

Endangered Species Curriculum – High School

Stage 1 – Desired Outcome

Established GOALS:

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- Students will understand the definition of “endangered species” and the concept of biodiversity.
- Students will understand that many endangered species are endangered because of lack of habitat or changing environmental conditions caused by human activity.
- Students will choose one of 10 endangered species to research.
- Students will visit at least 2 web sites to learn about the endangered species they choose. They will describe the species, its role in the ecosystem, the cause of its endangered status, and what must be done to save this species.
- Students will create a “missing species” report, which is like a “missing persons” report and/or a “missing species” poster, which is like a “missing pet or person” poster.
- Students publish their reports and/or posters in a number of ways to share the information with their community.
- Students complete an evaluation to help them grapple with deeper questions about the future of their endangered species and our role in helping them to survive.

Standards by grade:

[Grade 9 and 10](#)

[Grade 11 and 12](#)

[Next Gen Standards](#)

National Arts Standards

UNDERSTANDINGS

U

Big Idea: Students will understand that each species plays an important role in an ecosystem. When changes are made to the environment, plants and animals must adapt or move if they are to survive. Often, they cannot. If we want to save an endangered species, we must save the ecosystem it lives in.

Understandings: Students will understand how one endangered species is connected to the ecosystem where it lives. Why are their ecosystems changing so quickly? What was our role? What is our role in helping them survive?

Misunderstandings: Many people think that losing species relates to the idea of survival of the fittest- a 19th century concept that says those species which are eliminated in the struggle for existence are unfit- and that if species can't adapt to the changing environment humans don't have an obligation to do

ESSENTIAL QUESTIONS:

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Questions that foster inquiry:

- What does it mean for a species to go extinct?
- What does it mean for potential human knowledge and discovery when plant and animal species are lost?
- Is land only important to meet the needs (food production, resources for building things, places to live) of human beings? Do we need wild areas in addition to the land used by people to meet their needs? Why? Why not?
- Should people change their behaviors to save an endangered species? Why? Why not?
- What changes are you willing to make in order to save a species? (Examples: Would you be willing to buy fewer material things? Would you have a birthday party and suggest people make donations to save a species in your name rather than give you a gift? Will you consider donating still-usable items so they don't end up in a landfill prematurely? Will you shop at

<p>what we can to save them.</p> <p>Sometimes environmental problems are caused by businesses that want to make money quickly for the people who have invested in the business. If we disagree with this motive, we need to educate ourselves and make our voices heard. We can also be more thoughtful of our material consumption and spend money in stores that are helping solve environmental problems.</p>	<p>environmentally conscious businesses? Make greater efforts to recycle at home and at school? Would you be willing to use less heat and/or electricity within your home?</p>
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<p>Knowledge: K</p> <p>Students will know that many species of plants and animals are going extinct. We can save many of these species, but it will require changes in our own behaviors, and changes in government policy and business practices.</p>	<p>Skills: S</p> <ul style="list-style-type: none"> • Students will explore the Internet and visit a variety of web sites to gather information about their species. • Students will organize the information and visuals they gather to explain the plight of the endangered species they chose to study. • Students will be able to create an argument for saving a specific endangered species in words and/or images.
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Stage 2 – Assessment Evidence

<p>Performance Tasks: T</p> <p>Students will visit the Endangered Species Coalition Project web site to learn about the species they have chosen to learn about. They may visit other web sites to gain a fuller understanding. Additional sources of information on the ten species are provided in the additional resources sheet.</p> <p>Students demonstrate their understanding of the problem of endangered species by creating a “missing species” report. The reports may be used in a number of ways to draw attention to the problem and its possible solutions. For suggestions on follow-up activities and ways of using these reports please see the OE section.</p> <p>Students demonstrate their understanding of the problem of endangered species by creating “missing species” poster. The posters may be displayed in a number of ways to draw attention to the problem and its possible solutions. For suggestions on</p>	<p>Other Evidence: OE</p> <p>Students can present their reports and/or posters to the class.</p> <p>Students can display their Missing Species Reports and/or posters in their school as an art installation.</p> <p>Students and teachers can organize a display of the reports and posters at their local library or a community center.</p> <p>Students and teachers can email their Missing Species Reports to their Congressional Representatives and Senators and also to the Endangered Species Coalition to support advocacy for endangered species.</p> <p>Students may hang their posters around their community as if they were looking for a lost pet.</p> <p>Students and teachers can organize with other classes in their community to select one day of action where</p>
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follow-up activities and ways of using these posters please see the OE section.

Students may fill out the evaluation to help them decide how important they feel this issue is. These evaluations may be the basis for a class discussion.

they hang their posters around town as a guerrilla art installation.

