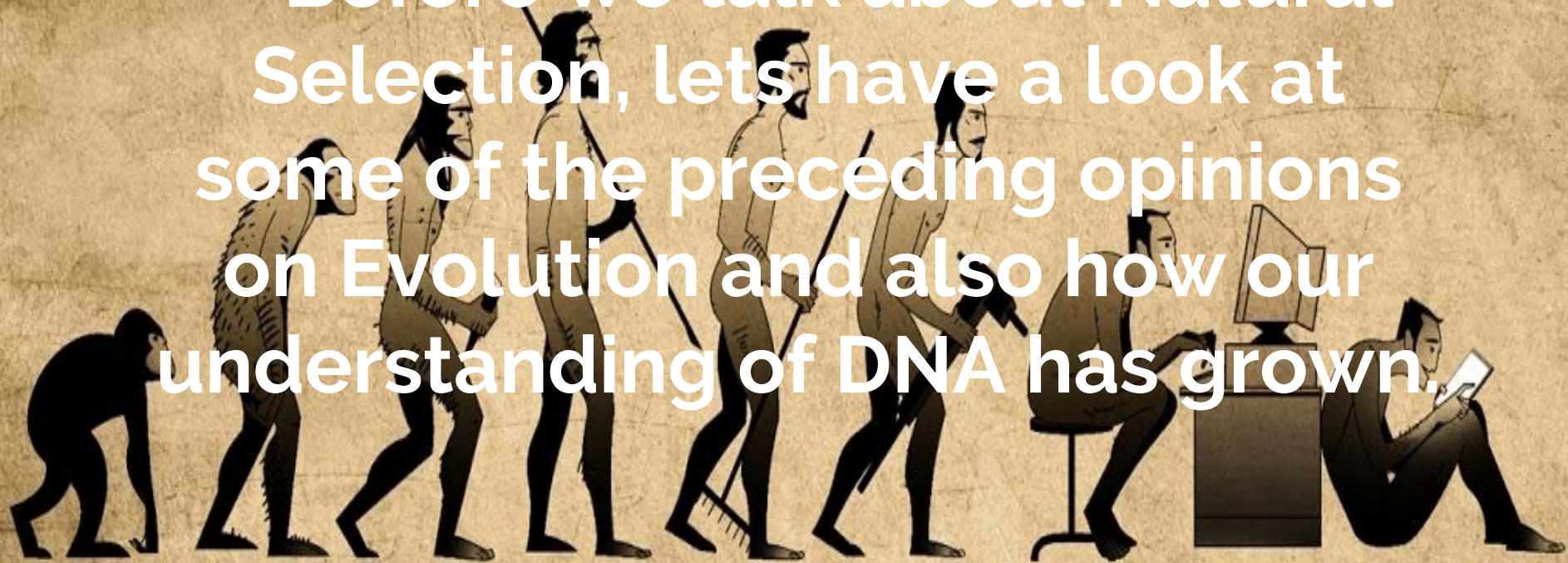


Evolution

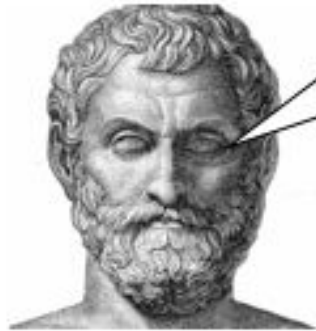


History of Evolutionary thought, Natural Selection, and Evidence for Evolution.

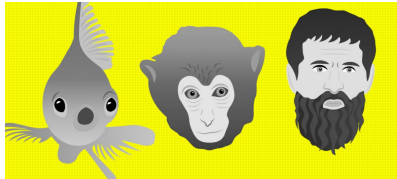
Before we talk about Natural Selection, lets have a look at some of the preceding opinions on Evolution and also how our understanding of DNA has grown.



