12-1996

Our Endangered Animals: A Wildlife Management Case Study

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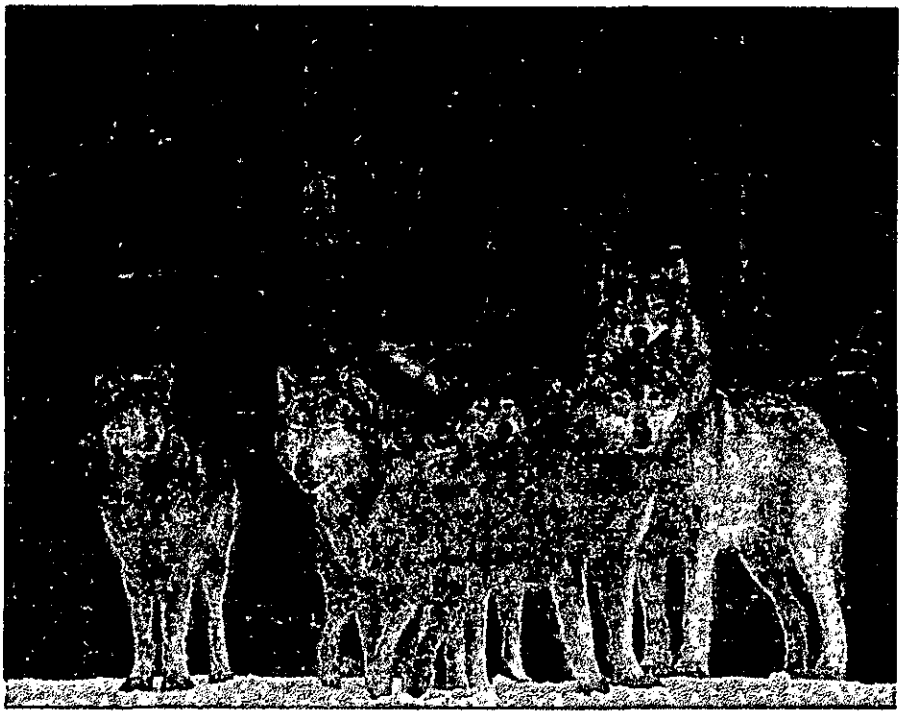


By

Robin A. Renfroe

Our Endangered Animals:

A Wildlife Management Case Study

Developed for
Grades 5-8

by
Robin A. Renfroe

A Case Study Submitted
as fulfillment of
University Honors 499

for Dr. Trudi Volk

December 2, 1996

Introduction

Issue: Awareness and management issues of endangered animals of the world, the United States, Illinois, and Randolph County, Illinois.

Rationale: Many science texts in the past have focused on the endangered animals of the world, primarily Africa and South America. Although it is important for students to understand the effects of man's activities globally, it is equally important for students to understand the affects locally.

Awareness of the locally endangered species enables students to participate in the protection of these animals and possibly help save them from extirpation or extinction.

It is also important for students to understand what factors contribute to the endangerment of animals. Using these materials, students will learn of three factors contributing to the endangerment of animals in Randolph County; habitat loss, illegal hunting, and pollution. They will also learn which animals are endangered in our county and how to identify these animals. Last, the students will learn what they can do to help protect these animals from extirpation or extinction.

Overview of Lessons

Pre Lesson Activities:

- Collect and Protect Endangered Animals Stamp Activity

Goal I Lessons:

- Vocabulary Introduction
- Researching issues that cause animals to become endangered
- Endangered Animals of Randolph County and Illinois. Using resources to find information on these animals.

Goal II Lessons:

- Beliefs and Values associated with endangered animals
- Analyzing issues associated with endangered animals using books, movies, and newsprint.

Goal III Lessons:

- Using the issue investigation method
- Identifying problems, issues, and solutions related to endangered animals.
- Writing research questions
- Using a survey instrument
- Interpreting data
- Communicating data

Goal IV Lessons:

- Discovering issues, suggesting solutions, and evaluating those solutions.
- Completing Issue Action Plans

Pre Lesson Activities

Focusing Activity: Collect and Protect Endangered Species stamp activity and video.

Sequence of Activities:

- Complete a KWL web with students on what they know about endangered animals, and what they want to learn.
- Show video on endangered species.
- Have students take an endangered animal cards and a worksheet.
- Students will read the cards and answer the questions on the worksheet using the cards and what they have learned from the video.
- Finish the KWL web by adding what the students have learned about endangered animals.
- Hand out the students flyer provided in the packet on endangered animals for the students to take home and read.

Materials for Focusing Activity:

- Collect and Protect Endangered Animals stamp kit
- Collect and Protect Endangered Animals Video.
- Endangered Animals stamps
- Teacher made worksheets (one per student)

Resources for Pre-Lesson Activity

Collect and Protect Endangered Species Stamp Kit. **United States Postal Service; Washington, D.C.**

Collect and Protect Worksheet

1. Using your endangered animals card, locate the area where your animal lives. Write the name of the animal on the area or areas of the map below that fits its habitat.

2. List a special trait that your animal shows.

   _____

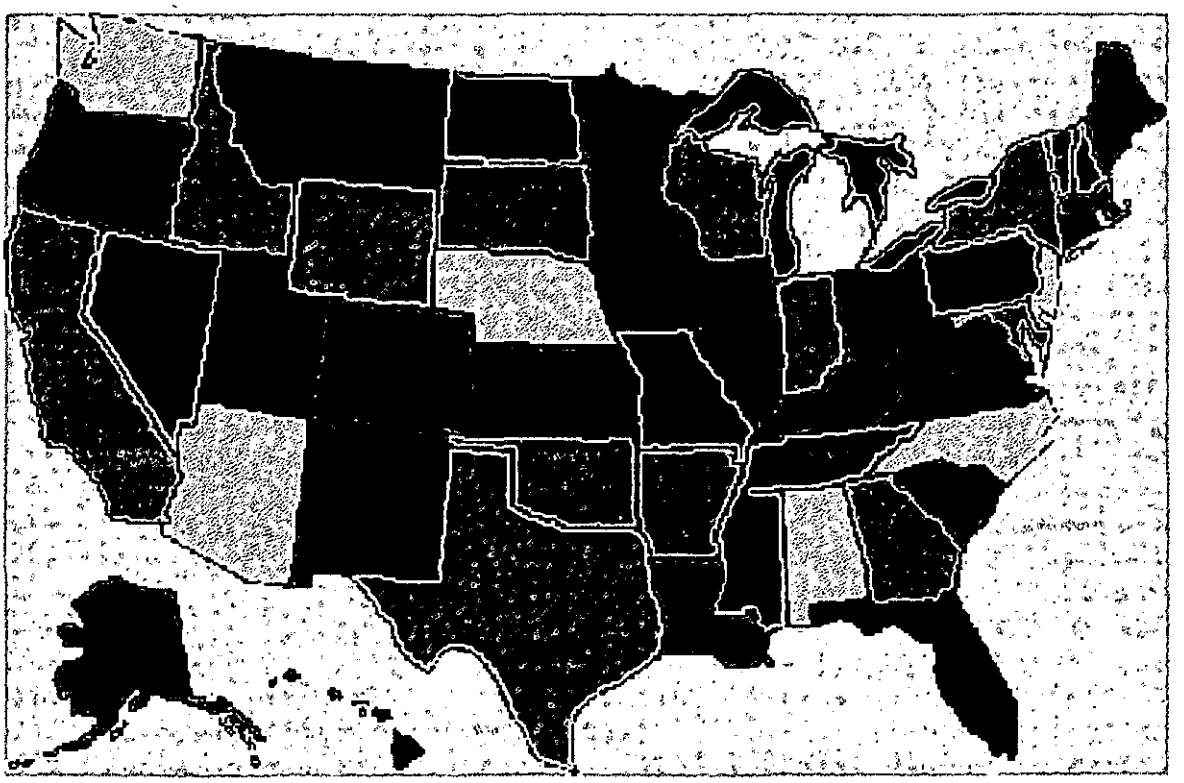
3. Is your animal a day or night animal? _____

4. What does your animal eat? _____

5. Name something that you particularly liked about your animal.

   _____

   _____



Level I Foundations

Lesson One

Focus of Instruction: Important vocabulary introduction. Threatened, Endangered, Extinct.

Time Needed: Two class periods

Student Objectives:

1. The students will define threatened, endangered, and extinct.
2. The students will provide examples of animals that are threatened, endangered, and extinct.
3. The students will list and describe reasons for animals becoming extinct.

Sequence of Instruction:

- Ask students to give a definition for threatened, endangered, and extinct.
- Show overhead of correct definitions and go over them with the students.
- Give students a handout with these definitions and a graphic of the concept.
- Give students a handout with graphic examples of animals that are threatened, endangered, and extinct.
- Ask students to verbally give examples of animals that are endangered, threatened, or extinct.
- Lecture students on the reasons for animals to become threatened, endangered, and extinct. (Habitat loss, pollution, and illegal hunting)
  - Discuss wetland loss and animals threatened by this.
  - Discuss real-estate development and the effects on animals.
  - Discuss trading in furs, zoo animals, exotic species of animals and birds.
  - Discuss environmental pollution.
- Give students worksheets to complete on the definitions and the reasons for endangered animals.

Materials Needed:

- Overhead of definitions
- Handouts of definitions and graphics
- Handouts of example species
- Worksheets for definitions, and reasons for endangered animals.

Evaluation Strategies:

The students will be given a worksheet to complete on the definitions, and reasons for endangered animals.

The students will also be checked on verbal responses to examples of animals that are threatened, endangered, and extinct.

Resources for
Level I Foundations

Section I
Graphics and definitions from

Hagengruber, David and Hungerford, Harold. *Threatened and Endangered Animals.* (1993). Champaign IL; Stipes Publishing L.L.C.

Permission granted to copy from Robert Watts, Stipes Publishing.

Section II
Endangered Animal Activities handouts from

Endangered Animals Packet (1996). Http://www.bris.uic.edu

Food Chain Mobile from

Harlow, Rosie and Morgan, Gareth. *175 Amazing Nature Experiments.* (1991). New York; Random House.

Habitat Lap Sit and Habitat Rummy

Project Wild. (1983). Western Regional Environmental Education Council.

Resource material for students from

Wildlife Fact file no information available.

Section III

Poster of Endangered Animals of Illinois from Illinois Department of Natural Resources.

Research material for students from

Endangered and Threatened Species of Illinois: Status and Distribution. Vol. - 2 Animals. (1992). Springfield, IL; Illinois Endangered Species Protection Board.

Endangered and Threatened Species of Illinois: Status and Distribution. Vol. - 3 Changes. (1994). Springfield, IL; Illinois Endangered Species Protection Board.

Definitions

Threatened - an animal species that is still abundant in some areas but has declined in total numbers.

Extinct - a species that is gone forever. It has been completely eliminated.

Endangered - a species that is in danger of becoming extinct.

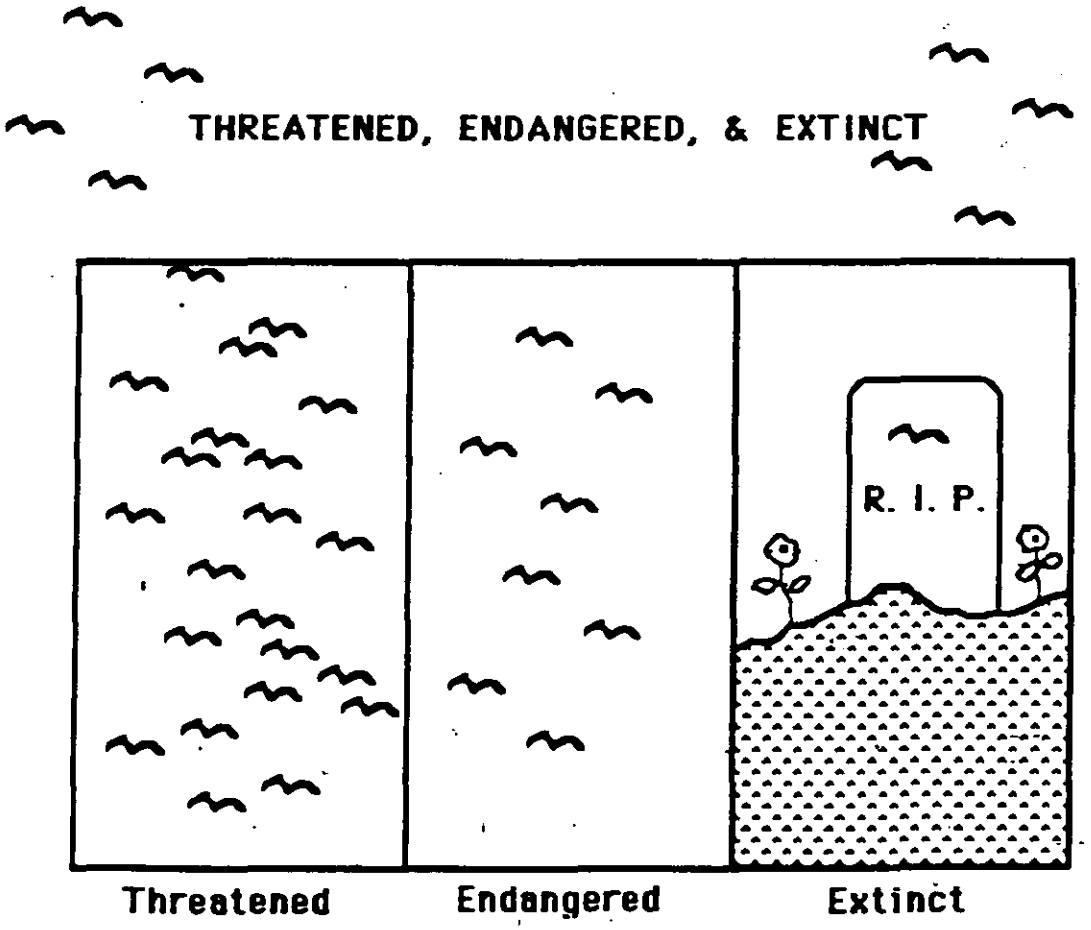
Definitions

Threatened - an animal species that is still abundant in some areas but has declined in total numbers.

Extinct - A species that is gone forever. It has been completely eliminated. There are no numbers left.

Endangered - a species that is in danger of becoming extinct. The numbers are very low.

Look at the following picture. It illustrates the concepts of threatened, endangered, and extinct.



Examples of Threatened Endangered and Extinct Animals

Bald Eagle

Florida Panther

Passenger Pigeon

Worksheet #1
Endangered, Threatened, and Extinct animals

In your own words, define the following in the space provided.
(2 points each)

1. **A Threatened Animal is one that -**

_____
_____

2. **An Extinct Animal is one that -**

_____
_____

3. **An Endangered Animal is one that -**

_____
_____

4. **List and describe two things that can cause an animal to become endangered.**
(4 points)

_____
_____
_____
_____
_____
_____
_____
_____
_____
_____

Worksheet #1
Endangered, Threatened, and Extinct animals

In your own words, define the following in the space provided.
(2 points each)

1. **A Threatened Animal is one that** ____is still abundant in some areas but has declined in general numbers Any thing close to this in the students own words is correct.

2. **An Extinct Animal is one that** - _____ is no longer seen. That species is gone forever. Completely eliminated. Any answer close to this is correct.

3. **An Endangered Animal is one that** - is in danger of becoming extinct. There are very few left alive. Again, any answer close to this is correct.

4. **List and describe two things that can cause an animal to become endangered.**
(4 points)

The students could list any two of the following three reasons
1. Pollution - examples include industrial pollution and pesticides, poisons the animal. Littering, harms or poisons the animals.
2. Habitat loss - development pushes the animals out of their homes - if animals are forced to live in smaller areas they will starve or die of disease.
3. Illegal hunting - poaching for body parts, furs, zoo trading, selling exotic species as pets all harm the animals by decreasing the population.

Section Two Lessons

Focus of Instruction: Researching issues of habitat loss, pollution, and illegal hunting and poaching using the Wildlife Fact file and observation of surroundings.

Time Needed: 2 weeks

Student Objectives:

1. The students will identify important body parts of animals that may be valuable to poachers.
2. The students will list reasons for taking animals from the wild.
3. The students will identify affects of pollution on animals in the wild.
4. The students will identify various types of pollution.
5. The students will identify the components of a food chain and the how pollution affects the chain.
6. The students will identify the types of pollution present in their community and graphs the results.
7. The students will identify the components of an animal habitat.
8. The students will identify the habitat native to specific animals.
9. The students will identify the human causes of habitat loss to animals.

Sequence of Instruction:

Part I - Illegal hunting

Lesson one

- Take students to the computer lab and allow them to choose one of four instructional games to play.

The games include - *Discovering Endangered Wildlife* (Queue CD-ROM), *One Small Square* (Virgin Software CD-ROM), *ABCs Wide World of Animals* (Creative Wonders CD-ROM), and *The Environment* (Tom Snyder Productions).

- After playing the game, have students write one or two paragraphs about what they learned while on the computer.

Lesson Two

- Show overhead of Illegal Hunting Facts
- Discuss reasons for illegal hunting; special body parts, sport hunting (trophy), hunting for fun, and to sell as pets.
- Show pictures of four animals with special body parts
- Hand out worksheet *Gotta have Parts!* and have students answer the four questions about the animals shown.

Lesson Three

- Instruct students to work in groups of four to fill out the next worksheet *Poachers Stink*. The students should use the Wildlife Fact files to help with this worksheet.
- Discuss with students the answer choices they chose. Also discuss how they feel about poachers and other options to trophy animal parts. What do they feel we could do to stop poachers?

Lesson Four

- Give students a handout with pictures of six animals.
- Give students the worksheet *Just Leave me Alone.*
- The students should work individually to answer the questions on the worksheet.
- When finished, have the students work in pairs to check each others answers.
- Have students share their bonus answer of one thing we can do to help vanishing animals that are illegally hunted.

Part II - Pollution

Lesson Five

- Show overhead of Pollution Facts
- Discuss the four types of pollution; air, land, water, and noise.
- Ask students to share ideas on how these four types of pollution can affect animals.
- Show a picture of an animal and have students fill in the worksheet packet *Pollution and Animals don't mix,* page one.
- Ask students to share their answers.
- Using the Wildlife Fact File and working in groups of 4, have the students fill in the remaining pages of the worksheet packet.
- Give students the worksheet *The pollution solution* for homework to be returned the next day for a grade.

Lesson Six

- Discuss with students the definitions predator, prey, and food chain- they should already have this from their homework.

  Predator - an animal that hunts and kills other animals for food

  Prey - an animal that is hunted for food

  Food chain - a system by which living things get their food.
- Hand out worksheet *the polluted chain* and have students draw their food chain.
- Go over the questions as a group as to how the food chain is affected by pollution.
- Ask questions of students such as what can we do to stop the pollution of the food chain. Ask for specific examples and plans of action. Recycling centers are one example that the students may wish to start up in the classroom.

Lesson Seven

- Each student will construct their own food chain mobile

  The teacher should have the mobile patterns ready for the students to cut and use. See Handout attached for pattern and instructions.
- When students have finished the food chain mobile, hang them in the room for the remainder of the semester.

Lesson Eight

- Give the students the *Can you believe worksheet.*
- After explaining the worksheet take the students for a walk through the community to observe the land pollution found there.
- Students should record their observations

- After returning to the classroom, the students should answer the questions on the worksheet and color in their graphs.
- Discuss what they have found and possible solutions to the problem.

Part III - Habitat Loss

Lesson Nine

- Do Habitat Lap Sit Activity

  See Handout Attached for the Procedure.
- Following the activity have students discuss the components of a habitat and what happens if one of those components is missing.

Lesson Ten

- Show overhead of habitat facts and discuss the different types of habitats and their components - food, water, shelter, and space.
- Give students the worksheet *Habitat Adventure.*
- Show students pictures of two animals.
- Using the Wildlife Fact file have the students answer questions of these two animals on the worksheet.
- Give students the worksheet *World Tour* as homework to be completed for the next day. Students should use the wildlife fact file or other resources such as the Internet to help them complete this worksheet. Time will be given in class to complete this assignment.

Lesson Eleven

- Review the types of habitats and their components for the students. Ask the students to describe these habitats.
- Give students the handout *What's happening to my habitat.*
- Discuss the ways that man affects habitats as shown on the worksheet; farming, road building, water sports, buildings, and logging for lumber.
- Allow students to use the classroom resources to find which animals live in each habitat in order to answer the worksheet.
- Give students the *Endangered Animals* Crossword puzzle to complete in the remaining class time.

Lesson Twelve

- Students play Habitat Rummy Game

  See attached for the Procedure and the master cards for the game
- When students are finished with the game have them discuss what they have learned while playing the game.

Materials Needed:

Lesson One

- Computers for entire class
- Computer games: *Discovering Endangered Wildlife* (Queue CD-ROM), *One Small Square* (Virgin Software CD-ROM), *ABCs Wide World of Animals* (Creative Wonders CD-ROM), and *The Environment* (Tom Snyder Productions).

Lesson Two

- Overhead of Illegal Hunting Facts
- Gotta Have Parts handout
- Overhead of four animals with body parts.

Lesson Three

- Poachers Stink Handout

Lesson Four

- Just Leave Me Alone Handout
- Handout of six animals.

Lesson Five

- Overhead of Pollution Facts
- Pollution and Animals Don't Mix handout
- The Pollution Solution Handout

Lesson Six

- The Polluted Chain Handout

Lesson Seven

- Food Chain Mobile Handout
- Cardboard pattern
- Markers
- Scissors
- Needle and Thread

Lesson Eight

- Can you Believe Handout
- Markers or colored pencils

Lesson Nine

- Habitat Lap Sit Activity

Lesson Ten

- Overhead of Habitat Facts
- Habitat Adventure Handout
- Overhead of two animals
- World Tour Handout

Lesson Eleven

- What's Happening To my Habitat Handout
- Endangered Animals Crossword

Lesson Twelve

- Habitat Rummy Game
- Master Cards and Animal Cards

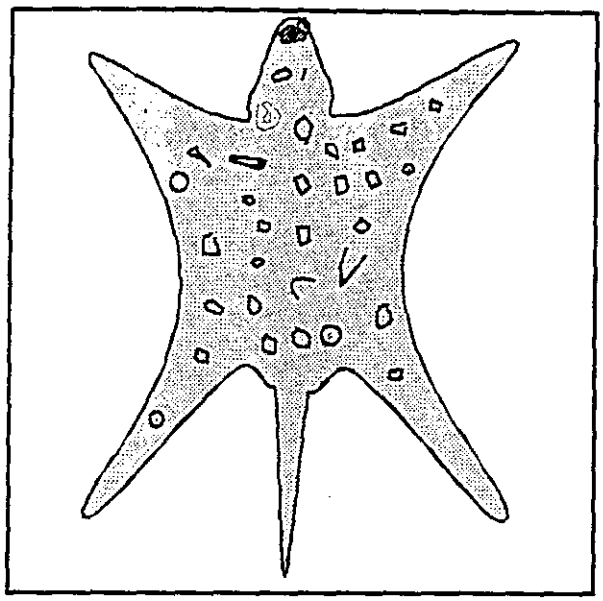
Evaluation Strategies:

1. The students will be checked for their ability to identify the important body parts on the *Gotta Have Parts Handout* during lesson two.
2. The students will be observed for their ability to work well in groups during lesson three.

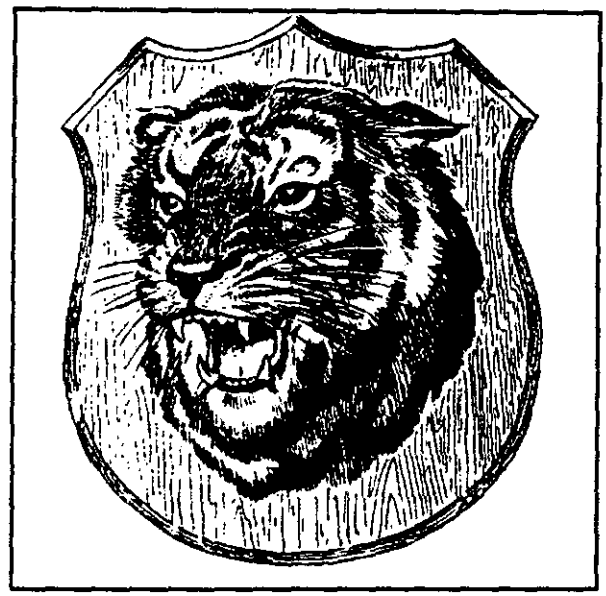
3. The students will be checked for understanding of poaching and the harm it causes during lesson three by verbal response.
4. The students will be checked for their ability to apply the concept of special body parts and how they are used by the animal and humans by completing the *Just Leave Me Alone* worksheet during lesson four.
5. The students will be observed for understanding of the types of pollution and their affects on animals during class discussion and completion of the worksheet *Pollution and Animals Don't Mix* during lesson five.
6. The students will be checked for their understanding of vocabulary and how pollution affects the food chain by completing the worksheet *The Pollution Solution* during lesson five.
7. The students will be observed for their understanding and comprehension of the working of the food chain by their drawing on the *Polluted Chain* handout during lesson six.
8. The students will also be observed for their ability to apply a solution to the problem of pollution to their lives by offering suggestions during class discussion during lesson six.
9. The students will be checked for their construction of the mobile during lesson seven.
10. The students will be observed for participation in the observation of pollution in the community during lesson eight.
11. The students will be checked for their understanding of the data by graphing the information and correctly interpreting the data during lesson eight.
12. The students will be observed for participation in a group activity and discussion during lesson nine.
13. The students will be checked for comprehension of animal habitats and habitat components by completing the *Habitat Adventure* worksheet on lesson ten.
14. The students will show understanding of the damages that man causes to animal habitats by completing the *What's Happening to my Habitat* worksheet during lesson eleven.
15. The students will be observed for participation in the group discussion about what was learned during lesson twelve.

Illegal Hunting Facts

Animals can become vanishing animals if they are **illegally hunted**. People illegally hunt animals for their **special body parts**, for **sport**, for **fun**, or for **use as pets**. We call people who illegally hunt animals **poachers**.

