

Biology CR

State Standard Number	State Standard Area/Description	Unit Name	Course Topic Description
B	Biology		
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.		
B-1.1	Generate hypotheses on the basis of credible, accurate, and relevant sources of scientific information.	Nature of Science	Scientific Method Lab
B-1.2	Use appropriate laboratory apparatuses, technology, and techniques safely and accurately when conducting a scientific investigation.	Nature of Science	Scientific Method Lab
B-1.3	Use scientific instruments to record measurement data in appropriate metric units that reflect the precision and accuracy of each particular instrument.		
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.		
B-1.5	Organize and interpret the data from a controlled scientific investigation by using mathematics (including formulas and dimensional analysis), graphs, models, and/or technology.	Nature of Science	Scientific Method Lab
B-1.6	Evaluate the results of a controlled scientific investigation in terms of whether they refute or verify the hypothesis.		

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B-1.7	Evaluate a technological design or product on the basis of designated criteria (including cost, time, and materials).		
B-1.8	Compare the processes of scientific investigation and technological design.		
B-1.9	Use appropriate safety procedures when conducting investigations.	Nature of Science	Scientific Method Lab
0	Biology: Content		
B-2	The student will demonstrate an understanding of the structure and function of cells and their organelles.		
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, Parts 7-9
B-2.3	Compare the structures and organelles of prokaryotic and eukaryotic cells.	Cell Structure	Section 1, Part 5
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 6-8

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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	Mitosis Lab
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 11
B-2.8	Explain the factors that affect the rates of biochemical reactions (including pH, temperature, and the role of enzymes as catalysts).	Photosynthesis and Cellular Respiration	Section 1, Parts 6-7
B-3	The student will demonstrate an understanding of the flow of energy within and between living systems.		
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 and Cellular Respiration	Section 2, Parts 1 and 8-10
B-3.2	Summarize the basic aerobic and anaerobic processes of cellular respiration and interpret the chemical equation for cellular respiration.	Photosynthesis and Cellular Respiration	Section 3, Part 2 Video
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 and Cellular Respiration	Section 1, Part 10
B-3.4	Summarize how the structures of organic molecules (including proteins, carbohydrates, and fats) are related to their relative caloric values.		

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B-3.5	Summarize the functions of proteins, carbohydrates, and fats in the human body.	Nature of Science	Section 2, Parts 15-21
B-3.6	Illustrate the flow of energy through ecosystems (including food chains, food webs, energy pyramids, number pyramids, and biomass pyramids).		
B-4	The student will demonstrate an understanding of the molecular basis of heredity.		
B-4.1	Compare DNA and RNA in terms of structure, nucleotides, and base pairs.	Genetics	Section 5, Part 2
B-4.2	Summarize the relationship among DNA, genes, and chromosomes.	Genetics	DNA Lab
B-4.3	Explain how DNA functions as the code of life and the blueprint for proteins.	Genetics	DNA Lab
B-4.4	Summarize the basic processes involved in protein synthesis (including transcription and translation).	Genetics	Section 5, Parts 3-4
B-4.5	Summarize the characteristics of the phases of meiosis I and II.	Cell Structure	Meiosis Lab
B-4.6	Predict inherited traits by using the principles of Mendelian genetics (including segregation, independent assortment, and dominance).	Genetics	Section 1, Parts 5-9
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

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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.	Genetics	Section 2, Parts 6-13
B-5	The student will demonstrate an understanding of biological evolution and the diversity of life.		
B-5.1	Summarize the process of natural selection.	Evolution	Section 2, Part 4
B-5.2	Explain how genetic processes result in the continuity of life-forms over time.	Evolution	Section 2, Part 1 Video
B-5.3	Explain how diversity within a species increases the chances of its survival.	Evolution	Section 2, Part 4
B-5.4	Explain how genetic variability and environmental factors lead to biological evolution.	Evolution	Section 2, Parts 5-7
B-5.5	Exemplify scientific evidence in the fields of anatomy, embryology, biochemistry, and paleontology that underlies the theory of biological evolution.	Evolution	Section 1, Parts 5-7
B-5.6	Summarize ways that scientists use data from a variety of sources to investigate and critically analyze aspects of evolutionary theory.	Evolution	Evolution Lab
B-5.7	Use a phylogenetic tree to identify the evolutionary relationships among different groups of organisms.	Biological Diversity	Section 1, Part 3
B-6	The student will demonstrate an understanding of the interrelationships among organisms and the biotic and abiotic components of their environments.		

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B-6.1	Explain how the interrelationships among organisms (including predation, competition, parasitism, mutualism, and commensalism) generate stability within ecosystems.	Ecology	Section 1, Part 5
B-6.2	Explain how populations are affected by limiting factors (including density-dependent, density-independent, abiotic, and biotic factors).	Ecology	Section 2, Part 6
B-6.3	Illustrate the processes of succession in ecosystems.	Ecology	Section 2, Part 5
B-6.4	Exemplify the role of organisms in the geochemical cycles (including the cycles of carbon, nitrogen, and water).	Ecology	Section 3, Parts 2-5
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).		
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.	Ecology	Section 1, Part 6