

RESOURCE LIBRARY | ACTIVITY : 2 HRS 30 MINS

Local and Global Effects of Deforestation in the Amazon Rain Forest

Students analyze a map to identify and describe multiple landscapes in the Amazon rain forest, the organisms that inhabit those landscapes, and the role of the forest in the water cycle and nutrient cycle. Then they construct a scientific argument for the effects of deforestation on the local ecosystem and the water and nutrient cycles.

GRADES

6, 7, 8

SUBJECTS

Geography, Human Geography

CONTENTS

6 PDFs

OVERVIEW

Students analyze a map to identify and describe multiple landscapes in the Amazon rain forest, the organisms that inhabit those landscapes, and the role of the forest in the water cycle and nutrient cycle. Then they construct a scientific argument for the effects of deforestation on the local ecosystem and the water and nutrient cycles.

For the complete activity with media resources, visit:

<http://www.nationalgeographic.org/activity/local-and-global-effects-deforestation-amazon-rain-forest/>

DIRECTIONS

1. Activate students' prior knowledge about the local and global environmental effects of deforestation.

Introduce the activity with a discussion about students' local area and the organisms that live there. Ask students to brainstorm what roles trees might play in the forest. Then have students brainstorm consequences to the plants and animals that inhabit the local ecosystem if all the trees were removed. Introduce the term *deforestation* and share that deforestation is of major concern in the Amazon rain forest. Ask the guiding question: *How does deforestation in the Amazon rain forest affect the water cycle, nutrient cycle, and plant and animal life?* Facilitate a whole-class discussion around the Habitat Loss inset map with a focus on Deforestation on the Amazonia: The Human Impact side of the map. Explain to students that they will explore the layers of forest and different organisms that live there along with the role trees play in the nutrient and water cycles to understand the effects of deforestation.

2. Construct knowledge about the role of trees in the Amazon ecosystem.

Distribute the map Amazonia: Vital and Fragile and the worksheet Role of Trees in the Amazon. Have students use the map to explore different types of vegetation, the landscapes of the forest and how they provide different habitats for the organisms that live there, and the role trees play in the water and nutrient cycles. Ask students to complete Part 1, Part 2, and Part 3 of the worksheet.

3. Construct an evidence-based argument for limiting deforestation in the Amazon rain forest.

Divide students into small groups and distribute a copy of the worksheet Constructing an Evidence-Based Argument, to each small group. Direct groups to construct an evidence-based argument for the need to limit deforestation in the Amazon rain forest. Distribute the Evidence-Based Argument about Protecting the Trees in the Amazon Rain Forest Rubric and discuss the rubric criteria as a class. Explain to students that they should use their work from the completed worksheet, Role of Trees in the Amazon, to help identify the evidence they need to support their claim(s).

4. Have students present their arguments.

Have small groups share their arguments about the importance of limiting deforestation in the Amazon rain forest with the class. Conclude with a whole-class discussion reflecting on the potential loss of plants and animals in the Amazon rain forest and the potential changes to the water and nutrient cycles due to deforestation. To wrap up the activity, ask: *What is deforestation? What are the effects of deforestation to the plants and animals in the Amazon rain forest? How would the water and nutrient cycle be affected by deforestation?*

Tip

The Amazonia: The Human Impact map contains many layers of information. It may be helpful to read through some of the heads and summaries as a class and discuss what information is likely to be contained in that component of the map.

Modification

This activity works best in small groups. Cooperative learning benefits advanced learners and struggling readers. Assign groups so that advanced students are grouped with struggling readers.

Modification

To ensure that everyone participates in group work, assign or allow students to choose roles according to their strengths (e.g., recorder, facilitator, speaker, computer driver).

Alternative Assessment

Collect evidence-based arguments from small groups and use the provided rubric to assess groups' final arguments.

Use the provided answer key to check students' completed Role of Trees in the Amazon worksheets.

