

# BIOMES/THE RAINFOREST

LIFE SCIENCE, ECOLOGY, BIOLOGY, GRADES: 5-9



All around the chamber, strange forms like giant hairy turnips twisted out of the water and up through the roof of the cave.

"What are those?" asked Max.

"Tree roots from above," said Lola. "They've burrowed down through the limestone to get to this river."

"I can't believe roots could bore through solid rock," marveled Max.

Lola turned around to look at him. "Life is hard in the rainforest," she said. "Everything is fighting for survival."

"Including you?"

She didn't answer and they paddled on in silence.

*The Jaguar Stones, Book One: Middleworld, page 135*

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## ESSENTIAL QUESTION:

How does the rainforest function as a biosphere?

## Sub Questions:

- How do plants, animals, and humans affect their rainforest environment, and how does it, in turn, affect them?
- What is the importance of the rainforest biome, and how can it be preserved?

## MATERIALS/RESOURCES:

- Wire, string, masking tape, scissors, index cards, paper, colored pencils, markers, glue, decorations.
- Research materials.

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**OBJECTIVES****The students will know:**

- How the rainforest biome operates and why it is important to the well-being of the planet Earth.
- How humans are affecting the rainforest, and how to protect it from various dangers.

**The students will be able to:**

- Demonstrate a working knowledge of the tropical rainforest biome.
- Identify animal environmental adaptations and compare them to our own.
- Compare and contrast the effects various societies have had on the rainforest.
- Implement various means of conserving the rainforest through everyday activities.

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**RATIONALE:**

While tropical rainforests cover less than 2% of the earth's surface area, they are home to 50% of its plant and animal species, many found nowhere else on the planet. Often described as the lungs of the planet, our rainforests are currently disappearing at the rate of 100 acres every minute.

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**KEY VOCABULARY:**

**Adaptation:** a modification in an organism to make it better equipped to survive and reproduce in a particular environment.

**Biosphere:** the earth and all its biomes considered as one single ecosystem.

**Biome:** a community of plants and animals that occupies a distinct region (such as rainforest or desert).

**Ecology:** relationship between organisms and their environment.

**Ecosystem:** a community of living things and their environment, viewed as a series of interdependent relationships.

**Evolution:** a gradual change in the gene pool of a species over several generations, as a result of natural selection.

**Temperate:** a region free from extremes of weather or climate.

**Tropical:** relating to the hot and humid regions on either side of the equator.

**Layers of the Rainforest:**

- **Emergent Layer:** where the tallest trees (up to 270 feet high) break through the canopy in search of sunlight.
- **Canopy Layer:** the crowns and branches of densely growing trees that form a ceiling, blocking the sunlight from lower layers.
- **Understory:** shrubs, saplings, vines, and ferns.
- **Forest Floor:** wet leaves and leaf litter.

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**DAY 1: INTRODUCING THE RAINFOREST BIOME****Lead In/Inquiry:**

As a class, create a KWL chart in which students list what they already know and what they would like to find out about the rainforest. Using the diagram, discuss the tropical (as opposed to temperate) rainforest, and how it functions as a complex biosphere. Have students add anything they learned from the discussion

**Procedure:**

1. Students will research the smaller ecosystems that make up the rainforest biosphere, and choose one to study. (i.e. swamp)
2. SW create a chart, mobile or model to represent their chosen ecosystem and its inhabitants. The finished artwork should convey the interconnected nature of the ecosystem, with one unifying factor being represented at the center and each part branching out from it. For example, if the ecosystem is a swamp, then the center would be "swamp." One spoke would represent one branch of that ecosystem. Closest to the center might be algae, followed by an algae-eating fly. Next would come a fly-eating frog, and the outermost symbol may describe a frog-eating bird. The next spoke would represent another branch, perhaps beginning with tadpoles near the center, followed by a type of fish, then a fish-eating mammal, and so on.
3. Students will present their ecosystem to the class, describing each element included.

**Closure:**

As a class, discuss how the different ecosystems presented fit into the larger rainforest biome.

