



<u>Course Title:</u> Biology		
<u>Description:</u> Biology is a survey of many different aspects of living things. It will cover topics ranging from microscopic to populations of organisms. The course will provide a strong background in the basic biological language.		
<i>Life Sciences</i>		
<u>Reporting Topic</u>	<u>Grade Level Standards</u>	<u>Competency Statement</u>
Unit 1 - Life		
<u>Ecosystems</u>	• Use mathematical and/or computational representations to support explanations of factors that affect carrying capacity of ecosystems at different scales. (HS LS2-1)	Students will explain how factors of an ecosystem affect carrying capacity.
<u>Homeostasis</u>	• Develop and use a model to illustrate the hierarchical organization of interacting systems that provide specific functions within multicellular organisms (HS LS 1-2). • Plan and conduct an investigation to provide evidence that feedback mechanisms maintain homeostasis. (HS-LS1-3)	Students will investigate feedback mechanisms through the scientific process.
<u>Matter and Energy of Life</u>	• Construct and revise an explanation based on evidence for how carbon, hydrogen, and oxygen from sugar molecules may combine with other elements to form amino acids and/or other large carbon-based molecules. (HS-LS1-6)	Students will explain how carbon, hydrogen, and oxygen atoms, from the environment, are used to make molecules found within living organisms. .
Unit 2 - Energy		
<u>Photosynthesis</u>	• Develop and use a model to illustrate the hierarchical organization of interacting systems that provide specific functions within multicellular organisms (HS LS 1-2). • Use a model to illustrate how photosynthesis transforms light energy into stored chemical energy. (HS-LS1-5).	Students will explain how sunlight is converted into chemical energy through photosynthesis.



<u>Cellular Respiration</u>	- Develop and use a model to illustrate the hierarchical organization of interacting systems that provide specific functions within multicellular organisms (HS LS 1-2). - Use a model to illustrate that cellular respiration is a chemical process whereby the bonds of food molecules and oxygen molecules are broken and the bonds in new compounds are formed, resulting in a net transfer of energy. (HS-LS1-7)	Students will be able to explain how food is converted into usable energy through cell respiration.
<u>Cycling of Matter and Energy</u>	Construct and Revise an explanation based on evidence for the cycling of matter and flow of energy in aerobic and anaerobic conditions (HS LS 2-3) - Develop a model to illustrate the role of photosynthesis and cellular respiration in the cycling of carbon among the biosphere, atmosphere, hydrosphere and geosphere. (HS LS 2-5)	Students will illustrate the cycling of matter and energy within ecosystems.
Unit 3 - Cell Cycle		
<u>Mitosis</u>	Use a model to illustrate the role of cellular division (mitosis) and differentiation in producing and maintaining complex organisms. (HS-LS1-4)	Students will explain the importance of cell division and differentiation in order to maintain life.
<u>Meiosis</u>	Ask questions to clarify relationships about the role of DNA and chromosomes in coding the instructions for characteristic traits passed from parents to offspring. (HS-LS3-1)	Students will explain how meiosis creates genetic variety used in sexual reproduction
Unit 4 - Genetics		
<u>DNA Replication</u>	Ask questions to clarify relationships about the role of DNA and chromosomes in coding the instructions for characteristic traits passed from parents to offspring. (HS-LS 3-1)	Students will explain how and why cells copy their DNA to pass traits from parents to offspring.
<u>Protein Synthesis</u>	Construct an explanation based on evidence for how the structure of DNA determines the structure of proteins which carry out the essential functions of life through systems of specialized cells. (HS-LS1-1).	Students will explain how DNA is used to make proteins.
Unit 5 - Heredity		



<u>Genetic Variation</u>	Make and defend a claim based on evidence that inheritable genetic variations may result from: (1) new genetic combinations through meiosis, (2) viable errors occurring during replication, and/or (3) mutations caused by environmental factors. (HS-LS3-2)	Students will show how different factors create variety in organisms.
Unit 6 - Evolution		
<u>Natural Selection</u>	- Construct an explanation based on evidence that the process of evolution primarily results from four factors: (1) the potential for a species to increase in number, (2) the heritable genetic variation of individuals in a species due to mutation and sexual reproduction, (3) competition for limited resources, and (4) the proliferation of those organisms that are better able to survive and reproduce in the environment. (HS-LS4-2) - Evaluate the evidence for the role of group behavior on individual and species' chances to survive and reproduce (HS LS 2-8)	Students will explain factors that affect natural selection leading to change in populations.
<u>Evolution of Populations</u>	Apply concepts of statistics and probability to explain the variation and distribution of expressed traits in a population. (HS-LS3-3) Construct an explanation based on evidence for how natural selection leads to adaptation of populations. (HS-LS4-4) - Apply concepts of statistics and probability to support explanations that organisms with an advantageous heritable trait tend to increase in proportion to organisms lacking this trait. (HS-LS4-3)	Students will analyze data to identify variation and predict future populations.
<u>Speciation</u>	- Communicate scientific information that common ancestry and biological evolution are supported by multiple lines of empirical evidence. (HS LS4-1) Evaluate the evidence supporting claims that changes in environmental conditions may result in: (1) increases in the number of individuals of some species, (2) the emergence of new species over time, and (3) the extinction of other species. (HS-LS4-5)	Students will use multiple lines of evidence to show common ancestry between two groups of organisms.



<i>Engineering</i>		
<u>Reporting Topics</u>	<u>Grade Level Standards</u>	<u>Competency Statement</u>
<u>Science Processes</u>	Participate in the scientific laboratory setting while following procedures correctly and effectively, in order to successfully complete the activities required in the science course.	Students will correctly follow scientific procedures safely and effectively in a lab setting
<u>Designing Solutions</u>	Design a solution to a complex real-world problem by breaking it down into smaller, more manageable problems that can be solved through engineering. (HS-ETS1-2)	Students will design a solution to a real world problem that can be solved through engineering.