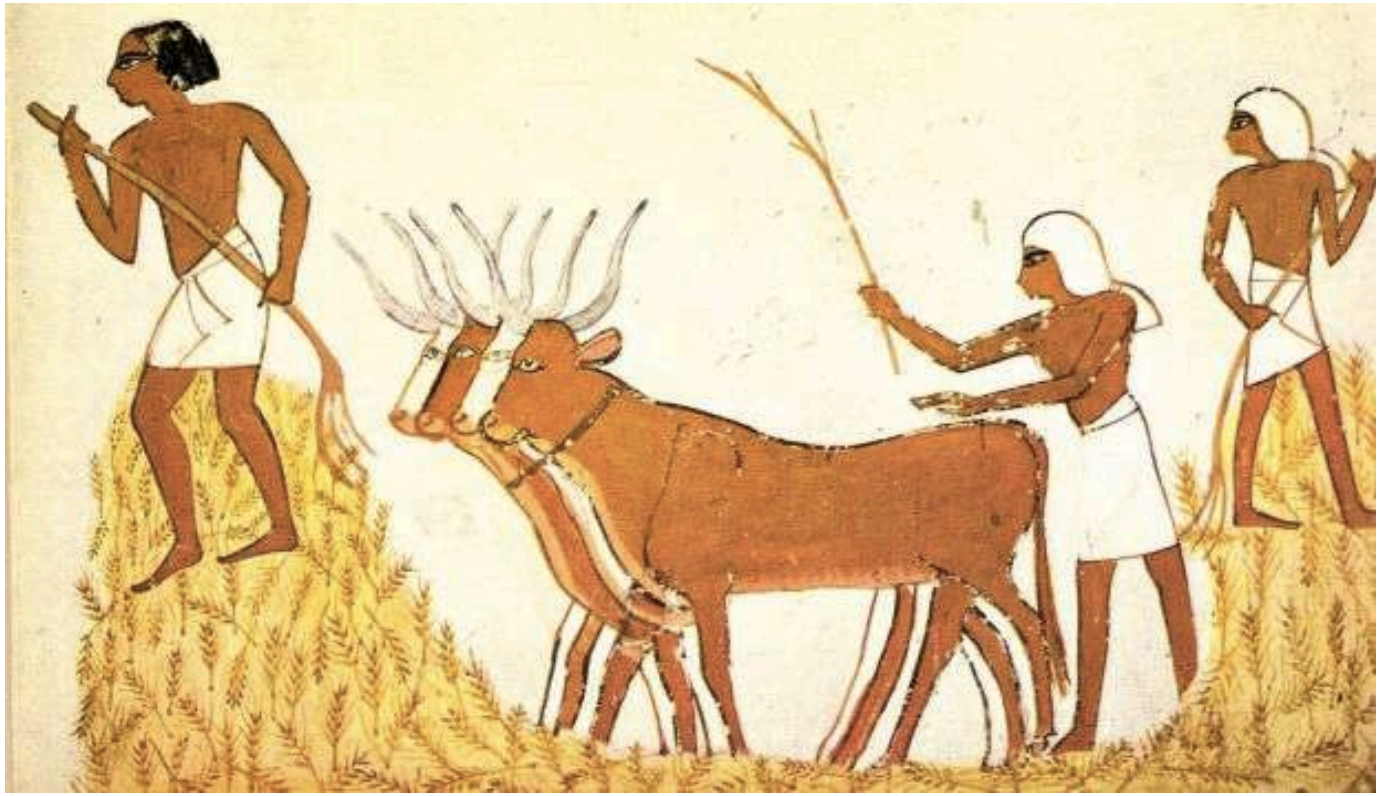
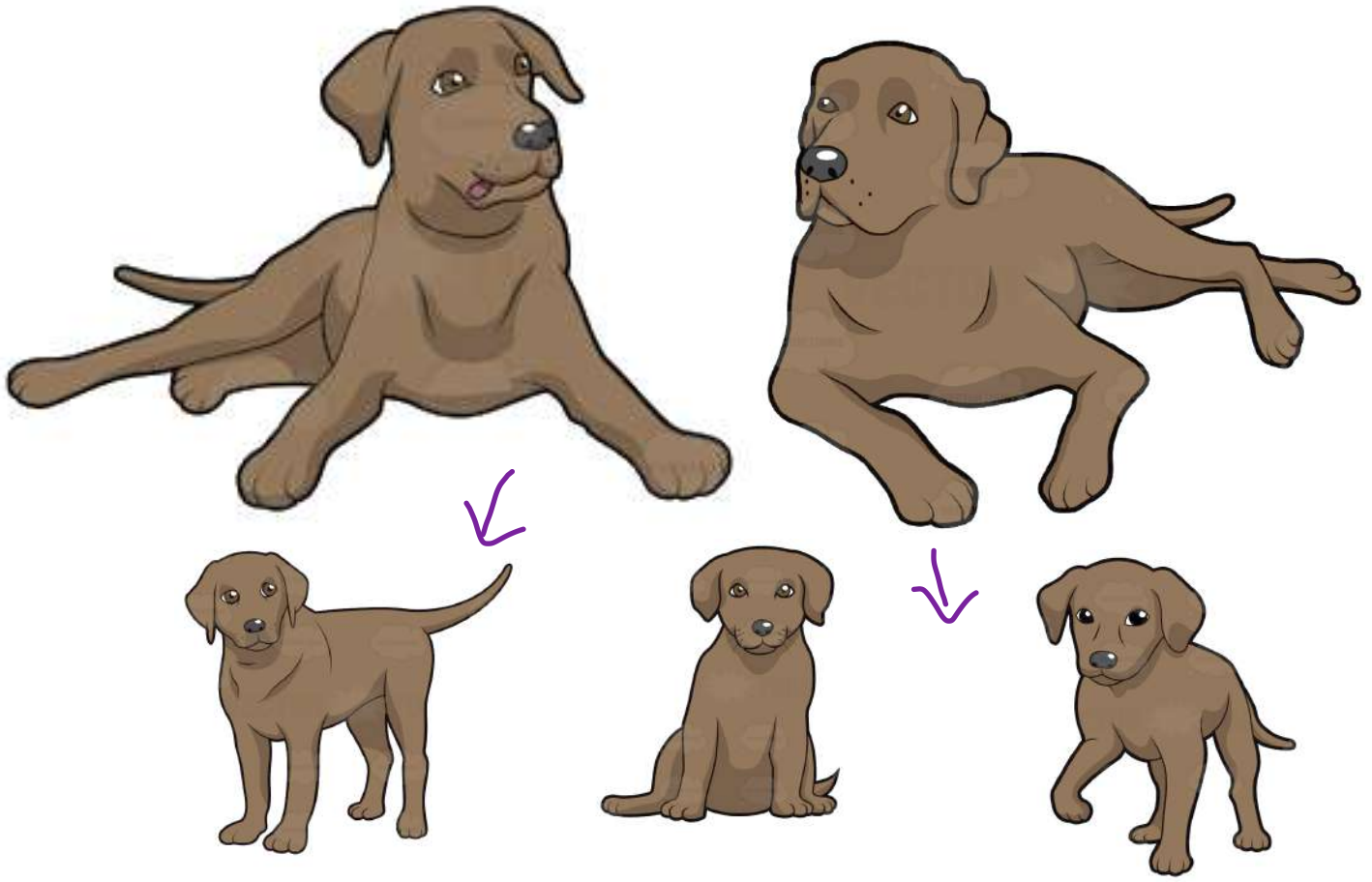
Selective Breeding

