

LESSON PLAN: IT'S A JUNGLE OUT THERE!

Adapted by Mary Garvilles from Teaching and Learning with New York Times
<http://learning.blogs.nytimes.com/1999/04/06/its-a-jungle-out-there/>

Lesson overview: In this lesson, students act as ethnobotanists and investigate the relationship between plants and people. Pairs of students learn about different plants, focusing on environmental requirements, life cycle, sustainability, and benefits to humankind, and then create ethnobotanical posters featuring their research.

Objectives:

Students will:

1. List and investigate the various ways different cultures make use of the plants found in the Mariana Islands.
2. Examine the field of ethnobotany by reading and discussing “What is Ethnobotany”
3. Conduct ethnobotanical research on a plant of their choice, focusing on the plant’s environmental requirements, life cycle, sustainability, and benefits to humankind.
4. Create informative and creative ethnobotanical posters about the plants researched in class.

Time/duration: 45 minutes- 1 hour

Materials:

- Student journals
- Pens/ pencils
- Paper
- Printed copies of “What is Ethnobotany” essay (1/student)
- Classroom blackboard /whiteboard
- Computer with internet access
- Resource materials about different types of flora on the Mariana Islands (science and health textbooks, botany resources, encyclopedias, Internet access, etc.)

Background:

Lesson procedure:

- 1) WARM-UP/ DO-NOW: In their journals, students respond to the following questions (written on the board prior to class), and then share their answers:
 - a) What information about a culture can one gain from learning about the plants found in that culture?
 - b) What different uses are there for plants and plant products?
- 2) Students read and discuss “What is Ethnobotany” (reprinted below). Respond to the following questions:

- a) What is an ethnobotanist, and what type of training does becoming an ethnobotanist require?
 - b) What many uses for plants are discussed in the article? For what was Paul Alan Cox determined to find a cure?
 - c) What inspired Dr. Balick to become an ethnobotanist?
 - d) Who was Don ElijoPanti's apprentice? What would happen if Don did not have an apprentice?
 - e) What was Arvigo's idea to keep the plant safe from destruction?
 - f) Who works with ethnobotanist in the field to do research on medicinal plants?
 - g) With which tribes did these ethnobotanists work? Who did they interview about medicinal plant treatments before collecting and studying the specimen?
 - h) What does the Rainforest Medical Foundation do?
 - i) Do you think the Mariana Islands contain medicinal plants that could provide treatment for ailments such as AIDS or cancer?
 - j) Do you know of any ethnobotanists in the Mariana Islands?
- 3) Students should brainstorm a list of native plants of which they have heard (e.g. ifit, *Pandanus*). Ask whether any know of plants that have medicinal uses. Add to their list by referring to the teacher's resource page for medicinally important plants.
 - 4) Divide students into pairs, and have each pair select a different native Mariana plant as the subject for ethnobotanical research. Using all available resources, the students must research the following information about their plant (questions should be written on the board for reference).
 - a) From what plant is this native tree/plant from, and what does it look like? (find a picture or illustration)
 - b) What is/are the scientific name/s of this plant?
 - c) Where is this plant found?
 - d) What ecological conditions are needed for this plant to thrive, and in what ecosystem would one find this plant?
 - e) What is the life cycle of this plant? (diagram the life of the plant; include how it reproduces)
 - f) What parts of the plant are used, and for what purposes?
 - g) What are this plant's benefits to humans?
 - h) In what different products could one find this plant, and what is the function of the plant in each product?
 - i) Is this plant common or rare? Is its population growing or shrinking? Is it at risk of extinction?
 - j) What efforts are being made towards the sustainability of this plant species, if any?
 - 5) WRAP-UP/ HOMEWORK: After concluding their research, students create informative ethnobotanical posters about their plants. Posters can be displayed in the classroom or put on display in other areas of the school.

Further Questions for Discussion:

- What can one learn about a culture from studying the ways the culture uses various types of plants?
- In what types of products might one find herbs and botanicals?
- How are the natural supplies of some herbs becoming endangered due to the popularity of herbal supplements, and what might this mean for the future of the industry and of the earth?

- What is the importance of sustainability of the earth's resources, and how is sustainability achieved?
- In what ways do plants, "support all of life"?

Evaluation / Assessment:

Students will be evaluated based on written journal response, participation in class discussions, thorough ethnobotanical research about a plant, and research-based ethnobotanical poster about the plant studied.

