

Biology

State Standard Number	State Standard Area/Description	Unit Name	Course Topic Description
0	Scientific Inquiry		
B-1	The student will demonstrate an understanding of how scientific inquiry and technological design, including mathematical analysis, can be used appropriately to pose questions, seek answers, and develop solutions.	The Nature of Science and Biology	Section 1 part 2
B-1.1	Generate hypotheses based on credible, accurate, and relevant sources of scientific information.	The Nature of Science and Biology	Section 1 part 2
B-1.2	Use appropriate laboratory apparatuses, technology, and techniques safely and accurately when conducting a scientific investigation.		
B-1.3	Use scientific instruments to record measurement data in appropriate metric units that reflect the precision and accuracy of each particular instrument.	The Nature of Science and Biology Photosynthesis	Salt Boiling Lab Online Photosynthesis lab Enzyme Lab
B-1.4	Design a scientific investigation with appropriate methods of control to test a hypothesis (including independent and dependent variables), and evaluate the designs of sample investigations.	Photosynthesis	Enzyme Lab
B-1.5	Organize and interpret the data from a controlled scientific investigation by using mathematics, graphs, models, and/or technology.	The Nature of Science and Biology	Salt Boiling Lab
B-1.6	Evaluate the results of a controlled scientific investigation in terms of whether they refute or verify the hypothesis.	The Nature of Science and Biology Photosynthesis	Salt Boiling Lab Online Photosynthesis lab Enzyme Lab
B-1.7	Evaluate a technological design or product on the basis of designated criteria (including cost, time, and materials).		

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B-1.8	Compare the processes of scientific investigation and technological design.		
B-1.9	Use appropriate safety procedures when conducting investigations.		
0	Content		
B-2	The student will demonstrate an understanding of the structure and function of cells and their organelles.	Cell Structure	Section 1 Part 5 Cell Features: Common Features of Cells
B-2.1	Recall the three major tenets of cell theory (all living things are composed of one or more cells; cells are the basic units of structure and function in living things; and all presently existing cells arose from previously existing cells).		
B-2.2	Summarize the structures and functions of organelles found in a eukaryotic cell (including the nucleus, mitochondria, chloroplasts, lysosomes, vacuoles, ribosomes, endoplasmic reticulum [ER], Golgi apparatus, cilia, flagella, cell membrane, nuclear membrane, cell wall, and cytoplasm).	Cell Structure	Section 1 Part 5 Cell Features: Common Features of Cells; Part 7 Animals Cells; Part 8 Plant Cells Parts 7 and 8 Include drag and drop activities
B-2.3	Compare the structures and organelles of prokaryotic and eukaryotic cells.	Cell Structure	Section 1 Part 5 Cell Features: Common Features of Cells; Part 7 Animals Cells; Part 8 Plant Cells Parts 7 and 8 Include drag and drop activities

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B-2.4	Explain the process of cell differentiation as the basis for the hierarchical organization of organisms (including cells, tissues, organs, and organ systems).		
B-2.5	Explain how active, passive, and facilitated transport serve to maintain the homeostasis of the cell.	Cell Structure	Section 2 Parts 2-5
B-2.6	Summarize the characteristics of the cell cycle: interphase (called G1, S, G2); the phases of mitosis (called prophase, metaphase, anaphase, and telophase); and plant and animal cytokinesis.	Cell Structure	Section 3 Part 5 The Eukaryotic Cell Cycle
B-2.7	Summarize how cell regulation controls and coordinates cell growth and division and allows cells to respond to the environment, and recognize the consequences of uncontrolled cell division.	Cell Structure	Section 3 Part 5 Journal: Cancer Cells
B-2.8	Explain the factors that affect the rates of biochemical reactions (including pH, temperature, and the role of enzymes as catalysts).	Photosynthesis	Section 1 Part 2 Enzymes: Organic Catalysts; includes a multimedia tutorial
B-3	The student will demonstrate an understanding of the flow of energy within and between living systems.	Photosynthesis	Section 1 Part 1 provides an overview of the photosynthesis and cellular respiration processes.
B-3.1	Summarize the overall process by which photosynthesis converts solar energy into chemical energy and interpret the chemical equation for the process.	Photosynthesis	Section 2 Part 1 Photosynthesis: Food Production
B-3.2	Summarize the basic aerobic and anaerobic processes of cellular respiration and interpret the chemical equation for cellular respiration.	Photosynthesis	Section 3 Part 2 Glycolysis Occurs in All Living Things; includes multimedia tutorial covering all processes, not alone the one mentioned in the part title

