

Rainforest Rescuers Overview

Rainforest Rescuers takes students into a thriving coastal rainforest to learn about its ecosystem and the delicate balance and interdependence of its flora and fauna. Through this greater understanding, students are challenged to do whatever they can in their daily lives to rescue these vital rainforests.

Three conifers, the Douglas-fir, Western Red Cedar and Western Hemlock, are key players in the ecology of West Coast rainforests. They are also essential to the lumber industry in BC. The Western Red Cedar is of particular importance to coastal First Nations.

Students will learn how to identify each of these trees. The interdependence of trees, plants and the soil they grow in will lead to a discussion on soil, its creation and its health. A parallel will be made between the natural processes of soil creation in a forest and efforts to compost at home or at school. We'll have some fun investigating a bucket of kitchen scraps and sifting through some well-aged compost. If weather permits live organisms important in the decomposing process (slugs, wood bugs, bacteria, fungi and other small forest litter munchers) will also be examined.

A tour of the park allows students to see the three conifers in a natural setting and to see nurse logs, a living example of the importance of decaying material to the ecosystem. Optional extensions may include new kitchen waste programs in the lower mainland, 3R programs (Reduce, Reuse, Recycle) and discussion of the connection between recycling and the health of our environment.

“Rainforest Rescuers” Background

What are Rainforests? Coastal rainforests cover less than 1/5 of 1% of the earth’s land surface. They have 3 main distinguishing features: 1) they are close to oceans, 2) they are close to mountains and 3) they get a high level of rainfall. The surrounding rainforest at Capilano is what we call a Coastal Temperate Rainforest. Each year 6.5 feet (2.4 meters) of snow and rain falls on Capilano. And that makes it a RAINforest!

The coastal temperate rainforest at Capilano today is approximately 400 to 600 years old. It is considered an old growth forest and the main trees have reached their adult age, which means they can get pretty big. Some of the larger logged trees in the Capilano area have been recorded as being 30 feet (9 meters) in circumference at 4 feet above the ground.

British Columbia’s Rainforests have distinctive geological, environmental and cultural characteristics that make them unique. The rainforest coast of BC is the largest remaining intact temperate rainforest zone in the world, and it is a natural resource that has had and still has an impact on human history. The temperate area of the planet is the area of the globe located between the tropics and the polar circles. In this area, the changing of seasons is generally subtle and the weather can be unpredictable, just like in North Vancouver. This is because the ocean and the winds affect the climate.

The rainforests of the world are extremely important and need to be protected for many reasons. 40-75% of the world’s species are found in rainforests. Over half of the world’s temperate rainforests have already been destroyed and more than 1/4 of what remains is found on BC’s west coast. Certain medicines are created using plants which can only be found in rainforests. Logging and clear cutting are the main causes of deforestation.

Rainforests have 3 major layers to them: the forest floor, the undergrowth and the canopy:

The forest floor is the lowest living part of the forest: the ground. Even if you cannot see it, the soil is alive. Any single cubic meter of soil can have 2000 earthworms, 40 000 insects and 120 000 mites working hard to decompose dead plants and animals into nutrients usable by the trees and other plants.

The undergrowth, or understory, is the area of the forest that grows in the shade of the canopy. It is located in the middle, between the forest floor and the canopy.

The canopy, or overstorey, is the habitat found at the uppermost level of a forest. This is where you find the treetops. Over 1500 species of insects, plants and animals live in the rainforest canopy.

Douglas-fir trees dominate the rainforest surrounding the Capilano area. The three major trees of this rainforest are the Douglas fir, the Western Red Cedar and the Western Hemlock.

The Western Red Cedar is the provincial tree of British Columbia. It is an evergreen, which can grow up to 60 meters tall and 3 meters in diameter. First Nations peoples often call it the Tree of Life because of the abundance of materials and products that can be generated from it. The Red Cedar is a shade tolerant tree. It can grow with minimal amounts of sunlight.

The Western Hemlock is also an evergreen. As the largest species of Hemlock it can grow to 70 meters in height and have a 2.7-meter diameter. Its bark is dark brown to reddish brown, and becomes thick and grooved with age.

The Douglas-fir tree is an evergreen native to western North America. It is the tallest tree after the Coast Redwood (also called the Sequoia), reaching heights of up to 120 metres tall. Its bark can be 10 – 30 cm in thickness, which means an adult Douglas fir, could survive a 450°C forest fire! Standing at over 250 feet (76 metres) Big Doug, is the tallest fir tree in the forest, and has survived a fire. If you look closely, you'll see scorch marks on his bark. Big Doug might be the tallest fir but the oldest fir at Capilano is Grandma, clocking in at close to 500 years of age!

The rainforest is special for all, but especially for those species (including us humans) who depend on it. Many people do not realize that a wide range of human activities can damage the park's fragile and dynamic ecosystem: littering, misuse of trails, overuse, habitat loss, pollution, land impact, logging, etc... By learning what to do and what not to do in a rainforest, and by teaching others the things we learn, we can come to the rescue of our rainforests and make sure they are around for a very long time!

