

Biology

| State Standard Number | State Standard Area/Description | Unit Name | Course Topic Description |
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| SC.912.L.14 | Organization and Development of Living Organisms | | |
| SC.912.L.14.A | Cells have characteristic structures and functions that make them distinctive. | | |
| SC.912.L.14.B | Processes in a cell can be classified broadly as growth, maintenance, reproduction, and homeostasis. | | |
| SC.912.L.14.C | Life can be organized in a functional and structural hierarchy ranging from cells to the biosphere. | | |
| SC.912.L.14.D | Most multicellular organisms are composed of organ systems whose structures reflect their particular function. | | |
| 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. | Unit 3: Cell Structure | Introduction |
| | | | Section 2: The Cell Membrane: Structure and Function |
| 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). | Unit 3: Cell Structure | Section 1: Cell Structure |
| | | | Section 2: The Cell Membrane: Structure and Function |
| 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. | Unit 3: Cell Structure | Section 1: Cell Structure |
| | | | Section 2: The Cell Membrane: Structure and Function |
| SC.912.L.14.4 | Compare and contrast structure and function of various types of microscopes. | Unit 3: Cell Structure | Section 1: Cell Structure |
| SC.912.L.14.5 | Explain the evidence supporting the scientific theory of the origin of eukaryotic cells (endosymbiosis). | Unit 6: History of Life on Earth | Section 2: Birth of a Planet and Establishment of Life |
| | | Unit 7: Biological Diversity | Section 3: The Protista: a Kingdom in Transition |
| SC.912.L.14.6 | Explain the significance of genetic | Unit 4: Genetics | Section 2: The |

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| | factors, environmental factors, and pathogenic agents to health from the perspectives of both individual and public health. | | Chromosome Theory of Inheritance |
| | | Unit 9 Animal Organization | Section 5: The Lymphatic System and Immunity |
| | | Unit 10: Population Ecology | Section 1: Population Growth |
| SC.912.L.14.7 | Relate the structure of each of the major plant organs and tissues to physiological processes. | Unit 8: Plant Structure | Section 1: Plant Organs, Tissues, and Cells |
| SC.912.L.14.8 | Explain alternation of generations in plants. | Unit 8: Plant Structure | Section 2: Flowering Plant Reproduction |
| SC.912.L.14.9 | Relate the major structure of fungi to their functions. | Unit 7: Biological Diversity | Section 5: Kingdom Fungi |
| SC.912.L.14.10 | Discuss the relationship between the evolution of land plants and their anatomy. | Unit 7: Biological Diversity | Section 4: Plant Kingdom |
| SC.912.L.14.11 | Classify and state the defining characteristics of epithelial tissue, connective tissue, muscle tissue, and nervous tissue. | Unit 9 Animal Organization | Section 1: Animal Tissue |
| SC.912.L.14.12 | Describe the anatomy and histology of bone tissue. | Unit 9 Animal Organization | Section 1: Animal Tissue |
| | | | Section 8: Muscular and Skeletal Systems |
| SC.912.L.14.13 | Distinguish between bones of the axial skeleton and the appendicular skeleton. | Unit 9 Animal Organization | Section 8: Muscular and Skeletal Systems |
| SC.912.L.14.14 | Identify the major bones of the axial and appendicular skeleton. | Unit 9 Animal Organization | Section 8: Muscular and Skeletal Systems |

