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