*Journey into Amazonia Unit (Grades 5-10)*

Introduction

Dear Educator,

The classroom resources you see here are designed to help you use this Web site, other material on the Internet, and the "Journey Into Amazonia" videos for a study of the Amazon rainforest. These materials are designed for upper elementary, middle, or high school students (grades 5-10) although extension suggestions may help you modify them for younger or older students.

Each lesson plan provides objectives, standards correlations, background information, Web links, procedures, extension suggestions, and assessment recommendations. Each incorporates video clips from the "Journey Into Amazonia" documentary, though the lessons also function as stand-alone activities. The "Be An Amazon Activist" sheet offers suggestions for students, families, or classes who want to get more involved in Amazon rainforest conservation.

Please take some time to explore the classroom resources and the rest of the content on the "Journey Into Amazonia" Web site. You may also be interested in a previous PBS site called "[Science in the Rainforest](http://www.pbs.org/tal/costa_rica/)" which launched during the 1995-1996 school year and introduces students to the rainforests of Costa Rica.

The lesson plans below can be conducted individually, or done in sequence to create an interdisciplinary unit for science and social studies classes. A suggested sequence is listed here.

[**Levels of Life: Interrelationships in the Rainforest**](https://www.pbs.org/journeyintoamazonia/teacher_levels.html)
Learn about the animals and plants in different layers of the Amazon rainforest, and create a mural illustrating the interdependence of rainforest organisms.

[**Broom Forest: A Tall Trees Simulation**](https://www.pbs.org/journeyintoamazonia/teacher_broom.html)
How do tall trees survive in the shallow, nutrient-poor soil of the Amazon? A simulation with everyday materials provides answers.

[**Soil in the Amazon**](https://www.pbs.org/journeyintoamazonia/teacher_soil.html)
The Amazon's rich plant life is remarkable when you consider the quality of the soil there. Students create Amazon soil and chart seedling growth.

[**The Rainforest, Raw Materials, and You**](https://www.pbs.org/journeyintoamazonia/teacher_raw.html)
Identify products from the rainforest and learn about sustainable agriculture.

[**Chico Mendes of Brazil**](https://www.pbs.org/journeyintoamazonia/teacher_chico.html)
Meet the rubber tappers in the Amazon rainforest and learn about one activist's fight to save the people and plants there.

[**World Trade Protests: Why All the Fuss ?**](https://www.pbs.org/journeyintoamazonia/teacher_world.html)
Conduct a mock court hearing between the U'wa tribe, the Colombian government, and Occidental Petroleum over land rights in the Amazon.

[**Be An Amazon Activist**](https://www.pbs.org/journeyintoamazonia/teacher_act.html)
Suggestions for students, families, and schools.

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During his last 19 years of teaching, Mr. Frostick has received a Christa McAuliffe Fellowship in 1993; the Technology & Learning Teacher of the Year, U.S. Northeast Region, 1997; Presidential Conservation Education Awards, 1982 & 1983: a Presidential Award for Excellence in Science Teaching, state level, 1992; Geological Society of America Award for Excellence in Earth Science Teaching, 1993; and was the Jay Cee's Outstanding Young Educator in W.V. in 1994.

Levels of Life: Interrelationships in the Rainforest

Grade Level: 5-9

Estimated Time: One class period to watch each of the videos and take notes. Three days to research each animal and determine what information will be placed on the bulletin board. Two days to construct the display. Several days to complete the student descriptions.

**Overview**
The Amazon basin is filled from top to bottom with life. New species are discovered each year in the rainforest, and scientists guess that less than half of the existing species have been described. Many of these organisms have remained unknown due to the remoteness of their habitat. For example, many rainforest species live only at the tops of tall trees unseen from the ground, while others live about half way to the top, making it extremely difficult to stop and look for them.

In this activity, students will research the characteristics of a variety of rainforest organisms and present their research findings to the group. As a class, they will construct a bulletin board that places the animals by their position in the environment, gives information about each animal, and shows their interrelationships.

**Objectives**

1. Research a plant or animal from the rainforest and identify its physical location within the rainforest (e.g., canopy, etc.).
2. Understand that different organisms live in different layers of the rainforest.
3. Contribute information to a group project about the organisms in a rainforest.
4. Make a presentation about their organism to the class.

**Materials**

* "Journey Into Amazonia" video
* Construction paper in various colors
* Art tissue paper (especially browns and greens but other colors also)
* Markers, colored pencils, crayons
* Tag board
* Scissors, rulers, glue
* String
* Reference materials: encyclopedias, magazines, Internet

**Teaching Strategy**
Students will research one of a number of organisms that live in the Amazon rainforest. For younger students, a list of organisms should be provided, though older students should be able to identify appropriate organisms on their own through reading or by watching the video. A list of possible plants and animals is provided below.

Students should collect information on index cards that are labeled with general topics on the top, factual information on the lines and bibliographic details on the back. It is recommended that you consult with your school's English teachers so that the cards are consistent with the research format being taught in students' other classes. A collection of between 10 and 30 cards should prove sufficient information. The cards should then be condensed so that each organism is represented by one index card on the bulletin board display.

The bulletin board should have a dark green background. Tree trunks are made from rolled newspaper covered with brown tissue paper. Rolled paper bags resemble vines. Construction paper backed with florist's wire with tissue paper fronds represent ferns. Bromeliads may be made from toilet paper rolls with layers of construction paper and tissue. Flowers are constructed from tissue. Animals are usually represented by drawings.

The plant materials should be attached to the board first and the animals last. The information cards are placed along the outside edges with a string running from the organism to the card.

After completion of the display, students should present a short description of their research to their class or to classes of younger students.

Selected Organisms For Research:

* Plants: Fern, Brazil Nut, Banana, Cecropia, Strangler fig, Palm trees (many varieties), Coffee, Kapok, Cocoa, Orchid, Vanilla, Bromeliad, Passion flower, Philodendron, Breadfruit, Cashew, Manioc, Yucca, Heliconia, Mahogany, Rubber Fungus
* Animals: Anaconda, Ant, Anteater, Beetle, Boa constrictor, Pit viper, Butterfly, Fer de Lance, Capybara, Caiman, Coatamundi, Cockroach, Electric eel, Catfish, Frog, Pink dolphin, Katydid, Grasshopper, Monkeys (many varieties), Jaguar, Kinkajou, Puma, Macaw, Parrot, Crow, Manatee, Mosquito, Bot fly, Parrot, Tarantula, Bat, Termite, Sloth, Quetzal, Toucan

**Background**
The rainforest exists through nutrient recycling. The soil is extremely poor, and thus doesn't always supply the nutrients required for plant growth. As plants die, their parts are quickly decomposed and the next generation of plants recycles the nutrients they contained. Without this process, the soil is too poor to support sustained plant growth.

Near the rivers, plants grow quickly into a dense mass of vegetation that absorb the available sunlight. Trees reach to the sun and spread wide branches with large leaves to absorb the energy. Away from the rivers, the floor of the rainforest is dark with less than 5% of the available sunlight filtering to the ground at noon. Thus the forest floor is fairly clear of thick vegetation and the tree trunks rise high to the canopy above.

