

**Tennessee Science Standards 9-12
Course Level Expectations Mapping**

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BIOLOGY	Boardworks High School Biology Presentations
Biology I : Standard 1 - Cells	
CLE 3210.1.1 Compare the structure and function of cellular organelles in both prokaryotic and eukaryotic cells.	Eukaryotic Cells Organelles Prokaryotic Cells
CLE 3210.1.2 Distinguish among the structure and function of the four major organic macromolecules found in living things.	Lipids Nucleic Acids Monosaccharides Polysaccharides Proteins
CLE 3210.1.3 Describe how enzymes regulate chemical reactions in the body.	Enzymes Enzyme Shape
CLE 3210.1.4 Describe the processes of cell growth and reproduction.	Cell Differentiation Mitosis
CLE 3210.1.5 Compare different models to explain the movement of materials into and out of cells.	Active Transport Diffusion Osmosis
Biology I : Standard 2 - Interdependence	
CLE 3210.2.1 Investigate how the dynamic equilibrium of an ecological community is associated with interactions among its organisms.	Describing Populations Ecosystems Predator-Prey Relationships
CLE 3210.2.2 Analyze and interpret population data, graphs, or diagrams.	Describing Populations Human Populations Predator-Prey Relationships
CLE 3210.2.3 Predict how global climate change, human activity, geologic events, and the introduction of non-native species impact an ecosystem.	Carbon Cycle Climate Change Fossil Fuels Human Impact on the Environment The Impact of Mining Loss of Diversity Water Pollution

CLE 3210.2.4 Describe the sequence of events associated with biological succession.	Ecosystems and Succession
Biology I : Standard 3 – Flow of Matter and Energy	
CLE 3210.3.1 Analyze energy flow through an ecosystem.	Energy Loss in a Food Chain Energy Transfer in a Food Chain Food Chains Food Webs
CLE 3210.3.2 Distinguish between aerobic and anaerobic respiration.	Aerobic Respiration Anaerobic Respiration
CLE 3210.3.3 Investigate the relationship between the processes of photosynthesis and cellular respiration.	Aerobic Respiration Carbon Cycle Photosynthesis 1 Photosynthesis 2
CLE 3210.3.4 Describe the events which occur during the major biogeochemical cycles.	Carbon Cycle Nitrogen Cycle Water Cycle
Biology I : Standard 4 - Heredity	
CLE 3210.4.1 Investigate how genetic information is encoded in nucleic acids.	DNA Nucleic Acids
CLE 3210.4.2 Describe the relationships among genes, chromosomes, proteins, and hereditary traits.	DNA Genes and Alleles Genetic Variation
CLE 3210.4.3 Predict the outcome of monohybrid and dihybrid crosses.	Patterns of Inheritance
CLE 3210.4.4 Compare different modes of inheritance: sex linkage, co-dominance, incomplete dominance, multiple alleles, and polygenic traits.	Boy or Girl? Gregor Mendel Incomplete Dominance and Codominance Patterns of Inheritance
CLE 3210.4.5 Recognize how meiosis and sexual reproduction contribute to genetic variation in a population.	Genetic Variation Meiosis
CLE 3210.4.6 Describe the connection between mutations and human genetic disorders.	Genetic Mutations Inherited Diseases

CLE 3210.4.7 Assess the scientific and ethical ramifications of emerging genetic technologies.	Asexual Reproduction Genetic Engineering Genetic Engineering for Health care GM Organisms Inherited Diseases Understanding Genomes
Biology I : Standard 5 - Biodiversity and Change	
CLE 3210.5.1 Associate structural, functional, and behavioral adaptations with the ability of organisms to survive under various environmental conditions.	Animal Adaptations Behavior Plant Adaptations
CLE 3210.5.2 Analyze the relationship between form and function in living things.	Animal Adaptations Plant Adaptations
CLE 3210.5.3 Explain how genetic variation in a population and changing environmental conditions are associated with adaptation and the emergence of new species.	Evolution Extinction
CLE 3210.5.4 Summarize the supporting evidence for the theory of evolution.	Evolution
CLE 3210.5.5 Explain how evolution contributes to the amount of biodiversity.	
CLE 3210.5.6 Explore the evolutionary basis of modern classification systems.	Classification
Biology II	
Biology II : Standard 1 – Cells	
CLE 3216.1.1 Compare the characteristics of prokaryotic and eukaryotic cells.	Eukaryotic Cells Prokaryotic Cells
CLE 3216.1.2 Describe how fundamental life processes depend on chemical reactions that occur in specialized parts of the cell.	Organelles
CLE 3216.1.3 Explain how materials move into and out of cells.	Active Transport Diffusion Osmosis
CLE 3216.1.4 Describe the enzyme-substrate relationship.	Enzymes Enzyme Shape
CLE 3216.1.5 Investigate how proteins regulate the internal environment of a cell through communication and transport.	Controlling Protein Synthesis Protein Synthesis Proteins Transcription and Translation
CLE 3216.1.6 Describe the relationship between viruses and their host cells.	HIV and AIDS
Biology II : Standard 2 - Interdependence	
CLE 3216.2.1 Describe how the stability of an ecosystem is maintained.	Describing Populations Ecosystems

