

## Biology

State Standard Number	State Standard Area/Description	Unit Name	Course Topic Description
0	Scientific processes.		
112.43.1	The student, for at least 40% of instructional time, conducts field and laboratory investigations using safe, environmentally appropriate, and ethical practices.	Various units throughout the course	
112.43.1.A	demonstrate safe practices during field and laboratory investigations;		
112.43.1.B	make wise choices in the use and conservation of resources and the disposal or recycling of materials.		
112.43.2	The student uses scientific methods during field and laboratory investigations.	Labs in various units, such as  The Nature of Science and Biology  Photosynthesis  Photosynthesis	Salt Boiling Lab  Enzymes Lab  Virtual Lab: Photosynthesis
112.43.2.A	plan and implement investigative procedures including asking questions, formulating testable hypotheses, and selecting equipment and technology;	Photosynthesis	Enzymes Lab
112.43.2.B	collect data and make measurements with precision;	Photosynthesis  The Nature of Science and Biology	Virtual Lab: Photosynthesis  Salt Boiling Lab
112.43.2.C	organize, analyze, evaluate, make inferences, and predict trends from data;	The Nature of Science and Biology	Salt Boiling Lab
112.43.2.D	communicate valid conclusions.		

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112.43.3	The student uses critical thinking and scientific problem solving to make informed decisions.	Various Discussion Boards and Journals, such as the journals in the Evolution Unit	
112.43.3.A	analyze, review, and critique scientific explanations, including hypotheses and theories, as to their strengths and weaknesses using scientific evidence and information;		
112.43.3.B	evaluate promotional claims that relate to biological issues such as product labeling and advertisements;		
112.43.3.C	evaluate the impact of research on scientific thought, society, and the environment;		
112.43.3.D	describe the connection between biology and future careers;	The Nature of Science and Biology	Section 1 Part 1 Who is a biologist?
112.43.3.E	evaluate models according to their adequacy in representing biological objects or events;		
112.43.3.F	research and describe the history of biology and contributions of scientists.	Genetics  Evolution	Section 1 Part 2 The Origins of Genetics: Gregor Mendel  Section 1 Part 1 Pre-Renaissance Thought, and Part 2 Evolutionary Thought During the 1700s

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0	Science concepts.		
112.43.4	The student knows that cells are the basic structures of all living things and have specialized parts that perform specific functions, and that viruses are different from cells and have different properties and functions.	Cell Structure	Section 1 Part 5 Cell Features: Common Features of Cells
112.43.4.A	identify the parts of prokaryotic and eukaryotic cells;	Cell Structure	Section 1 Part 5 Cell Features: Common Features of Cells
112.43.4.B	investigate and identify cellular processes including homeostasis, permeability, energy production, transportation of molecules, disposal of wastes, function of cellular parts, and synthesis of new molecules;	Photosynthesis	Section 2 Photosynthesis, Section 3 Cellular Respiration
112.43.4.C	compare the structures and functions of viruses to cells and describe the role of viruses in causing diseases and conditions such as acquired immune deficiency syndrome, common colds, smallpox, influenza, and warts;		
112.43.4.D	identify and describe the role of bacteria in maintaining health such as in digestion and in causing diseases such as in streptococcus infections and diphtheria.	Biological Diversity	Section 2 Part 5 Disease-causing Bacteria
112.43.5	The student knows how an organism grows and how specialized cells, tissues, and organs develop.	Animal Organization	Section 10 Part 1 The Reproductive System and Human Development
112.43.5.A	compare cells from different parts of plants and animals including roots, stems, leaves, epithelia, muscles, and bones to show specialization of structure and function;	Animal Organization  Plant Structure	Section 1 Part 1 Animal Tissues  Section 1 Part 1 Plant Organs, Tissues, and Cells

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112.43.5.B	identify cell differentiation in the development of organisms;	Animal Organization  Plant Structure	Section 1 Part 1 Animal Tissues  Section 1 Part 1 Plant Organs, Tissues, and Cells
112.43.5.C	sequence the levels of organization in multicellular organisms to relate the parts to each other and to the whole.		
112.43.6	The student knows the structures and functions of nucleic acids in the mechanisms of genetics.	Genetics	Section 4 Part 3 The Structure of DNA  Section 1 Part 3 The Principle of Segregation  Section 1 Part 6 The Principle of Independent Assortment
112.43.6.A	describe components of deoxyribonucleic acid (DNA), and illustrate how information for specifying the traits of an organism is carried in the DNA;	Genetics	Section 4 Part 3 The Structure of DNA
112.43.6.B	explain replication, transcription, and translation using models of DNA and ribonucleic acid (RNA);	Genetics	Section 5 Part 1 Protein Synthesis: From Gene to Protein
112.43.6.C	identify and illustrate how changes in DNA cause mutations and evaluate the significance of these changes;	Genetics	Section 5 Part 1 Protein Synthesis: From Gene to Protein  Section 5 Part 5 Genetic Mutations and Lab: RNA
112.43.6.D	compare genetic variations observed in plants and animals;		
112.43.6.E	compare the processes of mitosis and meiosis and their significance to sexual and asexual reproduction;	Cell Structure	Section 4 Part 6 Comparison of Mitosis and Meiosis

