

BIODIVERSITY -

Taking Stock in the Commonwealth

PURPOSE

To increase awareness and appreciation for Kentucky's rich biodiversity.

KERA CONNECTIONS to Life Science

Core Content: Organisms and Their Environments

Academic Expectations: 2.2 Patterns, 2.4 Models & Scale, 2.6 Change Over Time

Process Skills: Communication, Gathering Data and Applying Technology

OBJECTIVES

Students should be able to:

1. explain the concept of biodiversity
2. compare and contrast Kentucky landscapes
3. state three values of biodiversity.

VOCABULARY

Teachers may wish to discuss the following terms:
biodiversity, economy, landscape, physiographic region and species.

aFIELD NOTEBOOK

Ideas for Teachers

- A.** Encourage students to list all the plants and animals that live in Kentucky. What percentage of the estimated number of species did they list? Classify the organisms into groups like trees, shrubs, flowers, mammals, birds, reptiles, etc. Focus on one familiar group such as mammals. Allow students more time to collaborate on a class list of mammals. Did they include humans and domestic animals? How close did they come to 75 Kentucky mammals? Compare discrepancies to the fact that even biologists have not identified all species of life on earth.
- B.** Read students a story about how Kentucky looked to early frontiersmen like John Filson, Tecumseh or Simon Kenton. Discuss how different Kentucky looks today. You may wish to assign small groups to research one aspect of community change such as industry, population, historic landmarks, transportation or food supplies. Research how geographical structures have changed (river dammed to create a reservoir, forest cut down for lumber, wetland drained). By interviewing older residents of the area such as grandparents, elderly neighbors or nursing home residents, students may realize the vast number of changes that can occur in one lifetime. Assign students to write a story about a time-traveler that describes Kentucky two hundred years into the future.



Program 1

ANSWERS TO aFIELD NOTES

1.
 A pie chart illustrating the distribution of biodiversity. The largest slice is labeled "62.5% insects". The next largest is "19.5% plants". Other slices include "7.5% other animals", "5% fungi", "2.5% microorganisms", and "3% vertebrates".
2. insects & relatives
3. fish, amphibians, reptiles, birds & mammals
4. sponges, corals, worms, mollusks & starfish
5. microorganisms. More than 5,000 species may live in one pinch of soil. Biologists have only identified those of economic or health value.
6. coastal plain, hills, knobs, plateau, coalfields, mountains
7. Jackson, Shawnee, Cumberland
8. pennyroyal, bluegrass
9. Answers will vary.
10. Landforms, crops, industry, population numbers, size, rock types, plants, animals, history and cultural values may be described.
11. Buy
12. Buy
13. Sell
14. Buy
15. Sell
16. \$54.4 billion. Multiply 368,250 bars by 400 troy ounces by \$369.32

Ingredient Diversity

Cookies

Mix in this order:

- 3 eggs
- 1 cup brown sugar
- 1 cup sugar
- 1 stick butter or oleo
- 2 teaspoons vanilla
- 1 ½ cups peanutbutter
- 4 ½ cups oatmeal
- 4 ounces chocolate chips
- 4 ounces M & Ms chocolate candies
- 2 teaspoons baking soda

Bake at 350 degrees for 8-9 minutes. Be careful not to over bake. (My aunt calls these monster cookies. I think it's because they're out-of-this-world!)

Making Connections

From where in the world do the cookie ingredients come? On how many different countries and species do these cookies depend? Why is variety called the "spice of life?"

Why do you think the Mississippi River is called the "Granddaddy" of all rivers?



Send individual or class responses to:
Kentucky Afield for Kids
#1 Game Farm Road
Frankfort, KY 40601

E-mail: llang@mail.state.ky.us

C. THE BUCK STOPS HERE - Become a paper investor in the stock market. Compare the payoffs from raw materials, like gold, to manufactured products. Complex environmental processes are usually worth more than the parts too. Economists estimate the value of the Earth's free services at \$33 trillion annually.

D. Explore answers to the question "Is biodiversity greater in human communities or natural communities?" Peterson's *Field Guide to Urban Wildlife* and Benyus's *Field Guide to Wildlife Habitats of the Eastern U.S.* are good references. Graph biodiversity in the schoolyard.

E. Writing assignments may include an original poem or a collection of quotes about biodiversity.

Tasks for Students

1. Create a collage of magazine photographs, pressed plants, or artwork representing biodiversity in the state, a physiographic region or your county.
2. Visit www.kfwis.state.ky.us on the Internet. Print a list of animal species found in your county from the Kentucky Fish and Wildlife Information Systems website. Good sources for wild and cultivated plant species are the Kentucky Nature Preserves Commission, 801 Schenkel Lane, Frankfort, KY 40601, and your county's Natural Resources Conservation District. Are any species unique to your locale?
3. Wildlife watching is a growing pastime. Create a life list of species that you've seen.