For THOUSANDS of years, humans have been manipulating the traits of organisms through a process called **selective breeding.** Humans have used selective breeding to produce organisms with desirable traits, simply by following the patterns of inheritance. We have been using this technique since '*ancient times*,' long before we even knew what DNA was.

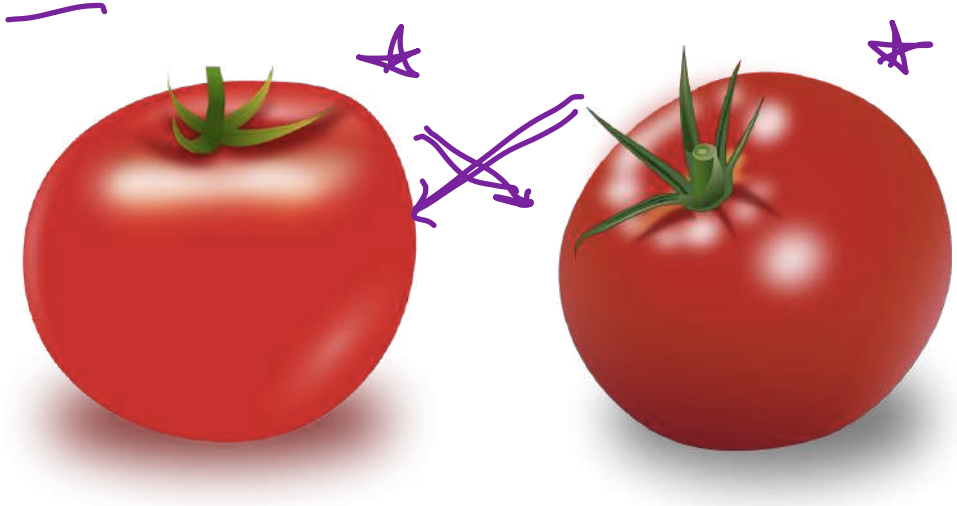


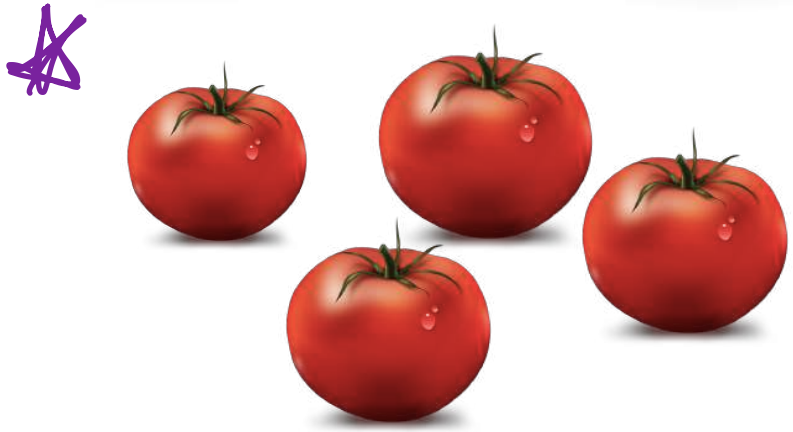
It doesn’t take a genius to figure out that if 2 brown dogs reproduce, they are likely to produce brown puppies.

