SYNOPSIS:

The nineteenth and twentieth centuries have seen human population grow exponentially. With this growth have come demands for food, shelter and resources. As these needs are met, fragile ecosystems worldwide can suffer. Natural habitats are shrinking and some scientists say that 25% of all plant and animal species will become extinct in just fifty years.

This program looks at the methods and research of scientists who are studying the biodiversity of our planet. Understanding Biodiversity is the first step in learning how we can preserve earth's intricate web of life while meeting human needs.

CURRICULUM UNITS:

Biology
Marine Biology
Ecology
Pharmacology
Environmental Science
Taxonomy
Life Science

CAREER OPPORTUNITIES:

Biologist
Entomologist
Naturalist
Cancer Researcher
Environmental Engineer
Pharmacologist
Chemist
Marine Biologist
Ecologist
Medical Researcher

PROGRAM OVERVIEW:

Earth could be considered one giant, fragile ecosystem. In this program, we introduce the concept of biodiversity and show how scientists have discovered that the healthiest ecosystems are those with the greatest biodiversity.

The biodiversity of an ecosystem can be described as the variety of living organisms found there. Biodiversity is studied and quantified by counting numbers of organisms, identifying different kinds of organisms and then determining relative ratios. This ratio can be referred to as a diversity index. Central to this study is developing a web of interaction and interdependence among the organisms.

The web of life on our planet faces an uncertain future. Some scientists believe that one of every four known plant and animal species will be extinct within fifty years, largely as a result of loss of habitat. Biologists think there may be thirty million species of organisms on earth today and we have managed to classify only 1.5 million of them. What is lost, undiscovered and unstudied could be the cure for cancer, the means to feed the hungry, or even the key to our own species' survival.

As diversity studies continue around the globe, new species are being found, new information about known species is coming to light and complex life webs are being mapped. The scientific data collected by the researchers is contributing to the knowledge we'll need to create effective environmental management plans to protect worldwide biodiversity.

ISSUES & CRITICAL THINKING:

1) After viewing the program, ask your students the following:
   a. How would they define biodiversity using a specific ecosystem as a reference?
   b. What is biodiversity, and why is it important?
   c. Using an example from your experience if possible, what has been the impact of population growth on an ecosystem?
   d. Why is the survival of forests important to earth's total biodiversity?
   e. How many species are thought to exist today?
   f. What life forms make up the foundation of marine and freshwater food chains?

2) Research the work of early taxonomists.

3) Have students create their own version of a low diversity ecotron chamber using common and abundant area species.

4) Form teams to compile a list illustrating the biodiversity found in your particular area of the country.

5) Ask students to describe why forests are called "the lungs of the earth."

6) Using examples from the film or student observations from nature, describe how competition, predation, and various symbiotic relationships create a healthy ecosystem.

7) Ask students to speculate on the impact of extinction of even one insect from an ecosystem.

8) Discuss the impact of human activity on the environment in your area.

9) One of the major considerations regarding rain forest (tropical and temperate) and marine reef destruction is pharmaceuticals identification. Ask students to research the sources of common medicines such as aspirin, digitalis, quinine, and the "natural" equivalent of today's synthesized Novacaine.

10) The biodiversiy of the soil can be studied in the laboratory. Ask students to bring in soil samples kept moist in closed plastic bags. Set up a bright light over a funnel (put some screening in it to hold the soil) placed over a jar or beaker containing a small amount of water. Soil organisms will move from the soil in the funnel through the screen and into the lower container where they can be examined with a hand lens (or use a stereoscope or microscope).

GLOSSARY:

Algae- Are a large and diverse group of simple, typically autotrophic organisms, ranging from unicellular to multicellular forms, such as the giant kelps

Forest Canopy- The upper layer or habitat zone, formed by mature tree crowns and including other biological organisms

Parasitic Wasp- Are increasingly used in agricultural pest control as they prey mostly on pest insects and have little impact on crops.

Biodiversity- The degree of variation of life forms within a given ecosystem, biome, or an entire planet.

Foxglove- A genus of about 20 species of herbaceous perennials, shrubs, and biennials that are commonly called foxgloves.

Taxol- Is a trade names for the generic chemotherapy drug Paclitaxel.

Ecosystems- A biological environment consisting of all the organisms living in a particular area.

Leafhopper- A common name applied to any species from the family Cicadellidae. Leafhoppers, colloquially known as hoppers, are minute plant-feeding insects.

Ecotron Chambers- The Ecotron consists of 16 physically and electronically integrated environmental chambers. The objective of the Ecotron is the analysis of the responses of ecosystems and organisms to current and future environmental changes.

Pacific Yew- Taxus brevifolia (Pacific Yew or Western Yew) is a conifer native to the Pacific Northwest of North America.

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