

SCIENCE - LIFE SCIENCE

- LS.1 The student will demonstrate an understanding of scientific reasoning, logic, and the nature of science by planning and conducting investigations in which
- data are organized into tables showing repeated trials and means;
 - a classification system is developed based on multiple attributes;
 - triple beam and electronic balances, thermometers, metric rulers, graduated cylinders, and probeware are used to gather data;
 - models and simulations are constructed and used to illustrate and explain phenomena;
 - sources of experimental error are identified;
 - dependent variables, independent variables, and constants are identified;
 - variables are controlled to test hypotheses, and trials are repeated;
 - data are organized, communicated through graphical representation, interpreted, and used to make predictions;
 - patterns are identified in data and are interpreted and evaluated; and
 - current applications are used to reinforce life science concepts.
- LS.2 The student will investigate and understand that all living things are composed of cells. Key concepts include
- cell structure and organelles;
 - similarities and differences between plant and animal cells;
 - development of cell theory; and
 - cell division.
- LS.3 The student will investigate and understand that living things show patterns of cellular organization. Key concepts include
- cells, tissues, organs, and systems; and
 - patterns of cellular organization and their relationship to life processes in living things.
- LS.4 The student will investigate and understand how organisms can be classified. Key concepts include
- the distinguishing characteristics of domains of organisms;
 - the distinguishing characteristics of kingdoms of organisms;
 - the distinguishing characteristics of major animal phyla and plant divisions; and
 - the characteristics that define a species.
- LS.5 The student will investigate and understand the basic physical and chemical processes of photosynthesis and its importance to plant and animal life. Key concepts include
- energy transfer between sunlight and chlorophyll;
 - transformation of water and carbon dioxide into sugar and oxygen; and
 - photosynthesis as the foundation of virtually all food webs.
- LS.6 The student will investigate and understand that organisms within an ecosystem are dependent on one another and on nonliving components of the environment. Key concepts include
- the carbon, water, and nitrogen cycles;
 - interactions resulting in a flow of energy and matter throughout the system;
 - complex relationships within terrestrial, freshwater, and marine ecosystems; and
 - energy flow in food webs and energy pyramids.
- LS.7 The student will investigate and understand that interactions exist among members of a population. Key concepts include
- competition, cooperation, social hierarchy, territorial imperative; and
 - influence of behavior on a population.
- LS.8 The student will investigate and understand interactions among populations in a biological community. Key concepts include
- the relationships among producers, consumers, and decomposers in food webs;
 - the relationship between predators and prey;
 - competition and cooperation;
 - symbiotic relationships; and
 - niches.
- LS.9 The student will investigate and understand how organisms adapt to biotic and abiotic factors in an ecosystem. Key concepts include
- differences between ecosystems and biomes;
 - characteristics of land, marine, and freshwater ecosystems; and
 - adaptations that enable organisms to survive within a specific ecosystem.
- LS.10 The student will investigate and understand that ecosystems, communities, populations, and organisms are dynamic, change over time, and respond to daily, seasonal, and long-term changes in their environment. Key concepts include
- phototropism, hibernation, and dormancy;
 - factors that increase or decrease population size; and
 - eutrophication, climate changes, and catastrophic disturbances.
- LS.11 The student will investigate and understand the relationships between ecosystem dynamics and human activity. Key concepts include
- food production and harvest;
 - change in habitat size, quality, or structure;
 - change in species competition;
 - population disturbances and factors that threaten or enhance species survival; and
 - environmental issues.
- LS.12 The student will investigate and understand that organisms reproduce and transmit genetic information to new generations. Key concepts include
- the structure and role of DNA;
 - the function of genes and chromosomes;
 - genotypes and phenotypes;
 - characteristics that can and cannot be inherited;
 - genetic engineering and its applications; and
 - historical contributions and significance of discoveries related to genetics.
- LS.13 The student will investigate and understand that populations of organisms change over time. Key concepts include
- the relationships of mutation, adaptation, natural selection, and extinction;
 - evidence of evolution of different species in the fossil record; and
 - how environmental influences, as well as genetic variation, can lead to diversity of organisms.