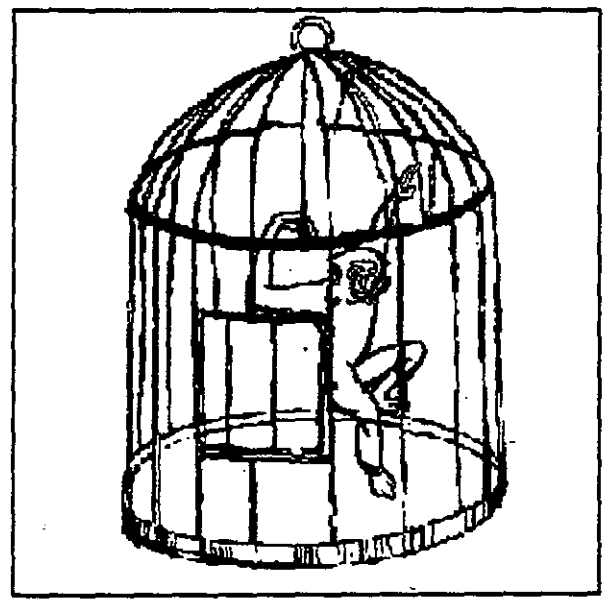


Special Body Parts



Sport Hunting

Hunting for Fun



Sell as Pets

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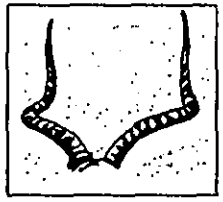
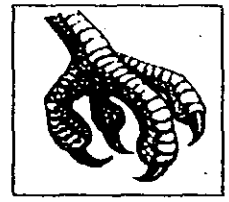
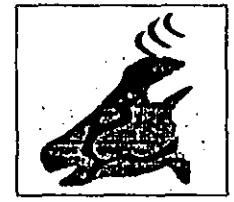


A. Horns



B. Grasping Feet



C. Eyes on Side

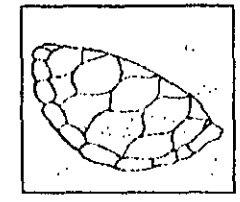
D. Sharp Teeth

E. Tearing Beak

Gotta Have Parts!

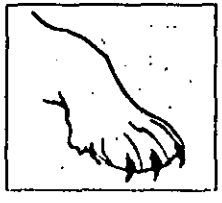
N. Hooves

All animals have body parts that make them special, for example, the tortoise's *shell* or the zebra's *hooves*. We call these **special body parts**. These special body parts help them **move from place to place**, **protect themselves**, **get food**, **camouflage**, and **stay warm**. Animals cannot live without their special body parts because they need them to *survive*.

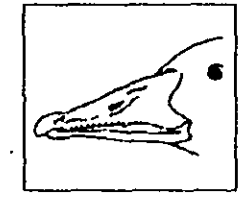


F. Shell

Directions: Write the name of the animal in the first column. Observe the animal's special body parts. Find a special body part that matches one of the pictures. Put the letter of the picture in the second column. Circle the use of the special body part in the third column.



M. Claws on Paws



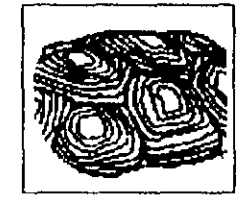
G. Flat Beak

Animal's Name	Special Body Part	Use of Body Part
1. _____	_____	PROTECTION GET FOOD CAMOUFLAGE STAY WARM MOVE

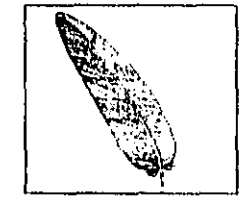
L. Webbed Feet

K. Eyes in Front

J. Spotted Fur



I. Scales



H. Feathers

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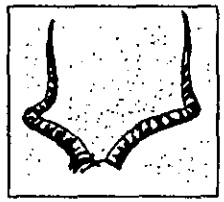
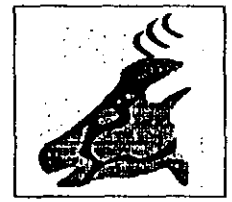


A. Horns

B. Grasping Feet



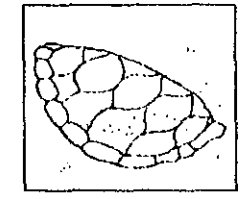
C. Eyes on Side

D. Sharp Teeth

E. Tearing Beak

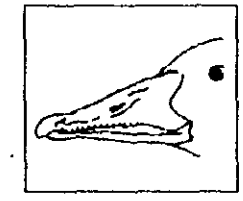
	Animal's Name	Special Body Part	Use of Body Part
2.			PROTECTION GET FOOD CAMOUFLAGE STAY WARM MOVE
3.			PROTECTION GET FOOD CAMOUFLAGE STAY WARM MOVE
4.			PROTECTION GET FOOD CAMOUFLAGE STAY WARM MOVE

N. Hooves

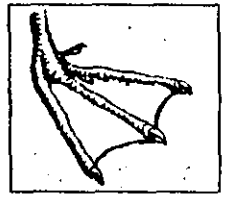


F. Shell

M. Claws on Paws



G. Flat Beak

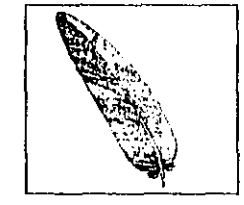


L. Webbed Feet

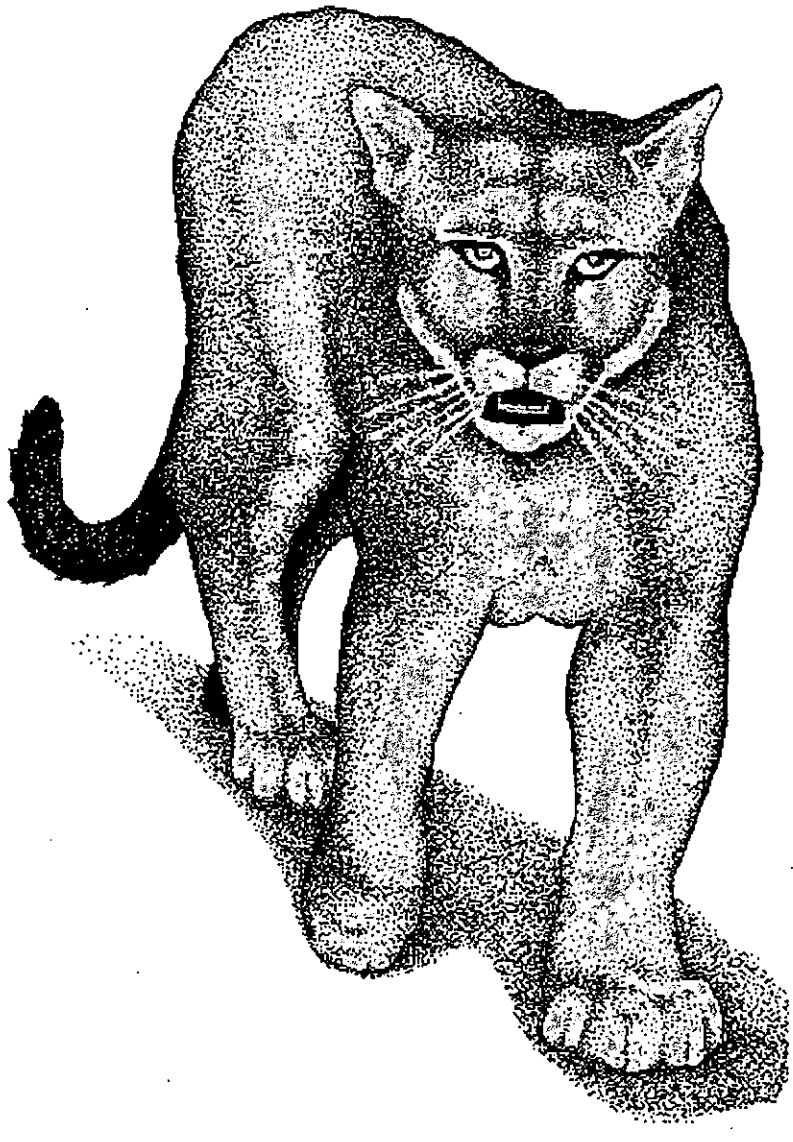
K. Eyes in Front

J. Spotted Fur

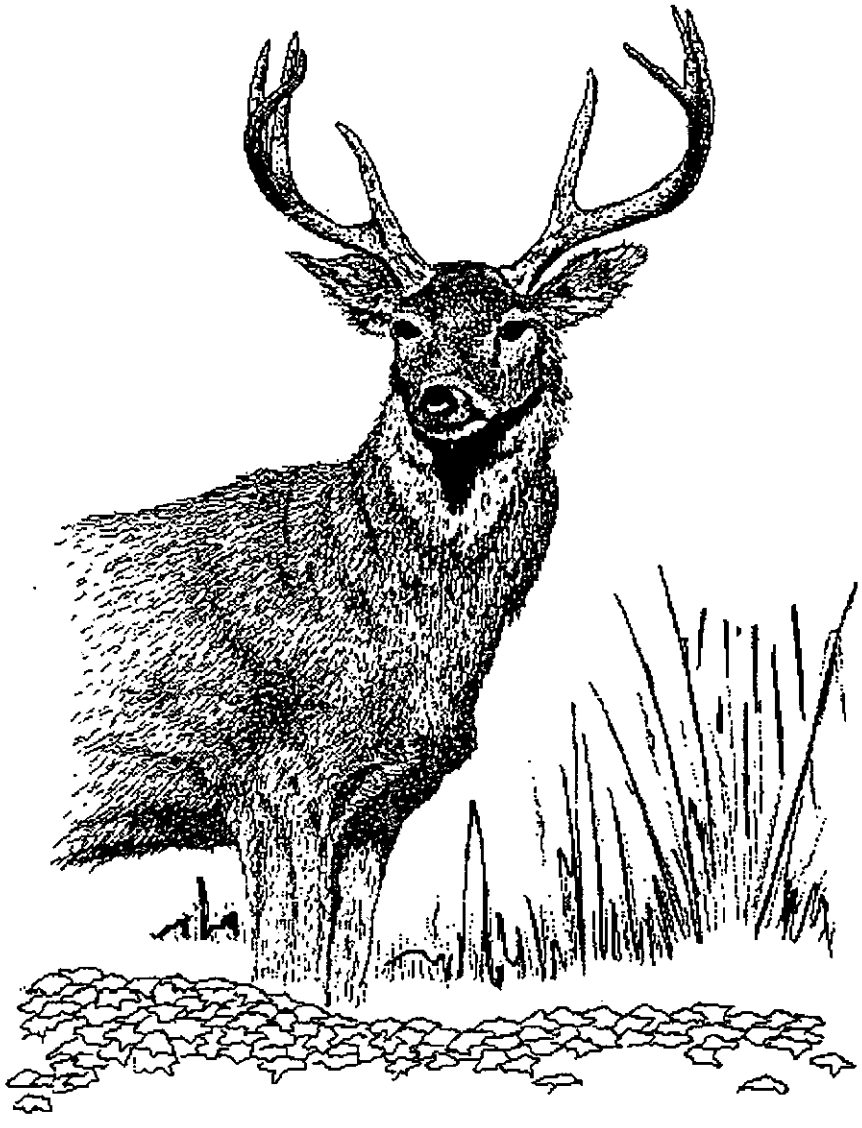
I. Scales



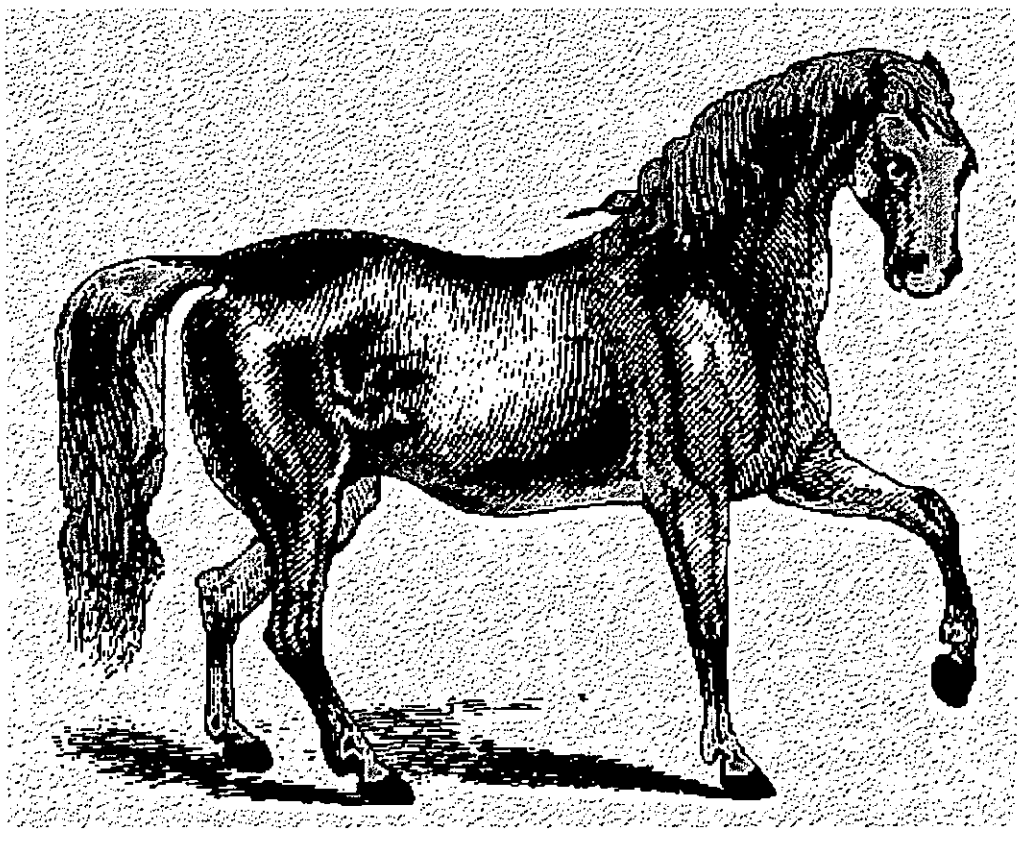
H. Feathers



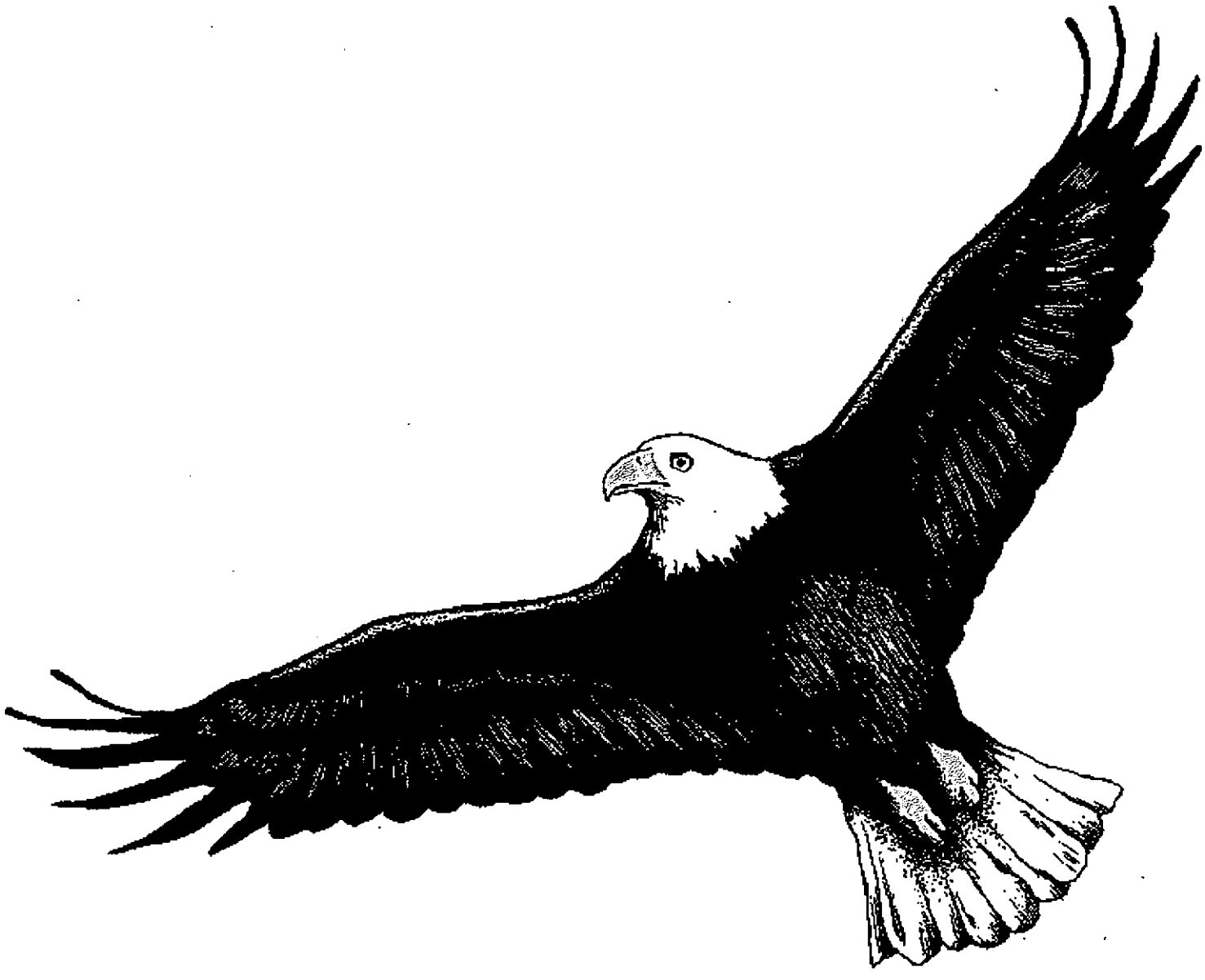
Picture Number 1



Picture Number 2



Picture Number 3



Picture Number 4

POACHERS STINK!

Hello. My name is Ranger Rick and I am a game warden. My job is to enforce the laws that protect vanishing animals.

Poachers are hunters who do not obey the law. Why do poachers illegally kill or capture vanishing animals?

Poachers **illegally hunt** animals for four reasons. They sell the animal's **special body parts** to make money. They hunt for **sport** to use the dead animal as a trophy. They capture animal babies to sell as **pets**. Lastly, they hunt animals just for **fun**.

Illegal hunting is one of the ways people are causing animals to become vanishing animals. Let's discover why poachers are illegally hunting animals.

Can you identify the following vanishing animals by matching them to a portion of their special body parts? Be alert!

SECTION 1

1. These special body parts belong to the

   _____.

2. Name the special body part that helps this animal eat meat:

   _____.

3. Poachers kill this animal for sport. What would be better for this animal? (circle answer)

   a) to be a trophy on the wall

   b) to be alive in its home

4. What else could you put on the wall instead of an animal trophy? _____

5. Why do you think poachers illegally hunt these animals?

   _____

6. Are these vanishing animals? (circle answer) yes no

7. If people keep killing these animals, they could become _____.

SECTION 2

1. This is the _____

________________________________.

2. Many people like to have this wild animal as a pet. Poachers take the baby from its mother and sell it to a pet store. How would you feel if you were taken away from your family forever?

____

____

3. Why do poachers illegally hunt these animals? (circle answer)

   a) to sell their special body parts b) for sport c) to sell them as pets

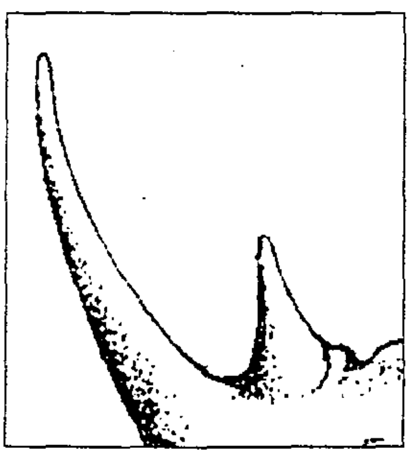
4. Is this a vanishing animal? (circle answer) yes no

5. If people buy these animals at the pet store, will poachers keep taking them from their families and homes? (circle answer) yes no

6. Could they become extinct? (circle answer) yes no

^^

SECTION 3



1. These special body parts belong to the

________________________________.

2. These special body parts are called the

________________________________.

3. These special body parts help the animal: (circle answers)

   camouflage. protect itself. move.

   stay warm. get food.

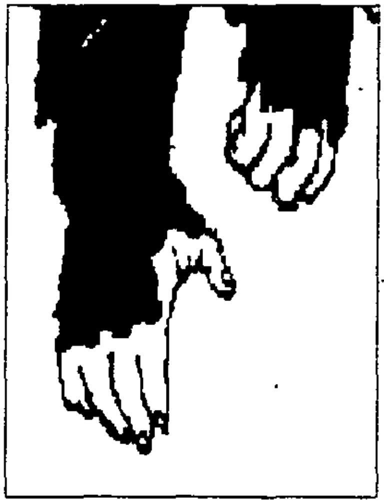
4. Poachers kill this animal to get its special body parts. Sometimes the horns are carved into handles for daggers. They are also ground into powder and used for drugs. Some people believe that taking these drugs will give them special powers. Do you believe that you would be different or powerful if you took this drug? (circle answer) yes no

5. Is this a vanishing animal? (circle answer) yes no

6. If people buy pills and dagger handles made from this animal, will poachers keep killing these animals? (circle answer) yes no

SECTION 4

1. These special body parts belong to the



______________________________.

2. These special body parts are called the

______________________________.

3. These special body parts help the animal: (circle answers)

camouflage. protect itself. move.

stay warm. get food.

4. Poachers kill this animal for its special body parts. They make ashtrays out of its hands. Do you think it is fair for an animal to die just so people who smoke can have an ashtray? (circle answer)

yes no

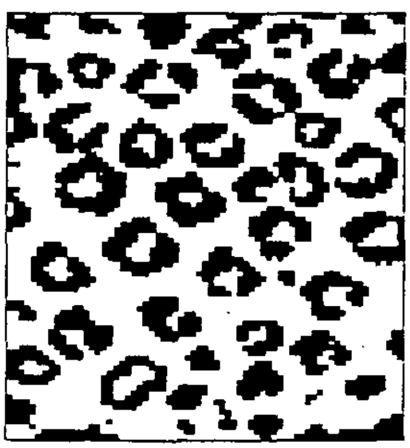
5. Why do poachers illegally hunt these animals? (circle answer)

a) to sell their special body parts b) for sport c) to sell them as pets

6. Are there many of these animals left on Earth? (circle answer) yes no

^^^

SECTION 5



1. This special body part belongs to the

______________________________.

2. This special body part is called the

______________________________.

3. This special body part helps the animal: (circle answers)

camouflage. protect itself. move.

stay warm. get food.

4. Poachers kill this animal for sport and so that they can make fur coats, rugs, and wall hangings from the fur. Would you buy a fur coat made from this animal? (circle answer) yes no

5. Is this a vanishing animal? (circle answer) yes no

6. If people keep killing these animals, they could become ____________________.

SECTION 6

1. These special body parts belong to the

______________________________.

2. These special body parts are called the

______________________________.

3. These special body parts help the animal: (circle answers)

camouflage. protect itself. move.

stay warm. get food.

4. Poachers kill this animal so that they can make jewelry and statues from the **ivory** tusks. What else could people use for ivory jewelry and statues so this animal wouldn't have to be killed?

____

5. Why do poachers illegally hunt these animals? (circle answer)

a) to sell their special body parts b) for sport c) to sell them as pets

6. What would happen to this animal if it didn't have its tusks? ______________

____

7. Is this a vanishing animal? (circle answer) yes no

8. If people keep killing these animals, they could become ____________________.

^^^

Pick an animal and fill in the following:

1. This special body part belongs to the

______________________________.

2. This special body part is called the

______________________________.

3. This special body part helps the animal:

move. protect itself. camouflage.

stay warm. get food.

4. Why do you think poachers illegally hunt these animals? (circle answer)

a) to sell their special body parts b) for sport c) to sell them as pets

<u>BONUS</u>! What should Ranger Rick tell the poachers when he arrests them? ______________________________________

Just Leave Me Alone...

Many animals are vanishing because they are *illegally hunted*. People hunt them for their **special body parts**, for **sport**, for **fun**, or for **use as pets**. People who illegally hunt animals are called **poachers**.

Directions: Observe each animal *in the handout* to answer the questions below.

A.

1. The _____ is hunted for its warm fur.
2. Is this a vanishing animal?

   a) yes b) no
3. Poachers use the fur to make coats. What could we use instead of an animal's fur to make coats?

   a) cheese b) pencils c) fake fur
4. Draw a picture of this animal. Be sure to include its special body part.

B.

1. The _____ is illegally hunted for its tusks. These tusks are long teeth made of ivory.
2. The elephant uses its tusks for protection. Can the elephant survive without its tusks?

   a) yes b) no
3. Poachers use the tusks to make ivory jewelry. What can we make jewelry from instead of ivory?

   a) plastic b) water c) bugs
4. Draw a picture of this animal. Be sure to include its special body parts.

C.

1. The _____ is killed for sport. Hunters make trophies out of it to hang on the wall.

2. Where does this animal's head look better? It looks better

   a) on its body. b) on a wall.

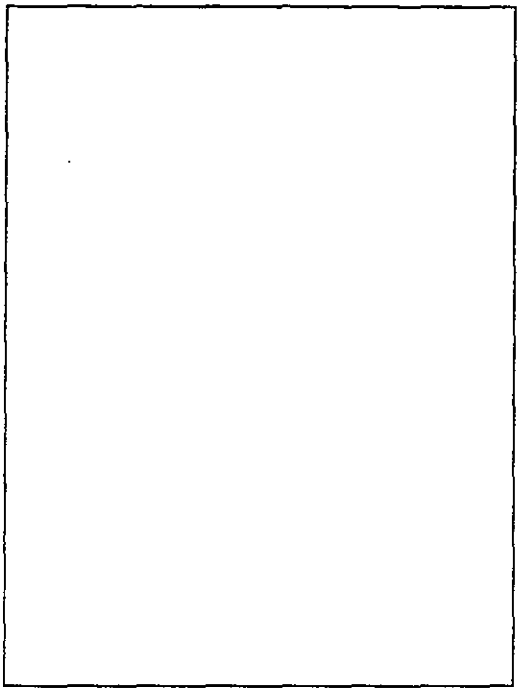
3. What other things could we use to decorate our walls?

   a) grass b) radios c) pictures

4. Could this animal become a vanishing animal if hunters keep killing it to make trophies?

   a) yes b) no

5. Draw a picture of this animal.



D.