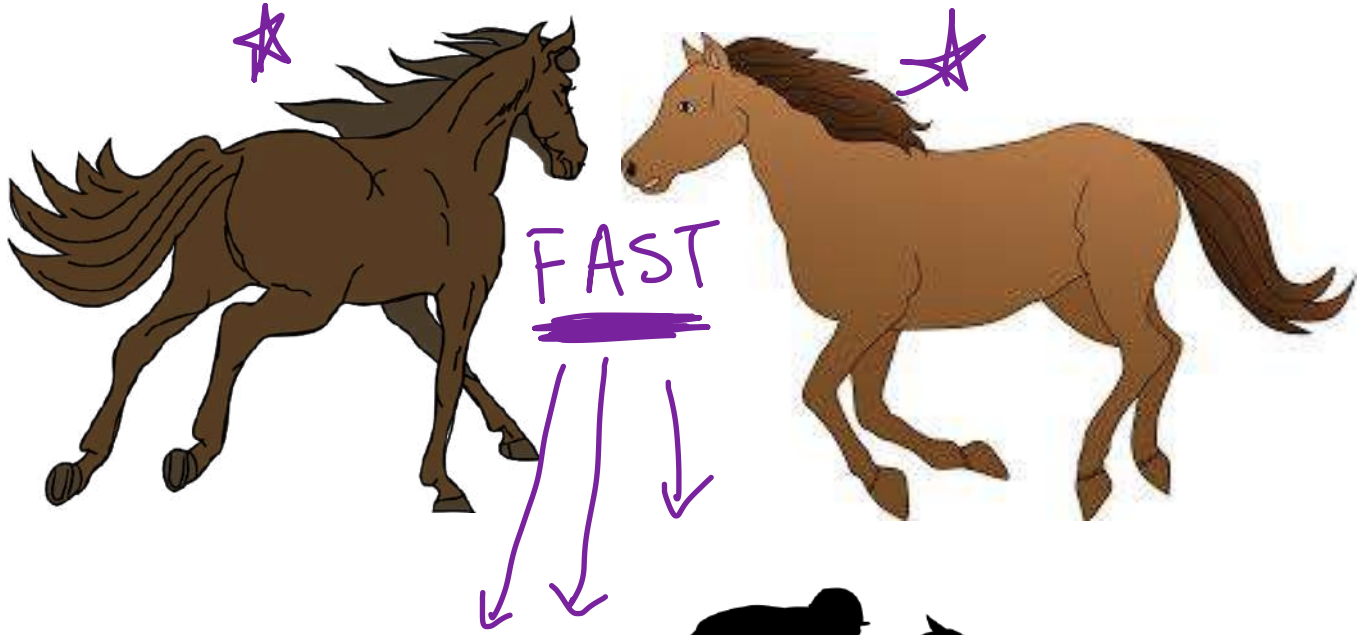


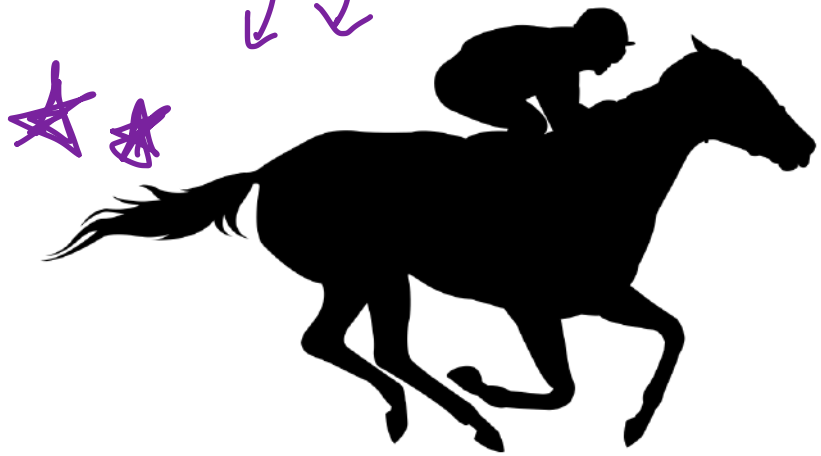
”Mates with Traits”

- **Selective breeding** (also called ***artificial selection***) is a technique that follows the patterns of **inheritance**; *select* two parent organisms with a *desired characteristic* and then **breed** them.



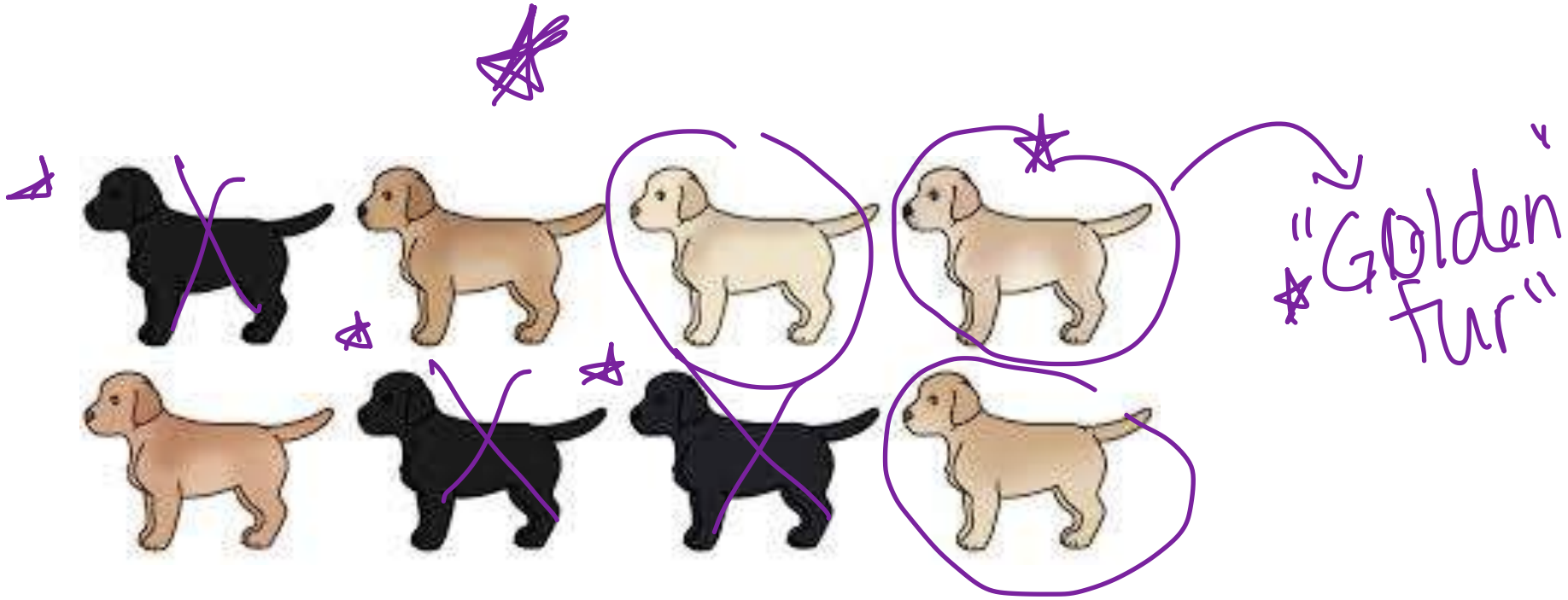






”Mates with Traits”