The rainforest is layered with the thickest layer being the highest. At the floor is the herb layer that contains small grasses and other plants up to several feet high. The shrub layer rises above the herbs to a height of about 20 feet. This is composed of short trees and bushes. Far above is the understory, an area of medium height trees. At the top is the canopy, a wide and unbroken expanse of leaves at a height of 100 feet or more.

Most of the animals in the rainforest live in only one of the vegetation zones. The canopy is the most populated area. Due to the difficulties in reaching and moving through the canopy, much of the life in this region is unknown. Even more difficult to reach is the understory layer. Trees in this area are relatively far apart, will not support much weight and hard to climb. Some contain nests of biting ants. Since the canopy prevents studies from being done from above and the weak trees prevent researchers from climbing, a lot of life in the rainforest is virtually unknown. Most of the exploration of the rainforest has occurred in the herb and shrub layers.

**Procedure**

1. Teachers should begin with a review of the biomes of the earth. Using either a wall map or smaller printed maps and research materials, identify the areas of rainforest around the world. If students need help identifying rainforests in other areas of the world, they might visit the Rainforest Action Network site at <http://www.ran.org/ran/info_center/factsheets/k1.html>. A Fact Sheet at this site will inform students that tropical rainforests are located around the equator, from the Tropic of Cancer in the north, to the Tropic of Capricorn in the south. The largest rainforests are in Brazil (South America), Zaire (Africa) and Indonesia (islands found near the Indian Ocean). Other tropical rainforests lie in Southeast Asia, Hawaii and the Caribbean Islands. The Amazon rainforest in South America is the world's largest, covering an area about two-thirds the size of the continental United States.
2. Watch all or parts of the "Journey To Amazonia" videos. To select appropriate segments of the film for your class, visit "[About The Series](https://www.pbs.org/journeyintoamazonia/about.html)" on this Web site. Because all the episodes of the program contain information about plant and animal life in the rainforest, teachers may want to narrow the focus to aquatic life, life in the canopy, etc.
3. While watching the video(s), students should note the wide diversity of plants and animals in the Amazon basin by listing in their notebooks the names of plants and animals and the portion of the rainforest they inhabit.
4. Students will select or be assigned an organism from a list of organisms to research. Research may be done in books, magazines or over the Internet. Begin with the sites listed below and with the content elsewhere on this Web site.
5. Students will prepare a color drawing and/or model from the provided materials for use on the display board.
6. Students will prepare a 5x8 inch card giving information about the organism.
7. Students will post their organism in the proper position on a classroom bulletin board. The information card will be placed on the perimeter of the board with a string connecting the information to the organism model.
8. Students will prepare a 2 to 5 minute presentation for the class about their organism. The presentation should provide general characteristics and identify the organism's diet.
9. Colored yarn may be used to connect organisms to one another to illustrate the concepts of a food web, commensalism, symbiosis, competition for resources, or predator-prey relationships. Different colors can be used to represent different relationships.

**Assessment**
Student assessment should be done on a matrix grid. Students' note cards should have subject headings, bibliographic information and factual information. These may be evaluated by completeness of the card and by the number of cards in an objective manner. The bulletin board portion should be assessed subjectively with the emphasis being on the proper placement of the organism. The presentation should be graded with an emphasis on the characteristics of the organism and its relationship to its surroundings.

**Extensions**

1. In schools with computer labs, technology may be integrated with the use of presentation software. These presentations emphasize organizational and outlining skills. Most of them allow the presentation to easily be published in the HTML language for use on a school Web site.
2. Students might play the [Amazon Explorer](https://www.pbs.org/journeyintoamazonia/explorer.html) game found on this Web site and use this game as a model for their own online game. Using their newfound rainforest knowledge, students might create a "choose-your-own-adventure" type of game, or a game more closely tied to one particular layer of the rainforest.

**Other Resources**

* An Amazon Adventure
by Robert Frostick (lesson author) and students participating in the Earthwatch program
<http://jajhs.kana.k12.wv.us/amazon/>
* The Rain Forest
by ThinkQuest Junior participants from South Guam Elementary School
<http://tqjunior.thinkquest.org/5393/> or<http://tqjunior.thinkquest.org/5128/>
* Rainforest Report Card
from Michigan State University's Basic Science and Remote Sensing Initiative
<http://www.bsrsi.msu.edu/rfrc/home.html>

**Related National Standards**
This lesson addresses the following national standards found in the McRel Standards Database at <http://www.mcrel.org/standards-benchmarks/> :

**Science**

* Knows that plants and animals have features that help them live in different environments
* Knows that animals and plants have a great variety of body plans and internal structures that serve specific functions for survival (e.g., digestive structures in vertebrates, invertebrates, unicellular organisms, and plants)
* Knows that living things are found almost everywhere in the world and that distinct environments support the life of different types of plants and animals
* Knows ways in which species interact and depend on one another in an ecosystem (e.g., producer/consumer, predator/prey, parasite/host, relationships that are mutually beneficial or competitive)
* Knows relationships that exist among organisms in food chains and food webs

Broom Forest: A Tall Trees Simulation

Grade Level: 5-9

Estimated Time: One class period to watch each of the videos, though a single video will allow students to see a variety of trees. One class period to construct a broom tree and sketch the different support systems.

**Overview**
In this lesson, students will better understand that the environmental factors of an area affect a species's characteristics over time. The shallow, nutrient-poor nature of the soil in the Amazon basin has caused many trees to have rapid growth as they seek sunlight, and also develop interesting support strategies to hold the top-heavy trees without using taproots. By using a model, students will construct support structures similar to those used by the tall Amazon trees. Students will understand the limitations of the support structures and how environmental damage may affect the trees.

**Objectives**

1. Construct a support system that will support a top-heavy tree for one minute.
2. Draw and label pictures of the three major support structures exhibited by rainforest trees.

**Materials**

* "Journey To Amazonia" video
* Common household brooms with rounded handle end, 1 per student group
* Duct tape
* Masking tape
* String
* Cardboard sheets
* Fan

**Teaching Strategy**
Discuss the wide biodiversity of the rainforest areas in terms of climate, making note of the long growing seasons and high amount of moisture available. The information in the "[Enter Amazonia](https://www.pbs.org/journeyintoamazonia/enter.html)" section of this site may help you present this information. As students watch video segments, discuss examples of competition between species as they fight over food and other resources. Relate these examples of competition to plant species growing in the jungle.

Have students describe the trees that they see in the video clips. Students should understand that the ground is relatively clear of vegetation and that wide branches in the canopy allow trees to collect sunlight to produce food.

For the broomstick exercise, divide the class into pairs or larger groups, depending on the supplies that are available. Have a materials area with rolls of duct tape, scissors, masking tape, poster board, newspaper and other materials in one part of the room. Use the items from the materials list, but include a number of other items that may or may not be used. Give each student group one broom. The object of the exercise is for the students to construct a support system that will hold the broom vertical for a period of one minute.

A fan is used at the end of the assignment to provide wind to check the trees for stability. If the trees are placed close to one another, the fall of one tree will affect those surrounding it.

