

I ENGAGING IN THE FIGHT AGAINST EXTINCTION

Welcome! Whether you have already begun teaching this unit or are previewing it in preparation for the future, this document will give you a deeper understanding of this unit's primary content, its project-based structure, and the pedagogical approaches underlying its design.

BIG IDEAS

While many may believe that topics like extinction, biomes, and species are best left to the science classroom, the roles of the historian who understands the past to influence the future and the eco-activist who spreads a message to change the world undoubtedly falls within the realm of social studies. In the unit [Engaging in the Fight Against Extinction](#), students are introduced to multiple mass extinctions that wiped out over 90 percent of species that have ever lived on Earth. They are also made aware of how mankind and nature are impacting the environment and threatening the existence of species around the world.

Students are invited to address this overwhelming problem in a more focused, manageable manner by turning their attention to one endangered species within one of Earth's biomes. Students research human factors, like patterns of human settlement and land use, and environmental factors, like climate patterns and natural disasters, that have driven these animals toward extinction. Then, students examine cascade effects and what the loss of one species could mean for others, including our own.

Finally, students look at examples of eco-artists and activist organizations that are taking action while inspiring others to join along. Driven by the question, How can we, as planetary stewards, take an active role in saving species from extinction?, students are empowered to create an informational pamphlet to spread their own message of hope and the urgency for action.

By joining the ranks of eco-artists, activists, and environmental organizations that are already raising awareness and inspiring others to change their behaviors, students have the opportunity to be the next generation of planetary stewards. This opportunity for intense engagement and willingness to take and advocate for immediate action will inspire your students to build hope for the future of Earth's imperiled species.

UNIT DRIVING QUESTION

How can we, as planetary stewards, take an active role in saving species from extinction?

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CHALLENGES AND OPPORTUNITIES

Prepare for possible challenges that students may have with particular concepts, as well as for opportunities to make connections to students’ ideas and authentic disciplinary practices as they engage with this unit.

Challenges

What are the challenges your students may face in this unit? In this section, you will find guidance and ideas to support your students’ understanding of content and/or practices that might be challenging.

1. Students may have emotional difficulty accepting that we are currently contributing to our own mass extinction event. These emotions could range from general anxiety to guilt and defensiveness.

Guidance:

- Be open to having conversations about how the reading or videos make students feel. Normalize the feelings.
- Recognizing defensiveness could include human-first arguments, such as how people’s livelihoods depend on resource extraction and use.
- Focus on trade-offs in future actions, rather than a human versus animals approach.

- Frame the subject with the purpose of empowering the students and creating hope for the future. Explain the importance of understanding problems and causes, so we can take action to initiate change.

2. Students may have difficulty with the amount of reading necessary to fully understand their focal species and the factors driving their extinction.

Guidance:

- Break up long texts into manageable sections for students ahead of time.
- Review common features of online informational texts so that students can read effectively.
- Suggest students [Stop and Jot: The Teacher Toolkit](#) at the end of each section to take any notes on important information they have learned. Review using text structures such as maps, infographics, and images, as shown in [Teaching Text Structures for Non-Fiction Reading: Cult of Pedagogy](#), to support understanding of complicated, visual-heavy texts. Practicing strategies like the text feature walk, explained by [Reading Rockets](#), can remind students how to use the features when they are available.
- Frame the study of eco-artists and the inclusion of art in their final product as an example of a text feature that is essential to conveying the message to those who view their pamphlets.

LESSON DRIVING QUESTIONS

Lesson 1:
How have humans impacted Earth for better and for worse?

Lesson 2:
Why is it important to prevent species extinction?

Lesson 3:
How can we inspire others to protect natural habitats and save endangered species from extinction?



Opportunities

What opportunities are present in this unit that you can leverage to create a rich learning environment? Read below to understand how this unit foregrounds students’ prior knowledge and experiences and connects to authentic disciplinary practices.

