Polygenetics: How are organisms related to each other?

* **Information used to build a tree**
	+ Biologists collect data about heritable traits that can be compared across organisms
		- Physical characteristics (morphology), genetic sequences, and behavioral traits
* **Homologies and Analogies**
	+ Homologous Features
		- Features in different organisms that are similar because they were inherited from a common ancestor that also had that feature
		- Example of homologous features in tetrapods:
			* 4 limbs
				+ Ancestors of tetrapods evolved four limbs and decedents have inherited that feature as well- 4 limbs is a homologous feature for tetrapods
			* Humurous
			* DNA
				+ Cellular structure homologous for plants and animals
			* CO1 gene
				+ Gene that is homologous for every organism with mitochandira
	+ Analogous Features
		- Features that come to be through convergent evolution- they have separate evolutionary origins
			* Example of analogous feature:
				+ Bird wings vs. bat wings

They have separate evolutionary origins but are similar because they both experienced natural selections. (Convergent evolution)

* **What happened when?**
	+ Radiometric Dating
		- Relies on half-life decay of radioactive elements to allow scientists to date rocks and materials
	+ Stratigraphy
		- You know how old a species is based on what layer of rock it is found in
	+ Molecular Clocks
		- Allow scientists to use the amount of genetic divergence between organisms to extrapolate backwards to estimate dates
* **Clade**
	+ A group of organisms believed to have evolved from a common ancestor



* **If humans evolved from apes, why do they still look like apes and not like humans?**
	+ We didn’t evolve from them, we just have a common ancestor
	+ Allopatric Speciation
		- Small group breaks away from a population and begins to evolve independently
		- The source group does not need to go extinct, and is normally not affected by the development of the new group