

RESOURCE LIBRARY | ACTIVITY : 50 MINS

# A Proposal to Build a Road in the Amazon

Students explore a real-world social issue of building a road in the Amazon. Students investigate the benefits this road could offer to the communities along the Brazil-Peru corridor and weigh this against the potential threats to the ecosystem and indigenous peoples.

## GRADES

9 - 12+

## SUBJECTS

*Biology, Geography, Human Geography*

## CONTENTS

3 PDFs

## OVERVIEW

Students explore a real-world social issue of building a road in the Amazon. Students investigate the benefits this road could offer to the communities along the Brazil-Peru corridor and weigh this against the potential threats to the ecosystem and indigenous peoples.

For the complete activity with media resources, visit:

<http://www.nationalgeographic.org/activity/proposal-build-road-amazon/>

## DIRECTIONS

### 1. Connect to students' prior knowledge about human impacts on the environment.

Activate students' prior understanding about human impacts on the environment. Have students think about various construction projects—buildings, bridges, highways, etc. (If there is something local, use that more relevant scenario to draw out student ideas.) Have students think about why these construction projects are important for the local communities and

people who live there. Ask: *Why do we need more bridges? Another building? Wider highways? What are the benefits of making these changes?* Then have students think about the effects these projects have on the environment. Ask: *What other living things are often affected by decisions to build bridges, roads, or buildings? How are they affected?* Have students think about the tensions involved in making difficult decisions. Ask a couple of students to share their thoughts with the class. The focus of this discussion is to get a few examples and to get students thinking about human impacts on the environment.

## **2. Introduce the Amazon Road Building case study.**

Give students The Amazonian Road Decision handout and ask them to read for understanding. Ask students to write any questions they might have. After reading the case study, have a brief discussion with the class to check for understanding. Ask:

- *What is the reason for building the road?* (The purpose is to connect rural communities that have had relatively stagnant economic growth over the past few decades.)
- *Who does the road benefit?* (It will benefit the rural communities near the road, particularly citizens of Cruzeiro do Sul, Brazil, by giving them access to transport and trade their goods to a larger city, and ultimately enhance their participation in the global economy.)
- *What would happen to the environment in the area if the road were built?* (The primary concern is the correlation between deforestation and roads throughout the Amazon. This road will provide easier access to large canopy trees, such as mahogany, that are highly valued in the global economy. Removing these trees will release large amounts of carbon into the atmosphere, affecting global warming. Additionally, road construction and ultimately road use could lead to pollution in the area and damage water quality.)
- *What would happen to the people and other living things in the area if the road were built?* (The indigenous people, like the Ashéninka population, will have to relocate and could face threats from disease as they lack immunity to diseases from outside cultures. Canopy dwellers—like birds and monkeys—and other living things will have to relocate as their resources and water quality will be diminished.)

## **3. Have students portray one of the stakeholders from the Amazon Road case study.**

Brainstorm individuals that might be involved in the decision about the construction of the Pucallpa-Cruzeiro do Sul road. Explain that the individuals they identify are called *stakeholders*. A stakeholder is a person, organization, living organism, or physical environment that is affected by the decision that is made. Some stakeholders, such as people and

organizations, have a strong voice in the decision and generally are a part of the decision-making process. Other stakeholders, such as plants, animals, and the physical environment, are silent and do not have a voice in the decision or the process for making a decision. Remind students that the Pucallpa-Cruzeiro do Sul road has a real-world environmental impact and, therefore, many stakeholders will be influenced when decisions are made. Write the list of stakeholders identified on the board (Ashéninka people (indigenous communities), Amazonian ecosystem, wildlife, loggers and logging companies, residents of rural communities, international consumers).

Distribute the Stakeholder Table worksheet, and model how to complete the first row. Explain to students that they will take on the role of one of these stakeholders and will write an early decision statement based on their knowledge and viewpoint of that stakeholder. Divide students into groups of three, and assign each group one of the stakeholders; grouping in odd numbers supports a more productive discussion. Ask students to read about their stakeholder in The Amazonian Road Decision handout and complete the row for that stakeholder in Part 1 of the Stakeholder Table worksheet. After they have discussed this stakeholder thoroughly, have students work as a group to write a decision statement from their stakeholder's perspective in Part 2 of the Stakeholder Table worksheet. There are no right or wrong answers to the table or the decision statement.

#### **4. Have stakeholder groups share their decision statement.**

Ask each group to share its decision statement with the rest of the class. Record the decision statements on the board for all students to see. As groups are sharing, the audience groups can fill out the rest of their Stakeholder Table worksheet.

