#3606
EXPLORING THE DIVERSITY OF LIFE

Grade Levels: 4-8
100 minutes
ENVIRONMENTAL MEDIA CORPORATION 1997

DESCRIPTION

Ten 10-minute programs explore temperate and tropical habitats and their abundant diversity of life. Tape 1: compares temperate and tropical forests, their habitats, the effects of rain on them, and shows how size can generate great diversity. Tape 2: uses butterflies to represent species diversity, compares how people relate to temperate and tropical environments, explores humans' impact on diversity, and investigates issues of threatened and endangered species.

ACADEMIC STANDARDS

Subject Area: Science

- Standard: Knows about the diversity and unity that characterize life
  - Benchmark: Knows different ways in which living things can be grouped (e.g., plants/animals; pets/nonpets; edible plants/nonedible plants) and purposes of different groupings
  - Benchmark: Knows that plants and animals progress through life cycles of birth, growth and development, reproduction, and death; the details of these life cycles are different for different organisms
- Standard: Understands basic earth processes
  - Benchmark: Knows that fossils provide evidence about the plants and animals that lived long ago and the nature of the environment at that time
  - Benchmark: Knows the composition and properties of soils (e.g., components of soil such as weathered rock, living organisms, products of plants and animals; properties of soil such as color, texture, capacity to retain water, ability to support plant growth)

BACKGROUND INFORMATION

The 10-program series, Exploring the Diversity of Life, establishes scientific and social frameworks for discussing the diversity of life appropriate for students grades 4-8. The series makes the concept of diversity accessible by comparing organisms and habitats found in temperate forests with those in tropical rain forests. Each program in the series focuses on species and ecosystem diversity to raise questions about why life is so diverse and why diversity is so valuable. The programs may be used singly or in combination.

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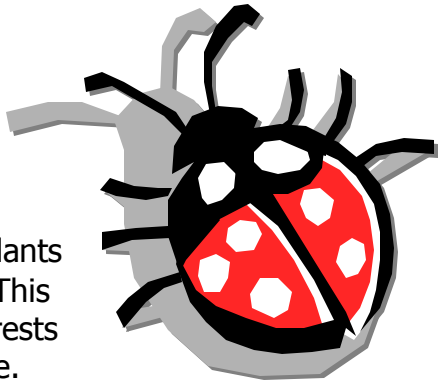

The 10 program titles are:

1. A World of Difference--Illustrates the underlying forces that have created this diversity by comparing habitats that produce more or less of it.
2. Go Climb a Tree--Examines trees and many of the plants and animals living in, on around, and under them. This first-hand view of trees in temperate and tropical forests illustrates their diversity and the diversity they create.
3. Life in Layers--Compares the layered habitats in temperate and tropical forests starting below the ground in a forest working up through the emergent trees above the canopy.
4. Rain and the Forest--Compares the effects of rain on the diversity of life in temperate and tropical forests.
5. Insect Diversity--Compares temperate and tropical forests to illustrate the forces that drive genetic, species and ecosystem diversity.
6. Butterfly Garden--Compares temperate and tropical in the context of a butterfly garden that you can make at home or in school.
7. Not What They Seem--Illustrates temperate and tropical examples of camouflage and their contribution to the diversity of life.
8. Forest School--Compares the ways people relate to their environments in North America and in a tropical rain forest.
9. Don't Be Part of the Problem--Examines the human impacts on the diversity of life both locally and globally.
10. Act With the Facts--Illustrates the kinds of information you need to gather to investigate issues involving the diversity of life.

PROGRAM 1 (A WORLD OF DIFFERENCE)

BEFORE SHOWING

Discussion Items and Questions

1. How many different kinds of native plants and animals can you name?
2. Why are there so many different kinds of plants in our area, and not just one kind?
3. Why do you think wet tropical places like Africa, or Indonesia, or South America have so many more different kinds of plants and animals than we have here?

AFTER SHOWING

Discussion Items and Questions

1. Discuss how species make habitat for other species.
2. Hypothesize the effects of species extinction.
3. List, either individually or a class, as many local plants and animals as they can from memory. Afterwards, take a short walk outside the school and record a list of

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school grounds species, especially those adapted to live on or with other species (e.g., a bagworm living on a cedar tree, a seed-eating bird, and others).

