



Evolution

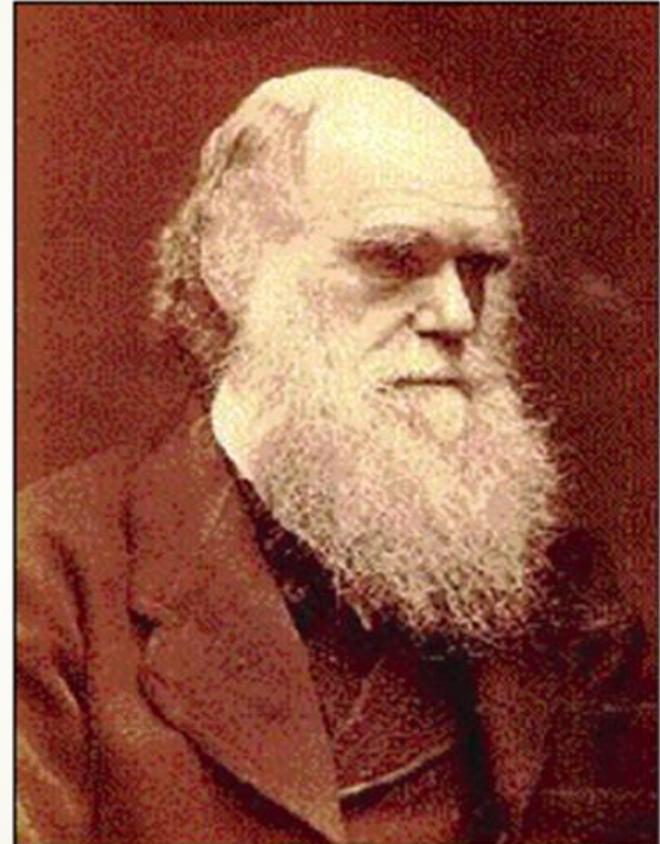
What is Evolution?



- ▶ Evolution is a change in a **population** over **time**.
- ▶ Theory of Evolution
 - ▶ First formed by Darwin in 1859
 - ▶ Due to Natural Selection
- ▶ Diversity increases survivability of a species
 - ▶ The more diverse a population the more likely it will survive:
 - ▶ Disease
 - ▶ Natural disasters such as, drought

Darwin's Theory of Evolution

- ▶ Common Descent-All life is descended from one common ancestor
- ▶ As genetic mutations occur in a population, they are passed from parent to offspring for generations
- ▶ The positive mutations or “favorable” traits cause a change in the population, known as Evolution

