

BYE, BYE BIRDIE

introduction

Humankind is now precipitating the **extinction** of large numbers of animals, birds, insects, and plants. Despite human activity, extinction occurs at a natural rate of about one to three species per year. Current estimates suggest that we are losing species at 1,000 to 10,000 times the natural rate. This means that dozens of species could be going extinct every day. Between human impact on the natural world and issues brought on by an increasingly warm climate, over 500 known species could face extinction by 2040.¹

Scientists believe that many of the species being lost carry untold potential benefits for the health and economic stability of the planet. With limited funding available for conservation, many believe that humanity should make some tough choices and decide which species can and should be saved.

Vocabulary: biodiversity, ecosystems, ecosystem services, endangered species, extinction, indicator species, IUCN Red List of Threatened Species, keystone species, poaching, umbrella species

materials

- Research Guide (provided)

procedure

1. Before beginning the activity, be sure that your class is familiar with the concept of **biodiversity**, the measure of variety of living things and their **ecosystems**. You may want them to read the Earth Matters background reading, “Man vs. Wild: Biodiversity at Risk.” Emphasize that biological diversity provides us with products (including pharmaceuticals, foods, materials for building and clothing, etc.), as well as crucial **ecosystem services**, such as clean water, breathable air, natural climate control, and providing stability to the environment. While humans are drawn to plants and animals that appeal to our hearts or our sense of beauty, often the ones that are most valuable to us are the species that are critical parts of ecosystems, regardless of their size or appearance.
2. Working individually or in pairs, have students create a list of criteria that they think should be considered when making a



Studies For Our Global Future

concept

The rate of wildlife endangerment is increasing and difficult decisions are required to determine how to prioritize efforts to save endangered species.

objectives

Students will be able to:

- Develop and apply a list of criteria that can be used to make decisions about protecting endangered species.
- Conduct research on an endangered species and effectively communicate to classmates its importance and why it should be saved.

subjects

Environmental Science (General and AP), Biology, English Language Arts

skills

Critical thinking, researching, comparing and evaluating, public speaking, decision making

method

Students determine a list of criteria to use when deciding the fate of endangered species, then conduct research on a specific species and create a presentation justifying its protection.

decision to save a species or let it become extinct. Students should write a one sentence justification for each factor they list.

3. Project the List of Selected Endangered or Threatened Species from page 4 and ask each student to “adopt” one of the threatened or **endangered species** listed. Make sure each student “adopts” a different species.
4. Provide students with time to research their species. The [U.S. Fish and Wildlife Service website](#) contains extensive information about the ecology of most of these species. For non-U.S. species, students can find information at the **IUCN Red List of Threatened Species** on the [IUCN website](#). Students can use the Research Guide to lead their research.
5. Ask students to prepare a short presentation that describes the species, offers current threats to the species’ survival, and gives reasons why it should be preserved. Threats might include habitat destruction, **poaching** or overhunting, disease, lack of adaptability to changes in climate or other ecological systems, increase in numbers of predators or competitors, etc. If they have difficulty finding information on a lesser-known species, students may wish to include research on a similar species to the one they “adopted” as well.
6. Divide the class into groups of 3-4. Students should present their findings on their “adopted” species to the group. As the presentations are made, students should take notes to use in later group discussion.
7. After the presentations, ask students if they would change their criteria. Have students explain the changes they would make or justify why their initial criteria was adequate or inadequate.
8. Within their groups, students should decide which one species they would “save” and why. Analysis should focus on the relative possibility of successfully “saving” the species and examine the value of the organism to both humans and the organism’s ecosystem.

discussion questions

1. Do you agree with this “triage” approach to saving species (e.g. there are too many to save so we need to pick the most important by establishing species importance) or is there a better way to approach biodiversity protection?

Answers will vary.

2. Do you think it would be better to focus on saving certain habitats or ecosystems, rather than focusing on specific species? Why or why not?

Answers will vary. Some may argue that focusing on specific species, especially iconic ones like polar bears or pandas, will make it easier to capture public attention and raise money that can help to protect the entire ecosystem. Others may note that focusing on individual species diverts funds that could be used for larger issues like watershed protection or climate change. Some environmentalists feel that focusing on individual species simplifies the issue too much, indicating that we, for example, have a “panda problem,” when in reality pandas are the victims of a wide array of problems. Some students may argue for a combination of both approaches.