1. The [Photo Ark](#) is an engaging collection of images of endangered species, photographed by National Geographic photographer Joel Sartore, that draws on students’ natural tendency to appreciate animals and can build engagement for the subject matter about which the students are reading.
2. This unit provides students with an opportunity to see social media as a tool for change rather than just a communication portal. Students can potentially use this medium to extend their message beyond their

classroom, sharing their conservation pamphlets or the message within as part of a social media campaign. Invite discussion and provide examples of how social media can be used as a platform for positive action (see examples given by the [University of Kansas' Center for Community Health and Development](#)). Read [Social Media 201: Leveraging Social Media to Increase Your Visibility](#) by the American Association of University Women for step-by-step suggestions for using each type of social media platform.

3. This activity map leads to a discussion about identifying reliable sources online. The links in the curated lists previously mentioned were chosen for their credibility and relevance and are starting points for research, but students may need to branch out from the lists. Directly teaching this skill can support a student's ability to identify additional credible resources as needed. [Common Sense Media](#) offers many tools, including the [Using Critical Thinking to Identify Trustworthy Websites](#) video, to teach this skill.

PRACTICE-FOCUSED SUPPORT

Think about your students and their needs. You may want to modify some of the activities in this unit. Leverage the following instructional practices to enhance students' learning and provide opportunities to differentiate, according to the needs in your classroom.

Build empathy and perspective-taking to engage productively during challenging discussions.

Complex subject matter in both social studies and science can often bring up topics that are challenging to talk about, whether because they are socially controversial or address identity politics. [Talking Politics: Valuing Different Perspectives](#), a video by Edutopia, teaches about how active perspective-taking can build empathy during identity-related discussions. Other resources include [Practice Brief 44: STEM Teaching Tools](#) about distinguishing between science versus social controversy, and a video on [Structured Academic Controversy: Teaching Channel](#).

Teach across perspectives and scale to engage with interdisciplinary issues.

For today's students to become the next generation of planetary stewards, they must learn to grapple with complex and interdisciplinary issues in productive ways, as explained in an article by [Carleton College's Science Education Resource](#)

[Center](#). At National Geographic, this approach is integral to developing geographic understanding: Read these educator tips about [Teaching at Multiple Scales](#) and [Teaching Across Perspectives](#). Watch resources from [Edutopia](#) about interdisciplinary instruction in action.

Project-Based Learning Supports Social Studies Skills

Project-based learning is a powerful strategy for scaffolding inquiry and disciplinary thinking, as outlined in the C3 framework. Read [Using PBL to Meet C3 Social Studies Standards: Edutopia](#) to learn about these connections, especially attending to how PBL supports students' authentic engagement in disciplinary skills and practices.

LEVERAGING PBL FOR SUCCESSFUL TEACHING AND LEARNING

Project-Based Learning (PBL) is a teaching approach in which students gain knowledge and skills by working to investigate and respond to a complex problem or challenge. Driven by the project, students explore a variety of resources that will help them understand essential content and perspectives for tackling the challenge. Student learning is presented in a culminating product that showcases disciplinary skills and knowledge as they apply to a local or global solution. The sections below outline how this unit is guided by a PBL approach.

Unit Driving Question

How can we, as planetary stewards, take an active role in saving species from extinction?

In this unit's project, students become planetary stewards by taking on the role of an eco-activist and creating an informational trifold pamphlet focused on an endangered species the student has thoroughly researched. The pamphlets will include information about the species and its biome, including data, maps, and graphics, reasons for its endangered status, steps citizens can take to help save the species from extinction, and information on organizations already actively working to save the species.

Leading with Engagement

This unit begins by engaging students through eliciting their prior knowledge and introducing an authentic problem and Driving Question. This creates a reason for learning that drives students through the arc of the unit.