WILD THINGS FOR TEACHERS

Experience Kentucky's biodiversity firsthand at the Salato Wildlife Education Center. Located in Frankfort, the Salato Wildlife Education Center is open Tuesday through Saturday from 10:00 a.m. to 4:00 p.m. and Sunday 1:00 p.m. to 5:00 p.m. Special group rates and programs are available by calling 502/564-7863.

RECOMMENDED RESOURCES

- * Minch, Norm. "Biodiversity - Why Should We Care?" *Kentucky Afield - The Magazine*. Mar./Apr. 1992, pp. 2 - 5.
- * *WOW! A Biodiversity Primer*. Windows on the Wild. A program of the World Wildlife Fund, 1994. ISBN # 0-89164-142-4. For more information write: Environmental Education, WWF, 1250 24th Street, NW, Washington, D.C. 20037. A fun pretest for biodiversity is available on the <http://www.wwf.org> website.

ADDITIONAL ACTIVITIES

- * Project WILD activities "Wildlife Is Everywhere!" "Microtek Treasure Hunt" and "Rainfall and the Forest"
- * Project WILD Aquatic activities "Micro Odyssey" and "Are You Me?"
- * "Your WILD Backyard" *Kentucky Afield for Kids*, May 1997.

BIODIVERSITY -

Taking Stock in the Commonwealth



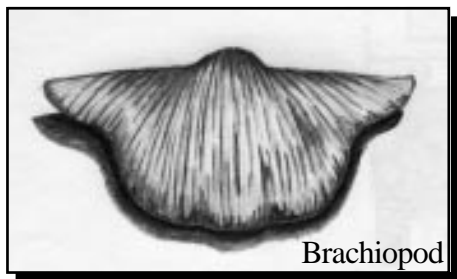
WHAT IS BIODIVERSITY?

“Bio” describes life while “diversity” means variety. **Biodiversity**, or biological diversity, refers to the wild, wonderful and sometimes wacky assortment of life forms on this planet. Biodiversity covers the different kinds of organisms, where they live and how they survive. Hickory trees, bacteria, the Shawnee Hills region, bald eagles, elk genes, dandelions, the Big Sandy River, monarch butterflies and photosynthesis are all parts of Kentucky’s biodiversity.

People are also part of biological diversity. Numbered at 3.7 million and growing, the human population dominates Kentucky’s countryside. We depend on biodiversity for food, water and shelter. In turn, our **economy**, religion and political views are influenced by the surrounding environment.

*The diversity of life
A swirling sea of genes, of species
Of varied landscapes across
the planet
Of rich human culture
Linking us all in ways
We are just beginning
to understand*

World Wildlife Fund



FIRST THIS, THEN THAT

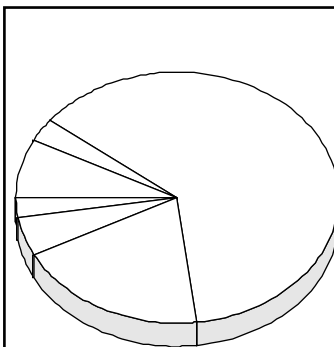
The level of biodiversity naturally changes over time. Fossils, found in ancient rock, show that brachiopods (clam-like sea animals) once lived in Kentucky. Besides offering a history lesson, these rock layers filter drinking water and add nutrients to the soil. Now Kentucky’s land and freshwater habitats, developed on top of these rocks, support 3,000 different kinds of plants and 760 **vertebrates** (animals with backbones). People cash in on the value of the rocks through mining, timber, farming and industry.

Evolution, or natural change, will continue to occur. What will Kentucky look like thousands of years into the future?

aFIELD NOTES

September 10, 1997

So far, biologists have identified 1.4 million different life forms on this planet. Biodiversity expert, E.O. Wilson, estimates the total number to be between 10 and 100 million species.



1. Complete the pie graph by determining what fraction of 1,400,000 species are represented in these groups:

Microorganisms	35,000
Fungi	70,000
Plants	273,000
Insects & Relatives	875,000
Vertebrates	42,000
Other Animals	105,000

2. Which group is the most diverse?

3. What types of organisms would be categorized as vertebrates?

4. Name three organisms that would be grouped with “Other Animals.”

5. What organisms are probably the least studied by biologists? Why?

6. Which regions are named after geologic landforms?

7. Which regions are named for people?

8. Which regions are named after plants?

9. In which region do you live?

10. How is life in your region different from others?

KENTUCKY'S PHYSIOGRAPHIC REGIONS

With forested mountains, grassy plains and underground streams, Kentucky's biodiversity is linked to the variety of landforms and habitats. Rocks, soils, water and terrain determine plant growth. In turn, animal distribution is connected to the vegetation. Human activities affect the landscape and its potential for life. Satellite imagery helps define six Kentucky **physiographic** regions.

