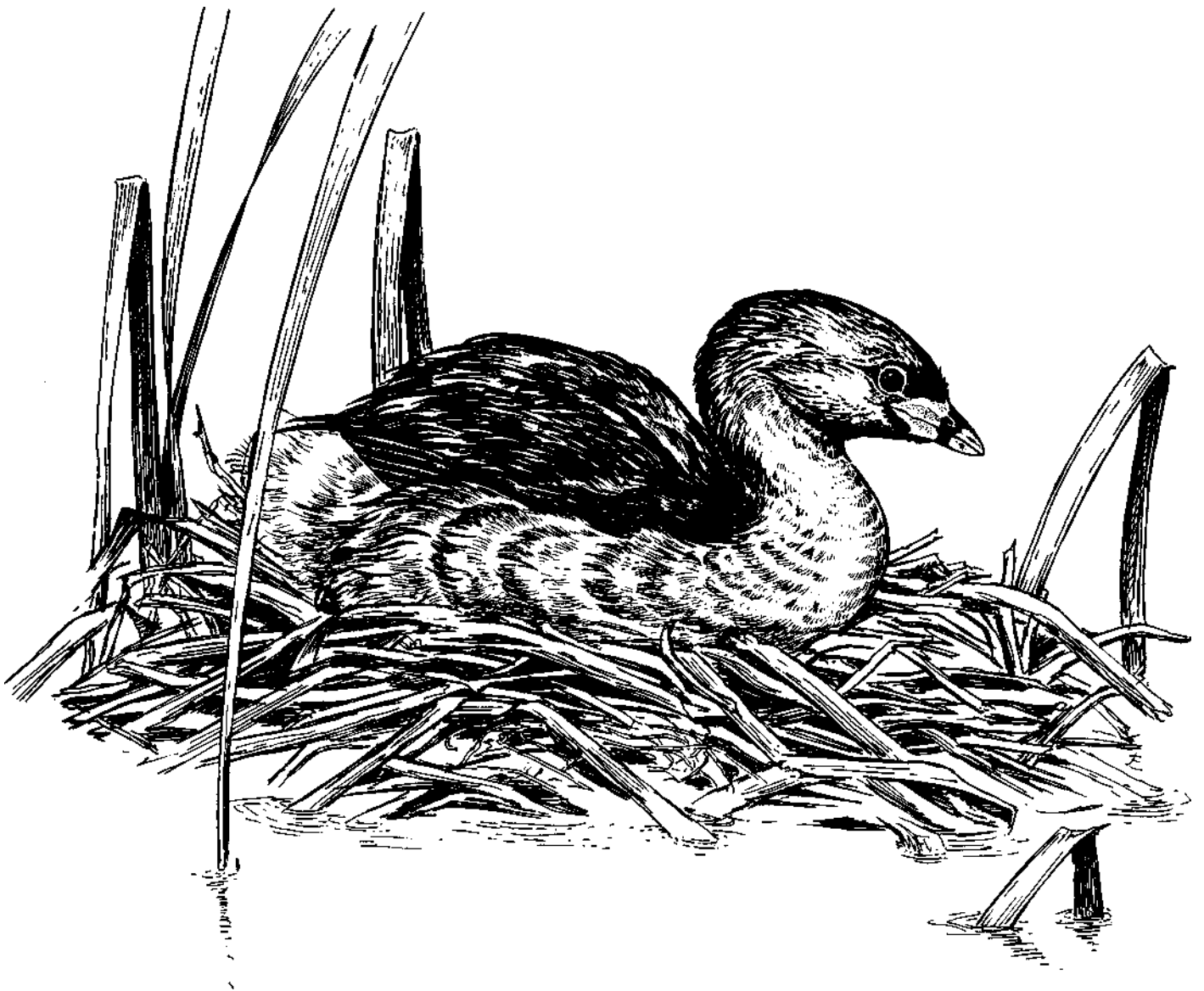


An Interdisciplinary Unit On

ENDANGERED ANIMALS



Ariane Allen Shuffleton, M. Ed. ©2002

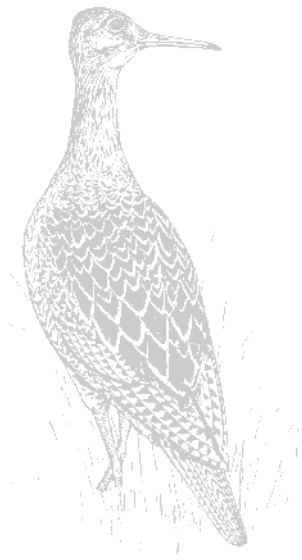


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Concord, NH 03301



INTRODUCTION AND BACKGROUND INFORMATION

Americans list the environment as one of our prime concerns. The problems our generation faces are becoming more alarming every day. Although “endangered animals” is only one topic related to the environment, wildlife is considered by some an “environmental barometer”. (“Wildlife, The Environmental Barometer” – brochure, Wildlife Management Institute, Washington, D.C.) Wildlife exists where nature is balanced. Some scientists estimate the current extinction rate is more than 1,000 times the natural rate of extinction. (“Windows on the Wild” – World Wildlife Fund 1999)

Although extinction itself is a natural phenomenon, it is today’s accelerated rate which is not natural. Humans are altering the environment to such a degree that many animals cannot adapt – therefore they die. Other species are being illegally hunted or trapped at a rate that is also causing extinction. Oil spills, pesticides, acid rain, and solid wastes are finding their way into animals’ digestive tracts and skin, which is still another reason animals are disappearing from our earth. If, in fact, wildlife is an “environmental barometer”, the human species is also in trouble.

When a species is extinct, that means it no longer exists anywhere on the earth; it is gone forever. Endangered animals are in danger of becoming extinct. Threatened animals are animals that will probably become endangered unless something is done to help them.

The federal government passed the Endangered Species Act in 1973. This law protects listed endangered and threatened species from being hunted, collected, sold, or used in any way without a permit. States set land aside solely for wildlife. Zoos study endangered animals and attempt to breed them in captivity. “Foster parenting” is another method used with some species to increase their numbers (for example, the whooping crane).

You don’t have to be a scientist or a governor to help in the fight against extinction. You can help to enforce wildlife laws. You can avoid buying products that are made from endangered animals (it’s illegal in this country). You can write letters to your congressmen. You can support wildlife organizations. Most of all, you can learn about endangered animals and teach others.

Educators can adapt the lessons and ideas to meet their own class needs, as I did for our second grade. Enjoy!

