Living Environment Course Outline 2015-2016

**Unit 1: Introduction to Life Functions, Cells, and Cell Processes**

*Essential Question: What does it mean to be a “living” thing?*

* That you are able to perform ALL of the essential life functions
* That you are made of cells
  + - Cell organelles
    - Microscope use
    - Organizational levels from molecules through organism
* That you require 4 main organic nutrients: proteins, carbohydrates, lipids, and nucleic acids
  + - Use of indicators
    - Examples of each
* That your cells perform key processes to keep you alive
  + - Transport of molecules: Diffusion, Passive, and Active
    - Cellular Respiration: Aerobic and Anaerobic
    - Photosynthesis (if you are a plant or other autotrophic organism)

**Unit 2: The Human Body (with some comparison/contrast to plants)**

*Essential Questions: How do the body systems work together to perform the essential life functions?*

* Nutrition
  + - Digestive system
    - Disruptions of homeostasis
* Transport
  + - Digestive, Respiratory, Circulatory, Excretory systems
    - Disruptions of homeostasis
* Respiration
  + - Muscular system (and Digestive, Respiratory, Circulatory, Excretory)
    - Disruptions of homeostasis
* Synthesis
  + - Reactions (dehydration synthesis and hydrolysis; aka building and breaking down)
* Growth
  + - “You are what you eat.” Nutrient assimilation
    - Skeletal system
* Regulation
  + - Nervous and Endocrine systems control feedback mechanisms
    - Immune system response
    - Integumentary system – first line of defense
    - Disruptions of homeostasis
* Excretion
  + - Excretory system
    - Disruptions of homeostasis

**Unit 3: Reproduction**

*Essential Question: How do organisms reproduce?*

* Asexually or Sexually
  + - Methods of both, examples
* Cell division: meiosis and mitosis
* Male vs Female anatomy
  + - Menstrual cycle
* Development: growth and differentiation
  + - Stages of embryonic development
    - Stem cells
    - Factors affecting development

**Unit 4: Genetics**

*Essential Questions: What are genes? What do genes do? How can we manipulate genes?*

* Protein Synthesis
  + - Transcription & Translation
* Mutations
* Environmental Influence
  + - Nature vs Nurture
* Genetic Engineering
  + - Artificial selection
    - Recombinant DNA
    - Gel Electrophoresis
    - Cloning
    - Gene Therapy

**Unit 5: Evolution**

*Essential Question: How does evolution happen and what influences its rate?*

* Natural Selection
* Evidence of evolution
  + - Fossil record
    - Comparative anatomy
    - Comparative embryology
    - Biochemistry
    - Geographic distribution/Geologic Time
* Examples of rapid evolution: antibiotic resistance, insecticide resistance

**Unit 6: Ecology**

*Essential Questions: What makes an ecosystem stable? How do we impact our environment and why is it important?*

* Biodiversity
* Species interdependence
* Energy flow
* Material cycling
* Trade-offs: weighing the pros and cons of our actions
  + - Population growth
    - Habitat destruction
    - Pollution
    - Invasive species
    - Climate change
    - Hydro-fracking