



Ohio 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.

Ohio Science Standards addressed by this program, organized by grade band and then standard:

GRADES K-2

Standard: Earth and Space Sciences

Benchmark B: Explain that living things cause changes on Earth.

Indicators:

Kindergarten

2. Explore that animals and plants cause changes to their surroundings.

Grade 1

3. Explain that all organisms cause changes in the environment where they live; the changes can be very noticeable or slightly noticeable, fast or slow (e.g., spread of grass cover slowing soil erosion, tree roots slowly breaking sidewalks).

Standard: Life Sciences

Benchmark A: Discover that there are living things, non-living things and pretend things, and describe the basic needs of living things (organisms).

Indicators:

Grade 1

1. Explore that organisms, including people, have basic needs which include air, water, food, living space and shelter.
4. Investigate that animals eat plants and/or other animals for food and may also use plants or other animals for shelter and nesting.

Grade 2

1. Explain that animals, including people, need air, water, food, living space and shelter; plants need air, water and nutrients (e.g., minerals), living space and light to survive.
5. Explain that food is a basic need of plants and animals (e.g., plants need sunlight to make food and to grow, animals eat plants and/or other animals for food, food chain) and is important because it is a source of energy (e.g., energy used to play, ride bicycles, read, etc.).

Benchmark B: Explain how organisms function and interact with their physical environment.

Indicators:

Kindergarten

6. Investigate the habitats of many different kinds of local plants and animals and some of the ways in which animals depend on plants and each other in our community.

Grade 1

3. Explore that humans and other animals have body parts that help to seek, find and take in food when they are hungry (e.g., sharp teeth, flat teeth, good nose and sharp vision).

Grade 2

2. Identify that there are many distinct environments that support different kinds of organisms.

3. Explain why organisms can survive only in environments that meet their needs (e.g., organisms that once lived on Earth have disappeared for different reasons such as natural forces or human-caused effects).

6. Investigate the different structures of plants and animals that help them live in different environments (e.g., lungs, gills, leaves and roots).

Standard: Scientific Ways of Knowing

Benchmark B: Recognize the importance of respect for all living things.

Indicators:

Kindergarten

3. Interact with living things and the environment in ways that promote respect.

Grade 2

3. Describe ways in which using the solution to a problem might affect other people and the environment.

Benchmark C: Recognize that diverse groups of people contribute to our understanding of the natural world.

Indicator:

Kindergarten

4. Demonstrate ways science is practiced by people everyday (children and adults).

GRADES 3-5

Standard: Life Sciences

Benchmark A: Differentiate between the life cycles of different plants and animals.

Indicator:

Grade 4

5. Describe how organisms interact with one another in various ways (e.g., many plants depend on animals for carrying pollen or dispersing seeds)

Benchmark B: Analyze plant and animal structures and functions needed for survival and describe the flow of energy through a system that all organisms use to survive.

Indicators:

Grade 3

2. Relate animal structures to their specific survival functions (e.g., obtaining food, escaping or hiding from enemies).

Grade 5

1. Describe the role of producers in the transfer of energy entering ecosystems as sunlight to chemical energy through photosynthesis.

2. Explain how almost all kinds of animals' food can be traced back to plants.

3. Trace the organization of simple food chains and food webs (e.g., producers, herbivores, carnivores, omnivores and decomposers).

Benchmark C: Compare changes in an organism's ecosystem/habitat that affect its survival.

Indicators:

Grade 3

6. Describe how changes in an organism's habitat are sometimes beneficial and sometimes harmful.

Grade 5

4. Summarize that organisms can survive only in ecosystems in which their needs can be met (e.g., food, water, shelter, air, carrying capacity and waste disposal). The world has different ecosystems and distinct ecosystems support the lives of different types of organisms.

5. Support how an organism's patterns of behavior are related to the nature of that organism's ecosystem, including the kinds and numbers of other organisms present, the availability of food and resources, and the changing physical characteristics of the ecosystem.

6. Analyze how all organisms, including humans, cause changes in their ecosystems and how these changes can be beneficial, neutral or detrimental (e.g., beaver ponds, earthworm burrows, grasshoppers eating plants, people planting and cutting trees and people introducing a new species).

Standard: Science and Technology

Benchmark A: Describe how technology affects human life.

Indicator:

Grade 5

1. Investigate positive and negative impacts of human activity and technology on the environment.

Benchmark B: Describe and illustrate the design process.

Indicator:

Grade 5

3. Explain how the solution to one problem may create other problems.

GRADES 6-8

Standard: Life Sciences

Benchmark B: Describe the characteristics of an organism in terms of a combination of inherited traits and recognize reproduction as a characteristic of living organisms essential to the continuation of the species.

Indicators:

Grade 7

8. Investigate the great diversity among organisms.

Grade 8

3. Explain how variations in structure, behavior or physiology allow some organisms to enhance their reproductive success and survival in a particular environment.

Benchmark C: Explain how energy entering the ecosystems as sunlight supports the life of organisms through photosynthesis and the transfer of energy through the interactions of organisms and the environment.

