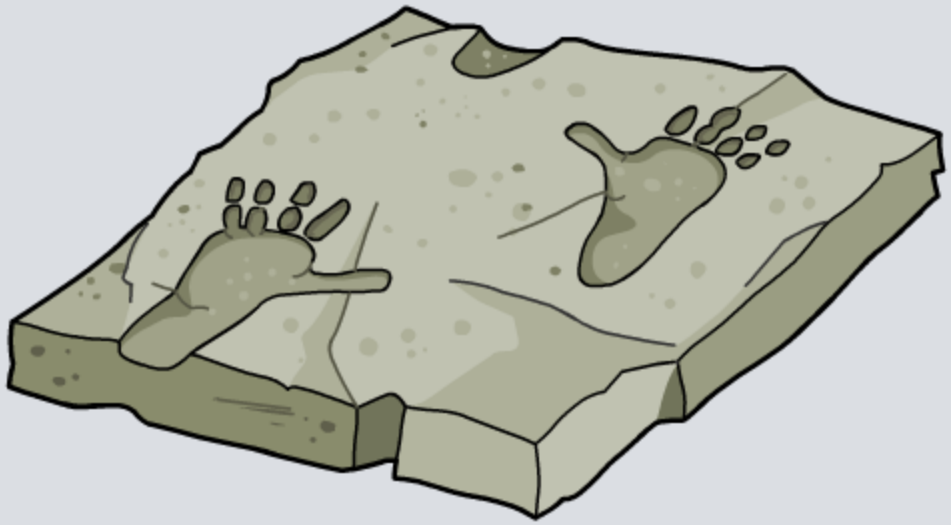
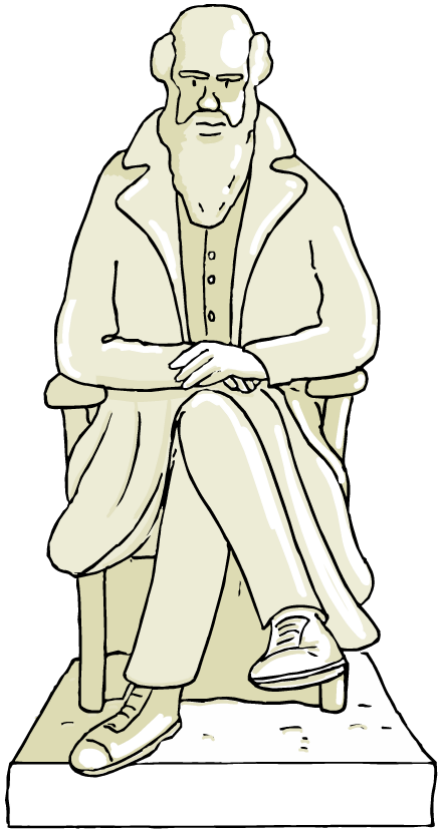
Evolution



Darwin's theory of evolution

Evolution is the scientific theory of how life developed on Earth.

The theory of evolution was developed by **Charles Darwin** (1809–1882), a British naturalist.



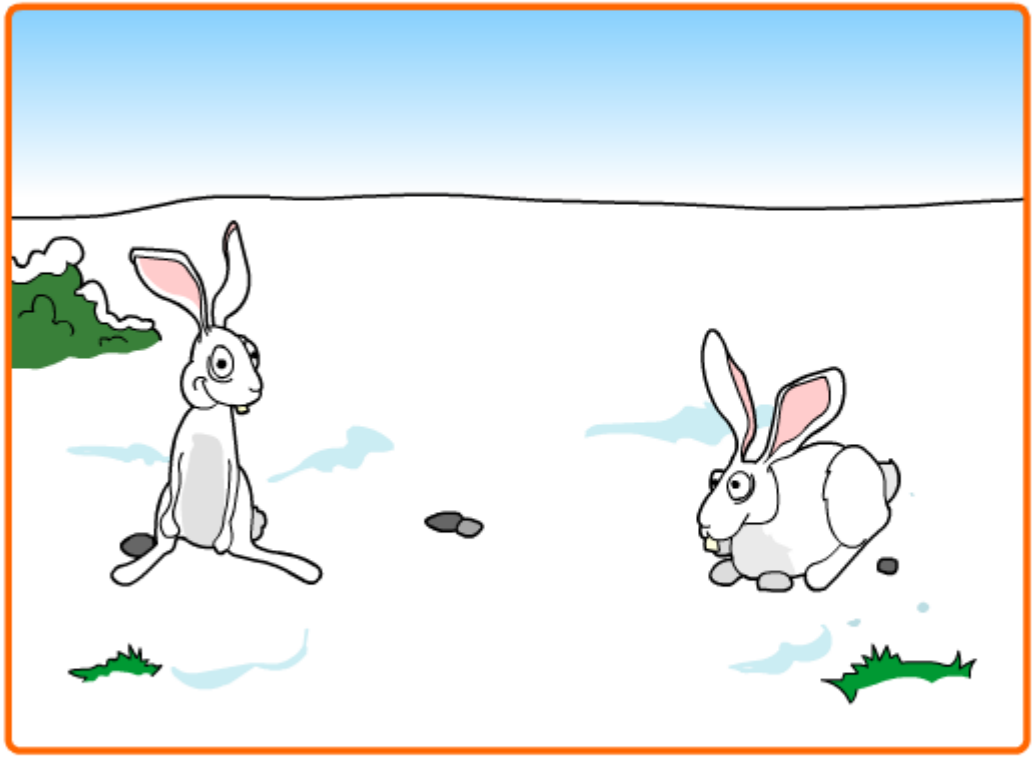
Darwin saw that changes in the environment could affect the survival of an individual or species.

