

CORE CONCEPTS

LIVING THINGS INTERACT WITH THEIR ENVIRONMENT

Key Prior Knowledge (from the Matter, Energy and Processes of Life Units):

- Energy is the ability to do work and exists in different forms. These forms include but are not limited to thermal, mechanical, chemical, electromagnetic, and nuclear. Energy cannot be created or destroyed, but may be converted from one form to another.
- Living organisms are made up of non-living matter and are subject to the same scientific laws as non-living things.
 - Matter can undergo both physical and chemical changes.
 - Matter and energy are neither created nor destroyed.
- Living organisms share common characteristics with each other at some stage in their life.
- All living organisms have needs required for survival and have developed a variety of adaptations (structural and reproductive) that allow them to meet these needs in their environment.
- Life requires the continual uptake of high quality energy (e.g. sunlight and chemical energy) and the release of lower quality energy (e.g. heat) to the surroundings.
- Structure and function are generally related at all levels of biological organization.
 - The ability of a part to function is dependent on its structure.
 - The success of the structure determines if that part will be found in future generations of a species (natural selection).

CORE CONCEPTS for Living Things Interact With Their Environment:

- All-living things are adapted to survive in the presence of all other living and non-living things in their ecosystems.
 - Because of the difference in climate and soil in various ecosystems, organisms develop different types of adaptations which allow them to compete over limited resources more effectively.
 - The size of populations is affected by both biotic and abiotic factors.
 - Altering any part of an ecosystem will positively or negatively effect the survival of living things within that ecosystem.

(SC.G.1.2.1, SC.G.1.2.6, SC.G.1.2.7, SC.G.2.2.1, SC.G.2.2.2, SC.G.2.2.3)

Nutrients (matter) are recycled in an ecosystem.

- Nitrogen cycle
- Carbon cycle
- Phosphorous cycle
- Water cycle

- (SC.G.1.2.3, SC.G.1.2.4, SC.G.1.2.6, SC.D.1.2.3, SC.D.2.2.1)
- Solar energy is captured and transferred to consumers and decomposers by producers, such as plants (energy is neither created nor destroyed, just changed from one form to another).
- (SC.G.1.2.5, SC.B.2.2.1, SC.B.1.2.1)
- Energy, in the form of heat, is lost to the atmosphere as it is used by organisms for biological processes.
 - Energy pyramids

SUNSHINE STATE STANDARDS BENCHMARK

- The student knows that plants, animals, and protists interact. (SC.G.1.2.1)
- The student knows that living things compete in a climatic region with other living things and that structural adaptations make them fit for an environment. (SC.G.1.2.2)
- The student knows that green plants use carbon dioxide, water, and sunlight energy to turn minerals and nutrients into food for growth, maintenance, and reproduction. (SC.G.1.2.3)
- The student knows some organisms decompose dead plants and animals into simple minerals and nutrients for use by living things and thereby recycle matter. (SC.G.1.2.4)
- The student knows that animals eat plants or other animals to acquire the energy they need for survival. (SC.G.1.2.5)
- The student knows that organisms are growing, dying, and decaying and the new organisms are being produced from the materials of dead organisms. This benchmark also assesses SC.G.1.2.4. (SC.G.1.2.6)
- The student knows that variations in light, water, temperature, and soil content are largely responsible for the existence of different kinds of organisms and population densities in an ecosystem. (SC.G.1.2.7)
- The student knows that all living things must compete for Earth's limited resources; organisms best adapted to compete for the available resources will be successful and pass their adaptations (traits) to their offspring. This benchmark also assesses SC.B.2.2.2 and SC.B.2.2.3. (SC.G.2.2.1)
- The student knows that the size of a population is dependent upon the available resources within its community. (SC.G.2.2.2)
- The student understands that changes in the habitat of an organism may be beneficial or harmful. (SC.G.2.2.3)