1. The unit launches with students being introduced to the Permian extinction and participating in a discussion about what could have caused so many species to disappear from Earth.
2. Group research on one of the five mass extinctions leads to a whole-class discussion where each group presents its learning about its specific extinction, its characteristics, causes, consequences, and possible solutions that may have prevented the extinction from occurring.
3. Introduction to the unit’s driving question sets students up to see humankind as the contributors to the sixth mass extinction before empowering them to act as planetary stewards—agents of the type of change necessary to prevent the sixth mass extinction.

Learning Together: Collaboration Structures

This unit includes several opportunities for collaboration. Consider the collaboration structures that will work best in your classroom.

1. Students work in research groups initially during the unit launch as they investigate and share information about each of the five mass extinctions. The collaboration enables students to synthesize a large amount of learning in a short amount of time so they can build background knowledge and an urgent reason that they must act.
2. Students uncover harsh truths about the damage humankind has done to the planet, potentially leading to the sixth mass extinction. This subject matter can cause anxiety or feel overwhelming to some students. The collaborative nature of the project provides opportunities for the teacher to address socio-emotional needs with small groups as they arise. Students should be reminded that the work they are doing is a manageable action that they can take toward solving what might seem to be an unmanageable problem. Students can also be coached to support one another emotionally while they work toward proposing solutions.
3. Students work in research groups, determined during the activity [Endangered Species and Their Biomes](#) toward the end of the unit, based on the endangered species and biome they choose. As they develop their trifold pamphlet together, they authentically experience how people with the same goal come together to

successfully address problems that require the action of more than one person to be solved, much like the activist organizations they learn about. The in-depth research necessary to fully understand the causes and effects of a species’ endangerment requires an extensive amount of reading. This may be better undertaken by a collaborative group that can be responsible for reading portions of the information and summarizing it for the rest of the group, thus expediting the learning process.

4. The unit provides curated information, as well as resources from Joel Sartore’s Photo Ark, for 15 specific endangered species. The Photo Ark is a National Geographic project that has the goal of photographing all species living in zoos and wildlife sanctuaries around the globe in order to inspire action to save wildlife. The scope of the work across multiple biomes provides an opportunity for groups of two or three to work together, ensuring that each group can research a different species.

ENGAGING IN AUTHENTIC PRACTICES AND IMPACTS

Throughout the unit, students engage in authentic disciplinary practices and skills through their project work, enabling them to develop disciplinary expertise and identities. Additionally, consider expanding the impact of students’ learning beyond the classroom by providing opportunities such as the ones listed below.

Disciplinary Skills and Practices:

- Generating questions
- Critical thinking
- Making historical connections
- Cause and effect
- Planetary stewardship
- Civic reasoning
- Human-environment interaction
- Understanding regions

Ideas for Impact:

- Taking Action in Local Communities: Student teams carry out their conservation action plans within their own community, educating and engaging with other local actors, dividing responsibilities, urging action on behalf of a vulnerable regional species with the help of knowledgeable and influential sponsors such as zoos, aquariums, and nonprofits.

- **Think Locally:** Students learn about the biome they personally live in and apply what they've learned to identify animals in their local region that need help to avoid extinction.
- **Public Service Announcement:** Students transform trifold into a public service announcement or social media campaign and publish short promotional videos that include trifold work.
- **Connecting with Activists:** Students identify an environmental activist or influencer who is connected to preserving endangered species within their animal's ecosystem. Teams send copies of their completed trifold to them along with a short letter of intent.

Constructing Solutions:

Arc of the Project

In line with the Project-Based Learning approach, project work is structured to unfold over the course of the unit, as students learn content that addresses their questions elicited during the launch of the unit.

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Assessing the Learning

Units intentionally assess student learning over time, through informal and formal assessments. This table highlights assessments you can use to inform your instruction and ensure students can demonstrate their learning of disciplinary content, skills, and practices.