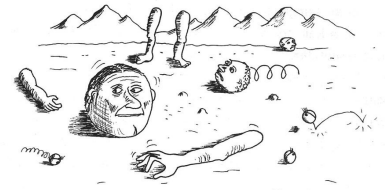
The History of Evolution & DNA....



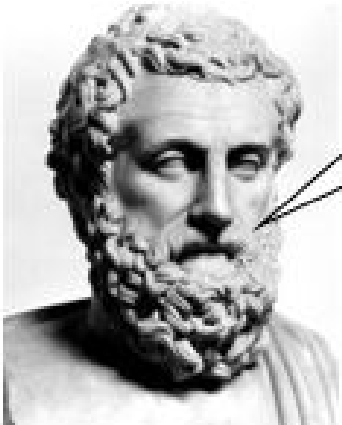
Anaximander (6th century BC)
Species are formed from water.
We're all descended from fish!



Empedocles (5th century BC)
Heads, limbs, and other organs are joined at
random and only some combos are fit for survival!



The History of Evolution & DNA....



Aristotle (384-322 BC)

A deity created templates, from which we are all created.

Christianity (1800s)

God created all living things. Living things are unchanging because God's creation is perfect.



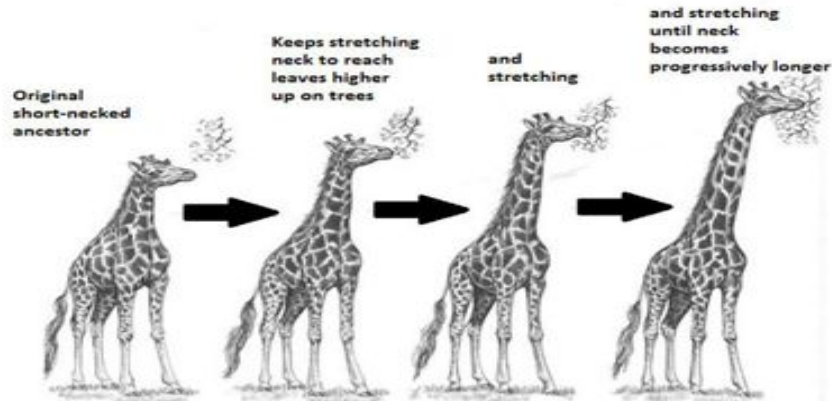
The History of Evolution & DNA....

If an **organism** changes during life in order to adapt to its environment, those changes are passed on to its offspring.

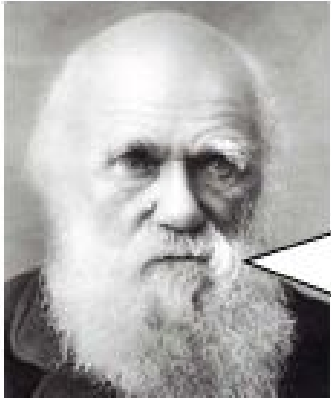


Lamarck (1744-1829)

Giraffe's long necks developed because they were needed.