**Background**
The rainforest of South America covers over 2,700,000 square miles with little large-scale human development. Trees, shrubs, woody plants and vines cover the forest, though it is not like the picture most people have of a jungle. The majority of the forest is fairly clear of underbrush and easy to walk through. The bases of tall trees are seen in all directions, with the trunks disappearing into the heights of the canopy layer far above. The trees grow quickly, causing them to have very straight, narrow trunks with few lower branches. Many of the trees in the mature rainforest reach heights of 150 feet or more, which is comparable to the tall trees in most deciduous forests in the United States. However, unlike many tall trees in the forests we know, Amazon trees do not produce a deep taproot for stability.

The trees have to compete with their neighbors throughout their life. Each tall tree once started out on the forest floor in an area where a previous tall tree once stood. When that first tree fell, it brought sunlight onto the forest floor and a tangle of small plants sprouted. The current tall trees survived the tangle amd grew large enough to spread wide branches with leaves to absorb as much sunlight as possible. Over 80% of the forest's food is produced in the canopy and up to 2/3 of the animals and plants live there on the branches of the trees. The branches tend to radiate out from one area at the top of the tree, much like the ribs on an umbrella. The canopy of a tall tree may exceed 80 feet wide, making it a top-heavy monster on a thin trunk.

At one time in South America, the water in the Amazon River flowed from east to west and wore down most of the land to a broad, flat expanse. As the continental plate containing South America moved, it collided with the Nazca plate of the Pacific, which caused the Andes Mountains to form on the western part of the continent. The waters reversed and now the Amazon basin drains across the old, erosion-worn drainage basin, a distance of several thousand miles. The land that is left has few minerals and nutrients and is covered in a base of compacted clay that prevents the passage of water and the deep growth of plant roots.

Most of the roots of the tall trees can only penetrate a short distance, leaving them with little support. They have developed several unique support strategies that students will discover in this activity.

Tall trees in the Amazon basin are dependent on the other trees around them. The wide canopies at the top which touch one another keep the wind from striking the tree from the side. At the forest floor, it is rare to feel any wind at all. Thus, the support structures of individual trees have evolved to provide vertical support, not support from sideways stresses. When an area of the forest is opened due to cutting, a larger area of trees will be affected as the wind takes its toll.

The bases of the trees take on one of three distinct shapes to provide support. One group has a network of wide roots that connect to the base and run across the surface of the ground. They may run for many feet in all directions so that any sideways stresses can be distributed throughout the network. This is represented by tape that runs across the floor to the base of the broom. Another strategy is the formation of large buttresses much like those found on gothic cathedrals. The buttresses are thin extensions at the tree's base that give the tree's trunk a deeply folded appearance. Each buttress acts as a prop against stresses. Cardboard strips or other thin props alongside the broom handle represents this strategy. The last strategy is the formation of many prop-roots that come from the lower part of the trunk. Prop-roots are many small roots that surround the tree to such a density that the trunk may not be seen through them. Strings running from the broom handle to the ground represent this strategy.

**Procedure**

1. Bring in examples (or have students locate while walking around school grounds) plants with taproots versus fibrous root systems. Explain how some plants use taproots to anchor themselves firmly into the ground. Using the background information above, explain to students why plants in the rainforest can't employ this support strategy.
2. To learn more about rainforest plants, especially tall trees, watch segments from the "Journey To Amazonia" videos.

Video Clips:

* + Episode Two, "Life On Land" 6:00: Treetops from the air
	+ Episode Two, "Life On Land" 40:00: Various views of the tall trees
	+ Episode Three, "The Big Top" 4:18: Shows canopy
1. Divide students into groups of two (or more if you have fewer materials) and distribute one household broom to each group. Clear the center of the floor and assign an area for each group.
2. Explain that each group is to construct a support system that will cause the broom to stand up by the handle for a minimum of one minute. Each student or group will explain why their solution works and problems they addressed to arrive at their solution.
3. Examine the different structures and identify similarities between each group's solution. Usually, the solutions will naturally fall into the three groups that correspond to the three strategies found in the rainforest.
4. Have students sketch and label the three major support structures.
5. Place the trees within four feet of each other and turn on a fan in the room. Slowly direct a greater airflow at the grove of trees until one of more falls. Discuss how logging in the Amazon affects a larger number of trees than the ones actually cut.
6. Using the videos (particularly Episode Three, "[The Big Top](https://www.pbs.org/journeyintoamazonia/bigtop.html)"), observe the general flatness of the canopy as seen from the air. Identify the support system of trees seen throughout the video.

**Assessment**
Students may be assessed though their participation in the construction of their tree's support system. Students may be graded on their verbal description of how their support design distributes the forces and helps the tree to stand. This description may also be done as a written assignment.

**Extensions**

1. Students may be asked to populate their tree with smaller plants and animals to represent the great number of epiphyte species that live in the branches. These organisms can be made out of clay and other materials.
2. In many communities, the state Department of Agriculture or a naturalist from a park could present information on local plants and their special adaptations.

**Other Resources**

* Rainforest Plants
by ThinkQuest Junior participants from South Guam Elementary School
<http://tqjunior.thinkquest.org/5393/plant_intro_rf.html>
* Tropical Rainforest Plants
by The Evergreen Project Adventures
<http://mbgnet.mobot.org/sets/rforest/plants/index.htm>

**Related National Standards**
This lesson addresses the following national content standards found in the McRel Standards Database at <http://www.mcrel.org/standards-benchmarks/> :

Science

* Knows that plants and animals have features that help them live in different environments
* Knows that animals and plants have a great variety of body plans and internal structures that serve specific functions for survival (e.g., digestive structures in vertebrates, invertebrates, unicellular organisms, and plants)
* Knows basic ideas related to biological evolution (e.g., diversity of species is developed through gradual processes over many generations; biological adaptations, such as changes in structure, behavior, or physiology, allow some species to enhance their reproductive success and survival in a particular environment)

Soil in the Amazon

Grade Level: 7-12

Estimated Time: One class period to watch each of the videos. One class period to mix the soil and plant seeds. One month or more to collect data from the plants. One period to graph and analyze the data.

**Overview**
The difference between the soil of the Amazon and soil found in more temperate climates is striking. In this lesson, students will study plant growth in soils with different nutrients and physical compositions. By examining data, students will come to understand the effects of nutrient depletion in the Amazon and the impact of tree and plant removal from Amazon soils. Students will be able to describe slash-and-burn agriculture and its impact on the environment.

**Objectives**

1. Students will grow plants in soil representing that found in the Amazon basin, and compare results to plants growing in fertile soil and soil fertilized with leaf compost.
2. Students will compare the growth of plants in simulated Amazon soil compared to soil prepared by the slash and burn method.
3. Students will chart, average and graph plant growth by height.
4. Students will compare leaf development in plants grown in different soils.

