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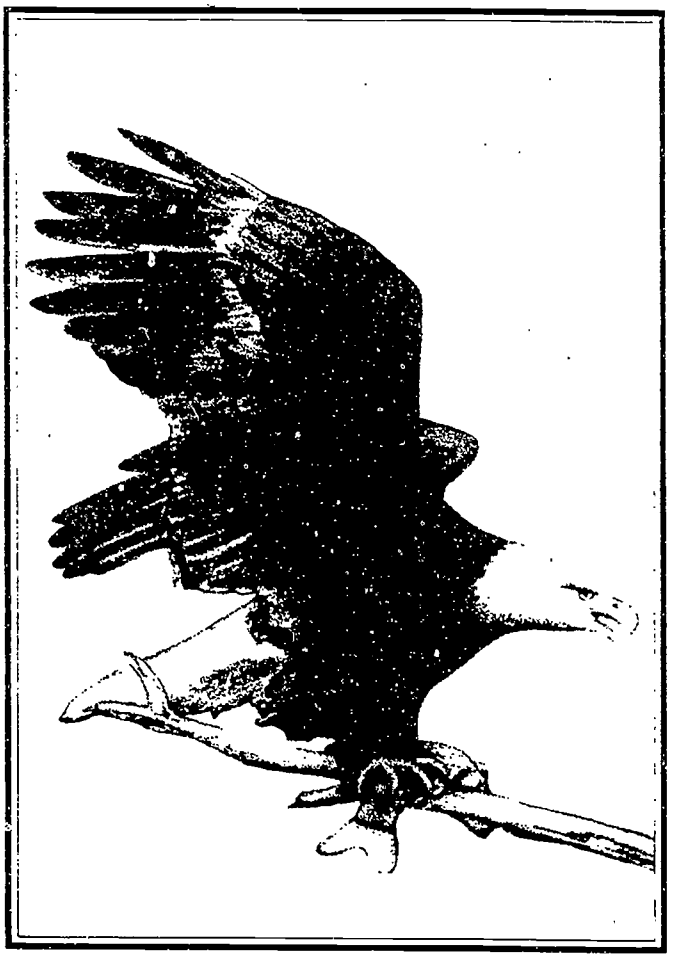
ABSTRACT

This document provides hands-on environmental education activities for the classroom and the outdoor setting of Jordan Lake State Recreation Area. The activity packet, designed for grades K-3, meets curriculum objectives of the standard course of study established by the North Carolina Department of Public Instruction. It includes on-site activities conducted at the park and previsit and postvisit activities designed for the classroom. These activities may be performed independently or in a series to build upon students' newly gained knowledge and experiences. In these activities students go on a "safari," become part of a food chain, and discover the roles of predator and prey at Jordan Lake. The learning experiences expose students to the major concepts of predator, food chain, prey, habitat, adaptation, resource management, and preservation of natural areas. Vocabulary words appear in bold type the first time they are used in each activity. These words and their definitions may be found in the glossary at the back of the activity packet, followed by a list of reference materials. A supplemental educator's guide provides information about the field trip to Jordan Lake. (Contains 16 references.) (KS)

PREDATORS



AND PREY

Jordan Lake State Recreation Area

An Environmental Education Learning Experience

Designed for Grades K-3

In the web of life, all things are connected.
The bobcat and the rabbit are but
opposite ends of the same strand.

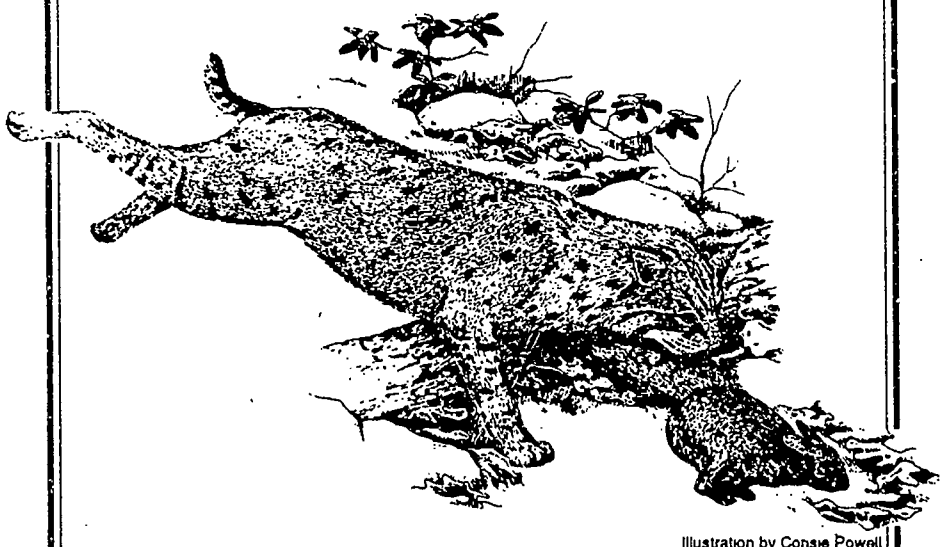


Illustration by Consie Powell

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was developed by

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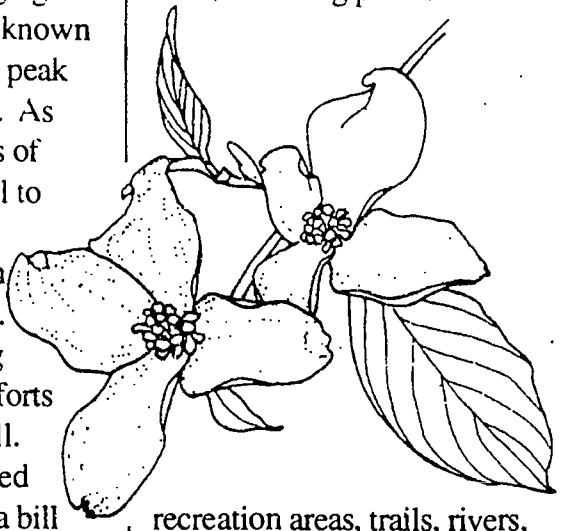
Table of Contents

Introduction to the North Carolina State Parks System

Preserving and protecting North Carolina's natural resources is actually a relatively new idea. The seeds of the conservation movement were planted early in the 20th century when citizens were alerted to the devastation of Mount Mitchell. Logging was destroying a well-known landmark - the highest peak east of the Mississippi. As the magnificent forests of this mile-high peak fell to the lumbermen's axe, alarmed citizens began to voice their opinions. Governor Locke Craig joined them in their efforts to save Mount Mitchell. Together they convinced the legislature to pass a bill establishing Mount Mitchell as the first state park.

That was in 1915. The North Carolina State Parks System has now been established for more than three-quarters of a century. What started out as one small plot of public land has grown into 59 properties across the state, including parks,



recreation areas, trails, rivers, lakes and natural areas. This vast network of land boasts some of the most beautiful scenery in the world and offers endless recreation opportunities. But our state parks system offers much more than scenery and recreation. Our lands and waters contain unique and valuable archaeological, geological and biological resources that are important parts of our natural heritage.

As one of North Carolina's principal conservation agencies, the Division of Parks and Recreation is responsible for the more than 125,000 acres that make up our state parks system. The Division manages these resources for the safe enjoyment of the public, and protects and preserves them as a part of the heritage we will pass on to generations to come.

An important component of our stewardship of these lands is education. Through our interpretation and environmental education services, the Division of Parks and Recreation strives to offer enlightening pro ams which lead to an understanding and appreciation of our natural resources. The goal of our environmental education program is to generate an awareness in all individuals which cultivates responsible stewardship of the earth.

For more information contact:

N.C. Division of Parks and Recreation
P.O. Box 27687
Raleigh, N.C. 27611-7687
919/ 733-PARK

Introduction to Jordan Lake State Recreation Area

Following a disastrous hurricane that struck the Cape Fear River basin in 1945, the United States Congress directed a study of water resources in the area. Subsequently, it authorized the U.S. Army Corps of Engineers to build the New Hope Lake project to control flooding on the lower Cape Fear. Construction of the reservoir began in 1967. In 1973, the name of the project was changed to B. Everett Jordan Dam and Lake in honor of the former U.S. Senator from North Carolina. The lake was flooded in 1981, and the Corps of Engineers constructed a variety of park facilities. These facilities and the land around Jordan Lake are leased and operated by the North Carolina Division of Parks and Recreation.

At normal water level, Jordan Lake covers 13,500 acres. It is 17 miles long with 150 miles of shoreline. In addition to flood control, the lake provides water supply, water quality control, and fish and wildlife conservation. Its wide range of recreation opportunities includes fishing, boating, water skiing and camping.

Jordan Lake supports the largest summering population of the bald eagle in the eastern United States. The eagle, our national symbol for more than 200 years, used to soar over the nation by the tens of thousands. Now fewer than 5,000 survive, and this magnificent bird of prey is in danger of extinction.