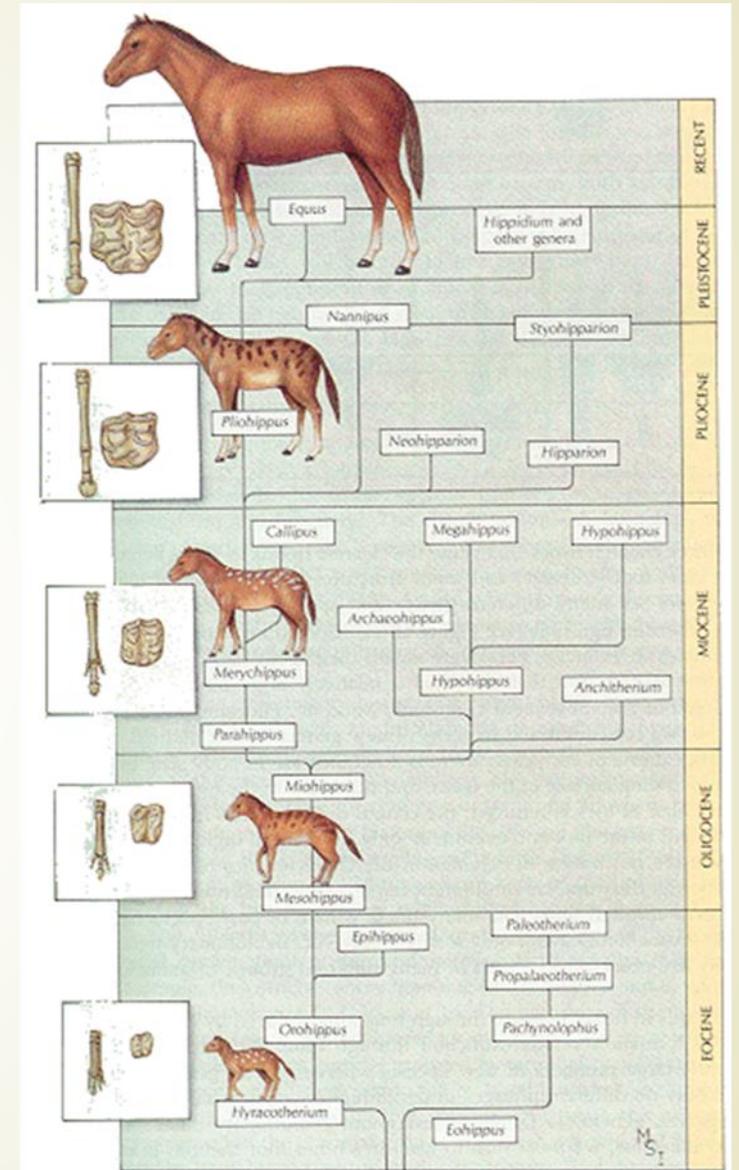


Ch. Darwin
Jan. 7th 1874.

Picture courtesy of Virginia Tech

Evolution of the Horse

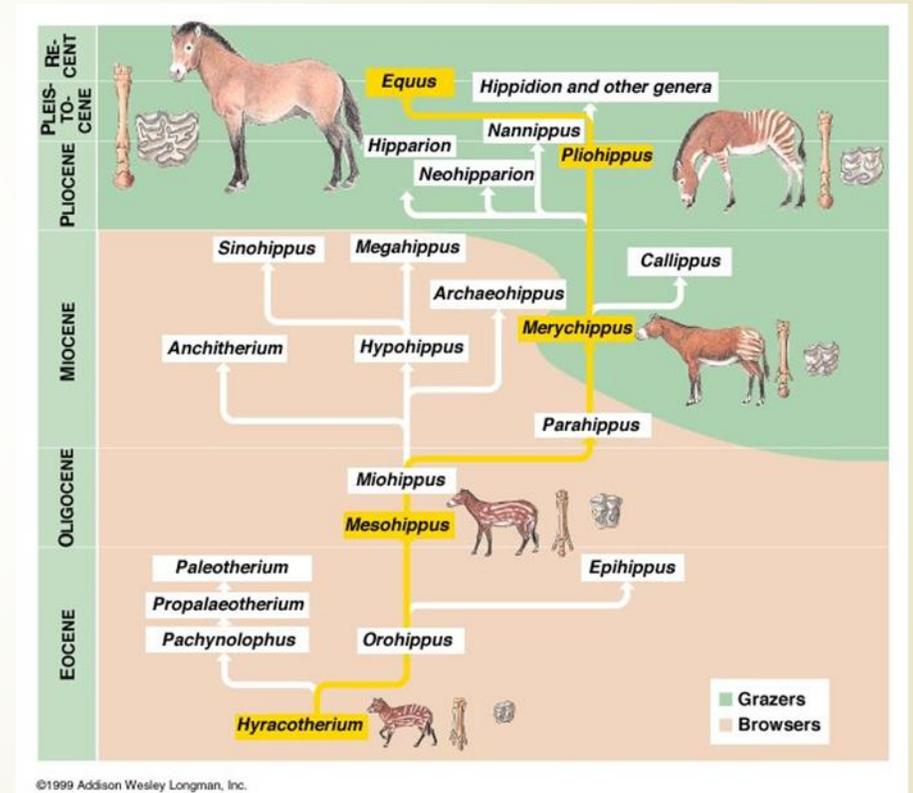
- ▶ The first known ancestor of the horse was the Eohippus
- ▶ This ancient creature stood only a foot tall, had four toes on the front feet and three on the rear feet, and was well adapted to the swamp lands it roamed