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112.43.6.F	identify and analyze karyotypes.	Genetics	Section 3 Part 1 The Human Karyotype: A Picture of Our Genes
112.43.7	The student knows the theory of biological evolution.	Evolution	
112.43.7.A	identify evidence of change in species using fossils, DNA sequences, anatomical similarities, physiological similarities, and embryology;	Evolution	Section 1 Part 4 Evidence for Evolution and Parts 5 and 6
112.43.7.B	illustrate the results of natural selection in speciation, diversity, phylogeny, adaptation, behavior, and extinction.	Evolution	Section 2 Part 3 Natural Selection
112.43.8	The student knows applications of taxonomy and can identify its limitations.	Biological Diversity	Section 1 Part 1 Taxonomy and other parts of this section
112.43.8.A	collect and classify organisms at several taxonomic levels such as species, phylum, and kingdom using dichotomous keys;	Biological Diversity	Section 1 Part 1 Taxonomy
112.43.8.B	analyze relationships among organisms and develop a model of a hierarchical classification system based on similarities and differences using taxonomic nomenclature;	Biological Diversity	Section 1 Part 1 Taxonomy and Section 1 Part 4 The Kingdoms and Domains of Life
112.43.8.C	identify characteristics of kingdoms including monerans, protists, fungi, plants, and animals.	Biological Diversity	Section 1 Part 4 The Kingdoms and Domains of Life and parts 5 and 6 (that explore characteristics of the domains and kingdoms)

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112.43.9	The student knows metabolic processes and energy transfers that occur in living organisms.	Photosynthesis	
112.43.9.A	compare the structures and functions of different types of biomolecules such as carbohydrates, lipids, proteins, and nucleic acids;	The Nature of Science and Biology	Section 2 Part 5 Carbon Compounds
112.43.9.B	compare the energy flow in photosynthesis to the energy flow in cellular respiration;	Photosynthesis	Section 1 Part 1 Photosynthesis and Cellular Respiration
112.43.9.C	investigate and identify the effects of enzymes on food molecules;	Photosynthesis  Animal Organization	Section 1 Part 2 Enzymes: Organic Catalysts  Section 6 Part 4 The Stomach
112.43.9.D	analyze the flow of matter and energy through different trophic levels and between organisms and the physical environment.	Population Ecology	Section 3 Part 1 The Biosphere And Mass Extinctions
112.43.10	The student knows that, at all levels of nature, living systems are found within other living systems, each with its own boundary and limits.		
112.43.10.A	interpret the functions of systems in organisms including circulatory, digestive, nervous, endocrine, reproductive, integumentary, skeletal, respiratory, muscular, excretory, and immune;	Animal Organization	Various Sections dealing with organ systems
112.43.10.B	compare the interrelationships of organ systems to each other and to the body as a whole;	Animal Organization	Various Sections dealing with organ systems

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112.43.10.C	analyze and identify characteristics of plant systems and subsystems.	Plant Structure	Section 1 Part 2 Plant Organs: Stems, Roots, Leaves, and Flowers
112.43.11	The student knows that organisms maintain homeostasis.	Animal Organization	Section 2 Part 1 Animal Organ Systems and Homeostasis
112.43.11.A	identify and describe the relationships between internal feedback mechanisms in the maintenance of homeostasis;	Animal Organization	Section 2 Part 1 Animal Organ Systems and Homeostasis
112.43.11.B	investigate and identify how organisms, including humans, respond to external stimuli;	Animal Organization	Section 2 Part 1 Animal Organ Systems and Homeostasis
112.43.11.C	analyze the importance of nutrition, environmental conditions, and physical exercise on health;	Animal Organization	Section 6 Part 8 Regulation of Appetite
112.43.11.D	summarize the role of microorganisms in maintaining and disrupting equilibrium including diseases in plants and animals and decay in an ecosystem.	Biological Diversity	Section 2 Part 5 Disease-causing Bacteria
112.43.12	The student knows that interdependence and interactions occur within an ecosystem.	Population Ecology	
112.43.12.A	analyze the flow of energy through various cycles including the carbon, oxygen, nitrogen, and water cycles;	Population Ecology	Section 3 Part 1 The Biosphere And Mass Extinctions

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112.43.12.B	interpret interactions among organisms exhibiting predation, parasitism, commensalism, and mutualism;	Population Ecology	Section 1 Part 2 Several Basic Controls Govern Population Size
112.43.12.C	compare variations, tolerances, and adaptations of plants and animals in different biomes;	Population Ecology	Section 2 Part 2 Terrestrial Biomes and Part 3 Climate, Altitude and Terrestrial Biomes (the latter part deals also with Aquatic biomes)
112.43.12.D	identify and illustrate that long-term survival of species is dependent on a resource base that may be limited;	Population Ecology	Section 1 Part 4 Altering Population Growth
112.43.12.E	investigate and explain the interactions in an ecosystem including food chains, food webs, and food pyramids.	Population Ecology	Section 2 Part 5 Disturbance of a Community
112.43.13	The student knows the significance of plants in the environment.	Photosynthesis	Section 2 Part 1 Photosynthesis: Food Production
112.43.13.A	evaluate the significance of structural and physiological adaptations of plants to their environments;	Plant Structure	Section 1 Part 2 Plant Organs: Stems, Roots, Leaves, and Flowers
112.43.13.B	survey and identify methods of reproduction, growth, and development of various types of plants.	Plant Structure	Section 2 Part 1 Flowering Plant Reproduction  Section 2 Part 9 Vegetative Propagation