

## Biodiversity Chapter 22 Notes

- Evolution by Natural Selection occurs through differential rates of reproductive success
  - o Some genotypes are better adapted to the environment
- Q: Can a change in a population's food source result in evolution by natural selection?
  - o A: YES. Adaptation to Environmental Changes
- **TIMELINE TIME!!!**
  - o 1795 - Hutton proposes *The Principle of Gradualism*: change is the product of continual slow processes (not spurts). VERY VERY VERY LONG TIME!!
  - o 1798 - Malthus - "Essay on the Principle of Population": The amount of people on earth will eventually outgrow their resources
  - o 1809 - Charles Darwin is Born
  - o 1809 - Lamarck proposes that Acquired characteristics are passed down
  - o 1831 - Darwin's trip on the HMS Beagle starts
  - o 1838 - Darwin's trip on the HMS Beagle ends
  - o 1859 - Origin of Species is published
  - o 1970s - *Punctuated Equilibrium* is proposed: Evolution occurs in spurts (like, 100 thousand year spurts.) Opposite of the Principle of Gradualism.
- **Fossils** - relics/impressions of organisms from the past
- **Paleontology** - The study of fossils
- Lots of fossils are marine organisms (they don't decompose as fast)
- Thoughts of Darwin: "hmm...the fossils in South America looked South American. They're all different from the Australian fossils. The Galápagos fossils look like the South American fossils. They Galápagos fossils and the South American fossils might be related."
- **Homologous Characteristic** - trait that came from having a common ancestor
- **Observations of Darwin's Theory:**
  1. Species can produce more offspring than the environment can support
  2. Most populations are stable in size over longer periods
  3. Resources are limited
  4. Individuals in a population vary in phenotype/genotype
  5. This variation is heritable
- **Inferences of Darwin's Theory:**
  1. Production of individuals beyond the tipping point results in only a fraction of offspring surviving (based on observations 1-3)
  2. Survival for existence isn't random. This is **Survival of the Fittest** (based on observations 4-5)