

## Tropical Rainforest Facts



- located in tropics by equator
- cover about 2% of earth's surface, but house over half of world's plant and animal species; ¼ of medicines originated in rainforest
- rainforests are disappearing at an alarming rate; half have been cut down in the last century; after cut down, crops can only be grown a couple years because of nutrient-poor soil on forest floor and the land is then abandoned
- more than half of the people living near rainforests rely on firewood for cooking and/or heating, placing additional pressure on remaining forests
- about 2,000 trees per minute are cut down in rainforests
- in most tropical countries, only one tree is being replanted for every 10 cut down
- the estimated rate of extinction of species of plants and animals in rainforest ecosystems resulting from human interference is 50,000 per year, which is an average of 140 per day
- largest is Amazon Rainforest in South America
- receive 80" – 400" rain per year (Iowa averages 32"); usually short heavy showers late in day, but can drizzle all day
- temperature rarely dips below 60° F and not above 90° F because of continual heavy cloud cover, but always very humid; no seasons; greater difference between day and night temperatures than seasonal temperatures
- vegetation is dense at rivers' edges but not once go further into the rainforest
- leaves have adapted to allow rapid rain removal in several ways – smooth, waxy leaves (like Balsam Apple), drip tips (like Bo tree), holes (like Swiss Cheese plant), and divided, lobed or fringed leaves (like palms)
- trees do not need thick bark to hold in moisture like in temperate zones, so most have thin, smooth trunks
- topsoil is very shallow, so large trees have shallow, widely spread roots; trees often must grow buttress trunks (extra trunks that are joined – like bo tree)), stilt trunks, or more than one trunk (like banyan tree) so have enough support
- many foods, especially fruits, originated in the rainforests; over 3000 kinds of fruits can be found in rainforests, but only about 200 are in use right now; examples of common rainforest foods are oranges, grapefruit, pineapple, **coconut**, avocados, **starfruit**, **dates**, **figs**, **papaya**, **bananas**, **coffee**, chocolate (cacao), chewing gum (**chicle**), ginger, cinnamon, **pepper**, vanilla, cashews, Brazil nuts, tapioca, sweet potatoes, guava, passion fruit, ginger root, mangoes, and lemons (ones in bold are located in the dome)
- Over ¼ of the world's medicines have originated in the rainforests; indigenous people have used the healing powers of plants for thousands of years; some examples of those we use today are quinine, which is extracted from the bark of the cinchona tree, and is used to cure malaria; vincristine, which is extracted from the periwinkle, and is one of the most powerful anti-cancer drugs; from curare lianas a substance called d-turbocuarine is extracted and used to treat multiple sclerosis and Parkinson's disease, as well as serve as an anesthetic; a chemical from the Calabar bean is used to treat glaucoma; the blueprint for making aspirin is derived from willow tree extract; the secretions of a particular Amazonian frog is used to treat seizures, depression and Alzheimer's; the U.S. National Cancer

Institute has identified 3,000 plants that are active against cancer cells and 70% of those plants are found in rainforests

