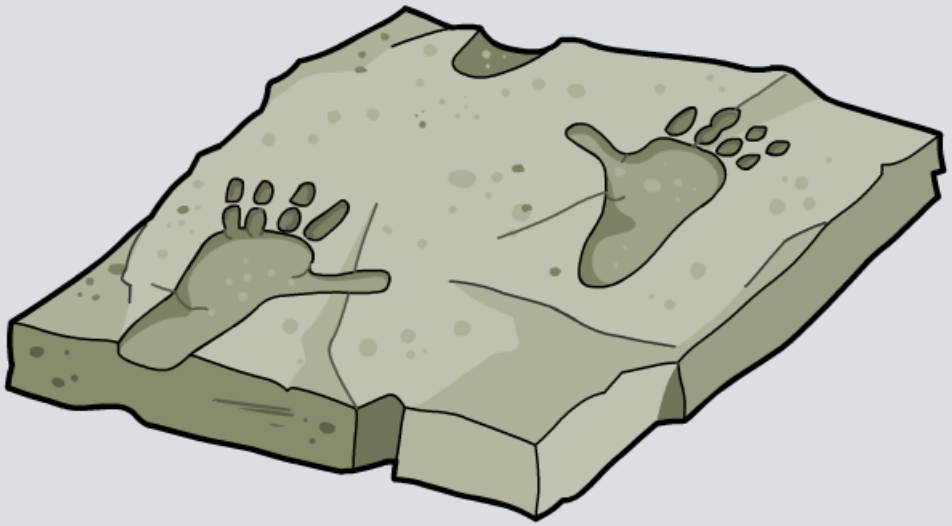
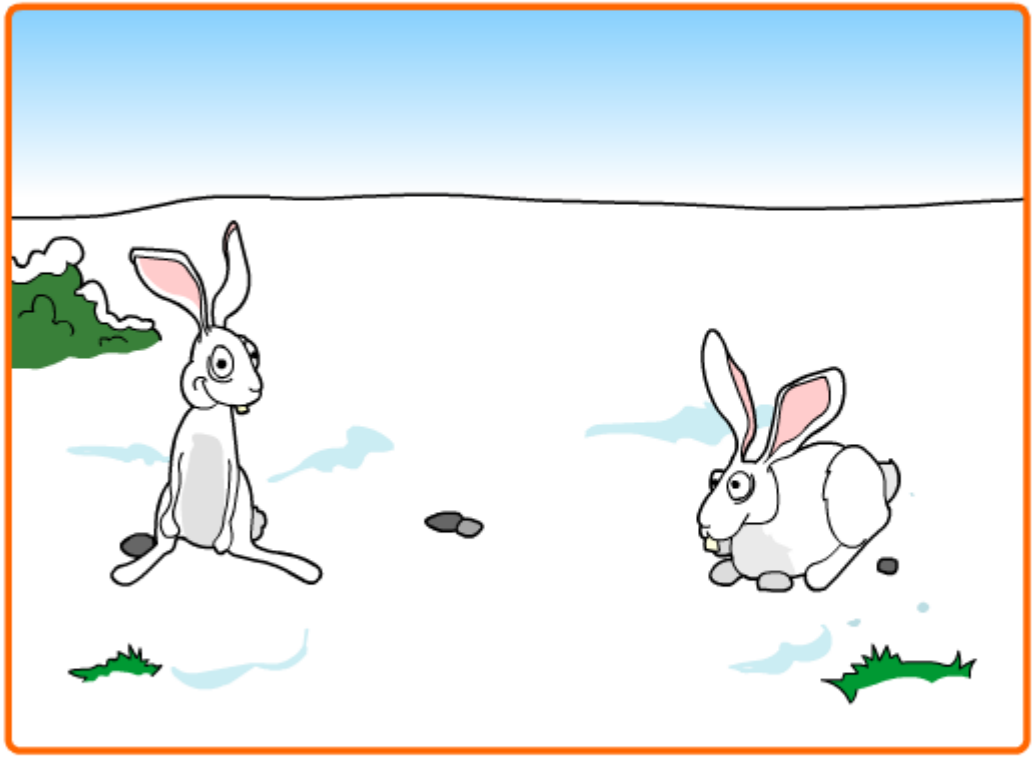
Evolution



What is natural selection?