The number of eagles in the area has increased dramatically since the flooding of the reservoir. Vast undisturbed areas provide many of the migrating eagle's basic living requirements, including an abundant supply of fish and a mature forest for roosting. To view this fascinating bird, join one of the park's interpretive programs or bird watch on your own. The eagles congregate at the north end of the lake and can be best seen from the NC 751 bridge or the Wildlife Resources Commission observation deck.

For more information contact:

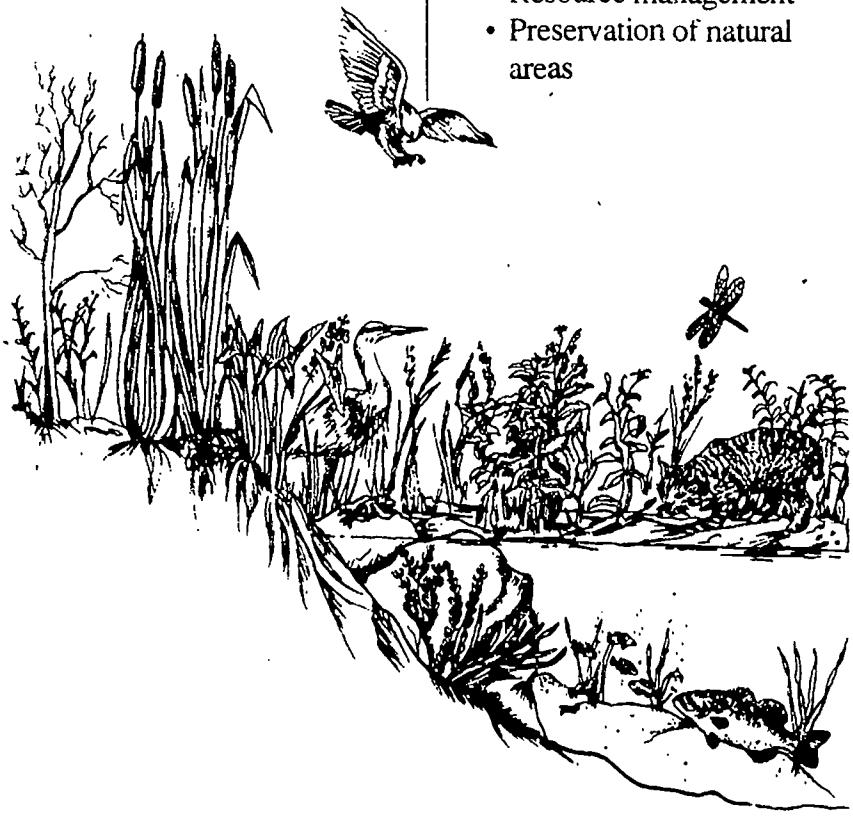
Jordan Lake State Recreation Area
Route 2 Box 159
Apex, NC 27502
(919) 362-0586

Introduction to the Activity Packet for Jordan Lake State Recreation Area

The environmental education learning experience, Predator and Prey, was developed to provide hands-on environmental education activities for the classroom and the outdoor setting of Jordan Lake State Recreation Area. This activity packet, designed to be implemented in grades K - 3, meets curriculum objectives of the standard course of study established by the North Carolina Department of Public Instruction. It includes three types of activities - 1) pre-visit activities, 2) on-site activities, and 3) post-visit activities. On-site activities will be conducted at the park, while pre-visit and post-visit activities are designed for the classroom environment. These activities may be performed independently or in a series to build upon students' newly gained knowledge and experiences. In these activities, students will have the opportunity to go on a safari, to be part of a food chain and to discover the roles of predator and prey at Jordan Lake.

The environmental education learning experience, Predators and Prey, will expose students to the following major concepts:

- Predator
- Food chain
- Prey
- Habitat
- Adaptation
- Resource management
- Preservation of natural areas



The North Carolina Department of Public Instruction is in the process of revising the curriculum for all subject areas, therefore specific curriculum objectives are not listed. Each activity does include, however, a list of the curriculum study areas used in that activity.

Vocabulary words used throughout this environmental education learning experience appear in bold type the first time they are used in each activity. These words and their definitions may be found in the vocabulary at the back of the activity packet. A list of the reference materials used in developing the a tivities follows the vocabulary.

Note: On-site activities may require hiking which could expose the students to hot, humid conditions and ticks. Accessibility to some of these areas may be difficult for persons with special needs.

Predator & Prey: The Hunter & The Hunted

Every animal on earth shares a common problem. It must get enough to eat or it will die. Some animals get enough to eat by feeding on plants, while some feed on other animals. Herbivores are animals that eat plants for food. Carnivores are animals that eat other animals for food. Some animals eat both plants and animals; they are called omnivores.

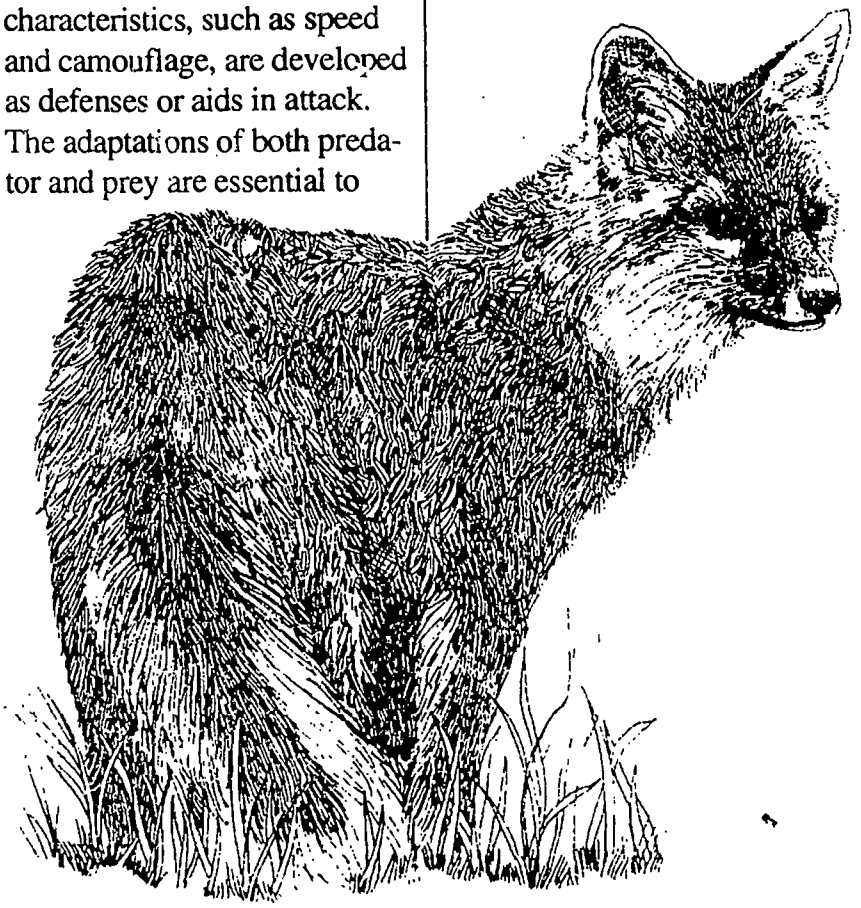
Herbivores, or the hunted, are called prey, while carnivores, or hunters, are called predators. An omnivore can be a prey or a predator, depending on whether it is eating a plant or another animal.

Predators and prey face different problems getting enough to eat. Herbivores, or prey, generally have no problem finding food if the area they live in is undisturbed by human activities. The plants that they eat do not move from place to place and, usually, there are plenty of them. The challenge for the prey is how to get enough to eat without being attacked by a predator.

Carnivores, or predators, do not have to eat as often because the animals they eat are a more concentrated source of energy, but predators must work harder to find and catch their food.

Both predators and prey have special characteristics that help them to meet the challenges of getting enough to eat. These special characteristics are called adaptations. The senses – hearing, sight and smell– of both predators and prey, are adapted in special ways to help them meet their particular challenges. Other characteristics, such as speed and camouflage, are developed as defenses or aids in attack. The adaptations of both predator and prey are essential to their survival.

Every animal, whether predator or prey, occupies a special niche in nature. Each plays a vital role in the checks and balances of the natural world. If there were no prey, the predators would starve to death. If there were no predators, the prey would die of overpopulation and disease. Knowledge and awareness of the adaptations of the hunter and the hunted, and of the important relationship between predator and prey, is central to understanding the natural world.



Activity Summary

The following outline provides a brief summary of each activity, the major concepts introduced, and the objectives met by the completion of the activity.

I. Pre-Visit Activities

Pre-visit activities prepare the student for the on-site activities by providing a fundamental basis for the understanding of predators, prey, habitat, adaptations and the food chain.

#1 The ABC's of Predator and Prey (page 3.1)

Students will determine whether an animal is a predator or prey based upon what it eats.

Major Concepts:

- Predator
- Prey
- Alphabet

Objective:

- Determine whether an animal is a predator or prey based upon what the animal eats.