1. The _____ is hunted by poachers for its horns. They grind up the horns to make drugs.

2. Some people think that drugs made from the horns will make them strong. Do you think that they would make you strong?

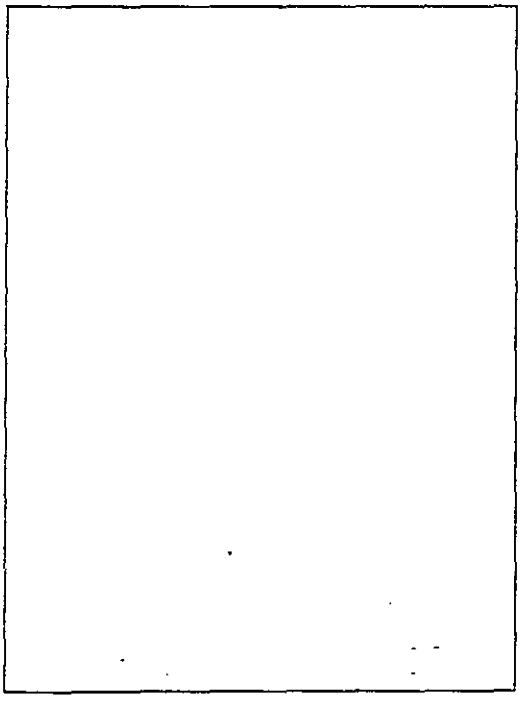
   a) yes b) no

3. If hunters keep killing these animals, they will become

   a) extinct. b) old. c) turtles.

4. Is it good to be a vanishing animal?

   a) yes b) no



5. Draw a picture of this animal. Be sure to include its special body parts.

E.

1. The ______________________________
   is killed because people are afraid that it will hurt them or eat their cattle. Some people kill them for fun.

2. Hunters were paid money for each wolf they killed. So many wolves were killed that now they are

   a) bark. b) vanishing animals.

3. Who can help vanishing animals get better?

   a) people b) trees c) fish

4. Draw a picture of this animal.

F.

1. The ______________________________
   is trapped and sold as a pet.

2. Is this a vanishing animal?

   a) yes b) no

3. These animals are taken away from their homes and never get to see their family and friends again. How would you feel if that happened to you?

   a) happy b) sad c) sleepy

4. What animal would make a better pet?

   ____

5. Draw a picture of this animal.

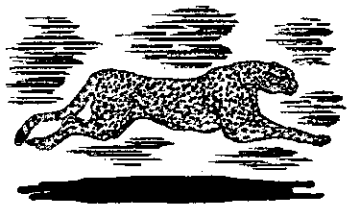
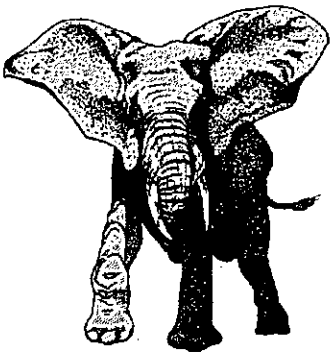
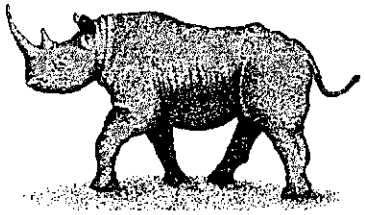
>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>><<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<

BONUS

Name one thing you can do to help vanishing animals that are illegally hunted.

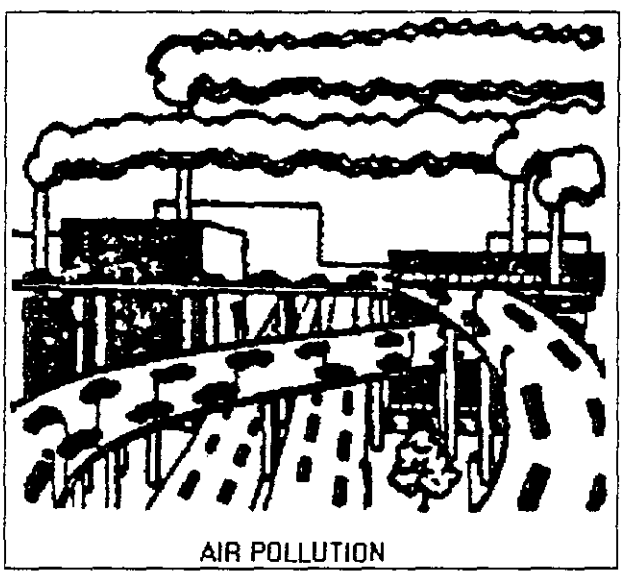
____

Animals Handout for
Just Leave Me Alone worksheet

Animal #1 	Animal #2 	Animal #3 
Animal #4 	Animal #5 	Animal #6 

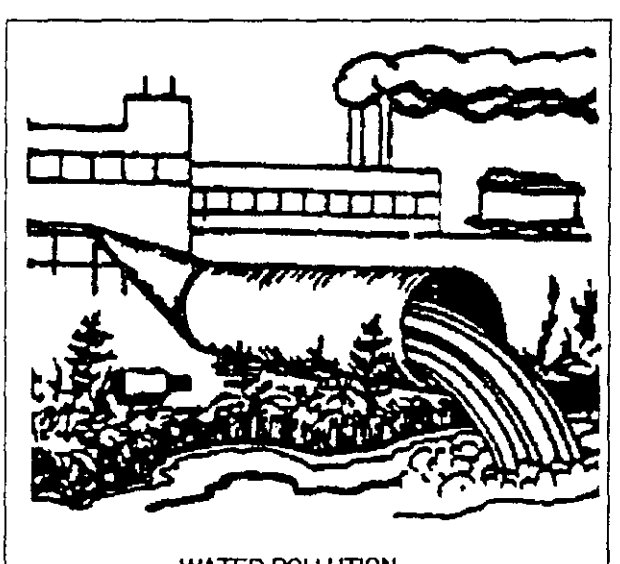
Pollution Facts

Pollution is anything produced by humans that hurts animals, plants, and the environment. The four kinds of pollution are air pollution, water pollution, land pollution, and noise pollution. Pollution is harmful to the health of people *and* animals.

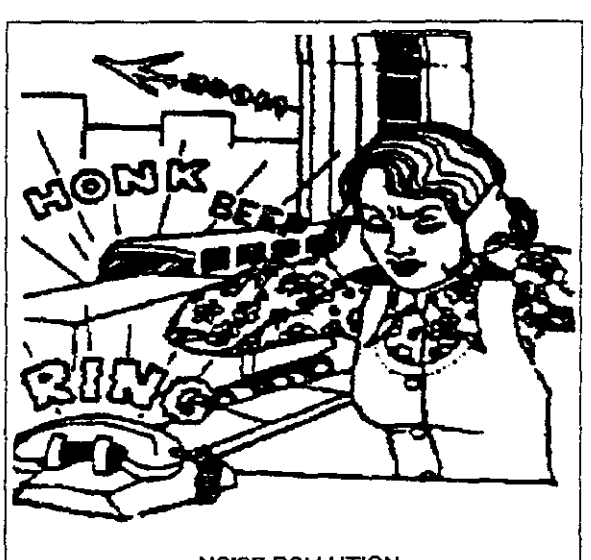


AIR POLLUTION

LAND POLLUTION



WATER POLLUTION



NOISE POLLUTION

POLLUTION AND ANIMALS DON'T MIX

Directions: Animals can become ***Vanishing Animals*** if they eat polluted food or if their surroundings become polluted. Learn more about animals and pollution by making an **animal card** for the animal Shawn. Fill in the blanks with the correct answers by carefully observing the animal and its surroundings.

HINT: READ THE SIGNS!

1. This animal is called a (an) _____.
2. This animal eats: (circle one) meat plants
3. This animal is a: (circle one) predator prey
4. This animal would be most affected by what kind of **pollution**? (circle one)

    a. air pollution
    b. water pollution
    c. land pollution
    d. noise pollution

3. Draw a picture of this animal being affected by the type of **pollution** you circled above.

Find the *Alligator Snapping Turtles.*

1. These animals use _____ to help them eat.

   Because *Alligator Snapping Turtles* eat _____,

   they are _____ animals.

2. *Alligator Snapping Turtles* would be most affected by what kind of pollution?

   a. air pollution
   b. water pollution
   c. land pollution
   d. noise pollution

3. Draw a picture of *Alligator Snapping Turtles* being affected by this type of pollution.

Find the *Llamas*.

1. *Llamas* use _____ to help them eat _____. *Llamas* eat plants and are _____ animals.

2. *Llamas* would be most affected by what kind of **pollution**?

   a. air pollution
   b. water pollution
   c. land pollution
   d. noise pollution

3. Draw a picture of the *Llamas* being affected by this type of **pollution**.

Animal Card BONUS!

1. You use _____ to help you eat.

   Because *you* eat _____, you are

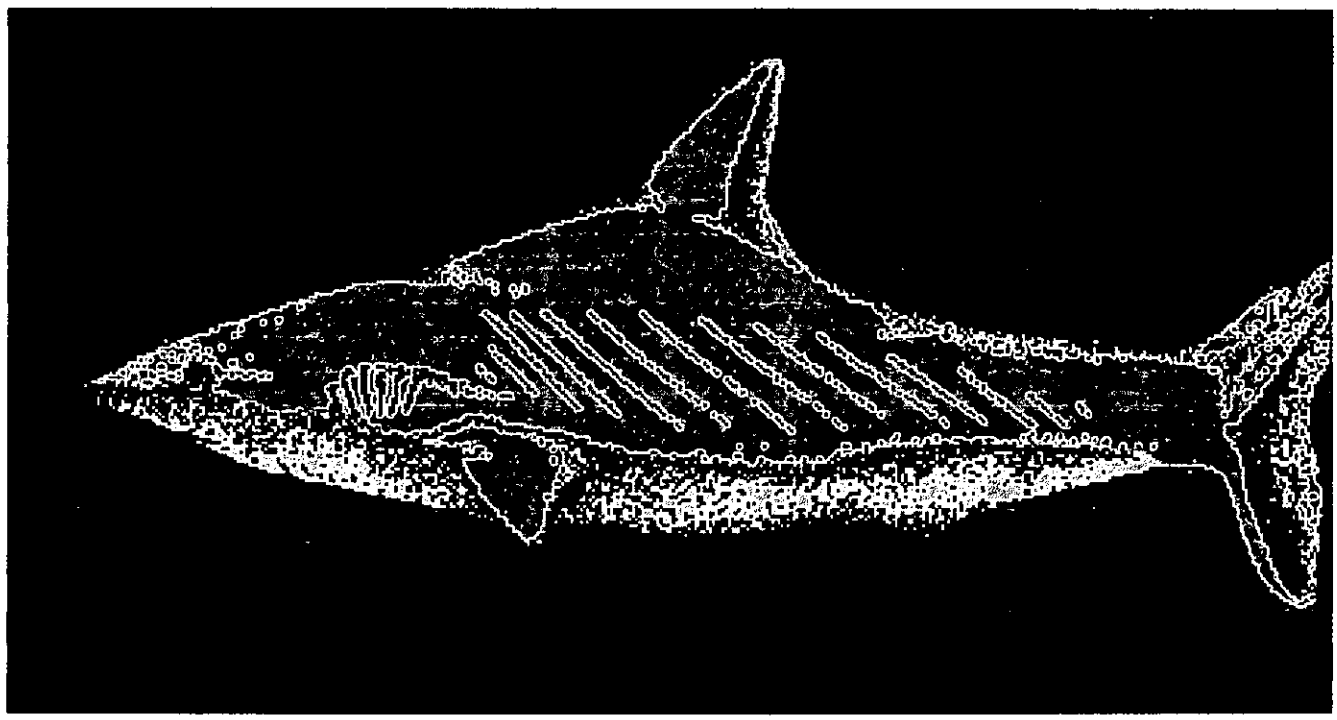
   a_____ animal.

2. You would be most affected by what kind of **pollution**?

   a. air pollution
   b. water pollution
   c. land pollution
   d. noise pollution

3. Draw a picture of *you* being affected by this type of **pollution**.

Animal for
Pollution and Animals don't mix



The Pollution Solution

Pollution is anything that makes our world unclean. Many animals are hurt by different kinds of **pollution**, either when they eat it or when it poisons their home. In fact, sometimes **pollution** can make animals become **vanishing animals**. Learn more about **pollution** by observing life in and around the zoo. For each question, fill in the blanks with your answer.

Vocabulary List:

1. **Predator:** An animal that hunts and kills other animals for food
2. **Prey:** An animal that is hunted for food
3. **Food Chain:** A system by which living things get their food

e ats

Example of a Food Chain

eats

1. Can you list a **food chain** found in this area?

_____

eats

_____

eats

_____

2. a. Which animal in your food chain is the **predator**? _____

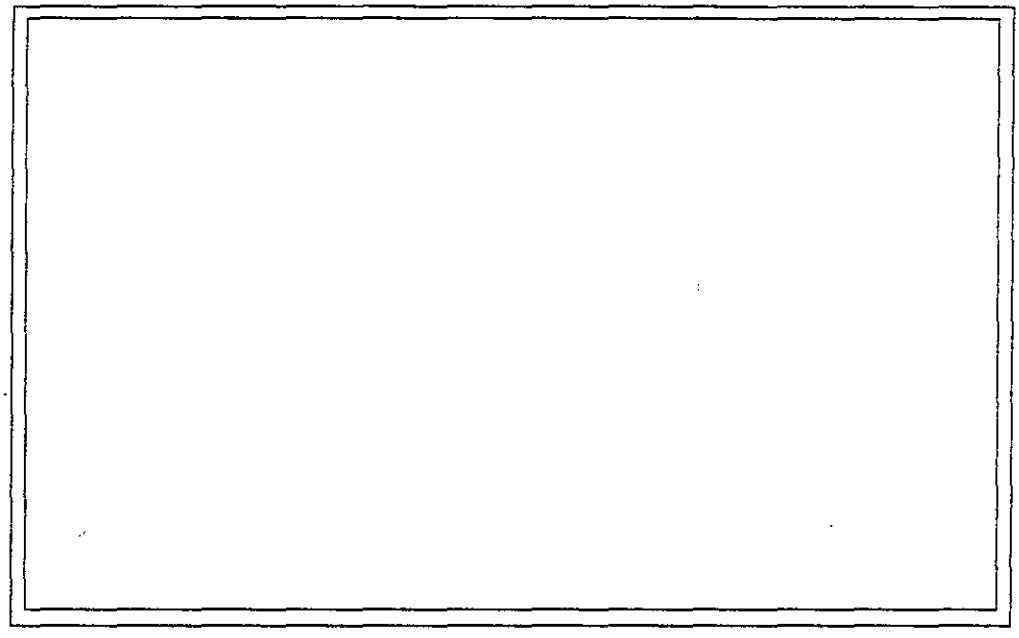
   b. Which animal in your food chain is the **prey**? _____

3. List two kinds of **pollution** you can see, hear, or smell from where you are standing.

1. _____

2. _____

4. Draw a picture showing how one of these kinds of **pollution** could hurt the **animals** who live in this area.



5. Who is responsible for cleaning up **pollution** in our world?

a. Wildlife
b. All human beings
c. Scientists and zookeepers

6. Name one thing **you** can do to help stop pollution.

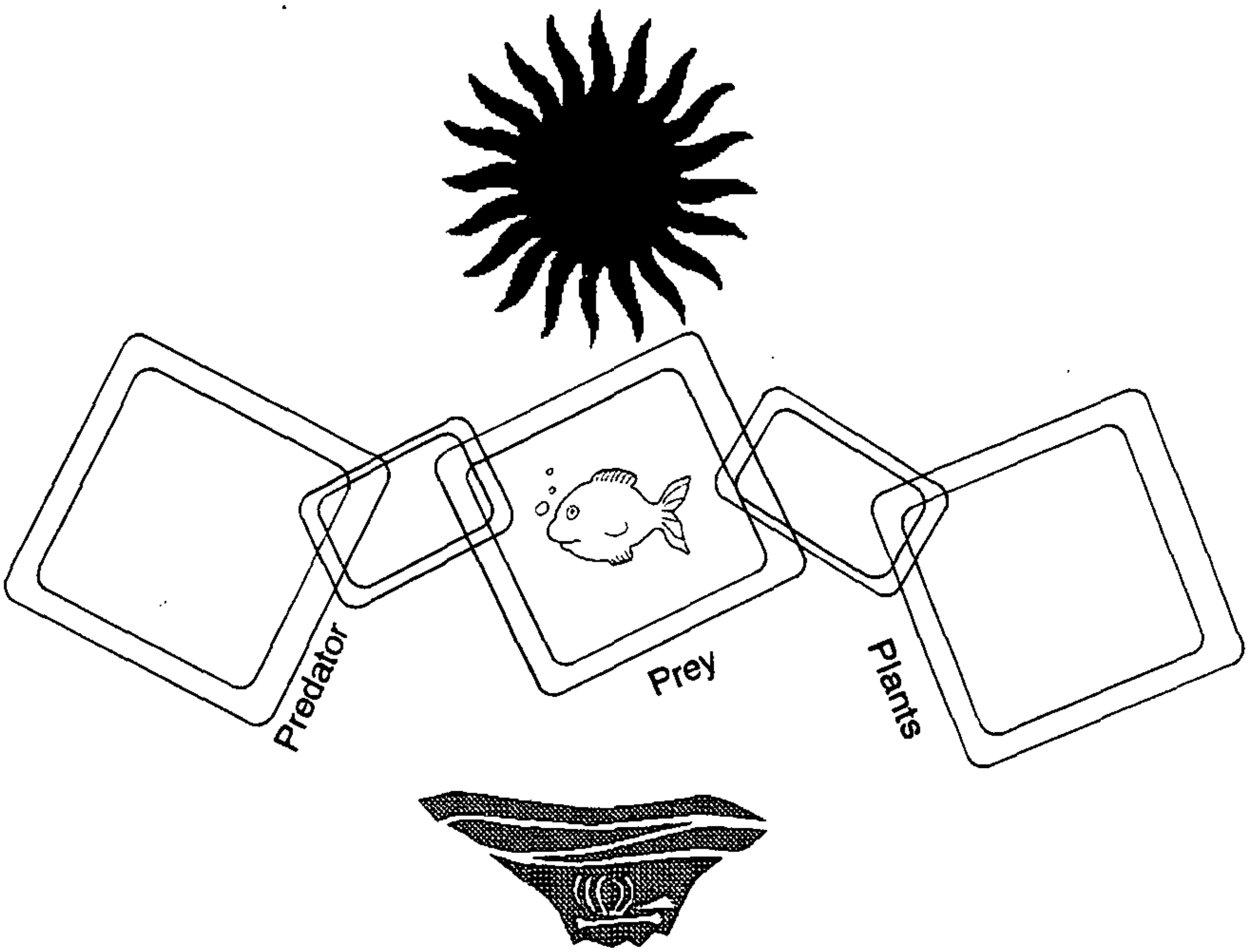
_____

The Polluted Chain

Animals can become **vanishing animals** if they eat polluted food or if their homes become polluted. Learn more about predator and prey animals and how pollution affects the **food chain**.

Food Chain - a system by which all living things get food to live .

A. Find a **predator that eats fish** . Complete the food chain for your animal. When your food chain is complete, answer the questions below to find out how pollution hurts your animal.



^^
^^^^^^

Sometimes people dump motor oil and chemicals in the water.

1. What will happen to the **prey fish** if it swallows oil?

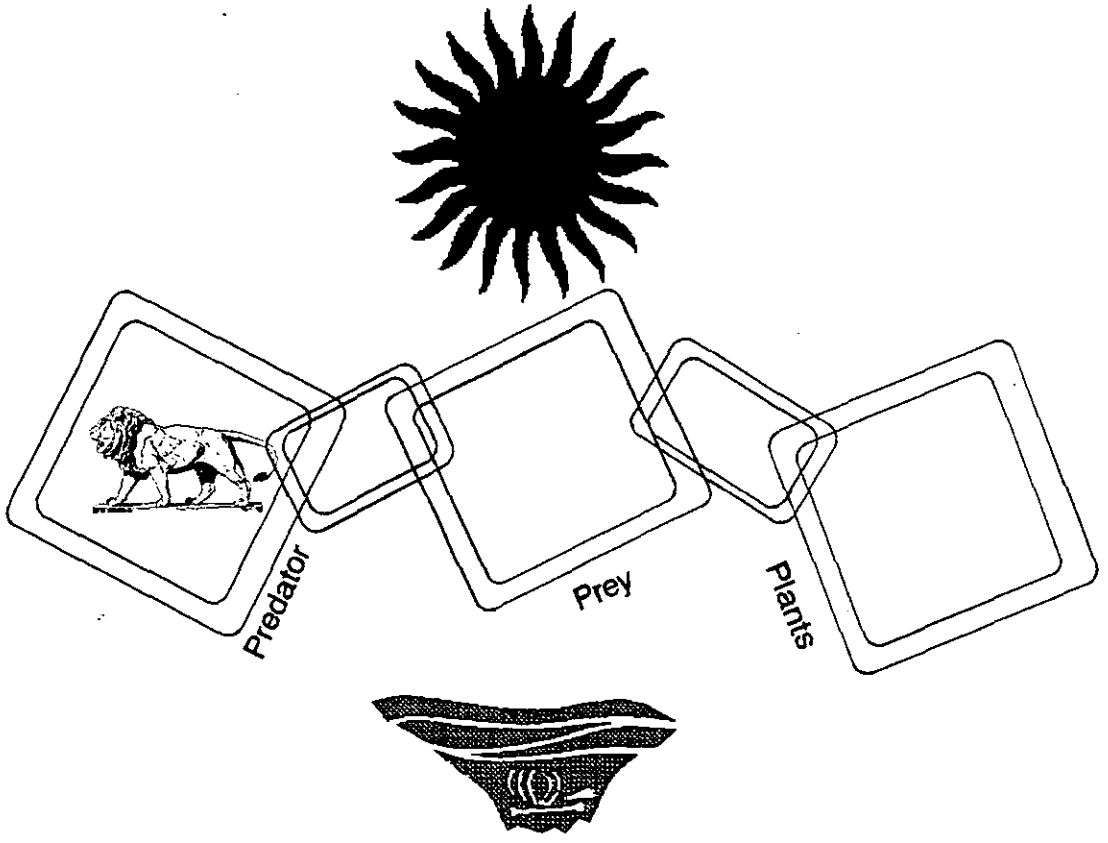
   a) It will get poisoned. b) It will be fine.

2. What will happen to your **predator** if it eats many of

these poisoned fish?

a) Nothing will happen to it. b) It will get sick and die.

B. Find a **prey** animal that might be eaten by a lion. Draw your **prey** animal in the food chain. Complete the food chain by looking at the sign and drawing in what it eats. When your food chain is complete, answer the questions below to find out how pollution hurts your animal.



Sometimes people leave plastic trash on the ground.

1. What will happen to the **prey** animal if it eats the plastic trash?

   a) It will choke and die. b) It will be fine.

2. If too many of these animals die, they will become

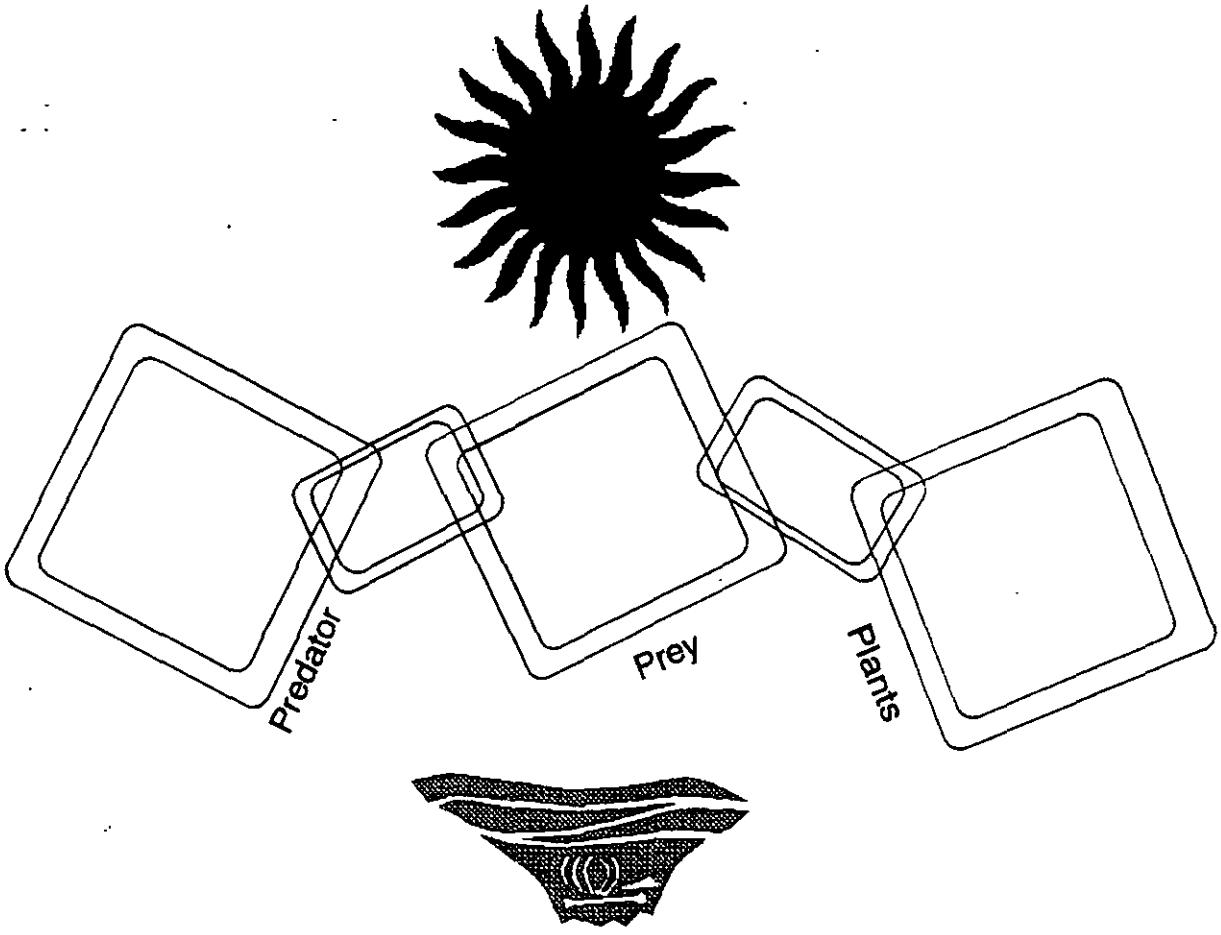
   a) vanishing animals. b) statues. c) teachers.