Individuals with certain traits were more likely to survive and reproduce than individuals without that trait.

Darwin proposed that evolution took place through a process he called **natural selection**.

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.



start

How the giraffe got its neck

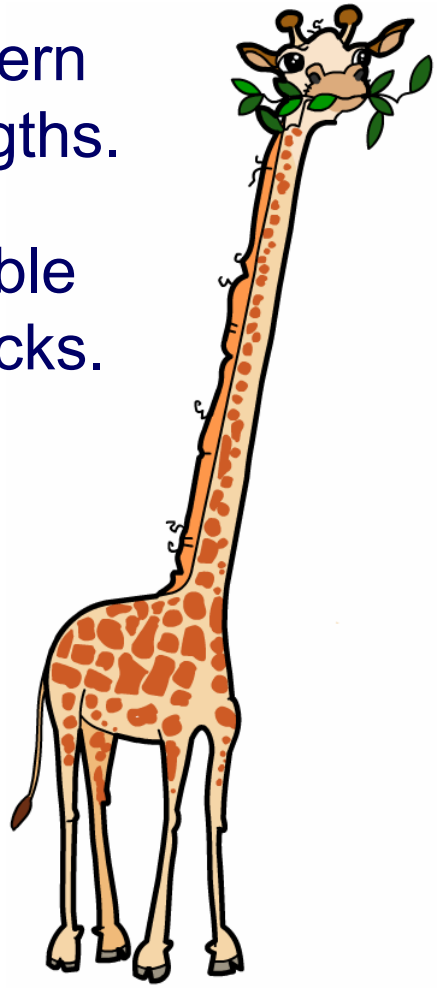
How does natural selection explain a giraffe's long neck?

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

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 offspring. These offspring might have very slightly longer necks than their parents.

Over many generations of natural selection, the giraffe evolved a much longer neck than its ancient ancestors.



Peppered moths

You can see natural selection in action!

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

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

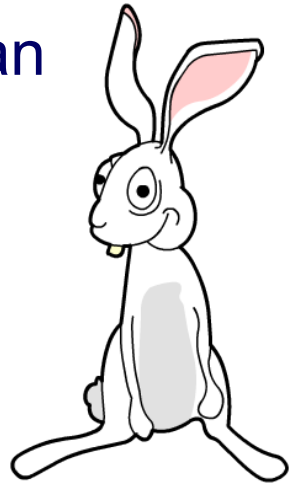
Cities are cleaner now. What difference has this made?

The number of light colored moths is increasing.

What happens when habitats change?

Evolution ensures that individuals within a species have traits allowing them to survive and reproduce in their habitat.

If the habitat changes, however, successful traits can become a disadvantage.



For example, if global warming caused Arctic snow to melt, brown rabbits may be better camouflaged, and so more likely to survive than white rabbits.

Individuals that fail to reproduce, compete effectively for food or survive against new predators will eventually die out. If the last individual of a species dies, the species is **extinct**.

Why did the dodo become extinct?

The dodo was a large flightless bird that lived on the island of Mauritius. It nested on the ground in forests, producing one egg at a time.

When human settlers arrived on the island in the mid-1600s, they brought animals such as rats and dogs to the island, which ate the dodos' eggs.

The settlers chopped down the forests in which the dodos lived, and may have even hunted the dodo for food.

The dodo became extinct sometime in the late 1600s. What traits might have helped the dodo to survive longer?

True or false?

The mechanism of natural selection

What is the order of stages in natural selection?

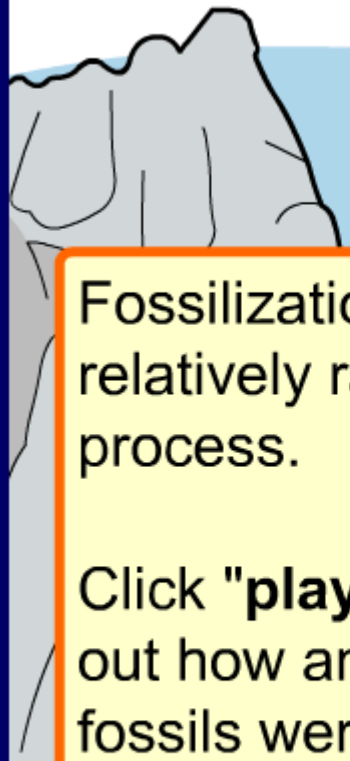
1. Offspring with many competitive traits survive and reproduce at the expense of...
2. Individuals produce genetically diverse offspring
3. ...offspring with few competitive traits, which die or reproduce less
4. The frequency of the adaptive trait increases in the population
5. Offspring compete for food, water and mates, and have to avoid predators

?