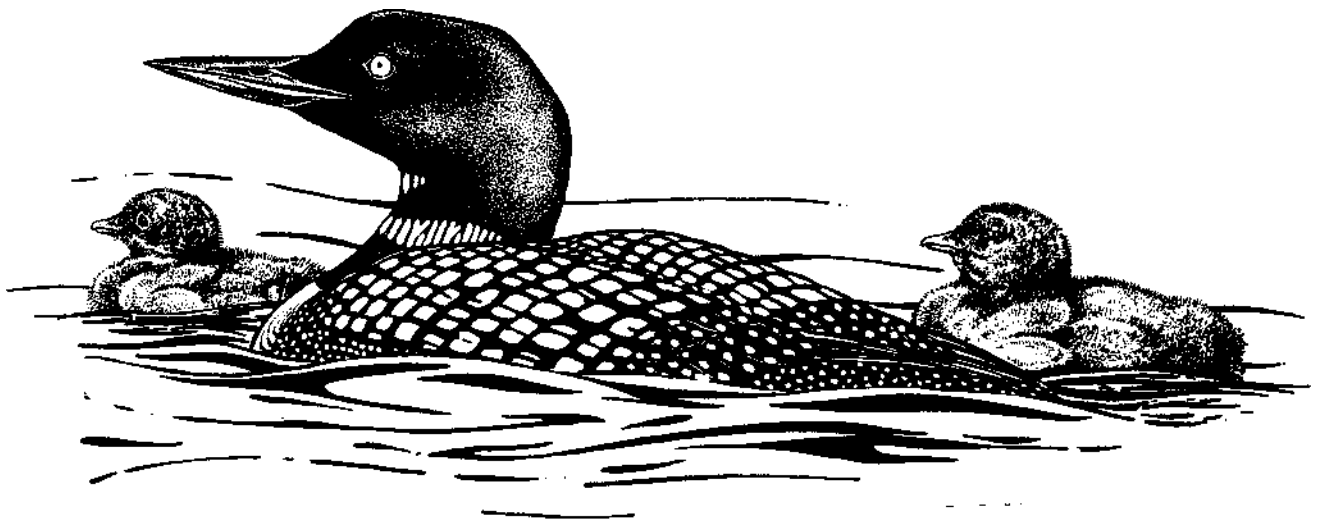
Ariane Allen Shuffleton



UNIT GOALS

The goals of this unit are as follows:

1. Students will develop empathy, concern, and awareness of and about endangered animals.
2. Students will understand the major factors that cause animals to become rare, threatened, endangered, and extinct (habitat destruction, over specialization, pollution, and poaching).
3. Students will gain an understanding of what is presently being done to save endangered animals.
4. Students will explore their own ideas of what needs to be done, as well as what individuals and groups can do, to help save endangered animals.
5. In pairs, students will research an animal in order to gain an in-depth understanding of the problems and possible solutions for a particular endangered animal.





UNIT OUTLINE

Lesson 1	Brainstorming Prior Knowledge
Lesson 2	Apple Demonstration
Lesson 3	Animal Interviews
Lesson 4	Habitat and Its Components
Lesson 5	From the Wild to Captivity
Lesson 6	Human Alterations in the Environment
Lesson 7	Acid Rain: An Experiment
Lesson 8	Carrying Capacity and Crowding
Lesson 9	Plastic Food
Lesson 10	Chopping Down the Forest
Lesson 11	Oil Pollution: An Experiment
Lesson 12	More Than One Reason
Lesson 13	Susceptibility to Extinction
Lesson 14	Bumper Stickers and Pins: Make a Statement
Lesson 15	Harmful Activities and Alternatives

Lesson 1 – Brainstorming Prior Knowledge

Objective: Find out what students know about endangered animals.

Method: Brainstorm prior knowledge

Material: Chalkboard or large piece of paper to record what students say.

Procedure: Write “Endangered Animals” on the top of the paper or on the chalkboard. Ask students what they know about endangered animals. Record all responses, correct and incorrect.

Note: Save this for the end of the unit; cross out incorrect responses at this time, and add other facts that were learned during the unit.

Lesson 2 – Apple Demonstration

Objective: At the end of this lesson, students will have a better understanding of how small an area of the earth humans and all other land dwelling animals live.

Method: Demonstration

Materials: A whole apple, a knife, and a cutting board, globe for comparison

Procedure: Have the students sit so they can see the demonstration. Create a “serious” atmosphere. Tell them that we are going to pretend that this apple is the earth. Discuss how the apple is similar to the earth. Ask the students to guess how much of the earth (apple) they think people and animals that live on the land occupy.

- 70-75% of *earth* is covered with oceans; cut the apple in fourths and push 3 quarters to the side.
- 30% of *what remains* is too dry for life to exist; cut 1/3 away and push to the side.
- 30% of *what remains* is too mountainous for life to exist; cut another 1/3 away and push to the side.
- Of the *remaining portion*, only the surface (skin) is used for living space; trim off the skin.
- Ask the students “How long until we use it up?” Don’t wait for a response; eat skin.

Have students write for five minutes to express their feelings, thoughts, and ideas to “save the earth”. Students who wish can then share their responses.

Lesson 3 – Animal Interviews

Objective: Students will become aware of reasons why some animals are endangered. Each student will examine an endangered animal by researching, writing, and verbally describing the problems of a particular animal. Students will design their own costumes and props for interviews.

Method: Research, write reports, interviews with classmates

Materials: Resource folders containing information about an animal, its habitat, its status (endangered, threatened, rare), its problems/reasons for being endangered, etc. (one folder per two children). Teacher makes these in advance. Materials for props and costumes.

Procedure: Teacher models an interview (s/he dresses up or makes a puppet); introduce yourself and ask students to write down a question to ask this animal. Tell the students some facts about yourself (the animal): where you live, what you eat, your life cycle, etc. then allow the students to interview you. Students research animals in pairs; when a pair is ready, let their classmates interview them. A “data sheet” listing the type of information they are expected to know might be helpful.

Note: Model an interview at the beginning of the unit. Allow the students ample time to research their animal, and then make the interviews the culminating project for the unit. In the following lessons, when I refer to “an animal”, students can work with their partners, and use “their animals” as the focus of the lessons.

Lesson 4 – Habitat and Its Components

Objective: Students will be able to define “habitat” and identify its components. Students will brainstorm, then organize and synthesize the information.

Method: *Brainstorm.* Draw and label parts of own habitat, then of an animal’s habitat

Materials: Chalkboard, drawing paper, crayons.

Procedure: On the board make two columns with headings “people” and “wildlife”. Ask the students what people need in order to survive; write down all responses. Do the same for wildlife heading. Go back over the lists to try to narrow each one of them down to water, food, shelter, space, arrangement, sunlight, air, and soil.

- *Define habitat:* home for animals, what they need in order to survive.
- Add “pets” and “plants”. Do these have the same components?
- Have students draw pictures of their own habitats (homes) and label *water, food, shelter, space, and arrangement*. Share the pictures, then have students draw pictures of an animal’s habitat and label the parts.

Note: If students have a hard time with arrangement, ask them how convenient it would be if their bathroom were two miles from their house!

Lesson 5 – From the Wild to Captivity

Objective: Students will be able to identify and analyze problems that occur when animals are moved from the wild to captivity. Students design zoo environments for endangered animals that satisfy all the needs for that particular animal.

Method: Discussion, drawings

Materials: Drawing paper, crayons

Procedure: Review the definition of “habitat”. List components on board (water, food, space, protection, arrangement).

- Discuss different types of habitat in relation to different animals.
- Choose one type of animal, and list habitat requirements for that animal.
- Draw a picture of that animal in a zoo with all its needs satisfied. Label the needs of the animal. Is it possible? Discuss pictures. Discuss the problems scientists and zookeepers have when they want to keep a wild animal in an enclosed area.

