

Genes

1. Variation

CONCEPT 1

LESSON GUIDE

NATURAL SELECTION

PRECISE LEARNING POINTS

KNOW

I know what natural selection is.

APPLY

I can apply my knowledge to explain Darwin's Theory of Natural Selection.

EXTEND

I can extend my knowledge to evaluate evidence for natural selection.

NOTES

Natural selection

Organisms need resources such as food, mates and a space to live. Organisms needing similar resources may compete with each other if these resources are in short supply. Organisms within the same population show variation, some of the organisms may be better adapted to compete successfully for resources. Over many generations, more and more of the organisms with adaptations to successfully compete will survive and reproduce. Less successful competitors will die, possibly before they've had a chance to reproduce. Over time the organisms with the adaptations to successfully compete will become more common. This is called natural selection.

For example, giraffes feed on leaves and buds on trees. A population of giraffes living in the same habitat may compete for food. In history, there were ancestors of the giraffe with both long and short necks. If one giraffe is better able to reach the buds and leaves than another giraffe, it is more likely to find enough food to survive. We say that this giraffe is better adapted than a giraffe that cannot reach the buds and leaves as easily. When food became scarce, the giraffes with longer necks were better able to reach leaves of the taller trees. Longer necks meant they were more likely to survive. Over many generations, more and more giraffes with long necks were born.

Charles Darwin

There have been several theories suggested to explain why and how populations change over time; this change over time is called evolution. The most widely accepted theory is that of Charles Darwin. Darwin (1809-82) suggested that organisms struggle to survive and so produce many offspring to ensure that some survive. He recognised that there is variation within a species. He described the organisms most likely to survive (for example, giraffes with long necks) as the 'fittest'.

Darwin drew these conclusions:

1. All organism produce more offspring than is needed.
2. Organisms have a fairly constant population size and not all offspring will survive.
3. There is a wide range of features within a species and some variations make it likely that the organism will survive.
4. The 'fittest' organisms are most likely to survive to reproduce and pass on their genes.

Evidence for natural selection

A scientific theory is an explanation based on repeated observations and experimentation. Darwin collected many thousands of specimens and made many observations on his travels. He wrote extensively about the finches living on a group of islands in the Pacific Ocean, the Galapagos Islands.

Darwin observed that these birds varied from island to island. These birds were similar in many ways, except for their beaks. He observed that variation in beak structure gave certain advantages to some finches in their search for food and he linked these differences to the type of food available on different islands. For example, some beaks were well adapted for crushing seed shells, but others for catching insects.

Darwin concluded that variation in the original species meant that birds with different beaks were more likely to survive on each island. This led to natural selection and after several generations, the difference became so great that new species were formed.