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B-3.3	Recognize the overall structure of adenosine triphosphate (ATP)-namely, adenine, the sugar ribose, and three phosphate groups-and summarize its function (including the ATP-ADP [adenosine diphosphate] cycle).	Photosynthesis	Section 1 Part 3 Where Does Energy Come From?
B-3.4	Summarize how the structures of organic molecules (including proteins, carbohydrates, and fats) are related to their relative caloric values.		
B-3.5	Summarize the functions of proteins, carbohydrates, and fats in the human body.	The Nature of Science and Biology	Section 2 Part 5 Carbon Compounds
B-3.6	Illustrate the flow of energy through ecosystems (including food chains, food webs, energy pyramids, number pyramids, and biomass pyramids).	Population Ecology	Section 3 Part 1 The Biosphere And Mass Extinctions
B-4	The student will demonstrate an understanding of the molecular basis of heredity.	Genetics	Section 4 Part 1 DNA: THE MOLECULAR BASIS OF GENETICS, includes multimedia tutorial
B-4.1	Compare DNA and RNA in terms of structure, nucleotides, and base pairs.	Genetics	Section 4 Part 3 The Structure of DNA Section 5 Part 2 From Genes to Proteins: RNA
B-4.2	Summarize the relationship among DNA, genes, and chromosomes.	Genetics Cell Structure	Section 4 Part 3 The Structure of DNA Section 3 Part 2 The DNA Molecule
B-4.3	Explain how DNA functions as the code of life and the blueprint for proteins.	Genetics	Lab: DNA Section 5 Part 2 From Genes to Proteins: RNA

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B-4.4	Summarize the basic processes involved in protein synthesis (including transcription and translation).	Genetics	Section 5 Part 2 From Genes to Proteins: RNA
B-4.5	Summarize the characteristics of the phases of meiosis I and II.	Cell Structure	Section 4 Part 1 Meiosis and Sexual Reproduction Includes multimedia tutorial
B-4.6	Predict inherited traits by using the principles of Mendelian genetics (including segregation, independent assortment, and dominance).	Genetics	Section 1 Part 3 The Principle of Segregation also parts 4-6 of the same section
B-4.7	Summarize the chromosome theory of inheritance and relate that theory to Gregor Mendel's principles of genetics.	Genetics	Section 2 Part 1 Extending Mendel's Rules: The Chromosome Theory Of Inheritance
B-4.8	Compare the consequences of mutations in body cells with those in gametes.		
B-4.9	Exemplify ways that introduce new genetic characteristics into an organism or a population by applying the principles of modern genetics.	Evolution	Section 2 Part 2 Mutation Rate
B-5	The student will demonstrate an understanding of biological evolution and the diversity of life.	Evolution	Section 1 Part 3 Evolution by Natural Selection
B-5.1	Summarize the process of natural selection.	Evolution	Section 2 Part 3 Natural Selection

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B-5.2	Explain how genetic processes result in the continuity of life-forms over time.	The Nature of Science and Biology	Section 1 Part 5 Interactive activity
B-5.3	Explain how diversity within a species increases the chances of its survival.		
B-5.4	Explain how genetic variability and environmental factors lead to biological evolution.	Evolution	Section 2 Multimedia tutorial
B-5.5	Exemplify scientific evidence in the fields of anatomy, embryology, biochemistry, and paleontology that underlies the theory of biological evolution.	Evolution	Section 2 Parts 4 - 5 Evidence for Evolution
B-5.6	Summarize ways that scientists use data from a variety of sources to investigate and critically analyze aspects of evolutionary theory.	Evolution	Section 1
B-5.7	Use a phylogenetic tree to identify the evolutionary relationships among different groups of organisms.	Biological Diversity	Section 1 Part 2 Construction of Phylogenetic Trees
B-6	The student will demonstrate an understanding of the interrelationships among organisms and the biotic and abiotic components of their environments.	Population Ecology	Section 2 part 2 Terrestrial Biomes and Part 3 that covers aquatic biomes
B-6.1	Explain how the interrelationships among organisms (including predation, competition, parasitism, mutualism, and commensalism) generate stability within ecosystems.	Population Ecology	Section 1 Part 2 Several Basic Controls Govern Population Size

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B-6.2	Explain how populations are affected by limiting factors (including density-dependent, density-independent, abiotic, and biotic factors).	Population Ecology	Section 1 Part 1 Population Growth
B-6.3	Illustrate the processes of succession in ecosystems.	Population Ecology	Section 2 Part 4 Change in Communities Over Time
B-6.4	Exemplify the role of organisms in the geochemical cycles (including the cycles of carbon, nitrogen, and water).	Population Ecology	Section 3 Part 1 The Biosphere And Mass Extinctions
B-6.5	Explain how ecosystems maintain themselves through naturally occurring processes (including maintaining the quality of the atmosphere, generating soils, controlling the hydrologic cycle, disposing of wastes, and recycling nutrients).	Population Ecology	Section 3 Part 1 The Biosphere And Mass Extinctions
B-6.6	Explain how human activities (including population growth, technology, and consumption of resources) affect the physical and chemical cycles and processes of Earth.	Population Ecology	Section 3 Part 2 Disruption of the Biosphere as well as parts 3-5