

FLORIDA SCIENCE STANDARDS Grades 9–12
Contents Standards Mapping

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LIFE SCIENCE	Boardworks High School Biology Presentation
Standard 14: Organization and Development of Living Organisms	
SC.912.L.14.1 - Describe the scientific theory of cells (cell theory) and relate the history of its discovery to the process of science.	Cell Theory
SC.912.L.14.2 - Relate structure to function for the components of plant and animal cells. Explain the role of cell membranes as a highly selective barrier (passive and active transport).	Active Transport Diffusion Eukaryotic Cells Organelles Osmosis
SC.912.L.14.3 - Compare and contrast the general structures of plant and animal cells. Compare and contrast the general structures of prokaryotic and eukaryotic cells.	Eukaryotic Cells Organelles Prokaryotic Cells
SC.912.L.14.4 - Compare and contrast structure and function of various types of microscopes.	Microscopy
<i>SC.912.L.14.5 - Explain the evidence supporting the scientific theory of the origin of eukaryotic cells (endosymbiosis).</i>	–
SC.912.L.14.6 - Explain the significance of genetic factors, environmental factors, and pathogenic agents to health from the perspectives of both individual and public health.	Infectious Diseases Inherited Diseases Tuberculosis
SC.912.L.14.7 - Relate the structure of each of the major plant organs and tissues to physiological processes.	Plant Adaptations Specialized Plant Cells
<i>SC.912.L.14.8 - Explain alternation of generations in plants.</i>	–
<i>SC.912.L.14.9 - Relate the major structure of fungi to their functions.</i>	–
SC.912.L.14.10 - Discuss the relationship between the evolution of land plants and their anatomy.	Plant Adaptations
SC.912.L.14.11 - Classify and state the defining characteristics of epithelial tissue, connective tissue, muscle tissue, and nervous tissue.	Nerve Impulses
SC.912.L.14.12 - Describe the anatomy and histology of bone tissue.	The Skeleton
<i>SC.912.L.14.13 - Distinguish between bones of the axial skeleton and the appendicular skeleton.</i>	–
SC.912.L.14.14 - Identify the major bones of the axial and appendicular skeleton.	The Skeleton
<i>SC.912.L.14.15 - Identify major markings (such as foramina, fossae, tubercles, etc.) on a skeleton. Explain why these markings are important.</i>	–

SC.912.L.14.16 - Describe the anatomy and histology, including ultrastructure, of muscle tissue.	Sliding Filament Theory Types of Muscles
SC.912.L.14.17 - List the steps involved in the sliding filament of muscle contraction.	Sliding Filament Theory
SC.912.L.14.18 - Describe signal transmission across a myoneural junction.	Controlling Movement
SC.912.L.14.19 - Explain the physiology of skeletal muscle.	Sliding Filament Theory Types of Muscles
<i>SC.912.L.14.20 - Identify the major muscles of the human on a model or diagram.</i>	–
SC.912.L.14.21 - Describe the anatomy, histology, and physiology of the central and peripheral nervous systems and name the major divisions of the nervous system.	The Nervous System
SC.912.L.14.22 - Describe the physiology of nerve conduction, including the generator potential, action potential, and the synapse.	Nerve impulses
SC.912.L.14.23 - Identify the parts of a reflex arc.	Reflexes
SC.912.L.14.24 - Identify the general parts of a synapse and describe the physiology of signal transmission across a synapse.	Nerve impulses
<i>SC.912.L.14.25 - Identify the major parts of a cross section through the spinal cord.</i>	–
SC.912.L.14.26 - Identify the major parts of the brain on diagrams or models.	The Brain
SC.912.L.14.27 - Identify the functions of the major parts of the brain, including the meninges, medulla, pons, midbrain, hypothalamus, thalamus, cerebellum and cerebrum.	The Brain
<i>SC.912.L.14.28 - Identify the major functions of the spinal cord.</i>	–
SC.912.L.14.29 - Define the terms endocrine and exocrine.	The Endocrine System
SC.912.L.14.30 - Compare endocrine and neural controls of physiology.	Hormones Nerve Impulses The Endocrine System
SC.912.L.14.31 - Describe the physiology of hormones including the different types and the mechanisms of their action.	Hormones The Endocrine System
SC.912.L.14.32 - Describe the anatomy and physiology of the endocrine system.	The Endocrine System
SC.912.L.14.33 - Describe the basic anatomy and physiology of the reproductive system.	Female Reproductive System
SC.912.L.14.34 - Describe the composition and physiology of blood, including that of the plasma and the formed elements.	Blood and Blood Vessels
SC.912.L.14.35 - Describe the steps in hemostasis, including the mechanism of coagulation. Include the basis for blood typing and transfusion reactions.	Blood and Blood Vessels Blood Transfusions
<i>SC.912.L.14.36 - Describe the factors affecting blood flow through the cardiovascular system.</i>	–
SC.912.L.14.37 - Explain the components of an electrocardiogram.	Electrocardiograms
<i>SC.912.L.14.38 - Describe normal heart sounds and what they mean.</i>	–
<i>SC.912.L.14.39 - Describe hypertension and some of the factors that produce it.</i>	–

