



Kentucky Academic Standards Addressed By Zoo Program

Nocturnal Adventure – Sleep With the Manatees

Program description:

Students will explore biodiversity, where it can be found and how we play a significant role in protecting it. Students will learn about Eco-regions, specifically the Florida Everglades, and how relationships within make them so significant. Students will also discover the Florida manatee, why it is endangered, what they can do to help and about the human impact on biodiversity.

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.

Sixth Grade

SC-06-3.4.2

Students will make inferences about the factors influencing behavior based on data/evidence of various organism's behaviors.

Behavior is one kind of response an organism may make to an internal or environmental stimulus. Observations of organisms, data collection/analysis, support generalizations/conclusions that a behavioral response is a set of actions determined in part by heredity and in part from experience. A behavioral response requires coordination and communication at many levels including cells, organ systems and organisms.

Seventh Grade

SC-07-3.4.1

Students will:

- Describe the role of genes/chromosomes in passing of information from one generation to another (heredity);
- Compare inherited and learned traits.

Every organism requires a set of instructions for specifying its traits. This information is contained in genes located in the chromosomes of each cell that can be illustrated through the use of models. Heredity is the passage of these instructions from one generation to another and should be distinguished from learned traits.

Organizer: Biological Change

Standards:

Fifth Grade

SC-05-3.5.1

Students will describe cause and effect relationships between enhanced survival/reproductive success and particular biological adaptations (e.g., changes in structures, behaviors, and/or physiology) to generalize about the diversity of populations of organisms.

Biological change over time accounts for the diversity of populations developed through gradual processes over many generations. Examining cause and effect relationships between enhanced survival/reproductive success and biological adaptations (e.g., changes in structures, behaviors, and/or physiology), based on evidence gathered, creates the basis for explaining diversity.

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.

Sixth Grade

SC-06-3.5.1.

Students will explain that biological change over time accounts for the diversity of species developed through gradual processes over many generations.

Biological adaptations include changes in structures, behaviors, or physiology that enhance survival and reproductive success in a particular environment.

Eighth Grade

SC-08-3.5.1

Students will draw conclusions and make inferences about the consequences of change over time that can account for the similarities among diverse species.

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.

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.

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-05-4.7.2.

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 complete 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 no 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.