



Frisch's Outreach: Biodiversity (4-6) Extensions

At a glance

Students will learn about the importance of biodiversity through discussion, a narrative and an animal encounter.

Goal

Understand the concept of biodiversity; recognize threats to it and what we can do to protect it.

3. The students will be able to give an example of a keystone species.

Objectives

1. Students will be able to give an example of biodiversity in plants and animals, biodiversity of ecosystems and biodiversity on a genetic level.
2. The students will be able to identify threats to biodiversity.

Theme

The Earth's biodiversity has led to the evolution of many fascinating relationships between wildlife species

Sub-themes

1. Biodiversity is the variety of life.
2. All living things are interconnected in the web of life and depend on biodiversity

Academic standards

Ohio Science Academic Content Standards	<i>Life Sciences</i> <i>Grade 4:</i> B – 3 <i>Grade 5:</i> B – 1, 2, 3; C – 4,5,6 <i>Grade 6:</i> B – 6, 7, 8; C – 8 <i>Grade 7:</i> B – 8; C – 2, 3; D – 4, 5 <i>Grade 8:</i> B – 2,3; D – 4, 5 <i>Grade 10:</i> E – 13, 14; F – 15, 16, 17; G – 18, 19; H – 21; I – 24 <i>Grade 11:</i> B – 4, 5; E – 6, 7, 8; F – 9, 11 <i>Grade 12:</i> B – 10; E – 7, 8
Kentucky Core Content—Science	<i>Life Sciences</i> <i>Elementary:</i> P-4 SC-E-3.3.1; SC-E-3.3.2; SC-E-3.3.3 <i>Middle:</i> 5-7

	SC-M-3.2.1; SC-M-3.4.1; SC-M-3.4.2; SC-M-3.5.1; SC-M-3.5.2; SC-M-3.5.4; <i>High School: 8-11</i> SC-H-3.4.1; SC-H-3.4.2; SC-H-3.5.2; SC-H-3.5.3; SC-H-3.5.4; SC-H-3.5.5
Indiana Science Standards	<i>The Living Environment</i> <i>Grade 4</i> 4.4.2; 4.4.3 <i>Grade 5</i> 5.4.1; 5.4.4; 5.4.5; 5.4.7 <i>Grade 6</i> 6.4.8; 6.4.9; 6.4.10 <i>Grade 7</i> 7.4.2; 7.4.9; <i>Grade 8</i> 8.4.1; 8.4.2; 8.4.3; 8.4.7; 8.4.8 <i>Grades 9-12</i> B.1.21; B.1.23; B.1.29; B.1.32; B.1.34; B.1.38; B.1.39; B.1.41; B.1.43; B.1.46

Background

Biodiversity is “the variety of life on Earth, reflected in the variety of **ecosystems** and **species**, their processes and interactions, and the **genetic** variation within and among species.” Biodiversity is important to maintain livable conditions on Earth by providing ecological services such as pollination, decomposition, providing food, erosion and flood control, and oxygen production. Every day we are learning of new ways to benefit medically and economically from living things. There are many threats to biodiversity. These include loss of habitat, introduction of exotic species, genetic pollution, hybridization and climate change.

Biodiversity is a complicated and highly interconnected system. People are most familiar with **biodiversity of species**; this can include plants, animals and microorganisms. In a healthy ecosystem there are many different niches that are filled by a variety of plants and animals. If a species is eliminated from an ecosystem and there is no other plant or animal to fill in that niche, the whole ecosystem can be impacted.

The Biodiversity of ecosystems

reflected in rain forests, prairies, old fields, deserts, ponds, rivers, wetlands, coral reefs, estuaries, alpine zones are very important. There many animals that may require more than one type of habitat. Deer are a good example. They find cover in the woodlands and food in meadows. They also depend on ponds and streams for water. Owls may roost in trees and hut at night over fields. Typically areas where two different habitats meet such as a forest edge have a higher biodiversity. There, species from each habitat are mixing together in one area. On a more global scale, migratory birds depend on different habitats that can be thousands of miles apart. For example, the scarlet tanager winters in the montane evergreen forests of northwest South America and spends its summers in the mature deciduous forests of eastern North America. Another reason why biodiversity of ecosystems is so important is because two different habitats may benefit each other. A good example is the relationship between streams and wetlands. Wetlands are important to keep rivers and streams healthy. Wetlands filter out pollution and silt out of water. They also help with flood

control. Floodwaters can help replenish wetlands. Because of this, both habitats are healthier and the animals and plants that live there benefit, even though they may live in only one of the ecosystems.