- the four main cash crops of the tropical rainforest are mahogany (wood for furniture), cocoa, Brazil nuts, and rubber
- rainforests consist of 4 layers:
  1. **Emergent Layer** –
    - very tall trees that stick up above rest of canopy
    - high winds, thunder and lightning and greatest variance in day/night temperatures
    - few animals live in this layer other than the harpy eagle, which swoops down into the canopy layer to get its favorite prey-monkeys
    - relies on wind, not animals, to carry seeds
  2. **Canopy Layer** –
    - denser layer of tall trees
    - 70% of rainforest fruits grow in this layer
    - leaves may have **drip tips** to shed water quickly
    - many types of **epiphytes**- plants that attach themselves to tree trunks and branches - are in this layer, some examples are **bromeliads** (have central cup to capture water), **staghorn fern**, **Spanish moss**, and **orchids**, which have **aerial roots** to capture moisture from the air
    - **Lianas**, which are woody vines that have roots in the ground and start at a tree's base and either attach themselves to trunks with suction-type roots or climb around the trunk, extend into the canopy, reaching for sunlight; lianas often join with vines on other trees and provide more support for the top-heavy canopy trees; intertwining lianas also make it very difficult to cut canopy trees down; certain types of lianas are used in making rattan, which is used for wicker furniture
    - insects, birds, butterflies and monkeys are important seed carriers
    - most rainforest animals live in this layer and have adapted to life in the trees, e.g. flaps of skin, like in flying squirrels, flying lemur and flying fox; prehensile tails, like in many monkey species, and even some species of porcupines, anteaters and pangolins
    - other animals in this layer are sloths, gibbons, orangutans, and howler monkeys
    - common birds are toucans, quetzals, parrots, macaws, hornbills, sunbirds, birds of paradise, woodpeckers, and puffbirds;
  3. **Understory** –
    - gets little sunlight – about 2% -5%
    - high humidity from canopy layer holds moisture in
    - has little wind, so delicate flowers and insects can exist
    - flowers have showy stamens, strong scents and nectar to attract pollinators
    - coffee trees, heliconia (lobster claw) and many palms grow in this layer
    - brightly colored insects and animals can live here – don't need camouflage since so little light (butterflies, ocelot, civet, leopard, poison arrow frog, lizards)
    - nectar-feeding birds like hummingbirds, spatula tail birds, sunbirds and parrots are common in this layer and the canopy
  4. **Forest floor** –
    - very little sunlight reaches here (less than 2%), so little vegetation grows
    - rotting fruit and vegetation is quickly decomposed into shallow topsoil by abundant termites, earthworms, fungi and bacteria
    - gorillas (nest in trees at night), elephants, peccaries, tapirs, giant anteaters and armadillos forage on the rotting vegetation and abundant insects
- The rivers of the rainforest also contain many animals – anaconda (world's largest snake), crocodiles, caiman, manatees, matamata turtles, pygmy hippos, piranhas, river dolphin, electric eels. One of the most amazing river plants is the giant water lily, which is strong enough for a child to sit on.

## Teaching Ideas and Resources to Use Before and After Your ICN session about Rainforests and the Des Moines Botanical Center



### Rainforest Habitat -

- A. **Rainforest Facts** - Share relevant facts (ones appropriate to your grade level) about this habitat from the enclosed Tropical Rainforest Facts Sheet.
- B. **Wish You Were Here** - have students each make a postcard of their virtual rainforest visit, complete with a picture on one side and writing on the other
- C. **Tropical Taste Test** - Introduce your class to some of the foods of the rainforest (a list of some common foods is on the Rainforest Fact Sheet) – you could either bring in several types yourself or divide up a list among the students.
- D. **A Rainforest Party** – As a culmination to a rainforest unit, have students plan a rainforest party (either real or imaginary). Where will it be held (and directions to get there)? What would be a good way to decorate? What will they wear (it will probably rain some of the time)? What will the invitations look like? What animals will be invited? What will they eat? What music will they play? What games will they play?
- E. **How Tall are the Trees?** – Have students get a better picture of how tall the trees in the rainforest canopy are. Take them outside to a large open area (like on your playground) and have them use yardsticks to measure out 150 ft., making sure they mark where they started and stopped.
- F. **Bromeliads** – Rainforests are full of bromeliads. These are a type of tropical plant in the pineapple family that lives on tree branches and trunks. Their long, curved leaves overlap at the base to form a tight little bowl for catching water. The leaves act as gutters for collecting water and sending it to the “tank” in the center of the plant. Some large bromeliads can hold up to 2 gallons of water. Some rainforest animals drink from these tanks, and some insects, spiders, worms, and frogs like to live in them. The animal droppings bring nutrients to the plant. Bromeliads can absorb nutrients through special leaf pores that other plants don’t have.  
Experiment with the water catching ability of a bromeliad:
  - Get a fresh pineapple from the store and cut off some of the fruit part, leaving about 3 inches of fruit attached to the leaves.
  - Let the pineapple top dry for a couple days, then remove the soft fruit, leaving the core attached to the leaves.
  - Fill a container with soil and plant the pineapple top with the core in the soil with the leaves up above the soil surface. Water the leaves of the pineapple and see how they catch water.
  - Set the pineapple in a sunny place and water it when it gets dry. Most bromeliads have wider, deeper centers, so they trap water even better than a pineapple. [idea from *The Remarkable Rainforest* by Toni Albert]
- H. **Rainforest Review Game I** – Give each student a blank bingo-type game sheet (5 squares by 5 squares) or have them draw their own a plain sheet of paper. Give each student a handful of bingo game markers or have them make some of their own. Put a list of plants, animals and foods you have discussed in your rainforest unit on the overhead projector (or have students brainstorm a list). Then have

them put a FREE space in the middle of their Bingo Game sheet and choose 24 other words from the list to write wherever they want on their game sheet. Have a clue for each word already cut out and put in a bag or envelope to draw from (e.g. we get chocolate from this tree [cacao]; this animal hangs upside down from branches [sloth]; this bird has a multi-colored large beak [toucan]; natives often use poison from this animal in their darts [poison arrow frog]; only one crop of this fruit is produced and then the plant dies and this fruit grows in bunches and grows in an upward direction [bananas], etc. The winner is the first person with 5 in a row (across, down or diagonally). Have students clear their cards and start another round.

