

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](#)