Read: *Close to the Wild* by Thomas Cajacob and Theresa Burton (See “Children’s Literature” list for details)

Lesson 6 – Human Alterations in the Environment

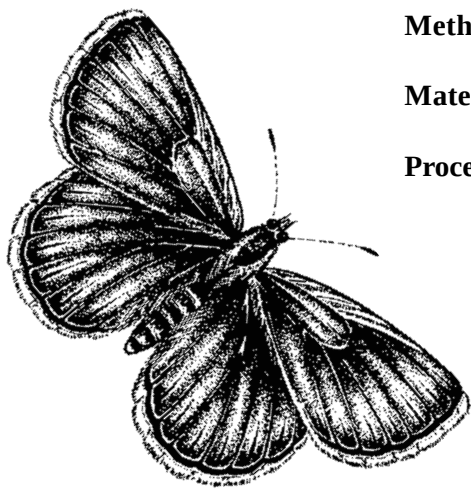
Objective: Students will be able to describe some ways that humans are altering habitats, which causes some animals to become endangered.

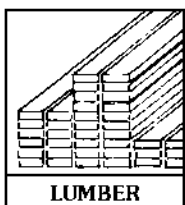
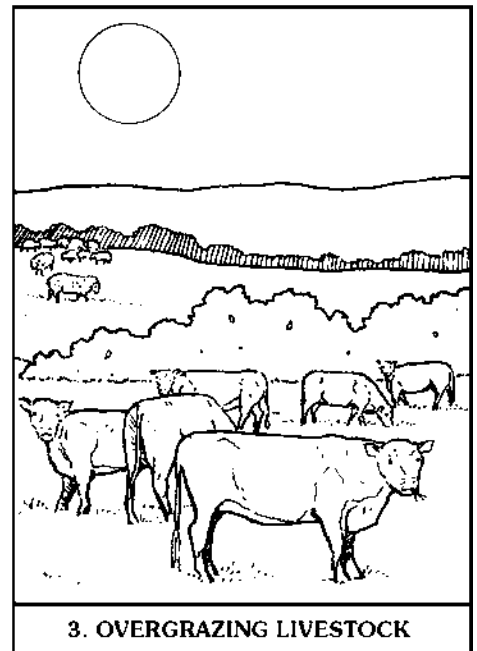
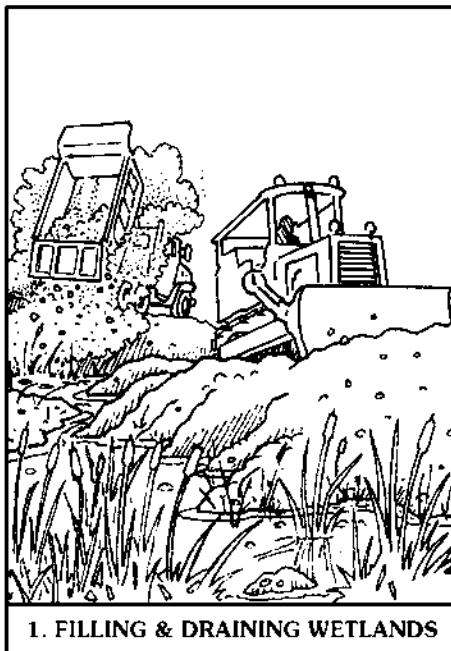
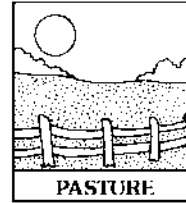
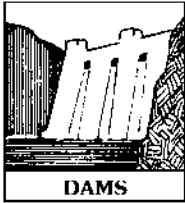
Method: Worksheet; discussion

Materials: Worksheet (*NatureScope* “Endangered Species: Wild & Rare”), Crayons

Procedure: Elicit definitions for endangered and extinct.

- Show pictures of endangered animals.
- Explain that the main reason species are disappearing is because humans are changing their habitats. Ask the students why people would want to change habitats.
- Do worksheet together with discussion. The large pictures in the middle represent the way people are changing habitats. The smaller pictures on the top and bottom show why people change habitats.
- Draw lines from the big pictures to the small pictures to show the reasons why people are changing habitats.
- Discuss other ways that people are changing habitats, and why. Discuss the consequences this might have for wildlife.
- Let students color the page.





Lesson 7 – Acid Rain: An Experiment

Objective: Students will formulate hypotheses, perform an experiment, and evaluate the results. Students will be able to draw conclusions about the way acid rain affects plant and animal life.

Method: Experiment with plants and vinegar

Materials: Four bean plants (plant two ahead of time), two peperomia plants, two jade plants, vinegar, water, plastic bag, paper towels, two spray bottles, ruler.

Procedure: While students are out of the room, wet 4 or 5 paper towels with vinegar and place them around the room. When students enter the room and notice the smell, discuss how people get rid of smells (place smelly paper towels in a plastic bag and throw away). Animals don't have the ability to get away from some types of pollution.

- Does anyone know what acid rain is? Discuss.
- Draw a simple picture of smokestacks, pollution filled clouds moving away, and then falling as rain in a pond with fish, fish die or are eaten by a bird, etc.
- Bring out plants and spray bottles. Explain to the students that acid rain sometimes is as acidic as vinegar. Label one bottle "acid rain" (vinegar) and the other water. Have one student spray half the plants with water, and another student spray the other plants with acid rain. Label the plants. Determine how much liquid should be sprayed on the plants (for example, ten pumps). Formulate a hypotheses about acid rain and how it might affect the plants. Fill out charts. Charts should include a date, color, height, width, and comments for each plant.
Optional: Start two other plants as seedlings. What effect does acid rain have on these plants? Continue this for several days (two weeks is a good length of time). Discuss how acid rain could affect animals by getting in the food chain.

For background, read: "Acid rain: Effects on fish and wildlife", US department of the Interior, Fish and Wildlife service, Leaflet 1, Washington, D.C., 1985; "The Acid Rain Story", Friends of the Earth / EPI / OS, Washington, D.C., 1985.

Lesson 8 – Carrying Capacity and Crowding

Objective: Students will be able to define “carrying capacity”. Students will become more sympathetic toward animals whose habitat is being destroyed.

Method: Students experience crowding; discussion

Procedure: Ask for a student volunteer.

- Approach the student, asking when the closeness feels uncomfortable.
- Discuss types of physical and emotional reactions. Does one feel the same with family or close friends? Animals also feel uncomfortable when approached; discuss reasons why (fear of predation, protect young).
- Discuss why are some animals more comfortable around humans than others (fly, quick, swim, size, alone or in group).
- Now have students all sit very close together; how do they feel? What would happen if animals were crowded? Would they survive? What do they need to survive? What might an animal do if it were crowded? (Leave, attack, disease, die, not enough food) What kinds of human intervention could occur which would help wildlife? (Reintroduce predators, winter-feeding, plant additional vegetation, relocate animals, hunting)
- Define “carrying capacity” – The number of plants and animals that an environment can support. Why is this important? What is the carrying capacity for the classroom?