**Materials**

* "Journey To Amazonia" video
* Flats used by greenhouses to sprout plants or small plastic cups.
* Potting soil
* Agricultural clay (montmorillinte or laolinite is better)
* Sand
* Humus
* Decayed leaves
* Small pieces of wood sufficient to make a small fire
* Supply of seeds (FastPlants from Carolina Biological Supply Company or radishes work well)
* Florescent light or other light source

**Teaching Strategy**
Begin the presentation of the unit on soils by taking the students outside to observe the soil horizons in your area. Dig a soil pit and identify the O, A, B and C horizons if possible. Have students examine soils taken from each horizon with a hand lens and describe what is found.

Describe the makeup of the soil in the Amazon and provide a short history of the continent. You may use short segments of "Journey To Amazonia" to show the layers of clay along the Amazon riverbanks. Discuss the lack of nutrients in the Amazon soil and have the students compare potting soil (or soil from your area) with the agricultural clay.

Break students into groups of two to four and distribute the planting flats. Planting flats are the containers used by greenhouses to sprout plants; each can accommodate between four and twenty plants, depending on the size of the flat. Students will fill all the sections in one flat with the same kind of soil and label the container. Ideally, each group will grow a flat of plants in each soil type, but soil types may be assigned to groups if space or monetary restraints dictate. One seed should be placed in the center of each section. Students will then take readings over the period of the experiment.

Teachers should explain that scientists take large numbers of readings in biology experiments and average results to better insure a correct interpretation of the results. Each group will take their own data and combine it with data from the rest of the class for the final result. Classes that have access to computers will find this is an excellent spreadsheet activity.

Students will conclude the exercise by writing a description of their findings in a lab report, or they may present their findings on a poster.

**Background**
Soils are a mixture of the broken remains of rocks and decayed organic matter in a given area; soils provide the nutrients that sustain plant growth. Looking closely at the fragments in a soil sample under a magnifying glass or microscope will show parts of the base rocks. As time passes, these base rocks may become deeply buried by soils that have washed in from hundreds or thousands of miles away.

The Amazon River is an ancient river that may even have started when South America was joined with Africa. During the last 600 million years, the river has worn the land very flat and removed almost all of the soluble nutrients. The river meanders back and forth, constantly scouring the basin and moving nutrients downstream. It leaves behind almost inert clay as the soil.

Soils are divided into layers that are called horizons. The top horizon, the O horizon, is made of fresh and partially decomposed plant materials. In deciduous forests this layer may be fairly thick but in the rainforest, it's quite thin, usually under an inch. The next layer is the A layer which comprises a mixture of mineral particles and some decomposed organic material. In temperate regions this may be several inches to a foot thick, but in the Amazon it is usually no more than an inch. The B horizon is almost entirely rock particles, along with nutrients that have been washed out of the A horizon. This area is quite thick, running into the feet, in most of the United States while it is quite thin in the Amazon. The C horizon is composed of partially weathered bedrock and bedrock. It lies at various depths in the United States but is buried up to 4000 feet deep in the Amazon basin.

There are three main soil orders in the Amazon, though much of the basin has not been examined. Under the forest are the ultisols that are composed mainly of kaolinite clay and minerals that are washed from above. It is acidic, contains primarily aluminum compounds and has limited minerals for plant growth. The oxisols are found under some areas and are comprised mainly of kaolinite clay. This is thick, sticky clay that has almost no nutrients available for plants. Under the higher lands that do not flood, a soil type known as spoldsols is found. This is fairly sandy and acidic. Nutrients wash out of it easily, leaving little for plants to use.

Thus the people of the Amazon have multiple problems with farming the soil. The clays are relatively acidic, which stunts root development in plants. The clay contains a lot of aluminum that is toxic to plants. Last, the clay is thick, which makes it hard for plant roots and even water to penetrate.

Students will simulate the soils of the Amazon by using a mixture of the agricultural clay with a small amount of sand (about 5%) mixed in. Putting a 1 mm layer of decayed leaves across the top will represent the O and A horizons. Teachers should note that when this soil is watered, most of the water will stand on top of the clay rather than pass through. This is normal and explains why the rivers rise and flood in the rainy season since the water cannot soak into the soil.

The survival of the plant life in the Amazon depends on the recycling of nutrients. As leaves or plants die and fall, insects and fungus rapidly decompose them. New plants quickly spring up and use the available nutrients. This rapid succession has sustained the plant life for millions of years.

When humans come into an area, the land is often cleared of plants. Natives have cut the plants in small areas and burned them to concentrate the nutrients as a simple fertilizer for many years in a procedure called slash-and-burn farming. Given the lack of minerals, this produced a land that yielded crops for a short time before becoming depleted and forcing the people to move elsewhere. On a small basis, this produced no effect on the basin, but as the population has grown and as foreign corporations establish large-scale farms and ranches in the Amazon, much wider areas are being cut. The result of widespread cutting is to completely remove the nutrients from the area, making recovery impossible. It also allows erosion of the soft clay to occur, choking the waters with silt.

In this exercise, students simulate slash-and-burn fertilizer by building a small fire out of wood and other plants, then by mixing the ashes with the top of the clay in one of the flats.

**Procedure**

1. Dig a hole outside of the school and examine the soil horizons (this is best done away from the school where construction equipment did not effect the soil).
2. Watch the "Journey Into Amazonia" videos or selected clips. Note the wide diversity of plants and animals in the Amazon basin.

Video Clips:

* + Episode One "Waterworlds" 4:00: Scenes behind the otters show the slippery clay and mud banks
	+ Episode One "Waterworlds" 18:30: Turtles dig in riverbanks to lay eggs
	+ Episode Two "Life On Land" 19:15: Aerial view of river with lower water showing depositional features
	+ Episode Two "Life On Land" 20:00: Rain with water rising
1. Discuss the age of the South American continent and the effect of millions of years of rain washing the minerals to the ocean.
2. Break students into groups of two to four. Distribute the flats and have each group of students fill the flats with potting soil. Place one seed in each section. Repeat using "Amazon" soil and again using "Amazon" soil that contains decaying leaves.
3. Students will construct a chart sufficient to take growth readings for a month to 6 weeks depending on the plant seeds that were chosen.
4. Water and take measurements of the plant growth every other day. Students should take descriptive notes of plant appearance at least once a week.
5. Graph the final results and write a description of the results of the experiment.

**Assessment**
Students should be assessed by performance criteria during the set up and data collection stages of this activity. A check-off sheet showing when each student took readings or watered the plants may be helpful. Students may be assessed objectively in the collection of data, construction of a chart and construction of the graph. A final written analysis of the data should be graded with a matrix that addresses the nutrients in the soil, the importance of the recycling of leaves, the impact of slash-and-burn farming and the effect of deforestation. An alternative to a written paper is to present students' findings on a poster for display in the class or the hallways.

**Extensions**

1. Soil test kits may be used to determine the fertility of the different soils. These kits may be obtained from science catalogs or from garden supply stores. The agricultural departments of many states will test soil samples professionally for little or no charge.
2. Invite the district soil conservation specialist or agricultural agent to speak to the class.
3. At this site or on other sites, investigate how many acres of rainforest disappear each day. Determine how much of that acreage is being lost to large scale agriculture (cattle, etc.) and what kinds of organizations are involved. Students might also compare deforestation in the Amazon to clear cutting in U.S. forests.

