# Lesson 6: Extend

**Big Idea:** Artificial selection is not a new or natural process.  Artificial selection plays a large role in our agriculture production today.

**Lesson Objective:** Students will justify if their design process was natural selection or artificial selection.

**Lesson Essential Question:** When designing your organism to be the best suited for its environment was that natural selection or was it artificial selection?

**Materials Needed:** Artificial Selection Reading

**Vocabulary:**

**Lesson Flow:**
1. **Assessing Prior Knowledge (Engage)**
   a. Teacher shows students pictures of wild strawberries vs store bought strawberries.
      i. http://1.bp.blogspot.com/-fDQBm9NDQI0/UbZ_0V-4MoI/AAAAAAAADr0/F2rjZKgt8o4/s1600/strawberry+comparison.jpg
   b. Teacher poses the question *"Why are these strawberries so different?"*
   c. Students answer using prior knowledge and knowledge of natural selection.

2. **Artificial Selection Reading (Explore)**
   a. As students read they will use text tags to talk with the text.
   b. Students must use at least 5 text tags.
   c. Students will explain 3 of their text tags using the sentence starters.

3. **Class Discussion (Explain)**
   a. Discuss with students:
      i. Techniques for artificial selection
         1. Crossbreeding
         2. Genetic modification
      ii. Positives and Negatives to the environment
      iii. Positives and Negatives to the human race

4. **What have we done? (Evaluate)**
   a. Teacher poses the question *"Think back to when we designed organisms to be best suited for their environment.  Was this natural selection or artificial selection?  Provide evidence to support your claim."*

# Artificial Selection at Work

http://www.learner.org/courses/essential/life/session5/closer1.html

## What is artificial selection?

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?



*Teosinte* (left) and its modern descendent, corn.

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 *Brassicas* 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.



A variety of vegetables of the *Brassica oleracea* species

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