



Indiana Academic Standards Addressed By Zoo Program

Nocturnal Adventures – 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

Indiana Science Standards addressed by this program:

GRADES K-6th

Standard 1: The Nature of Science and Technology

The Scientific Enterprise

1st Grade

1.1.3

Recognize that and demonstrate how people can learn much about plants and animals by observing them closely over a period of time. Recognize also that care must be taken to know the needs of living things and how to provide for them.

Technology and Science

5th Grade

5.1.6

Explain how the solution to one problem, such as the use of pesticides in agriculture or the use of dumps for waste disposal, may create other problems.

Standard 3: The Physical Setting

Earth and the Processes That Shape It

2nd Grade

2.3.4

Investigate by observing and then describe how animals and plants sometimes cause changes in their surrounding.

6th Grade

6.3.16

Explain that human activities, such as reducing the amount of forest cover, increasing the amount and variety of chemicals released into the atmosphere, and farming intensively, have changed the capacity of the environment to support some life forms.

Standard 4: The Living Environment

Diversity of Life

1st Grade

1.4.2

Observe and describe that there can be differences, such as size or markings, among the individuals within one kind of plant or animal group.

2nd Grade

2.4.1

Observe and identify different external features of plants and animals and describe how these features help them live in different environments.

3rd Grade

- 3.4.1 Demonstrate that a great variety of living things can be sorted into groups in many ways using various features, such as how they look, where they live, and how they act, to decide which things belong to which group.
- 3.4.2 Explain that features used for grouping depend on the purpose of the grouping.

6th Grade

- 6.4.1 Explain that one of the most general distinctions among organisms is between green plants, which use sunlight to make their own food, and animals, which consume energy-rich foods.
- 6.4.3 Describe some of the great variety of body plans and internal structures animals and plants have that contribute to their being able to make or find food and reproduce.

7th Grade

- 7.4.2 Describe that all organisms, including the human species, are part of and depend on two main interconnected global food webs, the ocean food web and the land food web.

Interdependence of Life

1st Grade

- 1.4.3 Observe and explain that animals eat plants or other animals for food.

- 1.4.4 Explain that most living things need water, food, and air.

2nd Grade

- 2.4.2 Observe that and describe how animals may use plants, or even other animals, for shelter and nesting.
- 2.4.3 Observe and explain that plants and animals both need to take in water, animals need to take in food and plants need light.
- 2.4.4 Recognize and explain that living things are found almost everywhere in the world and that there are somewhat different kinds in different places.

Interdependence of Life and Evolution

3rd Grade

- 3.4.4 Describe that almost all kinds of animals' food can be traced back to plants.

4th Grade

- 4.4.2 Investigate, observe, and describe that insects and various other organisms depend on dead plant and animal material for food.
- 4.4.3 Observe and describe that organisms interact with one another in various ways, such as providing food, pollination, and seed dispersal.
- 4.4.4 Observe and describe that some source of energy is needed for all organisms to stay alive and grow.
- 4.4.6 Explain how in all environments, organisms are growing, dying, and decaying, and new organisms are being produced by the old ones.

5th Grade

- 5.4.4 Explain that in any particular environment, some kinds of plants and animals survive well, some do not survive as well, and some cannot survive at all.

5.4.5 Explain how changes in an organism's habitat are sometimes beneficial and sometimes harmful.

5.4.7 Explain that living things, such as plants and animals, differ in their characteristics, and that sometimes these differences can give members of these groups (plants and animals) an advantage in surviving and reproducing.

6th Grade

6.4.8 Explain that in all environments, such as freshwater, marine, forest, desert, grassland, mountain, and others, organisms with similar needs may compete with one another for resources, including food, space, water, air, and shelter. Note that in any environment, the growth and survival of organisms depend on the physical conditions.

6.4.9 Recognize and explain that two types of organisms may interact in a competitive or cooperative relationship, such as producer/consumer, predator/prey, or parasite/host.

6.4.10 Describe how life on Earth depends on energy from the sun.

7th Grade

7.4.6 Explain how food provides the fuel and the building material for all organisms.

7.4.7 Describe how plants use energy from light to make sugars from carbon dioxide and water to produce food that can be used immediately or stored for later use.

7.4.8 Describe how organisms that eat plants break down the plant structures to produce the materials and energy that they need to survive, and in turn, how they are consumed by other organisms.

7.4.9 Understand and explain that as any population of organisms grows, it is held in check by one or more environmental factors. These factors could result in depletion of food or nesting sites and/or increase loss to increased numbers of predators or parasites. Give examples of some consequences of this.

8th Grade

8.4.4 Describe how matter is transferred from one organism to another repeatedly and between organisms and their physical environment.

8.4.5 Explain that energy can be transferred from one form to another in living things.

8.4.8 Describe how environmental conditions affect the survival of individual organisms and how entire species may prosper in spite of the poor survivability or bad fortune of individuals.

BIOLOGY I

Standard: Principles of Biology.

Ecology

B.1.37 Explain that the amount of life any environment can support is limited by the available energy, water, oxygen, and minerals, and by the ability of ecosystems to recycle the residue of dead organic materials. Recognize, therefore, that human activities and technology can change the flow and reduce the fertility of the land.

- B.1.39 Describe how ecosystems can be reasonably stable over hundreds or thousands of years. Understand that if a disaster such as a flood or fire occurs, the damaged ecosystem is likely to recover in stages that eventually result in a system similar to the original one.
- B.1.41 Recognize that and describe how human beings are part of Earth's ecosystems. Note that human activities can, deliberately or inadvertently, alter the equilibrium in ecosystems.
- B.1.46 Recognize and describe that a great diversity of species increases the chance that at least some living things will survive in the face of large changes in the environment.
- B.1.47 Explain, with examples, that ecology studies the varieties and interactions of living things across space while evolution studies the varieties and interactions of living things across time.
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ENVIRONMENTAL SCIENCE, ADVANCED

Standard: Principles of Environmental Science

Environmental Systems

- Env.1.4 Understand and explain that human beings are part of Earth's ecosystems and give examples of how human activities can, deliberately or inadvertently, alter ecosystems.

Flow of Matter and Energy

- Env.1.14 Recognize and explain that the amount of life any environment can support is limited by the available energy, water, oxygen, and minerals, and by the ability of ecosystems to recycle organic materials from the remains of dead organisms.

Populations

- Env.1.20 Demonstrate how resources, such as food supply, influence populations.
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ADVANCED LIFE SCIENCE: ANIMALS (L) STANDARDS

Standard: Animal Genetics and the Environment

Evolution

- AS.4.14 Compare and contrast adaptations of animals for survival in different environmental conditions.

Ecology

- AS.4.20 Explain the role of resources in every ecosystem. Define trophic level. Explain the concept of energy flow: primary producers, primary consumers, secondary consumers, tertiary consumers, and decomposers.
- AS.4.21 Describe the impact humans have on the capacity of any system to support life. List the factors that limit the capacity of an ecosystem. Discuss the interactions that occur between birth rate, population growth, and carrying capacity of the ecosystem. Identify the demographic (birth, death and fecundity rates) components that are used to construct a life history curve. Explain how demographic components are used in animal husbandry.