**Other Resources**

* Soil Type and Composition by the EPA and Purdue University
[http://pasture.ecn.purdue.edu/~epados/farmstead/
site/src/main.htm](http://pasture.ecn.purdue.edu/~epados/farmstead/site/src/main.htm)
* USDA World Soil Resources
<http://www.nhq.nrcs.usda.gov/WSR/>
* The Rainforest Action Network
[http://www.ran.org](http://www.ran.org/)

**Related National Standards**
This lesson addresses the following national content standards found in the McRel Standards Database at <http://www.mcrel.org/standards-benchmarks/> :

Science

* Knows how matter is recycled within ecosystems (e.g., matter is transferred from one organism to another repeatedly, and between organisms and their physical environment; the total amount of matter remains constant, even though its form and location change)
* Knows how the amount of life an environment can support is limited by the availability of matter and energy and the ability of the ecosystem to recycle materials
* Knows how the interrelationships and interdependencies among organisms generate stable ecosystems that fluctuate around a state of rough equilibrium for hundreds or thousands of years Knows ways in which humans can modify ecosystems and cause irreversible effects (e.g., human population growth, technology, and consumption; human destruction of habitats through direct harvesting, pollution, and atmospheric changes)
* 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)
* Knows components of soil and other factors that influence soil texture, fertility, and resistance to erosion (e.g., plant roots and debris, bacteria, fungi, worms, rodents)

The Rainforest, Raw Materials and You

Grade level: 5-10

Estimated time: One class period for identification and comparison of rainforest products used by students; two to three additional class periods for research.

**Background**
The rainforests of the world are a tremendous resource for many of the world's people, including Americans. Many of the things we buy at the store and use every day like fruits, vegetables, ingredients for medicines, and construction materials come from the rainforest. And scientists believe that's just the tip of the iceberg: there are many species of plants and animals in the rainforest that haven't even been discovered yet! Rainforests are disappearing at the rate of 3,800 acres a day, largely because some of the things that come from the rainforest (like lumber, oil, and gold) aren't sustainably harvested. Human and animal generations will not be able to benefit from the rainforest's future resources if this continues.

**Lesson Objectives**

1. Students will identify products made with materials that originate in the world's rainforests.
2. Students will identify the rainforest products they have used and choose which 5 products are the most important to them.
3. Students will work with a partner to compare and contrast their choices. (THINK, PAIR, SHARE: Cooperative learning construct)
4. Students will choose 2-3 of their most important rainforest products and do research to evaluate whether or not their products have been harvested in a sustainable manner from the Amazon.

**Materials**

* Copies of "[Products from the Rainforest](https://www.pbs.org/journeyintoamazonia/products.doc)" handout [this is a downloadable document in Microsoft Word format]
* Handful of Brazil nuts
* Colored push pins for locating and marking several of the world's rainforests
* World map in the classroom

**Procedure**

1. Distribute several handfuls of nuts around the classroom. Ask students if they know where "nuts" come from. (Do they grow underground, on trees, in the water, etc?) Have they ever seen or tasted this particular nut? Inform students that this nut is called a Brazil nut. Ask students to listen for the mention of the Brazil nut, and play the video clip. After video, compare student responses about the growth and origin of this type of nut.

Video Clip: Episode Two ("Life On Land") 27:22: This segment highlights the Brazil nut tree. It drops its product on the forest floor and small rodents runs away with the nuts. The nut is a rainforest product that benefits both humans and other animals.

1. Explain that the Brazil nut is one of many products that come directly from the rainforests of the world, like the one shown in the video in the South American Amazon region. Point out on map if desired.
2. Ask for some student volunteers. Have them each look on the classroom map to identify and locate other significant world rainforests. If they need help identifying rainforests in other areas of the world, they might visit the Rainforest Action Network site at <http://www.ran.org/ran/info_center/factsheets/k1.html>. A Fact Sheet at this site will inform students that tropical rainforests are located around the equator, from the Tropic of Cancer in the north, to the Tropic of Capricorn in the south. The largest rainforests are in Brazil (South America), Zaire (Africa) and Indonesia (islands found near the Indian Ocean). Other tropical rainforests lie in Southeast Asia, Hawaii and the Caribbean Islands. The Amazon rainforest in South America is the world's largest, covering an area about two-thirds the size of the continental United States.
3. Pass out the "[Products from the Rainforest](https://www.pbs.org/journeyintoamazonia/products.doc)" sheet. Go over the contents. Instruct students to go through the list , marking which products they have used at least once in their lives.
4. Then, direct students to identify the five products that are most important to them. (THINK)
5. Have students work in pairs (PAIR) to compare and contrast their choices. Which are the same, which are different? (SHARE).
6. Explain to students that using materials that are from the rainforest is not necessarily a bad thing. The most important thing is the manner in which humans harvest products from the rainforest. Use "oranges" as an example. The teacher can share this excerpt from the Rainforest Action Network site at <http://www.ran.org/ran/info_center/factsheets/k4.html>:

Eating foods that come from the rainforest is not always good. For instance, in order to make enough orange juice for everyone, some orange juice companies destroy rainforest land to plant orange groves. One thing we can do to help save the rainforests is to drink orange juice made only from oranges that are grown in the United States. Orange juice containers will say where their oranges are grown. Oftentimes it will say that the oranges are from Brazil, which means they were grown on cleared rainforest land. If that's the case, try to find another brand of orange juice to buy.

1. Ask students to work with their partner to define the word "sustainable." Then have them share and introduce the concept of sustainable agriculture, which means that a product can be harvested in a way that will not damage productivity of the rainforest for future generations. Ask the students to talk to their partner about whether growing oranges on rainforest land is an example of sustainable agriculture. Why or why not?
2. For homework, ask students narrow their list even further to 2 or 3 of the products that they chose as being most important to them. Ask them to research those products to find out 1) if their product is harvested from the Amazon, 2) if it is done in a sustainable manner, and 3) if not, how they could change their shopping behavior in favor of a product that is made in a sustainable way.

These sites may be helpful to them in their research (as well as using search engines like Infoseek, Lycos, or Yahoo:

* + The Rainforest Action Network
	[www.ran.org](https://www.pbs.org/journeyintoamazonia/www.ran.org)
	+ Natural Resources Defense Council
	[www.nrdc.org](https://www.pbs.org/journeyintoamazonia/www.nrdc.org)
	+ World Resources Institute
	[www.wri.org](https://www.pbs.org/journeyintoamazonia/www.wri.org)
	+ The World Bank
	[www.worldbank.org](https://www.pbs.org/journeyintoamazonia/www.worldbank.org)
	+ United States Agency for International Development
	[www.usaid.org](https://www.pbs.org/journeyintoamazonia/www.usaid.org)

Have students document their research and write it up in one or two paragraphs.