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**DAY 2: ADAPTATIONS OF SPECIES****Procedure:**

1. Tropical rainforests are home to 50% of the world's plant and animal life, and have the most diverse populations of any biome. Discuss the significance of this and the role evolution and adaptation play in the survival of animal and plant life in the rainforest. For example, basilisk lizards have learned to run on water to escape danger. The Montezuma Oropendola bird builds an inaccessible hanging nest high in the treetops to protect its young from predators. Howler monkeys, the loudest land animals on the planet, have developed an extra-large voice box to communicate across long distances.
2. Have each student think of a new challenge posed to rainforest animals, and have each design their own animal who has adapted to solve the problem. Have them draw a picture of their new animal, and give it a name. On the back, they should describe the problem and how the adaptation solves it.
3. Each student should introduce his new animal to the class, and discuss why the adaptation is important to the creature's survival in the rainforest.

**Closure:**

The Maya told many animal stories, and even worshiped certain species. Have each student write a short story about their invented animal.

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**DAY 3: THE RAINFOREST AND HUMAN SOCIETIES****Procedure:**

1. The Mesoamerican rainforests have long been home to humans. As a class, discuss how three societies - the Maya, the early colonial Spanish, and modern civilization - have functioned as part of the rainforest biome.
2. Split the class up into four groups: rainforest species, the Maya, the Spanish, and current residents. Have each group research their contributions (both positive and negative) to the rainforest, and list their concerns about the rainforest's current state and the effect brought upon it by other groups.
3. Hold a series of mock trials in which each group raises a complaint against another. The plaintiff should present their case for concern, and the group on the defense must argue their side of the story, with the rest of the class serving as a jury.

**Closure:**

Unlike animals, humans have the ability to manipulate their environment on a grand scale. Have the students write a short paper in which they identify three ways in which humans have altered their everyday environment to suit their needs. Students should then describe how humans might have instead adapted their own lifestyles to address these environmental changes as opposed to making alterations.

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**DAY 4: RAINFOREST ENDANGERMENT AND CONSERVATION****Procedure:**

1. As a class, discuss some of the dangers the rainforests are facing and what threat this poses to the well-being of the entire planet.
2. Students should research conservation efforts already underway, and what individuals can do.
3. As a class, make a list of ten things people can do to help save the rainforest. Have each student choose one thing to implement for one week (i.e. using cloth bags instead of plastic or paper shopping bags, only using recycled paper or reusing paper, giving up red meat, etc).

**Closure:**

Each student will keep a journal of what happened during the week of the change. Was it difficult? Why or why not? Did they feel it had any effect? Will they continue to implement it once the week is up?

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**ASSESSMENT:**

Students should be evaluated on how well their written and oral work demonstrates accumulated knowledge about the rainforest biome, as well as their participation in group work and class discussions. Product artifacts will include the ecosystem chart/model, invented animal paper, and journal of conservation efforts.

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**COMMON CORE STANDARDS:**

CCSS.ELA-LITERACY.SL.6.1 Engage effectively in a range of collaborative discussions with diverse partners on grade 6 topics, texts, and issues, building on others' ideas and expressing their own clearly.

CCSS.ELA-LITERACY.WHST.6-8.1 Write arguments focused on discipline-specific content.

CCSS.ELA-LITERACY.WHST.6-8.2 Write informative/explanatory texts, including the narration of historical events, scientific procedures/ experiments, or technical processes.

CCSS.ELA-LITERACY.WHST.6-8.4 Produce clear and coherent writing in which the development, organization, and style are appropriate to task, purpose, and audience.

CCSS.ELA-LITERACY.WHST.6-8.7 Conduct short research projects to answer a question (including a self-generated question), drawing on several sources and generating additional related, focused questions that allow for multiple avenues of exploration.

CCSS.ELA-LITERACY.RST.6-8.7 Integrate quantitative or technical information expressed in words in a text with a version of that information expressed visually (e.g., in a flowchart, diagram, model, graph, or table).

CCSS.ELA-LITERACY.WHST.6-8.9 Draw evidence from informational texts to support analysis, reflection, and research.