Applications and Activities

1. Describe a place with less diversity than your local environment, and explain the reasons for the difference.
2. Take sides to argue for and against preserving the diversity of life.
3. Describe actions that might be taken to preserve biodiversity.

PROGRAM 2 (GO CLIMB A TREE)

BEFORE SHOWING

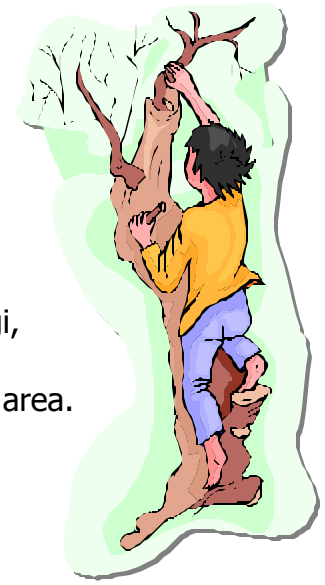
Discussion Items and Questions

1. What kinds of trees live in our area? How many can we list?
2. What are some differences between the different kinds of trees we named?
3. Has anyone here ever climbed up in a tree? What did you see up there?
4. Why do you think wet tropical places like Africa, or Indonesia, or South America have so many more different kinds of trees than we have here?

DURING SHOWING

Discussion Items and Questions

1. How do you know trees are alive?
2. What advantage do upward-pointing branches give trees living where ice can accumulate during freezing rain? (Answer: rain clinging to the bark drains down toward thicker, stronger places farther out from the trunk. More horizontal branches that do not drain in this way tend to break in ice storms.)
3. What advantage do flexible downward-swooping branches give trees that live where it snows heavily? (Answer: rather than break, they bend down until the snow slides off.)
4. In a place where it rains constantly, what is the advantage of rain forest tree leaves' shape? (Answer: the drip tip channels water off the leaf, avoiding excessive wetness that might smother the leaf or invite aquatic organisms to live on it.)
5. Why are leaves that stay on the tree all year often thick, leathery, or waxy? (Answer: the extra heft and covering extend their useful life by protecting them from insects, fungi, and bacteria.)
6. Guess some advantages of common tree leaf shapes in your area.



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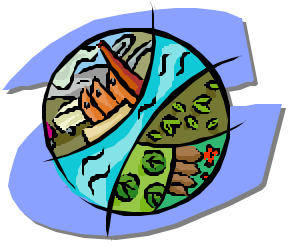
AFTER SHOWING

Discussion Items and Questions

1. Take a short walk on the school grounds and record a list of school grounds tree species, and some of the plants and animals that live in them (e.g., a bagworm living on a cedar tree).
2. Discuss how trees are habitat for other species, prompting students for examples of how creatures that live in trees make their living, either from "Go Climb a Tree" or elsewhere (e.g., woodpeckers, caterpillars, tree frogs).
3. Ask students to describe or draw animals that live on trees, list the visible adaptations to life in a tree, and give a hypothetical explanation of the adaptation (e.g., katydids that look like tree leaves).

PROGRAM 3 (LIFE IN LAYERS)



BEFORE SHOWING

Discussion Items and Questions

1. Can you name any native plants or animals that live each layer of a local forest? Make a rough diagram of forest layers that everyone can see, and as students contribute names, place the names in each layer.
2. In the spring, which layer of the forest becomes active first? Can you guess why?

DURING SHOWING

Discussion Items and Questions

1. Why are tree crowns flatter in the tropics, and more pointed in temperate zones? (Answer: the sun's rays are more vertical in the tropics, and more angled in temperate zones. A flat, thin crown catches more vertical rays; a triangular crown catches more angled rays.)
2. What are some conditions of life in each forest layer (temperate or tropical), and some adaptations to them? (Example: leaves are abundant in forest canopies; so are leaf-eating insects; and so are birds that eat leaf-eating insects. Birds miss leaf-eating insects adapted to look like leaves more often than they miss their more visible cousins.)
3. Why do some plants grow up in trees, and when they do, where do they get their food? (Answer: these plants get food from falling leaf matter, dust, or from the trunk itself.)
4. Why are understory trees so busy in the early spring? (Answer: it's when they get the most light.)
5. What are some adaptations to life on the ground in a forest? (Example: rodents' short legs and keen sense of smell are good for staying close to the ground and rooting among litter to sniff out food.)