Indicators:

Grade 6

8. Describe how organisms may interact with one another.

Grade 7

2. Investigate how organisms or populations may interact with one another through symbiotic relationships and how some species have become so adapted to each other that neither could survive without the other (e.g., predator-prey, parasitism, mutualism and commensalism).
3. Explain how the number of organisms an ecosystem can support depends on adequate biotic (living) resources (e.g., plants, animals) and abiotic (non-living) resources (e.g., light, water and soil).

Benchmark D: Explain how extinction of a species occurs when the environment changes and its adaptive characteristics are insufficient to allow survival (as seen in evidence of the fossil record).

Indicators:

Grade 7

4. Investigate how overpopulation impacts an ecosystem.
5. Explain that some environmental changes occur slowly while others occur rapidly (e.g., forest and pond succession, fires and decomposition.)

Standard: Science and Technology

Benchmark A: Give examples of how technological advances, influenced by scientific knowledge, affect the quality of life.

Indicators:

Grade 6

1. Explain how technology influences the quality of life.
2. Explain how decisions about the use of products and systems can result in desirable or undesirable consequences (e.g., social and environmental).

GRADES 9-10

Standard: Earth and Space Sciences

Benchmark D: Describe the finite nature of Earth's resources and those human activities that can conserve or deplete Earth's resources.

Indicator:

Grade 10

5. Explain how the acquisition and use of resources, urban growth and waste disposal can accelerate natural change and impact the quality of life.

Benchmark F: Summarize the historical development of scientific theories and ideas, and describe emerging issues in the study of Earth and space sciences.

Indicator:

Grade 10

7. Describe advances and issues in Earth and space science that have important long-lasting effects on science and society (e.g., geologic time scales, global warming, depletion of resources and exponential population growth).

Standard: Life Sciences

Benchmark D: Explain the flow of energy and the cycling of matter through biological and ecological systems (cellular, organismal and ecological).

Indicators:

Grade 10

9. Describe how matter cycles and energy flows through different levels of organization in living systems and between living systems and the physical environment. Explain how some energy is

stored and much is dissipated into the environment as thermal energy (e.g., food webs and energy pyramids).

Benchmark E: Explain how evolutionary relationships contribute to an understanding of the unity and diversity of life.

Indicators:

Grade 10

12. Describe that biological classification represents how organisms are related with species being the most fundamental unit of the classification system. Relate how biologists arrange organisms into a hierarchy of groups and subgroups based on similarities and differences that reflect their evolutionary relationships.

13. Explain that the variation of organisms within a species increases the likelihood that at least some members of a species will survive under gradually changing environmental conditions.

Benchmark F: Explain the structure and function of ecosystems and relate how ecosystems change over time.

Indicators:

Grade 10

15. Explain how living things interact with biotic and abiotic components of the environment (e.g., predation, competition, natural disasters and weather).

16. Relate how distribution and abundance of organisms and populations in ecosystems are limited by the ability of the ecosystem to recycle materials and the availability of matter, space and energy.

17. Conclude that ecosystems tend to have cyclic fluctuations around a state of approximate equilibrium that can change when climate changes, when one or more new species appear as a result of immigration or when one or more species disappear.

Benchmark G: Describe how human activities can impact the status of natural systems.

Indicator:

Grade 10

18. Describe ways that human activities can deliberately or inadvertently alter the equilibrium in ecosystems. Explain how changes in technology/biotechnology can cause significant changes, either positive or negative, in environmental quality and carrying capacity.

GRADES 11-12

Standard: Earth and Space Science

Benchmark C: Explain that humans are an integral part of the Earth's system and the choices humans make today impact natural systems in the future.

Indicators:

Grade 11

11. Analyze how materials from human societies (e.g., radioactive waste and air pollution) affect both physical and chemical cycles of Earth.

12. Explain ways in which humans have had a major effect on other species (e.g., the influence of humans on other organisms occurs through land use, which decreases space available to other species and pollution, which changes the chemical composition of air, soil and water).

13. Explain how human behavior affects the basic processes of natural ecosystems and the quality of the atmosphere, hydrosphere and lithosphere.

14. Conclude that Earth has finite resources and explain that humans deplete some resources faster than they can be renewed.

Standard: Life Sciences

Benchmark B: Explain how humans are connected to and impact natural systems.

Indicators:

Grade 11

5. Investigate the impact on the structure and stability of ecosystems due to changes in their biotic and abiotic components as a result of human activity.

Benchmark E: Explain the interconnectedness of the components of a natural system.

Indicators:

Grade 11

7. Show how populations can increase through linear or exponential growth with corresponding effects on resource use and environmental pollution.

8. Recognize that populations can reach or temporarily exceed the carrying capacity of a given environment. Show that the limitation is not just the availability of space but the number of organisms in relation to resources and the capacity of earth systems to support life.

Grade 12

9. Explain why and how living systems require a continuous input of energy to maintain their chemical and physical organization. Explain that with death and the cessation of energy input, living systems rapidly disintegrate toward more disorganized states.

Benchmark F: Explain how human choices today will affect the quality and quantity of life on earth.

Indicators:

Grade 11

9. Give examples of how human activity can accelerate rates of natural change and can have unforeseen consequences.

11. Investigate issues of environmental quality at local, regional, national and global levels such as population growth, resource use, population distribution, over-consumption, the capacity of technology to solve problems, poverty, the role of economics, politics and different ways humans view the earth.