

LESSON: The Loneliest Animals

GRADE LEVEL: 5-8

TIME ALLOTMENT: Two 45-minute class periods

OVERVIEW:

The loneliest animals are the last of their kind on the planet. Scientists warn that up to 100 species a day are being pushed toward extinction. Sadly, many of these creatures are endangered because of human actions. *Nature: The Loneliest Animals* profiles a variety of captive breeding programs, designed to bolster these dwindling animal populations.

Using segments from this program and other Web resources, students will discuss different ways that animal species become extinct, and analyze how human actions can positively and negatively influence a species' population. Students will also discuss the benefits and challenges of helping an endangered species through captive breeding, and will prepare "news segments" for the class to present research on endangered species.

OBJECTIVES

Students will be able to:

- Compare and discuss different causes of extinction;
- Name several currently highly endangered species, and describe how people are trying to bring them back from the brink of extinction;
- Research an endangered species, and present information from online, print, and broadcast resources in an oral report.

MEDIA RESOURCES:

Video:

NATURE, *The Loneliest Animals*, selected segments

Clip 1: Yangtze giant soft shell turtle

Clip 2: Sumatran rhinoceros

Clip 3: Lemurs

Clip 4: Black-Footed Ferret

Clip 5: Imperiled Lives

Web sites

Yangtze Giant Soft-shell Turtle (China)

Asian Turtle Conservation Network: Rafetus Swinhoei

http://www.asianturtlenetwork.org/field_guide/Rafetus_swinhoei.htm

Fact page on the endangered soft-shell turtle

China's Turtles: Emblems of a Crisis (New York Times)

http://www.nytimes.com/2007/12/05/world/asia/05turtle.html?_r=2

Article about the Chinese breeding effort for Rafetus Swinhoei

Sumatran Rhinoceros (Sumatra, Indonesia)

International Rhino Foundation:

Sumatran Rhino Sanctuary

<http://rhinos-irf.org/srs/>

[NOTE: page features graphic photo of two rhinos mating.]

Information about Sumatran Rhinos from the Indonesian sanctuary

Sumatran Rhino

<http://rhinos-irf.org/sumatran/>

General information about the endangered Sumatran Rhino

News from the Field - International Rhino Foundation Blog

<http://intlrhinofoundation.wordpress.com/>

Latest news in Rhino research

Lemurs (Madagascar); including Golden-Crowned Sifaka

Duke University Lemur Center

<http://lemur.duke.edu/>

Information on the many species of lemur at the Duke University Center, including the endangered Golden-Crowned Sifaka

Black-Footed Ferret (United States)

Prairie Wildlife Research

<http://www.prairiewildlife.org/>

Black-footed ferret conservation information

STANDARDS:

National Science Education Standards

http://www.nap.edu/openbook.php?record_id=4962

LIFE SCIENCE: Content Standard C

As a result of their activities in grades 5-8, all students should develop understanding of

- **Diversity and adaptations of organisms**

- Biological evolution accounts for the diversity of species developed through gradual processes over many generations. Species acquire many of their unique characteristics through biological adaptation, which involves the selection of naturally occurring variations in populations. Biological adaptations include changes in structures, behaviors, or physiology that enhance survival and reproductive success in a particular environment.
- Extinction of a species occurs when the environment changes and the adaptive characteristics of a species are insufficient to allow its survival. Fossils indicate that many organisms that lived long ago are extinct. Extinction of species is common; most of the species that have lived on the earth no longer exist.

SCIENCE IN PERSONAL AND SOCIAL PERSPECTIVES: Content Standard F

As a result of activities in grades 5-8, all students should develop understanding of

- **Populations, Resources, and Environments**

- When an area becomes overpopulated, the environment will become degraded due to the increased use of resources.
- Causes of environmental degradation and resource depletion vary from region to region and from country to country.

MATERIALS:

For the class:

- One computer with Internet access and audiovisual projection system, for screening video segments
- "Last of their Kind" Answer Key
- [Optional - toothpicks, stopwatch, and flour, for the Extinction Simulation extension activity - see the "Loneliest Animals Extinction Simulation"]

For each group of 2-3 students:

- Computer with Internet access

For each student:

- "Causes of Extinction" Student Organizer
- "Last of their Kind?" Student Organizer
- "Explore a Species" Student Organizer

PREP FOR TEACHERS

Preview all of the video segments and Web sites used in the lesson.

Download the video clips used in the lesson to your classroom computer, or prepare to watch them using your classroom's Internet connection.

Bookmark the Web sites used in the lesson on each computer in your classroom. Using a social bookmarking tool such as del.icio.us (<http://delicious.com/>) or diigo (<http://www.diigo.com/>) or an online bookmarking utility such as portaportal (<http://www.portaportal.com/>) will allow you to organize all the links in a central location.