#2 What's a Predator? (page 3.2)

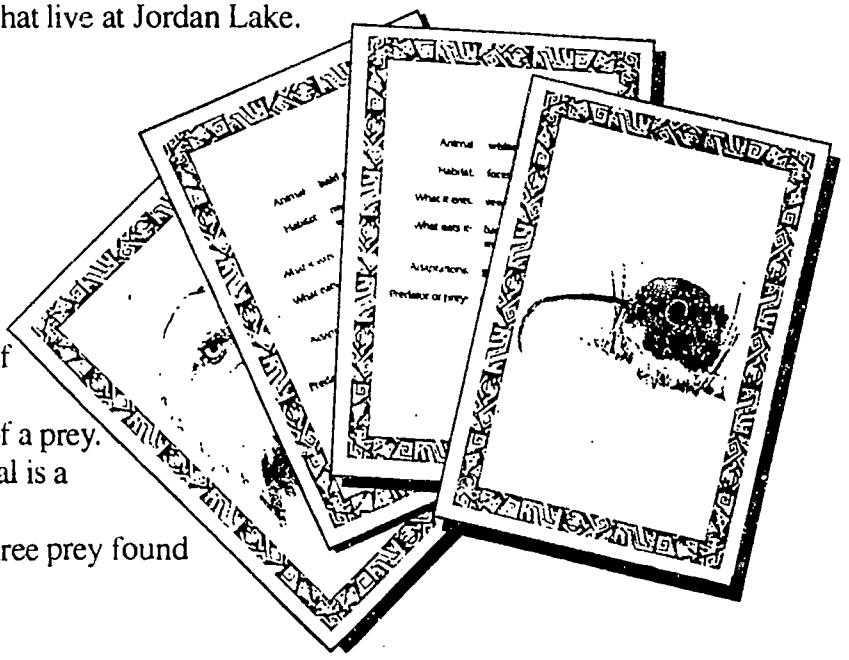
Using flash cards and a coloring sheet, students will learn to distinguish between predator and prey, and meet a few of the animals that live at Jordan Lake.

Major Concepts:

- Predator
- Prey
- Adaptation
- Habitat

Objectives:

- Name three characteristics of a predator.
- Name three characteristics of a prey.
- Determine whether an animal is a predator or prey.
- Name three predators and three prey found in this area.



#3 No Free Lunch (page 3.3)

Using a worksheet, students will complete a food chain by drawing examples in each link of the chain.

Major Concepts:

- Food chain
- Animal interactions
- Predator
- Prey

Objectives:

- Define the source of energy in a food chain.
- Describe two food chains.

II. On-Site Activities

On-site activities provide the student with direct information and experiences relating to the predator-prey relationship, the bald eagle, predator habitats and the food chain. Several other related concepts are discussed such as carrying capacity and adaptations.

#1 Predator Safari (page 4.1)

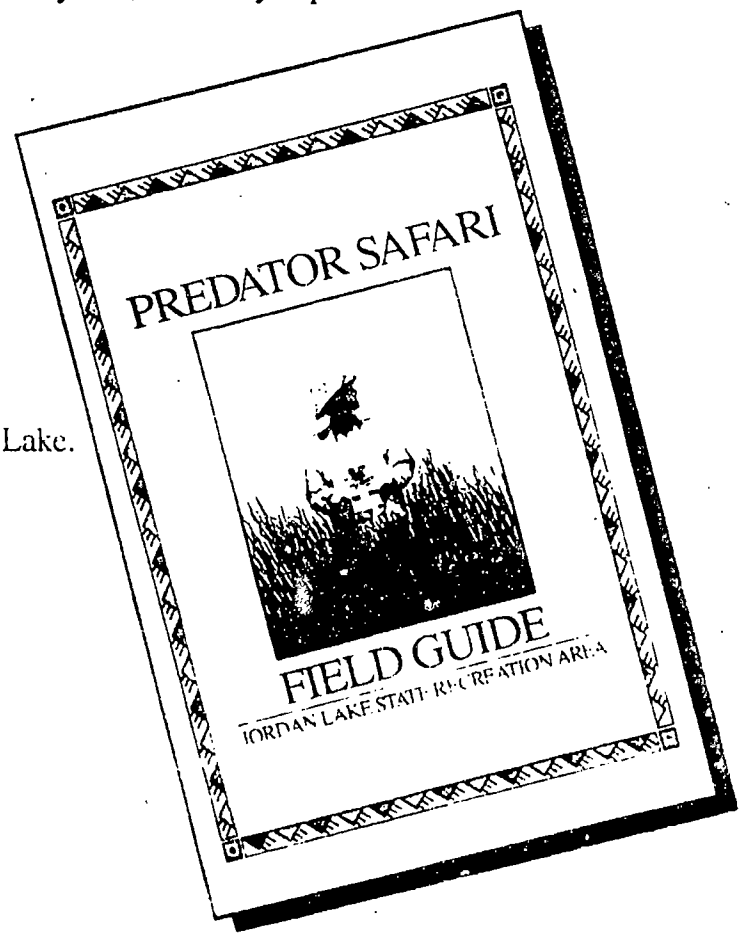
Using a field guide, students will hunt for animals, animal signs and animal habitats on this hike at Jordan Lake. Following the hike, rangers will use pictures and actual examples to discuss with the students what kinds of animal signs they saw, what they expected to see and didn't, and why they didn't.

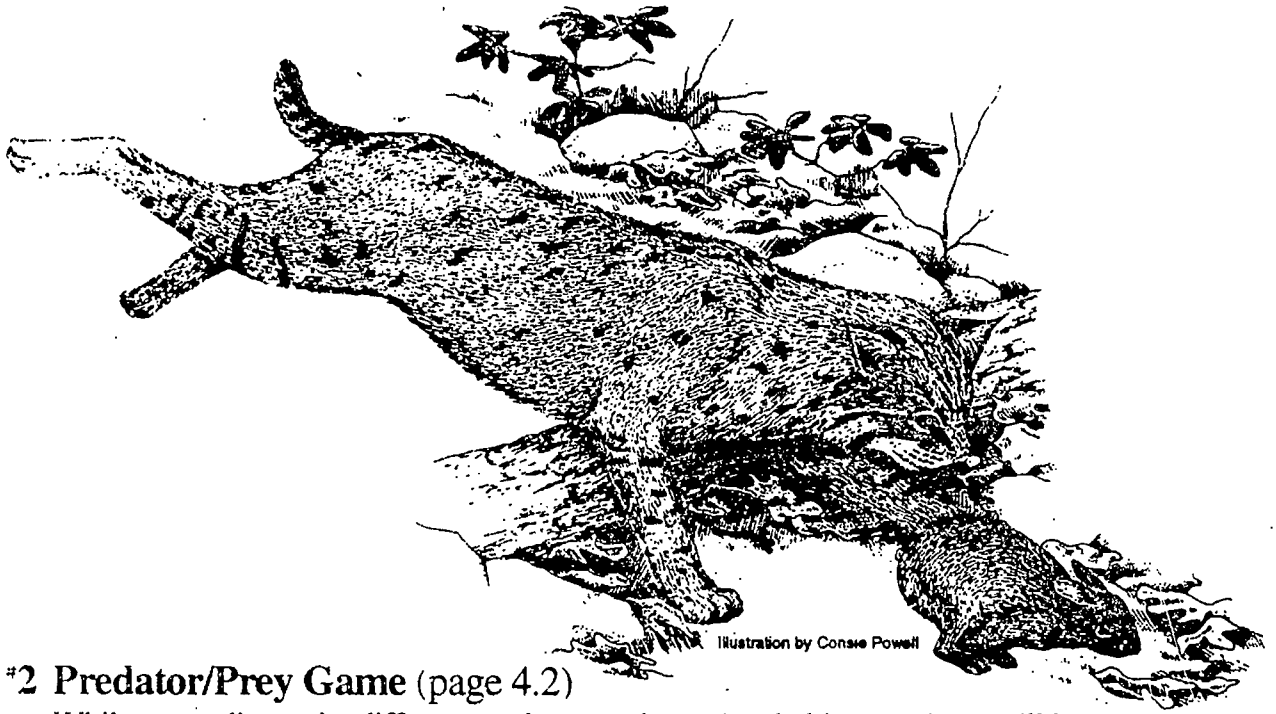
Major Concepts:

- Predator
- Prey
- Adaptation
- Habitat

Objectives:

- Identify two signs of prey.
- Identify two signs of predators.
- List four predators found at Jordan Lake.





#2 Predator/Prey Game (page 4.2)

While pretending to be different predators and prey in a habitat, students will learn about the food chain and natural carrying capacities.

Major Concepts:

- Predator/prey interactions
- Habitat
- Carrying capacity

Objectives:

- List four components of a habitat.
- Explain one benefit of predators.
- Explain two ways humans can affect wild animal populations.

#3 The Food Web Game (page 4.3)

Students will act out a food chain and expand it to become a food web.