Darwin's theory of natural selection (often called '**survival of the fittest**') is based on the fact that **natural variation** among organisms causes them to differ in their ability to survive and reproduce. Click "**start**" to find out what happens.



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How the giraffe got its neck

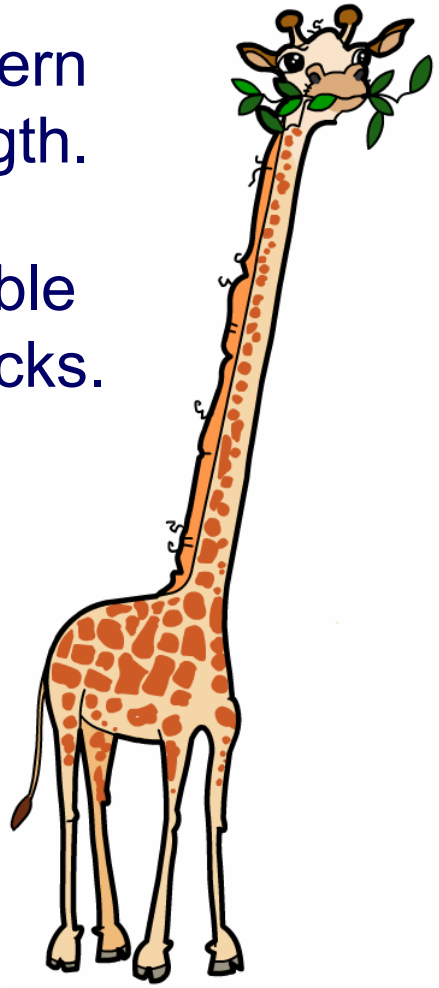
How does Darwin's theory explain a giraffe's long neck?

Due to natural variation, the ancestors of modern giraffes would have had necks of different length.

Giraffes with longer necks would have been able to reach more food than those with shorter necks.

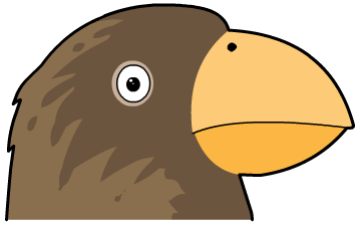
As a result, the long-necked giraffes were more likely to be healthy and live to produce more high-quality offspring.

This, in turn, would increase the chances of their long-necked characteristic (an **adaptive trait**) being passed on to future generations.

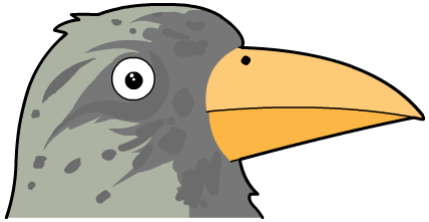


Galápagos finches

In the Galápagos, Darwin noticed that different islands had different types of finches, with different types of beak.



- Some finches had strong and claw-like beaks, suitable for crushing seeds.