Genetic diversity is equally important. Plants and animals can have as many as 400,000 genes. This allows for many different genetic variations. These variations allow for each species to adapt to the conditions of the ecosystem in which it lives. The Florida Panther is a subspecies of Puma. These cats were once the top predator in the Florida ecosystem. Before European settlers came to North America, Florida Panthers were found throughout the southeastern United States. They would come into contact and breed with puma populations in Texas to the west and the southern Appalachians to the north. Over time the Florida Panthers population became isolated from other Puma populations. Today there are only 30-50 of them left in the wild. Because of the small numbers and the Florida Panther's isolation from other populations of Puma in Texas and the southern Appalachians, inbreeding became common and genetic diversity was lost. As a result, the remaining individuals have been weakened. Inbreeding in animals can cause reduced fertility, increased genetic disorders, lower birth rate, higher infant mortality, slower growth rate, smaller adult size and loss of immune system function.

Biodiversity is a very complex yet important part of our planet. There are three types of biodiversity. They are biodiversity of species, biodiversity of habitats and genetic biodiversity. Without all three levels of, many species of plants and animals would not be able to survive.

Vocabulary

Biodiversity – The variety of life on earth. (Bio – Life; Diversity – Variety)
Biodiversity Hot spot – A region with a significant reservoir of biodiversity that is threatened with destruction.

Ecosystem – A natural unit consisting of all the plants animals and microorganisms in an area functioning together with all of the physical factors of the environment

Food Web – A complex set of interconnected food chains by which energy and materials circulate within an ecosystem.

Gator Hole – Areas in wetlands or swamps that were enlarged by an alligator digging it out. These are able to keep water year round and attract many different types of wildlife during droughts.

Genetic Pollution – This is an undesirable gene flow into wild populations. The term is usually associated with the gene flow from a genetically engineered organism or genetically modified organism to a nongenetically engineered organism. However, conservation biologists and conservationists are using it to describe gene flow from a domestic, feral, non-native or invasive species to a wild indigenous population.

Habitat – A place where animals and plants live and can find all the things they need to survive.

Hybrid – The result of interbreeding between two animals or plants of different taxa.

Hybridization – hybridization is the process of combining different varieties

or species of organisms to create a hybrid.

Indicator Species – Any biological species that defines a trait or characteristic of the environment. For example, a species may delineate an ecoregion or indicate an environmental condition such as a disease outbreak, pollution, species competition or climate change. Indicator species can be among the most sensitive species in a region, and sometimes act as an early warning to monitoring biologists.

Invasive Species – A non-indigenous species that heavily colonizes and adversely affect the habitats they invade economically, environmentally or ecologically.

Keystone Species – A species that plays a critical roles in an ecosystem. They affect other organisms in the ecosystem and help to determine the types and numbers of other species in a community. Examples Jaguar (Predator); Beaver (engineer)

Over consumption – The use of resources that exceeds the ability of natural processes to replace them.

Extensions

Habitat Hike

Take a hike around the school or neighboring area and explore your habitat. Which habitat do you live in? What animals did you see? How did you decide which habitat is yours?

Go to a wildlife preserve and make a map of all the different habitats you see. How many did you find? Be sure to label the habitats. You can also make a map key including the different animals that live there. Look for signs of human activity. What impact did it have?

Meet a Tree

Find a tree at school, at home or at a local park. The students will be studying the tree. Have the kids study and observe the tree. Encourage them lay on the ground at the base of the trunk and look up and get to know the tree from a different perspective. Look and see what animals are in the tree? Does the tree produce anything that animals can eat? Is anything feeding on the leaves or bark? Are there any good places that could provide shelter to animals? Are there any nests? Are there any signs of animal activity? What would happen if the tree was cut down?

The students can do weekly observations and see what changes over time. They can write a report on what they observed.

Have them sketch or draw the tree. You can also have them write a story about the tree and what lives in it.

Resources

Activity guides:

Windows on the Wild, Biodiversity Basics, World Wildlife Fund; 1999
Acorn Naturalists

Project Wild, Western Regional Environmental Education Council Inc. 1992

Books:

Peterson Field Guide Series
Kricher, John C.

Field Guide to Eastern Forests,
Houghton Mifflin Company, 1998

Kricher, John C.
A Field Guide to California and Pacific Northwest Forests
Houghton Mifflin Company, 1998

Kricher, John C.
*A Field Guide to Rocky Mountain and
Southwest Forests*
Houghton Mifflin Company, 1999

Crushman, Ruth Carol; Jones, Stephen R.
The North American Prairie
Houghton Mifflin Company, 2004

websites:

ALA's Great Websites for Kids:
Animals

<http://www.ala.org/gwstemplate.cfm?section=greatwebsites&template=/cfapps/gws/displaysection.cfm&sec=1>

Awesome Library – Kids

<http://www.awesomelibrary.org/Classroom/Science/Animals/Animals.html>

Awesome Library – Teachers

<http://www.awesomelibrary.org/Classroom/Science/Animals/Animals.html>

Cincinnati Zoo & Botanical Garden

www.cincinnati-zoo.org