

Unit 1

Scientific Inquiry

Duration	2 weeks	Assessed
Priority Standard(s)	Analyze an experiment, identify the components (i.e. IV; DV; control of constants, multiple trials) and explain their importance to the design of a valid experiment	
Supporting Standard(s)	Formulate testable questions and hypotheses	
	Identify the IV, DV, controls and constants accurately	
	Correctly create graphs (bar/line) using data	
	Correctly use experimental data to create a data table	
ACT Standard(s)	IOD 603 Perform a complex interpolation or complex extrapolation using data in a table or graph	
	IOD 701 Compare or combine data from two or more complex data presentations	
	SIN 303 Find basic information in text that describes a complex experiment	
	SIN 503 Determine the experimental conditions that would produce specified results	
	EMI 401 Determine which simple hypothesis, prediction or conclusion is, or is not, consistent with a data presentation, model or piece of information in text	
	EMI 702 Determine whether presented information, or new information, supports or contradicts a complex hypothesis or conclusion, and why	

Unit 2

Biochemistry

Duration	3 weeks		Assessed
Priority Standard(s)	9-12.LS1.C.3	Construct and revise an explanation based on evidence that organic macromolecules are primarily composed of six elements, where carbon, hydrogen, and oxygen atoms may combine with nitrogen, sulfur and phosphorus to form large carbon-based molecules.	
Supporting Standard(s)		Recognize and recall academic vocabulary	
		Describe basic atomic structure	
		Explain different types of bonds (hydrogen, ionic and covalent)	
		Solve equations for building polymers	
		Construct a model of the lock and key mechanism of enzymes	
		Predict how denaturing affects the functioning of enzymes	

Unit 3

Photosynthesis and Cellular Respiration

Duration	3 weeks		Assessed
Priority Standard(s)	9-12.LS1.C.1	Use a model to demonstrate how photosynthesis transforms light energy into stored chemical energy.	
	9-12.LS1.C.2	Use a model to demonstrate that cellular respiration is a chemical process whereby the bonds of molecules are broken and the bonds in new compounds are formed resulting in a net transfer of energy	
	9-12.LS2.B.1	Construct and revise an explanation based on evidence that the processes of photosynthesis, chemosynthesis, and aerobic and anaerobic respiration are responsible for the cycling of matter and flow of energy through ecosystems and that environmental conditions restrict which reactions can occur	
Supporting Standard(s)		Recognize and recall academic vocabulary	
		Identify reactants and products in photosynthesis	
		Identify factors that affect photosynthesis	

Unit 4

Homeostasis

Duration	2 weeks		Assessed
Priority Standard(s)	9-12.LS1.A.3	Plan and conduct an investigation to provide evidence that feedback mechanisms maintain homeostasis	
	9-12.LS1.A.2	Develop and use a model to illustrate the hierarchical organization of interacting systems that provide specific functions within multicellular organisms	
Supporting Standard(s)		Develop a model to identify and describe the relevant parts of body systems in multicellular organisms	
		Describe the relationships between components	
		Use a model to illustrate how the interactions between systems provides specific functions in multicellular organisms	
		Make a distinction between the accuracy of the model and actual body systems and functions it represents	

Unit 5

DNA Structure and Function

Duration	3 weeks		Assessed
Priority Standard(s)	9-12.LS1.A.1	Construct a model of how the structure of DNA determines the structure of proteins which carry out the essential functions of life through systems of specialized cells.	
Supporting Standard(s)		Recognize and recall academic vocabulary	
		Demonstrate base-pairing rules	
		Compare the functions of mRNA, tRNA and rRNA	
		Compare and contrast DNA and RNA	

Unit 6

Mitosis & Meiosis

Duration	3 Weeks	Assessed
Priority Standard(s)	9-12.LS1.B.1 Develop and use models to communicate the role of mitosis, cellular divisions, and differentiation in producing and maintaining complex organisms	
Supporting Standard(s)	Recognize and recall academic vocabulary	
	9-12.LS1-4 Use models to communicate the process of DNA replication	
	9-12.LS1-4 Describe the major events of the cell cycle to include cell growth, preparation for division, separation of chromosomes and separation of cell contents	
Priority Standard(s)	9-12.LS3.A.1 Develop and use models to clarify relationships about how DNA in the form of chromosomes is passed from parents to offspring through the processes of meiosis and fertilization in sexual reproduction	
Supporting Standard(s)	Recognize and recall academic vocabulary	
	Recognize that chromosomes hold DNA that codes for proteins which are expressed as the heritable traits of organisms	
Priority Standard(s)	9-12.LS3.B1 Compare and contrast asexual and sexual reproduction with regard to genetic information and variation in offspring	
Supporting Standard(s)	Develop a visual representation to compare and contrast asexual and sexual reproduction	
	Describe the relationship between sexual and asexual reproduction	

Unit 7
Heredity

Duration	4 weeks		Assessed
Priority Standard(s)	9-12.LS3.B4	Apply concepts of statistics and probability to explain the variation and distribution of expressed traits in a population.	
Supporting Standard(s)		Recognize and recall academic vocabulary	
		Understand patterns of probability	
		Recognize that chromosomes hold DNA that code for proteins which are expressed as the heritable traits of an organism	
Priority Standard(s)	9-12.LS3.B.2	Develop and use a model to describe why structural changes to genes (mutations) located on chromosomes may affect proteins and may result in harmful, beneficial or neutral effects to the structure and function of the organisms.	
Supporting Standard(s)		Develop a model to identify and describe structural changes to DNA and the effects of the changes	
		Describe the relationships between components, including the relationship between genotype and phenotype	
		Illustrate the structure and function of the organism and the organism's overall fitness	
		Make a distinction between the accuracy of the model and actual body processes	
Priority Standard(s)	9-12.LS3.B3	Make and defend a claim that inheritable genetic variations may result from: (1) new genetic combinations through meiosis, (2) mutations occurring during replication, and/or (3) mutations caused by environmental factors.	
Supporting Standard(s)		Make a claim and describe supporting evidence that includes the idea that inheritable genetic variations may result from meiosis, during replication or environmental factors	
		Use reasoning and valid evidence to describe how new combinations of DNA can arise from several sources, including meiosis, errors during replication and mutations caused by environmental factors	
		Defend a claim against counterclaims and critique by evaluating counterclaims and critique by evaluating counterclaims and by describing the connections between the relevant and appropriate evidence and the strongest claim	