Major Concepts:

- Food chain
- Food web
- Interdependence
- Producer (plant)
- Herbivore (prey)
- Primary carnivore (prey or predator)
- Secondary carnivore (predator)

Objectives:

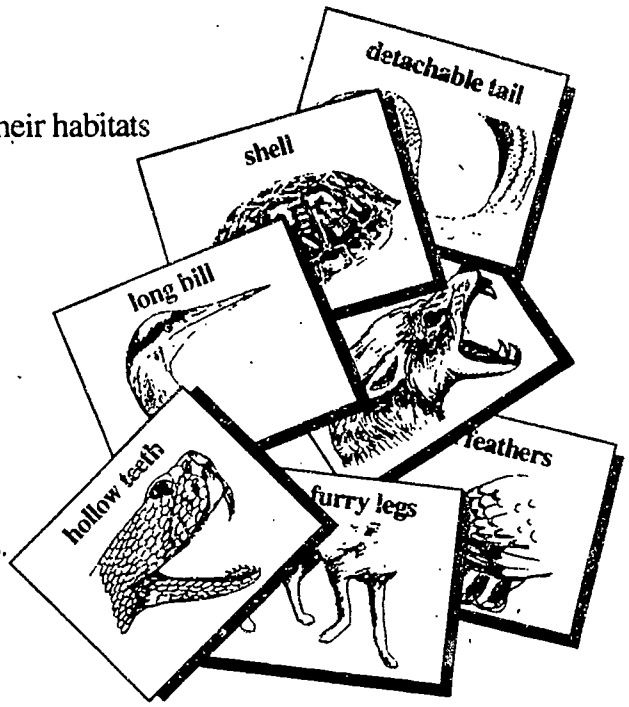
- Create a simple food chain.
- Connect several food chains to form a food web.
- Explain what happens when a food web is disrupted.
- List three ways we can help to preserve and protect natural food webs.

III. Post-Visit Activities

Post-Visit activities reinforce and expand upon the earlier lessons to create a more in-depth understanding of the concepts presented.

#1 Produce a Predator (page 5.1)

Students will learn how animals are adapted to their habitats by creating an imaginary predator.



Major Concepts:

- Adaptation
- Predator
- Prey
- Habitat

Objectives:

- List two adaptations of a predator.
- Create a predator from possible adaptations.
- List two things that affect the survival of predators.
- List two things humans can do to help predators survive.

#2 Food Chain Rummy (page 5.2)

Nearly all living plants or animals get their energy from the sun. In order to help students follow this flow of energy, they will play a card game called Food Chain Rummy. Different land and water-based food chain sets need to be collected for the students to get points.

Major Concepts:

- Food chain
- Predator
- Prey

Objective:

- Trace the energy flow through two separate food chains.

#3 Predator Maze (page 5.3)

Students will help a predator find its way through a maze to capture its prey.

Major Concepts:

- Predator
- Prey
- Food chain
- Habitat

Objective:

- List three different predators and their prey.

Pre-Visit Activity #1 The ABC's of Predators and Prey

Curriculum Objectives:

Kindergarten
- General Music: understand the importance of personal contributions, problem solving, awareness of singing versus speaking voice
- Visual Arts: art appreciation
- Communication Skills: effective speech, the role of reading, listening and visual comprehension
- Guidance: group participation and interaction, effective listening skills
- Science: plants and animals
- Social Studies: cooperation, problem solving

Grade 1
- General Music: participate freely, share knowledge and skills
- Visual Arts: art appreciation
- Communication Skills: effective speech, the role of reading, listening and visual comprehension
- Guidance: group participation and interaction, effective listening skills
- Science: animal differences and similarities, needs of animals
- Social Studies: cooperation, problem solving, importance of the environment

Grade 2
- General Music: composition structure, word pronunciation
- Visual Arts: art appreciation
- Communication Skills: effective speech, listening and visual comprehension
- Guidance: group interaction
- Science: animals around us, animal environments
- Social Studies: cooperation, problem solving, importance of the environment

Grade 3
- General Music: understand the importance of personal contributions, share knowledge and skills
- Visual Arts: art appreciation
- Communication Skills: effective speech, listening and visual comprehension
- Guidance: group interaction
- Science: defense mechanisms, interdependence of animals and plants, conservation, human impacts
- Social Studies: cooperation, problem solving

Location: Classroom

Group Size: Any

Estimated Time: 45 minutes

Materials:
Provided by the Educator:
Copy of alphabet script, cassette tape player, cassette tape with alphabet song (borrowed from the park)

Major Concepts:
- Predator
- Prey
- Alphabet

Objective:
- Determine whether an animal is predator or prey based upon what the animal eats.

Educator's Information:

The audio cassette tape is a song that tells the students the name of an **animal** that lives at Jordan Lake for each letter of the alphabet. It tells where the animal lives at the lake and what the animal eats. Students will be asked whether the animal is a **predator** or **prey** (some may be both), based on what the animal eats.

Instructions:

Before playing the tape, explain the following to your students in your own words (or in these):

"All animals have to eat! Some animals only eat **plants**. They are called herbivores. Some animals eat other animals. They are called predators. An animal eaten by another animal is called prey. For example, if an eagle catches a fish, the eagle is the predator and the fish is the prey."

Now play the tape. As students listen to the tape, hold up the appropriate picture for each letter. Stop the tape after the question "Do you think the animal is a predator or prey?" to allow the students time to answer. Lengthy discussion of each animal is not necessary or desired. The focus should be on what the animal eats in order to determine whether it is predator or prey. The educator may wish to spend more time on the eagle and the largemouth bass as they will be used throughout the activity packet.

ABC Song

A is for **aphid**.
The aphid lives on plants at Jordan Lake. The aphid eats plant sap. Is the aphid a predator or a prey?

B is for **beaver**.
The beaver lives at the water's edge at Jordan Lake. The beaver eats plants. Is the beaver a predator or a prey?

C is for **copperhead**.
The copperhead lives in the woods at Jordan Lake. The copperhead eats animals like mice. Is the copperhead a predator or a prey?

D is for **deer**.
The deer lives in the woods and the fields at Jordan Lake. The deer eats grass and leaves. Is the deer a predator or a prey?

E is for **eagle**.
The eagle lives in trees around Jordan Lake. The eagle eats fish and animals. Is the eagle a predator or a prey?

F is for **fox**.
The fox lives in the woods at Jordan Lake. The fox eats small animals. Is the fox a predator or a prey?

G is for **goose**.
The goose lives in the water at Jordan Lake. The goose eats water plants. Is the goose a predator or a prey?

H is for **heron**.
The heron lives at the water's edge at Jordan Lake. The heron eats fish. Is the heron a predator or a prey?

I is for **inch worm**.
The inch worm lives in trees at Jordan Lake. The inch worm eats leaves. Is the inch worm a predator or a prey?

J is for **jumping spider**.
The jumping spider lives in the woods at Jordan Lake. The jumping spider eats insects. Is the jumping spider a predator or a prey?

K is for **kingsnake**.
The kingsnake lives in the woods at Jordan Lake. The kingsnake eats small mammals and other snakes. Is the kingsnake a predator or a prey?

L is for **lizard**.
The lizard lives in the woods at Jordan Lake. The lizard eats insects. Is the lizard a predator or a prey?

M is for **mouse**.
The mouse lives in the woods and fields at Jordan Lake. The mouse eats plants and seeds. Is the mouse a predator or a prey?

N is for **newt**.
The newt lives in the water at Jordan Lake. The newt eats insects. Is the newt a predator or a prey?

O is for **owl**.
The owl lives in the trees at Jordan Lake. The owl eats mice and other small animals. Is the owl a predator or a prey?

P is for **painted turtle**.
The painted turtle lives in the water at Jordan Lake. The painted turtle eats plants. Is the painted turtle a predator or a prey?

Q is for **questionmark butterfly.**
The questionmark butterfly lives in the fields at Jordan Lake. The questionmark butterfly eats nectar and sap from plants. Is the questionmark butterfly a predator or a prey?

R is for **raccoon**.
The raccoon lives at the water's edge and in the woods at Jordan Lake. The raccoon eats clams and almost everything else. Is the raccoon a predator or a prey?

S is for **squirrel**.
The squirrel lives in the trees at Jordan Lake. The squirrel eats nuts. Is the squirrel a predator or a prey?

T is for **toad**.
The toad lives on the ground at Jordan Lake. The toad eats insects. Is the toad a predator or a prey?

U is for **upland chorus frog.**
The upland chorus frog lives in the woods at Jordan Lake. The upland chorus frog eats insects. Is the upland chorus frog a predator or a prey?

V is for **vulture.**
The vulture lives in the trees and sky at Jordan Lake. The vulture eats dead and injured animals. Is the vulture a predator or a prey?

W is for **woodpecker.**
The woodpecker lives in the trees at Jordan Lake. The woodpecker eats insects. Is the woodpecker a predator or a prey?

Y is for **yellow jacket.**
The yellow jacket lives in a hole in the ground at Jordan Lake. The yellow jacket eats nectar and sap. Is the yellow jacket a predator or a prey?

