



SCHOOL-TO-ZOO

FOREST EXPLORERS (1ST-3RD GRADES)

Pre-visit Information

The *Forest Explorers* program takes place in the zoo's Temperate and Tropical Rain Forest bioclimatic zones, and is designed to support the NSRC/STC *Soils* science kit curriculum. To help you and your students get the most out of the zoo program, we have put together an overview of the program and a list of key vocabulary words used by our instructors. If you visit the zoo after you have completed the classroom lessons of the *Soils* curriculum, your students will already be familiar with many of these key concepts and vocabulary words, but if you visit the zoo first, they may not be as familiar with them. Knowledge and understanding of these key ideas will enhance their zoo visit.

- Your *Forest Explorers* program will last for approximately one and a half hours.
- Please arrive at the zoo dressed appropriately to be outdoors, regardless of the weather.
- Please have your students eat either a snack or their lunches prior to the program time.
- We rely on chaperones to help the students in this program—please request that chaperones do not bring younger siblings and that they turn their cell phones off during the program time.
- Please refrain from visiting the Temperate or Tropical Forest bioclimatic zones prior to your program.
- Unless you arrive early for your program and enter the zoo in advance, you will be greeted at the South Entrance by zoo staff who will assist the contact teacher with the admissions process and lead your students into the zoo.

For more information and activities focusing on animals and plants in temperate and tropical forests, a Forest Explorers teacher packet can be downloaded at www.zoo.org/education/teacher-packets.

PROGRAM OVERVIEW

Forest Explorers introduces students to the important components of Costa Rica's tropical rain forests and Washington State's temperate forests. The program consists of a half hour interactive auditorium program in which students are transformed into different parts of both forests and an hour tour of the zoo's Tropical Rain Forest and Temperate Forest bioclimatic zones. Students also discover the importance of soil in forest ecosystems.

CONCEPTS

- There are differences and similarities between the temperate forests of Washington State and the tropical rain forests of Costa Rica.
- Temperate forests are found in Washington state, where there are distinct seasons: winters are cold and wet and summers are warm and dry. Tropical rain forests are found around the equator, where it's warm and wet year-round.
- Both forests provide habitats for plants and animals. Habitats provide animals with their five basic needs of food, air, water, shelter and space.
- Soil is made up of clay, silt and sand particles and mixed with organic matter. Organic matter, or humus ("hyoo-mus"), is created when plant and animal remains break down or decompose. During this process, nutrients are released into the soil for plants to use.

- Nutrients are what living things need to grow and live. Plants get their nutrients from the soil. Animals and people get nutrients from eating plants or other animals.
- Because it's always warm and wet in the tropical rain forest, decomposition happens very rapidly. In the temperate forest, decomposition is slower because it's not consistently warm and wet all year-round.
- All forests consist of three overlapping layers of vegetation: forest floor, understory, and canopy. The tropical rain forest is unique in that it contains the emergent layer, a fourth layer of tall trees that grow higher than the canopy layer.
- Some species rely on more than one habitat; for example, migrating birds may rely on both temperate and tropical rain forests. Therefore, these two forests are interdependent.
- People depend on forests for foods, wood, medicines and other products.

VOCABULARY

Bacteria: microscopic, unicellular organisms. Some bacteria in the soil help to break down organic matter.

Basic needs: the five primary things an organism needs to survive: air, water, food, shelter, space

***Biodiversity:** the different kinds of organisms in a specific ecosystem or on the planet as a whole

Canopy: the forest layer formed by tree crowns (tops), vines and other plant material

Conifers: cone-bearing plants such as pines, firs and spruces

***Consumer:** an organism that gets its chemical energy for growth and development from other organisms. Animals in a food web are consumers that obtain food energy by eating other animals or plants.