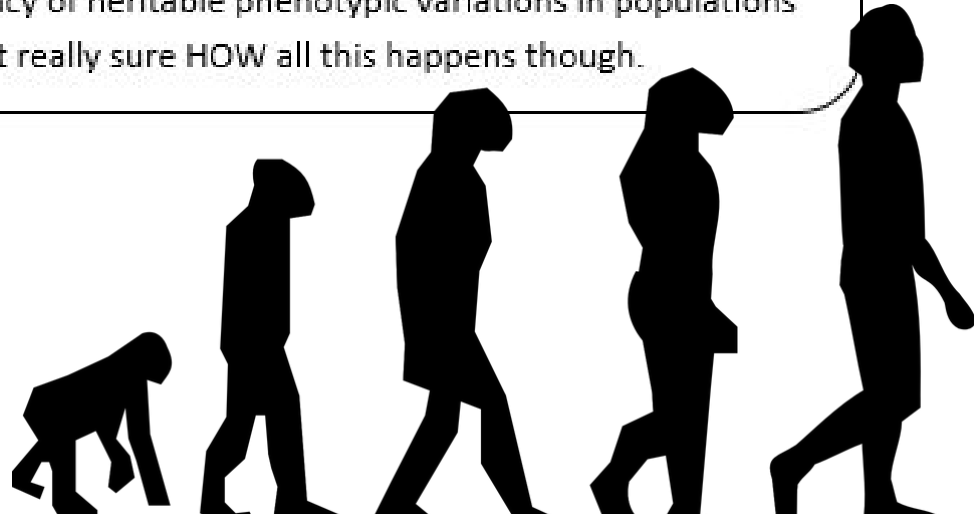


The History of Evolution & DNA....



Darwin (1859)

All species, living and extinct, have descended without interruption from one or a few original forms of life. Differences in the survival and reproduction of phenotypes, leading to differences in their contribution to the next generation, result in a change of frequency of heritable phenotypic variations in populations over time. I am not really sure HOW all this happens though.



The History of Evolution & DNA....



Gregor Mendel (1856)

Genes are how phenotypes are passed from one generation to the next.



Miescher (1869)

I tried to isolate proteins, but instead I found DNA.



Levene (1929)

DNA is made up of a phosphate group, deoxyribose sugar, and nitrogenous base.



Chargaff (1950)

DNA sequence varies among species, but A always pairs with T, and G with

The History of Evolution & DNA....



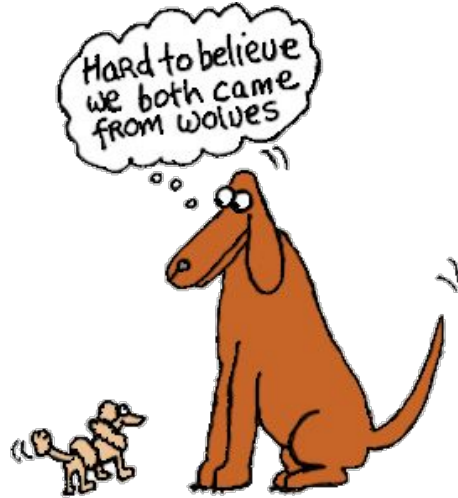
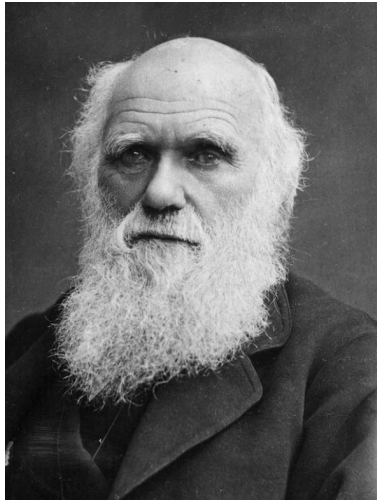
Watson & Crick (1953)
We have discovered DNA's 3D structure

Rosalin Franklin (1953)
Actually, it was me who discovered the double helical nature.



Darwin - Natural Selection

Darwin was influenced by his observations of **artificial selection** and **selective breeding**.