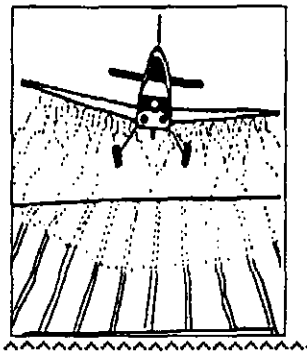
3. Who causes pollution?

   a) lions b) tigers c) bears d) people

4. Who can stop pollution? a) rocks b) people c) dolls

C. Your goal is to complete the food chain by drawing in the **predator** you see. You will need to read the sign carefully to discover what your predator eats. Draw in <u>one</u> type of food your predator eats. When your food chain is complete, answer the questions below to find out how pollution hurts your animal.





Sometimes people spray plants with poisons or chemicals to kill insects.

1. What will happen to the **prey** animal if it eats the poisoned plants?

   a) Nothing will happen to it. b) It will get sick.

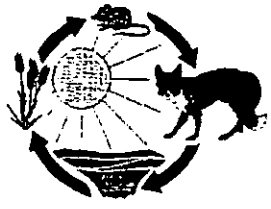
2. What will happen to your **predator** if it eats many of these sick prey animals?

   a) It will get sick and die. b) It will be healthy.

3. Circle the sentence which is <u>true</u>:

   a) Pollution doesn't do anything bad to the food chain.

   b) Pollution hurts everything in the food chain.



Food for Growth

Most plants make their own food, using carbon dioxide and water. This process is called photosynthesis. Animals cannot make their own food so they have to eat to get energy. Some animals eat plants; these animals are called herbivores. Some animals eat other animals and are known as carnivores. If an animal eats both plants and animals, it is an omnivore.

A Food Chain

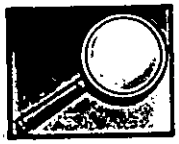
Make this mobile to see how a food chain works.

A plant (the wheat) captures the energy of the sun by photosynthesis. This energy is stored in the wheat grains. When a herbivore (the mouse) eats the plant, the stored food energy can be used by the herbivore. When a carnivore (the owl) eats the herbivore, the food energy is passed on again. Figure out some food chains that you are part of. You should find that everything you eat depends at some point on the energy from the sun.

A Food Chain Mobile

Copy the shapes of an owl, a mouse, and a piece of grain onto cardboard, and then cut around the black lines. You should have five separate pieces: a hollow owl, a hollow mouse, a piece of wheat, and two eyes. To build the mobile, thread the pieces using a needle and thread as follows. Thread the wheat at W and hang it from the mouse at A. Thread the mouse at X and hang it from the owl at B. Thread the owl's eyes at Y (hang from C) and at Z (hang from D). Finally, thread the owl at V so it can be hung up. Color the mobile before hanging it up.

Equipment: cardboard, scissors, thread, needle, paint or crayons.



An owl eats
and small bir
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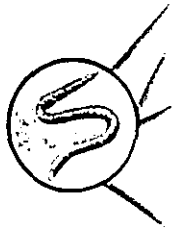
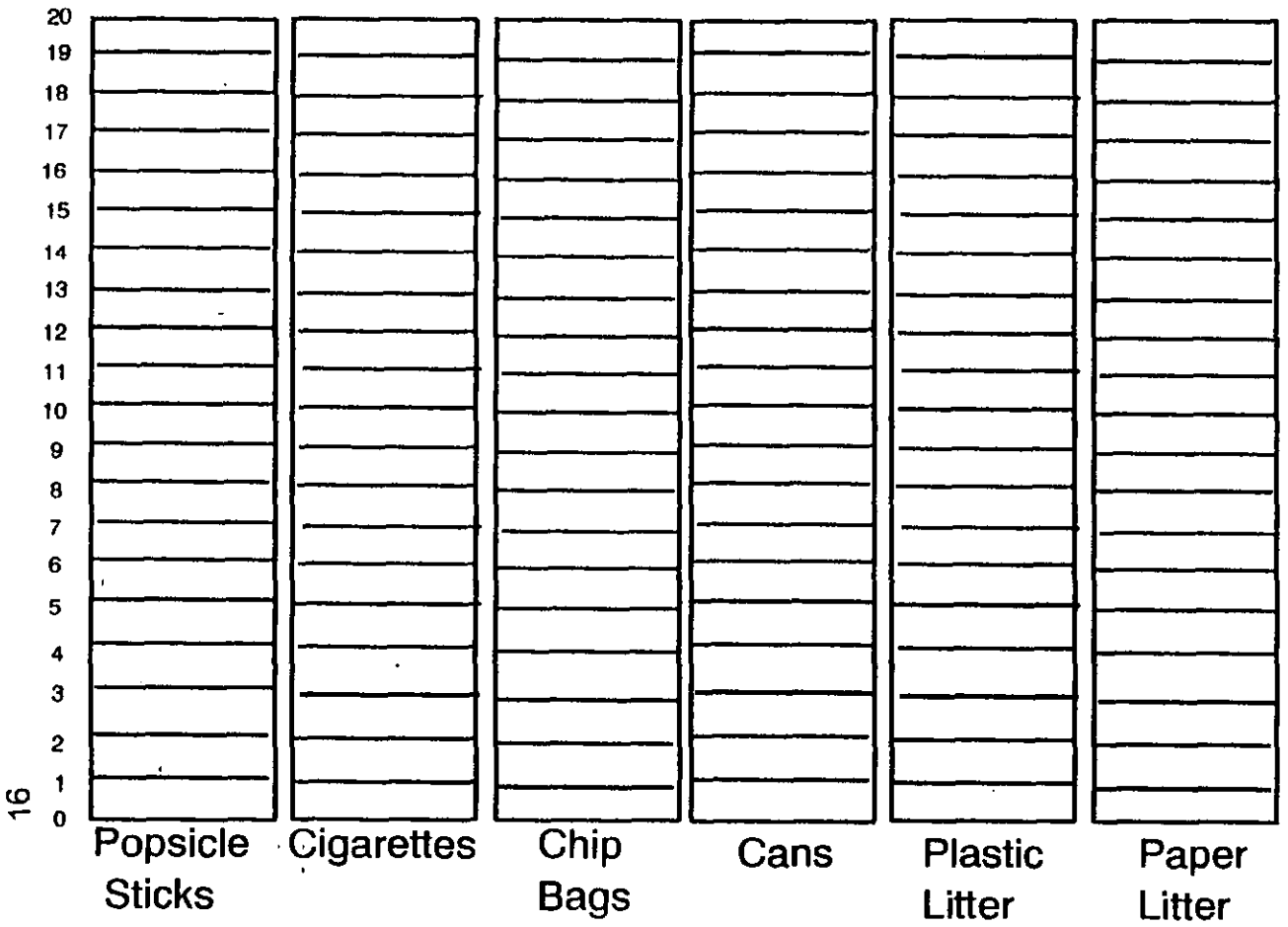


Can You Believe?

Can you believe that people in Chester pollute? They throw away trash carelessly instead of properly. This kind of pollution is called **litter**. Litter can make people and wild animals unhappy and unhealthy. In this activity you will carefully observe your surroundings and look for examples of litter. Use your pencil to shade in a box for each piece of litter you see. Start at the bottom of the correct column. When you are finished with the bar graph, answer the questions to learn more about litter.



1. What kind of litter did you observe the most?

   _____

2. Where should all litter be placed?

   _____

3. Who should pick up your litter?

   a) I should!

   b) Somebody else should.

Bonus: What would happen if an animal ate some litter?

_____

_____

HABITAT LAP SIT

Objectives
Students will be able to: 1) identify the components of habitat; 2) recognize how humans and other animals depend upon habitat; and 3) interpret the significance of loss or change in habitat in terms of people and wildlife.

Method
Students physically form an interconnected circle to demonstrate components of habitat.

Background
See "The Beautiful Basics," "Everybody Needs A Home," "What's That, Habitat?," "Habitracks," and "Habitat Rummy" for activities with similar purposes.

People and other animals share some basic needs. Every animal needs a place in which to live. The environment in which an animal lives is called "habitat." An animal's habitat includes **food, water, shelter,** and **adequate space** in an **arrangement** appropriate to the animal's needs.

If any of these components of habitat are missing or are affected significantly so that the arrangement for the individual animal or population of animals is no longer suitable, there will be an impact. The impact will not necessarily be catastrophic, but can be. There are a great many additional limiting factors beyond those of suitable food, water, shelter, and space. For example, disease, predation, pollution, accidents, and climatic conditions are among other factors which can have impact.

All things are interrelated. When we look at a biological community, we find interrelationships and interdependencies between plants and plants, plants and animals, as well as animals and animals. These interrelationships and interdependencies are important.

The major purpose of this activity is for students to become familiar with the **components of habitat**, and to recognize that it is not sufficient for there to be **food, water, shelter,** and **space** in order for animals to survive—those components of habitat must be in a suitable **arrangement.**

NOTE: This activity was inspired by a "New Game," and adapted to teach concepts related to wildlife.

Materials
none needed

Procedure
1. This activity takes very little time—but has a lot of impact! Ask the students to number off from "one" to "four." All the "ones" go to one corner of the room, the "twos" to another, etc.
2. As the students move to their corners, clear a space in the center of the room. Better still, go outside to a clear, grassy area. The "ones" should sit or stand together, "twos" together, etc.
3. Assign each group a concept as follows: "ones" = food, "twos" = water, "threes" = shelter, "fours" = space.
4. Now, it's time to form a circle! This is done by building the circle in chains of food, water, shelter, and space. A student from each of the four groups walks toward the cleared area. The four students stand next to each other, facing in toward what will be the center of the circle. Four more students—one from each group—join the circle. Keep adding to the circle in sets of four until all the students are in the circle.
5. All students should now be standing shoulder to shoulder, facing the center of the circle.
6. Ask the students to turn toward their **right,** at the same time taking one step toward the center of the circle. They should be standing close together, with each student looking at the back of the head of the student in front of him or her.
7. Don't panic—this **will** work! **Ask everyone to listen carefully.** Everyone should place their hands on the waist of the person in front of them. At the count of three, you want the students to **sit down . . . on the knees of the person behind them,** keeping their own knees together to support the person in front of them.

Age: Grades 4—9 (also younger and older)
Subjects: Science, Physical Education
Skills: discussion, generalization, kinesthetic concept development, small group work
Duration: 20 minutes
Group Size: 15 to 45 students
Setting: outdoors preferred; indoors possible
Conceptual Framework Reference: I.A., I.A.2., I.A.4., I.C., I.C.1., I.C.2., I.C.3., I.C.4., I.D., III.B.
Key Vocabulary: habitat, food, water, shelter, space, arrangement

You then say, "Food, water, shelter, and space—in the proper **arrangement** (represented by the students' intact, "lap-sit" circle)—are what is needed to have a suitable (good) habitat."

8. The students at this point may either fall or sit down. When their laughter has subsided, talk with them about the necessary components of suitable habitat for people and wildlife.

9. After the students understand the major point—that food, water, shelter, and space are necessary for any animal's survival, and in their appropriate arrangement comprise a suitable habitat—let the students try the circle activity again! This time ask them to hold their lap sit posture. As the students lap-sit—still representing food, water, shelter, and space in their appropriate arrangement—identify a student who represents "water." Then say, "It is a drought year. The water supply is reduced by the drought conditions." At this point, have the student who was identified as representing "water" remove himself or herself from the lap-sit circle—and watch the circle collapse, or at least suffer some disruption in arrangement. You could try this in several ways—removing one or more students from the circle. Conditions could vary: pollution of water supply, urban sprawl limiting availability of all components, soil erosion impacting food and water supplies, etc. Since animals' habitat needs depend upon food, water, shelter, and space, in their appropriate arrangement, "removal" of any will have an impact.

10. Ask the students to talk about what this activity means to them. Ask the students to summarize the main ideas they have learned. They could include: a) food, water, shelter, and space, in their appropriate arrangement, can be called habitat; b) humans and other animals depend upon habitat; c) loss of any of these elements of habitat will have impact on the animals living there; and d) the components of habitat must be in an arrangement suitable to the needs of the individual animals or populations of animals in order for the animals to survive.

Variation

Have students form a circle, holding hands. Walk around the circle, first naming one student as an animal of a particular ecosystem. Name the next four students in the circle as food, water, shelter, and space for that animal. Repeat the process until all the students are involved. Any "extras" can be identified as elements of habitat, e.g., resulting from a particularly good year for habitat needs for the last animal named. When all of the students have been designated as an animal or as components of an animal's habitat, comment on the fact that they are holding hands. This represents the idea that all things in an ecosystem are interrelated. Briefly discuss the idea of interrelationships. Then move the students into position to do the "lap sit" described in the Procedure above. Remind the students that they noticed all elements of the ecosystem were interrelated when they were holding hands. Now they are going to find out that they all are dependent upon one another as well. Do the "lap sit." Discuss interrelationships and interdependencies in ecological systems.

Evaluation

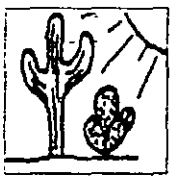
What are the five essential components of habitat?

Explain how the arrangement of food, water, shelter, and space is important to humans and other animals.

What would probably have the greater long-term impact on the wildlife living on a farm in Iowa? A severe winter which killed many animals or the development of part of the farm into a commercial shopping center?

HABITAT FACTS

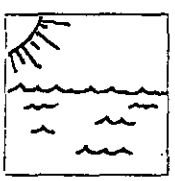
A habitat is the natural area where a plant or animal lives. A habitat supplies plants and animals with the **food**, **water**, **shelter**, and **space** they must have to survive.



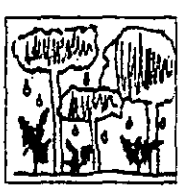
Desert - a very hot, dry, and sandy area that receives less than 10 inches of rain in one year

Grassland - a large open grassy plain

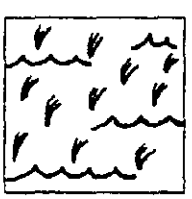
Forest - a large area of land covered with many trees and bushes



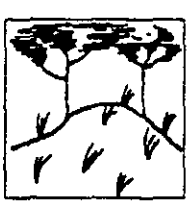
Water - the liquid that comes from the clouds and forms streams, rivers, lakes, and oceans



Rainforest - a very thick forest with many different kinds of tall trees; found where the rainfall is more than 100 inches in one year



Swamp or
Wetland - a piece of land with soft, muddy soil and a mix of water and grasses



Savanna - a large open grassy plain or meadow with a few trees

HABITAT ADVENTURE

Directions: Using the wildlife fact file, read the native habitat of the animals shown. Carefully observe each animal and its habitat. Write the proper name of the animal in the box below. As you draw the animal in the box below, be sure to include its surroundings. Learn more about the animal by answering the questions.
Circle the correct answer.

1. This animal is **native to which habitat**?

   A. rainforest
   B. water
   C. savanna
   D. desert
   E. forest
   F. grassland

2. This animal's **habitat** is found on which **continent**?

   A. South America
   B. Australia
   C. Africa
   D. Asia
   E. North America

3. Is this a **vanishing animal**?

   1. Yes

   2. No

_____
ANIMAL'S NAME

1. This animal is **native to which habitat**?

   A. rainforest
   B. water
   C. savanna
   D. desert
   E. forest
   F. grassland

2. This animal's **habitat** is found on which **continent**?

   A. South America
   B. Australia
   C. Africa
   D. Asia
   E. North America

3. Is this a **vanishing animal**?

   A. Yes

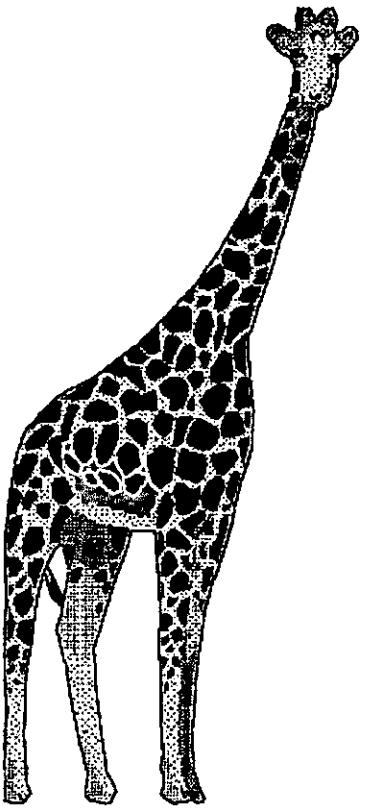
   B. No

_____
ANIMAL'S NAME

Animals for
Habitat Adventure

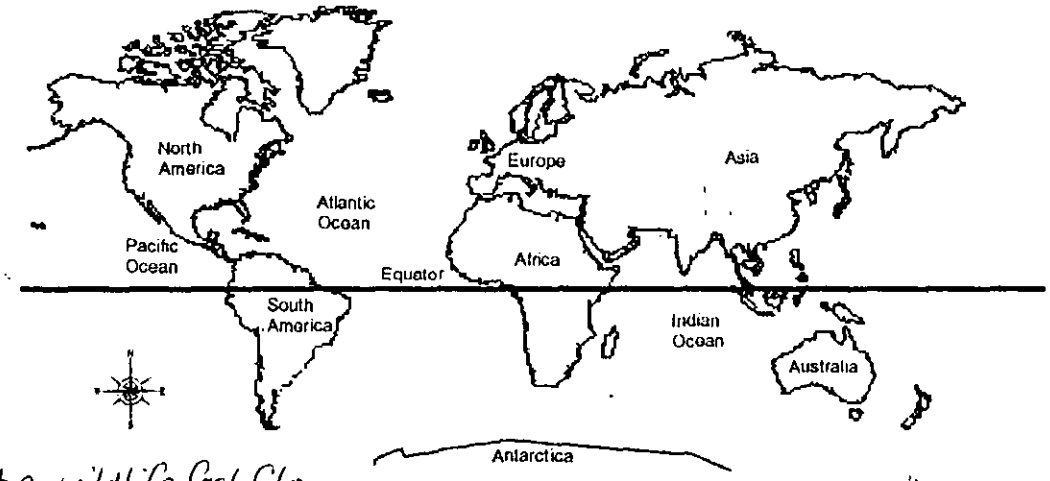
Animal #1

Animal #2



World Tour

Habitats can be found all over the world. If you travel to each continent, you can find many different habitats. Let's go on a world tour and use the map to find the continents. On our tour, we are going to learn about animals and where they live.



Directions: Fill in the chart below. Observe each animal. Use the wildlife fact file to discover its habitat and continent. Find out if it is a vanishing animal. Trace your path on the map of the world.

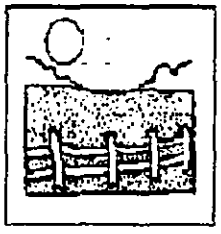
Name	Habitat	Continent	Is it a vanishing animal?
			yes no
			yes no
			yes no
			yes no

BONUS! How many continents did you travel to on the tour? _____

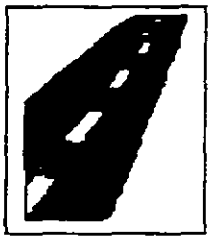
How many vanishing animals did you see? _____

WHAT'S HAPPENING TO MY HABITAT?

DIRECTIONS: Please use the pictures below to complete the four short stories about some of the animals' homes. Each story tells how habitats are being destroyed everyday. Write the animal's name on the line. Place the number of the correct picture in the boxes located in each story.

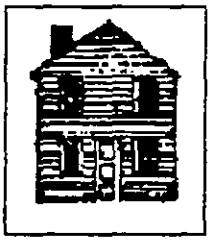


FARMS
1

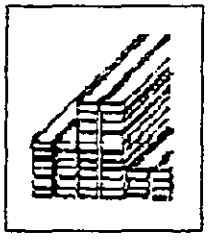


ROADS
2

WATER SPORTS
3



BUILDINGS
4



LUMBER
5

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1. The _____ lives in the **desert** habitat. **Deserts** are being destroyed by people who make [ ] in the sand when they race motorcycles and jeeps.

2. The _____ calls the **rainforest** habitat home. **Rainforests** are being destroyed because people cut down the trees to get [ ]. Many animals live in the tall trees of the **rainforest**.

3. The _____ lives in the **savanna** habitat. Our earth is losing **savannas** because people use the land for [ ]. Farmers raise cows and other livestock on land that is supposed to be for the wild animals.

4. The _____ can be found in the **wetland** habitat. **Wetlands** are being lost because people enjoy using them for [ ], such as water-skiing and fishing. They are also being destroyed by people who fill in the **wetlands** with dirt so they can put up [ ], like houses, hotels, and businesses. The state of Texas is home to many **wetland** animals.

VANISHING HABITATS = VANISHING ANIMALS

Endangered Animals

P A L L I D S T U R G E O N G
N L L W O N R A B I K M F O G
U T I L X N E Q X D Q M B R I
E R E N I H S E Y E G I B E V
L I M I R G C R A Y F I S H P
H V Z R C E A K O T W S H E Y
T E P I F S I T Y W P A R U J
H R U V A A K R O V U N F L U
Q C W E L N I B R R Z D E B B
X O W R C D T S Q A G D K J U
G O C O O P E R ' S H A W K G
W T H T N I D U N L Y R R W W
T E Q T A P U I R I K T C M E
G R Y E O E O I O J Y E I Y T
R B H R Q R L Q E P P R E D N

Alligator Gar
Barn Owl
Bigeye Shiner
Blue Heron
Cooper's Hawk
Crayfish
Falcon
Harrier
Kite
Pallid Sturgeon
River Cooter
River Otter
Sand Darter
Sand Piper

HABITAT RUMMY

Objectives

Students will be able to: 1) identify components of habitat as food, water, shelter, and space in a suitable arrangement; and 2) apply knowledge of these components to habitat requirements of various species of animals.

Method

Students make cards and play a card game.

Background

NOTE: See "The Beautiful Basics," "Everybody Needs A Home," What's That, Habitat?," or "Habitracks." Any one of these activities would be a good introduction to "Habitat Rummy," even though all except "Habitracks" are written for younger students.

The major purpose of this activity is for students to acquire a working understanding of the components of habitat.

Materials

writing paper and pencils, drawing paper, construction paper, scissors, glue, chalkboard (card masters have been included for those who want to eliminate research phase)

Procedure

PREPARATION OF CARDS FOR GAME (Skip this if you use card masters.)

1. Assign students to groups of two or three. Ask each group to pick one animal they will research. Encourage a wide range of animals, including both wild and domesticated.

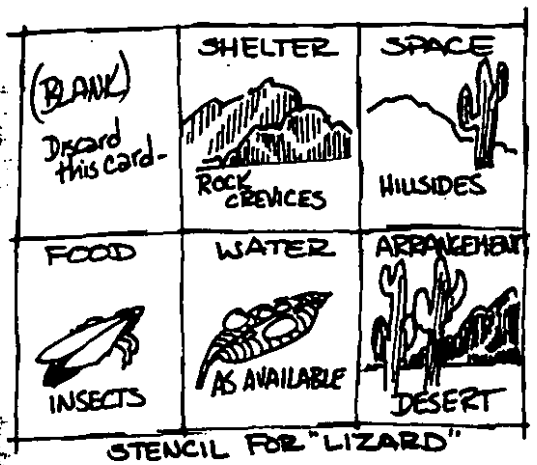
Age: Grades 4-7 (and older)
Subject: Science
Skills: analysis, application, classification, comparing similarities and differences, media construction, reading, small group work, writing
Duration: two 40-minute periods
Group Size: groups of two to three students
Setting: indoors or outdoors
Conceptual Framework Reference: I.C.2.
Key Vocabulary: habitat, survival needs, food, water, shelter, space, arrangement

2. Ask each group of students to use reference materials to research their animal. (You may need to instruct students in the use of the library. If library skills or references are a problem, students might be asked to choose from a list of animals for which you have classroom references.) Included in their findings should be a listing of what each animal uses to meet the following needs: **food, water, shelter,** and **space.** They should also find out where the animal lives. For example, if a group of students picks a lizard, they might determine that most lizards eat insects for food; use insects as a water source because of their high moisture content; rest in rock crevices or trees for shelter; and use a hillside or sandy wash as a space in which to find food. The lizard might live in a desert environment.

3. Either you or the students make a large, master "Habitat Information Chart" which includes the major categories of information found by the students as follows:

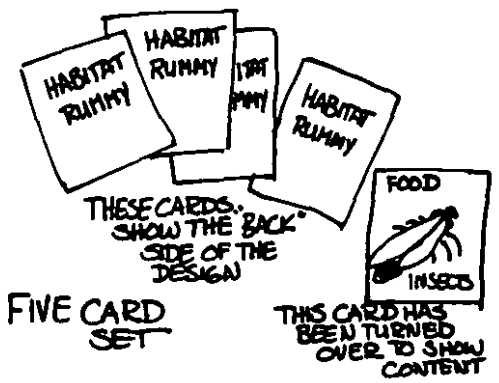
HABITAT COMPONENTS / ANIMAL	LIZARD	SEAGULL	BEAR	CHIPMUNK
FOOD	INSECTS	FISH	INSECTS, FISH BERRIES, BIRDS, EGGS MAMMALS	SEEDS BERRIES
WATER	WATER	WATER	WATER	WATER
SHELTER	ROCK CREVICES	CLIFFS - SAND DUNES	CAVES	BURROW
SPACE	HILLSIDES	OCEAN - COAST	HILLS VALLEYS	HILLSIDES
ARRANGEMENT	DESERTS	AQUATIC	WOODLAND	MEADOW WOODLOT

4. Once this information is on the master chart, make a smaller version on mimeograph or ditto stencils. You can make six, equal-sized rectangles on each stencil, with each stencil including the habitat components needed for one animal. Once printed, these rectangles will serve as playing cards. Or, the students can transfer the information to 3x5 cards for use to play. For example, the stencil for one animal could look like this:



STENCIL FOR "LIZARD"

5. Make a copy of the stencil for every two to three students. (If you want every student to have a complete deck of cards to keep, print a copy of each stencil for every student.)
6. Pass out a complete set of the card sheets to every group of students, along with heavy construction paper and glue. They can glue the printed sheets onto the five individual habitat cards per animal according to the printed stencil. Once cut, each set of five habitat cards makes a "book." For example:



Blank on one side; habitat components on the other side.

With the deck of cards complete, it is time to play "HABITAT RUMMY!"