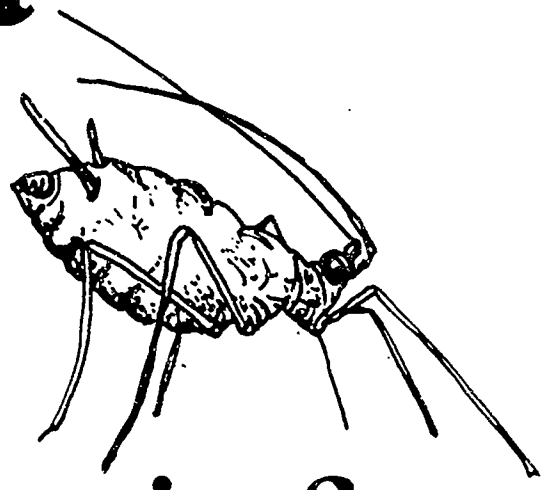
Z is for **zebra swallowtail (butterfly).**
The zebra swallowtail lives in the fields at Jordan Lake. The zebra swallowtail eats nectar. Is the zebra swallowtail a predator or a prey?

What letter did we miss?

Can you think of any animal's names which begin with that letter?

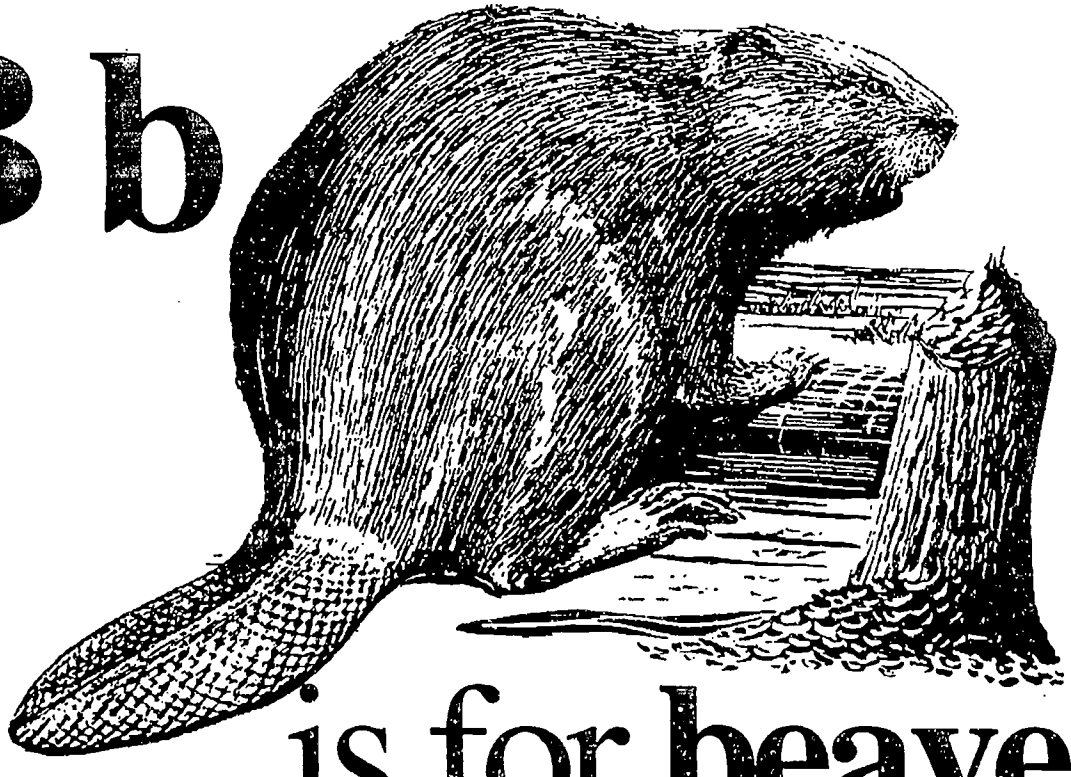
X is for **extinct!**

A a



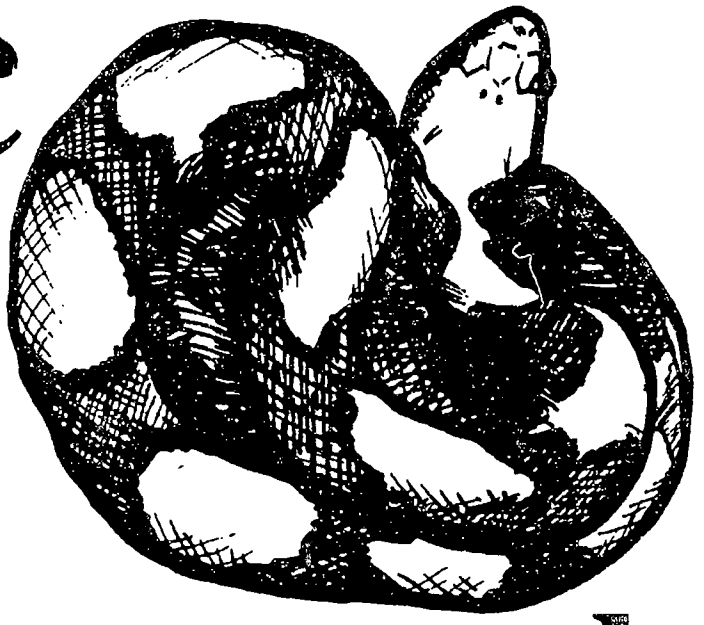
is for aphid.

B b



is for beaver.

C c

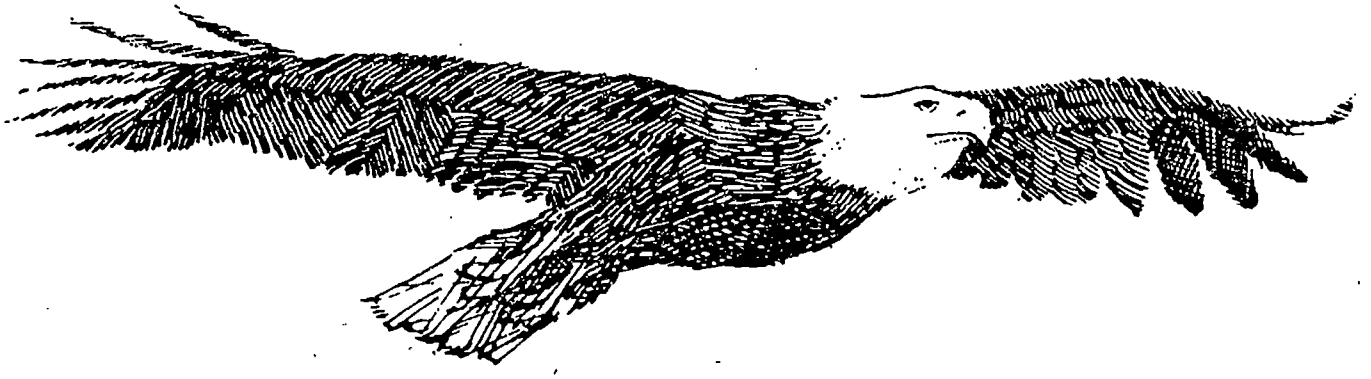


is for copperhead.

D d

is for deer.

E e

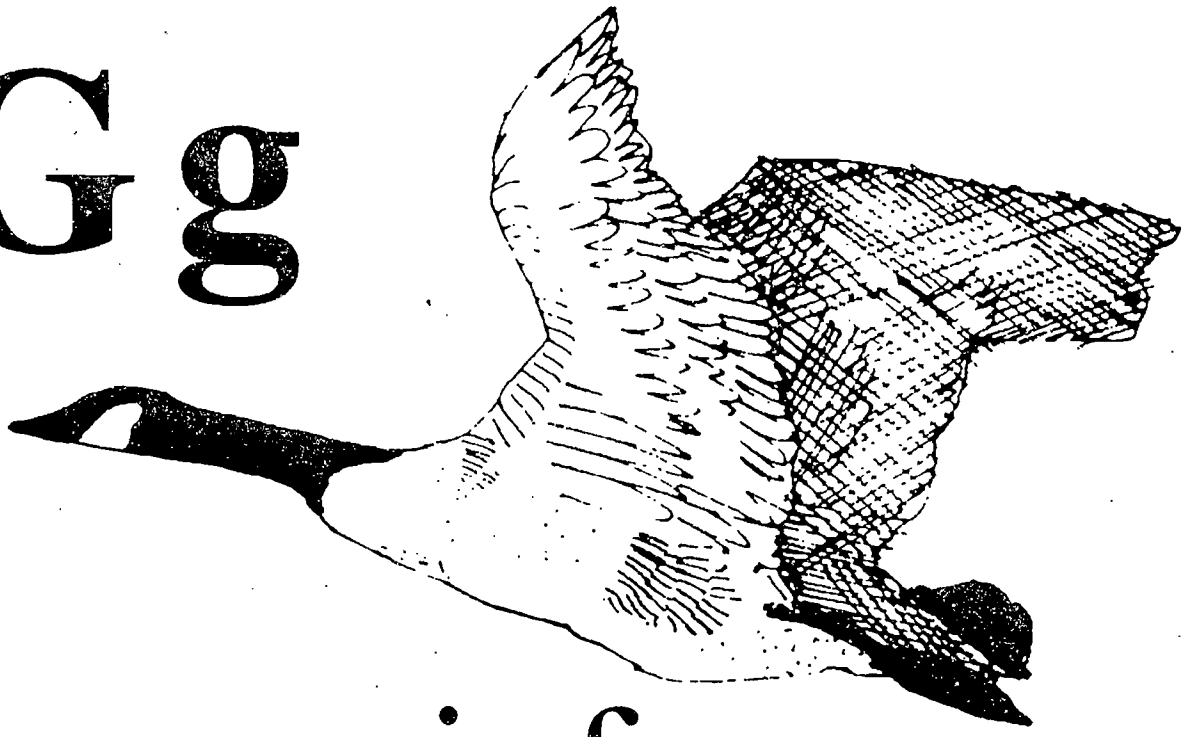


is for **eagle.**

F f

is for **fox.**

G g



is for goose.