3. Was it easy to come to a consensus about which species to save? Why or why not?

Answers will vary.

assessment

Evaluate students on the quality of their research and presentation. They should also be assessed on the coherence of their arguments in favor of or against preservation of both the endangered species they research and those presented by their classmates.

follow-up activity

1. Students conduct research to find if there are endangered species in your area and whether or not any efforts are being taken to protect them. The U.S. Fish and Wildlife Service, your state fish and game agency, a local nature center, or a nearby natural history museum may all provide useful information. Preservation projects could have been initiated through an area college or university, scouting or 4-H groups, nature clubs, or hunting and fishing clubs. If there are protection projects underway, students can ask to join in the efforts. If there are not, students could create their own ways to attempt to protect the species.
2. Students identify areas where endangered species live, mark them on a map, and look for locations that contain several endangered species. Ask students to consider why some of these species are endangered and if there might be common causes, based onto the location.

¹Nuwer, Rachel. (2020, June) "Mass Extinctions Are Accelerating, Scientists Report." *New York Times*. Retrieved from <https://www.nytimes.com/2020/06/01/science/mass-extinctions-are-accelerating-scientists-report.html>

List of Selected Endangered or Threatened Species

Species	Where found	Teacher's notes
Alabama cave shrimp	U.S. (Alabama)	Indicator species for water quality
American burying beetle	U.S.	Decomposer: helps remove decaying animals
Asian elephant	Southeast Asia	Important for domesticated use
Attwater's prairie chicken	U.S. (Texas/Louisiana)	Indicator species for healthy coastal prairie, potential game animal
Black rhinoceros	Africa	Keystone species: play a pivotal role in maintaining savanna grasslands; megaherbivore
Bolivian chinchilla rat	Bolivia	Valuable fur species
California condor	U.S. (California)	Carrion eater: helps remove decaying animals
Cheetah	Africa	World's fastest land animal
Chinook salmon	U.S.	Important food species for humans
Cracking pearly mussel	U.S. (Tennessee/Virginia)	Indicator species for clean water
Everglade snail kite	U.S. (Florida)	Umbrella species: eats snails, snails need healthy everglades
Giant panda	China	Umbrella species: undisturbed bamboo forest
Green pitcher plant	U.S. (Carolinas)	Indicator species for healthy wetlands, valuable for collectors
Grizzly bear	U.S., Canada	Umbrella species: needs wilderness
Humpback whale	Oceania	Indicator species for marine biodiversity and health
Indiana bat	U.S. (Indiana)	Eats mosquitos and other insects
Karner blue butterfly	U.S.	Umbrella species: endangered savanna/barrens ecosystem
Mexican long-nosed bat	U.S., Mexico	Keystone species: important pollinator for cactus species
Mountain gorilla	Uganda, Rwanda, Burundi	One of homo sapiens closest relatives
Nene goose	Hawaii	State bird of Hawaii
Ozark hellbender	U.S. (Missouri/Arkansas)	Indicator species for river water quality
Piping plover	U.S., Canada	Requires undisturbed beaches for nesting
Przewalski's horse	Mongolia, China, and Kazakhstan	Domesticated horses are descendants of this species
Red wolf	U.S.	Important predator
Scrub mint	U.S. (Florida)	Potentially valuable for medicinal use
Snow leopard	Asia	Threatened by poachers
Utah prairie dog	U.S. (Utah)	Keystone species: their towns offer habitat for other species
Vernal pool tadpole shrimp	U.S. (California)	A living fossil: it has been around over 70 million years
West Indian manatee	U.S., Caribbean	Helps keep sea beds from becoming overgrown
Whooping crane	U.S., Canada	Largest North American bird, important for tourism
Wood bison	Canada, U.S. (Alaska)	Numerous historical uses for food, clothing, etc.

Source: U.S. Fish & Wildlife Service. ECOS Environmental Conservation Online System. Retrieved February 17, 2021 from <https://ecos.fws.gov/ecp/species-reports>

vocabulary in table defined

An **indicator species** is one that shows the effects of habitat alteration before others. Miners used to bring canaries into coal mines because they acted as an indicator species. If the canary died, the miners knew the air was bad and that they should vacate the mine.

By protecting an **umbrella species**, ecologists are able to protect many other species that share the ecosystem. This is usually because the umbrella species requires a large area of undisturbed habitat, which is also good for the other species that share the habitat.

A **keystone species** is one whose presence is necessary for other species to survive and thrive. Often, the keystone species provides some ecological service that no other species can provide, such as pollinating a certain type of plant.

