

**SOUTH CAROLINA SCIENCE**  
**Content Standards Mapping**

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<b>BIOLOGY</b>	<b>Boardworks High School Biology Presentations</b>
<b>Standard B-2: The student will demonstrate an understanding of the structure and function of cells and their organelles.</b>	
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).	Cell Theory Cells to Organisms Organelles
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).	Eukaryotic Cells Organelles
B-2.3 Compare the structures and organelles of prokaryotic and eukaryotic cells.	Eukaryotic Cells Prokaryotic Cells
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).	Cell Differentiation Cells to Organisms
B-2.5 Explain how active, passive, and facilitated transport serve to maintain the homeostasis of the cell.	Active Transport Osmosis
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.	Mitosis The Stages of Mitosis
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 Differentiation Genetic Mutations Mitosis
B-2.8 Explain the factors that affect the rates of biochemical reactions (including pH, temperature, and the role of enzymes as catalysts).	Enzymes
<b>Standard B-3: The student will demonstrate an understanding of the flow of energy within and between living systems.</b>	
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 1 Photosynthesis 2
B-3.2 Summarize the basic aerobic and anaerobic processes of cellular respiration and interpret the chemical equation for cellular respiration.	Aerobic Respiration Anaerobic Respiration
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).	Cell Theory

B-3.4 Summarize how the structures of organic molecules (including proteins, carbohydrates, and fats) are related to their relative caloric values.	Lipids Monosaccharides Nucleic Acids Polysaccharides Proteins
B-3.5 Summarize the functions of proteins, carbohydrates, and fats in the human body.	Digestion Monosaccharides Polysaccharides Proteins Lipids
B-3.6 Illustrate the flow of energy through ecosystems (including food chains, food webs, energy pyramids, number pyramids, and biomass pyramids).	Energy Loss in Food Chains Energy Transfer in Food Chains Food Chains Food Webs
<b>Standard B-4: The student will demonstrate an understanding of the molecular basis of heredity.</b>	
B-4.1 Compare DNA and RNA in terms of structure, nucleotides, and base pairs.	DNA Nucleic Acids
B-4.2 Summarize the relationship among DNA, genes, and chromosomes.	DNA Nucleic Acids Transcription and Translation
B-4.3 Explain how DNA functions as the code of life and the blueprint for proteins.	Controlling Protein Synthesis DNA Protein Synthesis Transcription and Translation
B-4.4 Summarize the basic processes involved in protein synthesis (including transcription and translation).	Controlling Protein Synthesis Protein Synthesis Transcription and Translation
B-4.5 Summarize the characteristics of the phases of meiosis I and II.	Meiosis The Stages of Meiosis
B-4.6 Predict inherited traits by using the principles of Mendelian genetics (including segregation, independent assortment, and dominance).	Genes and Alleles Gregor Mendel Patterns of Inheritance

B-4.7 Summarize the chromosome theory of inheritance and relate that theory to Gregor Mendel's principles of genetics.	Genes and Alleles Gregor Mendel Incomplete Dominance and Codominance Patterns of Inheritance
B-4.8 Compare the consequences of mutations in body cells with those in gametes.	DNA Replication Genetic Variation Inherited Diseases
B-4.9 Exemplify ways that introduce new genetic characteristics into an organism or a population by applying the principles of modern genetics.	Genetic Engineering GM Organisms
<b>Standard B-5: The student will demonstrate an understanding of biological evolution and the diversity of life.</b>	
B-5.1 Summarize the process of natural selection.	Ecosystems Evolution The Process of Evolution
B-5.2 Explain how genetic processes result in the continuity of life-forms over time.	Asexual Reproduction Genetic Variation Meiosis
B-5.3 Explain how diversity within a species increases the chances of its survival.	Evolution Extinction The Process of Evolution
B-5.4 Explain how genetic variability and environmental factors lead to biological evolution.	Darwin Evolution The Process of Evolution
B-5.5 Exemplify scientific evidence in the fields of anatomy, embryology, biochemistry, and paleontology that underlies the theory of biological evolution.	Evolution Fossil Record
<i>B-5.6 Summarize ways that scientists use data from a variety of sources to investigate and critically analyze aspects of evolutionary theory.</i>	–
<i>B-5.7 Use a phylogenetic tree to identify the evolutionary relationships among different groups of organisms.</i>	–
<b>Standard B-6: The student will demonstrate an understanding of the interrelationships among organisms and the biotic and abiotic components of their environments.</b>	
B-6.1 Explain how the interrelationships among organisms (including predation, competition, parasitism, mutualism, and commensalism) generate stability within ecosystems.	Ecosystems Ecosystems and Succession Host-Parasite Relationships Predator-Prey Relationships

B-6.2 Explain how populations are affected by limiting factors (including density-dependent, density-independent, abiotic, and biotic factors).	Describing Population Ecosystems Predator-Prey Relationships
B-6.3 Illustrate the processes of succession in ecosystems.	Ecosystems and Succession
B-6.4 Exemplify the role of organisms in the geochemical cycles (including the cycles of carbon, nitrogen, and water).	Carbon Cycle Nitrogen Cycle Water Cycle
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).	Carbon Cycle Decomposers Nitrogen Cycle Recycling Nutrients Water Cycle
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.	Carbon Cycle Human Impact on the Environment Sustainability Water Pollution