CLE 3216.2.2 Investigate the major factors that influence population size and age distribution.	Describing Populations Human Populations
CLE 3216.2.3 Describe the varying degrees to which individual organisms are able to accommodate changes in the environment.	Evolution Extinction
CLE 3216.2.4 Distinguish between the accommodation of individual organisms and the adaptation of a population to environmental change.	Evolution
Biology II : Standard 3 – Flow of Matter and Energy	
CLE 3216.3.1 Describe the role of biotic and abiotic factors in the cycling of matter in the ecosystem.	Ecosystems and Succession Water Cycle Carbon Cycle Nitrogen Cycle Food Webs
CLE 3216.3.2 Explain how sunlight is captured by plant cells and converted into usable energy.	Photosynthesis 1 Photosynthesis 2 Food Chains
CLE 3216.3.3 Describe how mitochondria make stored chemical energy available to cells.	Aerobic Respiration
CLE 3216.3.4 Examine how macromolecules are synthesized from simple precursor molecules.	Lipids Nucleic Acids Monosaccharides Polysaccharides Proteins
CLE 3216.3.5 Analyze the role of ATP in the storage and release of cellular energy.	Cell Theory
Biology II : Standard 4 - Heredity	
CLE 3216.4.1 Describe how mutation and sexual reproduction contribute to the amount of genetic variation in a population.	Genetic Mutation The Stages of Meiosis
CLE 3216.4.2 Describe the relationship between phenotype and genotype.	Patterns of Inheritance
CLE 3216.4.3 Predict the probable outcome of genetic crosses based on Mendel's laws of segregation and independent assortment.	Gregor Mendel
CLE 3216.4.4 Describe the relationship among genes, the DNA code, production of protein molecules, and the characteristics of an organism.	Controlling Protein Synthesis Nucleic Acids Proteins Transcription and Translation
CLE 3216.4.5 Explain how the different shapes and properties of proteins are determined by the type, number, and sequence of amino acids.	Proteins

CLE 3216.4.6 Explain how the genetic makeup of cells can be engineered.	Genetic Engineering Genetic Engineering for Health Care
Biology II : Standard 5 - Biodiversity and Change	
CLE 3216.5.1 Identify factors that determine the frequency of an allele in the gene pool of a population.	Population Genetics The Process of Evolution
CLE 3216.5.2 Determine how mutation, gene flow, and migration influence population structure.	Population Genetics
Biology II : Standard 6 – Comparative Anatomy and Physiology	
CLE 3216.6.1 Investigate the unity and the diversity among living things.	Classification
CLE 3216.6.2 Describe the events associated with reproduction from gamete production through birth.	Meiosis The Stages of Meiosis Female Reproductive System Cell Differentiaton Development
CLE 3216.6.3 Compare organ systems of representative animal phyla that: regulate gas exchange, process and distribute nutrients, remove wastes, transmit chemical and electrical information, and respond to environmental stimuli.	Blood and Blood Vessels The Brain Digestion The Endocrine System Homeostasis Hormones Immune System The Kidneys Nerve Impulses The Nervous System The Respiratory System Ventilation
Biology II : Standard 7 – Botany	
CLE 3216.7.1 Describe different plant types plants based on their anatomy and physiology.	–
CLE 3216.7.2 Investigate the relationship between form and function for the major plant structures.	Specialized Plant Cells
CLE 3216.7.3 Examine the anatomical and physiological differences between plants and their growth, reproduction, survival, and co-evolution.	Plant Adapations
CLE 3216.7.4 Describe the difference between plants and fungi.	Classification
CLE 3216.7.5 Investigate the impact of plants on humans.	Photosynthesis 1 Photosynthesis 2