A Walk in the Tropical Rainforest

Creating and leading a multi-sensory rainforest tour

by Glenn Gustafson

Grade levels: 4-6
Subject areas: science, social studies, arts
Key concepts: tropical ecology, resource conservation, ethnobotany
Skills: critical and creative thinking, research, communication
Location: indoors in gym, hallway, or large classroom
Time: several weeks for preparation, one day/evening for presentation

Step off the boat into the blue surf and wade to shore under the watchful eyes and noisy calls of a pair of scarlet macaws feeding in an almond tree. Watch and listen for signs of the deadly fer-de-lance, the most dangerous snake in Central America. It’s raining, it’s hot, you’re dirty, and you feel more alive than you’ve ever felt before. You have arrived in the rainforest!

It’s not easy to convey in the classroom the wealth of sensory impressions that greets visitors to a tropical rainforest. But as it is unlikely that we can take our students on an adventure to the tropics, we must try other ways of bringing the rainforest to life here at home. With a little ingenuity, a teacher can recreate the sights, smells, sounds, tastes, and atmosphere of this unique ecosystem and, in so doing, help children understand its importance and recognize their own connections to it.

A fun way to do this is to work with a group of students to prepare a multi-sensory Walk in the Tropical Rainforest that can be offered as a guided tour to other classes or to the community. In preparing and presenting the walk, students become rainforest experts, absorbing a wealth of information about this ecosystem. The following suggestions for creating a tropical rainforest walk are based on research for an interpretive trail brochure that I developed as a volunteer in a park in Costa Rica in 1999. It is a learning adventure that I want to share with as many people as possible in order that places like these continue to exist.

Learning objectives
The objectives of the rainforest walk are that students will:

- experience aspects of the rainforest in a multi-sensory way
- understand the global importance of rainforests
- understand some of the ecological relationships in rainforests
- learn what they can do to help preserve rainforests

Introductory activity
This activity helps to generate interest in the rainforest by raising students’ awareness of the importance of rainforest products in their daily lives.
Procedure:
1. Begin by presenting a variety of everyday items and common foods that originate in tropical rainforests. Do not tell students where they came from; instead challenge students to guess what these items have in common. Items could include potatoes, cinnamon, vanilla, brazil nuts, chewing gum, a rubber bicycle tire, a tropical plant, chocolate, coffee, and bananas.

2. When students have guessed the rainforest origin of the items, show where they come from by pointing out on a map or globe where tropical rainforests are located.

3. Ask students how their lives would be affected if they did not have any of the items provided by rainforests.

4. Show a video such as Bosque Eterno De Los Niños or read a book such as Lynne Cherry’s The Great Kapok Tree (see Resources list, pages 85-86) as a general introduction to rainforests. Discuss the disappearance of rainforests and the consequent loss of many useful and beautiful things.

Preparing the rainforest tour
Over several sessions, have students research and develop the script, props, and other materials necessary to “produce” several interpretive stops on a tropical rainforest walk. Each stop should present a theme or illustrate an important aspect of the ecology of the rainforest (see suggestions in discussion below). Set up the walk in a large area such as a school gym, hallway, or classroom, and invite other classes and/or community members to be guest “explorers.” Set the mood by dimming the lights, playing a recording of rainforest sounds, running a humidifier, and, if possible, turning up the heat. To add drama and keep groups together during the walk, link the stops with a guide rope and have the guest explorers wear blindfolds as they follow the rope from stop to stop. Encourage the student guides to dress for the jungle in long sleeves, long pants, rubber boots, and sun hats.

Stop 1: Light gaps and pioneers
An undisturbed primary rainforest has very sparse growth near the ground because very little light penetrates the canopy. When a tree falls, causing what is called a “light gap,” the seeds of many light-loving or pioneer species will germinate and grow quickly. For example, Cecropia trees, often seen in light gaps, can grow up to 2.4 meters (8 feet) per year; but they live for only about 30 years and are eventually replaced by shade-loving species that can grow beneath the forest canopy. Forests are dynamic, constantly undergoing succession in this way. Research shows that the average square meter of forest lies within a light gap every 100 years.

Materials: heat lamp; several tall potted tropical plants; piece of a decomposing log in an airtight container; tape or CD recording of rainforest sounds; and materials for making a model of a Cecropia tree: a cardboard carpet tube mounted upright on wooden base, heavy green construction paper, tempera paint, sponge, wire coat hangers, scissors, tape, Cecropia leaf pattern template.

Procedure:
1. Have students research to learn about rainforest light gaps, rainforest succession, and pioneer species such as the Cecropia tree.