**Extension Activities**

1. Ask one or two students to share their products and research with the class.
2. For older students, ask them to choose one of their 5 products and (in addition to doing the sustainable harvesting research) identify one place where they buy it. Call. write a letter, or surf the Internet site of the retailer to find out where the raw materials for the product originated. For example, if they chose chewing gum, write a letter or call the manufacturer of the gum to find out where the chicle came from in order to make the gum. If the raw materials are not harvested in a sustainable manner, find the same product in a different brand name.

**Assessment Recommendations**
Students can be evaluated on their ability to recall at least 5 products whose raw materials originate in the rain forest, or on the quality of their paragraph writing and research.

**Other Resources**

**Print**

* Braus, Judy (ed.) "Rainforest: Tropical Treasures." Ranger Rick's Nature Scope, National Wildlife Federation, 1989.

**Online**

* The Rainforest Alliance
<http://www.rainforest-alliance.org/>
* The Rain Forest
by ThinkQuest Junior participants from South Guam Elementary School
<http://tqjunior.thinkquest.org/5393/> or<http://tqjunior.thinkquest.org/5128/>
* Rainforest Report Card
from Michigan State University's Basic Science and Remote Sensing Initiative
<http://www.bsrsi.msu.edu/rfrc/home.html>

**Related National Standards**
This lesson addresses the following national content standards found at [http://www.mcrel.org](http://www.mcrel.org/):

Geography:

* Understands the patterns and networks of economic interdependence on Earth's surface
* Understands how human actions modify the physical environment
* Understands global development and environmental issues

Chico Mendes of Brazil

Grade Level: 7-12

Estimated Time: Two to three class periods

**Background**
The Amazon rainforest contains many resources that humans need and want. Rubber, collected in liquid latex form from rubber trees, is one of them. In the rainforests of Brazil, people depend on rubber tapping for their livelihood. At the same time, cattle ranchers wish to clear the land for their cattle herds to graze. They must cut down the trees to do this. Thus, rubber tappers and cattle ranchers disagree over who has the rights to the trees and land. This issue is complicated by the fact that many rubber tappers are members of indigenous Amazon tribes, while many cattle ranchers are foreigners or represent foreign corporations. A Brazilian rubber tapper named Chico Mendes organized his fellow workers into the National Council of Rubber Tappers to protest the cutting of the trees by the cattle ranchers. Through his efforts, the union was able to obtain Brazilian government support for the creation of "extractive reserves" within the seven state areas of Brazil. The extractive reserves save small areas of the land for sustainable use, like rubber tapping. Although Mendes was murdered in 1988, his former coworkers and activists worldwide continue his efforts.

**Objectives**

1. Students will be able to locate the area of Acre, Brazil on a map.
2. Students will be able to identify rubber as a Brazilian rainforest product and explain how it is harvested.
3. Students will be able to explain who Chico Mendes was and why his actions are important to preservation of parts of the Brazilian Amazon.
4. Students will compose a hypothetical news report about the life and work of Chico Mendes as it might have been read on television 10 years ago, and in 1998 on the anniversary of his death.

**Materials**

* Class copies of "Remembering Chico Mendes" from the National Wildlife Federation Website at [www.nwf.org/international/chico/life.html](https://www.pbs.org/journeyintoamazonia/www.nwf.org/international/chico/life.html)
* "Journey To Amazonia" video
* Pictures of rubber being extracted from a tree. Look in encyclopedias, page 147 of "The Burning Season," or visit <http://www.amazonlink.org/ACRE/amazonas/rubber-tappers/forest.htm>
* Rubber tapping knife picture at <http://www.mim.com.my/mim/knife.htm>
* Pictures of rubber tapping at <http://www.immune.com/rubber/nr1.html#b>
* World map, textbook maps, or maps in the "[Enter Amazonia](https://www.pbs.org/journeyintoamazonia/enter.html)" section of this Web site.

**Procedure**

1. Everyone knows the rainforest is disappearing, but how fast? Ask students to estimate how many acres per minute are being eliminated from the earth's surface. Have them write down their guesses on a small piece of paper. Read out all the estimates and list them on the blackboard or a a transparency. Award a small token to the student who is closest to the correct figure (In 1999, 64 acres/minute according to the Rainforest Action Network). Compare 64 acres to the area of the school grounds or a local park for relevance.
2. Play the video clip from "Journey To Amazonia." Instruct students to make note of the kinds of animals and plants they see that are featured as inhabitants of the Amazon rainforest.

Video Clip:
Episode Three, "The Big Top" 43:36: The segment shows a large number of the Amazon's plants and animals that have been featured throughout the rest of the program. It ends with. "Great natural assets deserve great efforts to protect them."

1. Have students share their observations. Inform them that we get many products from the rainforest, like food, building materials and medicines, from the many plant species like the ones in the video. One important product of the rainforest is rubber; particularly the rainforest in Brazil.
2. Students should work with a partner to a) locate Brazil on a map b) make list of all the things they use that are made with latex or rubber.
3. Ask students how they think rubber is made. Then show pictures or explain that the most basic latex for making rubber comes from making a scratch in the bark of a rubber tree several times a week. The liquid latex runs from the scar and then the rubber tapper collects it a cup propped against the trunk with a Y shaped twig to hold it in place. The rubber tapper collects it in large quantities and sells it in return for food or goods.
4. Inform students that in the rainforest of Brazil, there was a very famous rubber tapper named Chico Mendes. He made a great effort and paid a great price to save the natural assets of the forest (like the ones featured in the video) in Brazil that his people depended on for their survival (rubber trees). Students read, "[Remembering Chico Mendes](http://www.edf.org/programs/International/chico/remembered.html)." Note the additional links to biographical information and other essays at the end of the article.
5. Questions for large group discussion:
	1. Why was it important for Chico Mendes to protest the way that cattle ranchers used the forest land?
	2. What did he achieve and how did he protest?
	3. What does the word "sustainable" mean? Which use of the rainforest (the rubber tappers or cattle ranchers) is an example of sustainable use of land? Why?
	4. How do you think the cattle ranchers feel about the "extractive resources"? Why?
	5. What happened to Chico Mendes? Do you think his efforts were worthwhile?
	6. Who are the major players in this disagreement over the land? (Perhaps make a concept web on the board of cattle ranchers, indigenous peoples, and others like consumers who buy the products produced by the cattle ranchers.) Are we as Americans involved in situations like this in the rainforest without really knowing we are? Why or why not?
6. Have students pretend that they are news reporters writing a one page report about the life and achievements of Amazon activist Chico Mendes. The report may have been read at the time of his death or last year during the events planned on the 10th anniversary of his death. Encourage them to include aspects of the large group discussion in their paper. They must also evaluate whether they think his efforts were in vain or not, and be able to support their answer with facts they learned through research. Good sites to visit include:
	1. The Chico Mendes Sustainable Rainforest Campaign
	<http://www.edf.org/programs/International/chico/index.html>
	2. National Wildlife Federation: Remembering Chico Mendes
	<http://www.nwf.org/international/chico/>
	3. Rainforest Action Network: Tenth Anniversary of Chico Mendes
	<http://www.ran.org/ran/info_center/press_release/19981216-2.html>

**Assessment Suggestions**
Have students hand in their lists of things they use that contain rubber, assess students on their participation in the discussion, and on the incorporation of that discussion in their one page report on Chico Mendes.