H h

is for heron.

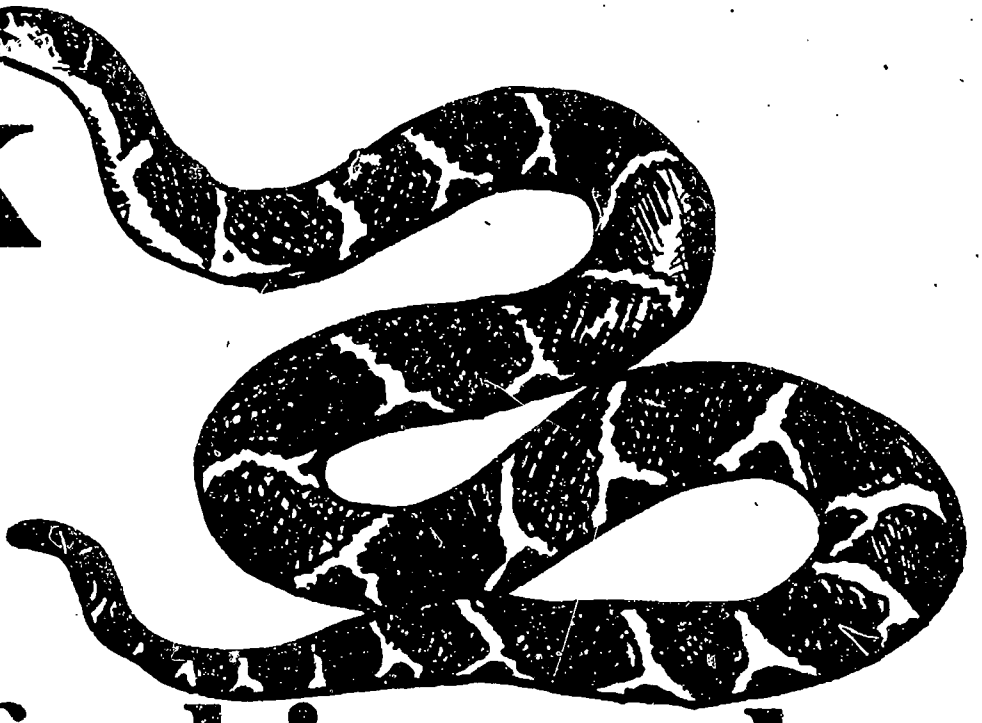
I i

is for **inch worm.**

J j

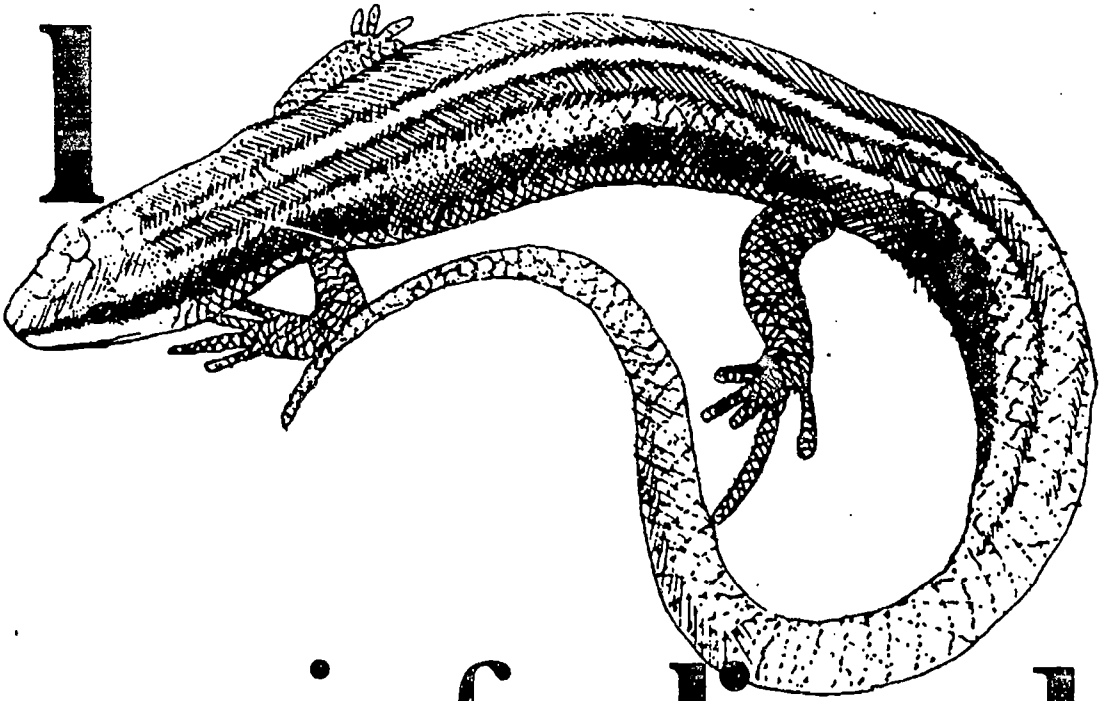
is for **jumping spider.**

Kk



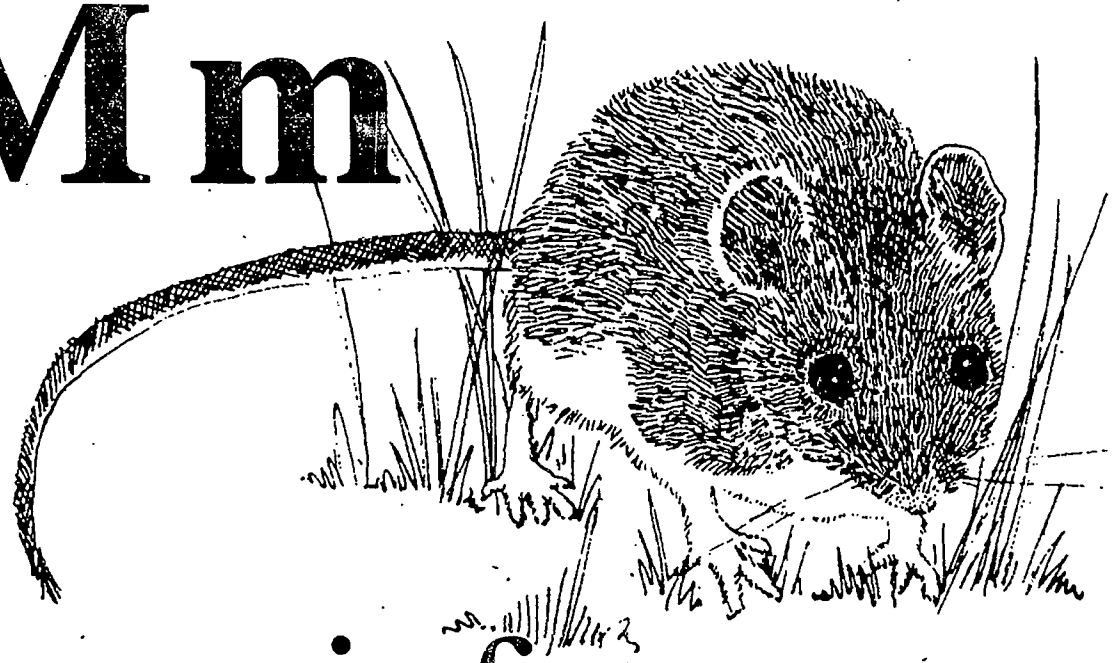
is for **kingsnake.**

Ll



is for **lizard.**

Mm

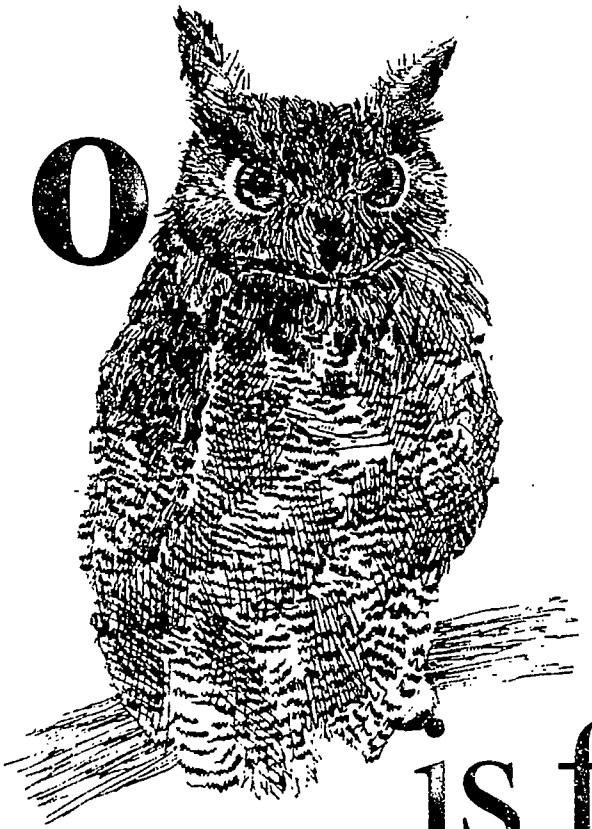


is for mouse.