- Because genes are inherited, it is likely that the offspring will receive the desired trait. But, because of **genetic recombination**, it is not guaranteed. Round after round of successful selective breeding overtime can dictate which genes are in the gene pool. Overtime we can manipulate *all* organisms to look a certain way. This can eliminate genetic diversity from the gene pool and guarantee particular traits over time.

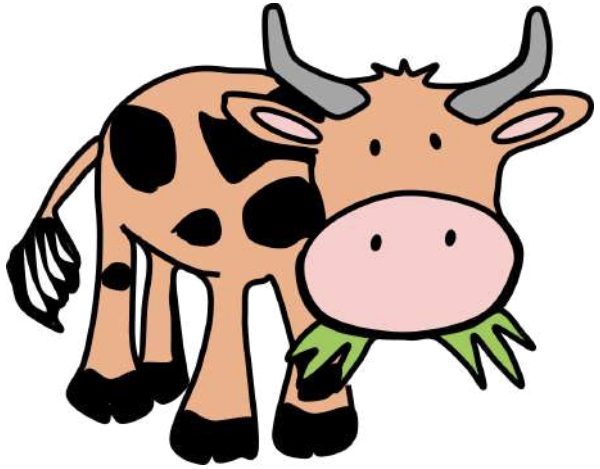


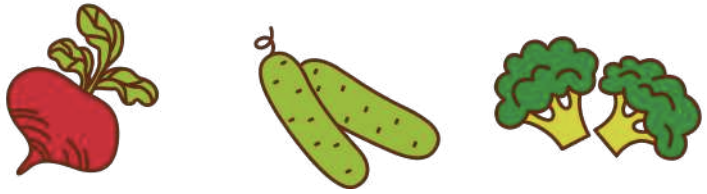
Examples of how we've benefitted from Selective Breeding:

- FARMING-
  - Crops (corn, potatoes, strawberries, watermelon, onions, lettuce, ETC!)
  - Animals (cows, chickens, pigs, sheep, ETC!)
  - Flowers (different varieties of flowers were achieved through selective breeding!)
- ANIMALS
  - PETS! (dogs, cats, etc.)
  - RACE HORSES










Farmers, to this day, use the technique of **selective breeding.** If farmers want corn that is *very sweet*, they will breed the sweetest corn plants. If farmers want corn that is *very large*, they will breed the largest corn plants. If farmers use this technique over *many generations*, they can produce corn that is very large, very sweet, or even corn with both traits!

- In fact, ALL of the produce that we are familiar with in the grocery store is the result of **selective breeding.** Have you ever been 'out in the wild' and seen a strawberry plant that looks like grocery store strawberries? How about a big head of perfectly crisp, wild lettuce? No? This is because these crops are the product of human control- they were selectively bred from smaller, less tasteful "wild" plants. Many generations of breeding has produced the fruits and vegetables that we have today.

- Have you even been ‘out in nature’ and seen a “wild” dairy cow? Absolutely not. There are wild buffalo, wild cattle, wild ox, etc. But, our “dairy cows” are the product of selective breeding. Over thousands of years, they were bred. They no longer have “traits for survival,” they have traits that benefit humans in the form of food. All farm animals selectively bred- chickens, cows, pigs, sheep, etc.

