

Condor's Flight:
Grand Canyon California Condor Distance Learning Program

Last revised: 12/3/15 (we review and update our lesson plans annually. Latest versions can be found online at http://www.nps.gov/grca/learn/education/learning/condor_flight.htm)

Pre-program lesson: Complete the following activity prior to the distance learning program.

Grand Canyon Focus: California Condor
School Subject: Life Science
Grade Levels: 4th – 7th
Time Requirement: One class period (60 minutes)

National Standards Addressed in the pre-lesson:

Our programs are aligned to National Science Standards, Next Generation Science Standards, and Common Core. For a full listing of all the standards this program addresses please follow the link at the top of the page and open the Flight of the Condor Standards PDF.

Lesson Overview

Endangered species are at risk of going extinct. What are some common causes of extinction and how can people prevent endangered animals from disappearing?

Lesson Objectives: Students will be able to:

- Compare different causes of extinction.
- Discuss why it is important to save endangered species.
- Describe what steps were taken to keep California condors from going extinct.

Materials

These two links are to live cameras operated by Ventana Wildlife Society and the San Diego Zoo showcasing the condors they're raising/ have in captivity. The Ventana camera changes locations to showcase live feeds of where the condors are including some locations in the wild.

Ventana Wildlife Society Cams: http://www.ventanaws.org/condor_cam/

San Diego Zoo Cam: <http://endextinction.org/condor-cam>

Background Information

A century ago passenger pigeons lived in North America. There were so many passenger pigeons that people often saw great flocks of them flying overhead containing thousands, even millions, of birds. Today, there is not a single one left. What happened?

The passenger pigeon became extinct. All living passenger pigeons disappeared from the earth entirely. The passenger pigeon became extinct for two reasons. First, the forests where it lived were cut down to make way for farms and cities. Second, many pigeons were shot for sport and because they were good to eat. At that time, there were no hunting laws to protect endangered species like there are now.

The passenger pigeon is one of the many plants and animals that once lived on our planet and have become extinct. For example, dinosaurs, mammoths, and saber-toothed tigers all became extinct long ago. More

recently, the dodo bird and the sea mink also have disappeared. Extinction has been going on since life began on earth. But today, extinction is happening faster than ever before.

There are approximately 1300 endangered or threatened species in the United States today. Endangered species are those plants and animals that have become so rare they are in danger of becoming extinct. Threatened species are plants and animals that are likely to become endangered within the foreseeable future throughout all or a significant portion of its range.

How Does Extinction Happen?

Species disappear because of changes to the earth, which are caused either by nature or by the actions of people. Sometimes a natural event, like a volcano erupting, can kill an entire species. Other times, extinction will happen slowly as nature changes our world. For example, after the Ice Age, when the great glaciers melted and the earth became warmer, many species died because they could not live in a warmer climate. Newer species that could survive a warmer environment took their places.

People can also cause the extinction of plants and animals. The main reason that many species are endangered or threatened today is because people have changed the homes or habitats upon which these species depend. A habitat includes not only the other plants and animals in an area, but all of the things needed for the species' survival -- from sunlight and wind to food and shelter. The United States has many habitats, from ocean beaches to mountain tops. Every species requires a certain habitat in order to live. A cactus, for example, needs the sunny, dry desert in order to grow. A polar bear, on the other hand, would not live in a desert, because it could not find enough food and water.

Pollution can also affect wildlife and contribute to extinction. Pesticides and other chemicals can poison plants and animals if they are not used correctly. The bald eagle is one bird that was harmed by pesticides. In the past, a pesticide called DDT was used by many farmers. Rains washed the pesticide into the lakes and streams where it poisoned fish. After eating the poisoned fish, the eagles would lay eggs with very thin shells. These eggs were usually crushed before they could hatch. Today, people are not allowed to use DDT, and this has contributed to the bald eagle being moved from endangered status up to threatened status.

People can also endanger plants and animals by moving, or introducing, new species into areas where they do not naturally live. Some of these species do so well in their new habitat that they endanger those species already living there, called the native species. These introduced species are called invasive species. For example, when some fish are introduced into a lake or stream, they may prey upon, or eat the food of the native fish. The native species may then have to find a new source of food or a new home, or face becoming endangered or extinct.

Another way that people harm animals and plants is by taking them from the wild. Some people might catch an insect like the Mission Blue Butterfly for a butterfly collection. Others might capture a wild animal for a pet, or pick a flower because it's pretty. In addition, some people illegally hunt animals for food, skins, or fur. In the past, lots of American crocodiles were killed so that their skins could be made into shoes and other clothing. This crocodile is now an endangered species.

Why Protect Endangered and Threatened Species?

Can you imagine walking in the woods without hearing birds singing in the trees, or picture what a field would be like without wildflowers blooming in the grasses? Our plants and wildlife make the world more interesting and beautiful place. More importantly, all living species, including people, depend on other

species for survival. For example, if a fish such as the shortnose sturgeon becomes extinct, all of the species that rely on it for food will also suffer and may become threatened or endangered.

We all depend upon plants and wildlife. From studying them, we have learned new ways of growing foods, making clothing, and building houses. Scientists have discovered how to use certain plants and animals as sources of medicines. If we fail to protect threatened or endangered species, we will never know how they might have improved our lives.

Endangered and threatened species need our help. Government agencies, such as the U.S. Environmental Protection Agency, the U.S. Department of Agriculture, the U.S. Fish and Wildlife Service, and the National Park Service, along with state fish and wildlife agencies and private groups are making information available so people can better protect endangered and threatened species and their habitats. To do your part, contact these agencies for information and join the challenge in helping to protect endangered and threatened species, and all wildlife, from extinction.