Teachers can schedule a class trip to their local US Fish and Wildlife Service office and also file the reports with them.

Stage 3 – Learning Plan

Learning Activities:

- **Engage** – Before you start this unit, assign the book *Forgotten Pollinators* by Stephen Buchmann and Gary Paul Nabhan.

Summary: Consider this: Without interaction between animals and flowering plants, the seeds and fruits that make up nearly eighty percent of the human diet would not exist. In "The Forgotten Pollinators," Stephen L. Buchmann, one of the world's leading authorities on bees and pollination, and Gary Paul Nabhan, award-winning writer and renowned crop ecologist, explore the vital but little-appreciated relationship between plants and the animals they depend on for reproduction -- bees, beetles, butterflies, hummingbirds, moths, bats, and countless other animals, some widely recognized and other almost unknown. Scenes from around the globe -- examining island flora and fauna on the Galapagos, counting bees in the Panamanian rain forest, witnessing an ancient honey-hunting ritual in Malaysia -- bring to life the hidden relationships between plants and animals, and demonstrate the ways in which human society affects and is affected by those relationships. Buchmann and Nabhan combine vignettes from the field with expository discussions of ecology, botany, and crop science to present a lively and fascinating account of the ecological and cultural context of plant-pollinator relationships. More than any other natural process, plant-pollinator relationships offer vivid examples of the connections between endangered species and threatened habitats. The authors explain how human-induced changes in pollinator populations -- caused by overuse of chemical pesticides, unbridled development, and conversion of natural areas into monocultural cropland-can have a ripple effect on disparate species, ultimately leading to a "cascade of linked extinctions."

To begin the lesson, write the following quote on the board. Ask students to discuss what they think it means and ask them to discuss whether or not they think it is important to protect endangered species.

"The Endangered Species Act is designed to protect not only large, charismatic wildlife such as grizzly bears and bald eagles, but also species that are more obscure, yet equally unique and critical to the web of life. The Act protects the ecosystems upon which imperiled wildlife and many other species depend, including humans. Through the Endangered Species Act, Americans said it's not enough that wildlife survive in the sterile confines of zoos, but that these species should also thrive in natural environments." Endangered Species Coalition Web Site

Tell students they are going to learn about endangered species. Before talking about endangered species, your students have to understand the interaction of species in ecosystems and biomes. The following videos are useful to reinforce this information.

Karoo Desert (3:40)

<http://video.nationalgeographic.com/video/karoo-desert>

People, Plants and Pollinators (20 minutes)

<http://education.nationalgeographic.com/media/people-plants-and-pollinators/>

Seeing the interactions between the biotic and abiotic parts of ecosystems and biomes, do you think we understand the impact of losing the species that have already gone extinct recently? Do you think we understand everything about the species that are currently endangered?

Visit the Endangered Species Coalition Web Site at

<http://www.endangered.org/campaigns/vanishing-wildlife/>

- Ask your students to choose one of the ten endangered species to research and write about. Students can work individually or in groups as you choose. If the students would like to see if the species they chose lives in your state you can visit <http://www.fws.gov/endangered/>
- **Explore** – Ask students to fill in the [Endangered Species Research](#) page. They should first gather information from the Endangered Species Coalition web site, and then visit at least one more web site to gather information. There are many suggestions for research starting points in the additional resources page.
- **Explain** – After students have had time to do their research, ask them to come together and share information about the species they chose and the causes of their endangered species dilemma. Can they make some generalizations about why so many animals are becoming extinct? How are ecosystems changing? What are some of the causes of these changes?
- **Elaborate** – Have students fill out a missing species report. They can fill in the missing species report form using what they have learned from class discussion and additional in/out of class research (online, talking to parents, books or videos). They can draw a picture of the species on the form, cut out a picture from a magazine or print a picture from an online source and use a glue stick to attach it to the form. They can create a collage of different images of the species, if desired.

Students and teachers can scan and email the report forms to their Congressional Representative (find the contact information here: <http://www.house.gov/representatives/find/> or <http://www.senate.gov/senators/contact/> You can also email the reports to the Endangered Species Coalition: <mailto:missingspeciesreports@endangered.org>

Have students make a missing species poster. Students illustrate the poster using what they learned about ecosystems and their selected species. In general, students will use the poster template with a blank space to create their own drawing of the species they selected. Be sure they are using the correct template for their species. Encourage students to experiment with drawing materials different than they are used to and to expand their use of the elements of design by employing shading techniques and creating texture in their drawings. Ask students to consider and discuss the impact of the posters, as a classroom activity, as an exhibition at their school or at a public library, and as a guerilla art campaign around their community.

