

Evolution in biology

[Science](#), [Biology](#)



The evolution of life on Earth has resulted in many hundreds of thousands of species. Genetic evidence reveals that humans share a common ancestor with life forms as different from us as bacteria and corn plants. In early 1800s, the source of Earth's remarkable diversity of life forms was hotly disputed. Many people believed that all species had come into existence at the same time in the distant past.

In 1831 Charles Darwin sailed to South America, and during the long Atlantic crossing Darwin studied geology and collected marine life. During stops along the coast and at various islands, he observed other species of organisms in environments ranging from sandy shores to high mountains. Darwin's melding of his observations of the natural world with the ideas of others led him to propose that evolution could occur by way of a process called natural selection. The history of life on Earth spans nearly 4 billion years.

It is a story of how species originated, survived or went extinct, and stayed put or spread into new environments. Microevolution is the name for cumulative genetic changes that may give rise to new species, Macroevolution is the name for the large-scale patterns, trends, and rates of change among groups of species. An individual fish, flower, or person does not evolve. Evolution occurs only when there is change in the genetic makeup of whole populations of organisms. In biology, a population is a group of individuals of the same species occupying a given area.

In theory, the members of a population have inherited the same number and kinds of genes. These genes make up the population's gene pool. Mutation is harmful when it alters a trait such that an affected individual cannot survive

or reproduce as well as other individuals. For example, for us humans, small cuts are common. By contrast, a beneficial trait improves some aspect of an individual's functioning in the environment and so improves chances of surviving and reproducing. A neutral trait, such as attached earlobes in humans, doesn't help nor hurt survival.

Darwin formulated his theory of evolution by natural selection by correlating his understanding of inheritance with certain features of populations. In 1859 he published his ideas in a classic book, *On the Origin of Species*. We can express the main points of Darwin's insight as follows: 1. The individuals of a population vary in their body form, functioning, and behavior. 2. Many variations can be passed from generation to generation. 3. In every set of circumstances, some versions of a trait are more advantageous than others. 4.

Natural selection is the difference in survival and reproduction that we observe in individuals who have different versions of a trait. 5. A population is evolving when some forms of a trait are becoming more or less common relative to the other forms. 6. Over time, shifts in the makeup of gene pools have been responsible for the amazing diversity of life forms on Earth.

Natural selection is not the only process that can adjust the relative numbers of different alleles in a gene pool. This kind of gene pool tweaking is called genetic drift.

The makeup of a gene pool also can change as individuals migrate into or out of a population genetically similar. For humans and other sexually reproducing organisms, a species is a genetic unit consisting of one or more

populations of organism that usually closely resembles each other physically and physiologically. This buildup of genetic differences between isolated populations is called divergence. When the genetic differences are so great that members of the two populations can't interbreed, speciation has occurred: the populations have become separate species.