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| SC.912.L.14.15 | Identify major markings (such as foramina, fossae, tubercles, etc.) on a skeleton. Explain why these markings are important. | Unit 9 Animal Organization | Section 8: Muscular and Skeletal Systems |
| SC.912.L.14.16 | Describe the anatomy and histology, including ultrastructure, of muscle tissue. | Unit 9 Animal Organization | Section 1: Animal Tissue |
| | | | Section 8: Muscular and Skeletal Systems |
| SC.912.L.14.17 | List the steps involved in the sliding filament of muscle contraction. | Unit 9 Animal Organization | Section 1: Animal Tissue |
| | | | Section 8: Muscular and Skeletal Systems |
| SC.912.L.14.18 | Describe signal transmission across a myoneural junction. | Unit 9 Animal Organization | Section 8: Muscular and Skeletal Systems |
| SC.912.L.14.19 | Explain the physiology of skeletal muscle. | Unit 9 Animal Organization | Section 1: Animal Tissue |
| | | | Section 8: Muscular and Skeletal Systems |
| SC.912.L.14.20 | Identify the major muscles of the human on a model or diagram. | Unit 9 Animal Organization | Section 8: Muscular and Skeletal Systems |
| 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. | Unit 9 Animal Organization | Section 7: The Nervous and Endocrine Systems: Control of the Body |
| SC.912.L.14.22 | Describe the physiology of nerve conduction, including the generator potential, action potential, and the synapse. | Unit 9 Animal Organization | Section 1: Animal Tissue |
| | | | Section 7: The Nervous and Endocrine Systems: Control of the Body |
| SC.912.L.14.23 | Identify the parts of a reflex arc. | Unit 9 Animal Organization | Section 2: Animal Organ Systems and Homeostasis |
| | | | Section 7: The Nervous and Endocrine Systems: Control of the Body |
| SC.912.L.14.24 | Identify the general parts of a synapse and describe the physiology of signal transmission across a synapse. | Unit 9 Animal Organization | Section 1: Animal Tissue |
| | | | Section 7: The Nervous and Endocrine Systems: Control of the Body |

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| SC.912.L.14.25 | Identify the major parts of a cross section through the spinal cord. | Unit 9 Animal Organization | Section 7: The Nervous and Endocrine Systems: Control of the Body |
| SC.912.L.14.26 | Identify the major parts of the brain on diagrams or models. | Unit 9 Animal Organization | Section 7: The Nervous and Endocrine Systems: Control of the Body |
| 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. | Unit 9 Animal Organization | Section 7: The Nervous and Endocrine Systems: Control of the Body |
| SC.912.L.14.28 | Identify the major functions of the spinal cord. | Unit 9 Animal Organization | Section 7: The Nervous and Endocrine Systems: Control of the Body |
| SC.912.L.14.29 | Define the terms endocrine and exocrine. | Unit 9 Animal Organization | Section 3: The Integumentary System: Protection and Senses Section 7: The Nervous and Endocrine Systems: Control of the Body |
| SC.912.L.14.30 | Compare endocrine and neural controls of physiology. | Unit 9 Animal Organization | Section 2: Animal Organ Systems and Homeostasis Section 7: The Nervous and Endocrine Systems: Control of the Body |
| SC.912.L.14.31 | Describe the physiology of hormones including the different types and the mechanisms of their action. | Unit 9 Animal Organization | Section 7: The Nervous and Endocrine Systems: Control of the Body |
| SC.912.L.14.32 | Describe the anatomy and physiology of the endocrine system. | Unit 9 Animal Organization | Section 7: The Nervous and Endocrine Systems: Control of the Body |
| SC.912.L.14.33 | Describe the basic anatomy and physiology of the reproductive system. | Unit 9 Animal Organization | Section 2: Animal Organ Systems and Homeostasis Section 10: The Reproductive System and Human Development |
| SC.912.L.14.34 | Describe the composition and physiology of blood, including that | Unit 9 Animal Organization | Section 1: Animal Tissue |

