NATIONAL GEOGRAPHIC

RESOURCE LIBRARY I ACTIVITY : 1 HR 40 MINS

Exploring the Relationship between Human Activity and Habitat Loss in the Amazon

Students analyze a map to identify and describe the relationship between habitat loss, land cover, and indigenous territories. After analyzing the effects of human activity on the current map, students make a prediction about how railroad development may impact the rain forest ecosystem and distribution of indigenous populations.

GRADES

6, 7, 8

SUBJECTS

Geography, Human Geography

CONTENTS

5 PDFs

OVERVIEW

Students analyze a map to identify and describe the relationship between habitat loss, land cover, and indigenous territories. After analyzing the effects of human activity on the current map, students make a prediction about how railroad development may impact the rain forest ecosystem and distribution of indigenous populations.

For the complete activity with media resources, visit:
http://www.nationalgeographic.org/activity/exploring-relationship-between-human-activity-and-habitat-loss-amazon/

DIRECTIONS

1. Engage student interest by introducing the plan to build a transcontinental railroad in the Amazon rain forest.

Distribute the map Amazonia: The Human Impact to students. Read the paragraph under the Transcontinental Railroad heading to students: Proposed by Peru, Brazil, and China, a $10 billion, 3,300-mile-long (5300 km) rail line would speed transport of resources like soy and phosphates. It would also affect pristine areas and 600 indigenous communities. Discuss terms that might be unfamiliar to students such as *soy, phosphates, pristine,* and *indigenous communities*. Then have students brainstorm the pros and cons of building this railroad. (If there is a local development project, use that scenario to start the conversation and draw out student ideas and then connect those ideas to the railroad). Ask: *Why do people believe they need this railroad? Who could benefit from having this railroad? Why might it affect "pristine areas" and "indigenous communities"? How might it affect these areas and communities?* Tell students they are going to explore the Amazon rain forest by looking at a map that can provide more information about what the area looks like now. This will help them think about how the area and people near the proposed railroad site might be affected by the railroad construction.

2. Construct knowledge about land cover types, habitat loss, and indigenous territories throughout Amazonia.

Distribute the worksheet Human Activity in the Amazon. Invite a volunteer to read aloud the directions to the class. Divide students into small groups of three. Have students engage in a jigsaw activity to complete the worksheet. To start, have each group use the map Amazonia: The Human Impact to complete one part of the worksheet. Groups will be assigned one of the following: Part 1. Land Cover in the Amazon; Part 2. Habitat Loss in the Amazon; or Part 3. Indigenous Territories in the Amazon.

3. Draw relationships between land cover, roads, and habitat loss in Amazonia.

Regroup students into new groups of three so there is an expert for each part of the worksheet in each new group. In their groups, have students first share what they learned about their part. Then have students continue to use the map Amazonia: The Human Impact to complete Part 4. Human Activity in the Amazon within their new small groups.

4. Make a prediction about the effects of building a transcontinental railroad through the Amazon rain forest.

Ask students to work independently and think about the impact a railroad could have on the land cover, habitat loss, and indigenous territories in the area surrounding the railroad. Have students complete Part 5 of the worksheet Human Activity in the Amazon. They will use this information to develop their prediction. Next, distribute the worksheet Prediction Statement about the Effects of a Transcontinental Railroad in the Amazon Basin and the handout Scientific Prediction (Explanation) about the Effects of a Transcontinental Railroad in the Amazon Basin Rubric. Review both the rubric and the worksheet directions with students. Distribute colored pencils. Ask students to complete and submit their worksheet for assessment.

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 jobs according to their strengths (e.g., recorder, facilitator, speaker, and map reader).

Alternative Assessment

Collect prediction statements from each student and use the rubric provided to assess students' work.