Lesson 9 – Plastic Food

Objective: Students will be able to describe the potential harmful effects of plastic and garbage on wildlife. Students will formulate and identify possible solutions to the problems that exist with waste.

Method: Student examines waste and learns about its effects on wildlife

Procedure: Teacher collects garbage for a couple of days (the students could collect it). Examine each article. Discuss how it could be perceived as food. Try to identify some animals that might perceive it as food. How might these materials affect animals if ingested or otherwise be harmful? Show pictures of garbage and animal interactions. What are some possible solutions to these problems?

Homework: Tell students to list 30 plastic items found in their home. The next day, share lists. Make a classroom list.

For Background, read: “Oceans at Risk”, *Animals*, Jan/Feb 1989, p. 7-23.

Lesson 10 – Chopping Down the Forest

Objective: Students will be able to describe some ways that wildlife is affected by deforestation.

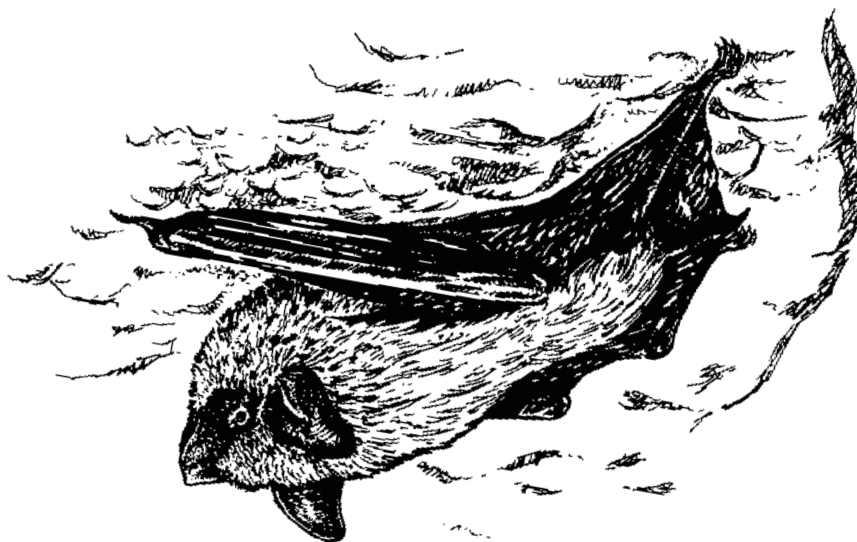
Method: Brainstorming; students create a “human forest”; discussion

Materials: Fan; chalkboard or large piece of paper

Procedure: Draw a picture of a forest on the board.

- Tell the students that a road is going to be put through the middle of this forest. Erase a strip through the forest. Ask the students how this might affect the wildlife. Discuss and list all responses.
- Have the students stand very close together in a big group with their arms up (human forest). Ask the child in the center to describe what he or she sees when “looking through the trees”. (How much light is on the floor? See me? See the rest of the room?)
- Turn on a fan at the edge of the human forest. Can the center student feel the breeze? Hear the fan?
- Begin to “chop down” the forest by removing the kids near the edge. Have the center child report any changes. Continue to chop down the forest until the center child is at the edge of the forest (you might find your “forest” moves!). Ask students what happened to the area that used to be the center of the forest (now it’s the edge). How might this affect wildlife that used to live in the center?
- Discuss and add to list.

Read: Read Roadside by David Bellamy. (See “Children’s Literature” list for details.)



Lesson 11 – Oil Pollution: An Experiment

Objective: Students will formulate hypotheses, perform an experiment, and evaluate the results. Students will also be able to draw conclusions about the way an oil spill can cause species to become endangered.

Method: Experiment with oil and eggs

Materials: Oil, water, 4 hard-boiled eggs, blue food coloring, eye dropper, 2 cup bowl, measuring cup

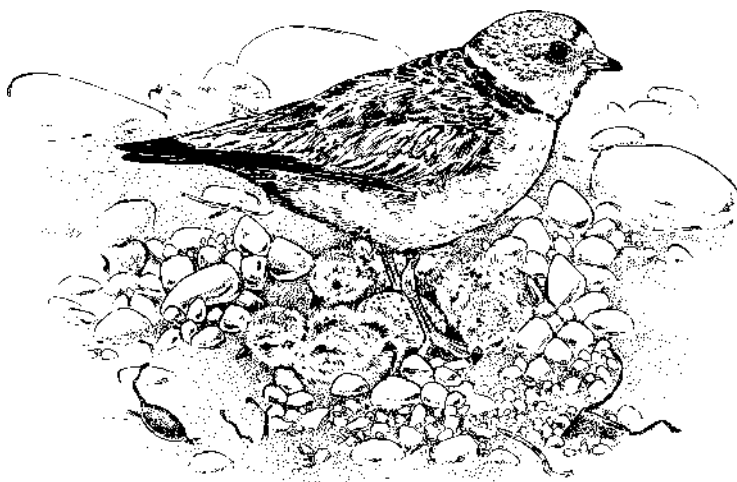
Procedure: Ask the students if they heard about the Exxon Oil spill in Prince William sound, Alaska. Discuss it and its effects on wildlife and people. Note how far away we are from Alaska.

We can have our own spill in the classroom!

- Peel, and then pass between the students, a regular hard-boiled egg (control egg).
- Mix $\frac{1}{2}$ cup oil, 10 drops of blue food coloring, and $\frac{1}{2}$ cup water in bowl. Place remaining 3 eggs in the bowl. While waiting, formulate hypotheses about what affects the oil will have on the eggs.
- Remove the first egg after 5 minutes, the second egg after 15 minutes, and the third egg after 30 minutes. Try to dry off the egg before peeling it.
- Observe, record and discuss the results.
- Discuss other effects oil spills have, such as: Harms unhatched eggs. Gets into pores of skin then into the blood stream, gets into the food chain and is digested. Gets into fur and feathers therefore they lose their ability to keep the animal warm, etc.

Note: Students do this experiment in four groups of five. Each student does an observation sheet (next pages).

Read: *Ranger Rick*, “The Big Oil Spill”, January 1990, p.32-34. *The Comeback Trail*, “The Deadly Effects of Crude Oil”, spring, 1989, p.1, 4 (Newsletter put out by DEFENDERS OF WILDLIFE – see bibliography).



OIL EXPERIMENT OBSERVATION SHEET

Name:

Before Experiment

1. What do you think is going to happen to the egg that is in the mixture for
 - a. 5 minutes
 - b. 15 minutes
 - c. 30 minutes

During Experiment

2. What does the egg look and feel like after being in the mixture for
 - d. 5 minutes
 - e. 15 minutes
 - f. 30 minutes

After Experiment

3. What do you think would happen if we left an egg in the mixture for 24 hours (a whole day)?
4. How do you think the results would change if we changed the amount of oil in the mixture?
 - More oil
 - Less oil
5. Put a little bit of the mixture on your finger tips. Now rinse them with water. Does the mixture come off? Do your fingers still feel greasy?
6. What effects do you think oil spills have on animals?
7. What can people do to stop oil spills?
8. What can you do?