Vocabulary:

botanical, ethnobotanist, paradigms, chromatograph, analytical, indigenous, machete, missionaries, cannibalism, cultivated, tubers, sustainability, demise, bandwagon, ecosystem, humility

Extension Activities:

1. *Create* an ethnobotanical scrapbook. First, collect leaves from different plants found in various areas in your community or around your home. Then, identify these plants using a botanical guide, and learn about the different uses for each plant. Feature each plant and the ethnobotanical information about it on a different page of the scrapbook.
2. *Interview* a botanist, ethnobotanist, or health care professional that includes herbal medicine in his or her practice, and write a newspaper article about his or her work and views about the environment and the various uses of plants.
3. *Examine* how the plant resources (such as forests and farms) in your community are grown and sustained.
4. *Choose* a country, and research the connections between the indigenous people of that country and the plants found in that area. Also learn about the plant resources that exist in that country today, focusing on the sustenance of those resources and whether or not the uses of those plants have changed over time.
5. *Examine* the profession of botany. What training is needed to become a botanist, and what does a botanist do? To what other fields of study is botany related, and how?
7. *Research* herbs and other natural supplements added to foods and other products. Why are these things added, and what are their effects? Would the presence of these supplements encourage or discourage you from purchasing these products, and why?

Interdisciplinary Connections:

Language Arts- Research different herbs and botanicals used in various products, particularly foods and personal care products. Then, create an informative pamphlet that discusses the uses and cautions of these different plant products.

Mathematics- Chart statistics regarding the sustenance of various plant forms in different biomes, such as the rain forest.

Media Studies- Visit a grocery store or find advertisements in magazines, newspapers, and on television to examine the marketing techniques used to promote the sale of various products containing herbs and botanicals and to enhance the credibility or "environmental friendliness" of the companies that produce them. What tactics do these ads and product packages use to inform and persuade customers to use these products?

RESOURCE: WHAT IS ETHNOBOTANY?

Ethnobotany is the study of how people of a particular culture and region make use of indigenous plants. Cultures have been using the environment around them for thousands of years. The use of plants were mentioned in the Code of Hammurabi in Babylon circa 1770 BC. The ancient Egyptians believed that plants had medicinal powers in the afterlife of the pharaohs (King and Veilleux WWW). Indigenous cultures of the rainforests and other areas still use plants today in their everyday lives. If plants work to help these cultures, should not they be researched to help the rest of the world?

Many jungles and rainforests contain unexplored species of plants that could contain medicinal uses. Ethnobotanists explore how plants are used for things, such as food, shelter, clothing, hunting, and religious ceremonies. These scientists spend long hours of hard time in the field doing research of these plants (King and Veilleux WWW).

Ethnobotanists are usually biologists that have had additional graduate training. They may have had training in things such as archeology, chemistry, ecology, anthropology, linguistics, history, pharmacology, sociology, religion, or mythology. With these skills, they can look at more than just the plant. They look at the culture and the resource of it (King and Veilleux WWW).

There are many ethnobotanists that have helped to bring ethnomedicine to the United States. Each Ethnobotanist has their own unique way of researching cultures and plant species. The following Ethnobotanists are prominent figures in their field of research.

Paul Alan Cox took his first trip in to the jungle in 1973, on a mission as a Mormon. He later got his Ph.D. at Harvard and taught at Brigham Young University. In 1984, Cox's mother died and he became determined to find a cure for cancer. So later that year, he returned to Samoa with his family in order to continue his research. His research has led to the development of five drugs, now in different levels of development. The one closest to approval is a drug called Prostratin, which inhibits the growth of HIV. Besides working in the field, Cox is the Director of National Tropical Botanical Garden in Hawaii, where he studies and preserves endangered plant species. He is also King Carl XVI Gustaf Professor of Environmental Science in Sweden, where he researches and records Swedish healing plants (Gerber and Marandino WWW).

Michael Balick received his Ph.D. in Biology from Harvard University. His fieldwork there inspired him to go into ethnobotany. "I was absolutely fascinated by the diversity, the magnitude, the splendor, and the way in which the indigenous people related to their environment." Balick is currently Director of the Institute at the New York Botanical Garden and he teaches graduate courses and co-directs a woman's health program at Columbia University (Gerber and Marandino WWW).

Four months out of every year Balick leaves home to go to Brazil, Belize, the South Pacific, and Southeast Asia to learn from the local people. He would like to set up a facility in Micronesia to gain the knowledge of traditional healing. A team of botanists, physicians, and healers would collect plant samples and then analyze them for healing properties. Balick has already established a facility like this in Central America (Gerber and Marandino WWW).