Picture courtesy of Memorial University

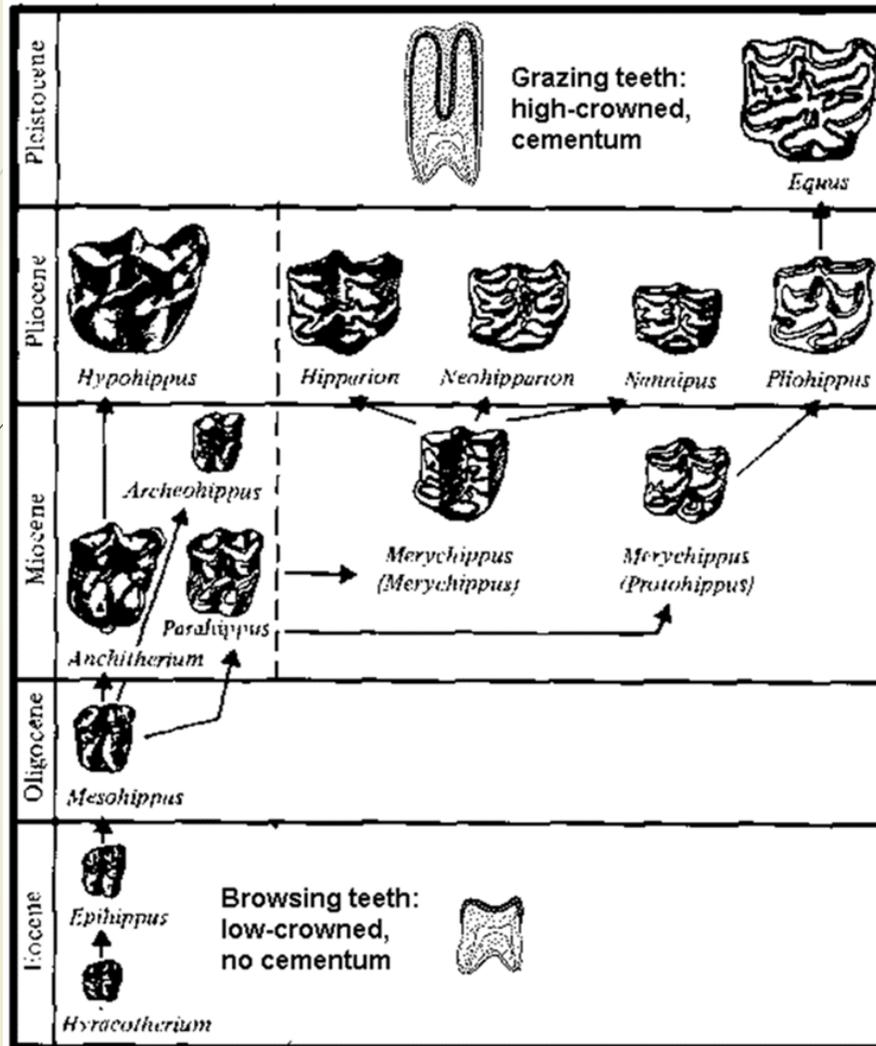
Evolution of the Horse

- Slowly the Eohippus evolved to stand around two feet high, as well as losing a toe on the front feet.
- This new three-toed animal was named Mesohippus
- As shown in the figure to the right these animals continued to evolve, changing from small multi-toed browsing creatures to larger single-toed grazing animals.