Lesson 12 – More Than One Reason

Objective: Students will understand that many reasons, not just one, cause animals to become extinct.

Method: Students will make paper plate wheels which show the various reasons why an animal is endangered

Materials: Paper plates, paper fasteners, scissors, crayons or markers.

Procedure: Pass out two paper plates to each student.

- Discuss reasons why animals are endangered (pollution, habitat loss, illegal hunting or trapping, nets, etc.).
- Depending on the animal and its problems, divide one plate with a ruler, drawing lines (for example, turtles have at least four problems – pollution, caught in nets, illegally killed for products and habitat destruction – so divide the plate into fourths).
- Label and draw the problems in each section.
- Cut a triangle out of the other plate, the size of one of the sections DO NOT cut it all the way to the center.
- Fasten the plate with the cut triangle on top of the plate with the sections.
- Draw a picture of the endangered animal on the top plate; title your wheel.
- Share wheels.

Lesson 13 – Susceptibility to Extinction

Objective: Students will be able to recognize the traits that make an animal susceptible to extinction.

Method: Students evaluate traits of imaginary animals, then design their own animals

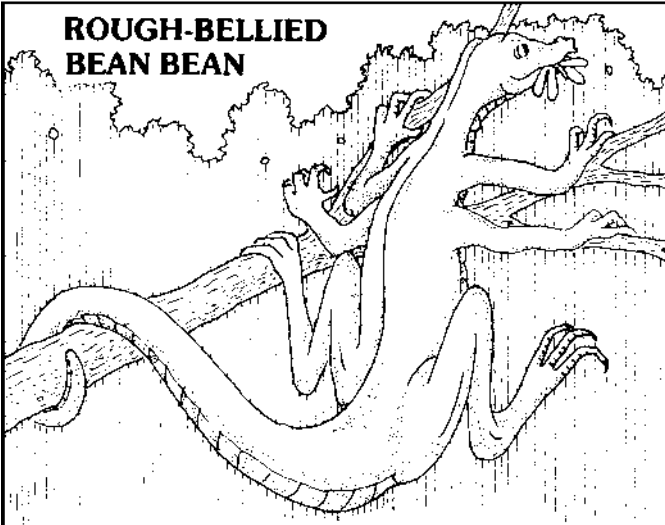
Materials: Teacher-made up imaginary animals (2-4) with various traits (or see *Nature Scope*, Endangered species: Wild & Rare, p. 15); drawing paper and crayons.

Procedure: Discuss imaginary animals that you have made up. Decide which out of these is most likely to go extinct first and why. Students now make up their own imaginary animals and list their traits. Animals should either be “endangered” or never go extinct. Share pictures and discuss traits.

Note: Traits of imaginary animals should be things like: eats food that only grows on one tropical island, lays one egg every four years, is very slow, not afraid of anything, have very valuable feathers, etc.

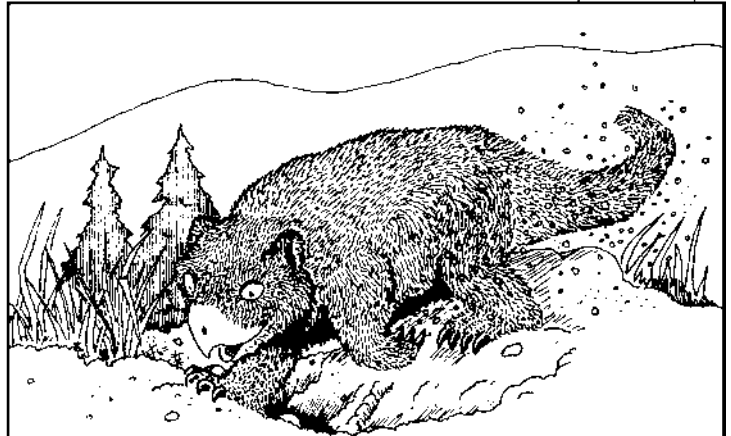
COPYCAT PAGE

ROUGH-BELLIED BEAN BEAN



- lives in hardwood forests
- feeds on fruit, leaves, insects, small mammals, and eggs; especially fond of flitter beetles and borgia beans
- has two broods per year (average number of young per brood is four)
- lives in social groups called palpals
- some groups migrate; others stay in the same area year round

THE RARE SCARE



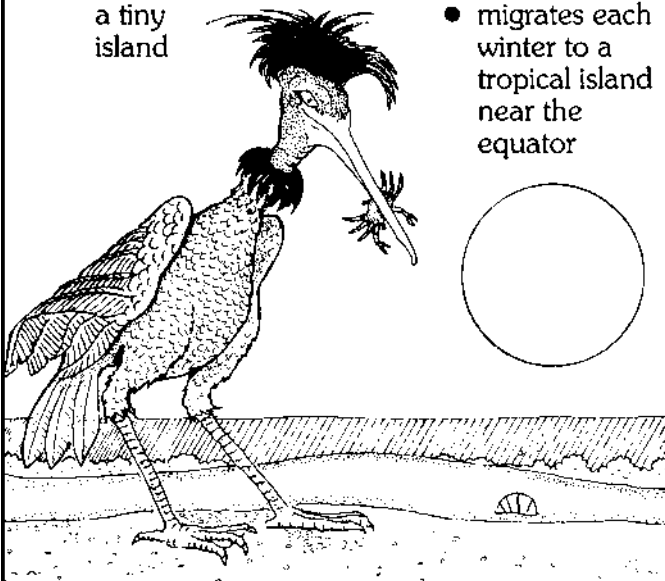
ZORGAN

- lives in burrows
- is often found in hilly and mountainous areas north of the equator
- feeds on camcams, miras, and other fruits
- mates for life
- can have two or three broods per year, but usually has one; often gives birth to twins, but one of the twins usually dies
- is noted for its beautiful blue fur

CRESTED CRABBIT

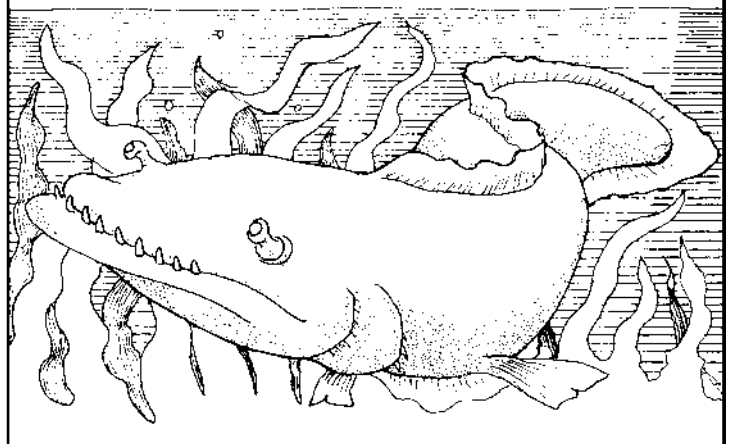
- is noted for its shiny purple crest feathers
- lays two eggs every other year
- feeds on white-backed sand crabs
- huge flocks gather during the mating season
- nests in rough-barked pine trees along the coast of a tiny island

- migrates each winter to a tropical island near the equator



GREEN GOOR

- lives in streams and marshes
- feeds on fish, eggs, tadpoles, and aquatic insects; especially fond of mosquito larvae
- hibernates in clusters in the mud during cold months
- lays an average of five eggs each year; eggs are sensitive to pesticide poisoning
- has been introduced into other areas to help control mosquitoes



Lesson 14 – Bumper Stickers and Buttons: Make a Statement

Objective: Students will identify button and bumper stickers designed to make a statement about some issues.

