

Section 7: Evolutionary Theory

- Charles Darwin: Epic voyage on the *HMS Beagle*, famous stop @ Galapagos Islands
- species are adapted to their environments
- similar environments don't always have same organisms
- fossils don't always look like living species
- Variation exists within a species, both in the wild and in domesticated organisms.
- Selecting for or against traits is possible (natural vs. artificial selection).
- Natural competition among organisms leads to a struggle for survival
- Organisms best adapted to their environments have better fitness, survive longer and have better fitness.
- Closely related organisms could be the result of descent with modification
- Supporting evidence: fossil record, geographical distribution of organisms, homologous body structures, embryology
- Causes of genetic variety: mutations and gene shuffling
- Hardy-Weinberg principle and the factors required to stay in genetic equilibrium

Practice questions:

- 1) What was the purpose of Darwin's voyage on the *HMS Beagle*? What did he get out of it?
- 2) How could horse breeders use artificial selection to increase the life span of the individuals in their herds?
- 3) What is fitness (in evolutionary terms)? How does it relate to adaptation?
- 4) How does the fossil record support the conclusions drawn by Darwin?
- 5) Define evolution in your own words.
- 6) Is extinction a pattern of evolution on its own, or does it depend on other patterns of evolution in order to occur? Explain.
- 7) What is the difference between homologous body structures (used to support evolution) and convergent evolution?
- 8) Why does evolution remain a theory to this day? What are some of the factors preventing it from becoming a law?
- 9) Why did it take so long for Darwin to publish his work?
- 10) Define the following terms:
 - a. Population
 - b. Species
 - c. Gene pool
 - d. Relative frequency of an allele
 - e. Genetic equilibrium