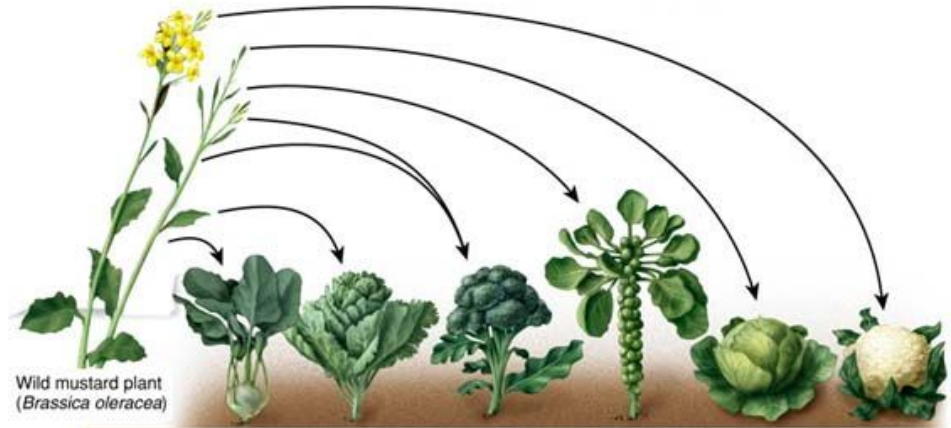
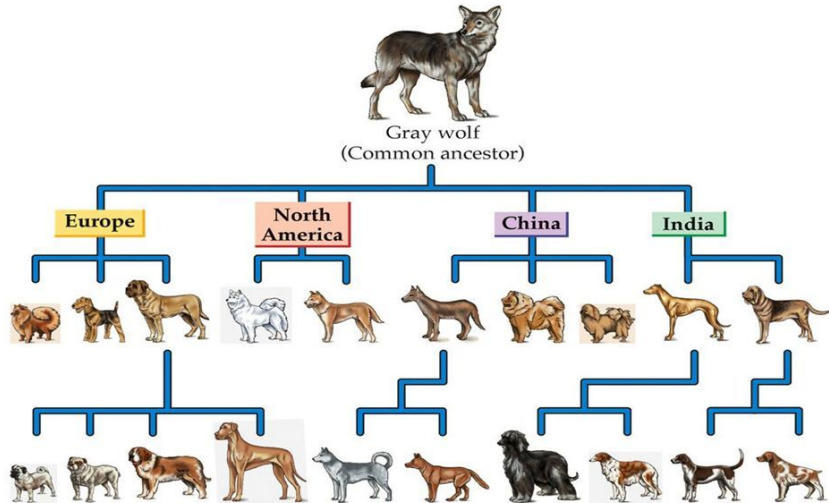


Think: What is artificial selection and selective breeding? Where/why would this be used? Give some examples.

https://www.youtube.com/watch?v=W_CnR0Ak604

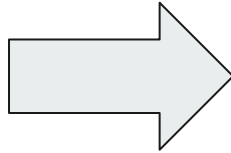
Examples of Selective Breeding over Time.

Examples- animals



Strain	Kohlrabi	Kale	Broccoli	Brussels sprouts	Cabbage	Cauliflower
Modified trait	Stem	Leaves	Flower buds and stem	Lateral leaf buds	Terminal leaf bud	Flower buds

Think: How could you turn a pack of wolves into Chihuahuas? Explain why your strategy would work.



Darwin - Natural selection

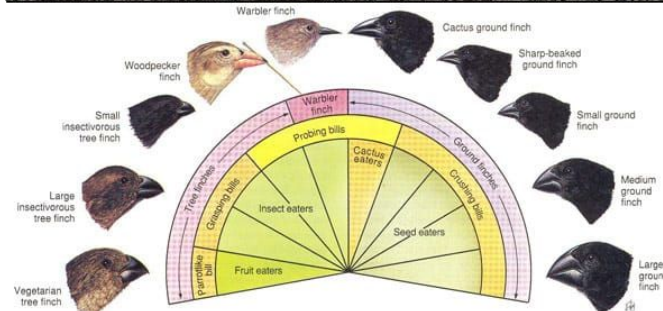
Darwin travelled to the **Galapagos Islands** and observed populations of birds (he called them finches). It was there that he developed the idea of **natural selection**.



<https://www.youtube.com/watch?v=s64Y8sVYfFY>

Darwin - Natural Selection

What were Darwin's observations at the Galapagos?



Natural Selection - broken into 4 steps

Step 1: There is *genetic variation* in a population.