#### **5. Have students reflect on the level of influence each of the stakeholder's has in the Amazon road decision.**

After all groups have presented, have a class discussion about the similarities and differences among the various stakeholder statements. To promote discussion, categorize the stakeholders that are in favor of building the road and the stakeholders that are not in favor of the road. Compare and contrast the reasoning of each of the stakeholder's groups. Ask the

class to share aloud which stakeholder(s) they think have the most influence in the decision-making process. Ask: *Which of the stakeholders have the least influence and why? Which stakeholders will be the most affected by the decision to build a road? Is there a relationship between the stakeholders that have the least influence and the ones that are the most affected?* (There is no right answer to these questions. Use these questions to support a lively discussion. When appropriate, reference the case study.) Ask students to take notes on the back of the Stakeholder Table worksheet. Ask students to hold onto their notes and Stakeholder Table worksheet. They will use this table and their notes in Activity 3 of this lesson.

## **6. Have students reflect on the Amazon road decision.**

Explain to students that in this activity, they were asked to make a decision from one perspective. Ask: *What do you think it would be like if you had to negotiate the multiple perspectives and needs of all stakeholders? Do you think you could come to a decision in which all involved would be happy? If yes, why? What would the process be?* Remind students a decision like this is much more complicated than taking one stakeholder's perspective. An informed environmental decision requires an examination of economic, cultural, and environmental factors. Have students individually reflect upon the process they went through by writing their thoughts on a piece of paper. Have them consider which factors they need to explore more so they can make a more informed decision. Use the following questions to guide their reflections:

- *What were some of the roadblocks you experienced in making your decision?*
- *Was there anything you considered but was not necessary in your discussions during your decision-making process? Explain.*
- *Did you feel that all stakeholders got a fair voice in the process? Why or why not?*
- *How did your group weigh the different consequences when making your decision statement?*
- *Did you consider economic, cultural, and environmental factors equally? If so, what played into your decision? If not, what factors do you need to explore more so you can make a decision that more fully considers cultural, environmental, and economic consequences?*

## **Modification**

For struggling readers, have them annotate the reading by circling new vocabulary and underlining important phrases or sentences. They can also be paired with more confident readers to help process the text.

## 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.

## Alternative Assessment

In this activity, students will complete the Stakeholders Table in small groups and participate in discussion. They will also draft a Decision Statement based on one stakeholder's perspective. Student talk and student work will be used to determine if students are meeting both objectives for this activity.

## Extending the Learning

- Have students write a persuasive paper to argue for or against building the road from the point of view of one stakeholder.
- Have students conduct further research on local building practices and create an informative campaign (brochure, multimedia presentation, etc.) for or against a local building project.
- Have students use MapMaker Interactive to explore the geography of the Amazon rain forest.

## OBJECTIVES

## Subjects & Disciplines

**Biology**

**Geography**

- Human Geography

## Learning Objectives

Students will:

- identify the role that stakeholders play in determining the outcome of building a road within the Amazon rain forest
- identify various geographic and political factors that may influence the decision to build a road in the Amazon rain forest

## Teaching Approach

- Learning-for-use

## Teaching Methods

- Cooperative learning
- Discussions
- Reading
- Role playing
- Writing

## 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
- Critical Thinking Skills
  - Analyzing
  - Understanding
- Geographic Skills
  - Acquiring Geographic Information
  - Analyzing Geographic Information

- Science and Engineering Practices
  - Analyzing and interpreting data
  - Asking questions (for science) and defining problems (for engineering)
  - Constructing explanations (for science) and designing solutions (for engineering)
  - Engaging in argument from evidence
  - Obtaining, evaluating, and communicating information

# National Standards, Principles, and Practices

## NATIONAL COUNCIL FOR SOCIAL STUDIES CURRICULUM STANDARDS

- Theme 11: The Patterns and Networks of Economic Interdependence on Earth's Surface:
- Theme 14: How human actions modify the physical environment:
- Theme 16: The changes that occur in the meaning, use, distribution, and importance of resources:

## COMMON CORE STATE STANDARDS FOR ENGLISH LANGUAGE ARTS & LITERACY

- Reading Standards for Informational Text 6-12:

Key Ideas and Details, RI.9-10.2

- Reading Standards for Informational Text 6-12:

Key Ideas and Details, RI.9-10.1

- Reading Standards for Informational Text 6-12:

Key Ideas and Details, RI.9-10.3

- Reading Standards for Informational Text 6-12:

Key Ideas and Details, RI.11-12.1

- Reading Standards for Informational Text 6-12:

Key Ideas and Details, RI.11-12.2

- Reading Standards for Informational Text 6-12:

Key Ideas and Details, RI.11-12.3

- Speaking and Listening Standards 6-12:

Comprehension and Collaboration, SL.9-10.1

- Speaking and Listening Standards 6-12:

Comprehension and Collaboration, SL.11-12.1

- Writing Standards 6-12:

Text Types and Purposes, W.11-12.2

• **Writing Standards 6-12:**

Text Types and Purposes, W.9-10.2

## **NEXT GENERATION SCIENCE STANDARDS**

• **HS. Earth's Systems:**

HS-ESS3-4. Evaluate or refine a technological solution that reduces impacts of human activities on natural systems.

