

RESOURCE LIBRARY | ACTIVITY : 50 MINS

The Roots of Extinction

Students brainstorm what factors lead to species becoming endangered or extinct. Then, students watch a video to uncover major challenges facing the Sumatran rhino and develop a scientific argument about the reasons for the species' decline.

GRADES

6, 7, 8

SUBJECTS

Biology, Ecology, Conservation

CONTENTS

1 PDF, 1 Link, 1 Video

OVERVIEW

Students brainstorm what factors lead to species becoming endangered or extinct. Then, students watch a video to uncover major challenges facing the Sumatran rhino and develop a scientific argument about the reasons for the species' decline.

For the complete activity with media resources, visit:

<http://www.nationalgeographic.org/activity/roots-extinction/>

In collaboration with



DIRECTIONS

This activity is part of the Extinction Stinks! unit.

1. Lead a brainstorm discussion to elicit students' ideas about why species become endangered or extinct.

- Ask: *What are some reasons that cause species to become endangered or extinct?*
 - Use a think-pair-share strategy to have students brainstorm and share their ideas.
 - Possible responses include:
 - Overharvesting
 - Habitat loss
 - Poaching and illegal hunting
 - Climate change
 - Pollution
 - Record students' responses on a whiteboard or a piece of butcher paper at the front of the room. Collect all of their responses for now, regardless of whether or not they may be a major cause of extinction.
- Ask students to predict which of these factors are most important to the Sumatran rhino becoming endangered. Ask them to support their claim using what they learned from SOS –Saving our Species.

2. Use a map to orient students to the Sumatran rhino's current challenges.

- Display or distribute the Vanishing Populations Map to students. Prompt students to explore the map, then ask them to identify the major pieces of information they can gather from the map. Record their responses on the board. These might include:
 - Sumatran rhino populations decreased 70 percent in the last 20 years.
 - Poaching is the major cause of the species' decline.
 - Populations are small in number (5-50) and spread out across several islands in small, isolated fragments.

3. Show a video to solidify new information about the Sumatran rhino's conservation needs.

- Show the Saving the Sumatran Rhino (5:26 minutes), prompting students to focus on what specific factors led to the Sumatran rhino becoming endangered.

- After playing the video, direct students to revisit their brainstorm list and claim about the Sumatran rhino from Step 1.
 - They may want to add new reasons why animals become endangered now that they have more information specific to the Sumatran rhino.
 - Ask students if their original prediction for what most threatens the Sumatran Rhino was correct or incorrect.
 - Emphasize the factors discussed in the video and map: geographic isolation, habitat destruction, poaching, and a slow gestation rate.

4. Ask students to write initial claims, evidence, and reasoning about three factors that contribute to the Sumatran rhinos' path to extinction.

- Distribute the Understanding Extinction handout to students. Explain that they will complete Part I by writing about the cause and effect of three factors that have led the Sumatran rhino closer to extinction.
- Have students work individually or with a partner to develop their scientific argument about why the three factors threaten the Sumatran rhino, using a Claim-Evidence-Reasoning (C-E-R) format.
 - Students may want to watch the Saving the Sumatran Rhino video one more time, once they have identified their claims to provide the evidence they need for their arguments.
 - Although only words are required, images may also be helpful in supporting students' C-E-R statements.
- Have students complete the reflection question at the end of Part I on the *Understanding Extinction* handout and share their ideas.
 - Possible responses include:
 - Promote captive breeding programs and reintroductions.
 - Protect land from deforestation and restoring habitat.
 - Monitor protected areas and enforcing regulations to reduce poaching.
 - This question prompts students to consider possible conservation solutions for dealing with issues, which is important preparation for the final product of the Extinction Stinks! unit.

Modification

Step 3: Try [this introduction lesson](#) from the Lawrence Hall of Science to orient students to the relationships between claims, evidence, and reasoning.

Tip

Step 3: Working with students on supporting a claim using evidence connected through reasoning is an important skill emphasized in the Next Generation Science Standards (NGSS). Read more about claims, evidence, and reasoning in [this article](#) from Ambitious Science Teaching.

Informal Assessment

Read students' *Understanding Extinction* handouts to evaluate their thinking about the causes of the rhino's endangered status. Look carefully for any evidence that was not present in the video, or reasoning that does not clearly tie the evidence to students' claims.

