

## What is artificial selection (Selective Breeding)?

Artificial selection is the intentional reproduction of individuals in a population that have desirable traits. In organisms that reproduce sexually, two adults that possess a desired trait — such as two parent plants that are tall — are bred together. In this example, the mechanisms of heredity dictate that the next generation will consist of more tall plants than previous generations. If artificial selection is continued, all of the population will ultimately be tall. Also called selective breeding, artificial selection is perhaps best understood as a contrast to natural selection, where the random forces of nature determine which individuals survive and reproduce. In both cases, the outcome is the same: a population changes over time, so that certain traits become more common.

## What are some examples of artificial selection?

Artificial selection has generated untold diversity in both plants and animals. In agriculture, superior strains of corn, wheat, and soybeans have resulted from careful breeding. The *Brassicaceae* described by Paul Williams in the video are great examples of artificial selection. Cabbage, broccoli, cauliflower, Brussels sprouts, collards, and kale are all members of the same species, *Brassica oleracea*. Gardeners have cultivated flowers such as roses and orchids, carefully manipulating heredity to produce the “perfect” hybrid.

Some consider domesticated animals to be the ultimate products of artificial selection. Thoroughbred racehorses are one example of artificial selection of animals. The meats we eat are the result of the careful selective breeding of cows, pigs, sheep, and chickens. Our pets are a far cry from their “wild” ancestors. Cats and dogs, which were originally domesticated for pest control, hunting, or shepherding, eventually were bred to become companion animals. A glance at a group of dogs — all of the species *Canis familiaris* — reveals an astounding diversity of body type, size, and coloration.

There can be a down side to artificial selection. Because this process essentially removes variation in a population, selectively bred organisms can be especially susceptible to diseases or changes in the environment that would not be a problem for a natural population. Inbreeding — the mating of closely related individuals — is also a problem. In dogs, this has resulted in breeds that have health issues ranging from decreased life span to hip dysplasia.

## Artificial Selection (Selective Breeding) Reading Questions

1. What is artificial selection? \_\_\_\_\_

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2. How is artificial selection demonstrated in plants? \_\_\_\_\_

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3. Explain the difference between artificial selection and natural selection. \_\_\_\_\_

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4. Explain the similarity between artificial selection and natural selection. \_\_\_\_\_

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5. Explain how artificial selection occurs in plants. \_\_\_\_\_

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6. Explain the benefits of artificial selection in plants. \_\_\_\_\_

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7. Explain how artificial selection occurs in animals. \_\_\_\_\_

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8. Explain the benefits of artificial selection in animals. \_\_\_\_\_

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9. Explain why and how artificial selection impacts variation in a population. \_\_\_\_\_

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10. Why is this not a problem with natural selection? \_\_\_\_\_

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