2. Work with students to create a model of a Cecropia tree (or other pioneer tree) based on photos or illustrations they have found during their research. Create a leaf template that can be traced and cut out of construction paper. Use a carpet tube for the trunk of the tree (you might paint it a mottled brown/green using a sponge) and attach the leaves to it with coat hangers inserted into holes punched in the tube.

3. To set up the tour stop, create a forest clearing by surrounding an area with tropical plants. Set the Cecropia tree in the clearing, shine the heat lamp down from above, and dim all other lights in the room.

4. During the tour, lead small groups of guest explorers to the “light gap” while they are blindfolded and holding onto the rope. Ask the explorers to describe what they feel (heat from the sun lamp), what they hear (rainforest sounds from the recording), and what they smell and touch (pass around the container of decomposing wood). Then have them remove their blindfolds while the guides explain how a light gap forms, the concept of succession, and interesting things they have learned about Cecropia trees and other pioneer species.
Stop 2: Things are looking up
A rainforest has diverse and abundant vegetation that provides many places for jungle creatures to live. From the top of the tallest trees down to the forest floor, these habitats are stratified into several identifiable layers:

**Emergent Layer:** The tallest trees form the emergent layer, which receives the most light, heat, and rain.

**Canopy:** Beneath the giant trees of the emergent layer is a second, more uniform layer of tall trees called the canopy. Because of the wet conditions, canopy trees support an abundance of plant growth such as mosses, orchids, and bromeliads. These plants are called eiphytes, or air plants, as they obtain nutrients and moisture from the air and rain, not from the trees.

**Understory:** Under the canopy trees are a variety of smaller or younger trees, as well as many vines, lianas, and the infamous strangler fig (Ficus spp.). The strangler fig begins life as an epiphyte, but grows downwards from the canopy to take root in the ground, eventually strangling the host tree with its interconnecting tendrils.

**Forest Floor:** Whenever light is available, an abundance of ferns, palms, and tropical plants cover the ground of the rainforest.

**Materials:** Rolls of craft paper, scissors, tempera paints, brushes, flashlights, reference books that show rainforest levels and a variety of rainforest plants and animals (e.g., Destination: Rainforest or Up a Rainforest Tree, see Resources, pages 85-86).

**Procedure:**
1. Have students work in groups to research the levels in the rainforest, the plants and animals that are found at each, and the ways in which these organisms interact.
2. Use craft paper and tempera paints to create a large diorama that depicts all of the rainforest levels and the plants and animals at each level. Each group can be responsible for depicting the level of the forest that they researched, while the groups can all work together to make the components that pass through several levels (such as canopy trees and emergent trees).
3. Mount the rainforest trees, with the associated vines, animals, and other organisms, on the gym wall. Birds and insects might be made three-dimensional and suspended by fishing line from the ceiling. Be sure to include some creatures whose camouflage enables them to blend almost invisibly into the background.
4. During the tour, have the guides use flashlights to illuminate different features of the diorama as they explain the various layers and habitats of the forest. Challenge the visitors to find camouflaged creatures in the scene, or invite them to return to discover these creatures after the flashlight tour is over.

Stop 3: Water, water everywhere
Rainforests receive as much as 3,000 millimeters (118 inches) of rainfall per year. This high level of precipitation, in combination with typically nutrient-poor, high-clay soils, means that whenever forest cover is removed serious soil erosion occurs. Under normal conditions, as rain falls in the forest some of the moisture is used by epiphytic plants, but much of it gently percolates through the canopy to the forest floor, where it is absorbed. Even in times of high rainfall, rainforest streams tend to be relatively gently flowing streams of clean, clear water. If the tree cover is removed, however, stream flow increases dramatically and red soil washes away in the water, looking almost like a stream of blood.

**Materials:** Two clear shallow basins, sand, garden tools, tropical plants, sticks and twigs, two spray misters.

**Procedure:**
1. Read a book or watch a video that depicts what happens when a tropical rainforest is logged (e.g., The Great Kapok Tree or the video Bosque Eterno De Los Niños).
2. As a reference, find pictures of healthy, intact rainforests and of rainforests after they have been cleared. Have two groups of students prepare two mini-ecosystems in shallow plastic basins as follows:

   - **Healthy ecosystem:** Create a landscape from sand (red sand if possible) that has a river valley in the center and hills on either side. Plant the hillsides with tropical plants right up to the bottom of the valley.
   - **Logged ecosystem:** Create the same landscape with sand, but instead of tropical plants, use sticks and twigs to represent the stumps and fallen wood left over after logging.
3. During the tour, have the guides explain what has happened on both sites. Then have volunteers take turns being the “rainstorm,” that is, using the spray bottles to heavily mist both ecosystems. Observe and discuss what happens to the soil in both situations as the rains continue.