Extending the Learning

- Have students discuss how the different type of water (black, clear, white), described in the Birth of a River section of Amazonia: Vital and Fragile, influences the types of organisms that live there.
- Have students think about the following question: What does the rain forest do for us—even if we don't live there? Remind students that the Amazon rain forest is a carbon sink.

The Amazon rain forest plays a crucial role in keeping carbon out of our atmosphere, as it naturally sequesters about 28% of the atmospheric carbon emitted by the burning of fossil fuels elsewhere. But, it can only remain a carbon sink as long as it absorbs more carbon dioxide than it releases. Ask students to think about and discuss what would happen if there were not enough trees to absorb carbon. Ask: Where would the carbon go? (If a large number of trees are removed, we will experience more global warming.)

OBJECTIVES

Subjects & Disciplines

Geography

- [Human Geography](#)

Learning Objectives

Students will:

- use a map to identify the areas of habitat loss in the Amazon rain forest due to deforestation
- use a map to identify landscapes about the role of the rain forest in maintaining the water and nutrient cycles
- use a map to construct knowledge about the role of the rain forest in maintaining the water and nutrient cycles
- construct a scientific argument that includes a claim, multiple pieces of evidence from a map, and scientific reasoning for the effects of deforestation on the water and nutrient cycles and the plants and animals within the local ecosystem

Teaching Approach

- Learning-for-use

Teaching Methods

- Cooperative learning

Skills Summary

This activity targets the following skills:

- 21st Century Student Outcomes
 - Information, Media, and Technology Skills
 - Information Literacy
 - Learning and Innovation Skills
 - Communication and Collaboration
 - Critical Thinking and Problem Solving
- 21st Century Themes
 - Environmental Literacy
 - Global Awareness
- Critical Thinking Skills
 - Analyzing
 - Understanding
- Geographic Skills
 - Acquiring Geographic Information
 - Analyzing Geographic Information
- Science and Engineering Practices
 - Analyzing and interpreting data
 - Constructing explanations (for science) and designing solutions (for engineering)
 - Obtaining, evaluating, and communicating information

National Standards, Principles, and Practices

IRA/NCTE STANDARDS FOR THE ENGLISH LANGUAGE ARTS

• Standard 7:

Students conduct research on issues and interests by generating ideas and questions, and by posing problems. They gather, evaluate, and synthesize data from a variety of sources (e.g., print and nonprint texts, artifacts, people) to communicate their discoveries in ways that suit their purpose and audience.

NATIONAL GEOGRAPHY STANDARDS

- **Standard 1:**

How to use maps and other geographic representations, geospatial technologies, and spatial thinking to understand and communicate information