TO PLAY HABITAT RUMMY

1. The object of the game is for a player to get five cards from one vertical column—or a complete set of habitat components for an animal—as listed on the master "Habitat Information Chart." The game ends when all "books" or complete sets of habitat components have been made, with the student having the most complete sets the "winner" of the game. Every group of two to three students playing the game uses one complete set of habitat cards and each group has a "winner." The game is based on luck, but the students become familiar with the habitat components for the animals involved as the game is played. The "Habitat Information Chart" must be in plain sight of the players.
2. The game begins as one student deals five cards to each of the players in his or her group. This happens simultaneously around the room, as all groups begin play. The first player—after dealing is complete—may discard an unwanted card and select another from the remaining deck, situated in the center of the circle of play. Play progresses around the circle with discarded cards being added to the leftover cards in the center (either face-up or face-down) and new cards being drawn, until one player gets a book—a complete set of five habitat components for an animal. (The master "Habitat Information Chart" serves as a reference in this process.) When a player does get a book, he or she yells "HABITAT!" This process continues until all "habitats" are complete, and the student in each group with the most "books" or complete habitats is the "winner." "Winners" could play "winners" with class champion given the title, "Wildlife Biologist!"
3. Ask the students to summarize what they have learned.

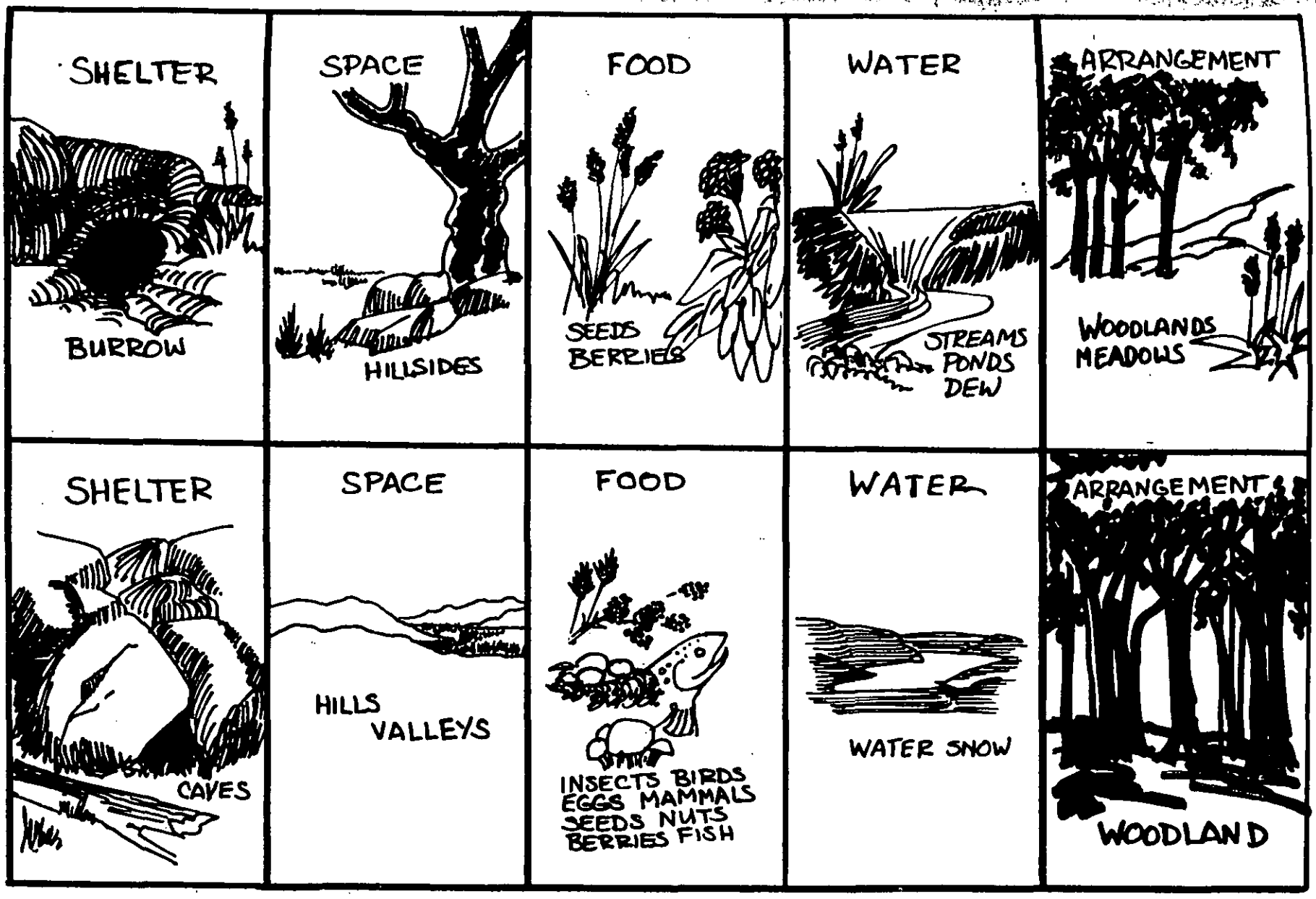
Variations or Extensions

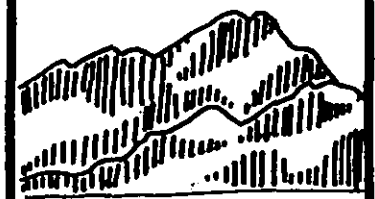
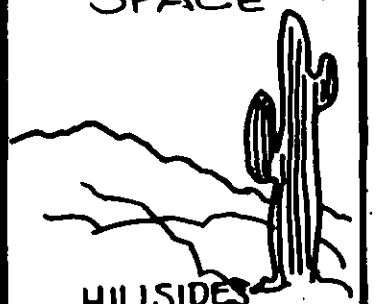
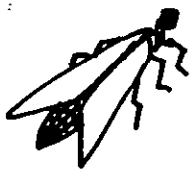
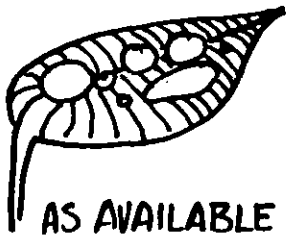
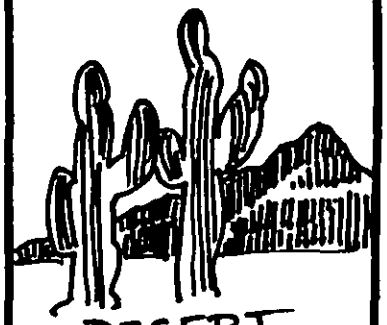
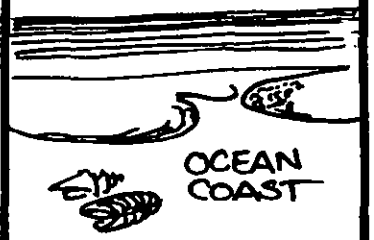
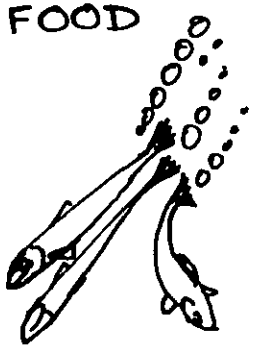
1. Showdown Challenge: Deal out all cards to players. Players showdown with the player to their left, starting at the dealer's left. Players challenge other players according to predator/prey relationships—with predators winning the challenge. The player with the most cards wins. Play for a specified time, using a time limit to end the game.

2. Food Chain Rummy: Play as in rummy. Players get a point for each component of every complete food chain. Cards may be added to either end of a food chain by any other player, acquiring points for every card involved each time. High score wins. Cards remaining in hand at the end of the game must be subtracted from the player's score.

Evaluation

Identify habitat needs (what kinds of food, water, shelter, and space, in what arrangement) for any five wild animals.



SHELTER  ROCK CREVICES	SPACE  HILLSIDES	FOOD  INSECTS	WATER  AS AVAILABLE	ARRANGEMENT  DESERT
SHELTER  CLIFFS SAND DUNES	SPACE  OCEAN COAST	FOOD  FISH	WATER  EASILY FOUND	ARRANGEMENT  AQUATIC

Section Three Lessons

Focus of Instruction: Endangered Animals of Illinois and Randolph County. Using resources to find information about our Endangered Animals.

Time Needed: 2 weeks

Student Objectives:

1 - The students will identify the endangered animals of Randolph County and of Illinois.
2 - The students will comprehend the events that contribute to the problem of endangered animals in Illinois and Randolph County.
3 - The students will show understanding of the endangered animals by giving an oral and a written report.

Sequence of Instruction:

Lesson One

- Display poster of Illinois Endangered Animals obtained from the Illinois Department of Natural Resources
- Discuss these animals with the students. Do they recognize any of these animals? Did they know that they were endangered? Have they ever seen these animals in the wild?
- Pass around the books listing the endangered animals of Illinois and Randolph County for the students to see. (*Endangered and Threatened Species of Illinois: Status and Distribution Vol2 - Animals* and *Vol3- 1994 changes* - obtainable through he Illinois Department of Natural Resources.
- Have the students note the animals that are endangered from Illinois.
- Give students a handout listing the animals of Randolph County that are endangered.
- Discuss the animals with the students - why are they endangered, what is being done to save them.
- Give the students a crossword puzzle to complete on the Endangered Animals of Illinois and Randolph County.

Lesson Two

allow one week for completion

- Assign a written and oral report on an animal of the students' choice that is endangered in Randolph County or Illinois.
- Instruct students on the important concepts to be touched upon in the report
  - 1 - the report should contain a picture of the animal (photo or drawing)
  - 2 - the report should contain information about the animal's habitat
  - 3 - the report should contain information about the reason for the animal being placed on the endangered list.
  - 4 - the report should contain information on the human influences on the animal and the environmental issues surrounding the animal.
  - 5 - the written report should be 2-3 pages in length
  - 6 - the oral report should be 5 minutes in length.

- The students should be given class time for research using the Internet, computer CD-ROMS such as *The Animals* and *Encarta*, the source books mentioned previously, encyclopedias and the library.

Lesson Three

allow one week for completion

- Student - Teacher conferences should be held the first day for final editing of the reports.
- Days 8-10 should be scheduled for the oral reports of the students on their endangered animal.

Materials Needed:

Lesson One

- Poster of Illinois Endangered Animals (obtained from the Illinois Department of Natural Resources)
- Handout of the Endangered Animals of Randolph County
- Endangered Animals Crossword Puzzle

Lesson Two

- Research materials
    - computer CD-ROMS such as Encarta, The Animals
    - the Internet
    - library research
    - *Endangered and Threatened Species of Illinois: Status and Distribution* vols. 2 and 3

Evaluation Strategies:

1. The students will be graded on the crossword puzzle completion during lesson one.
2. The students will be checked for understanding of the animals of Randolph County and Illinois by completion of the writing and the oral assignments during lesson two.

Endangered and Threatened Species of Randolph County, IL

Crustaceans

1. Crayfish - Orconectes Placidus - Endangered

Fish

2. Western Sand Darter - Etheostoma clarum - Endangered
3. Alligator Gar - Lepisosteus spatula - Extirpated in Illinois
4. Bigeye Shiner - Notropis boops - Endangered
5. Pallid Sturgeon - Scaphirhynchus albus - Endangered in Illinois and Federally

Amphibians and Reptiles

6. Great Plains Rat Snake - Elaphe guttata emoryi - Threatened
7. River Cooter - Psuedemys concinna - Endangered
8. Timber Rattlesnake - Crotalus horridus - Threatened
9. Alligator Snapping Turtle - Macroclemys temmincki - Threatened

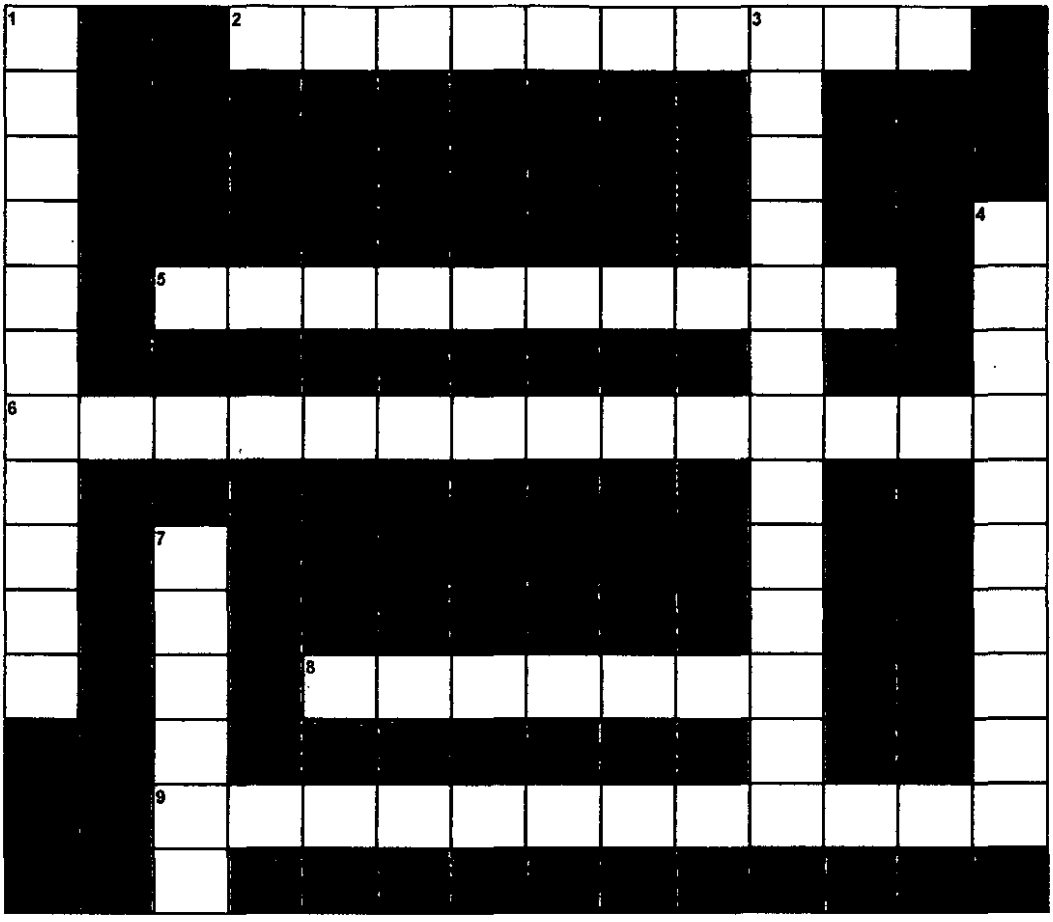
Birds

10. Cooper's Hawk - Accipiter cooperii - Endangered
11. Upland Sand Piper - Bartramia longicauda - Endangered
12. Northern Harrier - Circus Cyaneus - Endangered
13. Little Blue Heron - Egretta caerulea - Endangered
14. Peregrine Falcon - Falco peregrinus - Endangered in Illinois and Federally
15. Common Moorhen - Gallinula chlorupus - Threatened
16. Mississippi Kite - Icuinia mississippiensis - Endangered
17. Loggerhead Shrike - Lanius ludovicianus - Threatened
18. Common Barn Owl - Tyto alba - Endangered

Mammals

19. River Otter - Lutra canadensis - Endangered
20. Bobcat - Lynx rufus

Endangered Animals of IL



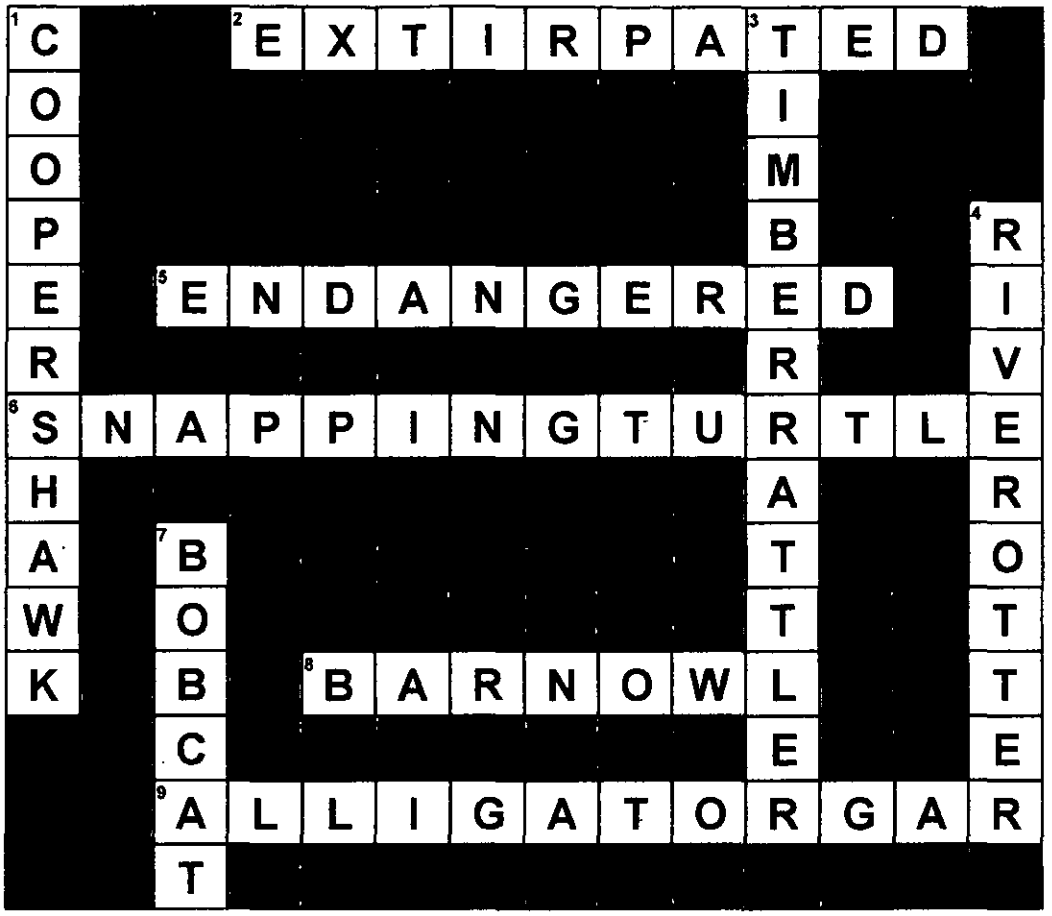
Across

2. Gone forever
5. Low in numbers
6. Threatened Turtle
8. End. Hooter
9. Extirpated Fish

Down

1. End. Accipiter
3. Threatened Snake
4. End. Water Mammal
7. End. Land Mammal

Endangered Animals of IL



Across

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9. Extirpated Fish

Down

1. End. Accipiter
3. Threatened Snake
4. End. Water Mammal
7. End. Land Mammal

Level II: Issue Awareness

Section One Lesson

Focus of Instruction: Beliefs and Values associated with endangered animals. Analyzing issues associated with endangered animals using movies, books, and newsprint.

Time Needed: 2-3 weeks

Student Objectives:

1. The students will communicate the major events seen in the Lorax that relate to endangered species.
2. The students will identify issues, players, positions, beliefs, and values in the Lorax.
3. The students will communicate the major events seen in *The old lady who liked cats* that relate to endangered species.
4. The students will identify issues, player, positions, beliefs, and values in *The old lady who liked cats.*
5. The students will identify value positions from belief statements that relate to endangered species and human actions.
6. The students will identify the problems and issues, players, positions, beliefs, and values in selected articles relating to endangered animals and human actions.

Sequence of Instruction:

Lesson One

- Show the Video *The Lorax*
- Have students discuss the important events that are shown. What are the problems, issues, who are the players and what do they belief, why do they believe this way.
- Hand out the worksheets for *The Lorax.* Students should complete these in groups of 3, discussing the movie as they work.

Lesson Two

- Show overhead of definitions (environmental problem, issue, players, and positions) and discuss these with the class.
- Hand out issue worksheet for *The Lorax* and go over this with the class to be sure they understand the process.

Lesson Three

- Read the book *The old ladies who liked cats*
- Have students identify the problems, issues, players, and positions in this book using the issue handout.
- Show overhead of definitions (beliefs and values)
- Give handout of value descriptors

- Have students complete the *Lorax* belief and values handout.

Lesson Four

- Review the value descriptors with students
- Give students the Values and Environmental Statements handout to be filled as a group.
- Give students a blank Issue Analysis Worksheet
- Read, again, *The old ladies who liked cats* and ask the students to fill out the worksheet during the reading using players, positions, beliefs, and values.
- Discuss the answers after the students have finished.

Lesson Five

- Give students the article *Trouble in Paradise* to read and analyze.
- Give students the Issue Analysis Worksheet to fill out after reading the article.
- Allow students to work in groups of three to accomplish this task.

Lesson Six

allow three days for completion

- Bring several old newspapers to class for the students to search through for issue articles relating to endangered animals.
- Ask students to cut out the article that they find and begin to complete an issue analysis.
- After the issue analysis has been completed, each student should share their article, briefly with the class and share their analysis of the article.

Lesson Seven

allow three days for completion

- Ask students to look through newspapers and books to find issues that relate to endangered animals of Illinois or Randolph County.
- Have students complete an issue analysis of this article.
- Have students again share this article and analysis with the class.

Lesson Eight

- Have a guest speaker from the Illinois Department of Natural Resources to speak about the endangered animals of Randolph County.
- Have students write a short essay about what they learned from the guest speaker.

Materials Needed:

Lesson One

- *The Lorax* video (Dr. Suess)
- Television and VCR
- Worksheets for *The Lorax*

Lesson Two

- Issue worksheet for *The Lorax*
- Definitions Overhead (environmental problem, issue, player, position)

Lesson Three

- Book *The old ladies who liked cats*
- Issue worksheet for *The old ladies who liked cats*
- Definitions overhead (beliefs, values)
- Value descriptors handout
- *The Lorax* beliefs and values handout

Lesson Four

- Values and Environmental Statements handouts
- Blank issue analysis worksheets

Lesson Five

- *Trouble in Paradise* article

Lesson Six

- Old newspapers (at least 30)

Lesson Eight

- Guest speaker from Department of Natural Resources

Evaluation Strategies:

1. The students will verbally demonstrate understanding of the important aspects of *The Lorax* in a group discussion during lesson one.
2. The students will demonstrate knowledge of the problem, issue, players, positions, beliefs, and values by completing *The Lorax* worksheets during lesson two.
3. The students will demonstrate knowledge of the problem, issue, players, positions, beliefs, and values by completing *The old ladies who liked cats* issue worksheets during lesson three.
4. The students will interpret values from a belief statement using the value descriptor sheet by completing the values and environmental statements worksheet during lesson three.
5. The students will show understanding of the issues, players, positions, beliefs, and values of various articles by completing issue analysis worksheets during lessons three, four, and five.
6. The students will interpret articles and analyze the issues presented in these verbally for the class during lessons five and six.
7. The students will demonstrate comprehension of the guest speaker's message by completing a short essay about what they have learned from him during lesson eight.

Resources for
Level II

Green, Carol. *The old ladies who liked cats.* (1991). New York; Harper Collins.

Worksheet for *The Lorax,* Value Descriptors handout, Belief Statements handout, Values and Environmental Statements, *Trouble in Paradise* article and Issue analysis worksheet from

Hagengruber, David and Hungerford, Harold. *Threatened and Endangered Animals.* (1993). Champaign, IL; Stipes Publishing L.L.C.

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The Lorax video can be obtained at Wàlmart stores for $6.96

Playhouse Video. *The Lorax* (1989). New York; Playhouse Video.

Important Events in *The Lorax*

The Introduction

The Lorax is a story about a man who abused the environment. It is also a story about what he learned afterwards. The story begins in the most run-down part of a dull, gray town. A small boy asks the Once-ler to share the secret of the Lorax and how the Lorax was taken away. The story is told as a "flashback" as the Once-ler talks about the Lorax and past events.

The Characters
the **Once-ler**, a businessman
the **Lorax**, a leader of the plants and animals

The Once-ler's Story: The Beginning

1. The Once-ler moved across the land in his wagon. He came upon a new land with an important natural resource. (A natural resource is a plant, animal or mineral that can be used by people.) What was this natural resource the Once-ler found?

The Natural Resource? _____

Setting Up Shop

2. The Once-ler used the land's natural resource to start a business which made and sold a product. What was the product? How was it used by buyers?

The Once-ler's Product? _____

The Product's Uses? _____

3. The Lorax appeared at this point and asked the Once-ler some angry questions. What did the Lorax want to know of the Once-ler? How did the Once-ler answer?

What the Lorax asked? _____

What the Once-ler Answered? _____

4. Certain animals depended on the truffula trees. Name the animals. Explain why these animals needed truffula trees.

Animals? _____

The Need for Trees? _____

5. Often, an industry makes **waste by-products**. For example, a waste by-product of sawing wood is sawdust. Sometimes the waste by-products of technology are unwanted or dangerous (for example, toxic chemicals). Sometimes waste by-products are useful.

(For example, wood chips can be used to make particle board.) Name two waste by-products that resulted from making thneeds.

Waste By-product -1? _____

Waste By-product -2? _____

6. The fish and swans were affected by the waste by-products of making thneeds. Explain how the by-products of making thneeds affected these animals.

_____

_____

_____

7. A number of organisms [plants and/or animals] in *The Lorax* went from a healthy population to one that you might consider "endangered". What animals and/or plants would you consider "endangered" in *The Lorax*? Why do you feel this way?

_____

_____

_____

8. Did the Once-ler try to prevent or stop the environmental effects of producing thneeds? Explain.

_____

_____

_____

Going Broke

9. The Once-ler's business failed. What happened to cause the failure of his business?

_____

_____

Lessons To Be Learned

10. The Once-ler learned that he had made a mistake. What did he learn?

_____

_____

11. What makes you think that the Once-ler's ideas about the use of natural resources changed?

_____

_____

12. Explain what must happen in order for the Lorax and the animals to return.

_____

_____

13. Your task will be to make two drawings. The first drawing should show the natural environment as it was **before** the Once-ler arrived. The second drawing should show the environment **after** the Once-ler had begun to use natural resources. Make your drawings on a separate sheet of paper. You may label important parts of your drawing. Make sure you finish your drawings before you answer the next question.

14. List ways in which the environment changed in your drawings as the Once-ler used natural resources and made the by-products of technology.

Change 1: _____

_____

_____

_____

Change 2: _____

_____

_____

_____

Issues Players and Their Positions

Issue Components	Example	The Lorax
The Event	Poaching black rhinos	
The Environmental Problem	The rhino population is declining and endangered.	
The Environmental Issue	Should black rhinos be hunted or protected?	
The Players	Wildlife experts Poachers	
The Player's Positions	Experts: Black rhinos should not be hunted and killed. Poachers: Black rhinos should be hunted and killed.	

Definitions

Environmental Problem - one that occurs when the condition of something or someone in the natural environment is at risk.

Issues - involve problems about which two or more parties can not agree.

Players - the individual, groups, or organizations involved in the issue.

