



Leaf Pack Network

Delaware State Standards, Grades 9-12

Leaf Pack Network[®] curriculum meets the following Delaware State Standards for grades 9-12.

Standard 1: Nature and Application of Science and Technology

The practice of science and the development of technology are critical pursuits of our society. These pursuits have involved diverse people throughout history and have led to continuous improvement in the quality of life and in our understanding of nature. Students will study the processes of scientific inquiry and technology development and the history and context within which these have been carried out.

Science as Inquiry

1. The identification and formulation of appropriate questions guide the design and breadth of a scientific investigation. Based on the type of question(s) proposed, investigations explore new phenomena, solve science and technology related problems, compare different theories, resolve conflicts concerning societal issues, determine reasons for discrepancies in previous experimental results, or test the practicality of a consumer product.
2. Scientific investigations in many cases follow no fixed set of steps. However, there are certain features of a valid scientific investigation that are essential and result in evidence that can be used to construct explanations.
3. Tools and technologies extend human capabilities to perform investigations in more detail and with greater accuracy and improved precision.
4. The close examination of evidence is necessary to construct logical scientific explanations and present arguments which defend proposed explanations. Such critical analyses of supporting evidence are not only important to scientific investigations but help in judging the validity of claims made in advertisements or concluded from investigative reports.
5. Publication and presentation of scientific work with supporting evidence is part of the critique, review, and validation process conducted by the scientific community. The presentation of such work in accessible journals and reviews adds to the body of scientific knowledge and serves as background for subsequent investigations in similar areas.

Standard 5: Earth's Dynamic Systems

Earth's features provide a record of how Earth has changed over time. This dynamic history can be documented and explained by a variety of physical, chemical, biological and geological processes. Students will study and learn to identify components of the various Earth systems and understand the changes and patterns that result from interactions within and between these systems.

Components of Earth

3. Sub-surface water is a limited resource and must be judiciously managed. The rate of movement of sub-surface water is controlled by differences in elevation and the porosity and permeability of the rock and soil through which it moves.

Standard 7: Diversity and Continuity of Living Things

The natural world consists of a diversity of organisms that transmit their characteristics to future generations. Students will study how living things reproduce, develop and transmit traits, and how these theories of evolution explain the unity and diversity of species found on Earth. Students will also study how knowledge of genetics, reproduction and development is being applied to improve agriculture and human health.

Diversity

1. Organisms are classified into a hierarchy of groups and subgroups, based on structural similarities and evolutionary relationships.

3. Variations of organisms within a species and diversity among species increase the likelihood that at least some organisms will survive major changes in the environment.

Standard 8: Ecology

Organisms are linked to one another in an ecosystem by the flow of energy and the cycling of materials. Humans are an integral part of the natural system and human activities can alter the stability of ecosystems. Students will acquire a basic understanding of the structure of ecosystems and how they function and change. They will also study how humans can apply scientific and technological knowledge about ecosystems in making informed decisions about the use of natural resources.

Flow of Matter and Energy in Ecosystems

1. The supply of nutrients and the efficiency of solar energy transformations are two major factors which ultimately determine the number of organisms and species in an ecosystem.

2. The law of conservation of matter applies to ecosystems. Matter needed to sustain life in ecosystems is continually recycled (e.g., carbon cycle, water cycle, nitrogen cycle, mineral cycles) among organisms and between organisms and the environment.
3. The law of conservation of energy applies to ecosystems. All energy is conserved as it passes from the Sun through an ecosystem. During energy transformations some energy is converted to biologically unusable waste heat which is eventually lost and replenished by a continual input of solar energy.
4. Each species in an ecosystem occupies the niche for which it is best suited. In general, no two species occupy the same niche. This allows different species to coexist successfully and helps to maintain the stability of the ecosystem.

Changes in Ecosystems

1. Earth's ecosystems are interconnected by biological, chemical, and physical processes. Changes in one ecosystem may have local or global consequences.
2. Ecosystems are reasonably stable over long periods of time and tend to have cyclic fluctuations around a point of equilibrium. An ecosystem can react to stabilize conditions (e.g., pH, nutrient reduction, temperature, disease) and restore itself to its original state. Ecosystems undergo major changes as a result of such factors as climatic change, introduction of new species, and habitat destruction.

Interaction of Humans Within Ecosystems

1. All organisms are dependent upon the Earth's finite supply of material resources to sustain life. Human decisions concerning the use of resources alter the stability and the biodiversity of ecosystems and adversely affect the natural recycling processes which maintain the quality of air, water, and land.

Technology and Its Influence on the Environment

1. Continuous growth in human population and depletion of land suitable for farming require farmers to rely on modern agricultural technologies to meet demands for increased crop yields. The use of these technologies, however, involves economic and environmental trade-offs. These technologies have been created and the skills required for their creation. Discuss the changes in agricultural practice brought about by these new technologies (e.g., application of less fertilizer/pesticide, field management, crop rotation, and integrated pest management).
2. The development of massive transportation systems has enabled the movement of population and goods by air, land, and water and has led to major changes in demographics and land use.



The Leaf Pack Network is an initiative of Stroud™ Water Research Center. The Stroud Center seeks to advance knowledge and stewardship of freshwater systems through global research, education, and watershed restoration. Learn more at www.stroudcenter.org