Make copies of student organizers listed in the "Materials" section.

INTRODUCTORY ACTIVITY**What Causes Extinction?**

1. To introduce the topic of endangered species, list 3-6 extinct animals on the board. Ask: What do these animals have in common? After a brief discussion, reveal that all of them are extinct. Invite students to name other animals that are now gone forever. Possible responses: dinosaurs, woolly mammoths, trilobites.
1. Ask: What percent of animal species that have ever lived are now extinct? Encourage students to make a prediction, and give the reason behind their guess. Write all predictions on the board. Reveal the answer: over 99% of all species that have ever lived are now extinct. (You may also discuss how we know about species that lived millions of years ago. Answer: fossils.)
1. Ask students to brainstorm: What are some reasons animal species become extinct? Write all suggestions on the board. Then discuss the following causes of extinction:

□Outer Space Collision (asteroid)

☐Habitat Loss/Pollution

☐Overhunting

☐Global Climate Change

☐Invasive Species

1. Distribute the ☐Causes of Extinction☐Student Organizer and briefly discuss each of the five causes listed on this page. They will be returning to the critical thinking questions on this organizer in the Culminating Activity.
2. As they learn about endangered animals in this lesson, they can find out which of these causes contributed to each animal population's decline.

LEARNING ACTIVITY:

1. FRAME the video segments the students are about to see. Explain that the students will be watching segments from a *Nature* episode called *The Loneliest Animals*, about several animal species that are on the brink of extinction. If humans don't take action soon, these species will be gone forever.
2. Distribute the ☐Last of Their Kind?☐Student Organizer to each student. Provide a FOCUS for the students, asking them to determine the information in the chart and to fill it in as they watch each segment. PLAY at least two of the video segments #1-4 for the class, FOLLOWING UP each segment with a discussion of the challenges faced by each species. Use the provided Answer Key to answer student questions.
3. Lastly, FRAME segment 5, ☐Imperiled Lives,☐for the students by explaining that this last segment will reveal some new developments in the survival plans for each of the species the students have seen. It will also raise the question of why saving endangered species is important not only to the animals in question, but to humans and the rest of life on earth, as well. PLAY the segment, and FOLLOW UP with a discussion about the importance of saving endangered species.

CULMINATING ACTIVITY:

1. Divide class into pairs or small groups. Have each group or pair select one of the following animals from the program.
 - Yangtze giant soft-shelled turtle
 - Sumatran rhino
 - Golden-crowned Sifaka, and other Madagascar lemurs
 - Black-footed ferret

2. Then have students use Web sites listed in the Media Resources section and other library resources to research more information about one of these endangered animal species. By looking at the press releases and blogs of the conservation organizations from the program, kids can become experts on the recent updates about a particular species, and feel a sense of ownership about this animal. To help students organize their research, hand out the "Explore a Species" Student Organizer to each student for this activity.
3. Once students have gathered all their information, their job is to present this research in the form of a short TV news segment, about five to ten minutes long, with each student having an opportunity to speak before the class. Encourage each group to include photographs and video clips (via Web sites) in its presentation. The presentation should summarize the pros and cons of trying to save this animal species, and include some questions raised during their research.
4. As homework, have students return to the "Causes of Extinction" Student organizer and write a 1-page response to the three critical thinking questions on the organizer. They should include the knowledge they have gained from the examples viewed and researched in class.

EXTENSION ACTIVITIES:

Extinction Simulation:

Conduct a hands-on activity to demonstrate how habitat destruction can contribute to species extinction. Refer to the "Loneliest Animals Extinction Simulation" for detailed instructions and a materials list for this outdoor or indoor activity.

Endangered Species in your state:

Have students research endangered species in your region and/or state using resources like the Sierra Club Endangered Species Map (<http://www.sierraclub.org/wildlife/species/map/>) and About.com's Endangered Species in Your State (http://animals.about.com/od/esstatelists/Endangered_Species_By_State.htm). To find out more about species survival efforts happening near you, contact your local Department of Environmental Protection, a local chapter of the U.S. Fish & Wildlife Service, and/or the zoos and aquariums in your region.



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Causes of Extinction

Directions: Read about some of the causes of extinction. Then, use this information along with your knowledge from other sources to answer these three critical thinking questions:

- 1) What are some reasons why people take actions such as overhunting or deforestation even when they their actions could lead to extinction of rare species?
- 2) What are some of the most important reasons why endangered species should be saved from extinction?
- 3) What actions do you think concerned citizens could take to prevent more species from becoming endangered?