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AFTER SHOWING

Applications and Activities

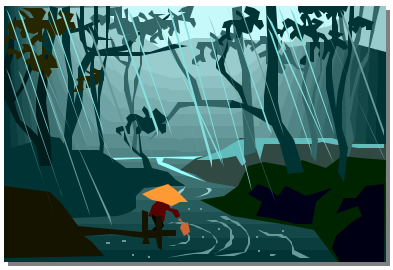
1. Visit a forested land. Describe characteristics of plants at each layer.
2. Draw imaginary plants and animals adapted to each layer of the forest, and explain the reasons for each of the features they have drawn.
3. List, either individually or as a class, as many local forest plants and animals as they can from memory. Afterwards, group these by forest layer.

PROGRAM 4 (RAIN AND THE FOREST)

BEFORE SHOWING

Discussion Items and Questions

1. If it rained more where you live, what plants and animals might live here that don't live here now, and which ones might disappear?
2. Describe some plant and animal adaptations to climatic conditions such as heat, cold, wet, and dry.



DURING SHOWING

Discussion Items and Questions

1. All creatures need water, and few can go more than a few weeks without it. However, some live in rocks, dirt, or bark that may dry out for months at a time. When it rains again, those creatures are still alive. Try to imagine some ways that creatures get through the dry spells.
2. Imagine creatures that never dry out. What problems might they have, and how might their bodies overcome these problems?
3. Far more leaves and sticks fall on the tropical rain forest floor, but very little of it builds up there. Where does it all go?

AFTER SHOWING

Applications and Activities

1. Design an imaginary rain forest plant, and an imaginary rain forest animal that could not live in a drier temperate place. Give the creature a name and draw it.
2. Take a short trip out into your schoolyard. Go to a place that dries out completely, such as a tree trunk, a sidewalk, or the wall of the school. Record what you see. Go to another place that stays wet most of the time, such as a pond, fountain, leaking hose, or drainage ditch, and again record what you see. Return to the classroom and discuss your findings.

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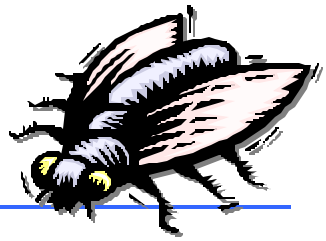
3. If your school has a forest nearby, go into it and observe the leaf litter both minutely with a magnifying glass, and at a distance. Observe, record your observations in writing, and draw what you see.



PROGRAM 5 (INSECT DIVERSITY)

BEFORE SHOWING

Discussion Items and Questions

1. Review the characteristics of insects (6 legs, 3 segments to the body, antennae, phases in the life cycle, and other features).
2. Hypothesize what would the world be like without insects.

DURING SHOWING

Discussion Items and Questions

1. Why do you think there are so many insects?
2. Why do you think there are so many different kinds of insects?

AFTER SHOWING

Applications and Activities

1. Visit a butterfly garden.
2. Take a walk in your schoolyard to examine various habitats and find the insects living in them. Bring a butterfly net to catch and release the insects, a bug box, a magnifying glass, and an insect field guide. Record findings, and discuss what you find.
3. After your trip to a butterfly garden or your schoolyard, compare the diversity of insects you find with the diversity of other animals you see in these habitats (e.g., birds or mammals).
4. Ask students to develop presentations on how specific features of a particular insect allow it to survive and reproduce in its habitat. Presentations should focus on common insects that can be found in urban and rural environments alike, such as cockroaches, ants, and houseflies.