Method: Students make bumper stickers and/or buttons

Materials: Bumper stickers – white contact paper or oak tag, which can be laminated when completed, tape for the backs, markers. Buttons – button machine or 3" circles on white oak tag, markers, safety pins. Bumper stickers and buttons for demonstration of examples.

Procedure: Show examples to kids. Discuss various slogans and their purpose.

- Brainstorm issues to use to make slogans.
- Help kids design their own sticker or button.
- Laminate or tape.
- Use safety pins to attach buttons.
- Share slogans and designs.

Lesson 15 – Harmful Activities and Alternatives

Objective: Students will evaluate a number of activities that are harmful to wildlife, and recommend alternatives.

Method: Brainstorming and drawings used for discussion

Materials: Cards which show humans in various activities, some that harm wildlife and others that help it. Chalkboard or pieces of paper, drawing paper, and crayons.

Procedure: Brainstorm a list of activities they have seen or heard that are harmful. Divide the class into groups of 4 or 5. Start by demonstrating what to do with the cards with the whole class. Hold up a card, discuss what it shows and decide why it is harmful or why it is not harmful and if it is, what can be done to make the activity beneficial to wildlife. Give each group some cards which they must separate into two groups: harmful and not harmful. Students should then discuss alternative activities for the harmful pile. Bring the class back together. Have a spokesperson from each group share their results with the rest of the class. Pass out drawing paper, and have students make their own cards. On the back have them write the helpful alternative activity.



SPELLING WORDS AND DICTATION SENTENCES

Extinct

Threatened

Endangered

Some *extinct* animals were once *endangered* or *threatened*.

Habitat

Pollution

Illegal

Many animals are endangered because of *habitat* loss, *pollution*, and *illegal* hunting.

Poachers

Rare

The name of animal he/she is studying

The _____ is *rare* because of *poachers*.

Animal

Food chain

Interview

Critical habitat



WRITING TOPICS

1. Response to Apple demonstration (Lesson #2)

2. How would I save the...

students write their own ideas of how they would save the endangered animal they are studying, or wildlife as a whole.

3. Letters to the Senator...

Students write letters to U.S. Senators and offer suggestions on what could be done to help protect endangered animals.

4. Report on Endangered Animal...

In pairs, students research and report on one endangered animal. Reports include information such as name, habitat, range, special features, why it is endangered, and what people are doing to help it.

5. All I know about endangered animals...

This assesses their knowledge about endangered animals.

6. Possible Rewrites

Shady Glade or Free Bird would be excellent books to rewrite.

7. Illustrate poem by Beverly Armstrong "where the wild things shouldn't be"

Each student illustrates a page of the poem and then makes a class book.



GRAPHS

1. Why is the animal you are studying endangered? (Habitat destruction, pollution, hunting, other)
2. Is the animal you are studying extinct, endangered, threatened, or rare?
3. Does the endangered animal you are studying live on land, water, or air?
4. What kind of habitat does the endangered animal you are studying live in? (desert, mountains, jungle, salt water, fresh water, other)
5. What continent does your animal live on? (Africa, South America, North America, Asia, Antarctica, Australia, Europe)
6. Does the animal you are studying live above, below, or near the equator?
7. Which endangered animal book did you like the best (list the books)
8. What have you liked best about studying endangered animals? (list activities)
9. What did you like best about the animal reports? (covers, maps, reports, viewing final products, other)



HELPFUL ORGANIZATIONS

Audubon Society of NH

Wildlife Section
3 Silk Farm Rd.
Concord, NH 03301
www.nhaudubon.org

National Wildlife Federation

1400 Sixteenth St., NW
Washington, DC 20036
www.nwf.org

New Hampshire Fish and Game Department

Nongame and Endangered Wildlife Program
2 Hazen Drive
Concord, NH 03301
www.wildlife.state.nh.us

Sierra Club

Information Services
730 Polk Street
San Francisco, CA 94109

US Department of Interior – Fish and Wildlife Services

18th and C Streets, NW
Washington, DC 20240
www.fws.gov

Wildlife Education, Ltd.

930 W. Washington Street
San Diego, CA 92103

www.natureserve.org

www.enature.com



LITERATURE LIST

Books for Children:

Althea. Leopards, Gorillas, Whales, and Parrot, Longman Group USA Inc., United States, 1988. Non-fiction; informative books about each animal listed in the titles; do deal directly with endangered species, although there is a note at the end of each book which describes their problems with humans; grades 1, 2.

Arnold, Caroline. Saving the Peregrine Falcon, Carolrhoda Books, Inc., Minneapolis, Minn., 1985. Non-fiction; discusses habitat, enemies, scientific research, problems, and solutions; grades 2 and up.

Bonnors, Susan. Panda, Delacote Press, New York, NY, 1978. Non-fiction; discusses the life cycle of the panda; does not discuss the fact that pandas are endangered; grades 1, 2.

Cajacob, Thomas and Burton, Teresa. Close to the Wild, Carolrhoda Books, Inc., Minneapolis, MN, 1986. Non-fiction; Up to page 14, discusses Siberian tigers, their characteristics, endangered, and the role zoos play in helping them; page 14 and beyond, discusses mating somewhat in detail; grades 2, 3 up to page 14, read aloud.

McClung, Robert M. Thor Last of the Sperm Whales, William Morrow & Company, New York, NY, 1971. Fiction based on fact; begins with a legend about a sperm whale; follows the life cycle of a sperm whale; briefly discusses reasons why whales are endangered; grades 3, 4 or read aloud for younger children.

Morris, Dean. Endangered Animals, Raintree Childrens Books, Milwaukee, Wisconsin, 1977. Non-fiction; overview of endangered species; discusses human impact (hunting, pollution, and habitat destruction), scientific studies, and the role zoos play in helping endangered species; grades 2, 3.

National Geographic Society. Animals in Danger, National Geographic Society, Washington, DC, 1978. Non-fiction; discusses specific animals, their characteristics, and why they are endangered; grades 2, 3.

Peet, Bill. Farewell to Shady Glade, Houghton Mifflin Co., Boston, MA, 1966. Fiction; group of animals are forced from their home due to habitat destruction, and on their way to find a new home they experience city pollution; grades 1, 2.

Roever, J.M. The Black-Footed Ferret, Steck-Vaughn Co., Austin, TX, 1972. Non-fiction; discusses many aspects of the black-footed ferret – habitat, diet, enemies, problems, and what people can do to protect wildlife; grades 2 and up, or read aloud.

