**Evolution**

[Evolution](javascript:openGlossary('gbevolut','0-13-181118-5')), or change over time, is the process by which modern organisms have descended from ancient organisms.

Darwin collected the preserved remains of ancient organisms, called [fossils](javascript:openGlossary('gbfossil','0-13-181118-5')).

* Some of those fossils resembled organisms that were still alive today.
* Others looked completely unlike any creature he had ever seen.

Darwin was fascinated in particular by the land tortoises and marine iguanas in the Galápagos.

* Giant tortoises varied in predictable ways from one island to another.
* The shape of a tortoise's shell could be used to identify which island a particular tortoise inhabited.
* Animals found in the Galapagos
  + Land Tortoises
  + Darwin Finches
  + Blue-Footed Booby
  + Marine Iguanas

Hypothesis: Separate species may have arose from an original ancestor

Darwin thought if earth changed over time, what about life?

Publication of Origin of Species

Natural Selection & Artificial Selection

* **Natural variation**--differences among individuals of a species
* **Artificial selection**- nature provides the variation among different organisms, and humans select those variations they find useful

Evolution by Natural Selection

* **The Struggle for Existence**-members of each species have to compete for food, shelter, other life necessities
* **Survival of the Fittest**-Some individuals better suited for the environment
* **Natural Selection** - Over time, natural selection results in changes in inherited characteristics of a population. These changes increase a species fitness in its environment

Evidence of Evolution

* **The Fossil Record**-Layer show change
* **Geographic Distribution of Living Things-**similar environments have similar types of organisms
* **Homologous Structures**-structures that have different mature forms in different organisms, but develop from the same embryonic tissue
* Similarities in Early Development
* **Vestigial organs**-organs that serve no useful function in an organism

Summary of Darwin’s Theory

* Individuals in nature differ from one another
* Organisms in nature produce more offspring than can survive, and many of those who do not survive do not reproduce
* Because more organisms are produce than can survive, each species must struggle for resources
* Each organism is unique, each has advantages and disadvantages in the struggle for existence
* Individuals best suited for the environment survive and reproduce most successfully
* Species change over time
* Species alive today descended with modification from species that lived in the past
* All organisms on earth are united into a single family tree of life by common descent