Nn

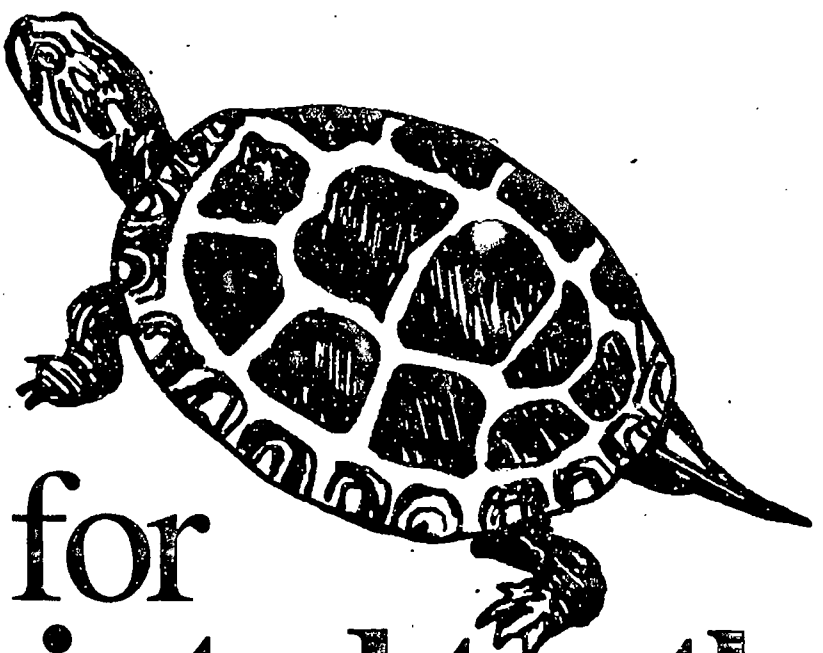
is for newt.

Oo



is for owl.

Pp



is for painted turtle.

Q q

is for questionmark butterfly.

R r

is for raccoon.

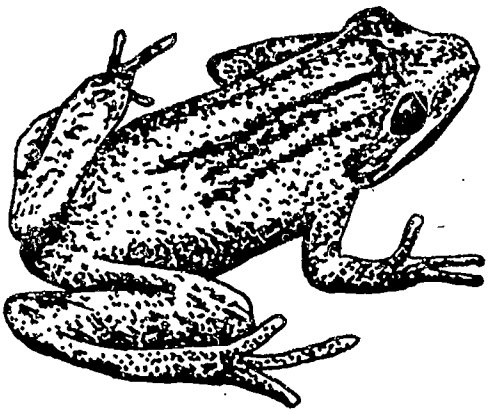
Ss

is for **squirrel.**

Tt

is for **toad.**

U u



is for **upland chorus frog.**

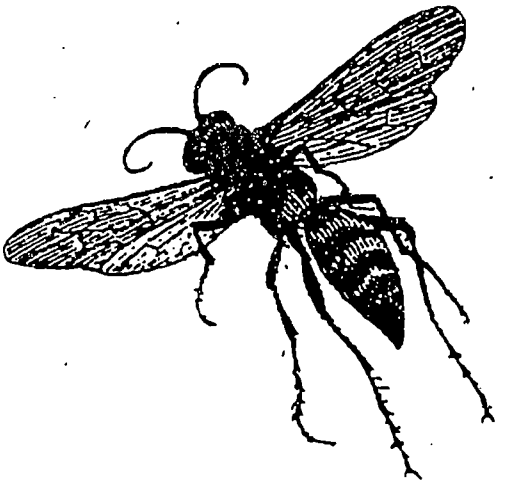
V v

is for **vulture.**

W w

is for woodpecker.

Y y



is for yellow jacket.

Z z

is for zebra swallowtail.

X x

is for EXTINCT.

Pre-Visit Activity #2 — What's a Predator?

Curriculum Objectives:

Kindergarten
- Visual Arts: art appreciation, art basics, personal perception and observation
- Communication Skills: listening and visual comprehension, effective speech, the role of reading
- Guidance: work and share cooperatively
- Science: plants and animals, water
- Social Studies: cooperation, problem solving

Grade 1
- Visual Arts: art appreciation, art basics, personal perception and observation
- Communication Skills: listening and visual comprehension, effective speech, the role of reading
- Guidance: work and share cooperatively
- Science: differences and similarities in animals, needs of animals
- Social Studies: cooperation, problem solving, importance of the environment

Grade 2
- Visual Arts: art appreciation, art basics, personal perception and observation
- Communication Skills: listening and visual comprehension, effective speech
- Guidance: work and share cooperatively
- Science: animals around us, animal, environments, water
- Social Studies: cooperation, problem solving, importance of the environment

Grade 3
- Visual Arts: art appreciation, art basics, personal perception and observation
- Communication Skills: listening and visual comprehension, effective speech
- Guidance: work and share cooperatively
- Science: defense mechanisms, interdependence
- Social Studies: cooperation, problem solving

Location: Classroom

Group Size: Any

Estimated Time:
30 minutes

Materials:
Provided by the Educator:
Animal flash cards, "Who's For Dinner?" worksheet (one copy per student), red, green and yellow colored markers or crayons

Major Concepts:
- Predator
- Prey
- Adaptation
- Habitat

Objectives:
- Name three characteristics of a predator.
- Name three characteristics of a prey.
- Determine whether an animal is a predator or a prey.
- Name three predators and three prey found in this area.

Educator's Information:

We recommend that the pre-visit activity "The ABC's of Predators and Prey" be done prior to this activity.

This activity is divided into two parts. The first section is a flash card game using common **animal** pictures. Students are asked to identify the animal, describe the animal's **habitat**, what it eats, who eats it, what **adaptations** it might have and if it is a **predator** or a **prey**.

The second section is a hidden animal game page where the students search for the animals and identify the predators and prey.

Student's Information:

Animals that hunt, catch, and eat other animals are called predators or **carnivores**. The animals that predators eat are called prey. All predators have special **characteristics** or features that help them live where they do, and to catch the food that they eat. These special characteristics are called **adaptations**. Prey animals also have special adaptations that help them to escape the predators. Some animals may be both a predator and a prey depending on whether they are eating or being eaten. In this activity, you will learn about some of the animals that live around Jordan Lake and try to determine if they are predators or prey.

Humans are like other animals. We all need food, water, **shelter**, and **space**. Animals, like us, live in many different kinds of homes. A bear may live in a cave. Many birds live in nests. Many of us live in houses or apartments. If we get hungry, we go to the kitchen or the cafeteria to get something to eat. When wild animals get hungry, they have to find their food. Some of the animals may eat berries or plants. Some of the animals eat other animals. It's important to be able to find the food that you need, without becoming food for someone else.

Instructions for Part 1:

What's A Predator? Flash Cards

1. Create the flash cards by photocopying and cutting as noted.

2. Explain that you will be talking about different kinds of animals.

3. Read the Student's Information to the students and compare animal needs to human needs.

4. Explain the following terms:

Predator - An animal that hunts, catches, and eats other animals for food, a carnivore. Local examples are the bald eagle, large-mouth bass, wolf spider, and gray fox.

Prey - An animal that is captured and eaten by a predator. Most prey animals are plant eaters, **herbivores**. Local examples are the white-tailed deer, gray squirrel, and white-footed mouse.

Adaptation - The special characteristics of an animal that allow it to survive and reproduce in the place where it lives. Some animals have good eyesight in order to find food. Some animals are camouflaged so that they can hide to avoid being captured. Others are camouflaged to sneak up on their prey.

5. Show examples of some of the animals from the Jordan Lake area using the flash cards. Discuss: where the animal may live; what the animal may eat; what may eat the animal; any special adaptations the animal may have; and whether the animal is a predator or a prey.

