



STAFFORD COUNTY PUBLIC SCHOOLS

Curriculum Overview Seventh Grade Life Science

Course Description:

Life Science promotes an understanding of the changes, cycles, patterns, and relationships in the living world. The nature of science is illustrated by the idea that explanations of nature are developed and tested using observations, experimentations, models, evidence, and systematic processes. Areas of study include: cell structure, function, and organization; physical and chemical processes essential to life, especially photosynthesis; DNA and transmission of genetic information. In addition, a large number of ecological concepts are studied including living and nonliving components of an ecosystem, chemical cycles and energy flow and organization and interactions within populations, communities, and ecosystems.

Essential Skills/Processes:

The goals of the course are to educate the student in the material content of Life Science, to increase science inquiry skills and logical thinking, and foster positive attitudes for further science study. There will be preparation for Life Science material on the Grade Eight Science Standards of Learning Test.

- The student will investigate and understand that all living things are composed of cells
 - The student will investigate and understand that living things show patterns of cellular organization
 - The student will investigate and understand that the basic needs of organisms must be met in order to carry out life processes
 - The student will investigate and understand how organisms can be classified
 - The student will investigate and understand the basic physical and chemical processes of photosynthesis and its importance to plant and animal life
 - The student will investigate and understand that organisms within an ecosystem are dependent on one another and on nonliving components of the environment
 - The student will investigate and understand that interactions exist among members of a population
 - The student will investigate and understand interactions among populations in a biological community
 - The student will investigate and understand how organisms adapt to biotic and abiotic factors in an ecosystem
 - The student will investigate and understand that ecosystems, communities, populations, and organisms are dynamic and change over time (daily, seasonal, and long term)
 - The student will investigate and understand the relationships between ecosystem dynamics and human activity
 - The student will investigate and understand that organisms reproduce and transmit genetic information to new generations
 - The student will investigate and understand that organisms change over time
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Essential Knowledge:

Essential knowledge and skills is categorized into seven strands.

Science as Process

- The nature of science developed and reinforced
- Data gathered and organized in tables, line graphs, showing repeated trials and means.
- Variables controlled to test hypotheses.
- Sources of experimental error identified.
- Dependent variables, independent variables, and constants identified.

- Extrapolations from graphs used to make predictions.
- An emphasis on laboratory safety.

Cell Structure and Organization

- Cell theory, cell structures, organelles and their functions.
- Cell division (mitosis and meiosis).
- Organizational levels.
- Functions and processes of the different organizational levels including respiration, removal of wastes, growth, reproduction, digestion, and cellular transport.

Life Processes

- Plant needs including light and energy sources, water, gases, and nutrients.
- Animal needs including food, water, gases, shelter, and living space.
- Factors that influence life processes.

Genetics and Change

- The role of DNA in the transmission of information.
- The relationship between meiosis and genetic variation.
- The function of genes and chromosomes.
- Genotypes and phenotypes.
- Factors affecting expression of traits.
- Historical contributions to genetics.
- Changes caused by mutation, adaptation and natural selection.
- Biodiversity linked to genetic variation and environmental influence.
- The fossil record linked to processes of evolution and extinction.

Classification

- Classification of organisms.
- Distinguishing characteristics among kingdoms of organisms.
- Distinguishing characteristics of major animal and plant phyla.
- Characteristics of the species.

Photosynthesis

- Physical and chemical aspects of photosynthesis.
- Energy transfer between light and chlorophyll.
- The conversion of water and carbon dioxide into sugar and oxygen.
- Photosynthesis as a basis for food webs.

Ecosystems and Biomes

- The carbon, water, and nitrogen cycles.
- Matter and energy flow through the ecosystem.
- Relationships between organisms in terrestrial, freshwater, and marine environments.
- Interactions including competition, cooperation, social hierarchies, and territoriality.
- Food webs to reveal relationships between producers, consumers, and decomposers; between predators and prey, and between parasites and hosts.
- The concepts of niche and symbiosis, including adaptations of organisms to a particular ecosystem.
- Study of changes over time affecting individuals and ecosystems including daily, seasonal, and long-term changes.
- The impact of human activity on the survival of organisms including environmental issues such as air and water quality, energy consumption, and waste disposal.