- **Standard 14:**

How human actions modify the physical environment

- **Standard 15:**

How physical systems affect human systems

- **Standard 4:**

The physical and human characteristics of places

COMMON CORE STATE STANDARDS FOR ENGLISH LANGUAGE ARTS & LITERACY

- **Reading Standards for Literacy in History/Social Studies 6-12:**

Integration of Knowledge and Ideas, RH.6-8.7

- **Reading Standards for Literacy in Science and Technical Subjects 6-12:**

Craft and Structure, RST.6-8.4

- **Speaking and Listening Standards 6-12:**

Comprehension and Collaboration, SL.8.3

- **Speaking and Listening Standards 6-12:**

Comprehension and Collaboration, SL.8.1

- **Speaking and Listening Standards 6-12:**

Comprehension and Collaboration, SL.8.2

- **Speaking and Listening Standards 6-12:**

Presentation of Knowledge and Ideas, SL.8.4

- **Speaking and Listening Standards 6-12:**

Comprehension and Collaboration, SL.6.1

- **Speaking and Listening Standards 6-12:**

Comprehension and Collaboration, SL.6.2

- **Speaking and Listening Standards 6-12:**

Comprehension and Collaboration, SL.6.3

- **Speaking and Listening Standards 6-12:**

Presentation of Knowledge and Ideas, SL.6.4

- **Speaking and Listening Standards 6-12:**

Comprehension and Collaboration, SL.7.1

- **Speaking and Listening Standards 6-12:**

Comprehension and Collaboration, SL.7.2

- **Speaking and Listening Standards 6-12:**

Comprehension and Collaboration, SL.7.3

- **Speaking and Listening Standards 6-12:**

Presentation of Knowledge and Ideas, SL.7.4

- **Writing Standards 6-8:**

Text Types and Purposes, WHST.6-8.1C

- **Writing Standards 6-8:**

Text Types and Purposes, WHST.6-8.1B

NEXT GENERATION SCIENCE STANDARDS

- **MS. Ecosystems: Interactions, Energy, and Dynamics:**

MS-LS2-4. Construct an argument supported by empirical evidence that changes to physical or biological components of an ecosystem affect populations.

Preparation

What You'll Need

MATERIALS YOU PROVIDE

- Pencils

PHYSICAL SPACE

- Classroom

SETUP

Students will need to be in participant structures that allow for whole class discussion as well as small group work. A space that allows students to move freely between these structures is needed.

GROUPING

- Heterogeneous grouping
- Large-group instruction

OTHER NOTES

This activity is intended to be conducted in three, 50-minute class periods: Day 1—students explore the map and construct knowledge about the water and nutrient cycles and the organisms that live in different landscapes of the forest; Day 2—students construct arguments; Day 3—students present arguments.

BACKGROUND & VOCABULARY

Background Information

Rain forests are disappearing at an alarmingly fast pace, largely due to human development over the past few centuries. Once covering 14% of land on Earth, rain forests now make up only 6%. Since 1947, the total area of tropical rain forests has likely been reduced by more than half, to about 6.2 to 7.8 million square kilometers (3 million square miles). Many biologists expect rain forests will lose 5-10% of their species each decade. Rampant deforestation could cause many important rain forest habitats to disappear completely within the next hundred years. Throughout the Amazon, mining and logging operations clear cut to build roads and dig mines. The Amazon is also threatened by massive hydroelectric power projects, where dams flood acres of land. Development is encroaching on rain forest habitats from all sides.

More than 20% of the world's oxygen is produced in the rainforest. The rainforest is also a carbon sink, which means it helps to remove carbon dioxide from the atmosphere. With rapid deforestation, it has been estimated that 20% of the Amazon rainforest has disappeared in the last 50 years, which has already led to detrimental effects to biodiversity and climate change.

There are many species of plants and animals that live in the Amazon rain forest and are endangered or threatened, including primates such as the spider monkey and red-handed howler monkey. When large trees are removed, the large canopy that provided shelter, food, or nesting for some of these species disappears, resulting in relocation and possible fragmentation of some populations. Changes made to the ecosystem affect all life that lives there, but for the endangered or threatened populations, these changes could challenge their survival.

Prior Knowledge

["map reading skills","ability to select evidence from maps and text that supports a claim","ability to obtain, evaluate, and communicate information from media and text resources"]

Recommended Prior Activities

- None

Vocabulary

Term	Part of Speech	Definition
biodiversity	<i>noun</i>	all the different kinds of living organisms within a given area.
deforestation	<i>noun</i>	destruction or removal of forests and their undergrowth.
ecosystem	<i>noun</i>	community and interactions of living and nonliving things in an area.
evapotranspiration	<i>noun</i>	loss of water from the Earth's soil by evaporation into the atmosphere and transpiration by plants.
nutrient cycle	<i>noun</i>	circulation of a chemical, such as water or oxygen, through living and nonliving parts of Earth.
rainforest	<i>noun</i>	area of tall, mostly evergreen trees and a high amount of rainfall.
resource	<i>noun</i>	available supply of materials, goods, or services. Resources can be natural or human.
tropical rain forest	<i>noun</i>	grouping of tall evergreen trees, usually close to the Equator, which receives more than 203 centimeters (80 inches) of rain a year.
water cycle	<i>noun</i>	movement of water between atmosphere, land, and ocean.

FUNDER



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