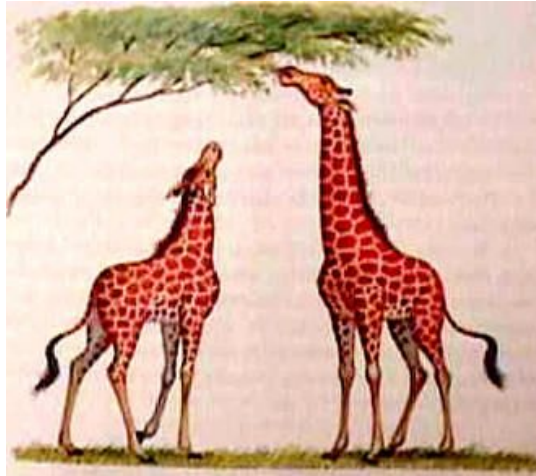
Natural Selection - broken into 4 steps

Step 2: Overproduction of offspring leads to *competition for survival*.



Natural Selection - broken into 4 steps

Step 3: Individuals with *beneficial phenotypes* most likely to survive to sexual maturity to pass on their *genes*.



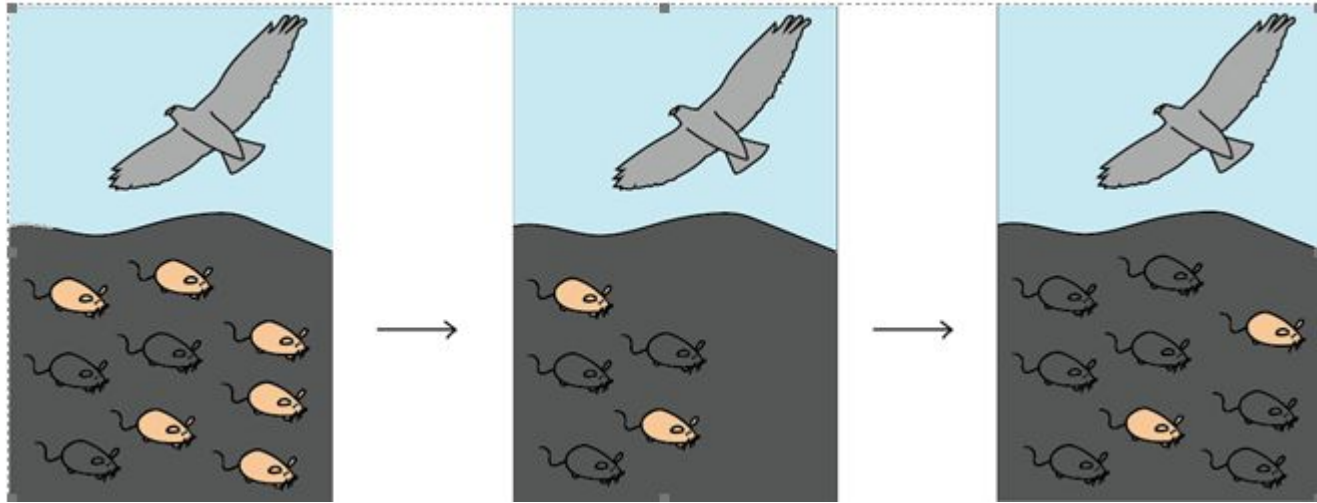
Natural Selection - broken into 4 steps

Step 4: The *traits* of those individuals that survive and *reproduce* will become more common in a population.



— —

Natural selection.....explain what is happening



Natural selection.....explain what is happening



Moth population before, during, and after the industrial revolution.