Students can share their work with other classes in their school or in a library or community center by creating an art installation of their fliers and /or reports. Signage can encourage visitors to tear off the contact information for Congressional Representatives on the bottom of each flier and call to voice their thoughts. Students can hang butcher paper and gather responses from family and community members to the report/poster imagery about ways that individuals can help protect endangered species.

The class can post copies their original artwork posters and also copies of the pre-designed posters around their neighborhoods as if they were missing pet posters. The Endangered Species Coalition website has a link to a grant application to cover the costs of color copies.

Teachers and students can coordinate with other classes and schools to schedule a Day of Action (we recommend coordinating around Endangered Species Day-May 20, 2016) and create a guerilla art installation of posters around their neighborhood, town or city. The more posters the better!

Teachers can schedule a field trip to their local US Fish and Wildlife Service office to file the reports with them. (this is a good PR opportunity- see Media Advisory and Event Advisory templates). Find your local office here: <http://www.fws.gov/offices/index.html>

- **Evaluate** – Students fill in the [Evaluation](#) page of their worksheet and evaluate what they have learned. Discuss answers in whole group.

Grade 9 and 10 Common Core Standards and National Arts Standards

Reading Informational Text Standards

Key Ideas and Details:

[CCSS.ELA-Literacy.RI.9-10.1](#)

Cite strong and thorough textual evidence to support analysis of what the text says explicitly as well as inferences drawn from the text.

[CCSS.ELA-Literacy.RI.9-10.2](#)

Determine a central idea of a text and analyze its development over the course of the text, including how it emerges and is shaped and refined by specific details; provide an objective summary of the text.

Integration of Knowledge and Ideas:

[CCSS.ELA-Literacy.RI.9-10.7](#)

Analyze various accounts of a subject told in different mediums (e.g., a person's life story in both print and multimedia), determining which details are emphasized in each account.

Writing Standards

Text Types and Purposes:

[CCSS.ELA-Literacy.W.9-10.1](#)

Write arguments to support claims in an analysis of substantive topics or texts, using valid reasoning and relevant and sufficient evidence.

[CCSS.ELA-Literacy.W.9-10.1.e](#)

Provide a concluding statement or section that follows from and supports the argument presented.

Research to Build and Present Knowledge:

[CCSS.ELA-Literacy.W.9-10.7](#)

Conduct short as well as more sustained research projects to answer a question (including a self-generated question) or solve a problem; narrow or broaden the inquiry when appropriate; synthesize multiple sources on the subject, demonstrating understanding of the subject under investigation.

[CCSS.ELA-Literacy.W.9-10.8](#)

Gather relevant information from multiple authoritative print and digital sources, using advanced searches effectively; assess the usefulness of each source in answering the research question; integrate information into the text selectively to maintain the flow of ideas, avoiding plagiarism and following a standard format for citation.

National Arts Standards: Visual Arts

Visual Arts / Creating:

Anchor Standard: Generate and conceptualize artistic ideas and work

VA:Cr1.2.HSI

Shape an artistic investigation of an aspect of present-day life using a contemporary practice of art or design.

Visual Arts / Presenting:

Anchor Standard: Convey meaning through the presentation of artistic work

VA:Pr6.1.HSI

Analyze and describe the impact that an exhibition or collection has on personal awareness of social, cultural or political beliefs and understandings.

Grade 11 and 12 Common Core Standards and National Arts Standards

Reading Informational Text Standards

Key Ideas and Details:

[CCSS.ELA-Literacy.RI.11-12.1](#)

Cite strong and thorough textual evidence to support analysis of what the text says explicitly as well as inferences drawn from the text, including determining where the text leaves matters uncertain.

Integration of Knowledge and Ideas:

[CCSS.ELA-Literacy.RI.11-12.7](#)

Integrate and evaluate multiple sources of information presented in different media or formats (e.g., visually, quantitatively) as well as in words in order to address a question or solve a problem.

Writing Standards

Text Types and Purposes:

[CCSS.ELA-Literacy.W.11-12.1](#)

Write arguments to support claims in an analysis of substantive topics or texts, using valid reasoning and relevant and sufficient evidence.

[CCSS.ELA-Literacy.W.11-12.1.e](#)

Provide a concluding statement or section that follows from and supports the argument presented.

[CCSS.ELA-Literacy.W.11-12.2](#)

Write informative/explanatory texts to examine and convey complex ideas, concepts, and information clearly and accurately through the effective selection, organization, and analysis of content.

[CCSS.ELA-Literacy.W.11-12.2.f](#)

Provide a concluding statement or section that follows from and supports the information or explanation presented (e.g., articulating implications or the significance of the topic).