SC.912.L.14.40 - Describe the histology of the major arteries and veins of systemic, pulmonary, hepatic portal, and coronary circulation.	-
SC.912.L.14.41 - Describe fetal circulation and changes that occur to the circulatory system at birth.	-
SC.912.L.14.42 - Describe the anatomy and the physiology of the lymph system.	-
SC.912.L.14.43 - Describe the histology of the respiratory system.	Diffusion The Respiratory System
SC.912.L.14.44 - Describe the physiology of the respiratory system including the mechanisms of ventilation, gas exchange, gas transport and the mechanisms that control the rate of ventilation.	Diffusion The Respiratory System Ventilation
SC.912.L.14.45 - Describe the histology of the alimentary canal and its associated accessory organs.	-
SC.912.L.14.46 - Describe the physiology of the digestive system, including mechanical digestion, chemical digestion, absorption and the neural and hormonal mechanisms of control.	Digestion
SC.912.L.14.47 - Describe the physiology of urine formation by the kidney.	The Kidneys
SC.912.L.14.48 - Describe the anatomy, histology, and physiology of the ureters, the urinary bladder and the urethra.	-
SC.912.L.14.49 - Identify the major functions associated with the sympathetic and parasympathetic nervous systems.	The Nervous System
SC.912.L.14.50 - Describe the structure of vertebrate sensory organs. Relate structure to function in vertebrate sensory systems.	-
SC.912.L.14.51 - Describe the function of the vertebrate integumentary system.	-
SC.912.L.14.52 - Explain the basic functions of the human immune system, including specific and nonspecific immune response, vaccines, and antibiotics.	Antibodies and Vaccinations Immune system Immune Responses Vaccination
SC.912.L.14.53 - Discuss basic classification and characteristics of plants. Identify bryophytes, pteridophytes, gymnosperms, and angiosperms.	-
Standard 15: Diversity and Evolution of Living Organisms	
SC.912.L.15.1- Explain how the scientific theory of evolution is supported by the fossil record, comparative anatomy, comparative embryology, biogeography, molecular biology, and observed evolutionary change.	Darwin Evolution Fossil record The Process of Evolution
SC.912.L.15.2 - Discuss the use of molecular clocks to estimate how long ago various groups of organisms diverged evolutionarily from one another.	-

SC.912.L.15.3 - Describe how biological diversity is increased by the origin of new species and how it is decreased by the natural process of extinction.	Evolution Extinction Population Genetics The Process of Evolution
SC.912.L.15.4 - Describe how and why organisms are hierarchically classified and based on evolutionary relationships.	Classification
SC.912.L.15.5 - Explain the reasons for changes in how organisms are classified.	Classification
SC.912.L.15.6 - Discuss distinguishing characteristics of the domains and kingdoms of living organisms.	Classification
SC.912.L.15.7 - Discuss distinguishing characteristics of vertebrate and representative invertebrate phyla, and chordate classes using typical examples.	Classification
SC.912.L.15.8 - Describe the scientific explanations of the origin of life on Earth.	–
SC.912.L.15.9 - Explain the role of reproductive isolation in the process of speciation.	Population Genetics
SC.912.L.15.10 - Identify basic trends in hominid evolution from early ancestors six million years ago to modern humans, including brain size, jaw size, language, and manufacture of tools.	–
SC.912.L.15.11 - Discuss specific fossil hominids and what they show about human evolution.	–
SC.912.L.15.12 - List the conditions for Hardy-Weinberg equilibrium in a population and why these conditions are not likely to appear in nature. Use the Hardy-Weinberg equation to predict genotypes in a population from observed phenotypes.	Population Genetics
SC.912.L.15.13 - Describe the conditions required for natural selection, including: overproduction of offspring, inherited variation, and the struggle to survive, which result in differential reproductive success.	Evolution The Process of Evolution
SC.912.L.15.14 - Discuss mechanisms of evolutionary change other than natural selection such as genetic drift and gene flow.	Population Genetics
SC.912.L.15.15 - Describe how mutation and genetic recombination increase genetic variation.	DNA Replication 1 DNA Replication 2 Genetic Variation Genetic Mutations Meiosis
Standard 16: Heredity and Reproduction	
SC.912.L.16.1 - Use Mendel's laws of segregation and independent assortment to analyze patterns of inheritance.	Gregor Mendel Patterns of Inheritance
SC.912.L.16.2 - Discuss observed inheritance patterns caused by various modes of inheritance, including dominant, recessive, codominant, sex-linked, polygenic, and multiple alleles.	Genes and Alleles Incomplete Dominance and Codominance Patterns of Inheritance