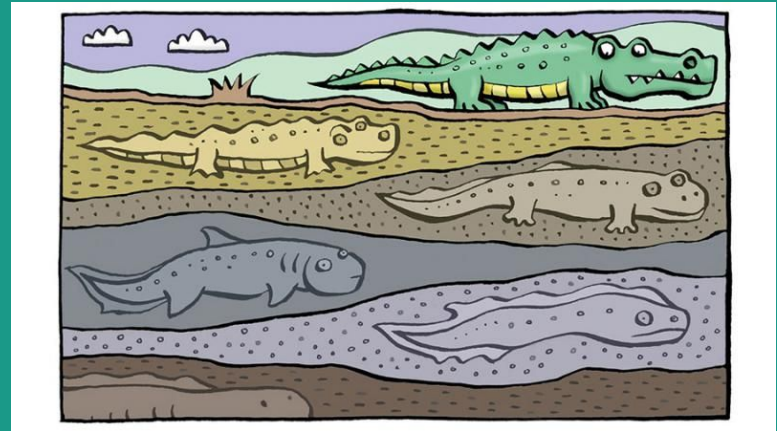
...in groups

5-10 minutes - Do some research on your assigned piece of evidence (see next slides) to determine how that piece of evidence supports the *Theory of Evolution* and what it may look like if Evolution were false.

Expected Observations If	
If Evolution is True	If Evolution is False

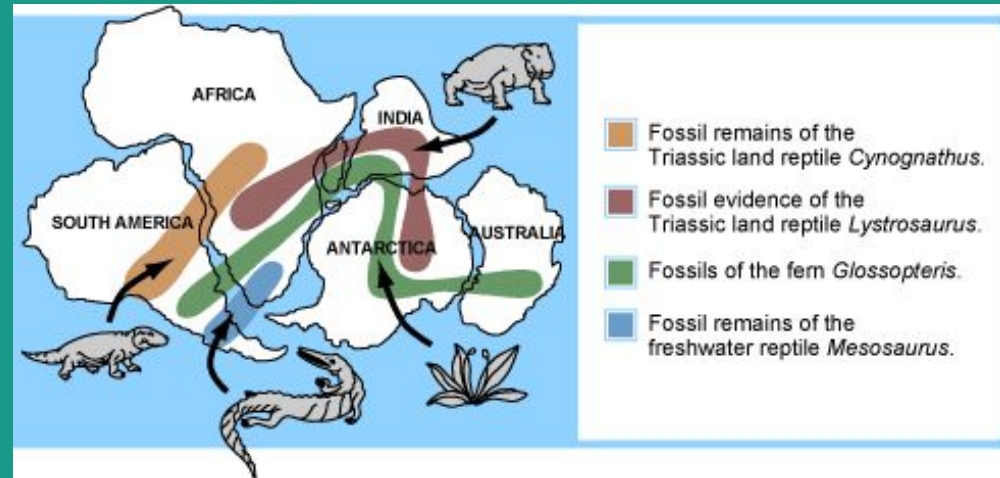
Evidence to Support Evolution

A) **Fossil Record** - The entire collection of fossils we have.