Bluegrass

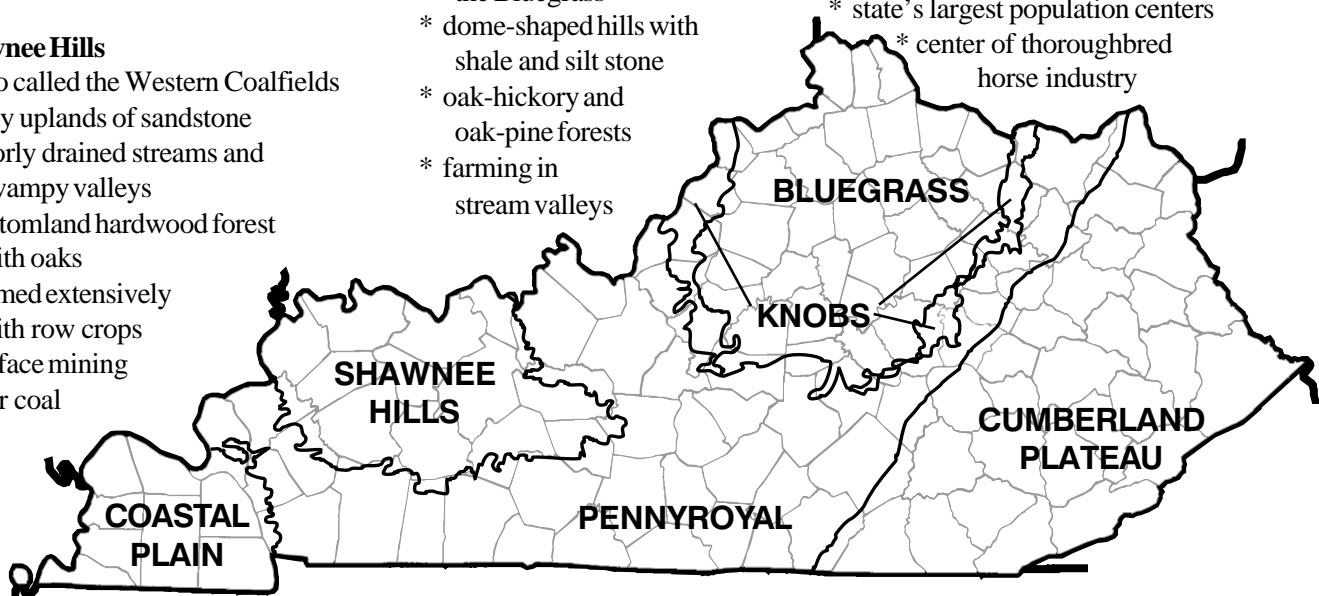
- * gently rolling land with rich soil
- * once covered with cane and savannah woodlands
- * small caves, sinking springs and salt licks
- * Kentucky River serves as a migratory route for game
- * state's largest population centers
- * center of thoroughbred horse industry

The Knobs

- * horse-shaped boundary to the Bluegrass
- * dome-shaped hills with shale and silt stone
- * oak-hickory and oak-pine forests
- * farming in stream valleys

Shawnee Hills

- * also called the Western Coalfields
- * hilly uplands of sandstone
- * poorly drained streams and swampy valleys
- * bottomland hardwood forest with oaks
- * farmed extensively with row crops
- * surface mining for coal



Coastal Plain

- * also called the Jackson Purchase
- * sand, gravel and silt deposited by an ancient sea
- * oxbow lakes and wetlands along the major rivers
- * oak-hickory forests
- * highly prized for row crop agriculture
- * altered by drainage and channelization

Pennyroyal

- * limestone and shale rocks
- * karst land of sinkholes, caves and disappearing streams
- * scattered oak-hickory forests
- * once home to barrens or prairies
- * cattle and pasture agriculture

Cumberland Plateau

- * includes Pine Mountain and Big Black Mountain (highest elevation 4,150 feet)
- * steep ridges and hollows
- * part of the Appalachian ecoregion
- * shales and sandstones
- * mixed forests
- * logging and coal mining



THE BUCK STOPS HERE -

Taking Stock in the Commonwealth

Businesses sell shares of **stock** to raise money. The money allows businesses to purchase materials, equipment and factories as well as to pay employees. The stock represents part-ownership of the business and a share of its future wealth. Investors make money from stock when they buy it at a low price and sell it at a higher one. The difference between the prices generates a **profit**. To some people, more money means a higher quality of life.