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CONSTRUCTING SOLUTIONS: ARC OF THE PROJECT

PBL PHASE	ACTIVITY	WHAT STUDENTS ARE DOING
<p>Engagement with an authentic, local problem provides a need to know.</p>	<p>Lesson 1, Activity 1: Mass Extinctions Over Time</p>	<p>Students discover the devastation of mass extinctions through research and are introduced to the important role of the planetary steward, empowering them to become eco-activists.</p>
	<p>Lesson 1, Activity 2: Impacts of the Anthropocene Epoch</p>	<p>Students explore the Anthropocene Epoch and the impact humans have had on the environment. They develop a list of human qualities that positively and negatively impact Earth in order to leverage the positive in a way that will convince others to act.</p>
	<p>Lesson 1, Activity 3: Endangered Species and Their Biomes</p>	<p>Students narrow their research focus from mass extinction to the extinction of a single species in a single biome. Student groups select a single species that will be the focus for the remainder of the unit’s work.</p>
<p>Relevant knowledge is explored and applied to the problem through disciplinary skills and practices.</p>	<p>Lesson 2, Activity 1: Causes and Effects of Extinction</p>	<p>Students begin collecting information to understand the human and environmental drivers of the species’ endangerment and the impact a species’ loss can have on other species through cascading effects.</p>
	<p>Lesson 2, Activity 2: Understanding Keystone Species</p>	
	<p>Lesson 2, Activity 3: Promoting Actions to Prevent Extinction</p> <p>Lesson 3, Activity 1: Inspiring Conservation Through Art</p>	
<p>Learning is applied to the development of a discipline-appropriate product.</p>	<p>Lesson 3, Activity 2: Spreading the Message of Conservation</p>	<p>Student teams complete and share their action-oriented conservation projects that serve to preserve one of Earth’s most endangered species.</p>

ASSESSING THE LEARNING

ACTIVITY	ASSESSMENT OPPORTUNITY	SS STANDARD(S) ADDRESSED
Lesson 1, Activity 1: Mass Extinctions Over Time	The Five Mass Extinctions Four-Square assesses students' ability to read and gather information about a specific topic, as well as their understanding of the differentiating characteristics of one of the five mass extinctions, its causes and effects.	CCSS.ELA-LITERACY.WHST.6-8.9. D2.His.14.6-8.
Lesson 1, Activity 2: Impacts of the Anthropocene Epoch	Exploring the Anthropocene Epoch assesses students' ability to analyze connections between harmful aspects of human activity and the potential outcome of the sixth mass extinction. Students also make connections between the positive and negative qualities of humanity that will lead to contributions toward slowing or expediting the sixth mass extinction.	CCSS.ELA-LITERACY.WHST.6-8.9. D2.His.1.6-8.
Lesson 1, Activity 3: Endangered Species and Their Biomes	The Introductory Research on Biomes worksheet guides students in collecting the type of information necessary to differentiate between biomes and begin to consider which of the biomes and species they might be interested in researching for their final project. It also assesses a student's ability to draw evidence from informational texts prior to engaging in research based upon their own questions.	CCSS.ELA-LITERACY.WHST.6-8.9. D3.1.6-8.
Lesson 2, Activity 1: Causes and Effects of Extinction Lesson 2, Activity 2: Understanding Keystone Species Lesson 2, Activity 3: Promoting Actions to Prevent Extinction Lesson 3, Activity 1: Inspiring Conservation Through Art	The Investigating an Endangered Species and its Biome worksheet assesses students' understanding of human and environmental drivers of extinction, cascading effects of the species' extinction, critical risks facing the species, and actions that can be and are being taken to mitigate loss.	CCSS.ELA-LITERACY.WHST.6-8.9. D2.His.14.6-8. D4.6.6-8.
Lesson 3, Activity 2: Spreading the Message of Conservation	The Focal Species Pamphlet: Project Checklist and Rubric assesses students' capacity to take action to address problems through the quality and inclusion of all required elements of the trifold pamphlet, as well as the ability to integrate visual and text-based information meant to inspire others to take action.	CCSS.ELA-LITERACY.WHST.6-8.4. CCSS.ELA-LITERACY.RH.6-8.7. D4.7.6-8.