Extending the Learning

- Research a construction project in your local area to help students make a local connection to construction issues. Have students consider the tension between the need for resources and protecting the ecosystem.
- Include information about the long-term impact of other development projects in the Amazon rain forest to help students predict some of the long-term effects of the railroad construction project. For example, in 1964 the rushed extraction of oil from the Ecuadorian region, the "Oriente," led to pollution and disease in much of the area. The Camisea gas project in Peru resulted in gas leaks that contaminated the water and land and also introduced indigenous people to new diseases they could not overcome.
- Have students explore an online interactive map that introduces them to some of the towns, indigenous populations, and flora and fauna along the transcontinental railroad path.
- Have students think about the effects on climate change if the railroad is constructed. The Amazon rain forest is a carbon sink. It 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 discuss what would happen if there were not enough trees to absorb carbon. 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 maps to identify areas of land cover, habitat loss due to fires, deforestation, and roads along with the distribution of indigenous populations in the Amazon rain forest
- draw patterns across layers of information provided in maps, including the relationship between habitat loss, land cover, and the distribution of indigenous populations in the Amazon rain forest

- make a prediction about the effects on habitat loss, land cover, and indigenous populations if a transcontinental railroad is built in the Amazon rain forest

Teaching Approach

- Learning-for-use

Teaching Methods

- Cooperative learning
- Discussions
- Reading
- Writing

Skills Summary

This activity targets the following skills:

- 21st Century Student Outcomes
  - Information, Media, and Technology Skills
    - Information Literacy
    - Information, Communications, and Technology 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.6.1
• **Speaking and Listening Standards 6-12:**
Comprehension and Collaboration, SL.6.2

• **Speaking and Listening Standards 6-12:**
Comprehension and Collaboration, SL.7.1
• **Speaking and Listening Standards 6-12:**
Comprehension and Collaboration, SL.7.2
• **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

- Colored pencils
- 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

OTHER NOTES

This activity is intended to be conducted in two, 50-minute class periods: Day 1– students explore the map and construct knowledge about the relationship between habitat loss, land cover, and indigenous territories; Day 2–students write and present prediction statements.

RESOURCES PROVIDED: HANDOUTS & WORKSHEETS

- Amazonia: The Human Impact
- Human Activity in the Amazon
- Human Activity in the Amazon Answer Key
- Prediction Statement About the Effects of a Transcontinental Railroad in the Amazon Basin
- Scientific Prediction About the Effects of a Transcontinental Railroad in the Amazon Basin Rubric

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.

Indigenous communities are scattered throughout the Amazon rain forest. These populations have a long relationship with the forest that allows them to hunt, fish, and grow crops for sustenance. Indigenous territories are diminishing as loggers, drug traffickers, oil companies, and miners have encroached on their land. As a result, they have retreated deeper into the jungle, where they choose to live in isolation to preserve their cultural traditions and spiritual connections to the rain forest.

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

["basic understanding of the term deforestation and its causes","basic map analysis skills","ability to use a map key to draw conclusions about a map","ability to look at multiple maps of the same area that show different data and extrapolate patterns across these layers","ability to select evidence from maps and text that supports a claim","ability to obtain, evaluate, and communicate information from map resources"]

Recommended Prior Activities

- None

Vocabulary

Term	Part of Speech	Definition
carbon sequestration	*noun*	process of capturing carbon emissions and storing them underground.
carbon sink	*noun*	area or ecosystem that absorbs more carbon dioxide than it releases.
deforestation	*noun*	destruction or removal of forests and their undergrowth.
ecosystem	*noun*	community and interactions of living and nonliving things in an area.
indigenous	*adjective*	characteristic to or of a specific place.
indigenous reserve	*noun*	area of land set aside by the government for exclusive use by an indigenous community.
phosphate	*noun*	type of salt used as fertilizer. Excess phosphates can choke freshwater ecosystems.
prediction	*noun*	forecast or projected outcome of a situation.
rainforest	*noun*	area of tall, mostly evergreen trees and a high amount of rainfall.
resource	*noun*	available supply of materials, goods, or services. Resources can be natural or human.

Term	Part of Speech	Definition
soy	*noun*	beans, or fruit, of the soybean plant, native to Asia.
transcontinental railroad	*noun*	railroad that spans an entire continent.
tropical rain forest	*noun*	grouping of tall evergreen trees, usually close to the Equator, which receives more than 203 centimeters (80 inches) of rain a year.

FUNDER

Educational resources for this project funded by the Gordon and Betty Moore Foundation and the BIO Program at the Inter-American Development Bank.