Virginia Science

Life Science (2018)

The student will demonstrate an understanding of scientific and engineering practices by LS1	a asking questions and defining problems LS 1A b planning and carrying out investigations LS 1B c interpreting, analyzing, and evaluating data LS 1C d constructing and critiquing conclusions and explanations LS 1D e developing and using models LS 1E f obtaining, evaluating, and communicating information LS 1F
The student will investigate and understand that all living things are composed of one or more cells that support life processes, as described by the cell theory. Key ideas include LS 2	a the development of the cell theory demonstrates the nature of science LS 2A b cell structure and organelles support life processes; LS 2B c similarities and differences between plant and animal cells determine how they support life processes; LS 2C d cell division is the mechanism for growth and reproduction; and LS 2D e cellular transport (osmosis and diffusion) is important for life processes LS 2E
The student will investigate and understand that there are levels of structural organization in living things. Key ideas include LS 3	a patterns of cellular organization support life processes; LS 3A b unicellular and multicellular organisms have comparative structures; and LS 3B c similar characteristics determine the classification of organisms. LS 3C
The student will investigate and understand that there are chemical processes of energy transfer which are important for life. Key ideas include LS 4	a photosynthesis is the foundation of virtually all food webs; and LS 4A b photosynthesis and cellular respiration support life processes. LS 4B

The student will investigate and understand that biotic and abiotic factors affect an ecosystem. Key ideas include LS 5	**a** matter moves through ecosystems via the carbon, water, and nitrogen cycles; LS 5A
	b energy flow is represented by food webs and energy pyramids; and LS 5B
	c relationships exist among producers, consumers, and decomposers. LS 5C
The student will investigate and understand that populations in a biological community interact and are interdependent. Key ideas include LS 6	**a** relationships exist between predators and prey and these relationships are modeled in food webs; LS 6A
	b the availability and use of resources may lead to competition and cooperation; LS 6B
	c symbiotic relationships support the survival of different species; and LS 6C
	d the niche of each organism supports survival. LS 6D
The student will investigate and understand that adaptations support an organism's survival in an ecosystem. Key ideas include LS 7	**a** biotic and abiotic factors define land, marine, and freshwater ecosystems; and LS 7A
	b physical and behavioral characteristics enable organisms to survive within a specific ecosystem LS 7B
The student will investigate and understand that ecosystems, communities, populations, and organisms are dynamic and change over time. Key ideas include LS 8	**a** organisms respond to daily, seasonal, and long-term changes; LS 8A
	b changes in the environment may increase or decrease population size; and LS 8B
	c large-scale changes such as eutrophication, climate changes, and catastrophic disturbances affect ecosystems. LS 8C
The student will investigate and understand that relationships exist between ecosystem dynamics and human activity. Key ideas include LS 9	**a** changes in habitat can disturb populations; LS 9A
	b disruptions in ecosystems can change species competition; and LS 9B
	c variations in biotic and abiotic factors can change ecosystems. LS 9C
The student will investigate and understand that organisms reproduce and transmit genetic	**a** DNA has a role in making proteins that determine organism traits; LS 10A
	b the role of meiosis is to transfer traits to the next generation; and LS 10B

information to new generations. Key ideas include LS 10	**c** Punnett squares are mathematical models used to predict the probability of traits in offspring LS 10C
The student will investigate and understand that populations of organisms can change over time. Key ideas include LS 11	**a** mutation, adaptation, natural selection, and extinction change populations; LS 11A
	b the fossil record, genetic information, and anatomical comparisons provide evidence for evolution; and LS 11B
	c environmental factors and genetic variation, influence survivability and diversity of organisms LS 11C