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| | of the plasma and the formed elements. | | Section 4: The Circulatory System: Transport of Materials within the Body |
| SC.912.L.14.35 | Describe the steps in hemostasis, including the mechanism of coagulation. Include the basis for blood typing and transfusion reactions. | Unit 9 Animal Organization | Section 5: The Lymphatic System and Immunity |
| SC.912.L.14.36 | Describe the factors affecting blood flow through the cardiovascular system. | Unit 9 Animal Organization | Section 4: The Circulatory System: Transport of Materials within the Body |
| SC.912.L.14.37 | Explain the components of an electrocardiogram. | Unit 9 Animal Organization | Section 4: The Circulatory System: Transport of Materials within the Body |
| SC.912.L.14.38 | Describe normal heart sounds and what they mean. | Unit 9 Animal Organization | Section 4: The Circulatory System: Transport of Materials within the Body |
| SC.912.L.14.39 | Describe hypertension and some of the factors that produce it. | Unit 9 Animal Organization | Section 4: The Circulatory System: Transport of Materials within the Body |
| SC.912.L.14.40 | Describe the histology of the major arteries and veins of systemic, pulmonary, hepatic portal, and coronary circulation. | Unit 9 Animal Organization | Section 4: The Circulatory System: Transport of Materials within the Body |
| SC.912.L.14.41 | Describe fetal circulation and changes that occur to the circulatory system at birth. | Unit 9 Animal Organization | Section 10: The Reproductive System and Human Development |
| SC.912.L.14.42 | Describe the anatomy and the physiology of the lymph system. | Unit 9 Animal Organization | Section 2: Animal Organ Systems and Homeostasis |
| | | | Section 5: The Lymphatic System and Immunity |
| SC.912.L.14.43 | Describe the histology of the respiratory system. | Unit 9 Animal Organization | Section 9: Respiration and Excretion: Exchange of Materials |

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| 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. | Unit 9 Animal Organization | Section 9: Respiration and Excretion: Exchange of Materials |
| SC.912.L.14.45 | Describe the histology of the alimentary canal and its associated accessory organs. | Unit 9 Animal Organization | Section 6: The Digestive System: Getting Food and Nutrients into the Body |
| 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. | Unit 9 Animal Organization | Section 6: The Digestive System: Getting Food and Nutrients into the Body |
| SC.912.L.14.47 | Describe the physiology of urine formation by the kidney. | Unit 9 Animal Organization | Section 9: Respiration and Excretion: Exchange of Materials |
| SC.912.L.14.48 | Describe the anatomy, histology, and physiology of the ureters, the urinary bladder and the urethra. | Unit 9 Animal Organization | Section 9: Respiration and Excretion: Exchange of Materials |
| SC.912.L.14.49 | Identify the major functions associated with the sympathetic and parasympathetic nervous systems. | Unit 9 Animal Organization | Section 7: The Nervous and Endocrine Systems: Control of the Body |
| SC.912.L.14.50 | Describe the structure of vertebrate sensory organs. Relate structure to function in vertebrate sensory systems. | Unit 9 Animal Organization | Section 3: The Integumentary System: Protection and Senses |
| SC.912.L.14.51 | Describe the function of the vertebrate integumentary system. | Unit 9 Animal Organization | Section 2: Animal Organ Systems and Homeostasis Section 3: The Integumentary System: Protection and Senses |
| SC.912.L.14.52 | Explain the basic functions of the human immune system, including specific and nonspecific immune response, vaccines, and antibiotics. | Unit 9 Animal Organization | Section 5: The Lymphatic System and Immunity |

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| SC.912.L.14.53 | Discuss basic classification and characteristics of plants. Identify bryophytes, pteridophytes, gymnosperms, and angiosperms. | Unit 7: Biological Diversity | Section 4: The Plant Kingdom |
| SC.912.L.15 | Diversity and Evolution of Living Organisms | | |
| SC.912.L.15.A | The scientific theory of evolution is the fundamental concept underlying all of biology. | | |
| SC.912.L.15.B | The scientific theory of evolution is supported by multiple forms of scientific evidence. | | |
| SC.912.L.15.C | Organisms are classified based on their evolutionary history. | | |
| SC.912.L.15.D | Natural selection is a primary mechanism leading to evolutionary change. | | |
| 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. | Unit 5: Evolution | Section 1: Evolution: Descent with Modification Section 2: Evolution and Genetics |
| 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. | Unit 5: Evolution | Section 1: Evolution: Descent with Modification |
| 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. | Unit 5: Evolution | Section 1: Evolution: Descent with Modification |
| | | Unit 10: Population Ecology | Section 3: The Biosphere and Mass Extinctions |

