

Table D shows how Darwin's theory explains the evolution of pale skin colour from dark in some groups of humans.

Darwin's theory	Example of human skin colour
<ul style="list-style-type: none"> There is variation in characteristics between individuals of a species because they have different alleles (genetic variation). 	<ul style="list-style-type: none"> Many thousands of years ago some humans left Africa. Over many generations, the people spread into northern Asia and Europe. The people who left Africa had dark skin, though some had slightly lighter skin than others.
<ul style="list-style-type: none"> Some variations make individuals more likely to survive. We say they are better adapted to the environment. 	<ul style="list-style-type: none"> People living in northern areas who had lighter skin made more vitamin D than people with darker skin.
<ul style="list-style-type: none"> Individuals that survive can reproduce. Their offspring can inherit the alleles for the better-adapted variations. 	<ul style="list-style-type: none"> Those people in northern areas who made more vitamin D grew better and had more children. These children inherited paler skin from their parents.
<ul style="list-style-type: none"> In the next generation there will therefore be more offspring with the better-adapted variations. 	<ul style="list-style-type: none"> Over many generations human skin colour in northern Asia and Europe became paler and paler.

D how Darwin's theory explains the evolution of pale skin colour from dark in some human populations

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- Define the term natural selection.
 - State what 'being better adapted' means.
 - Explain why human skin colour evolved as people moved from Africa to northern Asia and Europe.

The evolution of antibiotic resistance in bacteria is another example of evolution through natural selection. **Antibiotics** kill bacteria. However, some bacteria have variations in their genes that stop them being killed by an antibiotic. We say they are **resistant** to it. The antibiotic-resistant bacteria survive and reproduce when other bacteria are killed. They pass on antibiotic resistance to their offspring.

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- State what is meant by antibiotic resistance in bacteria.
 - Explain why using antibiotics leads to an increase in the number of antibiotic-resistant bacteria.

Key points

- Charles Darwin developed a theory of evolution by natural selection. This states that individuals that are better adapted to their environment are more likely to survive and produce more young. More individuals in the next generation will have the better adaptations.
- Evolution is change over time.
- Human evolution is the change in human-like species over time. Evidence for this comes from fossil bones and from stone tools.

Checkpoint

How confidently can you answer the Progression questions?

Foundation

- F1** Sketch a flow chart to show how Darwin explained evolution through natural selection.

Strengthen

- S1** Some scientists think that environmental changes a few million years ago caused an increase in brain development of human-like species. Suggest evidence to support this idea.