



Here's Looking at Yew

Background Information for Teachers

Biological diversity, or biodiversity, refers to the different kinds of plants and animals in an ecosystem. Much has been said about the biodiversity of tropical rainforests and the thousands of plant and animal species that live there. The ecosystems of Washington's forests are also richly diverse. Forest diversity is important for many reasons. Among them:

1. There are thousands of plant and animal species that may contain chemical compounds of great value for pharmaceuticals, natural pesticides or new strains of disease-resistant crops.
2. Biodiversity provides an enormous gene pool that helps ensure species survival. This large and diverse gene pool contributes to a healthy, balanced ecosystem. By drawing on the gene pool, species are able to adapt and respond to environmental pressures such as climate change and disease.
3. All species are bound together by a complex web of relationships and interdependencies. Every plant and animal provides something (shelter, food, pollination), and a change in one species may be felt throughout the ecosystem.

In the Pacific Northwest the changing value of a species has taken the foreground as scientists have discovered the cancer-curing properties of Pacific yew trees. The drug taxol is extracted from the tree and has been shown to cure various kinds of cancer, including ovarian cancer (a disease that kills 12,000 women annually in the United States). Until a few years ago, the Pacific yew had little recognized value although at one time Northwest Coast tribes prized its strong, dense wood for poles and harpoon shafts. This scraggly inhabitant of forests has become a "miracle tree" in the fight against cancer. What other important discoveries await us? The answer is that we have no way of knowing which of the thousands of species of plants and animals, both vertebrate and invertebrate, will be found to have critical economic or ecologic importance.

The U.S.D.A. Forest Service, Federal Bureau of Land Management and National Cancer Institute are now struggling to figure out how we can use the Pacific yew while we ensure protection of it. Many private and government researchers are working hard to answer many questions and replicate taxol in the laboratory. They also are studying the overall role of biological diversity and the possible contributions of various species.

Skills

Classification, observation, graphing, discussion, creative writing

If More Ideas section is used:
Research

Subject Areas

Math, science, language arts

If More Ideas section is used:
Art

Materials

Watercolor supplies
(or colored chalk)

Picture of Pacific yew*

Bar graph* (make transparency)

* Provided



Learning Outcome

By studying the Pacific yew tree of Washington, students will gain an understanding of the concept of diversity.

Learning Procedure

How Many Plant Types Do We Have? Take the class on a walk through the local neighborhood and to different areas of the school grounds (field, playground, forest, near buildings, yards, lawn, near driveways). Assign groups of students to different areas to count the number of different species (different kinds of plants). Discuss the importance of including various kinds of mosses, grasses, lichens, “weeds” and algae (if present) in addition to ornamentals, annuals and perennials. It is not necessary to know the name of each plant: a simple record sheet can include a leaf sample or sketch of each species rather than the name. (Be sure to alert the students about the potential presence of poisonous plants before they begin.)

When assignments are completed, pool data by graphing students' findings. To do this, create a bar graph showing the number of species of plants in each group's assigned area. Use a transparency of the chart provided in this lesson.

What is Diversity, Anyway? Explain the concept of “diversity,” noting the different species in one area. Ask which group's area has the greatest diversity. What might be some advantages of greater diversity in a front yard, a forest, or a human population? (Refer to background information.)

Point out examples where diversity is lacking and consider reasons for reduced diversity.

Discuss the concept of “weed.” What is a weed? Who decides? How does using that classification influence our perception of a plant's value? (In eastern Washington, Baby's-breath was considered a weed until people realized its commercial value to the floral industry.)

Understanding the Pacific Yew: Explain that people have not always understood the value of diversity. Show the picture of the Pacific yew and discuss how people have valued this species over time (from tribal uses to little use to intense research and a life-saving drug).

Have students write poems about the Pacific yew and illustrate them with watercolor or colored chalk. Poems might follow this pattern:

Pacific Yew		
_____ and _____,		(two adjectives)
_____ing, _____ing, _____ing,		(three "ing" verbs)
_____?		(a question)
Example:		
Pacific Yew		
needled and rosy-barked		
breathing, shading, slow-growing,		
Who knew the secrets of your bark?		