**Extension Activities**
Have different students lead or pose the discussion questions.

Ask students to pick their favorite fast food restaurant or other restaurant establishment and find out where there obtain the majority of their beef products.

Instruct students to prepare a current events update (short oral report) for any of the following: extractive reserves in Brazil or any other country, sustainable development, or the current leadership and activities of the National Council of Rubber Tappers.

View 1994 movie "The Burning Season" based on the life of Chico Mendes.

Compare Chico Mendes to leaders of other human rights, political, or environmental movements in countries around the world. What similarities exist? Are there movements or ideals for which students would risk their lives?

**Other Resources**

**Print**

* Revkin, Andrew. The Burning Season. Houghton Mifflin Co. 1990.
* National Wildlife Federation. "Ranger Rick's Nature Scope: Tropical Treasures". 1989 Pgs. 48-59.

**Online**

* "Remembering Chico Mendes: His Legacy and Our Future"
National Wildlife Federation
<http://www.nwf.org/international/chico/life.html>
* "Remembering Chico Mendes"
Environmental Defense Fund
[http://www.edf.org/programs/International/
chico/remembered.html](http://www.edf.org/programs/International/chico/remembered.html)
* Book Review: "Brazil and the Struggle for Rubber: A Study in Environmental History."
<http://www.igc.org/intheamazon/f09d.htm>
* ACRE Amazon Link
<http://www.amazonlink.org/ACRE/amazonas/rubber-tappers/forest.htm>

**Related National Standards**
This lesson addresses the following national content standards found at [http://www.mcrel.org](http://www.mcrel.org/):

World History

* Understands the search for community, stability, and peace in an interdependent world

Geography

* Understands the patterns and networks of economic interdependence on Earth's surface
* Understands how human actions modify the physical environment
* Understands how physical systems affect human systems
* Understands global development and environmental issues

World Trade Protests: Why all the fuss?

Grade Level: 10-12

Estimated Time: At least two class periods

**Background**
Conflict about control of resources in the rainforest is played out every day all over the world. In November 1999 in Seattle, Washington, environmentalists gathered outside the World Trade Organization meeting to protest oil drilling by Occidental Petroleum on ancestral land of the U'wa tribe in the South American country of Colombia. The U'wa tribe has requested that the Colombian Ministry of the Environment deny Occidental's request for a drilling permit. In this lesson, students will stage a mock court hearing about this issue.

Summary of Mock Court Hearing Plaintiffs and Defendants

* Occidental Petroleum
multinational oil company headquartered in California
* U'wa tribe
people indigenous to northeastern Colombia American consumers individuals and corporations that use oil products (like gasoline) in their daily lives
* Environmental activists
international community of activists that advocate positive environmental change and development (such as Amazon Watch and Rainforest Action Network)
* Colombian Ministry
branch of the Colombian government that is responsible for issuing of the Environment oil drilling permits on land within their country

**Objectives**

1. Students will be able to identify five key groups that are involved in the dispute over rainforest oil in Colombia.
2. Students will conduct group research on the role of one of these groups, and determine whether or not this group would be for or against a permit to begin drilling for oil on U'wa land.
3. Students will present their group's opinion at a mock court hearing in response to this question, "Should the Colombian Ministry of the Environment grant Occidental Petroleum a permit to allow them to drill for oil on U'wa land in Colombia?"

**Materials**

* Access to computer and the internet (search engines) OR access to current periodicals
* Five posterboards for making signs to identify each group (Occidental Petroleum, American consumers, U'wa Tribal Council, Environmental Activists, Colombian Ministry of the Environment)
* "Journey To Amazonia" video

**Procedure**

1. Ask students what they need to survive. Elicit answers to list on a blackboard or transparency.
2. Play a segment from "Journey To Amazonia."

Video Clip:
Episode 2, "Life On Land" 00:47: "The cycle of birth and regeneration is re-enacted daily by millions of plants and animals. Plants and animals are bound by mutual advantage. They give each other the most precious of gifts. That is the gift of life itself." (Many indigenous peoples derive what they need to live from the forest, and the human cycle of family growth has taken place in the forest for many years. Their existence is sometimes threatened by global development).

Then ask students to consider what indigenous people living in the rainforest need to survive. Compare students' answers to the answers they gave about their needs at the beginning of this activity. (Do this is a large group brainstorming or with a partner). Inform students that many people in the world consider land to be necessary for their survival, almost like shelter, especially if the land has been in their family for generations. Indigenous people who live in the rainforest consider it necessary for their survival as a cultural group.

1. Inform students that there are many people in the world who are in danger of losing the right to live freely on the land they have inhabited for generations. One such people are the U'wa of the Colombian rainforest. On one hand, the U'wa claim that they should be allowed to control how the land is used, because their ancestors have lived there so long. On the other hand, oil companies and government officials argue that the oil reserves in the Colombian rainforest could generate a lot of money for Colombia, and are needed by consumers around the world.
2. Students are going to be plaintiffs and defendants in a mock court hearing that will decide whether or not the U'wa people of Colombia will be able to keep living on the land that helps them survive in the Amazon rainforest.
3. Arrange student groups and have a leader choose random placards to determine which group they will research. Have students share the names of their groups and list on board or overhead. Make sure they are aware of the situation and the other groups involved.
4. Instructions for students: They must represent their group to the Colombian Ministry of the Environment and plead their case. Advise students to research the "who, what, when, where, why and how" of their group's position. Ask them to predict whether their group would or would not support oil drilling on the U'wa land in Colombia. How will drilling affect their group? Students must be able to support and argue for or against the case.
5. Allow a class period for research. If necessary, the teacher may assist in brainstorming and skills for using a search engine like search terms and keywords. The sites listed below will be good places to start in your search for information.
6. Imitate a court hearing where four groups inform the rest of the class about their group's position. They must plead their case to the Colombian Ministry of the Environment group, who must make a decision about whether the permit will be granted.

**Assessment Recommendations**
Have students evaluate fellow group members' participation in the research and the court hearing. Ask each group to prepare a list of "who did what" following the hearing. If the hearing was videotaped, use the tape to help evaluate the students' performance and participation.

**Extension Activities**

1. Write a position paper or speech agreeing or disagreeing with this statement, "The Colombian Minister of the Environment should grant drilling rights to Occidental Petroleum On U'wa land."
2. Videotape the court proceedings.
3. Ask students to do research on events that have happened regarding the U'wa tribe since September 1999. Has drilling begun yet? Has there been any violence in the area? Had Occidental Petroleum issued any public press releases about this issue?
4. Ask students if they can think of any other indigenous peoples that have been displaced. How about in the mainland United States? If so, what happened to them? What resources were in demand (oil, gold, etc.)? (Teachers may want to obtain a video from this online resource: <http://www.lib.berkeley.edu/MRC/IndigenousVid.html> and have students compare and contrast the U'wa and Native American experiences. Teachers may want to focus on an Indian tribe that has its history in the local area.)