Positions - the point of view of the player regarding the issue. Based on a belief system.

Issues Players and Their Positions

Issue Components	The old ladies who liked cats
The Event	
The Environmental Problem	
The Environmental Issue	
The Players	
The Player's Positions	

Definitions

Belief - an idea that a person holds to be true.

Value - a specific idea which helps an individual decide what is important. Help shape the beliefs that an individual holds on an issue.

Value Descriptors

The descriptions below attempt to name and define values that might be held by individuals. These definitions, as well as the list itself, are incomplete.

Value:	Definition:
Aesthetic:	the appreciation of form, composition, and color through the senses.
Economic:	the use and exchange of money, materials, and/or services.
Ecological:	the maintenance of natural biological systems.
Educational:	the accumulation, use, and communication of knowledge.
Egocentric:	a focus on self-centered individual needs and fulfillment.
Environmental:	human activities as they relate to quality of natural resources, e.g., plant and animal species, air, water, soil, etc.
Ethical/Moral:	present and future human responsibilities, rights and wrongs, and ethical standards.
Ethnocentric:	a focus on the fulfillment of ethnic/cultural goals.
Health:	the maintenance of positive human physiological conditions.
Legal:	relating to regulations, laws; law enforcement; law suits.
Political:	the activities, functions, and policies of governments and their agents.
Recreational:	leisure activities.
Religious:	the use of belief systems based on faith or dogma.
Scientific:	process of empirical research; knowledge gained by systematic study.
Social:	shared human empathy, feelings, and status.

Belief Statements in *The Lorax*

Directions: Each statement below suggests the speaker's values. Its should give you an idea about what the player thinks is important or worthy. Use the "Value Descriptors" list as a guide. Remember, there is no real right and wrong. Your answer is a "good answer" if you can **defend** it.

BELIEF STATEMENTS	VALUE POSITION
What the Once-ler said	
1. "But . . . . business is business! And business must grow . . . "	_____
2. "And I biggered my money, which everyone needs."	_____
3. "Plant a new Truffula. Treat it with care. Give it clean water. And feed it fresh air."	_____
4. "Well, I have my rights, Sir, and I'm telling you I intend to go on doing just what I do !"	_____
What the Lorax said	
5. "You're gumming the pond where the Humming-Fish hummed!"	_____
6. "No one can sing who has smog in his throat."	_____
7. "Sir, you're crazy with greed. There is no one on Earth who will buy that fool thneed!"	_____

Questions:

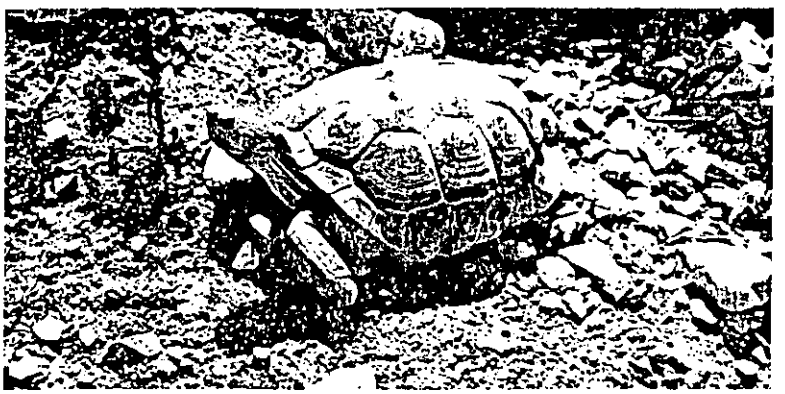
A. What value(s) appear to influence the Once-ler's statements?

B. What value(s) appear to influence the Lorax's statements?

Values and "Environmental" Statements

Directions: Below you will find a list of statements which relate somehow to the environment and endangered species. You are not asked to agree with the statements - just analyze each for the value it represents. Write the name of the value in the space provided.

1. Humans have a responsibility to protect wildlife.	
2. Whale watching brings an estimated $3,300,000 to the state of Hawaii each year.	
3. The Bible states that Man is meant to have control over the earth.	
4. We were taught how Native Americans used the bison to survive on the Great Plains.	
5. I like to watch foxes because they are beautiful animals.	
6. Fire was an important part of prairie plant and animal systems.	
7. If you want to become a wildlife biologist, you will have to get a college degree.	
8. My family has always taken care of its farmland, and it is important for me to do the same thing.	
9. Many valuable medicines have been discovered in plants found in tropical rain forests.	
10. It is against the law to dump toxic chemicals into the Tennessee River.	
11. Only the government can enact laws to protect endangered species.	
12. Many bird watchers travel to Hawaii to see the birds that live there.	
13. The gray wolf is an important forest predator.	
14. I don't care if the duck season is closed or not, I'll hunt ducks any time I want to.	
15. My friends and I all enjoy holding the desert tortoise at the nature center.	



Desert Tortoise. Photo courtesy Harold R. Hungerford.

Assignment: Issue Analysis

On the following pages, you will find a number of articles taken from newspapers and periodicals. All of the articles will provide you with information about endangered species. In fact, all of the articles are about endangered species issues! Your task will be to analyze one or more of these articles. You should be pretty good at that already . . . and you will get even better with practice. At the end of each article, you will find an issue analysis worksheet.

Trouble in Paradise

by John Carey

Suppose you owned a piece of paradise . . . a 50 by 100 foot lot off Paradise Drive on Florida's No Name Key. At one end of the lot, warm waves gently surge through a tangled labyrinth of red mangrove roots. At the other, a rare and unique deer no larger than a big dog occasionally browses under the palms and pines.

Now consider a question. Should efforts be made to keep the lot undeveloped, thus preserving a tiny slice of habitat for the endangered Key deer? Or should the area be zoned for houses and condominiums, sending the value of your lot soaring?

This being America, where getting rich is the national dream, the opportunity to cash in probably will be irresistible. Certainly that is what most Monroe County residents in the Florida Keys apparently feel. "We've already got enough land set aside for the deer," says Charles Walther of the aggressive pro-development Lower Keys Chamber of Commerce. "I want to see a better balance between deer and other creatures who chose to live here, such as man."

The trouble, of course, is that the balance has tipped in favor of people, despite the presence of a national wildlife refuge set up to protect the deer. Over the last decade, the human population of Big Pine Key, the largest of the Lower Florida Keys and the principal home of the Key deer, has roughly doubled. The wildlife refuge on Big Pine and neighboring No Name Key has been surrounded and pockmarked with developments on privately-owned land.

As a result, deer numbers have dropped from about 400 to an estimated 250 in the last ten years. Dozens of the animals are killed each year by automobiles, dogs, ditches and poachers. Without a special effort, many biologists warn, the nation's smallest deer might soon go the way of the passenger pigeon. "We don't have the land to sustain these losses and still have the deer here," say refuge biologist Tom Wilmers.

Should the Key deer be saved? It is not distinct enough from its whitetail cousins to the north to be called a separate species. It also stands in the way of squeezing more revenue out of the islands. As Mike Puto, Commissioner of Monroe County said recently, "The Key deer don't pay taxes. People do." Of course, the deer does draw tourists and tourist dollars to the Keys. It also requires no expensive county services like schools and police.

Without a special effort, . . . the nation's smallest deer might soon go the way of the passenger pigeon.

The deeper issue, however, is not deer versus people. Instead, it is the classic question of how much is enough. "The deer is an indicator species," explains refuge manager Deborah Holle. If the deer vanish, it means that irreplaceable palm and pine, hardwood hammock and mangrove habitats will also have disappeared. And gone too will be the living things that depend on

these habitats, from mud turtles and marsh bunnies to "a list of rare plants as long as your arm," says Wilmers. And gone too will be much of the beauty that once made the Keys so special, replaced by the dive shops, condos and traffic jams.

"People are selling away the very things that brought them here in the first place," says Wilmers.

As humans struggle to sort out their priorities, the Key deer continues to suffer, as it has during most of its encounters with the white man.

The animal's story begins thousands of years ago when the great ice sheets of the last Ice Age melted, raising sea levels and creating the necklace of low-lying islands that we call the Florida Keys. Isolated from their mainland kin, the island deer evolved into a distinct subspecies. They grew smaller (a male stands about two feet high at the shoulder, compared to three and a half feet for an Everglades whitetail). They also became less fecund, rarely bearing twins as other whitetails do. "The reproductive capacity never needed to be higher because there were no predators on the Keys," explains biologist Willard Klimstra of Southern Illinois University.

But the predator was not long in coming. Early adventurers discovered that the deer was both abundant and tasty. . . .

By the 1920s and '30s, . . . [it was] estimated that the population had dropped below 30 animals, putting the deer on the brink of extinction.

Then in 1934, nationally syndicated cartoonist "Ding" Darling dramatized the plight of the creature in a heartstring-tugging cartoon.

After a ban on hunting was ignored, a special warden was appointed in 1950. The warden, Jack C Watson, is credited with almost single-handedly saving the Key deer. "He was a one-man vigilante," recalls his son, Jack Watson, Jr. "He felt that wildlife had more rights than most people did; and if he found a hunter, he might disable his car."

In 1954, the National Key Deer Wildlife Refuge was established, with Watson as its manager. . . . [The] refuge today covers less than one third of Big Pine Key's 6,000-odd acres. In its early years, the refuge was surrounded by undeveloped land and the deer thrived. "By the early 1960s, the herd was well on its way to recovery," says Klimstra.

. . . no increase in refuge budget would probably be enough to stem the tide of development.

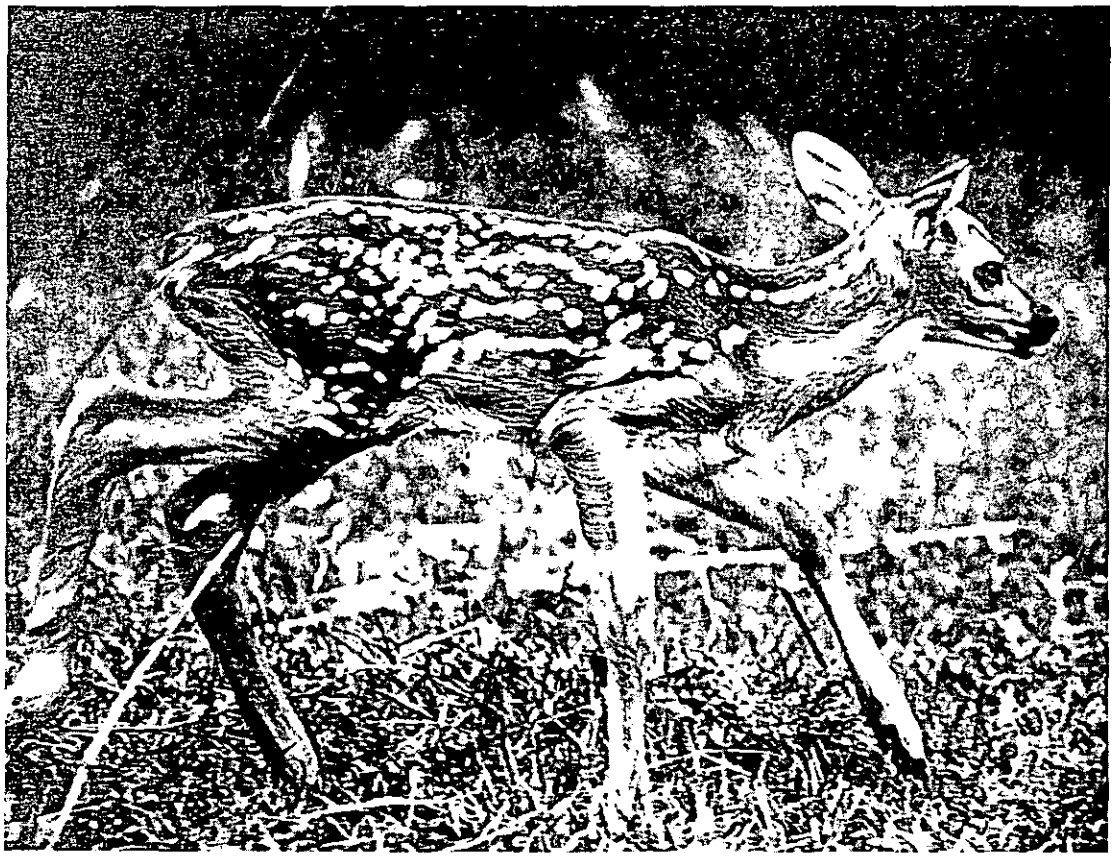
Between 1968 and 1973, Klimstra and his colleagues and students conducted the only major study ever done on the Key deer. Using radio collars, the biologists discovered that, among many other things, the animals depend on fresh water sources on Big Pine and No Name Keys. Although some deer browsed on small backcountry keys, they were forced to swim back to the larger islands during dry periods.

Klimstra also measured several alarming sources of mortality. In one year, 62 deer were killed by automobiles. Nearly one-fifth of all fawns drowned in drainage ditches too wide for the tiny animals to cross and too deep to climb out of. In addition, dogs ran down an unknown number of deer. "Due to conflicts with human populations and reduction in habitat," Klimstra warned in 1974, "the Key deer population can only decrease."

The dire prediction has come true. Now the National Key Deer Wildlife Refuge is struggling to keep the deer herd alive by buying additional scraps of habitat. Last year, the federal government spent $2.4 million to purchase 43 acres on Big Pine just before the land became a 160-condo development. The acquisition brought the refuge's total area to a meager 7,246 acres, more than half of which is on outlying keys infrequently used by deer. "When you visit the refuge, you see a lot of undeveloped land," says Dale Allen, of the

Florida Trust for Public Lands, who has acted as middleman for land acquisitions. "But until you see maps, you don't realize that a lot of land is already subdivided, just waiting for the bulldozers." Unless more land can be bought, believes Allen, "we are almost sure to see the total elimination of the Key deer."

Yet no increase in refuge budget would probably be enough to stem the tide of development. One reason, suggests Holle, is that new arrivals unthinkingly accept what they find. When they see the natural environment disappearing, they may begin to protest. By then, however, there has been a flood of additional newcomers. As Dorothy Abbott of Big Pine's Key Deer Realty says, "The demand will always be there for a piece of paradise." But if the deer and the natural bounty that the animal symbolizes disappear, then the Keys could become a paradise lost.



Key deer fawn. Photo courtesy Leslie A. Hagengruber.

Issue Analysis Worksheet

The Issue:

The Players & Their Positions	Belief Statements	Values

Level III: Issue Investigation

Section One

Focus of Instruction: Practicing the issue investigation method. Learning to identify problems, issues and solutions in issues related to the endangered species. Learning to write research questions, use a survey instrument, and interpret the data gained from the survey.

Time Needed: 3 weeks

Student Objectives:

1. The students will identify the components of an issue investigation process.
2. The students will collect information related to an issue so that the student can develop research questions, identify important sources, and write letters to receive more information.
3. The students will use a survey to collect data related to the issue chosen.
4. The students will collect data, interpret and communicate the results.
5. The students will state 3 rules important to writing research questions.
6. The students will write sample research questions correctly.
7. The students will create a graph given sample information.

Sequence of Instruction:

Lesson One

- Ethi-Reasoning Activity
- Discuss how these dilemmas are the same as issues. Students can discuss how they think others in the community would feel about these issues and what could be done to solve the problems. Any of these topics could be used in an issue investigation.
- Have students start thinking of an issue that they may wish to investigate. Ask students to form voluntary groups of 3-4 students to investigate an issue.

Lesson Two

- Show overhead of the components of an issue investigation.
  (Issue introduction, Research questions, Data collection strategy, Data interpretation, Conclusions, Recommendations)
- Explain each of the components in depth to the understanding of the students.
- Give handout of rules to writing research questions to the students and go over these rules with the students as a whole group.
- Students complete sample research questions in groups of two and then check answers as a class.

Lesson Three

- Show overhead of the three types of research methods used. (Survey, questionnaire and opinionnaire)
- Go over the definitions of each of these components and explain their uses.
- Explain the types of survey collection (random, convenience, and systematic.)

- Give handouts containing examples of questionnaire and opinionnaire.
- Explain that another method of gaining information is to send letters to those knowledgeable about your issue.
- give Handout of sample letter and organizations for gaining information.
- Ask students to identify the topic and groups to work with for their issue investigation.

Lesson Four

- Instruct students as to the parts of a graph (x and y axis, titles, labels, etc.)
- Give students sample information to graph.
- Allow time for students to write letters for their issue investigations and to work on their research questions.

Lesson Five

allow one week for completion

- Allow students to work in their assigned groups to develop research questions, search library for sources of background information and to write letters for information.
- The work should be checked in stages, once the research questions are finished, the teacher should okay the progression onto the survey instrument.
- After students have finished the survey instrument - the teacher should check this for appropriateness and allow the students to carry out the survey.
- Instruct the students on the Conclusions, Inferences, and Recommendations to be made from the data collection.
- Allow students to complete worksheets on which they draw conclusions, inferences, and make recommendations.

Lesson Six

allow one week for completion

- Students should finish collecting data, bring it all together and interpret the results.
- Students should create graphs and tables to communicate their interpretation of the results.
- Students will present their information to the class in their issue groups.

This will include the background information, the research questions, the survey instrument, and the interpretation of the data collected.

Materials Needed:

Lesson One

- Ethi- Reasoning Activity

Lesson Two

- Overhead containing components of an issue investigation
- Handout of rules to writing research questions
- Topic sentences for writing sample research questions.

Lesson Three

- Overhead of the three types of research methods.
- Overhead of types of survey collection (random, convenience, and systematic)
- Handouts of sample questionnaire and opinionnaire.
- Handout of sample letter and list of organizations

Lesson Four

- Sample information for graphing exercise.

Lesson Five

- Worksheets for conclusions, inferences, and recommendations.

Evaluation Strategies:

1. Verbally quiz the students on the components of the issue investigation during lesson one.
2. The students will complete research questions given a handout of issue statements during lesson two.
3. The students will write letters to various organizations to obtain information for their issue investigations during lesson four.
4. The students will complete a graph given information on endangered animals during lesson four.
5. The students will identify conclusion, inference, and recommendations by completing a worksheet on these items during lesson five.
6. The students will work in groups to collect information, write research questions, write a survey instrument, conduct a survey, interpret the results in graphic form, and present the information to the class during lesson six.

Resources for
Level III

Ethi- Reasoning Activity from

Project Wild. (1983). Western Regional Environmental Education Council.

Article for writing research questions, producing a line graph worksheet, and writing conclusions and inferences worksheets from

Hungerford H., Vold T., and Ramsey J. *Investigating and Evaluating STS Issues and Solutions.* (1990). Champaign, IL; Stipes Publishing L.L.C.

Permission granted to copy from Robert Watts, Stipes Publishing.

Research Questions handout, Sample Questionnaire, Sample Opionnairre, and Sample letter and addresses from

Hagengruber, David and Hungerford, Harold. *Threatened and Endangered Animals.* (1993). Champaign, IL; Stipes Publishing L.L.C.

ETHI-REASONING

Objectives

Students will be able to: 1) examine their own values and beliefs related to wildlife and other elements of the environment; and 2) evaluate possible actions they might take that have impact on wildlife and the environment.

Method

Students read, discuss, make judgements, and write about hypothetical dilemmas concerning wildlife and/or natural resources.

Background

This activity is designed to give students the opportunity to examine their own values and beliefs as they relate to wildlife and other elements of the environment. It is not the intent of this activity to prescribe "right" and "wrong" answers for the students. One exception is in the areas where information about laws is conveyed.

There are variations from state to state in laws affecting wildlife and the environment. Each state has an official public agency which is legally responsible for caring for most wildlife within the state. This agency can be contacted in your state to request general information about laws affecting most wildlife in your area. For example, it is legal to hunt and fish for some animals in all states; however, what animals and under what conditions are specified by laws and regulations for which the state wildlife agency is responsible. There are also federal regulations affecting wildlife. The U.S. Fish and Wildlife Service can be contacted for information about such laws. For example, federal law protects all birds of prey—eagles, hawks, and owls—from shooting or any other intentional cause of death, injury, or harassment. All threatened and endangered species are protected by law. Songbirds are protected by law; that is, it is against the law to intentionally harm songbirds. It is also generally illegal to possess birds' nests, eggs, and feathers, even those found lying on the ground. It is generally against the law to pick up the carcass of an animal which has been killed by a vehicle along a highway or road. Instead, local wildlife authorities should be notified. In many cases, it is against the law to take an injured wild animal home to care for it. For example, birds of prey cannot be cared for by private citizens unless those citizens have a permit to do so. There are many laws, and they are complex. Again, it is useful and important to contact local authorities about the laws protecting and affecting wildlife in your area.

Whether right or wrong, questions of law can be separated from questions of ethics. At a personal level, an individual's choices as to what seem right or wrong for him or her in terms of values and behaviors may be described as a personal code of ethics. Hunting, for example, is controversial for some people from an ethical point of view. Some people say that even though hunting is legal, it is unethical, because a human being is taking the life of a wild animal. Others believe hunting to be a responsible and ethical form of recreation, acquiring food, or animal population control. These differences of belief may be sincerely held. Whether or not a person chooses to hunt is a personal choice dictated by one's personal ethics. Conflicts arise, however, when a person motivated by one set of ethics tries to force his or her ethics on others through activities such as arguments, harassment, or legislative action.

It is the major purpose of this activity to provide students with an opportunity to come to their own judgements about what they think are the most responsible and appropriate actions to take in situations affecting wildlife and the environment.

Age: Grades 5—12
Subjects: Social Studies, Science, Language Arts
Skills: analysis, application, discussion, evaluation, problem-solving, small group work, synthesis, writing
Duration: one 30—45-minute period
Group Size: any; small groups of two to four students recommended
Setting: indoors or outdoors
Conceptual Framework Reference: I.D., V.A., V.B., V.B.1., VI.B., VI.B.1., VI.B.2., VI.B.4., VI.B.5., VI.C., VI.C.1., VI.C.2., VI.C.7., VI.C.12., VI.C.16., VII.A., VII.A.1., VII.A.2., VII.A.3., VII.A.4., VII.B., VII.B.1., VII.B.2., VII.B.3., VII.B.4., VII.B.7.
Key Vocabulary: dilemma, responsibility

Materials

copies of "dilemma cards"

Procedure

1. From the attached pages the teacher should copy and cut up the dilemma cards. Other dilemmas could be written that are more specific to problems in your area. Students could also be involved in the process of creating the dilemma cards, with each student responsible for one card. Dilemmas can be left entirely open-ended, with no options suggested for consideration.
2. Divide the class into groups of four, and give each group a stack of dilemma cards. Place them face down at the center of the group.
3. The first student draws a card from the top of the stack. The student studies the situation, decides what he or she should do, and formulates his or her reasons.
4. When the student is ready—typically in less than two minutes—the student reads the situation and the options aloud to the rest of the group. The student gives the decision he or she has chosen, and briefly describes the reasoning involved. In turn, each of the other members of the group is invited to comment on the dilemma, and what he or she would do in the situation. The discussion of each dilemma by the members of the group should take about five minutes. The person whose dilemma is being discussed should have the opportunity to ask questions of the other members of the group, and to offer clarification about his or her decision. The discussion gives the students experience in having ideas examined by peers, and is intended to remind the students of the need to take personal responsibility for decision-making. It is not necessary and may not be desirable for the students to reach consensus; there are legitimately ranging views of the most appropriate and responsible actions to take in many situations. The purpose is to provide students with an opportunity to examine, express, clarify, and take responsibility for their own reasoning.
5. The card is then returned to the bottom of the stack and the next student selects a card from the top of the stack. Continue this process until all students have had the opportunity to express their decision and rationale about a dilemma.

Extensions and Variations

1. Here are a few other general topics, around which dilemma cards could be created: abandoning pets to fend for themselves to try to find new homes; impact of pets on wildlife, like cats catching wild birds, and dogs chasing deer; use of pesticides in gardens; live Christmas trees versus artificial; acid rain; picking wild flowers and fruit; feeding wildlife around your home, etc.
2. Adapt this to a debate format!
3. Write and discuss you own dilemmas!

Evaluation

Choose a dilemma. Write a short paragraph on the positive and negative effects of all the options listed for that dilemma. Indicate what additional information, if any, is needed in order to make a responsible and informed decision. Identify what seems, in your judgement, to be the most responsible decision—and explain your reasoning.

