Evolution Unit Learning Objectives

* Natural selection is the major mechanism of evolution.
* Darwin’s theory of evolution by means of natural selection.
* Define evolutionary fitness.
* The importance of genetic and phenotypic variation caused by mutations and new gene combinations.
* Define adaptation.
* The effect of chance and random events, especially on small populations (genetic drift, population bottleneck, founder effect).
* Hardy-Weinberg genetic equilibrium and equations.
* Evidence of evolution = geographical, geological, morphological, molecular, genetic, fossils, homologous and vestigial structures.
* Phylogenetic trees and cladograms
  + Traits are gained or lost
  + Speciation and common ancestors
  + Evolutionary trees are often being changed and revised with new information
* Shared characteristics of life (all three domains)
  + DNA and RNA serve as the genetic material
  + Mechanisms of transcription, translation, and DNA replication
  + Conserved metabolic pathways, e.g. glycolysis
  + Similar organelles among all eukaryotic cells: cytoskeleton, membrane-bound organelles, endoplasmic reticulum, nuclear membrane, linear chromosomes
* Speciation and extinction
  + Adaptive radiation
  + Reproductive isolation = geographic barriers, various pre- and post-zygotic mechanisms. Allopatric and sympatric speciation.
* Populations of organisms continue to evolve
  + E.g. emergent diseases, drug/pesticide resistance, etc.