**Introduction to Evolution**

**What is a theory?**

* Definition:
	+ “A coherent set of propositions that explain a class of phenomena that are supported by **extensive factual evidence** and that may be used for prediction of future observations.”
	+ Numerous lines of evidence \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ exist
	+ Examples
* Different than a fact
	+ Facts are based on direct \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ or \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
		- Examples:

**What is evolution?**

* Can be a difficult term to define:
	+ Is a process that occurs over \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
	+ Does \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ refer to an individual, but to a \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
	+ It is \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ one individual changing into another
* Most simply:
	+ “Evolution is a process that results in heritable changes in a population spread over many generations.”
	+ Change in allele \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ of a gene pool over generations
	+ Descent with \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ (Darwin)

**History of evolution**

* Jean Baptiste Lamarck
	+ \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ biologist
	+ Noticed that species changed over time in response to the \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
		- Evolution!
	+ \_\_\_\_\_\_\_\_\_\_\_\_ and \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Inheritance

**Lamarckism**

* Use and Disuse Inheritance (1809)
	+ Traits are acquired in response to the \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
	+ \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ traits can be passed on to offspring
	+ **Use**:
		- Organisms will develop characteristics that are \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ in a given environment.
	+ **Disuse:**
		- Organisms will lose characteristics that are \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ in a given environment.

\*\*Use and Disuse Inheritance is NOT supported by evidence\*\*

**Example of Use and Disuse:** Giraffe neck length

* Example:
	+ Giraffes’ long necks enable them to reach leaves on the tops of trees.

**Charles Darwin**

* Born in 1809, to a wealthy \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ family
* Educational history:
	+ Enrolled in \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ school, but dropped out and became interested in theology.
	+ When he became interested in \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_, he took a job on the \_\_\_\_\_\_\_\_\_\_\_\_\_ \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

**Aboard the Beagle**

* Purpose of the Beagle’s voyage:
	+ Chart the coast of \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
* Darwin worked as a \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
	+ Studied the South American \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
		- Especially on the \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
	+ Collected \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ as well as \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
	+ Recorded detailed observations of many \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ organisms
* \_\_\_\_\_\_\_\_ year voyage

**Darwin’s Findings**

* After close analysis of his data, Darwin proposed a \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_:
	+
* Findings were published in \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
	+
	+ Proposed that \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ is the mechanism that drives evolution

***On the Origin of Species***

* The process of natural selection:
	1. Species \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
		+ More offspring are born than the \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ can sustain
	2. There is heritable \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ in traits within a species
	3. Certain traits were \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ to the environmental conditions than others
	4. The individuals with traits best suited to the environment will have the greatest chance to \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ and \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
		+ - Those best suited to their environment will produce the most offspring
* Result:
	+ The number of individuals with a favorable trait will \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ over time.
	+ When \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_changes over time, evolution has occurred!
		- Allele frequency = Proportion of a particular allele of a gene in a population

**Gene mutations and allele frequency**

* Gene pool
	+ Set of all \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ in a population
* \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ can create new alleles
	+ New alleles change the composition of gene pool by changing allele frequencies
* Over time, allele frequencies will change:
	+ Frequency of alleles that help survival will \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
	+ Frequency of alleles that are detrimental to survival will \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_