**Other Resources**

Print

* Marshall, Judy. "Ranger Rick's Nature Scope: Tropical Treasures". National Wildlife Federation, 1989, pg 46.

Online

* Amazon Watch
<http://www.amazonwatch.org/> (see "Breaking News And Alerts" and "News Room")
* E-Wire: Colombia Urged to Reject Occidental License
<http://ens.lycos.com/e-wire/Sept99/09sept9902.html>
* U'Wa: People Of the Andean Cloud Forest
<http://uwa.moles.org/>
* English Version of U'Wa Statement, September 1999
<http://www.amazonwatch.org/uwa/uwastatement0999.html>
* Colombia: Petrochemical Industry
<http://tradeport.org/ts/countries/colombia/isa/isar0004.html>
* Occidental Petroleum
<http://www.oxy.com/>
* South America: Resources
Encyclopedia Brittanica
[http://www.britannica.com/bcom/eb/article/3/0,5716,117563+2,00.html](http://www.britannica.com/bcom/eb/article/3/0%2C5716%2C117563%2B2%2C00.html)
* CIA World Factbook: Colombia
<http://www.cia.gov/cia/publications/factbook/co.html>
* Colombian Government Trade Bureau
<http://www.coltrade.org/>

**Related National Standards**

World History

* Understands the search for community, stability, and peace in an interdependent world

Geography

* Understand that culture and experience influence people's perceptions of places an regions
* Understands the patterns and networks of economic interdependence on Earth's surface
* Understands the pattern of human settlement and their causes
* Understands the forces of cooperation and conflict that shape the divisions of Earth's surface
* Understands how human actions modify the physical environment
* Understands the changes that occur in the meaning, use, distribution, and importance or resources
* Understands global development and environmental issues

Be an Amazon Activist

**Simple Steps for Students, Schools, and Families**

**Why Is the Rainforest In Danger?**
When you think of the rainforest, you probably think of monkeys, jungle plants, big snakes, and lots of rain. You may not think about oil, copper, and gold, but these are found in the rainforest, too! Companies from many different countries are interested in removing things like oil, copper, and gold from the rainforest and selling them in other parts of the world. The wood from certain types of trees in the rainforest, like mahogany, is also very valuable. When these natural resources are removed from the rainforest, companies often destroy or damage the water, soil, plants, and animals there.

Another reason the rainforest is disappearing is because of cattle farming. Although cows aren't normally found in the rainforest, some individuals and companies are clearing rainforest land and raising cows on it because the land is relatively cheap. However, the rainforest soil isn't very good for growing the grasses cattle eat; usually after a few years the cattle farmers have to move on to new areas of the rainforest, cut down more trees, and start over again.

Although rainforests have been around for millions of years--they're the Earth's oldest living ecosystems--they may not be around for much longer. At the present rate of destruction, all the earth's rainforests will be gone in 30 years. And once the rainforest is destroyed, it doesn't come back. 137 species of plants and animals become extinct every day in rainforests around the world.

**Why Save the Rainforest?**
Some uses of the rainforest land, like those listed above, are very damaging to the rainforests' survival. However, other products can be "sustainably harvested" from the rainforest and greatly benefit both the native people living in the rainforest and the rest of us in other communities. For instance, did you know that:

* One out of every four medicines in pharmacies today comes from the rainforest. These include treatments for serious diseases like cancer, heart disease, arthritis, and childhood leukemia. But there's much more testing to be done: scientists estimate that over 99% of the plants in the rainforest haven't even been studied yet for their possible medical uses.
* Destruction of forests is the second largest cause of global warming. Scientists believe that if global warming continues, it could cause serious problems like floods and droughts in different parts of the world.
* Rainforests supply yummy foods. Look to the rainforests for Brazil nuts, cocoa, coffee, bananas, yams, and many other foods and spices we enjoy every day.
* About one million people call the Amazon home. These people's ancestors have lived in the Amazon for hundreds of thousands of years, and the survival of their culture depends on the rainforest's survival.

**How Can I Help?**
One of the biggest threats to the rainforest today is large-scale logging of rainforest trees. To help decrease the number of trees logged in the rainforest, you can:

* avoid buying products made from "exotic woods" that grow in the rainforest. These include Mahogany, Teak, Rosewood, Sitka Spruce, and Western Red Cedar.
* use recycled paper (or tree-free paper made from cotton, straw, or other substances)
* recycle paper goods at home and at school

Another way you can help is by using fewer products made from oil. When oil is drilled and piped in the rainforest, it causes a lot of pollution to the water and ground there. One out of every four gallons of oil coming into the U.S. comes from the Amazon rainforest. Try to do the following:

* walk or ride your bike when you can. If you can't do that, keep gasoline use to a minimum by carpooling or taking a bus.
* use glass instead of plastic (which is made from oil). If you have to use plastic bottles, utensils, etc., recycle them.

Cattle farming in the rainforest leads to large-scale "slash-and-burn" practices in the Amazon: the rainforest is set on fire to clear away the trees and other plants, and then grass is planted for cows to eat. The meat from these cows often comes to the U.S. for fast food burgers, frozen dinners, and other products. Every hamburger patty from the rainforest means 55 square feet of rainforest land has been destroyed. Try to:

* find out where the meat you eat comes from. Ask for this information in fast food restaurants. In the grocery store, look to see if you can find this information on food packaging.
* eat less red meat, if possible, and write letters to fast-food restaurants and other food manufacturers asking them not to buy beef from the rainforest if they're doing so now.

If your class or school is interested in doing more to protect the rainforests, consider joining the efforts of others connected through the Rainforest Action Network (<http://www.ran.org/>). Two programs you might want to investigate are:

* The Protect-An-Acre Program: Organize a community fundraiser for this program, and the money will be used to help native people in the Amazon secure community land and develop sustainable uses of rainforest resources. This is different from other "buy-an-acre" programs you may have heard about, because the money goes to the people who live in the rainforest, allowing them to live and work where their ancestors did, and to encourage non-harmful uses of rainforest land.
* RAN's Kid's Action Team: A $7.00 subscription fee will buy your class a Kid's Action Guide with rainforest information; you'll also receive four newsletters sent throughout the year with articles, activities, and suggestions for ways to help preserve the rainforests. Teachers may copy the printed materials for classroom distribution.

Other good rainforest Web sites and resources include:

* **The Rainforest Alliance**
<http://www.rainforest-alliance.org/>
* **The Rain Forest**
by ThinkQuest Junior participants from South Guam Elementary School
<http://tqjunior.thinkquest.org/5393/> or
<http://tqjunior.thinkquest.org/5128/>
* **Rainforest Report Card**
from Michigan State University's Basic Science and Remote Sensing Initiative
<http://www.bsrsi.msu.edu/rfrc/home.html>
* **ACRE Amazon Link**
[http://www.amazonlink.org/ACRE/amazonas/
rubber-tappers/forest.htm](http://www.amazonlink.org/ACRE/amazonas/rubber-tappers/forest.htm)
* **Amazon Watch**
<http://www.amazonwatch.org/>

\*Thanks to Tamar Hurwitz and the Rainforest Action Network for the statistics and conservation ideas cited above.