Stop 4: Rainforest restaurant
The rainforest is an abundant source of food crops, and some of its plants could even save our lives! One of the rather unusual plants in the rainforest is a ladder-like vine called a monkey ladder — yes, monkeys do climb it! Indigenous people have traditionally ingested an infusion of the vine to treat diabetes, and research has proven it to be equivalent to insulin. Sap from a somewhat similar vine, the common liana, is used to make an infusion to treat fever in children. So far, only about 5,000 of the world’s 250,000 plant species have been investigated for medicinal use. Think what we may be missing!

Materials: plants, stuffed tropical birds, tropical music, rainforest treats prepared by students, and, if desired, rainforest products displayed in a “corner store” atmosphere.

Procedure:
1. Research the various rainforest items that we use in our lives: for example, food items such as Brazil nuts, and medicines such as quinine used to combat malaria. (Suggested resources: Jungles and Earth Child 2000).
2. Have students set up a “Rainforest Restaurant” that serves treats from the rainforest, such as rainforest cookies made with cashews and Brazil nuts. Students may wish to make a menu (and perhaps translate it into Spanish) detailing what is being served and where it comes from.
3. Students can also create a small “corner store” with rainforest products such as rubber tires, medicines, chewing gum, fruit, and Panama hats.

The Rainforest Restaurant is the refreshment stop on the rainforest tour. It can be decorated as elaborately as the class would like, with everything from tropical plants to toy parrots. Music from a tropical country adds a nice touch. As visitors stop on their walk, the student servers can explain what is in the rainforest treats they are serving and the importance of using rainforest products.

Stop 5: Disturbing behavior
When an area of rainforest is cleared, it can regrow relatively quickly if allowed to. For example, at the Campanario Biological Reserve in Costa Rica, a large field that had been cultivated was allowed to regenerate naturally, with some additional planting by staff. After only nine years the field became an area of dense growth, providing an abundance of hiding places and food sources that attract a variety of animals, from hummingbirds to spider monkeys.

Materials: large ball of heavy string or yarn.

Procedure:
1. Have students research the various life forms that can be found in a regenerating rainforest, noting the order in which plants and animals return following a disturbance, as well as “who eats whom” in the food web of the regenerating forest.
2. At this last stop on their walk, have a large rectangle marked on the floor and ask visitors to sit around the edges of it. This represents the edges of an imaginary field that has been cleared in the rainforest. Have the student guides review the life forms that return to the clearing (based on “who eats whom”) and have visitors step forward to represent these various plants and animals. Connect them with string as the story unfolds to show “who eats whom.” For example, the first plant to start growing may be a Heliconia (the student representing the plant steps forward and takes the end of the string). The Heliconia quickly blooms and is visited by a hummingbird (the student representing the hummingbird now steps forward and picks up the string). The hummingbird is then connected to something else that it may eat or be eaten by. This continues until all the visitors have become part of the web of life in the newly established rainforest.
3. To demonstrate how interconnected this new ecosystem is, have someone leave the web, tugging on the string as they go (perhaps a parrot is captured by a smuggler for resale in North America). Have everyone who feels the tug likewise pull on the string. This ripple effect will eventually pass through the entire web.
demonstrating that harming one part of the ecosystem will affect everything in the rainforest.

**Summary activities**

- As visitors complete the tour, ask them to share what they have learned about the rainforest and talk about things they can do to help preserve it. A before-and-after Jungle Explorer quiz on the plants, animals, products, and ecology of the rainforest will help to focus attention and discussion.

- Plan an action stage of the project, such as fundraising for the purchase of rainforest land through organizations such as the Rainforest Action Network or Bosque Eterno de los Niños/Children’s Eternal Rainforest. If this is planned beforehand, funds can be raised by charging admission for the rainforest tour and for treats in the rainforest restaurant. As a follow-up, all of the classes involved in the tour may participate in a rainforest bake sale for the community at large.

- Have students make a rainforest scrapbook based on the tour they organized, including drawings, research, photos, and any observations they made. These scrapbooks could be constructed from paper that the class makes using rainforest materials such as coconut fibers that are added to the pulp.

**Extensions:**

- Investigate local connections to the rainforest by visiting local grocers and specialty stores to see what tropical products are for sale in your community.

- Visit a local natural area and conduct research to find out what migratory birds (or butterflies) either live in or pass through your area. Have students plot on a world map the places to which these colorful visitors migrate in winter. Discuss the importance of maintaining rainforest and local habitat in order to protect these species.

