



Kentucky Academic Standards Addressed By Zoo Program

Nocturnal Adventure – Wolf Woods

Program description:

During the Wolf Woods Overnight students will prowl the Zoo for predators, explore the intricate food webs that support these animals and learn what role humans have played in the lives of predators over the centuries. This Overnight examines the complex relationships within and between ecosystem trophic levels, as well as the vital roles predators play. This overnight also investigates the human impact on these interactions over the centuries

Kentucky *Core Content for Science Assessment* standards addressed by this program:

END OF PRIMARY – HIGH SCHOOL

Subdomain: Biological Science

Organizer: Unity and Diversity

Standards:

End of Primary

SC-EP-3.4.1.

Students will explain the basic needs of organisms.

Organisms have basic needs. For example, animals need air, water and food; plants need air, water, nutrients and light. Organisms can survive only in environments in which their needs can be met.

SC-EP-3.4.3.

Students will describe the basic structures and related functions of plants and animals that contribute to growth, reproduction and survival.

Each plant or animal has observable structures that serve different functions in growth, survival and reproduction. For example, humans have distinct body structures for walking, holding, seeing and talking. These observable structures should be explored to sort, classify, compare and describe organisms.

Fourth Grade

SC-04-3.4.1.

Students will:

- Compare the different structures and functions of plants and animals that contribute to the growth, survival and reproduction of the organisms;
- Make inferences about the relationship between structure and function in organisms.

Each plant or animal has structures that serve different functions in growth, survival and reproduction. For example, humans have distinct body structures for walking, holding, seeing and talking. Evidence about the relationship between structure and function should be used to make inferences and draw conclusions.

Fifth Grade
SC-05-3.4.1

Students will describe and compare living systems to understand the complementary nature of structure and function.

Observations and comparisons of living systems at all levels of organization illustrate the complementary nature of structure and function. Important levels of organization for structure and function include cells, tissue, organs, organ systems, organisms (e.g., bacteria, protists, fungi, plants, animals), and ecosystems. Examining the relationship between structure and function provides a basis for comparisons and classification schemes.

Organizer: Biological Change

Standards:

Fifth Grade
SC-05-3.5.2.

Students will understand that all organisms must be able to obtain and use resources, grow, reproduce, and maintain stable internal conditions while living in a constantly changing external environment.

High School
SC-HS-3.5.1

Students will:

- Predict the impact on species of changes to 1) the potential for a species to increase its numbers, (2) the genetic variability of offspring due to mutation and recombination of genes, (3) a finite supply of the resources required for life, or (4) natural selection;
- Propose solutions to real-world problems of endangered and extinct species.

Species change over time. Biological change over time is the consequence of the interactions of (1) the potential for a species to increase its numbers, (2) the genetic variability of offspring due to mutation and recombination of genes, (3) a finite supply of the resources required for life and (4) natural selection. The consequences of change over time provide a scientific explanation for the fossil record of ancient life forms and for the striking molecular similarities observed among the diverse species of living organisms, whereas others can change cells and organisms. Only mutations in germ cells have the potential to create the variation that changes an organism's future offspring.

SC-HS-3.5.2

Students will:

- Predict the success of patterns of adaptive behaviors based on evidence/data;
- Justify explanations of organism survival based on scientific understandings of behavior.

The broad patterns of behavior exhibited by organisms have changed over time through natural selection to ensure reproductive success. Organisms often live in unpredictable environments, so their behavioral responses must be flexible enough to deal with uncertainty and change. Behaviors often have an adaptive logic.

Subdomain: Unifying Concepts

Organizer: Energy Transformations

Standards:

End of Primary

SC-EP-4.6.1

Students will describe basic relationships of plants and animals in an ecosystem (food chains).

Plants make their own food. All animals depend on plants. Some animals eat plants for food. Other animals eat animals that eat the plants. Basic relationships and connections between organisms in food chains can be used to discover patterns within ecosystems.

Fourth Grade

SC-04-4.6.1

Students will analyze patterns and make generalizations about the basic relationships of plants and animals in an ecosystem (food chain).

Plants make their own food. All animals depend on plants. Some animals eat plants for food. Other animals eat animals that eat the plants. Basic relationships and connections between organisms in food chains, including the flow of energy, can be used to discover patterns within ecosystems.

