

**Texas High School Science
Curriculum Standards**

© Boardworks 2009

Biology	Boardworks High School Biology Presentations
(4) Science concepts. The student knows that cells are the basic structures of all living things with specialized parts that perform specific functions and that viruses are different from cells. The student is expected to:	
(A) compare and contrast prokaryotic and eukaryotic cells;	Prokaryotic Cells Eukaryotic Cells
(B) investigate and explain cellular processes, including homeostasis, energy conversions, transport of molecules, and synthesis of new molecules; and	Controlling Protein Synthesis Homeostasis Hormones Protein Synthesis The Endocrine System Transcription and Translation
(C) compare the structures of viruses to cells, describe viral reproduction, and describe the role of viruses in causing diseases such as human immunodeficiency virus (HIV) and influenza.	HIV and AIDS
(5) Science concepts. The student knows how an organism grows and the importance of cell differentiation. The student is expected to:	
(A) describe the stages of the cell cycle, including deoxyribonucleic acid (DNA) replication and mitosis, and the importance of the cell cycle to the growth of organisms;	DNA Replication 1 Mitosis
(B) examine specialized cells, including roots, stems, and leaves of plants; and animal cells such as blood, muscle, and epithelium;	Blood and Blood Vessels Specialized Plant Cells Types of Muscles
(C) describe the roles of DNA, ribonucleic acid (RNA), and environmental factors in cell differentiation; and	Cell Differentiation Controlling Protein Synthesis DNA Nucleic Acids
(D) recognize that disruptions of the cell cycle lead to diseases such as cancer.	Genetic Mutations
(6) Science concepts. The student knows the mechanisms of genetics, including the role of nucleic acids and the principles of Mendelian Genetics. The student is expected to:	
(A) identify components of DNA, and describe how information for specifying the traits of an organism is carried in the DNA;	DNA Nucleic Acids Transcription and Translation
(B) recognize that components that make up the genetic code are common to all organisms;	-

(C) explain the purpose and process of transcription and translation using models of DNA and RNA;	Controlling Protein Synthesis Transcription and Translation
(D) recognize that gene expression is a regulated process;	Controlling Protein Synthesis
(E) identify and illustrate changes in DNA and evaluate the significance of these changes;	DNA Replication 2 Genetic Mutations
(F) predict possible outcomes of various genetic combinations such as monohybrid crosses, dihybrid crosses and non-Mendelian inheritance;	Gregor Mendel Incomplete Dominance and Codominance Patterns of Inheritance
(G) recognize the significance of meiosis to sexual reproduction; and	Genetic Variation Meiosis
(H) describe how techniques such as DNA fingerprinting, genetic modifications, and chromosomal analysis are used to study the genomes of organisms.	Genetic Engineering Understanding Genomes
(7) Science concepts. The student knows evolutionary theory is a scientific explanation for the unity and diversity of life. The student is expected to:	
(A) analyze and evaluate how evidence of common ancestry among groups is provided by the fossil record, biogeography, and homologies, including anatomical, molecular, and developmental;	Fossil Record
<i>(B) analyze and evaluate scientific explanations concerning any data of sudden appearance, stasis, and sequential nature of groups in the fossil record;</i>	–
(C) analyze and evaluate how natural selection produces change in populations, not individuals;	Evolution The Process of Evolution
(D) analyze and evaluate how the elements of natural selection, including inherited variation, the potential of a population to produce more offspring than can survive, and a finite supply of environmental resources, result in differential reproductive success;	The Process of Evolution
(E) analyze and evaluate the relationship of natural selection to adaptation and to the development of diversity in and among species;	Animal Adaptations Evolution Plant Adaptations
(F) analyze and evaluate the effects of other evolutionary mechanisms, including genetic drift, gene flow, mutation, and recombination; and	Population Genetics
<i>(G) analyze and evaluate scientific explanations concerning the complexity of the cell.</i>	–
(8) Science concepts. The student knows that taxonomy is a branching classification based on the shared characteristics of organisms and can change as new discoveries are made. The student is expected to:	
(A) define taxonomy and recognize the importance of a standardized taxonomic system to the scientific community;	Classification

(B) categorize organisms using a hierarchical classification system based on similarities and differences shared among groups; and	Classification
(C) compare characteristics of taxonomic groups, including archaea, bacteria, protists, fungi, plants, and animals.	Classification
(9) Science concepts. The student knows the significance of various molecules involved in metabolic processes and energy conversions that occur in living organisms. The student is expected to:	
(A) compare the structures and functions of different types of biomolecules, including carbohydrates, lipids, proteins, and nucleic acids;	Monosaccharides Nucleic Acids Polysaccharides Proteins Lipids
(B) compare the reactants and products of photosynthesis and cellular respiration in terms of energy and matter;	Photosynthesis 1 Photosynthesis 2
(C) identify and investigate the role of enzymes; and	Enzymes
<i>(D) analyze and evaluate the evidence regarding formation of simple organic molecules and their organization into long complex molecules having information such as the DNA molecule for self-replicating life.</i>	–
(10) Science concepts. The student knows that biological systems are composed of multiple levels. The student is expected to:	
(A) describe the interactions that occur among systems that perform the functions of regulation, nutrient absorption, reproduction, and defense from injury or illness in animals;	Behavior Digestion Female Reproductive System Homeostasis Hormones Immune System
(B) describe the interactions that occur among systems that perform the functions of transport, reproduction, and response in plants; and	Asexual Reproduction Specialized Plant Cells
(C) analyze the levels of organization in biological systems and relate the levels to each other and to the whole system.	Cells to Organisms
(11) Science concepts. The student knows that biological systems work to achieve and maintain balance. The student is expected to:	
(A) describe the role of internal feedback mechanisms in the maintenance of homeostasis;	Homeostasis Hormones
<i>(B) investigate and analyze how organisms, populations, and communities respond to external factors;</i>	–

(C) summarize the role of microorganisms in both maintaining and disrupting the health of both organisms and ecosystems; and	Infectious Disease
(D) describe how events and processes that occur during ecological succession can change populations and species diversity.	Ecosystems and Succession
(12) Science concepts. The student knows that interdependence and interactions occur within an environmental system. The student is expected to:	
(A) interpret relationships, including predation, parasitism, commensalism, mutualism, and competition among organisms;	Host-Parasite interactions Predator-Prey interactions
(B) compare variations and adaptations of organisms in different ecosystems;	Animal Adaptations Plant Adaptations
(C) analyze the flow of matter and energy through trophic levels using various models, including food chains, food webs, and ecological pyramids;	Energy Loss in Food Chains Energy Transfer in Food Chains Food Chains Food Webs
(D) recognize that long-term survival of species is dependent on changing resource bases that are limited;	Describing Populations
(E) describe the flow of matter through the carbon and nitrogen cycles and explain the consequences of disrupting these cycles; and	Carbon Cycle Nitrogen Cycle
(F) describe how environmental change can impact ecosystem stability.	Climate change