- Compare and contrast the ecology of the tropical rainforest and that of forests in your region. Students should find that the same ecological principles (e.g., light gaps and forest succession) are at work in both. Some resources to help with these explorations are TRFic! A Temperate Rainforest Teacher’s Guidebook and Poster Kit (Sierra Club of Canada, BC Chapter) and Exploring the Boreal Forest: Understanding an Ecosystem by Dave Glaze and Kay Wilson (Saskatchewan Environmental Society, 1991).

Through creating and hosting a Walk in the Rainforest, students can develop a sense of the amazingly intricate and complex world of tropical rainforests and help to educate others about it as well. It is only through awareness of this marvelous resource that we can generate the will to preserve it. It is my hope that every child who experiences the rainforest through activities such as these will one day step off a boat along a sandy shore and walk through warm surf under the watchful eye of scarlet macaws to discover first-hand the marvelous world that they once only imagined.

Glenn Gustafson is an environmental educator with Alberta Environment and an enthusiastic traveler to the rainforest regions of South and Central America.

**Resources**

**Books for younger students**


Telford, Carole, and Rod Todorou. *Up a Rainforest Tree*. Heinemann Interactive Library, 1998. Looks at the animals and plants found at each level of the forest, from the rainforest floor to the highest emergent trees.

**Books for older students and adults**


Forsyth, Adrian. *Portraits of the Rainforest*. Camden House, 1990. Good information for teachers and great color photographs to share with a class. Organized by interesting categories such as “rarity,” “beetlejuice,” and “El Tigre.”


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**Music**

There are many rainforest tapes and CDs available that have either nature sounds alone or combine nature sounds with music. *Simbiosis — Piano and Rainforest*, a CD by Manuel Obregon (1999), is a marvelous mixture of piano and nature sounds recorded live in the tropical cloud forests of Monteverde, Costa Rica.

**Videos, DVDs, and CD-ROMS**

Bosque Eterno de los Niños (15-minute video). Monteverde Conservation League, Apartado 10581-1000, San Jose, Costa Rica. This short video for younger students provides an excellent introduction to the beauty and wonder of the rainforest, while also examining threats to it.


Rainforest for Children: Animals of the Rainforest (25-minute video). Schlessinger Video Productions, 1996. Straightforward, simple narration and footage that is indicative of what one might see on a visit to a rainforest. Also in the series are people and plants of the rainforest. Grades 3 to 6.

Rainforest (60-minute video). National Geographic Video, Columbia Tristar Home Video, 1993. A well filmed and well researched educational video suitable for older students.


**Organizations and websites**

<www.tropical-forest.com> Children’s Tropical Forests. A non-profit organization in the U.K. that, among many activities, publishes an excellent newsletter summarizing rainforest activities worldwide.

<www.rain-tree.com> Rain Tree. Advocates preservation of the rainforest through the sustainable use of rainforest resources and products. The site includes a section to help with school reports and a gallery of rainforest pictures.

<www.ran.org> Rainforest Action Network. An excellent resource for rainforest information, with a focus on issues and actions. The Protect-An-Acre program supports organizations and communities working to protect rainforests; certificates are given for donations of US$25. Contact: Rainforest Action Network, Protect-An-Acre Program, 221 Pine St., 5th floor, San Francisco, CA 94104, rainforest@ran.org.

<www.savetherest.org> The Rainforest Foundation. A group focused on protecting the rights of rainforest peoples. The site includes a children’s section with background information and ideas for assisting this cause.

<www.rainforestweb.org> Rainforest Web. This site is truly the world rainforest information portal with links to articles and other websites dealing with everything from rainforest news to what you can do to protect rainforests from home.

**Training and field courses**

Rainforest and Reef: A non-profit organization that offers field courses in rainforest and marine ecology. Credits are available through Aquinas College in Grand Rapids, Michigan. Contact: Rainforest and Reef, P.O. Box 141843, Grand Rapids, MI 49514-1543, <www.rainforestandreef.org>.

Campanario Biological Reserve/Proyecto Campanario: A privately owned, education-focused reserve in Costa Rica that can provide first-hand explorations of lowland tropical rainforests to groups of teachers or students. It is located on the Osa Peninsula, a 60-minute walk north of Costa Rica’s largest national park. All groups visiting the reserve are accompanied by a qualified tropical biologist. Contact: Proyecto Campanario, Apartado 263-1260, Plaza Colonial, Escazu, 1260, Costa Rica, <www.campanario.org>.

Monteverde Conservation League: Stewards of the Bosque Eterno de los Niños/Children’s Eternal Rainforest as well as Monteverde Cloud Forest Preserve. Ecology workshops are offered for teachers and high school students. Contact: Monteverde Conservation League, Apartado 10581-1000, San Jose, Costa Rica.