Dilemma Card

You are president of a large corporation. You are very interested in pollution control and have had a task force assigned to study the pollution your plant is creating. The task force reports that you are barely within the legal requirements. The plant is polluting the community. To add the necessary equipment to reduce pollution would cost so much that you have to fire 50 employees. Should you:

- add the equipment and fire the employees
- not add the equipment
- wait a few years to see if the cost of the equipment will drop
- hire an engineering firm to provide further recommendations
- other

Dilemma Card

A deer herd has grown so large during the past ten years that many of the deer appear to be starving. The herd is severely damaging the habitat, eliminating much of the vegetation that the animals use for food or shelter. There is a disagreement within your community as to what course of action is best to take. You are personally opposed to hunting. A limited legal hunt has been proposed in order to reduce the size of the herd in this area. Should you:

- investigate and consider the situation to see what, in your judgement, seems to be the most humane and reasonable solution, including the feasibility of options such as moving some of the deer to other areas, understanding that they still may not survive
- attempt to identify the causes of this population increase and propose action to return the system to a balance;
- organize a protest to bring people opposed to hunting to the recreation area at the time the legal hunt is to begin;
- allow the habitat degradation to continue and the deer to starve
- leave it to the state wildlife agency to work with the land holder to arrive at a solution
- other

Dilemma Card

You are fishing at a secluded lake and have caught seven fish during your first day at the lake. Now, on the second day, the fishing has been great and you have caught five fish in the first hour, all of which are bigger than yesterday's fish. The law allows you to possess 12 fish. Should you:

- continue to fish and keep all the fish
- dispose of the smaller fish you caught yesterday and keep the big ones to stay within your limit
- have fish for lunch
- quit fishing and go for a hike
- other

Dilemma Card

You are a member of a country club that has recently voted to build a game farm to raise animals for members to hunt. You are not a hunter, you think that hunting is only okay to do in the wild, and you are opposed to the building of the game farm. Should you:

- stay in the club and do nothing
- stay in the club and speak out strongly against the subject
- resign from the club
- other

Dilemma Card

You are finally able to build the home your family has dreamed about. After reviewing the plans for your home, you realize that you cannot include all of the features you had planned for, due to rising construction costs. You must decide which one of the following you will include:

- solar heating
- recreation room with fireplace
- hot tub and sauna
- greenhouse
- other

Dilemma Card

You love children and would like to have a large family. You are aware, however, of the world's population projections for the future. Should you:

- plan to have a large family anyway
- decide not to have children
- limit yourself to one or two children
- other

Dilemma Card
You have found a young screech owl which you have managed to raise to maturity. You have been told that you cannot keep the owl any longer because keeping it without the proper permit is in violation of state and federal laws. Should you:
- offer it to your local zoo
- keep it as a pet
- call the fish and wildlife agency and ask their advice
- determine whether it could survive in the wild and, if it appears it could, release it in a suitable area
- other

Dilemma Card
You are walking in the woods and come upon a young fawn. There is no sign of the fawn's mother. Should you:
- leave it where it is
- move it to a sheltered area
- take it home
- other

Dilemma Card
You are out in the woods with a friend when you spot a hawk perched on a high limb. Before you realize what is happening, your friend shoots the hawk. An hour later, you are leaving the woods and are approached by a state wildlife officer, who tells you a hawk has been illegally shot and asks if you know anything about it. Should you:
- deny any knowledge of the incident
- admit your friend did it
- make up a story implicating someone else
- say nothing, but call the fish and wildlife office later with an anonymous phone tip
- other

Dilemma Card
You have purchased a beautiful ten acre property in the mountains to build a summer home. One hillside of the property has a beautiful view of the valley and lake below and is your choice for your homesite. However, you discover there is an active bald eagle nest site on that hillside. The bald eagle is sensitive to disturbance around its nest tree and is a protected species. Bald eagles are highly selective in choosing nest sites and usually return to the same nest year after year. Should you:
- select a different site on the property to build your home
- sell the property
- chop down the tree and build your home
- other

Dilemma Card
You are on a field trip with your class to the zoo. Although you know that feeding of the animals by zoo visitors is prohibited, some of your friends are feeding marshmallows to the bears. Should you:
- tell them that feeding marshmallows may harm the bears and ask them to stop
- report their behavior to the nearest zoo keeper
- ask the teacher to ask them to stop
- not do anything
- other

Dilemma Card
You are an influential member of the community. On your way home from work, you are stopped by a police officer and cited for having excessive auto emmissions. Should you:
- use your influence to have the ticket invalidated
- sell the car to some unsuspecting person
- work to change the law
- get your car fixed and pay the ticket
- other

Dilemma Card
You are on a picnic with your family and you see another family leaving to go home, without having picked up their own trash. It is clear the other family is going to leave litter all around. Should you:
- move quickly and ask them to pick up their trash before they leave.
- wait for them to leave and pick up the trash for them
- do nothing
- other

Dilemma Card
You are a farmer. You've been studying and hearing about farming practices like leaving edge areas for wildlife and organic pest control. Although these practices may improve your long-term benefits, they may reduce your short-term profits. You are already having trouble paying your taxes and keeping up with expenses. Should you:
- sell the farm
- keep studying farming practices but make no changes for now
- try a few methods on some of you acreage and compare the results with other similar areas on your land
- other

Components of an Issue Investigation

Introduction: Includes the background information on your issue.

Research Questions: The first step in an issue investigation. Provides a clear focus of the information to be collected. These contain **variables** that are to be measured, **a population** to collect the information from, and an **area** or geographical location to where the study is limited.

Data Collection Strategy:
The type of instrument used, and the sample or population to which the survey is given.

Data Interpretation: Making sense of the responses.

Conclusions - Factual summary of the results.

Inferences - general statements about what the data means, based on the conclusions.

Recommendations - suggested action concerning the issue based on the conclusions and inferences.

Issue Investigations: Rules for Research Questions

Research questions begin issue investigations by providing an exact focus on the information to be collected. Research questions provide a focus for the investigation's planning, instrument development, and data interpretation. Much time, energy, and resources have been wasted by student investigators who failed to clarify the questions they wanted to answer. It is doubtful whether an issue investigation (indeed, any scientific study) will be successful without appropriate research questions. Several rules for producing good research questions have been presented below. Please study them carefully.

Issue investigation research questions . . .

1. . . . are always stated **in question form.**

2. . . . always **avoid "Yes" or "No" answers.** This is usually achieved by using phrases such as "To what extent . . .", "In what ways . . .", and "What evidences indicates that . . .".

3. . . . **indicate a population and/or area.** The population refers to a group of human beings or some other major variable on which the research is focused, e.g., residents living within twenty miles of New Madrid, Missouri who fish in or near the Mississippi River. The area refers to the geographical location in which the data will be collected.

4. . . . when possible, **specify the identification or measurement of a variable.** A variable is a factor or condition around which the data are to be collected, e.g., the success of wild turkey hunters in western Kentucky, marine turtle deaths in shrimpers' nets on the Texas coast, or number of wolves killed illegally in Wyoming in 1993.

5. . . . when possible, **specify a relationship between two variables.** That is, a research question might ask the extent to which one variable affects (or is associated with) another variable. The following research question seeks to measure the extent to which Wisconsin duck hunters impact the Mississippi Flyway population of canvasback ducks: To what extent does waterfowl hunting in Wisconsin impact the population of canvasback ducks on the Mississippi Flyway?

6. . . . should be **important in a social and scientific (or environmental) sense.** Issues having importance for both human beings and the environment should be selected.

The authors realize that writing good research questions takes a lot of practice. Another STS issue situation will be presented to you. This one involves agricultural chemicals. Your task will be to analyze the information in such a way that you can write good research questions.

Despite Benefits, Herbicides Worry Some Farmers

By Anne Weinstein - Used with permission of the Associated Press

CHAMPAIGN (AP) - Charles Ehler fears the chemicals that are used on his 800-acre Champaign County farm.

"I'm not going to handle 90 percent of the herbicides because I'm not satisfied that they're safe," said Ehler, noting that many products are new and have been tested only on laboratory animals.

"I don't want to find out in the year 2000 that maybe the manufacturer wasn't close to standard and I end up with a raging case of leukemia."

So Ehler hires professionals to apply nearly all of the fertilizer and pesticides, and he hopes someday there will be a safer way to kill weeds and bugs and feed plants. In the meantime, Ehler and virtually every other Illinois farmer uses chemicals because they are essential to maximum production.

"If we had to do without herbicides, the people who oppose them should have to decide which third fo the world should starve," said Maurice Gordon, who also farms in the county. "When herbicides came along, we were able to narrow our rows and increase plant populations, so we came closer to getting the full potential out of our ground."

Gordon said he supports strict government controls and company testing, and he applies chemicals only after carefully studying the instructions.

But Gordon probably is the exception, said Robert Metcalf, an environmental toxicologist at the University of Illinois who studies pesticide dangers. "Instructions are more often violated than they're followed. There's a big problem of human safety because people just don't know what they're using," he said.

Metcalf said that despite testing by manufacturers of chemicals, dangerous ones still are sold. "Company policy is based on sales," said Metcalf, adding that the bottom line for some firms is profit.

However, Wendell Mullison of Dow Chemical Co., a major producer of farm chemicals, said a new product must pass 70 or 80 tests to meet government standards, and that takes five years and costs $15 million to $20 million per chemical. He said his company now is developing new chemicals that are more accurate in small amounts and break down more quickly in the soil.

Marshall McGlamery, a U of I agronomist, said a technique known as integrated pest management is helpful. Farmers should use crop rotation and cultivation to fight pests, and should plant seed varieties that give crops a head start on the intruders, he said.

When chemicals are used, they should be the post-emergence type that kill weeds when and where they appear, he said. The poorer choice is using pre-emergence chemicals over a large area to kill weeds "in case they come."

Metcalf worries about chemicals that find their way into groundwater supplies and wells, and A. B. Taylor of the Illinois Environmental Protection Agency said that is a possibility. However, Taylor said his agency has trouble keeping up with new developments in farm chemistry.

"One of our concerns is that most of the pesticides we test for are chemicals that aren't extensively used any more or their use has been suspended. We don't test the water for most of the ones that are popular today."

Writing Research Questions

Read the attached article, identify the variables involved in the issue.
Lastly, write two research questions related to these variables.

Variables

Research Question #1

Research Question #2

Three types of Research Methods

Survey - critical inspection of a certain area and population to provide exact information about an issue.

Questionnaire - carefully written set of questions about a particular subject that is given to a carefully selected sample of human beings.

Opinionnaire - carefully written set of questions which measure the opinions of a carefully selected sample of human beings.

Types of Surveys

Random Sample - One in which all viewpoints have an equal chance of being represented.

Systematic sample - consists of selecting a sample using a system. For example, choosing every 50^{th} person in the telephone book to survey.

Convenience sample - the sample consists of people the researcher can easily contact.

The Questionnaire

This questionnaire presented below is focused on collecting data to answer the research questions in the issue investigated by Mark, Sheila, and Joanne. It should be used with an adult member of a household. The size of the sample should be fairly large in order to make the data representative of the population. Often, a target of 70+ responses is chosen. It is also suggested that the data be collected and tabulated according to particular areas of the township.

Model Questionnaire: The Ballard Township Reservoir Issue

Hello, my name is _____.

I am a student at the Fairfield Osborn School. Three of us are investigating an issue related to the old Ballard Township Reservoir. May I ask you a few questions?

Person Responding: _____ Male _____ Female

_____

Address

1. How much do you know about the plans to drain the old local reservoir and convert it to other uses?

A Great Deal _____
A Moderate Amount _____
A Small Amount _____
Nothing At All _____

2. How much do you know about the value of the old reservoir as habitat for migrating waterfowl?

A Great Deal _____
A Moderate Amount _____
A Small Amount _____
Nothing At All _____

3. Do you know that two species of ducks that use the old reservoir are found on the state's list of threatened and endangered species?

Yes _____; No _____.

4. To what extent would you be willing to support the preservation of the reservoir as a refuge for waterfowl and other animals?

A Great Deal _____
A Moderate Amount _____
A Small Amount _____
Nothing At All _____

Do you have any comments you would like to make about the reservoir, the waterfowl, or the issue we are investigating?

Comments:

Thank you for your help!

Kerri's Issue Investigation Opinionnaire

Rockfish Ban Opinionnaire

Introduction

My name is Kerri Ginn and I am an Environmental Biology student at Easton High School. I am collecting information about the Rockfish Ban in the Chesapeake Bay. For your information: In 1985, the Striped Bass (Rockfish) was declared a threatened species. Commercial and recreational fishing was completely banned. The full ban has now been lifted but many restrictions have been placed on Rockfish fishing. There are certain seasons for catching Rockfish and commercial fishermen are assigned individual quotas - a certain number of pounds of Rockfish per person.

Background Items

Gender: _____ Male _____ Female

Age: _____ Under 18; _____ 18-25; _____ 26-40; _____ 41-65; _____ 66+

Education: _____ 9th Gd.; _____ 10th Gd.; _____ 11th Gd.; _____ 12 th Gd.;
_____ H.S.; _____ College; _____College Diploma; _____ Post Graduate School.

Are you a(an): [Check all that apply]
_____ Administrator, Faculty, or Staff; _____ Student; _____ Environmental Biology Student;
_____ Fisherman, Waterman; _____ Talbot County Resident.

Item 1: To what extent do you feel that the Rockfish Ban was necessary?
Not at all / Sight Extent / Moderate Extent / Considerable Extent / Great Extent

Item 2: To what extent do you feel that the restrictions now placed on Rockfish fishing are necessary?
Not at all / Slight Extent / Moderate Extent / Considerable Extent / Great Extent

Item 3: To what extent do you feel that the restrictions placed on Rockfish fishing have affected the Eastern Shore [of Maryland] and the watermen?
Not at all / Slight Extent / Moderate Extent / Considerable Extent / Great Extent

Item 4: To what extent do you feel that restrictions on Rockfish fishing will greatly increase their population?
Not at all / Slight Extent / Moderate Extent / Considerable Extent / Great Extent

Item 5: There is a Rockfish season in the spring. The female Rockfish is carrying eggs during this time. Should this season be allowed?	Yes	No
Item 6: Have you ever fished for Rockfish?	Yes	No
Item 7: Have you ever eaten Rockfish?	Yes	No
Item 8: Have you or anyone you know been negatively affected by the restrictions placed on Rockfish fishing?	Yes	No
Item 9: Do you think that the Rockfish Ban should be reinstated?	Yes	No

Thank you for your time!

Letters Requesting Information

Many times, as we learn more about an issue, we find that there is much that we do not know. One way to find answers to our questions is to write letters requesting specific information from experts, resource persons, and organizations. The sample letter on the following page is an example of a request for information.

The list of organizations below represents national and regional organizations which might have answers to the questions you have asked. Addresses for many regional and state-level agencies and organizations have not been provided, but they should be considered as important additional sources of information. Much of the information here was taken from the 1991 edition of the *Conservation Directory*, published by the National Wildlife Federation. The *Conservation Directory* is highly recommended for use with this case study.

Examples of Organizations Associated with The Problems and Issues of Threatened and Endangered Species

American Cetacean Society; P. O. Box 2639; San Pedro, CA 90731-0943 [213-548-6279] - [Protection of marine mammals]

American Fisheries Society; 5410 Grosvenor Ln., Suite 110; Bethesda, MD 20814 [301-897-8616] - [Conservation and wise use of fisheries]

American Museum of Natural History; Central Park West at 79th Street; New York, NY 10024 [212-769-5000] - [General ecological coverage - including many aspects]

Atlantic Salmon Federation; P. O. Box 429; St. Andrews, N.B.; Canada E0G 2X0 [506-529-8889] - [Preservation and management of the Atlantic salmon]

Canvasback Society, The; P. O. Box 101; Gates Mills, OH 44040 [216-443-2340] - [Promote increase of the canvasback duck]

Center for Marine Conservation, Inc.; 1725 DeSales St., NW ; Suite 500; Washington, DC 20036 [202-429-5609] - [Species recovery - coastal and ocean resources]

Cousteau Society, Inc., The; 930 West 31st Street; Norfolk, VA 23517 [804-627-1144] - [Protection/ improvement of quality of life]

Desert Tortoise Preserve Committee, Inc.; P. O. Box 453; Ridgecrest, CA 93556 [619-377-4258] - [Promote welfare of the desert tortoise - preservation of habitat]

Ducks Unlimited, Inc.; One Waterfowl Way; Long Grove, IL 60047 [708-438-4300] - [Preserve, restore, and develop wetlands for waterfowl in North America]

Environmental Task Force, 1346 Connecticut Ave. NW, Suite 912, Washington, DC 20036.

Gopher Tortoise Council; Florida Museum of Natural History; University of Florida; Gainesville, FL 32611 [904-392-1721] - [Work to preserve the gopher tortoise and its habitat]

Great Bear Foundation; P.O. Box 2699; Missoula, MT 59806 [406-721-3009] - [Protecton of bears and habitat, esp. grizzly bears]

Greenpeace USA, Inc.; 1436 U St. NW; Washington, DC 20009 [202-462-1177] - [Preservation of the earth as well as endangered species]

International Crane Foundation; E-11376, Shady Ln. Road; Baraboo, WI 53916-9778 [608-356-9462] - [Preservation of crane species]

Izaak Walton League of America, Inc., The; 1401 Wilson Road, Level B; Arlington, VA 22209 [703-528-1818] - [Education of public for conservation of natural resources]

Marine Mammal Commission; 1825 Connec-ticut Avenue, NW, Suite 512; Washington, DC 20009 [202-653-6237] - [Protection and conservation of marine mammals]

National Audubon Society; 950 Third Avenue; New York, NY 10022 [212-832-3200] - [Works to save threatened habitat and ecosystems]

National Geographic Society; 17th and M Streets, NW; Washington, DC 20036 - [202-857-7000] - [Publishes material related to numerous environmental issues as well as general geographic knowledge]

National Parks and Conservation Assn.; 1015 31st Street, NW; Washington, DC 20007 [202-944-8530] - [Preservation and improvement of the nation's park system]

National Speleological Society, Inc.; Cave Avenue; Huntsville, Al 35810 [Conservation of caves and caverns as well as the ecology of caves]

National Wildlife Federation; 1400 16th Street, NW; Washington, DC 20036-2266 [202-797-6800] - [Wise use and proper management of earth's natural resources as well as wildlife]

Nature Conservancy, The; 1815 North Lynn St.; Arlington, VA 22209 [703-841-5300] - [Identifies and makes an effort to protect ecologically important areas]

Pacific Seabird Group; 4990 Shoreline Hwy.; Stinson Beach, CA 94970; [International conservation of Pacific sea birds]

Peregrine Fund, Inc.; 5566 West Flying Hawk Lane; Boise, ID 83709 [208-362-3716] - [Preservation of falcons and other birds of prey]

Rachel Carson Council, Inc.; 8940 Jones Mill Road; Chevy Chase, MD 20815 [301-652-1877] - [International clearinghouse on ecology of the environment, esp. chemical contamination]

Sierra Club; 730 Polk Street; San Francisco, CA 94109 [415-776-2211] - [Protect the wild places of the earth; educational organization on matters of environmental importance]

Tall Grass Prairie Alliance; P.O. Box 557; Topeka, KS 66601 [913-357-4681] - [Dedicated to preservation of remaining segments of the tall grass prairie ecosystem]

Trout Unlimited; 501 Church Street, NE; Vienna, VA 22180 [703-281-1100] - [Protection and improvement of trout and salmon resources]

U.S. Environmental Protection Agency, 410 M St.SW, Washington, DC 20460; Region V, Office of Public Affairs, 230 South Dearborn St., Chicago, Il 60604.

Wilderness Society; 900 17th Street, NW; Washington, DC 20006-2596 [202-833-2300] - [Preserving wilderness and wildlife]

World Wildlife Fund - US; 1250 24th Street, NW; Washington, DC 20037 [202-293-4800] - Works worldwide to protect endangered wildlife and ecosystems]

Writing a Letter for Information

Directions: Identify specific questions or critical information that you need concerning the management of endangered species. Use the list of organizations (or use other lists of experts, agencies, or organizations that your teacher might have) to identify an **information source** that might answer your question or provide the information needed. Write a letter to that source seeking the information you need.

Sample Letter

January 21, 1994

Information Office
World Wildlife Fund
1250 24th Street, NW
Washington, DC 20037

Dear Sir or Madam:

As a part of our current study on issues surrounding threatened and endangered species, our class has taken an interest in threatened and endangered birds which are brought into the United States and sold in pet shops. We are, however, having some trouble finding current information on threatened and endangered birds, particularly those that might turn up in pet stores in the US.

Could you please provide us with a listing of threatened and endangered birds from outside the US with some comment or identification of those that might find their way into the US pet market? If you cannot provide that information, would you please direct us to the agency from which we might obtain it? We really appreciate your help.

What we hope to do with this information is to survey the many pet stores found in our city and determine if any of them are marketing threatened and endangered species.

Sincerely,

Roger T. Smith
The Environmental Science Class
Theodore Roosevelt Magnet School
1000 Fairfield Court
Dallas, Texas 75200

Producing a Line Graph

Do you think that you can report data in graphic form? Graphing is a skill just like any other process. We are going to ask you to graph some historical data collected over the years about the deer population on the Kaibab Plateau in Arizona. These figures might surprise you - particularly after you see them on a line graph. Here are the data in tabular form:

Deer Population Data on the Kaibab Plateau From 1907-1938

The Year	Population of Deer
1907	6,000
1910	10,000
1915	25,000
1920	56,000
1923	100,000
1925	85,000
1930	30,000
1935	14,000
1938	9,000

Please graph these data using the graph worksheet provided on the next page. The population variable should go on the vertical axis of the graph. The year variable goes on the horizontal axis. Label both axes. (V-5)

Your instructor will want to check your work on the graph. Also, he/she may ask you to do some additional tasks connected with reporting data. If so, hang in there and get the job done well! You are almost ready to be an independent investigator of STS issues.

Applying Your Data Interpretation Skills

Using the Kaibab Plateau deer population data given by the graph, write out the best possible **conclusion** that can be drawn from the data. (V-6)

_____

_____

_____

_____.

Now, we will tell you that, between 1907 and 1923, 300 coyotes and 600 mountain lions were killed on the Kaibab Plateau. For the years between 1907 and 1923, write the best possible **inference** you can from all the data at your disposal:

_____

_____

_____.

Lastly, we tell you that, during the years of increasing and decreasing deer populations, the range of the deer was so badly overgrazed that thousands of deer died from starvation. What logical **recommendation(s)** would you make based on all available information?

_____

_____

_____

_____

_____.

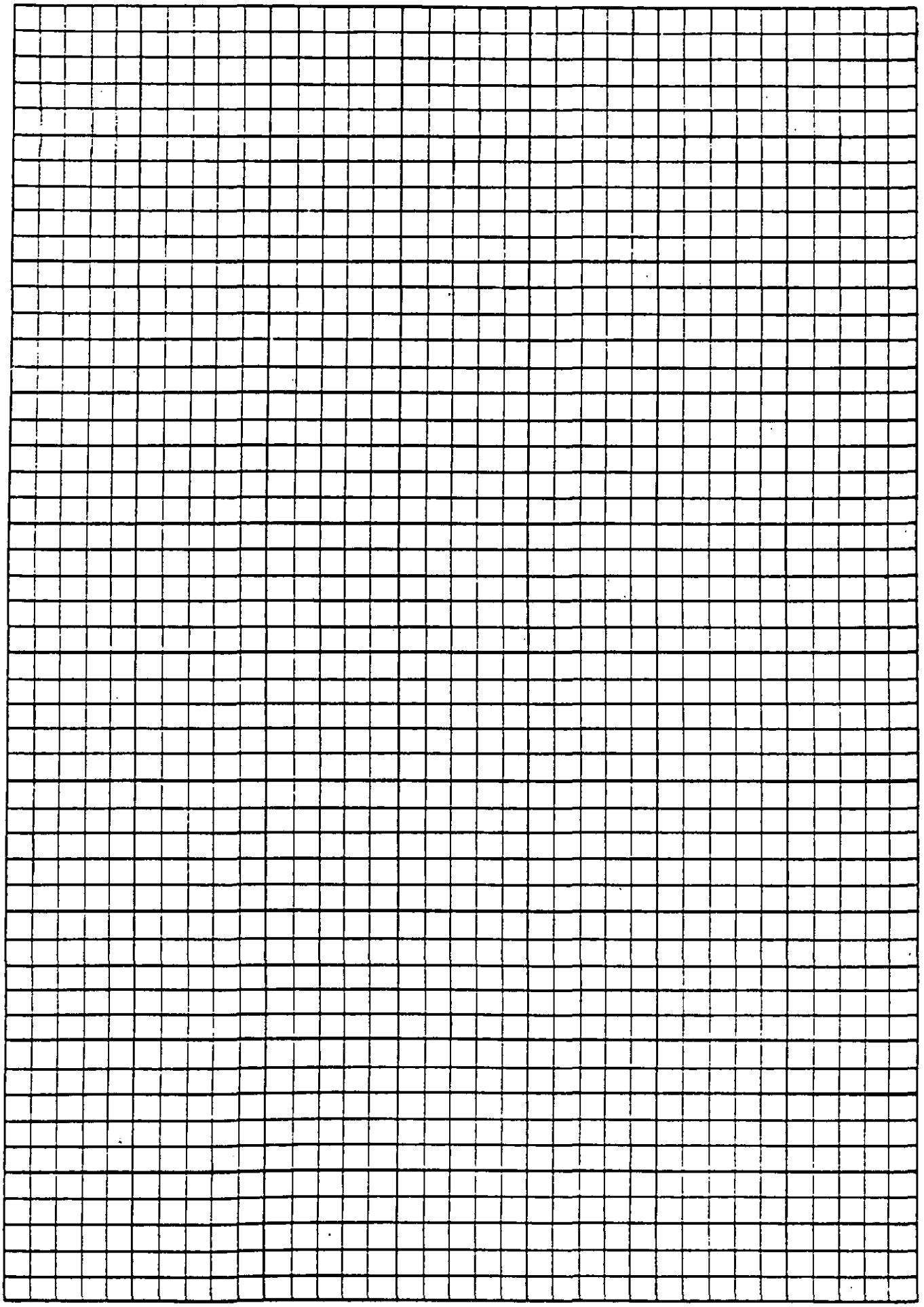
Another Try at Data Interpretation

You are probably getting better and better at data interpretation. That is good! These skills are very important, especially if you intend to make decisions based on your research findings. Let's look at another set of data, one having to do with coyotes.

Western ranchers have been at war with the coyote for some time. Sheep ranchers, in particular, have said that the coyotes cause economic losses by killing many of their animals. For years, the government has helped farmers and ranchers control coyote populations. Traps, poisons and even hunting by airplane have been used to reduce the number of coyotes.

Let's suppose you wanted to make an informed decision about whether the government-sponsored coyote control programs should be continued. Your research question might look like this: **Research Question**: To what extent should a government-sponsored coyote control program be continued in the western states?

On the next page, you will find some data collected in Kansas by scientists who analyzed the stomach contents of 1600 coyotes killed by hunters during one year. These data will be helpful to you in answering the research question. As you study the data table and the additional information it will be important to keep the research question in mind.



the presence of certain molds. He inferred that there was something about the mold that kept the bacteria from growing and reproducing. This inference resulted in the development of penicillin. Quite an important inference, wouldn't you say? Do you see the difference between Fleming's **observation** and his **inference**?

Conclusions and Inferences Made Easy

Suppose you and a friend walked to town one nice summer evening and decided to go to a movie after getting there. After two hours in the movie, you leave the theater and walk out onto a wet sidewalk. You notice that the streets are wet and puddles of water stand here and there. From this situation you can . . . (V-2)

Conclude? _____

_____

Infer? _____

_____

The next morning, you look out the window and see a moving van backed into your neighbor's yard. What can you . . .

Conclude? _____

_____

Infer? _____

_____

A little while later, you see what appears to be the driver of the moving van pouring something into the truck's fuel tank from a five gallon can. What can you . . .

Conclude? _____

_____

Infer? _____

_____

Let's see how well you have done. When you walked out of the movie theater there wasn't much you could **conclude** except that the streets and sidewalks were wet. But, you could **infer** that it had rained while you were watching the movie.

With the van backed onto the neighbor's yard you could probably **conclude** that a moving van had backed into the yard sometime during the night or early morning. You possibly **infer** that the neighbors are moving.

The person at the fuel tank of the moving van might or might not be the driver, but you can **conclude** that someone is pouring something into the fuel tank of the truck. You might **infer** that the substance is diesel fuel.

STS Issue Vignette:

On May 18, 1989 USA Today reported - on the front page - a comparison of the public's 1973 and 1988 Gallup Poll responses to two questions on pollution. On the question of whether the American public was seriously concerned about water pollution, 48% were seriously concerned in 1973 while a whopping 84% were seriously concerned in 1988. On the question of air pollution, 46% were seriously concerned in 1973 while a much larger 73% were seriously concerned in 1988.

