**Biology 21: Final Exam Study Guide 2015**

* **Science Skills**
  + Interpret information presented in graphs and data tables.
  + Identify independent and dependent variables, including those that are kept constant and those used as controls.
* **Genetics** (Chapter 12)
  + Use Punnett squares to compare the results of various patterns of inheritance:dominant and recessive traits, co-dominance, incomplete dominance, sex-linked, and multiple alleles (e.g. blood typing).
  + Interpret pedigrees: predict the genotypes and phenotypes of individuals who could be carrier, affected, and non-affected.
  + Analyze inheritance patterns using pedigrees.
* **Classification** (Chapter 17)
  + Identify relatedness between species using Linnaean taxonomic hierarchies.
  + Write using binomial nomenclature.
  + Interpret evolutionary relationships using phylogenetic trees and cladograms.
  + Identify an organism using a dichotomous key.
* **Microbiology** (Chapters 23 and 24)
  + Compare and contrast bacteria and viruses based on:
    - Structure
    - How they survive and reproduce
    - Treatment
  + Compare and contrast the lytic and lysogenic cycles of viruses.
  + Explain bacterial evolution in terms of resistance.
  + Describe bacterial morphology: cocci, bacilli, spirilla, gram-negative vs. gram-positive.
  + Describe viral morphology: capsid and core genetic material (DNA, RNA and retro viruses).
* **Evolution** (Chapters 15 and 16)
  + Describe the evidence to support the theory of evolution.
  + Investigate the development of evolutionary theory. Mainly, Darwin and his theory of evolution by natural selection.
  + Compare and contrast patterns of convergent, divergent, and co-evolution.
  + Compare and contrast gradualism and punctuated equilibrium.
  + Describe the process of speciation through mechanisms such as geographic and reproductive isolation.
* **Animal Evolution** (Selected sections from Units 8 and 9)
  + Describe the key structural characteristics that distinguish the nine major animal phyla.
    - 9 major phyla: Porifera, Cnidaria, Platyhelminthes, Nematoda, Annelida, Mollusca, Arthropoda, Echinodermata, Chordata (classes: fishes, amphibians, reptiles, aves, mammals)
    - Structural characteristics: symmetry, cephalization, number of tissue layers, presence of body cavity and number of openings, and segmented body.
  + Explain the adaptations that made it possible for animals to move from water to land.
    - Trends: methods of reproduction, methods of gas exchange, methods of transporting materials throughout the organism, overcoming gravity, movement, prevention of desiccation, and overwintering (migration, hibernation, endothermy).
  + Read and interpret animal phylogenetic trees and cladograms.
* **Plant Evolution** (Selected sections from Unit 7)
  + Describe the key structural characteristics that distinguish the major plant phyla.
    - 4 major phyla: Bryophytes, Tracheophytes, Gymnosperms, Angiosperms (monocot and dicot)
  + Explain the structural characteristics that made it possible for plants to move from water to land.
    - Vascular tissues, seeds, development and modification of roots, stems, and leaves, methods of reproduction (including alternation of generations), and prevention of desiccation.
  + Read and interpret plant phylogenetic trees and cladograms.
* **Ecology** (Chapters 18, 19 and 20)
  + Distinguish between the abiotic and biotic components in an ecosystem.
  + Trace the interactions among populations of different species within a community in terms of energy flow (food webs, trophic levels) and symbiosis (predation, parasitism, mutualism, commensalism).
  + Describe the factors that affect the carrying capacity of the environment.
  + Explain how population density is affected by emigration, immigration, birth rate and death rate.
  + Compare age structure diagrams for a developed, developing and underdeveloped country. And identify the factors that affect a population’s age structure.
  + Recognize the biosphere is a closed system, nutrients must be recycled (overview of Carbon, Water, and Nitrogen cycle).