Biodiversity is also big business. Soil, air and water are transformed by plants and animals into food and a source of income for many people. As human population grows, the value of biodiversity will undoubtedly go up. Protecting biodiversity now, like taking stock, will result in a future pay off. More biodiversity also means a higher quality of life.

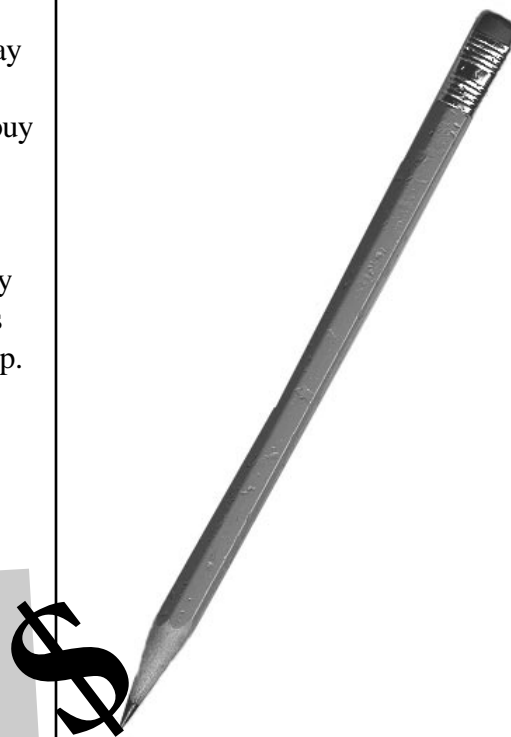
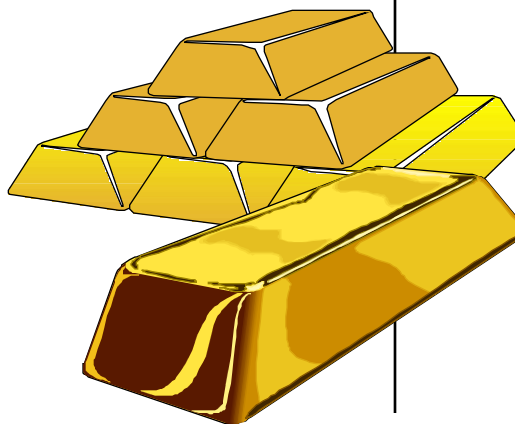
Should you buy or sell these stocks?

Stock	Average Price	Current Price	Buy or Sell?
11. Ashland Inc	\$33.50	\$30.03	_____
12. Brown-Forman A	\$32.55	\$29.75	_____
13. Lexmark Intl Cp	\$16.38	\$18.21	_____
14. McDonald's Cp	\$47.63	\$47.01	_____
15. Williamette Ind	\$45.54	\$66.00	_____

Use these clues to determine -

16. What's the value of gold in Fort Knox?

There are 368,250 gold bars in the vault.
Each bar weighs 400 troy ounces.
The current market value of gold
is \$369.32 per troy ounce.



The loss of biological diversity is second only to nuclear warfare in its threat to human and other life on this planet.

The U.S. Environmental Protection Agency



WHY SHOULD YOU CARE ABOUT BIODIVERSITY?

How many species did you eat for dinner last night? How many helped produce the clothes you are wearing? From house plants to pets to wooden furniture, how many species are found in your house? Your yard?

In addition to food, clothing and shelter, we need wildlife for medicines and industrial products. We enjoy the outdoors -- the recreation and re-creation that it offers. Fresh air, clean water, waste disposal, climate control, soil formation . . . the list goes on and on with free services provided by interactions between organisms and their environment. Biodiversity weaves the fabric of our existence.

MONEY MAKES THE WORLD-GO-ROUND

What would happen if humans valued living things like they did gold? What if a price tag were attached to each natural thing? How would it impact their decisions to drain a wetland or build a dam? Would money lost encourage people to protect biodiversity?

How can you help protect biodiversity? You can start by learning more about plants, animals and the habitats upon which they depend. Join us on a year-long journey as we celebrate biodiversity. Get involved. Tell your family and friends about biological diversity. Mail in your thoughts, opinions and questions about biodiversity to Kentucky Afield for Kids, #1 Game Farm Road, Frankfort, KY 40601. Together we can make a world of difference!



*In the end, we will
conserve only what we
love, we love only what
we understand, we will
understand only what
we are taught.*

Baba Dioum,
Senegalese conservationist