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HOG

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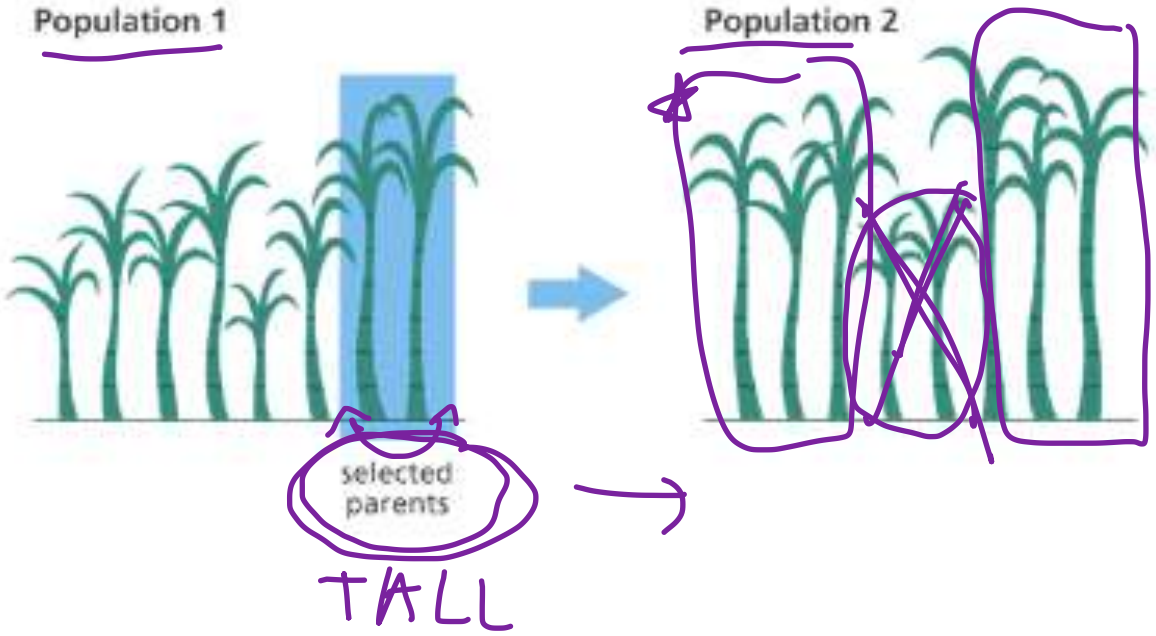
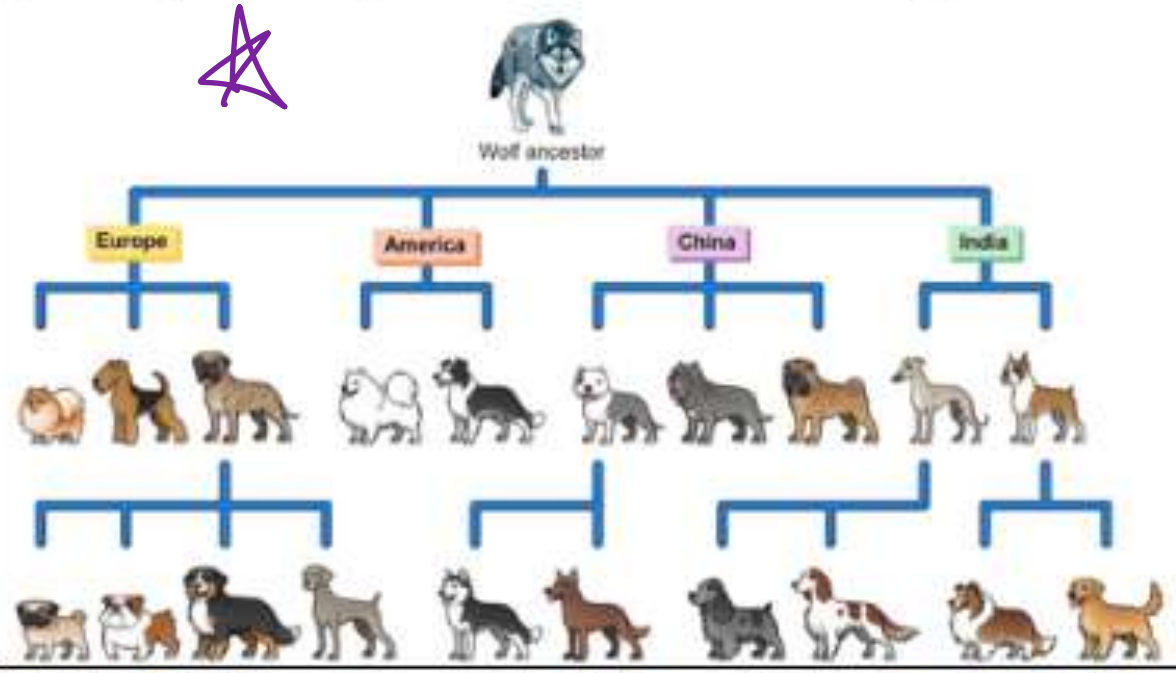
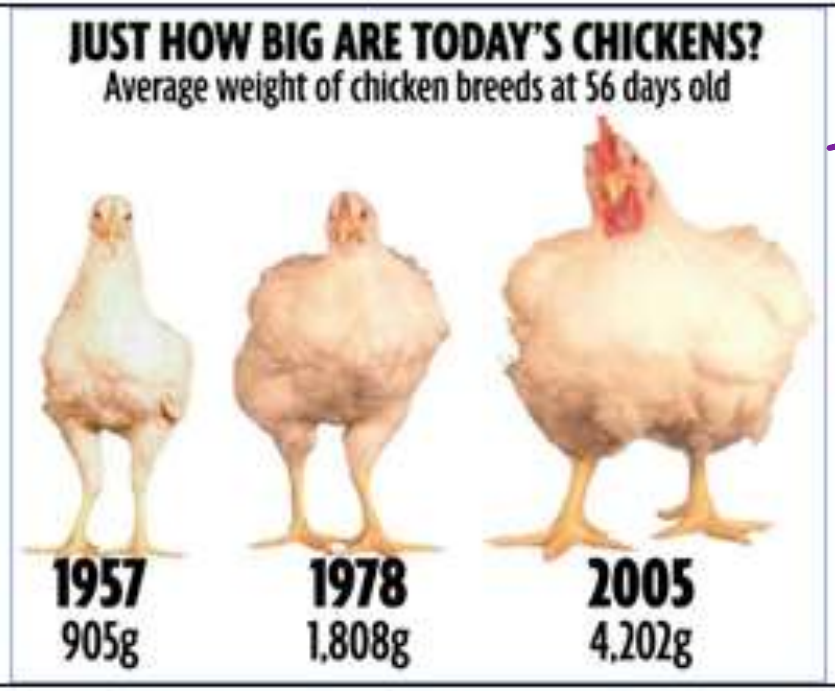
- Have you ever been 'out in nature' and seen a wild Chihuahua? How about a wild Poodle? NO! Maybe you've seen a stray, but these organisms are not "wild" animals- they are **domesticated** animals that are the product of **selective breeding.** Did you know that ALL DOMESTIC DOGS were selectively bred ***from wolves***?? YES- even the Chihuahua. How can this be!?! Well, it's the result of about 10,000 years of selective breeding, manipulating the gene pool of organisms over time.
  - I still don't believe you. HOW could a Chihuahua be bred from wolves?? Well... If you bred the smallest dogs with the smallest dogs… for hundreds of generations... the dogs could end up pretty small. Then, you only bred dogs that had any type of brown color in their fur over, and over, and over, and over again… you might end up with small brown dogs. And then, you chose the dogs with the biggest eyeballs, over, and over, and over again. If I was around for 10,000 years to do this… I might be able to produce a Chihuahua. Over TIME, selective breeding can be pretty powerful.