These statements are, in reality, conclusions drawn from the 1973 and 1988 surveys. There are no inferences stated here. Can you think of some inferences that might be made from these data?

What one thing is clear about these inferences? Yes, they are explanations of observations you have made. Something else should be clear (but it might not be). This is simply that you have proved none of your inferences. You say this isn't important? Wait just a minute! A water truck might have sprayed the streets in the downtown area the night you went to the movie. The van's driver might have backed into the wrong yard. The driver could have been pouring gasoline into the fuel tank - if that particular truck didn't run on diesel fuel!

You think you were tricked? Perhaps! But we are trying to make a point here - that inferences are not proof until they have been tested somehow. How do you test an inference? In the case of your examples it would have been easy. You could ask a police officer or someone else if it rained while you were in the movie. You could ask the neighbors if they are moving. You could ask the driver of the van what is being poured into the truck's fuel tank. In each case, whether the person talked to knows it or not, you are testing an inference. When an inference becomes something testable in science we call it a hypothesis. But, for now, let's go on to recommendations and leave hypothesizing out of the picture.

An Analysis of the Stomach Contents of 1600 Coyotes
Percentage of Diet

	Rabbit	Carrion	Chicken	Rodent	Other
Spring	45.7	26.0	11.5	11.8	5.0
Summer	47.7	19.3	15.3	10.0	7.7
Fall	47.3	23.0	10.3	10.7	8.7
Winter	52.7	27.7	8.3	8.0	3.3

Adapted from *You and the Environment - An Investigative Approach*, 1976

As the scientists examined the contents of the coyote stomaches, they placed food types into several categories. "Rabbit", of course, included the percentage of rabbits which were found. "Chicken" included any poultry or wild birds. "Other" included fruits, grains, insects, and snakes. "Carrion" included decaying flesh, whether it came from wild animals or livestock. Coyotes often find carrion on the range. The scientists noted that most of the livestock flesh found in coyote stomaches was decaying before the coyotes ate it. Fresh livestock appeared to make up a very small portion of the coyote's diet.

Now, let's repeat the **Research Question: To what extent should a government-sponsored coyote control program be continued in the western states?** In order to answer this question, you will need to produce a conclusion regarding the coyote's diet. Please write a conclusion which summarizes those food types which coyotes eat frequently, those that are eaten some of the time, and those that are rarely eaten. What is your **conclusion** drawn from the data? (V-7)

Next, write an **inference** based on your conclusion. In fact, several inferences are possible, depending on what outcomes were cited in the conclusion. To write the most appropriate inference, keep in mind the focus of the research question. Remember, an inference is an explanation or judgement based on the data.

Finally, write a **recommendation** which is consistent with the findings. That is, what advice would you offer concerning the continuation of government-sponsored coyote control programs?

Perhaps additional information could assist in writing a more specific recommendation. One method of coyote control is the use of a long-lived poison, "1080". The poison 1080 is usually placed on carrion. Unfortunately, this poison becomes available to many other wild and domestic animals besides coyotes. Ferrets, eagles, dogs and other

animals are killed by 1080. Many sheep ranchers support the use of 1080 in government-sponsored coyote population control programs. Many conservationists are violently opposed to its use. With this information in mind, write another **recommendation** about the use of 1080 which is consistent with the data. (V-8)

_____

_____

_____

_____.

A few other thoughts about the coyote are necessary. Our original Research Question asked about the extent to which government-sponsored coyote control programs should be continued. Do the data, as they are presented in this module, directly answer that question? Please explain your answer. (V-9) Yes _____ No _____. Explain:

_____

_____

_____

_____.

It is also important to remember that the data presented deal only with Kansas coyotes. To what extent do you think your conclusions, inferences, and recommendations are valid for other western states? Please answer and defend your decision. (V-10)

_____

_____

_____

_____.

Data Interpretation With Surveys

We've asked you to practice your interpretation skills using data collected by scientists. Now, let's look at data similar to those which **you** might collect. In this section,you will be working with actual data collected by a student in a small midwestern high school. (We'll just call that school, Midwest High). The sample size was 100, and included 20 freshmen, 20 sophomores, 20 juniors, 20 seniors, and 20 faculty and staff members. The issue here focused on the use of drugs and drug testing in Midwest High School. Several research question were asked. You will work with data collected on two of those research questions. (V-11)

Level IV: Citizen Action

Section One

Focus of Instruction: Using the data collected in level three, the students will list issues related to endangered species, suggest, and evaluate possible solutions to these issue problems.

Time Needed: 1-2 weeks

Student Objectives:

- The students will define and give examples of types of citizenship action, such as persuasion, consumerism, political action, physical intervention.
- The students will make citizenship action recommendations on their issue investigations.
- The students will analyze proposed solutions for ecological, economic, and social consequences.
- The students will identify the most viable recommendation and solution to the issue problems.
- The students will list possible citizen action for their issue and select an appropriate citizen action.

Sequence of Instruction:

Lesson One

- Discuss with students the recommendations made by various groups during the presentations. Ask if these actions are something that the students could carry out.
- Show overhead of Modes of Citizenship Actions
- Discuss the types of citizenship action.
- Give the students the handout on examples of actions.
- Discuss the actions listed, the differences in the types of actions, and other actions that the students may think of own their own.

Lesson Two

allow two days to complete this lesson

- Have students brainstorm a list of citizenship actions to help protect endangered species in their investigation groups.
- Give students the handout on writing persuasive letters
- Discuss how to write letters and whom to write in order to get action.
- Have students write a sample letter using the format on the handout.
- Give students the handout on Physical Actions
- Ask students to identify those actions that they could complete daily and those that they would be willing to do.
- Discuss various citizenship actions that require little effort and can be done every day.

For this section provide reference materials such as *Homes for Wildlife, 50 Ways to Save the Earth,* and various pamphlets containing information on butterfly gardens, building bird houses, and feeding wild animals.

Lesson Three

allow 3 days for this activity

- Hand out the activity *Can Do* and have the students complete the activity over the next week working in their investigation groups.

Lesson Four

allow one week for completion

- Students use their issue investigations to create issue action plans in their investigation groups.
- Give students the handout on the issue action plan
- When students have finished the handouts, discuss their actions with the class.
- If students decide that planting for wildlife or building bird houses is an appropriate action ask if anyone would like to do these actions as a class.
- Close out the unit by creating a milk carton bird feeder for the students to take home.
  Do this by taking a 1 quart milk carton and cutting squares out of the four sides.
  Allow students to decorate the carton with wildlife designs.
  Poke a hole in the top with a paper hole puncher and thread yarn or rope through the hole.
  Fill the feeder with birdseed and hang.

Materials Needed:

Lesson One

- Overhead of Modes of Citizenship Action
- Handout of Examples of Citizenship Action

Lesson Two

- Writing Persuasive Letters Handout
- Physical Actions Handout
- *Homes for wildlife*
- *50 ways to save the earth*
- Pamphlets on habitats and feeding of wildlife

Lesson Three

- *Can Do* activity

Lesson Four

- Handout on Issue Action Plan
- Mild Cartons
- Bird Seed
- Markers, crayons, glue, tape, and construction paper
- Paper hole puncher
- Thick yarn or glue

Evaluation Strategies:

1. The students will verbally communicate the types of Citizenship Actions, briefly explain each type and give examples of each during lesson one.
2. Working in groups, the students will brainstorm a list of possible citizenship actions during lesson two.
3. The students will write a persuasive letter in order to take action on an endangered species issue during lesson two. These will not be mailed.
4. The students will verbally identify physical actions that they can carry out themselves during lesson two.
5. The students will complete the Can Do activity showing understanding of the various methods of citizenship action and the necessary steps to carry out the citizenship actions during lesson three.
6. The students will complete an Issue Action Plan using their issue investigations showing understanding of the necessary actions, materials, and time needed to carry out such a plan during lesson four.

Resources for
Level IV

Modes of Citizenship Action, Examples of Actions, from

Hagengruber, David and Hungerford, Harold. *Threatened and Endangered Animals.* (1993). Champaign, IL; Stipes Publishing L.L.C.

Writing Persuasive Letters, Physical Actions, and Issue Action Plan from

Hungerford H., Vold T., and Ramsey J. *Investigating and Evaluating STS Issues and Solutions.* (1990). Champaign, IL; Stipes Publishing L.L.C.

Can Do Activity from

Project Wild. (1983). Western Regional Environmental Education Council.

Modes of Citizenship Action

PERSUASION: Persuasion is the act of trying to convince a person (or a group of persons) that a certain action is correct. Logical appeals such as discussion, letter-writing, and posters are the most positive approach to persuasion. However, emotional appeals and coercive efforts are also common types of persuasion.

CONSUMERISM: Consumerism is the act of buying (or not buying) a product or service. This action relies on the economic power of purchasing or boycotting to support (or not support) certain ideas held by producers, manufacturers, agencies, legislatures, or even nations. Direct boycotting, indirect boycotting, and consumer conservation are types of consumerism.

POLITICAL ACTION: Political action refers to any action which brings pressure on political and/or government agencies (and their representatives) in order to persuade them to take a certain action. Voting, campaigning, and lobbying are common types of political action.

PHYSICAL INTERVENTION: Physical intervention is simply a phrase which refers to a physical action taken to help improve the status of an issue. For example, plastic litter that might prove dangerous to marine mammals can be reduced by a clean-up campaign.

Written Almost Fifty Years Ago!

Parts of the earth, once living and productive, have thus died at the hand of man. Others are now dying. If we cause more to die, nature will compensate for this in her own way, inexorably, as already she has begun to do.

Fairfield Osborn in 1948

Some Examples of Possible Endangered Wildlife Actions

I. Persuasive Actions

a. Write "Letters to the Editor" for local and regional newspapers on endangered species issues.
b. Write a special Guest Editorial for a local or regional newspaper on an important endangered species issue.
c. Present issue investigation data to local environmental or wildlife groups.
d. Present action recommendations based on actual investigations at appropriate public hearings.
e. Present an educational program on endangered species to a school or civic group.
f. Keep TV stations informed of fast breaking news stories dealing with threatened or endangered species.
g. Organize a community educational program on bat awareness or other poorly known endangered species.
h. Distribute posters dealing with the use of pesticides and other toxic chemicals.
i. Convince adults to vote for environmentally responsible politicians.

II. Consumer Action

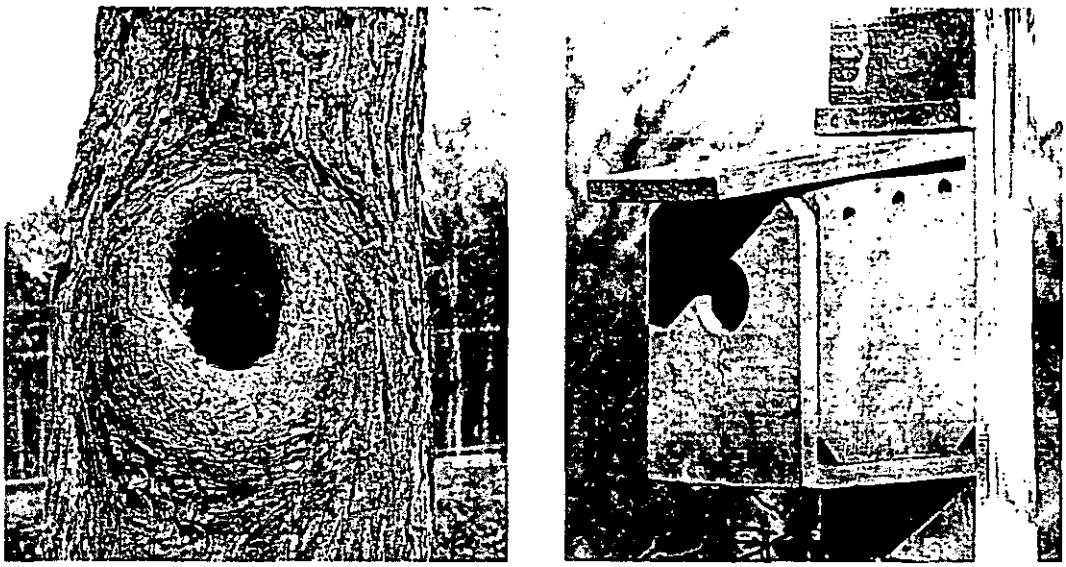
a. Join a responsible environmental or wildlife organization.
b. Purchase both state and federal waterfowl stamps.
c. Boycott products produced by environmentally irresponsible corporations.
d. Boycott retail organizations that sell ivory.
e. Boycott companies selling illegal skins and furs .
f. Boycott pet stores that deal in threatened or endangered wildlife.

III. Political Action

a. Vote for environmentally responsible candidates for organizational offices.
b. Petition governmental agencies to have problem species listed as threatened or endangered.
c. Pressure governmental agencies for stricter regulations on illegal trade in endangered species.
d. Pressure law enforcement agencies to pay closer attention to the illegal trade in skins, furs, and other animal products produced from threatened and endangered species.
e. Write to legislators urging appropriate positions on political issues related to endangered species or the habitat of threatened and endangered species.
f. Meet with officials to present the results of issue investigations and ask for appropriate environmental action.

IV. Ecomanagement

a. Set up and maintain bird feeding stations.
b. Build and install bat houses.
c. Plant windbreaks and fence rows for improving wildlife habitat.
d. Participate in responsible programs which offer adoption programs for endangered or threatened zoo animals, e.g., wolves, birds of prey, reptiles, amphibians, etc.
e. Contribute to environmental organizations that preserve ecosystems or intervene in endangered species issues.



As a result of human land use patterns, much of the original forests of the US have been converted to other uses. Natural tree cavities disappeared along with the forests. Birds which nest only in tree cavities (like the one on the left) had fewer breeding sites and their numbers decreased. The eastern bluebird is one species which has been brought back from the edge of extinction through the building and installation of nest boxes, such as the one on the right. Several other hole nesting birds, as well as bats, are helped through the use of nest boxes. Photos courtesy H. Hungerford.

An Example: The Lorax in Action

Let's return a final time to The Lorax. Remember that the Once-ler and the Lorax disagreed about the use of truffula trees. Let's pretend that the Lorax decided to take action rather than complain. Suppose that he formed an organization to undertake actions that included a boycott of thneeds, a letter-writing campaign to local government officials, and a replanting program designed to rebuild the truffula tree population. And suppose that the Once-ler countered with his own actions which included voting for officials who supported his position, funding a park for local endangered species, and writing letters to the editor of the local newspaper.

In our make believe example, both the Lorax and the Once-ler tried to resolve the issue using citizenship action methods. Your task will be to develop an action plan to help solve an endangered species issue using some of the same (or other) methods.

Action Vignette

A group of sixth graders in Kansas City, Missouri became interested in issues associated with solid waste and its disposal. They studied the problem and conducted research on recycling. Then, several of the students wrote letters to *The Kansas City Star*, a major newspaper in the area. Two of these follow as examples:

Recycle more

I am in the sixth grade . . . . We are studying toxic waste, landfills, and recycling. We have found out that many Kansas Citians don't recycle. And that many companies produce toxic waste, and just ship it off. Some of that toxic waste is in our air. . . . Our city is getting more and more polluted every day. And our landfills are getting filled up more quickly than ever before because people aren't recycling. I think we should start recycling and try to get companies to be more careful with toxic waste. Emily Bock

Make room

I think people should recycle their pop cans, glass and paper. The city puts trash in the landfill. Pop cans, glass and paper that could have been recycled will take up room. Let's recycle and make room for other trash. Anna Petrie

Writing Persuasive Letters

Since letter writing is a common form of persuasive action when trying to get good laws passed, the following guidelines are suggested for use when writing politicians. You may want to keep some of these in mind when writing persuasive letters to others as well.

1. Begin the main body of your letter with Dear Senator _____, Dear Representative _____, or Dear Governor _____.

2. In the first sentence, state the issue and how you wish the legislator to vote on the issue (or, in the case of the governor, how you want him/her to react to a proposed law). When referring to a specific bill, be sure to use its name and number.

3. It is best to limit each letter to a single issue.

4. Present the issue as briefly as possible. Describe your position and why you hold it. If you have detailed information to provide, organize the letter so that the reader does not have to wade through this in order to understand the meaning of your letter. Often, it is best to simply attach detailed information to the letter.

5. Never include disrespectful comments. Do not begin with statements such as, "You probably won't read this, but . . .". Be objective and courteous, never threatening.

6. Express your pleasure with any positive actions taken by the legislator or official. Often it is wise to devote a whole letter to praising some action taken which represents your interests. This lets the legislator or official know that he/she is on the right track.

7. Include a full return address so that the official can respond.

Guidelines for Persuasive Action

There are some guidelines which should be followed to make persuasive action more effective. Perhaps you can think of others.

1. Be sure the basic argument can be easily understood by those being persuaded.
2. Be certain the case being presented is accurate, and the facts are correct.
3. Show how the desired action fits the values of others.
4. Select a method of persuasion which is clear, interesting, and appropriate to the issue.

Can you think of others?

Activity: Classifying Persuasive Actions

Refer back to the story of the tree spikers reprinted earlier. While the actions of the tree spikers may be physical (ecomanagement) actions, they also are of a persuasive type. Classify the persuasion approaches taken by these people. Classify them as **logic, emotion, or coercion.** Defend your choice of classification. (VII-6)

Persuasion Type? _____

Your Defense: _____

_____

_____

Physical Actions	In Your Area?
Soil erosion control projects	_____
Cleaning up neighborhoods or business districts (litter control)	_____
Starting a recycling center	_____
Conducting a scrap metal drive	_____
Landscaping the school grounds	_____
Improving wildlife habitat with projects such as . . .	
Habitat planting projects	_____
Installing and servicing bird feeders	_____
Building and installing nest boxes for birds such as bluebirds and wood ducks	_____
Preserving important habitats for plants and animals that are native to the area	_____
Planting evergreen windbreaks to conserve energy during the winter	_____
Improving conservation practices such as . . .	
Turning off lights when not in use	_____
Repairing leaky faucets	_____
Putting weather stripping around doors and windows	_____
Lowering the thermostat	_____

What other physical action (ecomanagement) projects can you think of?

One example of a physical action is widespread in the Midwest. This is the construction and installation of bird boxes for the eastern bluebird. Until recently, this bird was on the "threatened species" lists of numerous states. Now, this species is so numerous that it is usually not considered threatened by extinction.

CAN DO!

Objectives

Students will be able to: 1) identify a problem involving wildlife on their own school grounds; 2) suggest and evaluate alternative means by which to either solve the problem or at least improve the situation; 3) successfully undertake the project; and 4) analyze and describe the process by which they successfully solved the problem or improved the situation.

Method

Students select a school environmental project; conduct research; make plans; and follow procedures to accomplish the project.

Background

Each of us can make constructive contributions to improving the environment in which we live. Sometimes our actions can improve the environment for people, sometimes for wildlife, and sometimes for both. Sometimes our effectiveness can be improved if we work with other people—sharing ideas, information, and skills.

A working knowledge of the following terms will be useful to students in this activity:

Problem—a difficult situation to be improved, or an opportunity to make things better. Problems can't always be "solved," but situations can usually be improved.

Authority—an individual or group of people with the power to make changes.

Compromise—a way to settle a problem in which both "sides" usually give a little.

Given that it is important for young people to learn that they "can do" for people, wildlife, and the environment—use your judgement in the course of this activity to assist students in selecting a project that is realistic, constructive, and possible. If not, the students may experience an activity that contributes to their thinking that they "can't do."

The major purpose of this activity is to provide students an opportunity to experience success in taking constructive actions to improve the environment for people and wildlife.

NOTE: See "The Monday Group: From Awareness to Action" for descriptions of successful community projects undertaken by older students, but still relevant as examples of what can be done.

Materials

writing materials

Age: Grades 2—9
Subjects: Social Studies, Language Arts, Science
Skills: analysis, application, description, discussion, evaluation, invention, listing, public speaking, problem-solving, small group work, synthesis, writing
Duration: minimum of three 45-minute periods
Group Size: any
Setting: outdoors and indoors
Conceptual Framework Reference: I.D., IV.A., IV.A.1., IV.A.2., IV.A.3., IV.A.4., IV.C., IV.D., IV.D.1., IV.D.2., IV.D.3., IV.D.4., IV.D.5., IV.D.6., IV.E., IV.E.4., IV.E.5., IV.E.9., IV.E.10., IV.F.11., VI.B.7., VII.A., VII.A.2., VII.A.3., VII.B., VII.B.1., VII.B.5., VII.B.6.
Key Vocabulary: problem, authority, compromise, constructive, realistic, effective, alternatives

Procedure

1. Ask the students to think of some ways in which they could improve areas of the school grounds as a home for wildlife. They might generate a list of activities on their school grounds that have a negative impact on wildlife. The list might include litter that poses a hazard for some kinds of wildlife; a muddy area that birds use for water but that has been recommended for blacktopping to minimize dust and mud; a proposed pesticide spraying that will not only kill the "pest" but perhaps affect other plants and animals; removal of a tree that presently helps contribute to cleaning the air, produces oxygen, and serves as a food and shelter source for varying kinds of wildlife, etc.
2. Looking at the list of possible problems and suggestions for ways to improve wildlife habitat at school—ask the students to select one they think they could realistically handle and do something constructive about. If there is difficulty in deciding which one, and reasonable support has been offered for each, the students might vote to decide. Students could also make speeches in support of the project they want to tackle, in hopes of swaying the class vote.
3. Once the project has been selected, ask the students to work alone or in small groups to begin to generate ideas for possible solutions to the problem and ways to implement the project. Each individual or small group could come up with a plan, including a written description and illustrations or sketches of how it will work, and how it can be accomplished.
4. Ask the groups to present their plans to the rest of the students. Students may ask questions for clarification. Once all the plans have been presented, ask the students to select the plan that seems most: a) constructive; b) realistic; c) helpful to wildlife; and d) apt to make a lasting contribution.
5. Also ask the students to select one or more alternative plans, in case their first choice is not acceptable to authorities at the school.
6. Once a plan, with alternatives for "back up," has been selected—ask the students to select a delegation to present their proposal to the school principal or whomever the appropriate authority would be. Remember janitors, groundskeepers, school board, etc.—anyone who would be physically and/or officially involved. A practice session before the students and any interested parents or other groups of students would be helpful. At the practice session, the student delegation would make their presentation as they plan to before the principal, janitor, etc.—responding to any questions from their audience that might be raised.
7. The students should make an appointment to present their proposal, make the presentation, and report back to their classmates. If their plan is accepted, they should make sure they know who to contact next in order to successfully complete their project. Making sure they have all necessary permissions secured, the students should proceed to successfully accomplish their project.
8. Once accomplished, ask the students to analyze their results. Did things work out like they wanted them to? Were there any surprises? Any unforeseen problems? How might they have been any more effective?

Evaluation

A nature trail near you is being vandalized. People are shooting at squirrels, taking bird nests from trees, and using knives to destroy interpretive signs. Name three things you and your class could do to help reduce this problem.

Remember, your task is to plan. Whether or not you attempt to carry out the plan will depend on your values and whether your work in this program has persuaded you that you should be involved. (VII-8)

ISSUE ACTION PLAN

The Issue: _____

_____

Your Recommended Solution: _____

_____

The Action(s) You Intend To Take To Help Bring About This Solution:

_____

_____

Applying the Action Analysis Criteria

1. **To what extent is there sufficient evidence** to warrant action on this issue?
There is sufficient evidence _____; there is not sufficient evidence _____.
Why did you answer as you did? _____

_____

_____

_____

2. Are there other **alternative actions** available for use? Yes _____; No _____. If so, what are they? _____

_____

_____

_____

3. Is this action the **most effective** one available? Yes ___; No ___. Why?

_____

_____

_____

4. What are the **legal consequences** of this action?

5. What are the **social consequences** of this action?

6. What are the **economic consequences** of this action?

7. What are the **ecological consequences** of this action?

8. To what extent do my **personal values** support this decision?

9. What are the **beliefs and values of others** who are involved in this issue?

10. Do I understand the **procedures** necessary to take this action? Yes ___; No ___.
What are they? _____

11. Do I have the **skills** needed to take this action? Yes ___; No ___.
12. Do I have the **courage** to take this action? Yes ___; No ___.
13. Do I have the **time** needed to take this action? Yes ___; No ___.
14. Do I have all of the **other resources** needed to make this action effective?
Yes ___; No ___. What resources are needed? _____

Your Proposed Plan of Attack

Using a form you are comfortable with (or one prescribed by your instructor), describe your strategy for completing your action(s). This could be in the form of a flow chart, an outline, or a step-by-step listing. It should include an anticipated time table of events, people you will need to contact, resources you will need to collect and use, financial expenditures, etc. In describing your strategy, we want you to think through all that is necessary for allowing you to successfully complete your action(s).

Your Decision - The Action Recommendation

Taking into consideration the analyses you have just completed, state your final recommendation(s) for action._____

_____

_____

_____

_____

_____

_____

In Summary

The writers have attempted to introduce you to the knowledge and skills needed to identify, analyze, investigate, and help resolve STS issues. The writers believe that these types of educational experiences are critical for young citizens learning how to live successfully in a scientific and technological society. The rest is up to you!

Resources

Collect and Protect Endangered Species Stamp Kit. United States Postal Service; Washington, D.C.

Earth Works Group. *50 ways you can save the earth.* (1989). Berkley, CA; Earth Works Press.

Endangered Animals Packet (1996). Http://www.bris.uic.edu

Endangered and Threatened Species of Illinois: Status and Distribution. Vol.2 - animals. (1992). Springfield, IL; Illinois Endangered Species Protection Board.

Endangered and Threatened Species of Illinois: Status and Distribution. Vol.3 - Changes. (1994). Springfield, IL; Illinois Endangered Species Protection Board.

Green, Carol. *The old ladies who liked cats.* (1991). New York; Harper Collins.

Harlow, Rosie and Morgan Gareth. *175 Amazing Nature Experiements.* (1991). New York; Random House.

Hagengruber, David and Hungerford, Harold. *Threatened and Endangered Animals.* (1993). Champaign, IL; Stipes Publishing L.L.C.

Hungerford H., Volk T., and Ramsey J. *Investigating and Evaluating STS Issues and Solutions.* (1990). Champaign, IL; Stipes Publishing L.L.C.

Landscaping for Wildlife. Springfield, IL; Illinois Department of Natural Resources.

Playhouse Video. *The Lorax.* (1989). New York; Playhouse Video.

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Wildlife fact file

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