Procedure

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.
2. 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.)
3. 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

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 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.

3. Ask: What problems do we face when a plant or animal goes extinct? Discuss how plants and animals can inspire new medicines for humans. Also discuss the connections between species; if one plant or animal disappears, what happens to the plants and animals that depended on it? What happens to those plants and animals?

4. Ask: What are the steps before an animal becomes extinct? Endangered animals are often very close to becoming extinct. Threatened animals have larger populations than endangered species but could become endangered if their numbers continue to decrease. Emphasize each step is connected if nothing is done to help the threatened or endangered species recover their population numbers. Threatened → Endangered → Extinct. Write some examples of endangered animals on the board including the California condor. Tell the students they will be watching a live cam showcasing the recovery efforts of this endangered animal that came very close to going extinct.

5. Lead a discussion about California condors as an endangered animal. Which of the causes discussed earlier almost made condors extinct {overhunting and pollution}? Would condor's numbers have recovered if people hadn't stepped in to help them? Why was captive breeding the best option for the condors? Why is it important to have condors in the wild {they play an important role as scavengers} What can all of us do to keep endangered animals, like condors, from going extinct?

Encourage your students to create a list of questions prior to the distance learning program. They will have the opportunity to present these questions to the park rangers during the last five to ten minutes of the program. Please guide your students in writing thoughtful questions.

DURING THE DISTANCE LEARNING PROGRAM

Distance Learning Program Lesson

Grand Canyon Focus:	California condors
School Subject:	Life science
Grade Levels:	4 th – 7 th
Time Requirement:	One class period (60 minutes)

National Standards Addressed in the live program:

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Lesson Overview

People travel from all over the world to view endangered California condors at Grand Canyon National Park. As the largest land bird species in North America and still one of the most endangered birds in the world, the story of the condor is a story of adaptation, people, and survival. Condors are perfectly adapted to live in the extreme landscape found at Grand Canyon and their many adaptations help them survive and thrive here. Despite their adaptations, condor's interactions with people have led to their drastic decline due to hunting, egg collecting, lead poisoning and ingesting garbage. In 1982, when only 22 birds were left in the world, the decision was made to begin a captive breeding program to increase the population and eventually release them back into the wild, with Grand Canyon high on the list of future release sites. Today, with the help of many humans, from scientists to park rangers to park visitors, condors have rebounded and Grand Canyon is home to the largest free-flying population of the birds anywhere in the world. Although the world population is now more than 400, it remains important today to highlight the threats that condors still face and the steps that all of us can take to protect these endangered animals.

Lesson Objectives

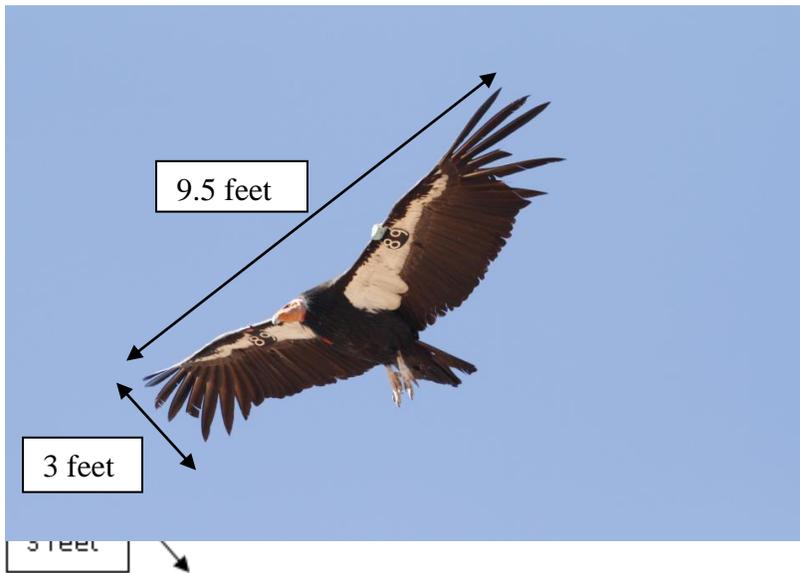
Students will be able to:

- Describe what an adaptation is.
- Explain how 2 physical adaptations help condors survive at Grand Canyon.
- List 4 major threats and causes of California condor decline.
- Explain 2 ways you think you can help this endangered species.

Materials

Condor Dress Up materials to have in the classroom as the ranger guides the activity:

- Shower cap or swimming cap (preferably pink or black)
- Big funny sunglasses
- Beak (make with foam or cardboard)
- Feather boa
- Red balloon/pouch filled with sand or flour with string to put around neck.
- Big white socks
- Condor wings (make with butcher paper, similar to the silhouette below, including black and white pattern)



Procedure

1. The ranger(s) will begin by reviewing the basic information about the location of Grand Canyon.
2. When the ranger(s) discuss condor adaptations they will ask for a volunteer to be “dressed up” during the program. As each adaptation is discussed, the ranger will ask you to add the corresponding prop to the volunteer, turning them into a condor in your classroom.
3. The ranger(s) will continue by discussing causes of the condors decline, the captive breeding effort, and threats to condors that still exist today.
4. The ranger(s) will conclude by answering some of the questions the students prepared.

Extension Activities:

After the program complete the post-visit activity, California condors and their Community Connections: A Shared Place.