Extending the Learning

Learn more about [genetic bottlenecks](#), a phenomenon in which small numbers of individuals that are geographically isolated end up with low genetic diversity. This leads to vulnerability to diseases and other challenges, as individuals that are closely related will be more likely to have similar reactions to change and, therefore, an entire population could be wiped out if their genetic makeup makes them susceptible to that change.

OBJECTIVES

Subjects & Disciplines

Biology

- [Ecology](#)
- Conservation

Learning Objectives

Students will:

- Utilize different sources to determine some of the major causes of extinction.
- Draw from different sources to identify some of the challenges faced by the Sumatran rhino, a species at risk of extinction.
- Apply an understanding of conservation issues specific to the Sumatran rhino.
- Practice developing scientific claims supported by evidence and reasoning.

Teaching Approach

- Project-based learning

Teaching Methods

- Brainstorming
- Discussions
- Visual instruction

Skills Summary

This activity targets the following skills:

- 21st Century Student Outcomes
 - Information, Media, and Technology Skills
 - Information, Communications, and Technology Literacy
 - Media Literacy
- 21st Century Themes
 - Environmental Literacy
 - Global Awareness
- Critical Thinking Skills
 - Analyzing
 - Applying
 - Understanding
- Geographic Skills
 - Acquiring Geographic Information
 - Analyzing Geographic Information
- Science and Engineering Practices

- Asking questions (for science) and defining problems (for engineering)
- Engaging in argument from evidence
- Obtaining, evaluating, and communicating information

National Standards, Principles, and Practices

COMMON CORE STATE STANDARDS FOR ENGLISH LANGUAGE ARTS & LITERACY

- **CCSS.ELA-LITERACY.SL.7.1:**

Engage effectively in a range of collaborative discussions (one-on-one, in groups, and teacher-led) with diverse partners on Grade 7 topics, texts, and issues, building on others’ ideas and expressing their own clearly.

- **CCSS.ELA-LITERACY.SL.7.2:**

Analyze the main ideas and supporting details presented in diverse media and formats (e.g., visually, quantitatively, orally) and explain how the ideas clarify a topic, text, or issue under study.

NEXT GENERATION SCIENCE STANDARDS

- **Crosscutting Concept 1:**

Patterns

- **Crosscutting Concept 2:**

Cause and effect: Mechanism and prediction

- **Disciplinary Core Ideas LS2.A: Interdependent Relationships in Ecosystems:**

- **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.

- **Science and Engineering Practice 1:**

Asking questions and defining problems

- **Science and Engineering Practice 7:**

Engaging in argument from evidence

- **Science and Engineering Practice 8:**

Obtaining, evaluating, and communicating information

Preparation

What You’ll Need

MATERIALS YOU PROVIDE

- Printed copies of the *Understanding Extinction* handout for each student

REQUIRED TECHNOLOGY

- Internet Access: Required
- Tech Setup: 1 computer per classroom, Projector, Speakers

PHYSICAL SPACE

- Classroom

GROUPING

- Large-group learning

BACKGROUND & VOCABULARY

Background Information

Many factors, including habitat loss, overexploitation, invasive species, climate change, and toxic pollution driven by human activities, may cause a species to become endangered. Habitat loss, overharvesting, and invasive species can all lead to a decrease in population size and, therefore, genetic diversity. Genetic diversity is essential to having a thriving species that can withstand challenges like climate change and disease. Of the more than 100,000 species assessed by the International Union for Conservation of Nature (IUCN), more than one fourth are categorized on the Red List as threatened to some extent.

Prior Knowledge

["Students should be somewhat familiar with the differences between a claim, evidence, and reasoning before completing the C-E-R activity in Step 4. See the "Tips" section for an external lesson that can help introduce these concepts."]

Recommended Prior Activities

- [SOS—Saving Our Species](#)

Vocabulary

Term	Part of Speech	Definition
endangered species	<i>noun</i>	organism threatened with extinction.
extinction	<i>noun</i>	process of complete disappearance of a species from Earth.
gestation	<i>noun</i>	pregnancy, or the period from conception until birth.
isolation	<i>noun</i>	separation from other people, habitats, or communities.
species range	<i>noun</i>	native, geographic area in which an organism can be found. Range also refers to the geographic distribution of a particular species.

For Further Exploration

Articles & Profiles

- [National Geographic: The Permian Extinction—When Life Nearly Came to an End](#)
- [National Geographic: Endangered Species](#)
- [Endangered Species Coalition: 10 Easy Things You Can Do To Protect Endangered Species](#)

Images

- [National Geographic: Genetic Bottleneck](#)



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