Deciduous: plants that shed their leaves all at one time

Decomposition: the process of breaking down matter into smaller parts

***Decomposers:** organisms that consume the remains of dead organisms and, in doing so, break down the tissues into simpler forms of matter that can be used as nutrients for other living organisms

***Ecosystem:** a natural unit consisting of all plants, animals, and microorganisms (biotic factors) in an area functioning together with all of the nonliving physical (abiotic) factors of the environment

Emergent layer: the highest layer of vegetation in a tropical rain forests consisting of individual tall trees that emerge from and stick out above the canopy layer

Epiphyte: a plant that grows on other plants but is not parasitic. Epiphytes get water and nutrients from the atmosphere, not from the soil.

Evergreen: a plant that sheds and replaces its leaves gradually over time, not all at once

Food chain: the eating relationships among organism within an ecosystem where food energy is transferred from one organism to another as each consumes a lower member and in turn is preyed upon by a higher member

***Food web:** the complex eating relationships among species within an ecosystem. In a diagram of a food web organisms are connected to the organisms they consume by arrows representing the direction of energy transfer.

Forest floor: the lowest above-ground layer of a forest ecosystem; composed of small herbs, shrubs and decaying plant matter

Fungi: plant-like organisms that lack the ability to photosynthesize; instead, they absorb food from other organisms and are responsible for decay and nutrient recycling

***Habitat:** an ecological or environmental area that is inhabited by a particular species. It is the natural environment in which an organism lives or the physical environment that surrounds (influences and is used by) a species population.

Humus (hyoo-mus): organic matter formed from decomposed plants or animals

* Vocabulary words marked with an asterisk are included in the Washington State Science Standards.

Interdependence: the reliance of organisms on each other for survival

Lichen: algae and fungi living together as one organism in a mutually beneficial relationship

***Niche:** the position of a species or population in its ecosystem. A shorthand definition of niche is how and where an organism makes a living.

Nurse log: a fallen dead tree on which other plants grow. Nurse logs provide a constant supply of moisture and nutrients for seedlings, as well as food and shelter to many animals.

***Nutrients:** a food or chemicals that an organism needs to live and grow, or a substance used in an organism's metabolism that must be taken in from its environment

***Organism:** a living thing such as an animal, plant, fungus, or microorganism. In at least some form, all organisms are capable of reacting to stimuli, reproduction, growth and maintenance as a stable whole

***Photosynthesis:** a metabolic pathway that converts light energy into chemical energy. Its initial substrates are carbon dioxide and water; the energy source is sunlight (electromagnetic radiation); and the end products are oxygen and (energy-containing) carbohydrates, such as sucrose, glucose or starch.

***Producer:** an organism that produces complex organic compounds from simple inorganic molecules using energy from light or inorganic chemical reactions

Snag: a standing dead tree; often important as animal shelter or nesting site

Understory: the forest layer above the forest floor and below the canopy; consists of large shrubs and small or young trees

PRE- AND POST-ASSESSMENT ACTIVITIES:

The following activities will provide you with an understanding of your students' current knowledge of temperate and tropical rain forests. In order to encourage their creativity and expression, remind your students that these exercises are not tests, but are a way of seeing what they already know and what they haven't yet learned. After your zoo visit for the *Forest Explorers* program, repeat both activities and compare student work from before and after.

1. DRAWING FORESTS

Materials: paper, crayons, markers or colored pencils

- Give your students one blank piece of paper each.
- Ask your students to draw a tropical rain forest on one side of the paper and a temperate forest (such as the ones we have here in Washington) on the other side.
- Have your students write their names and the number 1 on each side.

Note: When you do this exercise again for post-assessment, have students write the number "2" on each side.

2. FOREST STORY CIRCLE

Materials: tape recorder, stuffed animals, puppets or pictures of animals

- Sit in a circle with your students.
- Start the story with "Last summer when I went hiking through the tropical rain forest..." or "Once upon a time, we were in the temperate forest..." and have each student take a turn filling in part of the story using the animals as props.
- Go around the circle one time for a tropical rain forest story and a second time for a temperate forest story. Record both stories in order to compare with stories completed after your students have learned more about both forests.

QUESTIONS ABOUT YOUR FOREST EXPLORERS PROGRAM?

PLEASE CALL 206-548-2424.