• **HS. Ecosystems: Interactions, Energy, and Dynamics:**

HS-LS2-7. Design, evaluate, and refine a solution for reducing the impacts of human activities on the environment and biodiversity.

### **Preparation**

### **What You'll Need**

### **MATERIALS YOU PROVIDE**

- Copies of Handout – The Amazonian Road Decision
- Copies of student worksheet (one per group of students) – Stakeholders Table
- Pencils (1 per student)

### **REQUIRED TECHNOLOGY**

- Tech Setup: Interactive whiteboard, Presentation software

### **PHYSICAL SPACE**

- Classroom

### **SETUP**

In Activity 1, 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

## RESOURCES PROVIDED: HANDOUTS & WORKSHEETS

- [Stakeholder Table Answer Key](#)
- [Stakeholder Table](#)
- [The Amazonian Road Decision](#)

## BACKGROUND & VOCABULARY

### Background Information

- 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 20% 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. The diminishing rain forest would greatly affect global warming.
- The Amazon is one of the most biodiverse ecosystems in the world. Yet, there are species that live there that are endangered or threatened, including primates such as the spider monkey and red howler monkey. When large trees, like mahogany, 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.
- Indigenous communities are scattered throughout the Amazon rain forest. The Ashéninka are one indigenous group whose territory lies at the Peru-Brazil border. They are the second largest indigenous group in the Amazon rain forest (behind the Quechua). Most of the Ashéninka population lives on the Peruvian side of the border, where they hunt, fish, and grow crops for sustenance. Ashéninka territories have been 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.
- Mahogany, a strong, reddish-brown wood, is found throughout the tropical Amazon rain forest, with dense populations near the Peru-Brazil border. It is valued for its color (hence

the nickname, “red gold”) and durability and often used in paneling, furniture-making, and for musical instruments. The United States and Britain are the two largest importers of mahogany. In 2001, Brazil put a moratorium on mahogany exports making Peru the leading exporter. A 2012 World Bank report estimated that 80% of Peruvian timber export stemmed from illegal logging. A conservative estimate in 2000 stated nearly 57,000 mahogany trees were provided to the United States alone.

- Tensions are high between environmental activists who want to protect the rain forest and illegal loggers, miners, and other developers who want to make money to provide a better standard of living for their families and communities. In the past 10 years, over 900 environmental activists have been killed around the world. Peru has had around 60 deaths since 2002, making it one of the top five most dangerous places in the world for people who defend the environment. (Brazil alone has accounted for nearly 450 deaths in this same timespan.)
- South America includes thousands of rural communities. Due to poor infrastructure throughout many South American countries, these communities remain weakly connected, if connected at all, to the larger global economy. As a result, these countries have fallen behind other countries that have made decisions to invest in upgrading their highway infrastructure in the global trade market. More roads, or other means of connecting these communities, are needed throughout the continent.

## Prior Knowledge

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## Recommended Prior Activities

- [Building a Decision Statement](#)
- [Consequences in Environmental Decisions](#)
- [Environmental Decision-Making](#)
- [Influences of an Environmental Decision](#)

## Vocabulary

Term	Part of Speech	Definition
biodiversity	<i>noun</i>	all the different kinds of living organisms within a given area.

<b>Term</b>	<b>Part of Speech</b>	<b>Definition</b>
<b>carbon sink</b>	<i>noun</i>	area or ecosystem that absorbs more carbon dioxide than it releases.
<b>climate</b>	<i>noun</i>	all weather conditions for a given location over a period of time.
<b>deforestation</b>	<i>noun</i>	destruction or removal of forests and their undergrowth.
<b>economy</b>	<i>noun</i>	system of production, distribution, and consumption of goods and services.
<b>ecosystem</b>	<i>noun</i>	community and interactions of living and nonliving things in an area.
<b>greenhouse gas</b>	<i>noun</i>	gas in the atmosphere, such as carbon dioxide, methane, water vapor, and ozone, that absorbs solar heat reflected by the surface of the Earth, warming the atmosphere.
<b>indigenous</b>	<i>adjective</i>	characteristic to or of a specific place.
<b>infrastructure</b>	<i>noun</i>	structures and facilities necessary for the functioning of a society, such as roads.
<b>logging</b>	<i>noun</i>	industry engaged in cutting down trees and moving the wood to sawmills.
<b>rainforest</b>	<i>noun</i>	area of tall, mostly evergreen trees and a high amount of rainfall.
<b>rural</b>	<i>adjective</i>	having to do with country life, or areas with few residents.
<b>stakeholder</b>	<i>noun</i>	person or organization that has an interest or investment in a place, situation or company.
<b>watershed</b>	<i>noun</i>	entire river system or an area drained by a river and its tributaries.

## For Further Exploration

### Websites

- [National Geographic Magazine: Red Gold Rush](#)
- [National Geographic Magazine: Mahogany's Last Stand](#)

FUNDER



**IDB**  
Inter-American  
Development Bank

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FOUNDATION

Educational resources for this

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



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