SC.912.L.16.3 - Describe the basic process of DNA replication and how it relates to the transmission and conservation of the genetic information.	DNA Replication 1 DNA Replication 2 Transcription and Translation
SC.912.L.16.4 - Explain how mutations in the DNA sequence may or may not result in phenotypic change. Explain how mutations in gametes may result in phenotypic changes in offspring.	DNA Replication 2 Genetic Mutations Genetic Variation
SC.912.L.16.5 - Explain the basic processes of transcription and translation, and how they result in the expression of genes.	Transcription and Translation
<i>SC.912.L.16.6 - Discuss the mechanisms for regulation of gene expression in prokaryotes and eukaryotes at transcription and translation level.</i>	–
SC.912.L.16.7 - Describe how viruses and bacteria transfer genetic material between cells and the role of this process in biotechnology.	Prokaryotic Cells
<i>SC.912.L.16.8 - Explain the relationship between mutation, cell cycle, and uncontrolled cell growth potentially resulting in cancer.</i>	Genetic Mutations
SC.912.L.16.9 - Explain how and why the genetic code is universal and is common to almost all organisms.	Transcription and Translation
<i>SC.912.L.16.10 - Evaluate the impact of biotechnology on the individual, society and the environment, including medical and ethical issues.</i>	–
SC.912.L.16.11 - Discuss the technologies associated with forensic medicine and DNA identification, including restriction fragment length polymorphism (RFLP) analysis.	Understanding Genomes
<i>SC.912.L.16.12 - Describe how basic DNA technology (restriction digestion by endonucleases, gel electrophoresis, polymerase chain reaction, ligation, and transformation) is used to construct recombinant DNA molecules (DNA cloning).</i>	–
SC.912.L.16.13 - Describe the basic anatomy and physiology of the human reproductive system. Describe the process of human development from fertilization to birth and major changes that occur in each trimester of pregnancy.	Development Female Reproductive System
SC.912.L.16.14 - Describe the cell cycle, including the process of mitosis. Explain the role of mitosis in the formation of new cells and its importance in maintaining chromosome number during asexual reproduction.	Mitosis The Stages of Mitosis
<i>SC.912.L.16.15 - Compare and contrast binary fission and mitotic cell division.</i>	–
SC.912.L.16.16 - Describe the process of meiosis, including independent assortment and crossing over. Explain how reduction division results in the formation of haploid gametes or spores.	Meiosis The Stages of Meiosis
SC.912.L.16.17 - Compare and contrast mitosis and meiosis and relate to the processes of sexual and asexual reproduction and their consequences for genetic variation.	Meiosis Mitosis
Standard 17: Interdependence	
SC.912.L.17.1 - Discuss the characteristics of populations, such as number of individuals, age structure, density, and pattern of distribution.	Describing Populations