Ranger Rick. Endangered Animals, National Wildlife Federation, Washington, DC, 1989. Non-fiction; discusses the problems endangered animals have through examples of specific species (Giant Panda, Whooping Crane, Humpback Whale, Black-footed Ferret, Komodo dragon, Tiger, Small Cats, Crocodiles, Gorilla, Peregrine Falcon, Numbat, Wombat, Wallaby, Nene Goose, Lemurs, Black Rhino, Muriqui, and Green Sea Turtle); grades 3 and up or read aloud.

Rice, Paul and Mayle, Peter. As Dead As A Dodo, David R. Godine, Publisher, Inc., Boston, MA, 1981. Non-fiction; one-page descriptions of animals that are extinct, and why; all ages, read aloud.

Stone, A. Harris. The Last Free Bird, Prentice-Hall, Inc., Englewood, NJ, 1967. Fiction; story about bird witnessing habitat destruction; simple, yet good for all ages.

Stone, Lynn M. Endangered Animals, Children's Press, Chicago, IL, 1984. Non-fiction; defines "endangered" and "extinct"; discusses reasons why animals are endangered (hunting, pollution, introduced species, bought as pets, lack of space); discusses specific species; discusses how people are helping, including what young people can do; grades 2, 3.

Weaver, John L. Grizzly Bears, Dodd, Mead, & Co., New York, NY, 1982. Non-fiction; discusses the life cycle, habit, and habitat of the grizzly; grades 2 and up.

World Wildlife Fund. Our World in Danger, Ladybird Books, Inc., Loughborough, Leicestershire, England, 1989. Non-fiction; discusses habitat destruction, pesticide use, overgrazing, pollution, and hunting, and the effect these have on wildlife; discusses what people can and are doing; grades 2-4.

Articles from Ranger Rick Magazine:

"Adventures of Ranger Rick",

August 1988, p. 34-38, (mountain gorillas)

June 1988, p. 20-23 (loggerhead turtles)

February 1987, p. 27-30 (habitat destruction, critical habitat)

June 1985, p. 15-17 (poaching)

February 1985, p. 28-31 (introduced species)

September 1984, p. 16-19 (woodland caribou, habitat destruction, hunting)

November 1983, p. 21-24 (rainforest deforestation)

September 1983, p. 16-19 (leatherback turtles, garbage)

"The Big Oil Spill", January 1990, p. 32-34 (Alaska's Prince William Sound spill)

"China's Precious Pandas", July 1989, p. 22-30 (Giant pandas)

"Danger: Don't Pick a Wild Pet", July 1980, p. 36-37 (wild animals as pets)

"Eco Cops", January 1989, p.26-28 (environmental conservation officers)

"Elephant Trivia", April 1989, p. 38-47 (elephants and their problems with humans)

"Happy Bee",

June 1988, p. 12-13 (peregrine falcon, turtle eggs, ospreys)

June 1982, p. 44-47 (gray whales)

February 1981 p. 9-11 (sea otter, insecticides and birds, wolves, whooping cranes)

"Take an Inside Look", November 1989, p. 18-24 (lemurs)

"Wild Wings Over the West",

January 1990, p.20-27 (birds of prey, including the endangered peregrine falcon)

Books for Adults:

Beatley, Timothy. Habitat Conservation, Planning, Endangered Species and Growth. 1994.

Brooks, F. Protecting Endangered Species, (Green Guide Series). 1991.

Burgess, Bonnie. Fate of the Wild: The Endangered Species Act and the Future of Biodiversity. 2001

Cadieux, Charles. These Are the Endangered, The Stone Wall Press, Inc., Washington, DC, 1981. Discusses many endangered species (approximately 30), discusses national and international laws, describes the roles of zoos, refuges, and parks, and lists endangered species organizations.

Charman, Andy. I Wonder Why the Dodo is Dead and Other Questions About Extinct and Endangered Animals. 1996

Cutter, Susan L., Renwick, Hilary Lambert, and Renwick, William H. Exploitation, Conservation, Preservation, Rowan & Allanheld Publishers, Totowa, NJ, 1985. Text book; gives an overview of natural resources.

Czech, Brian, and Paul R. Krausman. The Endangered Species Act: History Conservation, Biology, and Public Policy. 2001.

Facklam, Margery. And Then There Was None: The Mysteries of Extinction. 1993

Fichter, George S. Endangered Animals (A Golden Guide Series). 2001

Hutton, John (ed). Endangered Species, Threatened Convention: The Past, Present and Future of Cities, The Convention on International Trade in Endangered Species.

Middleton, Susan and David Littschwager. Witness: Endangered Species of North America. Chronicle Books 1994

Leen, Nina. And Then There Were None, Holt, Rinehart and Wiston, New York, NY, 1973. Discusses different types of destruction, and how this affected specific endangered animals (for example, under “Threatened Wetlands”, crocodiles, whooping cranes, elk, etc., are discussed), discusses the peregrine falcon’s success with captive breeding, and lists environmental organizations.

National Wildlife Federation. NatureScope, Endangered Species: Wild & Rare, National Wildlife Federation, Washington, DC, 1989. One book in a series; contains background information and lesson plans.

Nilsson, Greta, The Endangered Species Handbook, Animal Welfare Institute, Washington, DC, 1986. Discusses causes and consequences, legislation and citizen action, resources, appendices, index, and illustrations.

Nilsson, Greta, Rare, Endangered and Threatened Species of Mammals, Birds, Reptiles and Amphibians, Animal Welfare Institute, Washington, DC, 1986. List of animals that are rare, endangered or threatened, and in which states.

Western Regional Environmental Education Council. Aquatic Project WILD, project WILD, Boulder, CO, 1987. Environmental and conservation education guide, with a focus on aquatic environments and species; lesson plans.

Western Regional Environmental Education Council. Project WILD, project WILD, Boulder, CO, 1986. Environmental and conservation education guide; lesson plans.

Wilcove, David S. and Wilson, E.O. The Condor's Shadow: The Loss and Recovery of Wildlife in America. 2000

Wilson, E.O. The Future of Life. 2002

Wood, Frances. Animals in Danger, Dodd, Mead, & Co., New York, NY, 1968. Discusses many endangered animals, why they are in danger, and what is being done to help them.