Rain Forest Rescuers

During the program we will discuss and observe various subjects. Below are examples of Topics and Vocabulary, which may be touched on during your visit to Capilano. A typical class visit will only cover a few of the following topics;

Plant needs.

- Air: oxygen, carbon dioxide, nitrogen.
- Water
- Sunlight (can be artificial source)
- Minerals, fertilizer, or nutrients: compounds containing nitrogen, phosphorus, and potassium; micronutrients such as iron
- Soil provides nutrients and an anchoring substrate.
- Warmth

Animal needs.

- Air; oxygen
- Water
- Food
- Warmth

Producers and consumers.

- Plants are producers.
- Animals are consumers.
- Photosynthesis utilizes the sun's energy to combine carbon dioxide and water to produce sugars and other complex compounds.
- Plants produce their own food through the process photosynthesis.
- Animals rely on plants and animals as their food source.

Animals as consumers.

- Predators consume animals for food.
- Prey is food for predator animals.
- Omnivores consume plants and animals for food.
- Herbivores consume plants only.
- Carnivores consume animals only.

Decomposers: Fungi, bacteria, yeasts, moulds

- Decomposers consume organic material (living or dead plant or animal material).
- Decomposers are an essential link in returning nutrients back to the environment for plants to utilize.
- A broader meaning of decomposers include animals such as worms, wood bugs, termites, slugs, snails, etc. which are important organisms in returning organic material into the soil.

Cycles of water and nutrients.

- Water cycle; precipitation, flowing through water features, incorporation into living tissue, evaporation.
- Carbon cycle

- Nitrogen cycle

Composition of Air

- Nitrogen
- Oxygen
- Water vapor
- Carbon dioxide

Composition of soil and importance to plants

- Nutrients
- Water
- Inorganic particles
- Organic matter
- Anchoring substrate

Typical structure of flowering plants and conifers.

- Function of
 - Flowers, cones
 - Leaves
 - Stem, trunk
 - Roots
 - Bark
 - Seeds
 - Pollen
 - Eggs

Three stars of the show.

- Western Red Cedar
- Douglas Fir
- Western Hemlock

These 3 species are:

- Conifers; seeds develop and are held in a cone.
- Evergreens; they retain leaves year round.
- Important lumber sources
- Important species in northwest rain forests.
- Of special importance for coastal First Nations, particularly cedars.

Vocabulary about trees and forests

- | | |
|---------------|---------------------------------------|
| • Root | • Seedling |
| • Trunk | • Mature tree |
| • Branch | • Snag |
| • Needle leaf | • Nurse log |
| • Scale leaf | • Canopy |
| • Cone | • Understory |
| • Seed | • Forest floor |
| • Bark | • Rain forest; tropical and temperate |

Plants and Animals living in forests like Capilano

- Plants
 - Ferns
 - Mosses
 - Conifer Trees
 - Flowering
 - Shrubs
 - Trees
 - Small plants; plants we often think of as “flowers”
 - Vines
- Animals
 - Mammals
 - Raccoon
 - Skunk
 - River otter
 - Squirrel
 - Chipmunk
 - Bear
 - Mouse
 - Rat
 - Birds
 - Robin
 - Blue Jay
 - Sparrow
 - Bald eagle
 - Crow
 - Seagull
 - Woodpecker
 - Chickadee
 - Owl
 - Raven
 - Insects and other arthropods
 - Ant
 - Spider
 - Wood bug
 - Centipede
 - Millipede
 - Slimy creatures
 - Slug
 - Worm
 - Aquatic creatures
 - Fish
 - Many invertebrates
- Fungi
 - Mushroom
 - Filamentous fungus
 - Bracts
- Bacteria
 - Soil micro-organisms

Below are topics and key vocabulary words that you might find useful for web research and background information or for any pre or post classroom activities you may wish to conduct.

Excellent website on waste and recycling

http://www.bchydro.com/powersmart/resources/Waste_And_Recycling.html

Go to Wikipedia home page.

http://en.wikipedia.org/wiki/Main_Page

All the following give positive results.

The plants and animals listed below are included mainly because Capilano Suspension Bridge Park habitat is typical for these species. Many will not be discussed though during the class visit to Capilano Suspension Bridge Park.

Western red cedar

Western hemlock

Douglas fir

Temperate rain forest

Temperate coniferous forest

Pacific temperate rain forest

Canopy (biology)

Understory

Forest floor

Rain forest

Wood bug (woodlouse)

Slug

Banana slug

Decomposer

Squirrel

Western gray squirrel

Douglas squirrel

Chipmunk

American robin

North American river otter

Rainbow trout

Compost

Photosynthesis

Woodpecker

Red-breasted sapsucker

Yellow-bellied sapsucker

Downy woodpecker

Pileated woodpecker

Bald eagle

Bracken fern

Sword fern

Licorice fern

Salmon

Moss

Lichen

Common raven

American crow

Owl

Fern

Maidenhair fern

Please copy and paste the following link for photos taken within the rainforest at Capilano Suspension Bridge Park

<http://www.flickr.com/photos/capilanosuspensionbridge/sets/72157627958694729/>