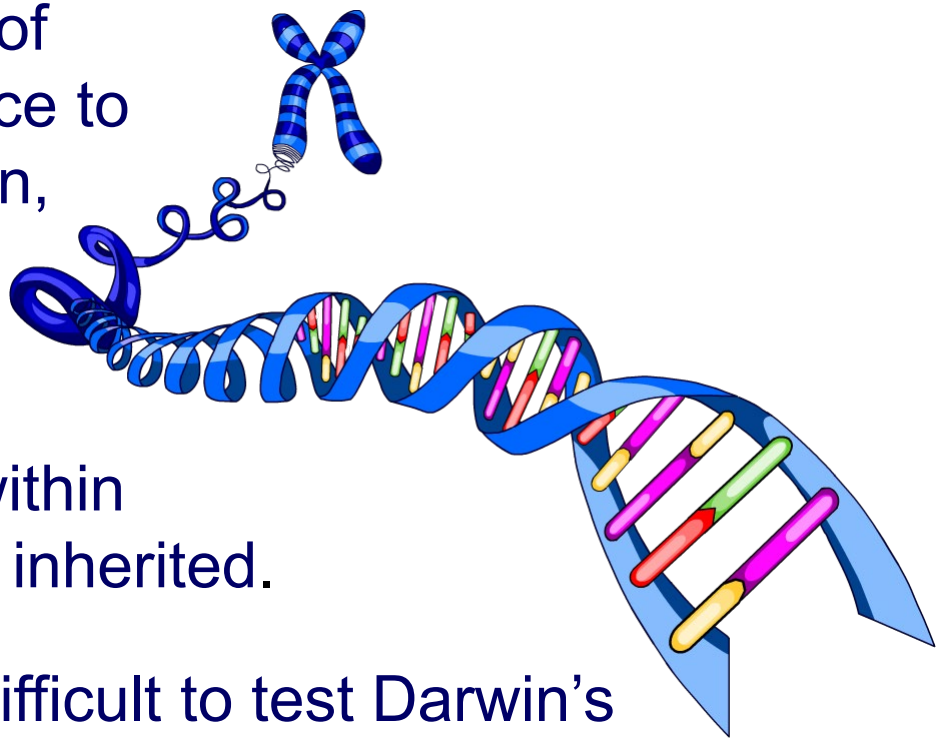


- Other finches had thin and delicate beaks, suitable for picking insects from holes in the ground.

Darwin thought all the finches could have evolved from one type of finch that came from the mainland.

Natural variation meant that some finches had slightly different beaks. These finches would have been able to eat different types of food and avoid competition. They would therefore have survived and passed on their genes.

Could Darwin explain everything?



Darwin made extensive use of specimens and fossil evidence to explain his theory of evolution, but because DNA and genes had not yet been discovered, he was unable to explain why traits varied within individuals or how they were inherited.

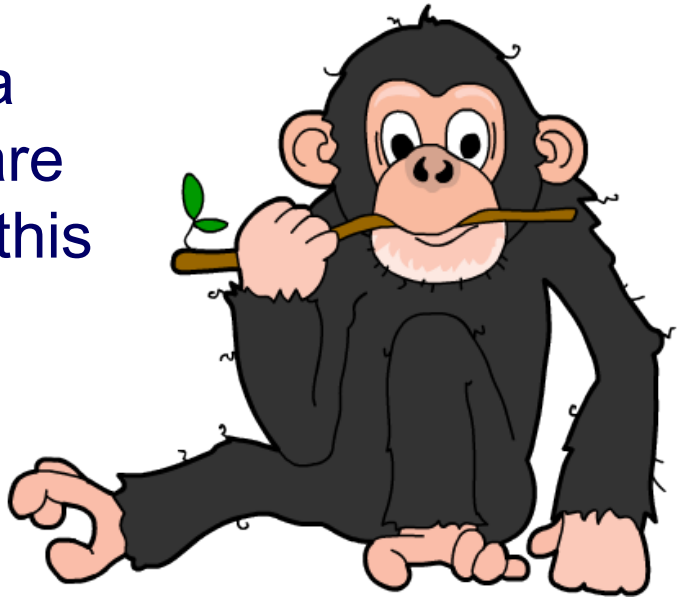
Victorian scientists found it difficult to test Darwin's theory. For his theory to work, the Earth needed to be millions of years old, but its age was not known at that time.

In addition, little was known about the process of fossilization or how to explain gaps in the fossil record.

New lines of evidence

DNA from different organisms can be compared. The fewer differences, the less time since they shared a common ancestor.

98% of a human and a chimpanzee's genes are the same. What does this tell you about their evolution?



It is a relatively short time since they both evolved from earlier mammals.

Peppered moths

Peppered moths rest on tree trunks during the day. Some are light colored and others are dark.

When cities were very polluted in the 19th century the number of previously rare dark colored moths increased, as they were better camouflaged against predators on soot-stained trees.

Cities are cleaner now. What difference has this made?

The number of light colored moths is increasing.