Seventh Grade

SC-07-4.6.4

Students will describe or represent the flow of energy in ecosystems, using data to draw conclusions about the role of organisms in an ecosystem.

For most ecosystems, the major source of energy is sunlight. Energy entering ecosystems as sunlight is transferred by producers into chemical energy through photosynthesis. That energy then passes from organisms in food webs.

Eighth Grade

SC-08-4.6.5

Students will:

- Describe the relationships between organisms and energy flow in ecosystems (food chains and energy pyramids);
- Explain the effects of change to any component of the ecosystem.

Energy flows through ecosystems in one direction from photosynthetic organisms to herbivores to carnivores and decomposers.

Organizer: Interdependence

Standards:

End of Primary

SC-EP-4.7.1.

Students will describe the cause and effect relationships existing between organisms and their environments.

The world has many different environments. Organisms require an environment in which their needs can be met. When the environment changes some plants and animals survive and reproduce and others die or move to new locations.

Fourth Grade

SC-04-4.7.1

Students will make predictions and/or inferences based on patterns of evidence related to the survival and reproductive success of organisms in particular environments.

The world has many different environments. Distinct environments support the lives of different types of organisms. When the environment changes some plants and animals survive and reproduce and other die or

move to new locations. Examples of environmental changes resulting in either increase or decrease in numbers of a particular organism should be explored in order to discover patterns and resulting cause and effect relationships between organisms and their environments(e.g., structures and behaviors that make an organism suited to a particular environment). Connections and conclusions should be made based on the data.

SC-04-4.7.2.

Students will:

- Describe human interactions in the environment where they live;
- Classify the interactions as beneficial or harmful to the environment using data/evidence to support conclusions.

All organisms, including humans, cause changes in the environment where they live. Some of these changes are detrimental to the organism or to other organisms; other changes are beneficial (e.g., dams benefit some aquatic organisms but are detrimental to others). By evaluation the consequences of change using cause and effect relationships, solutions to real life situations/dilemmas can be proposed.

Fifth Grade

SC-05-4.7.1

Students will:

- Describe and categorize populations of organisms according to the function they serve in an ecosystem (e.g., producers, consumers, decomposers);
- Draw conclusions about the effects of changes to populations in an ecosystem.

Populations of organisms can be categorized by the function they serve in an ecosystem. Plants and some microorganisms are producers because they make their own food. All animals, including humans, are consumers, and obtain their food by eating other organisms. Decomposers, primarily bacteria and fungi, are consumers that use waste materials and dead organisms for food. Food webs identify the relationships among producers, consumers and decomposers in an ecosystem. Using data gained from observing interacting components within an ecosystem, the effects of changes can be predicted.

SC-05-4.7.2.

Students will understand that a population consists of all individuals of a species that occur together at a given place and time. All populations living together and the physical factors with which they interact compose an ecosystem.

Eighth Grade

SC-08-4.7.1

Students will describe the interrelationships and interdependencies within an ecosystem and predict the effects of change on one or more components within an ecosystem.

Organisms both cooperate and compete in ecosystems. Often changes in one component of an ecosystem will have effects on the entire system that are difficult to predict. The interrelationships and interdependencies of these organisms may generate ecosystems that are stable for hundreds or thousands of years.

High School

SC-HS-4.7.1

Students will:

- Analyze relationships and interactions among organisms in ecosystems;
- Predict the effects on other organisms of changes to one or more components of the ecosystem.

Organisms both cooperate and compete in ecosystems. Often changes in one component of an ecosystem will have effects on the entire system that are difficult to predict. The interrelationships and interdependencies of these organisms may generate ecosystems that are stable for hundreds or thousands of years.

SC-HS-4.7.2

Students will:

- Evaluate proposed solutions from multiple perspectives to environmental problems caused by human interaction;
- Justify positions using evidence/data.

Human beings live within the world's ecosystems. Human activities can deliberately or inadvertently alter the dynamics in ecosystems. These activities can threaten current and future global stability and, if not addressed, ecosystems can be irreversibly affected.

SC-HS-4.7.5

Students will:

- Predict the consequences of changes in resources to a population;
- Select or defend solutions to real-world problems of population control.

Living organisms have the capacity to produce populations of infinite size. However, behaviors, environments and resources influence the size of populations. Models (e.g., mathematical, physical, conceptual) can be used to make predictions about changes in the size or rate of growth of a population.