CINCINNATI ZOO & BOTANICAL GARDEN

Kentucky Academic Standards Addressed By Zoo Program

GUIDED TOURS — INSECT (Early Primary-12th Grade)

Program description:
Learn about one of the most important groups of animals on the planet in our award-winning Insectarium. A live insect demonstration is included. A perfect cold weather tour.

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

EARLY PRIMARY – HIGH SCHOOL

Subdomain: Biological Science
Organizer: Unity and Diversity
Standards:

Early 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-3.4.2	Students will understand that things in the environment are classified as living, nonliving and once living. Living things differ from nonliving things. Organisms are classified into groups by using various characteristics (e.g., body coverings, body structures).
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.
SC-EP-3.4.4	Students will describe a variety of plant and animal life cycles to understand patterns of the growth, development, reproduction and death of an organism. Plants and animals have life cycles that include the beginning of life, growth and development, reproduction and death. The details of a life cycle are different for different organisms. Observations of different life cycles should be made in order to identify patterns and recognize similarities and difference.

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 relationships between structure and function should be used to make inferences and draw conclusions.

SC-04-3.4.2 Students will understand that things in the environment are classified as living, nonliving and once living. Living things differ from nonliving things. Organisms are classified into groups by using various characteristics (e.g., body coverings, body structures).

SC-04-3.4.3 Students will compare a variety of life cycles of plants and animals in order to classify and make inferences about an organism.

Plants and animals have life cycles that include the beginning of life, growth and development, reproduction and death. The details of a life cycle are different for different organisms. Models of organisms' life cycles should be used to classify and make inferences about an organism.

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, tissues, 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.

Seventh Grade

SC-07-3.4.2 Students will describe and compare sexual and asexual reproduction.

Reproduction is a characteristic of all living systems and is essential to the continuation of every species as evidenced through observable patterns. A distinction should be made between organisms that reproduce asexually and those that reproduce sexually. In species that reproduce sexually including humans and plants, male and female sex cells carrying genetic information unite to begin to development of a new individual.

Eighth Grade

SC-08-3.4.4 Students will describe and explain patterns found within groups of organisms in order to make biological classifications of those organisms.

Observations and patterns found within groups of organisms allow for biological classifications based on how organisms are related.

High School

SC-HS-3.4.7 Students will: -Classify organisms into groups based on similarities;
-Infer relationships based on internal and external structures and chemical processes.

Biological classifications are based on how organisms are related. Organisms are classified into a hierarchy of groups and subgroups based on similarities that reflect their relationships. Species is the most fundamental unit of classification. Different species are classified by the comparison and analysis or their internal and external structures and the similarity of their chemical processes.

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.

Subdomain: Unifying Concepts

Organizer: Energy Transformations

Standards:

Early 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 the eat 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 the eat 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 directions from photosynthetic organisms to herbivores to carnivores and decomposers.

Organizer: Interdependence

Standards:

Early 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 others die or move to new locations. Examples of environmental changes resulting in either increase of decrease in numbers or 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.

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 bacterial and fungi, are consumers that use waste materials and dead organisms for food. Food webs identify the relationships among producers, consumer and decomposers in an ecosystem. Using data gained

from observing interacting components within an ecosystem, the effects of changes can be predicted.

Sixth Grade

SC-06-4.7.1 Students will describe the consequences of change in one or more abiotic factors on a population within an ecosystem.

The number of organisms an ecosystem can support depends on the resources available and abiotic factors (e.g., quantity of light and water, range of temperatures, soil composition).

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.