Picture courtesy of Memorial University

Evolution of Horse



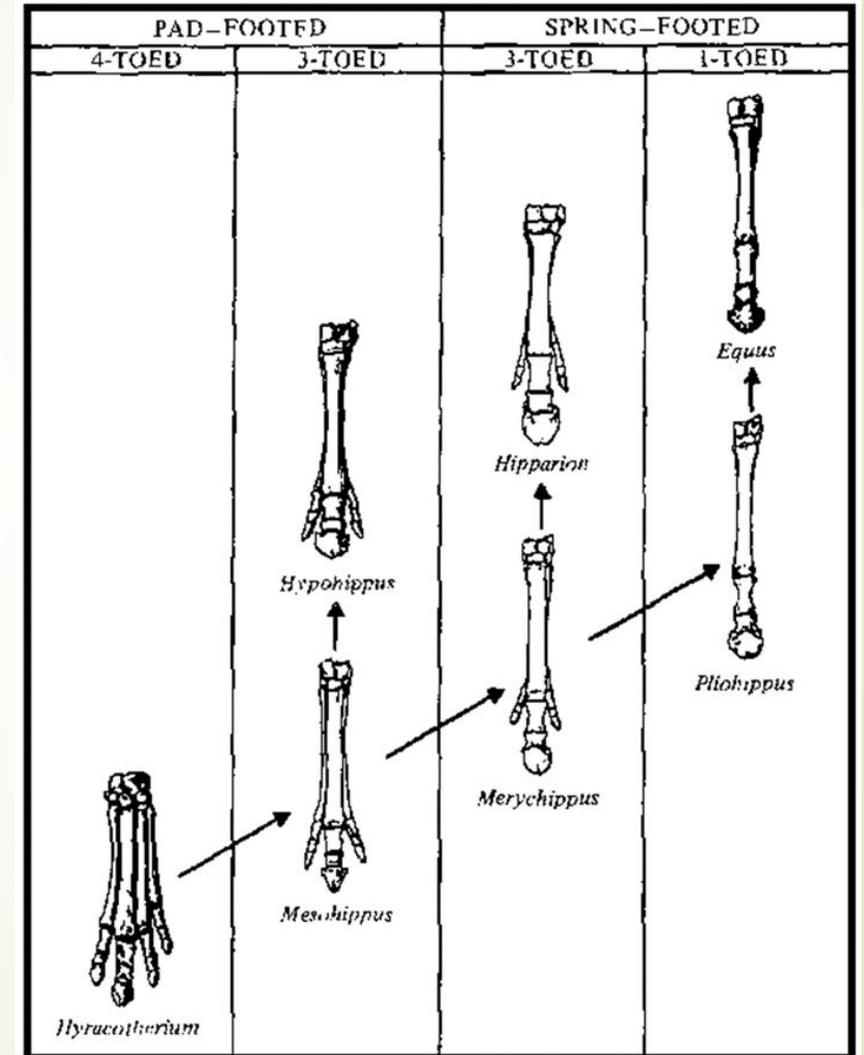
Picture courtesy of Memorial University

- The size and reduction in toes wasn't the only evidence of these animals adapting to their environment and evolving.
- As the earth was changing being able to live on prairie was an advantage to survival
- As seen in the evolution of their teeth these animals went from browsing in swamps to being able to graze on the prairie grasses

How do we show Evolution?

Fossil Records show

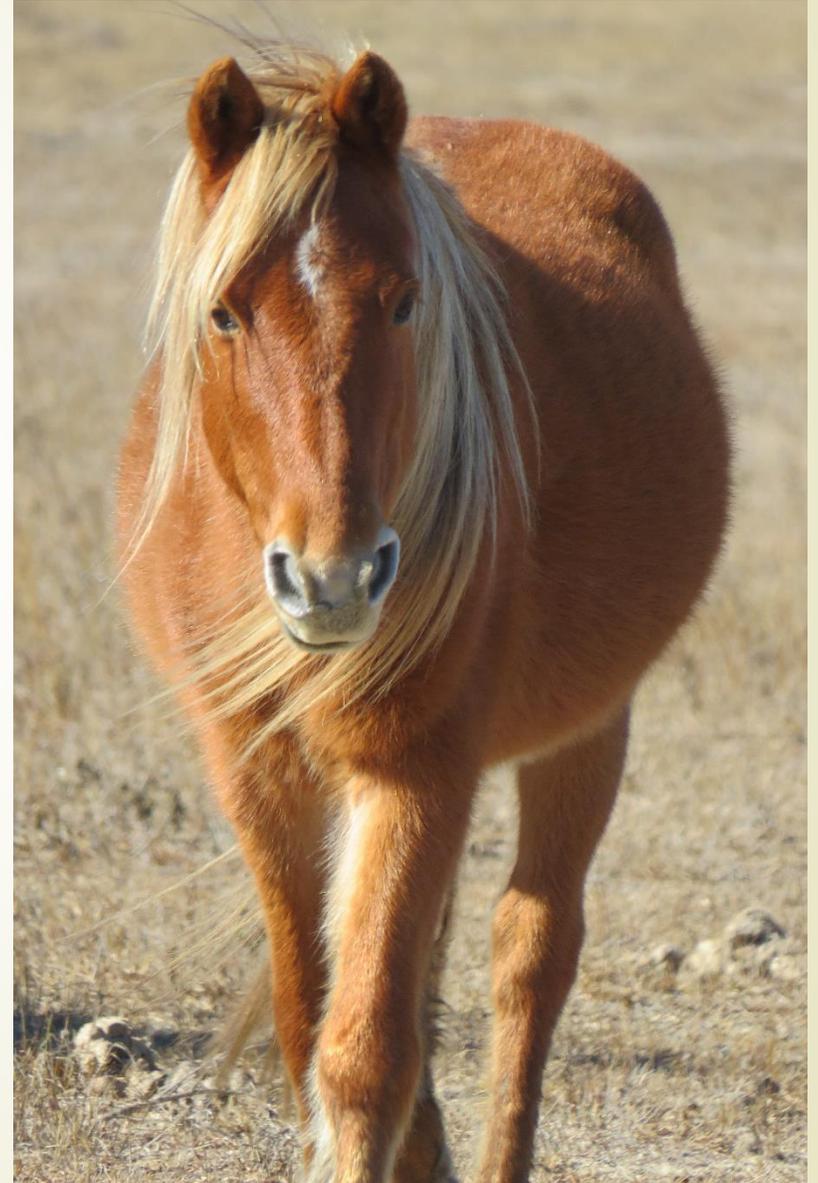
- Progression from simple to complex organisms
- Organisms that were once common are now extinct
- Organisms today are similar to fossils found in both young and old rock formations
 - The reduction in the number of toes on a horse
 - Change in their teeth