More Ideas

1. Assign each pair of students an animal or plant category such as birds, fish, reptiles, amphibians, mammals, mollusks, insects, spiders, micro-organisms, trees, flowers, vegetables, fruits and water plants. Have each pair create a magazine picture collage of all the different kinds of animals or plants in their category. Bind collages together as a book titled *Diversity on Planet Earth*. Or, students can collect magazine pictures of their category and make a class poster on which they label diverse uses and needs for specific species.
2. Have students research the ways in which Native Americans used the plants of Washington's forests for medicinal purposes, food and materials. (Look for books on ethnobotany in the library. Also, Washington State Department of Ecology's *Discover Wetlands* curriculum has a section on native plant use in Washington.)

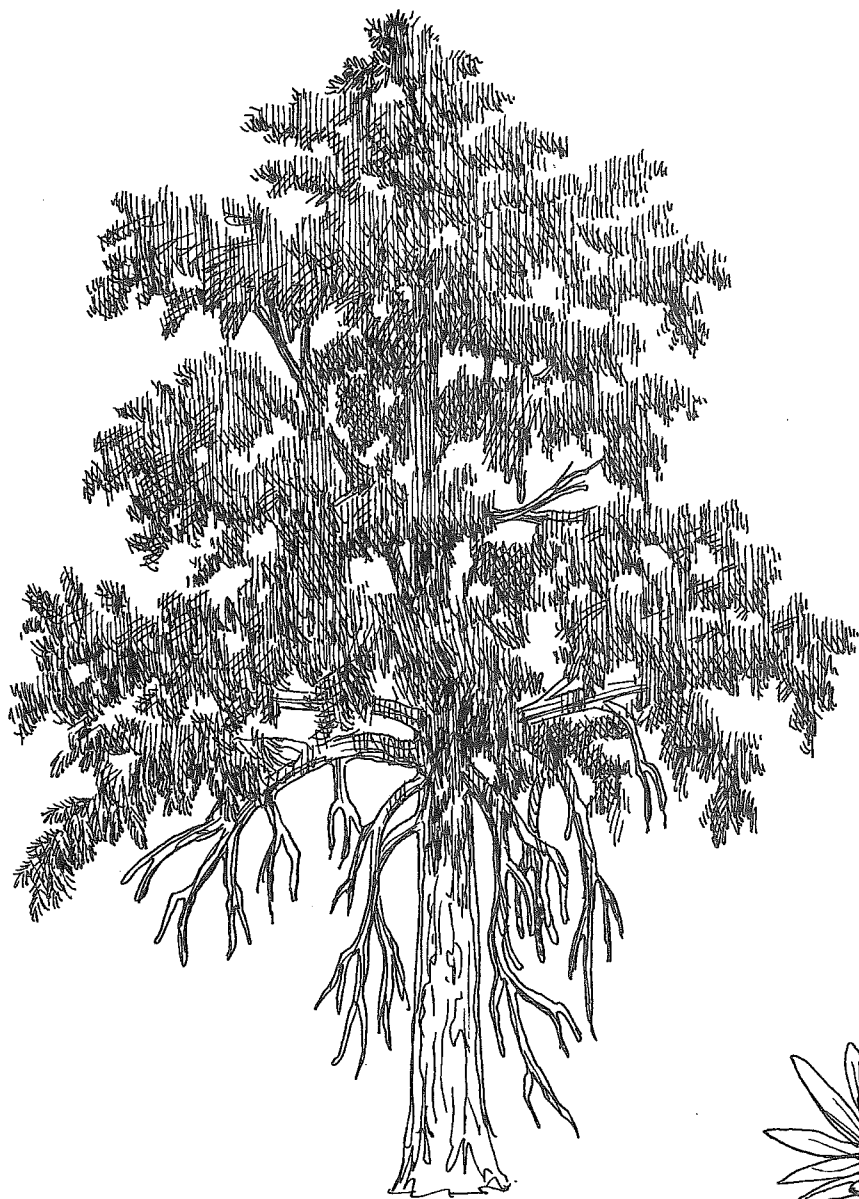
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3. Take hula-hoops out to the playground. Place one on a grassy spot and ask two students to look at the kinds of plants inside the hoop. How many different kinds of plants are there? Assign students the

task of finding a spot where a hoop can be placed that represents the greatest diversity in the schoolyard. Remind students of the possibility of plants they can't see, for example, soil fungi which are present even when their "mushrooms" are not.

Assessment: What Did We Learn?

Have each student write a letter to a friend or relative relating the story of the Pacific yew. Review important points beforehand, such as where the tree grows, what happened to it historically and why it is currently viewed as valuable.





Pacific yew