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| SC.912.L.15.4 | Describe how and why organisms are hierarchically classified and based on evolutionary relationships. | Unit 7: Biological Diversity | Section 1: The Kingdoms and Domains of Life |
| SC.912.L.15.5 | Explain the reasons for changes in how organisms are classified. | Unit 7: Biological Diversity | Section 1: The Kingdoms and Domains of Life Section 2: Prokaryotes: Bacteria and Archaea |
| SC.912.L.15.6 | Discuss distinguishing characteristics of the domains and kingdoms of living organisms. | Unit 7: Biological Diversity | All sections |
| SC.912.L.15.7 | Discuss distinguishing characteristics of vertebrate and representative invertebrate phyla, and chordate classes using typical examples. | Unit 7: Biological Diversity | Section 7: Kingdom Animalia |
| SC.912.L.15.8 | Describe the scientific explanations of the origin of life on Earth. | Unit 6: History of Life on Earth | Section 2: Birth of a Planet and Establishment of Life |
| SC.912.L.15.9 | Explain the role of reproductive isolation in the process of speciation. | Unit 5: Evolution | Section 2: Evolution and 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. | Unit 5: Evolution | Section 1: Evolution: Descent with Modification |
| SC.912.L.15.11 | Discuss specific fossil hominids and what they show about human evolution. | Unit 5: Evolution | Section 1: Evolution: Descent with Modification |
| 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 | Unit 5: Evolution | Section 1: Evolution: Descent with Modification Section 2: Evolution and Genetics |

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| | phenotypes. | | |
| 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. | Unit 5: Evolution | Section 1: Evolution: Descent with Modification Section 2: Evolution and Genetics |
| SC.912.L.15.14 | Discuss mechanisms of evolutionary change other than natural selection such as genetic drift and gene flow. | Unit 5: Evolution | Section 1: Evolution: Descent with Modification Section 2: Evolution and Genetics |
| SC.912.L.15.15 | Describe how mutation and genetic recombination increase genetic variation. | Unit 4: Genetics | Section 5: Protein Synthesis: From Gene to Protein |
| | | Unit 5: Evolution | Section 1: Evolution: Descent with Modification Section 2: Evolution and Genetics |
| SC.912.L.16 | Heredity and Reproduction | | |
| SC.912.L.16.A | DNA stores and transmits genetic information. Genes are sets of instructions encoded in the structure of DNA. | | |
| SC.912.L.16.B | Genetic information is passed from generation to generation by DNA in all organisms and accounts for similarities in related individuals. | | |
| SC.912.L.16.C | Manipulation of DNA in organisms has led to commercial production of biological molecules on a large scale and genetically modified organisms. | | |
| SC.912.L.16.D | Reproduction is characteristic of living things and is essential for the survival of species. | | |

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| SC.912.L.16.1 | Use Mendel's laws of segregation and independent assortment to analyze patterns of inheritance. | Unit 4: Genetics | Section 1: Mendel and Heredity |
| 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. | Unit 4: Genetics | Section 2: The Chromosome Theory of Inheritance Section 3: Human Genetic Traits |
| 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. | Unit 3: Cell Structure | Section 2: The Cell Membrane: Structure and Function Section 3: Chromosomes and Cell Reproduction |
| | | Unit 4: Genetics | Section 4: How Proteins are Made |
| 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. | Unit 4: Genetics | Section 3: Human Genetic Traits Section 5: Protein Synthesis: From Gene to Protein |
| | | Unit 5: Evolution | Section 1: Evolution: Descent with Modification |
| SC.912.L.16.5 | Explain the basic processes of transcription and translation, and how they result in the expression of genes. | Unit 4: Genetics | Section 5: Protein Synthesis: From Gene to Protein |
| SC.912.L.16.6 | Discuss the mechanisms for regulation of gene expression in prokaryotes and eukaryotes at transcription and translation level. | Unit 4: Genetics | Section 5: Protein Synthesis: From Gene to Protein |
| SC.912.L.16.7 | Describe how viruses and bacteria transfer genetic material between cells and the role of this process in biotechnology. | Unit 4: Genetics | Section 6: Biotechnology and the Genetics Revolution |
| | | Unit 7: Biological Diversity | Section 2: Prokaryotes: Bacteria and Archaea |
| SC.912.L.16.8 | Explain the relationship between mutation, cell cycle, and uncontrolled cell growth potentially resulting in cancer. | Unit 3: Cell Structure | Section 3: Chromosomes and Cell Reproduction |

