Artificial Selection

EVO-1.F.1

Through artificial selection, humans affect variation in other species.

EVO-1.G.1

Convergent evolution occurs when similar selective pressures result in similar phenotypic adaptations in different populations or species.

What is artificial selection?

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Humans select a specific trait in an organism, and it accumulates or reduces in the population.

Due to this, humans will grow/breed organisms with the favorable trait. This increases that "favorable" trait in the population leading to a change in the population phenotype.

Convergent evolution is due to common ancestry.

A. True

B. False

Convergent evolution is due to common ancestry.

B. False

Convergent evolution is a similar solution to a similar problem. It does **NOT** represent common ancestry.

For example:
sugar glider (marsupial) and flying squirrel (placental)

What is convergent evolution?

What is convergent evolution?

Similar solution to a similar problem...

This results from two populations that are under similar selective pressures. Due to this selective pressure, the same characteristic is selected for survival.

The two organisms look similar but DO NOT HAVE COMMON DESCENT.

How is artificial selection different than natural selection?

A. Artificial picks best traits for past events

B. Artificial picks best traits for future events

C. Artificial picks traits based on human's interests

D. Artificial picks traits based on predator/prey interests

How is artificial selection different than natural selection?

C. Artificial picks traits based on human's interests

Artificial selection is human selecting for traits they find favorable.

For example:
Corn has two varieties: thin/small seeds vs fat/plump seeds. Farmers have utilized artificial selection to produce majority plump kernels by constantly planting plump seeds so over time majority of the population has plump seeds.

Peppered moths are an example of artificial selection.

A. True

B. False

Peppered moths are an example of artificial selection.

B. False

Peppered moths are an example used in many classrooms. During the industrial revolution, humans caused the increase of smog and soot in the air which darkened the trees of the peppered moths' habitat. Over many generations, it was observed that the moths underwent directional selection to a darker moth phenotype.

Although humans caused the selective pressure which led to the directional selection, nature still determined reproductive fitness of the phenotypes.

Antibiotic resistant bacteria are an example of artificial selection.

A. True

B. False

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B. False

If humans introduce antibiotics into their bodies, the bacteria that are resistant will be killed leaving resistant bacterial selected for.

Although humans caused the selective pressure which led to the directional selection, nature still determined reproductive fitness of the phenotypes.

If a dog breeder only mates dalmatians with perfect spots, which type of selection?

A. Artificial selection

B. Natural selection

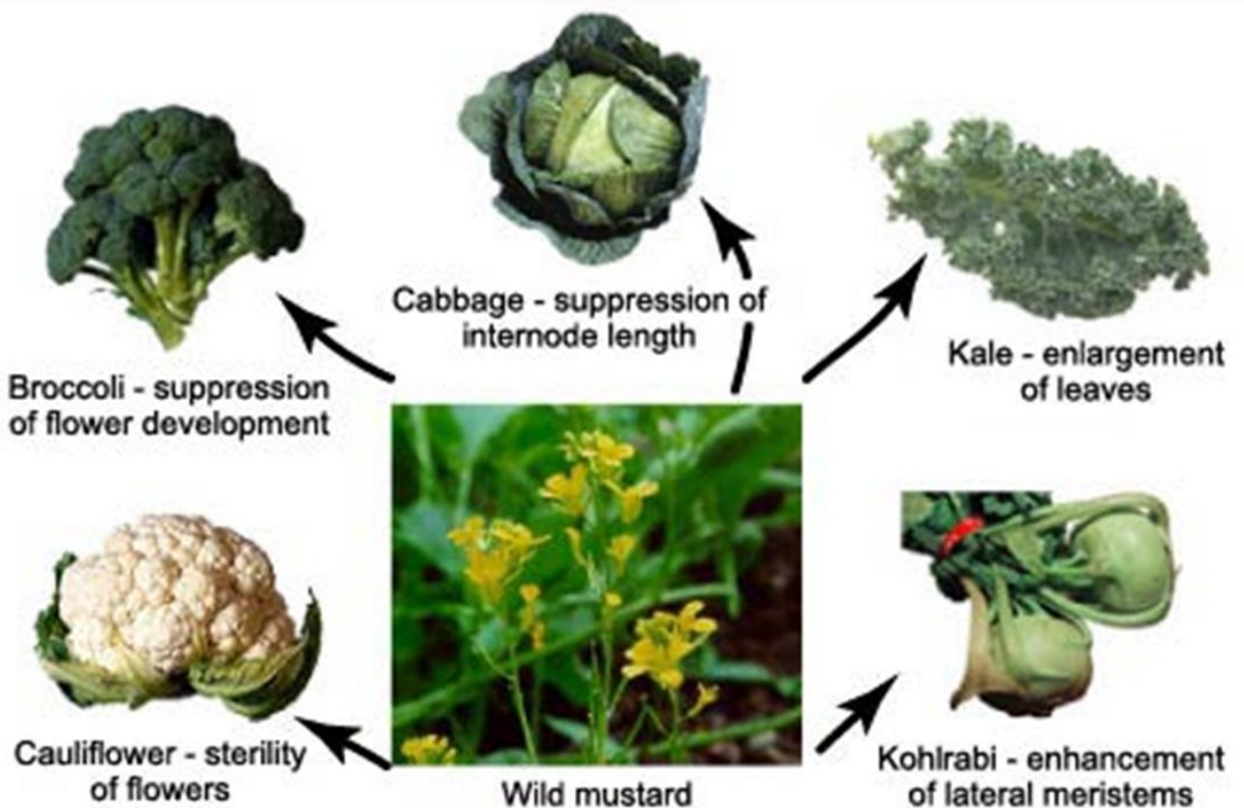If a dog breeder only mates dalmatians with perfect spots, which type of selection?

A. Artificial selection

Artificial selection involves humans selecting for specific traits by breeding organism with specific phenotypes.

Example of artificial selection

Broccoli - suppression of flower development

Cabbage - suppression of internode length

Kale - enlargement of leaves

Cauliflower - sterility of flowers

Wild mustard

Kohlrabi - enhancement of lateral meristems

Convergent evolution

A. Different structures, common ancestor

B. Different structures, different ancestor

C. Similar structure, common ancestor

D. Similar structure, different ancestor

Convergent evolution

D. Similar structure, different ancestor

Convergent evolution involves two populations having a similar trait due to similar environmental constraints. The populations do not share a common ancestor.

Note:

I like to think of convergent evolution as two organisms converge on the same trait. The are not related to one another but they are subjected to similar environmental conditions which leads to similar adaptations to be selected to survive.

-headed glider, sugar glider, phalanger, flying possum
urus breviceps)

10 cm
4 inches

southern flying squirrel, North American flying squirrel
(Glaucomys volans)

10 cm
4 inches