PROGRAM 6 (BUTTERFLY GARDEN)

BEFORE SHOWING

Discussion Items and Questions

1. Why do you think there are so many kinds of butterflies?
2. Where have you seen butterflies?

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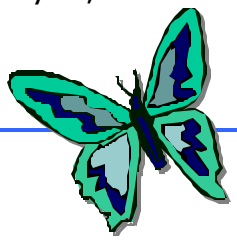
3. How many wings does a butterfly have? How many legs? What does its mouth look like? Use this opportunity to review butterfly characteristics (6 legs, 2 pairs of wings, thorax, abdomen, head, bulbed antennae, phases in the life cycle, and other features).



AFTER SHOWING

Discussion Items and Questions

1. Why do you think it's important to use native plants?
2. Scientists think butterfly eyes see the widest range of color of any animal on earth. Why might they need to see such a color range? (Possibly because both their food sources and their mating habits require them to distinguish among colors.)

Applications and Activities

1. Visit a butterfly garden.
2. Bring a chrysalis into a covered aquarium in the classroom, allow the butterfly to emerge, and release it when it is ready to fly.
3. Bring a caterpillar feeding on a host plant into the classroom, and use a magnifying glass to watch it eat.
4. Begin a "virtual butterfly collection" by maintaining records, photographs, drawings, or computerized records (graphics and/or text) of butterflies observed at your school.
5. With other members of the school community, create a butterfly garden and maintain records of observations.

PROGRAM 7 (NOT WHAT THEY SEEM)

BEFORE SHOWING

Discussion Items and Questions

1. If you wanted to avoid being seen in the location where you are right now, but could not alter your size, what would you change about your appearance?
2. If an animal were poisonous to something that might want to eat it, would it and its offspring survive best by looking like other animals, or by looking very different?
3. In England in the 19th century, light-colored trees near industrial cities became covered with soot. Over the years, the moths that lived on these trees became much darker. How do you think this happened?

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AFTER SHOWING

Applications and Activities

1. Find outdated issues of National Geographic, Smithsonian, or other wildlife magazines with photographs of animals that resemble their habitats. Cut the animals from the photographs, and then cut a square of habitat a little larger than the animal. Mix up the cutouts and ask students to match them.
2. Form groups of three, and work together to draw and color a habitat with an imaginary predator and prey. The predator and prey should both be camouflaged so that neither can be easily seen. Name both imaginary creatures and write a paragraph about the life of each: what it eats, what eats it, and why it looks the way it does.

PROGRAM 8 (FOREST SCHOOL)

BEFORE SHOWING

Discussion Items and Questions

1. Describe what you imagine life to be like for people living in a rain forest. What do they look like? How do they make a living? What do they eat? Do they go to school?
2. Has anyone ever spent an evening without electricity? What did you do?

AFTER SHOWING

Discussion Items and Questions

1. How do you gather food, keep it fresh, and prepare it?
2. In the rain forest, how would you visit a friend who lives a few miles away?

Applications and Activities

1. Build a model house with sticks, grasses, bark, and other natural materials. Describe their experience. What was difficult about it? How did they choose the plants they used?
2. Read and report on several books about life in a rain forest.
3. Write a fictional vignette about life in the rain forest.

PROGRAM 9 (DON'T BE PART OF THE PROBLEM)

BEFORE SHOWING

Discussion Items and Questions

1. What are some threatened or endangered species in our area?
2. What does endangered mean, and why are some local species endangered?

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3. What difference does it make if a species becomes extinct, and how important is it?
4. What can anyone do about it?

AFTER SHOWING

Discussion Items and Questions

1. Can you think of examples of animals that used to live in our area that no longer live here? What got harder for them when they were crowded by people?
2. What would happen to a forest if all the birds or insects disappeared?

Applications and Activities

1. Ask a member of the Fish and Wildlife Service, the Nature Conservancy, or other wildlife conservation group to talk about the state of life for plants and animals in your area. Ask this person to address genetic diversity, community diversity, and species diversity when talking about conditions for organisms.
2. Walk in the schoolyard to look for evidences of changes in habitats, and changes in the organisms that live there. Try to identify both new organisms that have moved in and organisms that have moved out. Talk about the impact of pesticides, drained woodlands, monoculture (grass), or any other features of the schoolyard that have altered habitat. The point is not that creating the schoolyard is bad, but that changes in habitat change the makeup of the community.