C solve

Darwin's evidence for evolution

How were animal fossils formed?



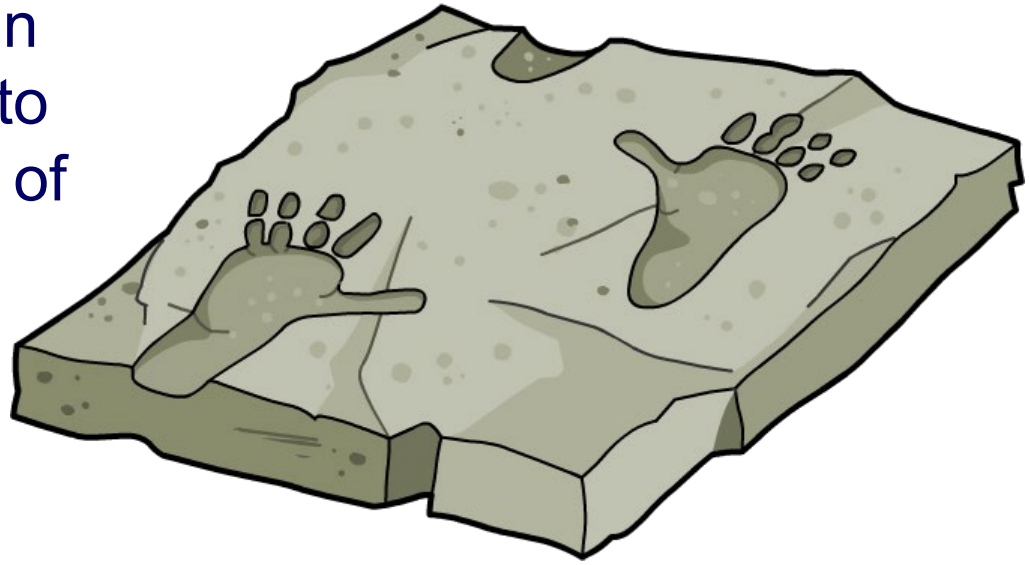
Fossilization is a relatively rare process.

Click "**play**" to find out how animal fossils were formed.

What does the fossil record show?

The history of life on Earth as shown by fossils is called the **fossil record**.

Although there are gaps in the fossil record, it helps to tell the evolutionary story of past and present-day organisms. It can show how the changes in an organism were linked to changes in its habitat.



The fossil record can also show how different species evolved from common ancestors.

Gradual changes in fossil records

How did the horse evolve?

Click a date in the timeline to find out how gradual changes in the fossil record show the evolution of the modern horse.



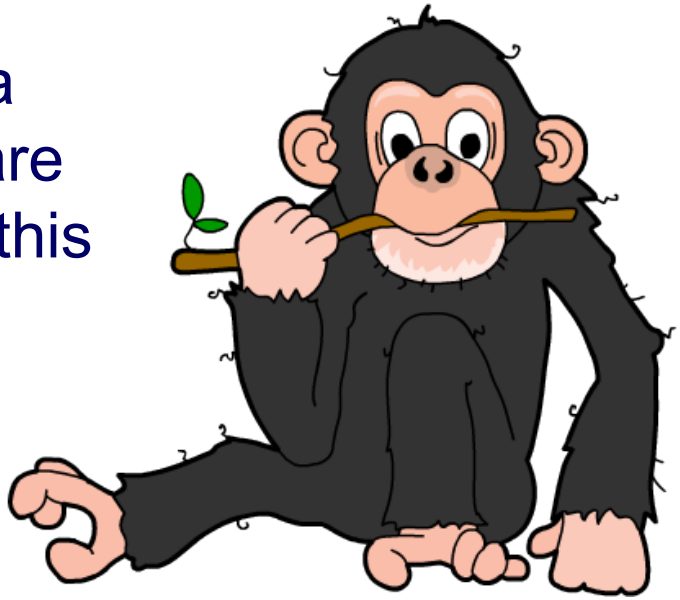


55 million years ago | 40 million years ago | 17 million years ago | 12 million years ago | 4 million years ago | summary

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.

Fill in the blanks

Complete these sentences about evolution

1. Fossils show that all species have _____ from simple life-forms over the space of 3 _____ years.

2. Each population that arose showed _____ due to gene mutations.

3. Natural _____ allowed individuals with _____ most suited to their environment

million	billion	variation	predators	selection
evolved	changes	species	traits	extinction

hide solve

Multiple-choice quiz