Unit 8

Biological Evolution

Duration		3 weeks	Assessed
Priority Standard(s)	9-12.LS4.A.1	Communicate scientific information that common ancestry and biological evolution are supported by multiple lines of empirical evidence.	
Supporting Standard(s)		Communicate scientific information including that common ancestry and biological evolution are supported by multiple lines of empirical evidence	
		Communicate that together, the patterns observed at multiple spatial and temporal scales provide evidence for causal relationships relating to biological evolution and common ancestry	
		Construct cladograms based on similarities	
Priority Standard(s)	9-12.LS4.A.2	Analyze displays of pictorial data to compare patterns of similarities in the embryological development across multiple species to identify relationships not evident in the fully formed anatomy.	
Supporting Standard(s)		Analyze pictorial data to (compare patterns of similarities across multiple species, describe common physical characteristics and compare and contrast embryological features to fully formed anatomy of organisms	
Priority Standard(s)	9-12.LS4.B.1	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.	
Supporting Standard(s)		Use reasoning to connect the evidence, along with the assumption that theories and laws that describe the natural world operate today as they did in the past and will continue to do so in the future.	
Priority Standard(s)	9-12.LS4.B.2	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.	
Supporting Standard(s)		Organize given data by frequency, distribution and variation of expressed traits in the population	
		Perform and use appropriate statistical analyses of data, including probability measures, to determine the relationship between a trait's occurrence within a population and environmental factors	
		Analyze and interpret data to explain the distribution of expressed traits	
Priority Standard(s)	9-12.LS4.C.1	Construct an explanation based on evidence of how natural selection leads to adaptations of populations.	
Supporting Standard(s)		Identify examples of adaptations that may have resulted from variations favored by natural selection	
Priority Standard(s)	9-12.LS4.C.2	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	
Supporting Standard(s)		Identify and describe additional evidence that was not provided but is relevant to the claims and to evaluating the given evidence	
		Use additional evidence to assess the validity, reliability, strengths and weaknesses of the given evidence, along with its ability to support logical and reasonable arguments about the outcomes of group behavior	

Unit 9
Ecology

Duration	6 Weeks	Assessed
Priority Standard(s)	9-12.LS2.A.1	Explain how various biotic and abiotic factors affect the carrying capacity and biodiversity of an ecosystem using mathematical and/or computational representations.
Supporting Standard(s)		Identify the limiting factors (biotic and abiotic) that may affect the carrying capacity of a population within an ecosystem
Priority Standard(s)	9-12.LS2.B.2	Communicate the pattern of cycling of matter and the flow of energy among trophic levels in an ecosystem
Supporting Standard(s)		Identify the claims about the cycling of matter and energy flow among organisms in an ecosystem
Supporting Standard(s)		Describe how claims can be expressed as a mathematical relationship in the components of a food web
Priority Standard(s)	9-12.LS2.B.3	Use a model that illustrates the roles of photosynthesis, cell respiration, decomposition and combustion to explain the cycling of carbon in its various forms among the biosphere, atmosphere, hydrosphere and geosphere.
Supporting Standard(s)		Use evidence from a given model to identify and describe the inputs and outputs of photosynthesis and cellular respiration
Supporting Standard(s)		Describe the contribution of photosynthesis and cellular respiration to the exchange of carbon within and among the biosphere, atmosphere, hydrosphere and geosphere in the given model
Priority Standard(s)	9-12.LS2.C.1	Evaluate the claims, evidence and reasoning that the interactions in ecosystems maintain relatively consistent populations of species while conditions remain stable, but changing conditions may result in new ecosystem dynamics
Supporting Standard(s)		Identify the given explanation that is supported by the claims, evidence and reasoning to be evaluated, and which includes the following idea: The complex interactions in ecosystems maintain relatively consistent numbers and types of organisms in stable conditions, but changing conditions may result in a new ecosystem
Supporting Standard(s)		Assess the logic of the reasoning, including the relationship between degree of change and stability in ecosystems, and the utility of the reasoning in supporting the explanation of how modest biological or physical disturbances in an ecosystem result in maintenance of relatively consistent numbers and types of organisms
Priority Standard(s)	9-12.LS2.C.2	Design, evaluate and/or refine solutions that positively impact the environment and biodiversity
Supporting Standard(s)		Design a solution that increases positive impact on the environment and biodiversity and that relies on scientific knowledge of the factors affecting changes and stability in biodiversity.
Supporting Standard(s)		Describe and quantify the criteria and limitations for the solution to the problem, along with the trade-offs in the solution
Priority Standard(s)	9-12.LS4.C.3	Create or revise a model to test a solution to mitigate adverse impacts of human activity on biodiversity.
Supporting Standard(s)		Describe or identify the components a model including human activity and the factors that affect biodiversity
Supporting Standard(s)		Show an understanding of the reliance of ecosystem function and productivity on biodiversity, and that take into account the limitations of the cost, safety and reliability as well as cultural and environmental impacts
Supporting Standard(s)		Identify possible negative consequences of solutions that would outweigh benefits