PROGRAM 10 (ACT WITH THE FACTS)

BEFORE SHOWING

Discussion Items and Questions

1. What are some threatened or endangered species in our area?
2. Why are these species in trouble?
3. What do we not know about these species, their habitat, and the changes to the habitat?

AFTER SHOWING

Discussion Items and Questions

1. Why were so many buffalo killed?
2. Why are so many large areas being divided?
3. Why are so many bogs being drained?
4. Why do we use so much wood?

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Applications and Activities

1. Bring in a speaker from your local park service, a wildlife conservation group, or other person knowledgeable about species in your area, and ask them to describe facts about species and habitats in your area.
2. Ask students to use the Internet to find several information sources on endangered or threatened species, and see what they can learn about species in your area. The United States Fish and Wildlife Service is a good place to start.
3. Identify a problem relating to the decline in the diversity of life, and formulate a strategy for addressing it. List the information they would need to make it work.
4. Call or write your state, province, or county to request a mailing of historical information about changes in wildlife habitats in your area. Try a museum of natural history, a department of natural resources, or even a planning department. In looking at changes over time, you might be surprised to find out that some habitats have improved for some wildlife, and become less hospitable to others. See if you can find out about less obvious change factors such as introduction of exotic species.
5. Walk in the schoolyard to look for evidences of changes in habitats, and changes in the organisms that live there. Try to identify both new organisms that have moved in and organisms that have moved out. Talk about the impact of pesticides, drained woodlands, monoculture (grass), or any other features of the schoolyard that have altered habitat. The point is not that creating the schoolyard is bad, but that changes in habitat change the makeup of the community.

RELATED RESOURCES

Captioned Media Program

- Adaptations of Animals (Second Edition) #2348
- Communities of Living Things #2460
- A Day in the Rain Forest Through the Eyes of a Butterfly #3452
- Monkey Rain Forest #2574
- Where Animals Live #2445

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World Wide Web

The following Web sites complement the contents of this guide; they were selected by professionals who have experience in teaching deaf and hard of hearing students. Every effort was made to select accurate, educationally relevant, and "kid-safe" sites. However, teachers should preview them before use. The U.S. Department of Education, the National Association of the Deaf, and the Captioned Media Program do not endorse the sites and are not responsible for their content.

- **TOUCAN SAM'S ENCYCLOPEDIA OF THE RAIN FOREST**

http://www.toucansam.kelloggs.ca/

Rain forest adventures from Kellogg's. Clickable menu in the form of discovery questions. Great for KWL researchers.

- **TROPICAL RAIN FOREST**

http://www.ontheline.org.uk/explore/nature/trfindex.htm

Tons of information about the vulnerability of the rain forest and action steps to end the problems.

- **THE AMAZON RIVER BASIN**

http://www.worldwildlife.org/amazon/so_cool.htm

A virtual visit to the Amazon rain forest and a chance to join in the efforts of the WWF to save the region: its indigenous animals, plants, and people.

- **LIVING THINGS**

http://www.fi.edu/tfi/units/life/life.html

Hundreds of living things links (plants, bugs, animals, ecosystems, etc.) from the Franklin Institute of Science Online. Buttons include: "Individuals Forum," "Families Forum," "Neighborhoods Forum," and "Circle of Life Forum."

- **BUTTERFLIES NORTH AND SOUTH**

http://susan.chin.gc.ca/Exhibitions/Butterflies/english/index.html

See the spectacular framework for all its offerings!

- **BUTTERFLY GARDENING**

http://www.butterflyhouse.org/gardening.html

Simple suggestions for planting a butterfly garden and attracting the winged friends to your site.

- **KID'S VALLEY GARDEN**

http://www.arnprior.com/kidsgarden/index.htm

"Planning," "Planting," "Keeping Plants Healthy," "Showing Your Plants," "Flowers," "Veggies," "Herbs," and more. An excellent and organized list of kids' gardening links.