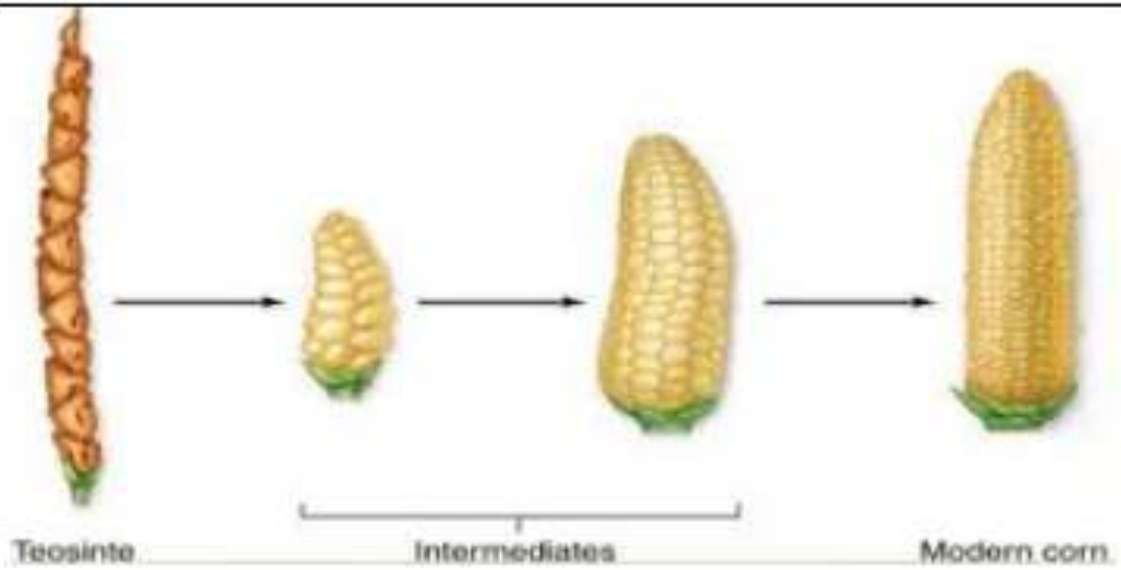
This picture shows selective breeding for the desired trait of "height." Two tall plants were chosen to breed. *Most* of the offspring inherited the gene for tallness, but not all!