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| SC.912.L.16.9 | Explain how and why the genetic code is universal and is common to almost all organisms. | Unit 4: Genetics | Section 5: Protein Synthesis: From Gene to Protein |
| SC.912.L.16.10 | Evaluate the impact of biotechnology on the individual, society and the environment, including medical and ethical issues. | Unit 4: Genetics | Section 6: Biotechnology and the Genetics Revolution |
| SC.912.L.16.11 | Discuss the technologies associated with forensic medicine and DNA identification, including restriction fragment length polymorphism (RFLP) analysis. | Unit 4: Genetics | Section 6: Biotechnology and the Genetics Revolution |
| 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). | Unit 4: Genetics | Section 6: Biotechnology and the Genetics Revolution |
| 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. | Unit 9: Animal Organization | Section 10: The Reproductive System and Human Development |
| 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. | Unit 3: Cell Structure | Section 3: Chromosomes and Cell Reproduction |
| SC.912.L.16.15 | Compare and contrast binary fission and mitotic cell division. | Unit 3: Cell Structure | Section 3: Chromosomes and Cell Reproduction |
| 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. | Unit 3: Cell Structure | Section 4: Meiosis and Sexual Reproduction |

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| 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. | Unit 3: Cell Structure | Section 4: Meiosis and Sexual Reproduction |
| SC.912.L.17 | Interdependence | | |
| SC.912.L.17.A | The distribution and abundance of organisms is determined by the interactions between organisms, and between organisms and the non-living environment. | | |
| SC.912.L.17.B | Energy and nutrients move within and between biotic and abiotic components of ecosystems via physical, chemical and biological processes. | | |
| SC.912.L.17.C | Human activities and natural events can have profound effects on populations, biodiversity and ecosystem processes. | | |
| SC.912.L.17.1 | Discuss the characteristics of populations, such as number of individuals, age structure, density, and pattern of distribution. | Unit 10: Population Ecology | Section 1: Population Growth |
| 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. | Unit 10: Population Ecology | Section 2: Community and Ecosystem Dynamics |
| SC.912.L.17.3 | Discuss how various oceanic and freshwater processes, such as currents, tides, and waves, affect the abundance of aquatic organisms. | Unit 10: Population Ecology | Section 2: Community and Ecosystem Dynamics |
| SC.912.L.17.4 | Describe changes in ecosystems resulting from seasonal variations, climate change and succession. | Unit 10: Population Ecology | Section 2: Community and Ecosystem Dynamics |
| | | | Section 3: The Biosphere and Mass Extinctions |

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| 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. | Unit 10: Population Ecology | Section 1: Population Growth |
| SC.912.L.17.6 | Compare and contrast the relationships among organisms, including predation, parasitism, competition, commensalism, and mutualism. | Unit 10: Population Ecology | Section 1: Population Growth |
| SC.912.L.17.7 | Characterize the biotic and abiotic components that define freshwater systems, marine systems and terrestrial systems. | Unit 10: Population Ecology | Section 2: Community and Ecosystem Dynamics |
| 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. | Unit 10: Population Ecology | Section 1: Population Growth |
| 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. | Unit 10: Population Ecology | Section 2: Community and Ecosystem Dynamics |
| SC.912.L.17.10 | Diagram and explain the biogeochemical cycles of an ecosystem, including water, carbon, and nitrogen cycle. | Unit 10: Population Ecology | Section 3: The Biosphere and Mass Extinction |
| SC.912.L.17.11 | Evaluate the costs and benefits of renewable and nonrenewable resources, such as water, energy, fossil fuels, wildlife, and forests. | Unit 10: Population Ecology | Section 3: The Biosphere and Mass Extinction |
| SC.912.L.17.12 | Discuss the political, social, and environmental consequences of sustainable use of land. | Unit 10: Population Ecology | Section 3: The Biosphere and Mass Extinction |