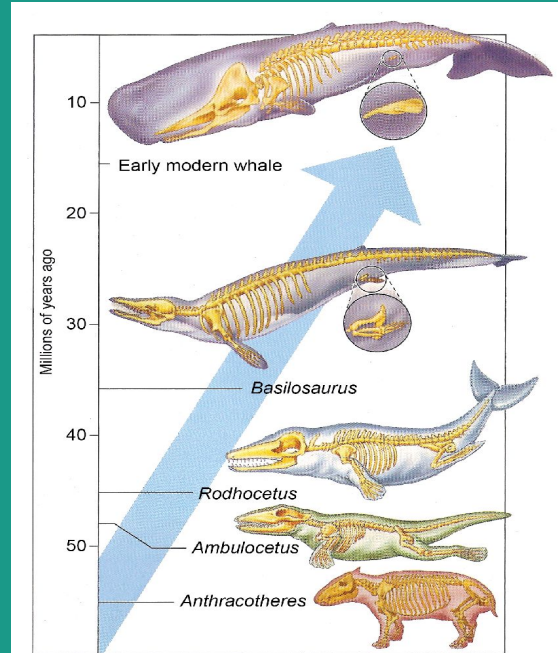
Evidence to Support Evolution

B) Geographical Patterns in the Fossil Record



Evidence to Support Evolution

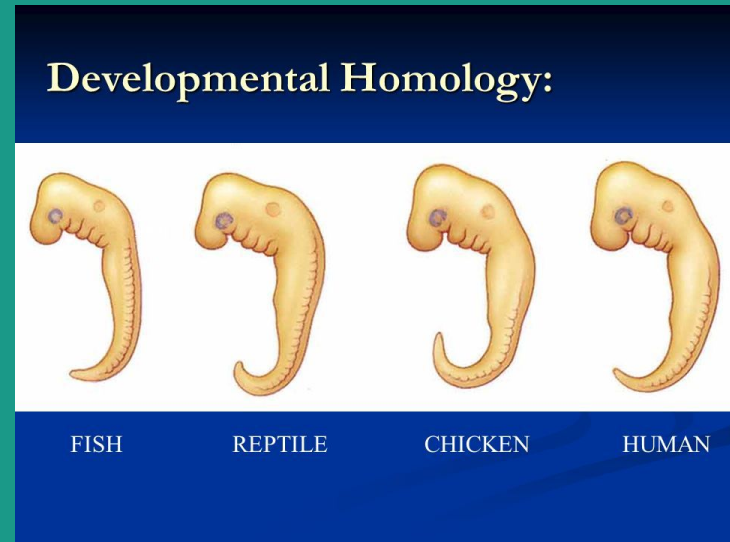
C) Transitional Forms -
Intermediate forms between fossil and more current day organism



Evidence to Support Evolution

D) Developmental Homologies

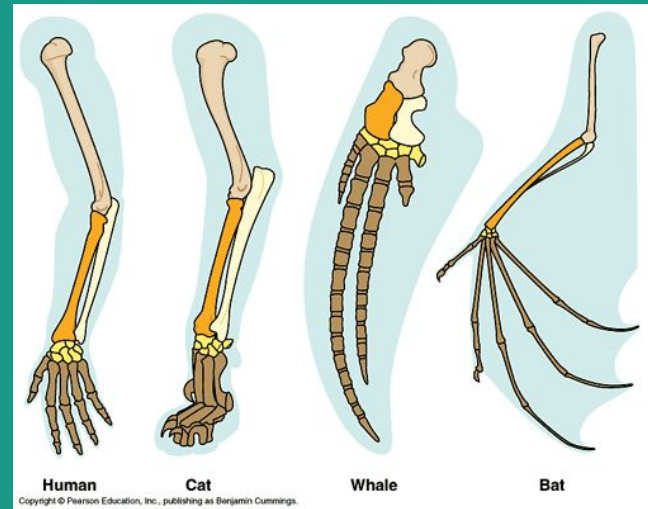
Similarities in how offspring develop



Evidence to Support Evolution

E) Structural Homologies

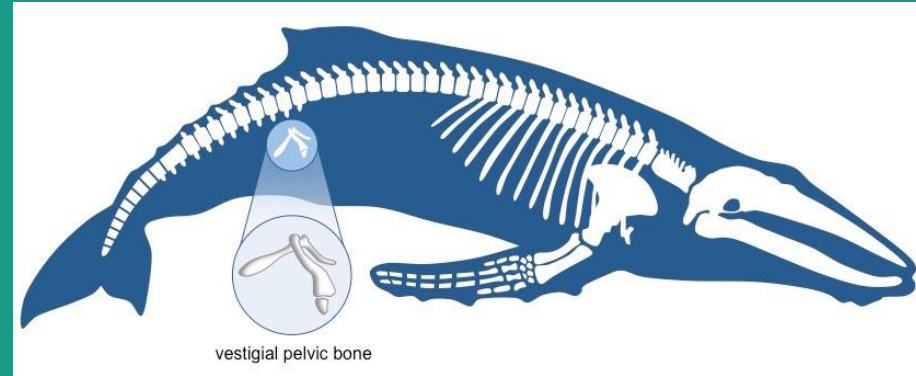
Similarities in structure among organisms.



Evidence to Support Evolution

F) Vestigial Structures

Structures that have no apparent function.



Evidence to Support Evolution

G) DNA records



The END

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