection takes longer in elephants than in bacteria. [2]

4. Before you hand it in

"Animals adapt because they need to."

The variation already exists by chance. The environment 'selects' which individuals survive and breed.

"The moths changed colour to match the trees."

The PROPORTION of dark moths in the population changed because more dark ones survived and bred.

"Survival of the fittest means the strongest."

The fittest are those best adapted to their environment — not necessarily strongest or fastest.