**Biology 21: Midterm Study Guide 2014-2015**

##### Ch. 1 Introduction to Biology

* List and Define the characteristics of life
* Describe each of the major themes in biology
* Use the scientific method to design and analyze and experiment.
* Use and define the following: controlled experiment, independent variable, dependent variable, control group, variables held constant, validity

###### Ch. 3 Biochemistry

* Identify that all organic compounds all contain carbon
* State the structure and function of the four major types of organic compounds (including monomers, polymers and functions):
  + Carbohydrates
  + Lipids
  + Proteins
  + Nucleic acids
* Describe the structure and function of enzymes.
* Describe how factors affecting enzyme function (temperature and pH)

###### Ch. 4 and 5 Cell Structure and Function

* Apply the Cell Theory
* Identify the difference between the cell structures in prokaryotes vs. eukaryote cells
* Compare and contrast the cell structure in plant vs. animal cells
* Describe the structure and function of the cell membrane, nucleus and organelles
* Describe how the various organelles work together to complete the functions of the cells.
* Compare and contrast passive transport vs. active transport (concentration gradient, hypertonic, hypotonic, isotonic)
* Describe the process of endocytosis and exocytosis.
* Describe the role of proteins in the cell membrane.

###### Ch. 6 and 7 Cell Energetics (Cellular Respiration and Photosynthesis)

* Describe the complementary roles of photosynthesis in producers and cellular respiration in all living things
* Identify the location and summarize each of the following processes: glycolysis, aerobic and anaerobic energy pathways (including fermentation)
* Describe the ADP and ATP cycles.
* Compare and contrast the production of ATP through aerobic vs. anaerobic pathways

###### Ch. 10 DNA, RNA, and Protein Synthesis

* Describe the relationship between nucleotides, genes, chromosomes and DNA.
* Compare and contrast the structure and function of DNA and RNA (mRNA, rRNA, tRNA)
* Describe the process of DNA replication
* Define and describe transcription (DNA to mRNA)
* Define and describe translation (mRNA to protein)
* Use the codon chart to determine the amino acid sequence of a gene
* Identify DNA mutations (deletion, substitution, frame-shift)
* Analyze the benefits and risks of genetically modified foods.

**Ch. 8 Cell Division (Mitosis and Meiosis)**

* Identify the structure of a chromosome and the importance of homologous chromosomes.
* Describe the movement of chromosomes in mitosis and meiosis
* Compare and contrast the end products of mitosis vs. meiosis
* Describe crossing over and the importance of it in sexually reproducing organisms.
* Compare and contrast cell division in animal and plant cells
* Describe the process of creating a unique individual including cell division, fertilization and growth
* Read and analyze a karyotype