SC.912.L.17.2 - Explain the general distribution of life in aquatic systems as a function of chemistry, geography, light, depth, salinity, and temperature.	–
SC.912.L.17.3 - Discuss how various oceanic and freshwater processes, such as currents, tides, and waves, affect the abundance of aquatic organisms.	–
SC.912.L.17.4 - Describe changes in ecosystems resulting from seasonal variations, climate change and succession.	Climate Change Ecosystems and Succession
SC.912.L.17.5 - Analyze how population size is determined by births, deaths, immigration, emigration, and limiting factors (biotic and abiotic) that determine carrying capacity.	Describing Populations Ecosystems
SC.912.L.17.6 - Compare and contrast the relationships among organisms, including predation, parasitism, competition, commensalism, and mutualism.	Host-Parasite relationships
SC.912.L.17.7 - Characterize the biotic and abiotic components that define freshwater systems, marine systems and terrestrial systems.	–
SC.912.L.17.8 - Recognize the consequences of the losses of biodiversity due to catastrophic events, climate changes, human activity, and the introduction of invasive, non-native species.	Climate Change Loss of Diversity
SC.912.L.17.9 - Use a food web to identify and distinguish producers, consumers, and decomposers. Explain the pathway of energy transfer through trophic levels and the reduction of available energy at successive trophic levels.	Energy Loss in Food Chains Energy Transfer Food Webs
SC.912.L.17.10 - Diagram and explain the biogeochemical cycles of an ecosystem, including water, carbon, and nitrogen cycle.	Carbon Cycle Nitrogen Cycle Recycling Nutrients Water Cycle
SC.912.L.17.11 - Evaluate the costs and benefits of renewable and nonrenewable resources, such as water, energy, fossil fuels, wildlife, and forests.	Fossil Fuels
SC.912.L.17.12 - Discuss the political, social, and environmental consequences of sustainable use of land.	–
SC.912.L.17.13 - Discuss the need for adequate monitoring of environmental parameters when making policy decisions.	Climate Change Impact of Using CFCs
SC.912.L.17.14 - Assess the need for adequate waste management strategies.	–
SC.912.L.17.15 - Discuss the effects of technology on environmental quality.	–
SC.912.L.17.16 - Discuss the large-scale environmental impacts resulting from human activity, including waste spills, oil spills, runoff, greenhouse gases, ozone depletion, and surface and groundwater pollution.	Air Pollution Climate Change Extinction Human Impact on the Environment The Impact of Using CFCs The Impact of Mining
SC.912.L.17.17 - Assess the effectiveness of innovative methods of protecting the environment.	–
SC.912.L.17.18 - Describe how human population size and resource use relate to environmental quality.	Human Impact on the Environment

SC.912.L.17.19 - Describe how different natural resources are produced and how their rates of use and renewal limit availability.	Fossil Fuels The Impact of Mining
SC.912.L.17.20 - Predict the impact of individuals on environmental systems and examine how human lifestyles affect sustainability.	Human Impact on the Environment Sustainability
Standard 18: Matter and Energy Transformations	
SC.912.L.18.1 - Describe the basic molecular structures and primary functions of the four major categories of biological macromolecules.	Digestion Lipids Nucleic Acids Monosaccharides Polysaccharides Proteins
SC.912.L.18.2 - Describe the important structural characteristics of monosaccharides, disaccharides, and polysaccharides and explain the functions of carbohydrates in living things.	Monosaccharides Polysaccharides
SC.912.L.18.3 - Describe the structures of fatty acids, triglycerides, phospholipids, and steroids. Explain the functions of lipids in living organisms. Identify some reactions that fatty acids undergo. Relate the structure and function of cell membranes.	Lipids The Fluid Mosaic Model
SC.912.L.18.4 - Describe the structures of proteins and amino acids. Explain the functions of proteins in living organisms. Identify some reactions that amino acids undergo. Relate the structure and function of enzymes.	Digestion Enzymes Proteins Nucleic Acids
<i>SC.912.L.18.5 - Discuss the use of chemiosmotic gradients for ATP production in chloroplasts and mitochondria.</i>	–
SC.912.L.18.6 - Discuss the role of anaerobic respiration in living things and in human society.	Anaerobic Respiration
SC.912.L.18.7 - Identify the reactants, products, and basic functions of photosynthesis.	Photosynthesis 1 Photosynthesis 2
SC.912.L.18.8 - Identify the reactants, products, and basic functions of aerobic and anaerobic cellular respiration.	Aerobic Respiration Anaerobic Respiration
<i>SC.912.L.18.9 - Explain the interrelated nature of photosynthesis and cellular respiration.</i>	–
<i>SC.912.L.18.10 - Connect the role of adenosine triphosphate (ATP) to energy transfers within a cell.</i>	–
SC.912.L.18.11 - Explain the role of enzymes as catalysts that lower the activation energy of biochemical reactions. Identify factors, such as pH and temperature, and their effect on enzyme activity.	Enzymes
SC.912.L.18.12 - Discuss the special properties of water that contribute to Earth's suitability as an environment for life: cohesive behavior, ability to moderate temperature, expansion upon freezing, and versatility as a solvent.	Water