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| SC.912.L.17.13 | Discuss the need for adequate monitoring of environmental parameters when making policy decisions. | Unit 10: Population Ecology | Section 1: Population Growth |
| SC.912.L.17.14 | Assess the need for adequate waste management strategies. | Unit 10: Population Ecology | Section 3: The Biosphere and Mass Extinction |
| SC.912.L.17.15 | Discuss the effects of technology on environmental quality. | Unit 10: Population Ecology | Section 3: The Biosphere and Mass Extinction |
| 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. | Unit 10: Population Ecology | Section 3: The Biosphere and Mass Extinction |
| SC.912.L.17.17 | Assess the effectiveness of innovative methods of protecting the environment. | Unit 10: Population Ecology | Section 1: Population Growth |
| SC.912.L.17.18 | Describe how human population size and resource use relate to environmental quality. | Unit 10: Population Ecology | Section 1: Population Growth |
| SC.912.L.17.19 | Describe how different natural resources are produced and how their rates of use and renewal limit availability. | Unit 10: Population Ecology | Section 3: The Biosphere and Mass Extinction |
| SC.912.L.17.20 | Predict the impact of individuals on environmental systems and examine how human lifestyles affect sustainability. | Unit 10: Population Ecology | Section 1: Population Growth |
| SC.912.L.18 | Matter and Energy Transformations | | |

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| SC.912.L.18.A | All living things are composed of four basic categories of macromolecules and share the same basic needs for life. | | |
| SC.912.L.18.B | Living organisms acquire the energy they need for life processes through various metabolic pathways (primarily photosynthesis and cellular respiration). | | |
| SC.912.L.18.C | Chemical reactions in living things follow basic rules of chemistry and are usually regulated by enzymes. | | |
| SC.912.L.18.D | The unique chemical properties of carbon and water make life on Earth possible. | | |
| SC.912.L.18.1 | Describe the basic molecular structures and primary functions of the four major categories of biological macromolecules. | Unit 1: The Nature of Science and Biology | Section 2: Chemistry of Life |
| SC.912.L.18.2 | Describe the important structural characteristics of monosaccharides, disaccharides, and polysaccharides and explain the functions of carbohydrates in living things. | Unit 1: The Nature of Science and Biology | Section 2: Chemistry of Life |
| 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. | Unit 1: The Nature of Science and Biology | Section 2: Chemistry of Life |
| 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. | Unit 1: The Nature of Science and Biology | Section 2: Chemistry of Life |
| | | Unit 2: Photosynthesis | Section 1: Photosynthesis and Cellular Respiration |

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| SC.912.L.18.5 | Discuss the use of chemiosmotic gradients for ATP production in chloroplasts and mitochondria. | Unit 2: Photosynthesis | Section 3: Photosynthesis and Cellular Respiration |
| SC.912.L.18.6 | Discuss the role of anaerobic respiration in living things and in human society. | Unit 2: Photosynthesis | Section 3: Photosynthesis and Cellular Respiration |
| SC.912.L.18.7 | Identify the reactants, products, and basic functions of photosynthesis. | Unit 2: Photosynthesis | Section 2: Photosynthesis and Cellular Respiration |
| SC.912.L.18.8 | Identify the reactants, products, and basic functions of aerobic and anaerobic cellular respiration. | Unit 2: Photosynthesis | Section 3: Photosynthesis and Cellular Respiration |
| SC.912.L.18.9 | Explain the interrelated nature of photosynthesis and cellular respiration. | Unit 2: Photosynthesis | Section 3: Photosynthesis and Cellular Respiration |
| SC.912.L.18.10 | Connect the role of adenosine triphosphate (ATP) to energy transfers within a cell. | Unit 1: The Nature of Science and Biology | Section 2: Chemistry of Life |
| | | Unit 2: Photosynthesis | Section 1: Photosynthesis and Cellular Respiration |
| | | | Section 3: Photosynthesis and Cellular Respiration |
| 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. | Unit 2: Photosynthesis | Section 1: Photosynthesis and Cellular Respiration |
| 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. | Unit 1: The Nature of Science and Biology | Section 2: Chemistry of Life |