Research to Build and Present Knowledge:

[CCSS.ELA-Literacy.W.11-12.7](#)

Conduct short as well as more sustained research projects to answer a question (including a self-generated question) or solve a problem; narrow or broaden the inquiry when appropriate; synthesize multiple sources on the subject, demonstrating understanding of the subject under investigation.

[CCSS.ELA-Literacy.W.11-12.8](#)

Gather relevant information from multiple authoritative print and digital sources, using advanced searches effectively; assess the strengths and limitations of each source in terms of the task, purpose, and audience; integrate information into the text selectively to maintain the flow of ideas, avoiding plagiarism and overreliance on any one source and following a standard format for citation.

National Arts Standards: Visual Arts

Visual Arts / Creating:

Anchor Standard: Organize and develop artistic ideas and work

VA:Cr2.2.HSII

Demonstrate awareness of ethical implications of making and distributing creative work.

Visual Arts / Presenting:

Anchor Standard: Convey meaning through the presentation of artistic work

VA:Pr6.1.HSI

Analyze and describe the impact that an exhibition or collection has on personal awareness of social, cultural or political beliefs and understandings.

High School Next Generation Standards

These NextGen Disciplinary Core Ideas are not specifically addressed in this project, but knowing these concepts would be very helpful in fulfilling the requirements.

LS2.A: Interdependent Relationships in Ecosystems

- Ecosystems have carrying capacities, which are limits to the numbers of organisms and populations they can support. These limits result from such factors as the availability of living and nonliving resources and from such challenges such as predation, competition, and disease. Organisms would have the capacity to produce populations of great size were it not for the fact that environments and resources are finite. This fundamental tension affects the abundance (number of individuals) of species in any given ecosystem. (HS-LS2-1),(HS-LS2-2)

LS2.C: Ecosystem Dynamics, Functioning, and Resilience

- A complex set of interactions within an ecosystem can keep its numbers and types of organisms relatively constant over long periods of time under stable conditions. If a modest biological or physical disturbance to an ecosystem occurs, it may return to its more or less original status (i.e., the ecosystem is resilient), as opposed to becoming a very different ecosystem. Extreme fluctuations in conditions or the size of any population, however, can challenge the functioning of ecosystems in terms of resources and habitat availability. (HS-LS2-2),(HS-LS2-6)
- Moreover, anthropogenic changes (induced by human activity) in the environment—including habitat destruction, pollution, introduction of invasive species, overexploitation, and climate change—can disrupt an ecosystem and threaten the survival of some species. (HS-LS2-7)

LS4.D: Biodiversity and Humans

- Biodiversity is increased by the formation of new species (speciation) and decreased by the loss of species (extinction). (*secondary to HS-LS2-7*)
- Humans depend on the living world for the resources and other benefits provided by biodiversity. But human activity is also having adverse impacts on biodiversity through overpopulation, overexploitation, habitat destruction, pollution, introduction of invasive species, and climate change. Thus sustaining biodiversity so that ecosystem functioning and productivity are maintained is essential to supporting and enhancing life on Earth. Sustaining biodiversity also aids humanity by preserving landscapes of recreational or inspirational value. (*secondary to HS-LS2-7*) (*Note: This Disciplinary Core Idea is also addressed by HS-LS4-6.*)

ETS1.B: Developing Possible Solutions

- When evaluating solutions it is important to take into account a range of constraints including cost, safety, reliability and aesthetics and to consider social, cultural and environmental impacts. (*secondary to HS-LS2-7*)

Endangered Species

Which endangered species have you chosen to study?

Research

Internet Site 1: Endangered Species Coalition Web Site

url: _____

<p>How does this web site describe the endangered plant or animal?</p>	<p>How does this web site describe the status of the endangered plant or animal?</p>
<p>How does this web site describe the cause of the species being listed as endangered?</p>	<p>What action(s) does this web site advocate in order to save this endangered species?</p>

Internet Site 1: Organization _____

url: _____

<p>How does this web site describe the endangered plant or animal?</p>	<p>How does this web site describe the status of the endangered plant or animal?</p>
<p>How does this web site describe the cause of the species being listed as endangered?</p>	<p>What action(s) does this web site advocate in order to save this endangered species?</p>

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Evaluation:

1. Do you think this plant or animal will go extinct? Why or why not? Make sure you discuss what actions are necessary to save this animal.

2. Are endangered insects as important as endangered large mammals like tigers or elephants? Why or why not?

3. Because there are so many species that need protecting, how should we choose which ones to focus our money and energy on?

4. What actions are you willing to take to save any endangered species and preserve the biodiversity on our planet? Now that you know more about the species are you willing to do more to protect them than you were before? Why? Why not?