Outer Space Collision □ When huge objects from outer space like asteroids and meteors collide with Earth, clouds of gas and dust surround the globe and block sunlight. The lack of light and clean air cause many plant and animal species to die out. Lucky for us, this is a very rare event, but when it happens, it is fatal to many types of plants and animals. EXAMPLE: Many species of dinosaurs, including Tyrannosaurus rex, became extinct about 65 million years ago when a large asteroid hit our planet.

Habitat Loss / Pollution □ Every living thing needs a place to live, find food, and reproduce. When natural surroundings and food sources are damaged or destroyed, animal species may not be able to reproduce quickly enough to survive. EXAMPLES: The destruction of rainforests in West Africa by loggers and farmers made it impossible for the Miss Waldron's red colobus monkey to survive. This type of monkey is now believed to be extinct. Plastic bags tossed on the beach can endanger leatherback turtles, which mistake the plastic for its favorite meal, jellyfish. Turtles can't digest plastic and choke on it.

Overhunting □ Eager to make a profit, fishermen or hunters sometimes kill animal species faster than these populations can reproduce. EXAMPLE: One of the world's most abundant birds, the passenger pigeon (*Ectopistes migratorius*), was driven to extinction by overhunting in the early 20th century. The last passenger pigeon, named Martha, died alone at the Cincinnati Zoo on September 1, 1914.

Global Climate Change □ The gases that make up Earth's atmosphere are in a delicate balance. Human actions on a large scale can cause levels of carbon dioxide, methane and other gases in the atmosphere to increase. This can cause the ice caps to melt, which in turn can cause sea levels to rise, and lead to flooding in coastal areas. EXAMPLES: Gases released from car exhausts can



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add more carbon monoxide to the air; deforestation can reduce the amount of oxygen in the atmosphere.

Invasive Species □ When species are transported from their native habitats to new ones, they compete with the resident species for food or space. Sometimes the resident species become a new food source for the newcomers. Some invasive species are microscopic, as in bacteria that spread disease. EXAMPLE: Dodos, flightless birds, lived on the small island of Mauritius (off the east coast of Africa) and evolved in isolation from major predators. When humans arrived there in early 1500s with new species such as dogs, monkeys, pigs, and rats, these other invasive species wiped out the dodos by the late 1600s.



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The Last of Their Kind?

WHAT TO DO

As you watch each segment, fill in this chart about some of the most endangered species on the planet.

Species	Native habitat	How many are left in the wild, and in captivity?	Why is it endangered?	Efforts to save this animal
Yangtze giant soft-shell turtle <i>(Rafetus swinhoei)</i>				
Sumatran rhino <i>(Dicerorhinus sumatrensis)</i>				
Golden-crowned sifaka <i>(Propithecus tattersalli)</i>				
Black-footed ferret <i>(Mustela nigripes)</i>				



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The Last of Their Kind? ANSWER KEY

WHAT TO DO

As you watch each segment, fill in this chart about some of the most endangered species on the planet.

Species	Native habitat	How many are left in the wild, and in captivity?	Why is It endangered?	Efforts to save this animal
Yangtze giant soft-shell turtle <i>(Rafetus swinhoei)</i>	Yangtze River Valley, China	0; 2	Development and overhunting	International team of biologists trying to mate the last female and male in captivity
Sumatran rhino <i>(Dicerorhinus sumatrensis)</i>	Sumatra, Indonesia	<200; handful	Poaching for horn, deforestation	Captive breeding program at Sumatran Rhino Sanctuary, with Cincinnati Zoo-born Andalas
Golden-crowned sifaka <i>(Propithecus tattersalli)</i>	Madagascar	?; 1 (Titus)	Clearing of Madagascar forest	(For lemurs in general): captive breeding program at Duke University Lemur Center, efforts to protect natural habitat
Black-footed ferret <i>(Mustela nigripes)</i>	North American prairie	Not given	Destruction of prairie, disease	Captive breeding program, outdoor "boot camp" to ready captive-born individuals for reintroduction to wild



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Explore a Species

WHAT TO DO:

Research an endangered species, using the questions below as a frame. Use your research to prepare a 5-10 minute TV news segment to present this animal, and the challenges to its survival, to your class. Make your news segment interesting by including elements like little-known facts, photos and/or video, and snappy dialogue.

****NOTE:** Remember to name the sources where you found your information**

Common Name of Endangered Species: _____

Scientific Name: _____

Questions to research:

- What are five interesting facts about this animal?
- Where does it live?
- Describe its habitat in as much detail as possible.
- What does it eat?
- What predators try to eat it?
- How does this animal reproduce? How many times a year is the female available for mating? (e.g., when it is "in heat" or when it lays its eggs)
- What is the animal species' estimated population today?
- Why is this animal endangered? (include more than one reason, if necessary)
- What human actions have contributed to this animal being endangered?
- What positive actions have already been taken to help this animal's situation?
- What other steps do you think humans could take to help this species survive?