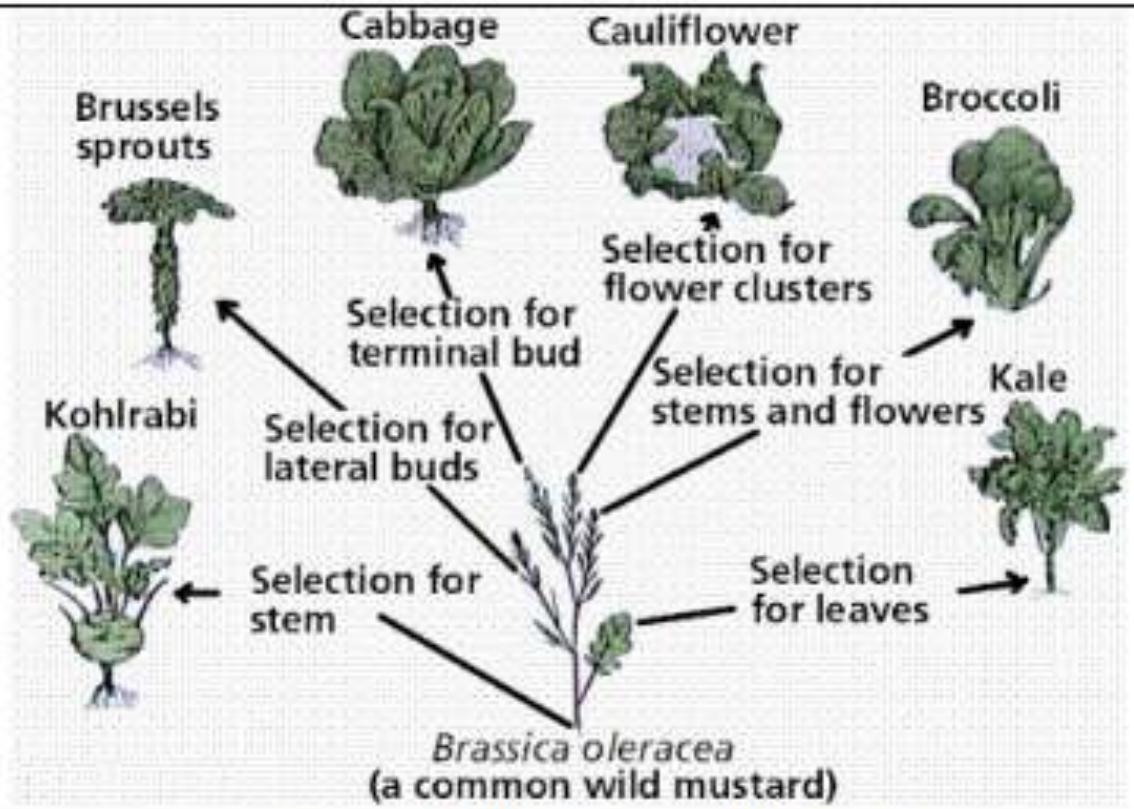
ALL modern-day dog breeds were selectively bred from the wolf. This took thousands of years to achieve. We are still selectively breeding dogs today.



Over the past 70 years, we have selectively bred the largest chickens to create chickens with more meat. This means more food for us.



Corn, and most other crops, were selectively bred from wild plants. We can see that corn was bred to be large in size, amongst other traits.



This picture shows all the different modern vegetables that were selectively bred from a single wild plant! Once again, this process takes many generations to achieve.

The picture above shows a wild rose. By selectively breeding flowers for color, number of petals, and size, we've created many unique varieties of roses.

Selective breeding

- Choose 2 mates with desirable traits
- Breed them. Hope that the offspring inherit the desired trait.
- Continue this process over and over
- Process has been used for thousands of years