

Artificial Selection

Artificial selection is the identification by humans of desirable traits in plants and animals, and the steps taken to enhance and perpetuate those traits in future generations. Artificial selection works the same way as natural selection, except that with natural selection it is nature, not human interference, that makes these decisions.

In laying out the evidence for his theory of evolution by natural selection in his 1859 book, *On the Origin of Species*, the British naturalist and biologist Charles Darwin highlighted the physical traits and behaviors of several species of bird called finches. During a voyage in the 1830s, Darwin had observed these birds on the Galápagos Islands, a group of islands in the Pacific Ocean west of South America.

Sometimes summed up by the phrase “survival of the fittest,” natural selection is based on the following principles: In nature, organisms produce more offspring than are able to survive and reproduce. Offspring with traits that make them more likely to survive, mature, and reproduce in the environment they inhabit pass on their traits to the next generation.

As this happens generation after generation, natural selection acts as a kind of sieve, or a remover of undesirable traits. Organisms therefore gradually become better-suited for their environment. If the environment changes, natural selection will then push organisms to evolve in a different direction to adapt to their new circumstances.

How does this relate to finches? On the Galápagos Islands, some finches appeared so different from others that Darwin did not realize at first that they were all finches. In fact, they were different species of finches with a variety of traits. Some finches, for instance, had long, narrow beaks, while others had short, thick beaks. Darwin concluded that the traits of the different populations of finches had changed over time, and that these variations were related to different environments in the islands. Each type of beak had evolved for a specific task. Where there was a large supply of seeds on the ground, for instance, short-beaked finches became more common, because these beaks were better at cracking open the seeds. Where cactus plants were more common, finches developed long, narrow beaks to extract pollen and nectar from cactus flowers.

Darwin’s finches constituted powerful evidence for natural selection. *But Darwin was also inspired greatly by the evolution that he saw in the traits of pigeons, not due to natural selection but rather artificial selection. Breeding pigeons was a popular hobby in England in Darwin’s time. By selecting which pigeons were allowed to mate, people had a profound effect on their appearance, such as the shape and size of their beaks and the color of their feathers.*

Dog breeding is another prime example of artificial selection. Although all dogs are descendants of the wolf, the use of artificial selection has allowed humans to drastically alter the appearance of dogs. For centuries, dogs have been bred for various desired characteristics, leading to the creation of a wide range of dogs, from the tiny Chihuahua to the massive Great Dane.

Artificial selection has long been used in agriculture to produce animals and crops with desirable traits. The meats sold today are the result of the selective breeding of chickens, cattle, sheep, and pigs. Many fruits and vegetables have been improved or even created through artificial selection. For example, broccoli, cauliflower, and cabbage were all derived from the wild mustard plant through selective breeding. Artificial selection appeals to humans since it is faster than natural selection and allows humans to mold organisms to their needs.