Rosita Arvigo and her husband worked as naprapaths and had their own healing practice in Belize, but in 1985 she met with Maya Shaman, Don ElijioPanti and changed the course of her career. When Arvigo met Don ElijioPanti he was over 90 years old and did not have an apprentice. Without an apprentice, all of his knowledge would be lost forever. Arvigo

begged Elijio to take her on as his apprentice for over a year before he finally agreed, but told her that she must stay indefinitely. She studied with him for the next 10 years. They spent days at a time in the rainforest and he taught her about the plants and the Maya belief of spiritual healing. Together they treated the Shaman's large list of clients, many of them living with Elijio for months (Gerber and Marandino WWW).

One day in 1991 Don ElijioPanti was telling Arvigo how the forest used to be ten minutes from his hut, and now it was a two hour hike to get there because of the destruction of the forest. Arvigo came up with an idea to keep the plants safe from destruction. The plants would be harvested and made in to medicinal tinctures. The tinctures last seven times longer than dried herbs because of the humidity. From this plan resulted a company called Rainforest Remedies. Rainforest Remedies produces a collection of nine different formulas based on the knowledge and research of Don ElijioPanti and Arvigo. The remedies treat ailments such as back pain, PMS symptoms, stomachache, colds, and flu. Half of the profits from Rainforest Remedies go to the Belize Traditional Healers Foundation to fund local healers (Gerber and Marandino WWW).

Besides running the business of Rainforest Remedies, Arvigo and her husband have established a six thousand acres plant sanctuary, where visitors can see the healing plants up close. She likes to share her knowledge as much as possible. Arvigo has seminars in both Belize and the United States about herbs and shares the teachings of Don ElijioPanti with the local healers (Gerber and Marandino WWW).

The preparation for an expedition takes months. The ethnobotanists must gather the correct tools and supplies and study the remote villages and dense tropical forests of where they will be. Researchers must also gather information. A regional study is done on epidemiology, traditional medicine, culture, and ecology of the people and environment. Databases are searched for already known information about plants used in the region (King and Veilleux WWW).

Once in the field thousands of hours are spent doing patient observation and experimentation, cataloging useful plants and poisonous ones, and searching and identifying plants. The most time is spent pressing and drying plants. This could take more time depending on the weather. Complications can occur from monsoons or heat (King and Veilleux WWW).

In the field, a team is present. This team consists of one or more ethnobotanists, researchers, and a physician. The ethnobotanist works to collect and identify plants. The researchers supply the information that they gathered before the trip to help the ethnobotanist. The physician has a very important job. The physician works with the shaman or traditional healer to find common diseases. He or she must be trained in anthropology, botany, public health, or any other relevant social sciences. They have to be open to different views of indigenous people and able to work with the other ethnobotanists (King and Veilleux WWW).

During the interview process, the physician gives a brief description, including pictures, of diseases to the shaman. The cases are presented without medical terms so that the shaman can understand. A translator is usually used in this process. Once the shaman has recognized the disease, the team records the botanical treatment. If several shamans recommend the same treatment then the plant will be collected (King and Veilleux WWW).

Without the rainforests, these and other medicines may not exist. In 1991, a group of physicians in the Netherlands realized that losing the rainforest would be an enormous loss of resources for medicine, so they began the Rainforest Medical Foundation (RMF). The

RMF works to save the rainforest and preserve the knowledge of the indigenous peoples (Rainforest Medical Foundation WWW). With the current rate of destruction in the rainforest, medicinals will not even be available for indigenous use (O'Connor WWW). In many situations, the local medicine may work better than the imported expensive western medicine. The knowledge of indigenous peoples is quickly being lost.

The traditional healers have extensive knowledge of plants, but due to the modernization of cultures there is a lack of interest and no apprentice to pass on the knowledge. With the help of RMF and other ethnobotanists, the knowledge may survive (Rainforest Medical Foundation WWW).

Many people believe that the rainforest does contain plants with the cures to many awful diseases. It has been proven by the ethnobotanists and their research that the rainforests do contain some beneficial resources. No major discoveries for AIDS or cancer have been found yet, but at the rate that ethnobotanists are researching and discovering new treatments for illnesses, they may someday find the major ones. For right now, the discoveries that are being made are already helping many people.

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