Standard				
HS-LS1 From Molecules to Organisms: Structures and Processes				
Sub Standards	**Description**	**Unit Addressing Standard**	**Specific Topic Within Unit**	**Possible Laboratory Reinforcement**
HS-LS1-1	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.	Cells, DNA, Genetics	Cells: Purpose of DNA, function of carbon based molecules, structure and function of cells; DNA: Replication/transcription, translation; Genetics: DNA as the coding particle for protien synthesis	DNA extraction lab, DNA model lab, Amino acid sequence lab
HS-LS1-2	Develop and use a model to illustrate the hierarchical organization of interacting systems that provide specific functions within multicellular organisms.	Cells, Human Systems	Homeostasis, Organism structure from molecules to organism,	Cell staining/tissues, Using ipad to build an allegorical system representing the human body
HS-LS1-3	Plan and conduct an investigation to provide evidence that feedback mechanisms maintain homeostasis	Cells, Human systems, Ecology, Study of Life	Cellular buffers, pH, Response to environment of living things,	Cold blooded animal study, Buffers in cytoplasm,
HS-LS1-4	Use a model to illustrate the role of cellular division (mitosis) and differentiation in producing and maintaining complex organisms.	Mitosis, Meiosis	Stages of cell division, genetic variation through meiosis	Animations of mitosis and meiosis using ipad, Onion root tip examination lab, Whitefish Blastula examination lab
HS-LS1-5	Use a model to illustrate how photosynthesis transforms light energy into stored chemical energy.	Photosynthesis	Photosynthetic processes of autotrophs	Waterweed photosynthesis simulation lab, Measuring rates of photosynthesis using Elodea lab,
HS-LS1-6	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.	Chemistry of Life, Carbon based molecule of living things, Photosynthesis	Formation of Glucose through photosynthesis, Four main carbon based molecules in living things	
HS-LS1-7	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.	Cellular Respiration	Chemical equation of cellular respiration, Process of ATP production through cellular respiration	Exercise lab measuring carbon dioxide output, Respirometer lab,
Standard				
HS-LS2 Ecosystems: Interactions, Energy, and Dynamics				
Sub Standards	**Description**	**Unit Addressing Standard**	**Specific Topic Within Unit**	**Possible Laboratory Reinforcement**

HS-LS2-1	Use mathematical and/or computational representations to support explanations of factors that affect carrying capacity of ecosystems at different scales	Principles of Ecology, Ecosystems	Habitat/niche, Population density/distribution, Growth patterns, Succession, Survivorship curves, Carrying capacities	Carrying capacity simulation lab
HS-LS2-2	Use mathematical representations to support and revise explanations based on evidence about factors affecting biodiversity and populations in ecosystems of different scales	Principles of Ecology, Ecosystems	Carrying capacities, Niche, Environmental factors affecting biodiversity, Human impact on the planet	
HS-LS2-3	Construct and revise an explanation based on evidence for the cycling of matter and flow of energy in aerobic and anaerobic conditions	Ecology, Ecosystems, Cellular Respiration	Biotic/Abiotic factors, Energy in the ecosystem, Food chains/webs, Cycles of matter. Energy flow through producers to consumers to decomposers. Cellular respiration and fermentation	Water cycle lab, Flow of energy simuation lab, Fermentation lab,
HS-LS2-4	Use mathematical representations to support claims for the cycling of matter and flow of energy among organisms in an ecosystem.	Chemistry of Life	Law of Conservation of Energy, Balancing chemical equations,	
HS-LS2-5.	Develop a model to illustrate the role of photosynthesis and cellular respiration in the cycling of carbon among the biosphere, atmosphere, hydrosphere, and geosphere.	Cycles of Matter, Chemistry of Life, Ecology, Photosynthesis/Cellular Respiration	Carbon cycling through photosynthesis and cellular respiration, Carbon cycles in the ecosystems	Animation lab following the cycling of carbon
HS-LS2-6	Evaluate the claims, evidence, and reasoning that the complex interactions in ecosystems maintain relatively consistent numbers and types of organisms in stable condition, but changing conditions may result in a new ecosystem	Ecology, Ecosystems	Natural resources, Threats to biodiversity, Human impact on the ecosystem, Survivorship, Carrying capacity	Research project on changing weather and its impact on environments, Carrying capacity simulation lab
HS-LS2-7	Design, evaluate, and refine a solution for reducing the impacts of human activities on the environment and biodiversity.	Ecology, Ecosystems	Human population growth, Urban spread, desertification, threatened and endangered species, Threats to biodiversity, Conservation, Air/Water quality	Energy consumption and cost lab, Research project: Human impact on the planet, Research lab: Loss of biodiversity by human activity.
HS-LS2-8	Evaluate the evidence for the role of group behavior on individual and species' chances to survive and reproduce.	Ecology, Evolution,	Population tendencies (herding, flocking,schooling), group dynamics in survival (Hunting, migrating, swarming)	Research population activites/tendencies of various species. Investigate hunting/fishing as population control measures
Standard				
HS-LS3 Heredity: Inheritance and Variation of Traits				
Sub Standards	**Description**	**Unit Addressing Standard**	**Specific Topic Within Unit**	**Possible Laboratory Reinforcement**

HS-LS3-1	Ask questions to clarify relationships about the role of DNA and chromosomes in coding the instructions for characteristic traits passed from parents to offspring.	Genetics, Meiosis	DNA copying, Linked traits, Multiple allele traits, Single allele traits	
HS-LS3-3	Apply concepts of statistics and probability to explain the variation and distribution of expressed traits in a population	Genetics	Mendels laws, Monohybrid crosses, Dihybrid crosses, statistical probability of inheritence of traits.	Bi-color corn lab, punnet square lab activities, pedigree activities
Standard				
HS-LS4 Biological Evolution: Unity and Diversity				
Sub Standards	**Description**	**Unit Addressing Standard**	**Specific Topic Within Unit**	**Possible Laboratory Reinforcement**
HS-LS4-1	Communicate scientific information that common ancestry and biological evolution are supported by multiple lines of empirical evidence.	Evolution, DNA, History of Life	Geological time lines, Protien/amino acid similarities, Homologous/analogous appendages/vestigle appendages.	Fossils, Striation, Geological time line activity.
HS-LS4-2	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 .	Evolution, Variations and mutations in DNA, Natural Selection	Processes of mutations leading to natural selections	Natural selection lab simulation, Predator/prey ipad simulation
HS-LS4-3	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.	Natural Selection, Evolution	Predator/prey situations	Peppered moth simulation
HS-LS4-4	Construct an explanation based on evidence for how natural selection leads to adaptation of populations	Evolution of Populations	Natural selection	Peppered moth simulation, Snowshoe hare and Lynx simulation
HS-LS4-5.	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	Principles of Ecology, Interactions in Ecosystems, Human impact on Ecosystems	Extinction of species, Geographical changes that lead to increases/decreases in populations	Galapagos island evaluation

HS-LS4-6	Create or revise a simulation to test a solution to mitigate adverse impacts of human activity on biodiversity.	Human impact on Ecosystems, Interactions in Ecosystems	Global warming, Pollution, Population increase of the human species	