World Wildlife Fund. Going, Going Gone, Animals in Danger Education Kit

Resources: Computers, On-line and Video

Biodiversity: The Variety of Life is a 42-minute video with study guide for grades 10-12. *The Last Show on Earth* is a four part video series for grades 9-12. Each 27-minute part covers a different aspect: endangered species, endangered habitat, endangered cultures and regaining balance. Both available from Bullfrog Films 1-800-543-3764

Discovering Endangered Wildlife is a Windows CD-ROM containing games, puzzles, photos, video clips, sounds, narration and printable fact sheets focusing on 50 species. For grades 5-9 from CLEARVUE/eav, 6465 N. Avondale Ave., Chicago, IL 06031-1996

Encyclopedia of U.S. Endangered Species is a CD-ROM with detailed information about 700 protected plants and animals, including multimedia presentations, photos, sounds, and interactive quizzes. Available from Zane Publishing, 1950 Stemmons, Ste. 4044, Dallas, TX 75207-3109

Endangered! Is a web site developed in tandem with the exhibit of the same name at the American Museum of Natural History. Features information on 34 endangered species with extensive information about each. www.amnh.org/Exhibition/Expedition/Endangered

Endangered Species Information Central is part of the US Fish and Wildlife Service web site featuring hundred of threatened and endangered species, each with its own mini home page, including biology, graphics and links. endangered.fws.gov/wildlife.html

Journey North is an internet-based learning adventure that engages students in global study of wildlife migrations, including several endangered species. Students get progress reports from scientists and help collect data that those studying the species use in their work. To learn how to subscribe to this free program, visit www.learner.org/jnorth

The National Wildlife Federation web site offers information on endangered species. www.nwf.org

The New Hampshire Fish and Game web site offers information on nongame and endangered wildlife. www.wildlife.state.nh.us



ENDANGERED AND THREATENED SPECIES IN NEW HAMPSHIRE

MAMMALS:

Endangered

- ✪ Canada lynx, *Lynx canadensis*
- eastern small-footed bat, *Myotis leibii*

Threatened

- marten, *Martes americana*

BIRDS:

Endangered

- pied-billed grebe, *Podilymbus podiceps*
- ✪ bald eagle, *Haliaeetus leucocephalus*
- northern harrier, *Circus cyaneus*
- golden eagle, *Aquila chrysaetos*
- peregrine falcon, *Falco peregrinus*
- ✪ piping plover, *Charadrius melodus*
- upland sandpiper, *Bartramia longicauda*
- ✪ roseate tern, *Sterna dougallii*
- common tern, *Sterna hirundo*
- least tern, *Sterna antillarum*
- purple martin, *Progne subis*
- sedge wren, *Cistothorus platensis*

Threatened

- common loon, *Gavia immer*
- osprey, *Pandion haliaetus*
- Cooper's hawk, *Accipiter cooperii*
- arctic tern, *Sterna paradisaea*
- common nighthawk, *Chordeiles minor*
- three-toed woodpecker, *Picoides tridactylus*
- grasshopper sparrow, *Ammodramus savannarum*

FISH:

Endangered

- Sunapee trout, *Salvelinus alpinus*
- ✪ shortnose sturgeon, *Acipenser brevirostrum*

Threatened

- (none currently listed)

REPTILES:

Endangered

- timber rattlesnake, *Crotalus horridus*

Threatened

- eastern hognose snake, *Heterodon platirhinos*

AMPHIBIANS:

Endangered

- marbled salamander, *Ambystoma opacum*

Threatened

- (none currently listed)

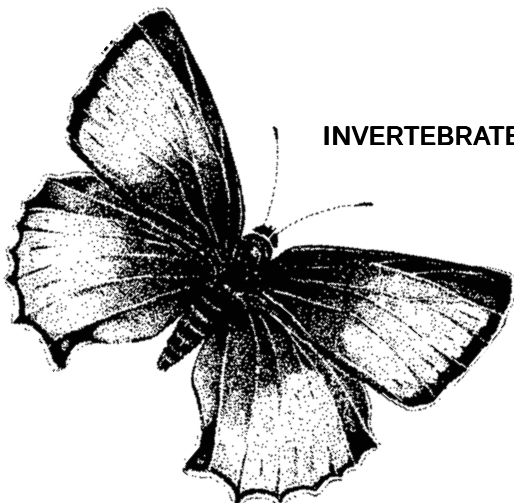
INVERTEBRATES:

Endangered

- ✪ dwarf wedgemussel, *Alasmodonta heterodon*
- brook floater, *Alasmodonta varicosa*
- frosted elfin butterfly, *Incisalia irus*
- ✪ Karner blue butterfly, *Lycaeides melissa samuelis*
- Persius dusky wing skipper, *Erynnis persius persius*
- ringed boghaunter dragonfly, *Williamsonia lintneri*

Threatened

- pine pinion moth, *Lithophane lepida lepida*
- pine barrens Zanclognatha moth, *Zanclognatha martha*
- cobblestone tiger beetle, *Cicindela marginipennis*



✪ Federally threatened or endangered.



LESSON CREDITS

Lesson 2 - Taken from “Thinking Wild, Vermont Project Wild Newsletter”, Summer/Fall 1989 (Project Wild, Vermont Fish and Wildlife Department, 103 South Main Street, Waterbury, VT 05676, p. 5).

Lesson 3 - Adapted from “Meet a Panda” out of NatureScope, Endangered Species: Wild & Rare (National Wildlife Federation, Washington, DC, 1989, p.22-23,60).

Lesson 4 - Adapted from “The Beautiful Basics”, “Everybody Needs a Home”, and “What’s That Habitat?” out of Project WILD (by Western Regional Environmental Education Council, Project WILD (by Western Boulder, CO 1986, p.29, 31-32, and 39-40).

Lesson 5 - Adapted from “Polar Bears in Phoenix?” out of Project WILD (Western Regional Environmental Education Council, Project WILD, Boulder CO, 1986, P. 103-104).

Lesson 6 - Adapted from “Habitat Is Home” out of NatureScope, Endangered Species: Wild & Rare (National Wildlife Federation, Washington, DC, 1989, P. 24-25, 31).

Lesson 7 - Adapted from “Deadly Skies” out of Aquatic Project WILD (by Western Regional Environmental Education Council, project WILD, Boulder, CO, 1987, P. 133-136).

Lesson 8 - Adapted from “ Classroom Carrying Capacity” and “Too Close for Comfort” out of Project WILD (by Western Regional Environmental Education Council, Project WILD, Boulder, CO 1986, p. 109-110, 185-186).

Lesson 9 - Adapted from “ Plastic Jellyfish” out of Aquatic Project WILD (Western Regional Environmental Education Council, Project WILD, Boulder, CO, p. 159-160).

Lesson 10 - Adapted from “Sizing Up Reserves” out of NatureScope, Endangered Species: Wild & Rare (National Wildlife Federation, Washington, DC, 1989, p. 28-30).

Lesson 11 - Adapted from “No Water Off A Duck’s Back” out of Project WILD (Western Regional Environmental Education Council, Project WILD, Boulder, CO, 1986, p. 151-152).

Lesson 12 - Adapted from “Wheel of Trouble” out of NatureScope, Endangered Species: Wild & Rare (National Wildlife Federation, Washington D.C., 1989, p. 37-38, 45).

Lesson 13 - Adapted from “The Rare Scare” out of Naturescope, Endangered Species: Wild & Rare (National Wildlife Federation, Washington D.C., 1989, p. 8-10).

Lesson 14 - Adapted from : “All around the World” out of Naturescope, Endangered Species: Wild & Rare (National Wildlife Federation, Washington D.C., 1989, p. 25-27), and “Cartoons and Bumper Stickers” out of Project WILD (by Western Regional Environmental Education Council, project WILD, Boulder, CO, 1986, p. 167-168).

Lesson 15 - Adapted from: “Ethi-Thinking” out of Project WILD (by Western Regional Environmental Education Council, project WILD, Boulder, CO, 1986, p.209-210).



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