Picture courtesy of Memorial University

Horses in the Americas

- ▶ Fossil records show that there were early horses in the Americas long before the Spaniards introduced their horses to this land.
- ▶ However there were no native horses here when settlers came
- ▶ Scientists believe that some of them crossed the Bering Land Bridge and continued to evolve in Asia. Those who stayed may have not been fit enough to survive and evolve. Some possible are disease, parasite, climate change, or competition wiped them out. (Ensminger, 1977)





How does Evolution Occur?

- ▶ Natural Selection- The process whereby organisms better adapted to their environment tend to survive and produce more offspring
 - ▶ Natural Selection allows for “Survival of the Fittest” which aids in the progression of a species
 - ▶ Mutation- A permanent change in a sequence of genetic material of an organism
 - ▶ Mutations are random, and could be beneficial, neutral, or harmful
 - ▶ Mutations are the basis for genetic variation; without them Evolution could not occur.
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Domestication of the Horse



- ▶ The domestication and diversification of the Horse is an example of Artificial Selection
 - ▶ Artificial Selection is where people choose the best traits in a population, and select for those traits.
- ▶ The first record of domestication of horses was in Central Asia around 3000 years B.C. (Ensminger, 1977)
- ▶ The diversity in this species is what will allow it to continue to thrive and evolve.

How Organisms are Classified

- ▶ Every organism has a Kingdom, Phylum, Class, Order, Family, Genus, and Species
- ▶ Kingdom is the least specific, while Species is the most specific
 - ▶ Ex: Kingdom- Animalia; Species- Equus caballus



Present day horses

- ▶ Today there are many different breeds and sizes of horses, but they are all the same species *Equus caballus*
- ▶ Kingdom- *Animalia*
- ▶ Phylum- *Chordata*
- ▶ Class- *Mammalia*
- ▶ Order- *Perissodactyla*
- ▶ Family- *Equidae*
- ▶ Genus- *Equus*
- ▶ Species- *Equus caballus*





Evolution of the Shackelford Banks Horses

- ▶ We don't know the size or body type of the horses who arrived on Shackelford Banks over the years
- ▶ After arriving, the horses had to adapt to the harsh conditions along the coast.
- ▶ They have evolved to:
 - ▶ Eat the rough dune and marsh grasses
 - ▶ Dig for fresh water
 - ▶ Withstand extreme weather conditions, such as hurricanes and droughts
- ▶ Over time the horses evolved: those who survived these conditions and reproduced became the Banker Horses roaming the island today.