I. **Rainforest Review Game II**– Here’s another great way to review your rainforest unit. Make up a list of questions you have covered and their answers on separate slips of paper. Distribute a question or answer slip to each student. Tell students they are to try to find their “partner,” the person with the matching question or answer slip as soon as quickly as they can and then sit down next to each other. When everyone has paired up, have students share their questions and answers. Collect the slips and do a few more rounds; your students will no doubt get faster each round (and have fun in the process)!

**J. Great Rainforest Books:**

- *The Great Kapok Tree* by Lynne Cherry - a young boy learns about the importance of the Kapok tree to the rainforest
- *Welcome to the Green House* by Jane Yolen – vivid images of the rainforest in rhyme
- *Does It Always Rain in the Rainforest? Questions and Answers About Tropical Rainforests* by Melvin Berger
- *Inside the Amazing Amazon* by Don Lessen and Michael Rotham – life in each of the rainforest layers
- *Carnivorous Plants* by Cythina Overbeck – learn about the amazing Venus flytrap, pitcher plants and bladderwort
- *The Most Beautiful Roof in the World: Exploring the Rainforest Canopy* by Kathryn Lasley- great photos, too
- *Nature’s Green Umbrella* by Gail Gibbons – fascinating facts about the plants, animals and medicines found in the rainforest
- *A Walk in the Rainforest* by Krisin Pratt – looks like just an alphabet book, but contains interesting details about each rainforest plant and animal
- *One Day in a Tropical Rainforest* by Jean Craighead George – written in story form
- *The Most Beautiful Roof in the World: Exploring the Rainforest Canopy* by Kathryn Lasley- great photos, too
- *Saving the Rainforest* by Sally Morgan – describes the life rainforests support and efforts to protect them
- *How Monkeys Make Chocolate: Foods and Medicines from the Rainforest* by Adrian Forsyth – designed like a magazine and describes the vital role rainforest plants play in giving us food and medicines
- *In the Heart of the Village: The World of the Banyan Tree* by Barbara Bash - day in the life an Indian Banyan tree, sacred tree provides shelter and other things for the people and animals of the village
- *Poison Dart Frogs* by Jennifer Owings Dewey - how these rainforest frogs discourage predators and how their poison becomes part of natives' arrows
- *Rainforests: Tropical Treasures* (Ranger Rick's Nature Scope) by the National

Wildlife Federation - idea book loaded with facts, trivia, treats, stories, activities, crafts, and problems with deforestation in the rainforest

- *Rainforests: An Activity Guide for Ages 6-9* by Nancy Cataldo - great rainforest resource for teachers; folktales, experiments, art projects, group activities
- *Unit About Tropical Rainforests* by Debby Depauw – 48 pages of information, puzzles, projects, and reproducibles for teachers
- *The Remarkable Rainforest: An Active Learning Book for Kids* by Toni Albert – resource for teachers

**K. Rainforest websites –**

- <http://rain-tree.com/schoolreports.htm> - great links to dozens of articles and photos about the rainforest and its plant and animal life; rainforest destruction problems and solutions
- [www.eduweb.com/amazon.html](http://www.eduweb.com/amazon.html) -rainforest facts
- <http://kids.ran.org/kidscorner> -rainforest facts and activities
- [www.srl.caltech.edu/personnel/krubal/rainforest/serve\\_home.html](http://www.srl.caltech.edu/personnel/krubal/rainforest/serve_home.html) - facts about where rainforests are located, plants, animals, people, preservation of, and Quicktime movies about the rainforest
- [www.enchantedlearning.com/subjects/rainforest](http://www.enchantedlearning.com/subjects/rainforest) - rainforest facts and activities for teachers and students
- [www.blueplanetbiomes.org/rainforest.htm](http://www.blueplanetbiomes.org/rainforest.htm) - plants, animal, climate of the rainforest