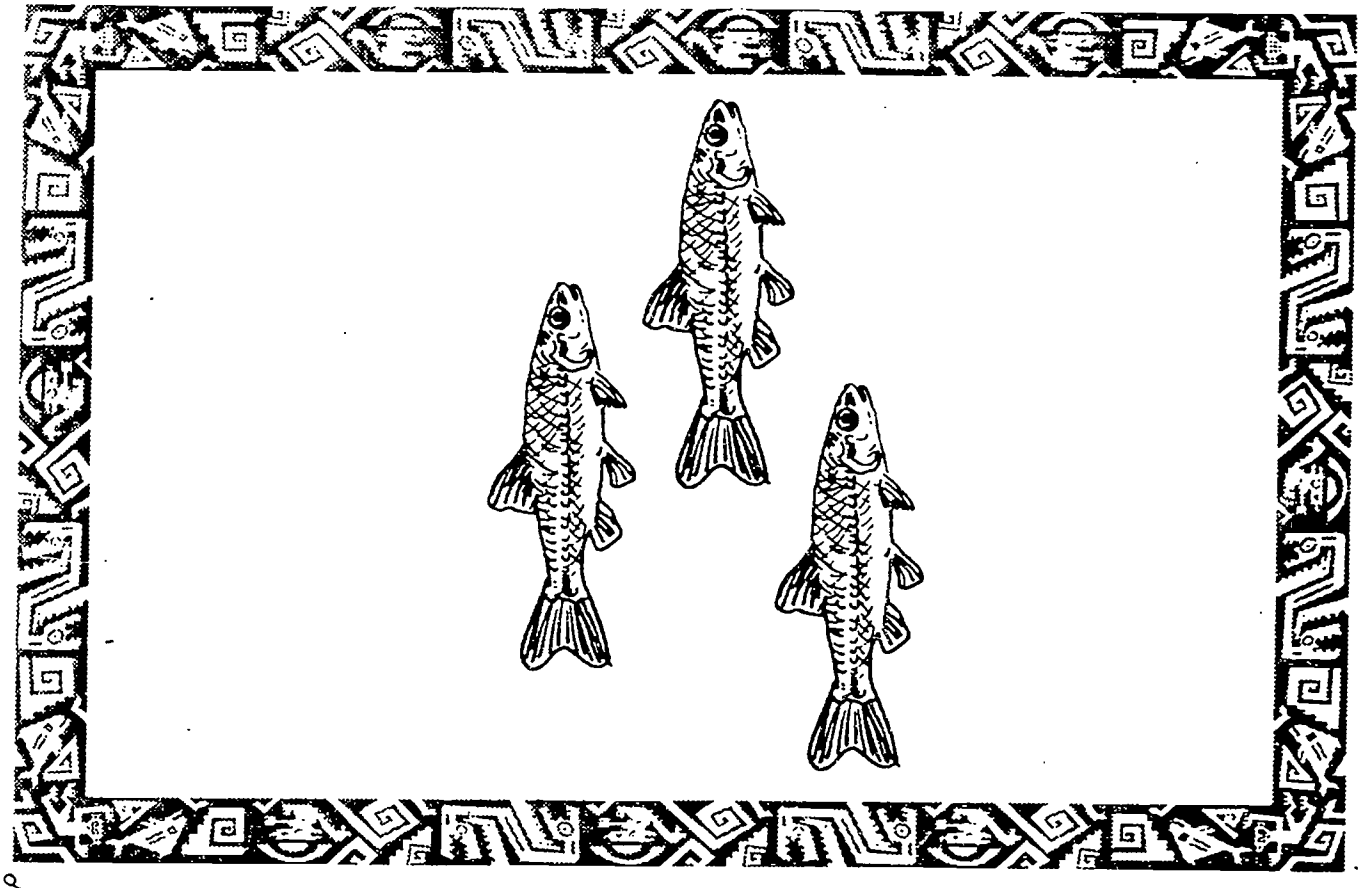
Instructions for Part 2:

Who's For Dinner?

1. Make copies of the "Who's For Dinner?" worksheet.

2. Explain that one adaptation for many predators and prey is the ability to hide. Just because an animal, such as a bass, is looking for a small fish to eat, doesn't mean that nothing is looking for a tasty bass for dinner.

3. Pass out copies of the "Who's For Dinner?" worksheet and allow the students to find as many animals as possible. After the students have found all the animals, have them color the predators red, and the prey green. If an animal is both a predator and prey, have them color it yellow.



Animal: **minnows**

Habitat: **lakes, ponds, rivers**

What it eats: **algae, duckweed, small invertebrates**

What eats it: **larger fish, turtles, birds**

Adaptations: **gills, scales**

Predator or prey: **prey mostly**

35

Animal: **bald eagle**

Habitat: **near large bodies of water**

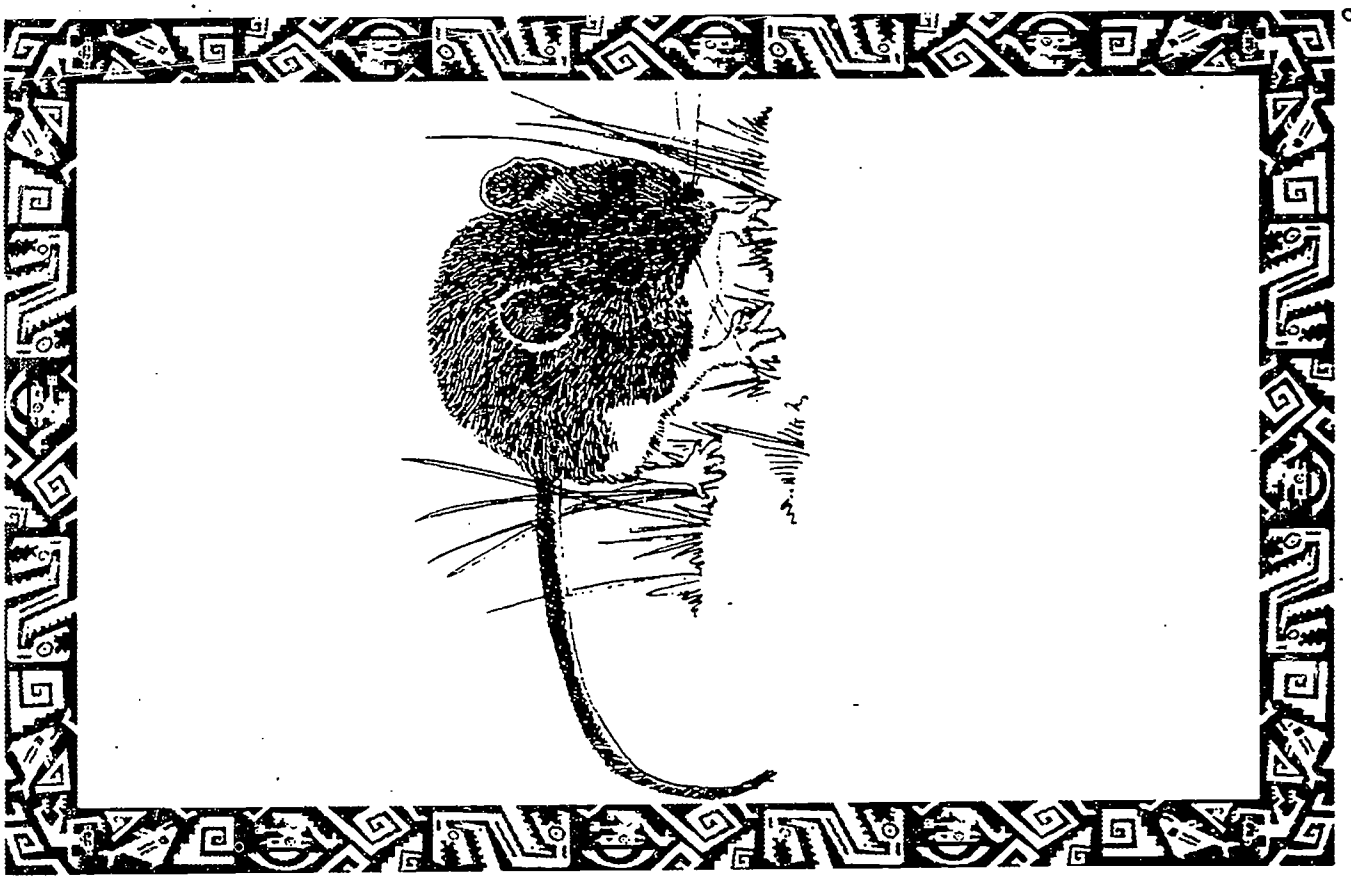
What it eats: **fish, waterfowl, carrion**

What eats it: **adults - nothing**
eggs - raccoons

Adaptations: **hooked beak, talons, sharp eyes, wings**

Predator or prey: **predator**

36



Animal: **white-footed mouse**

Habitat: **forests and field edges**

What it eats: **seeds, nuts, plants**

What eats it: **hawks, owls, foxes, snakes, bobcats**

Adaptations: **gnawing teeth**

Predator or prey: **prey**

Animal: **gray fox**

Habitat: **forests**

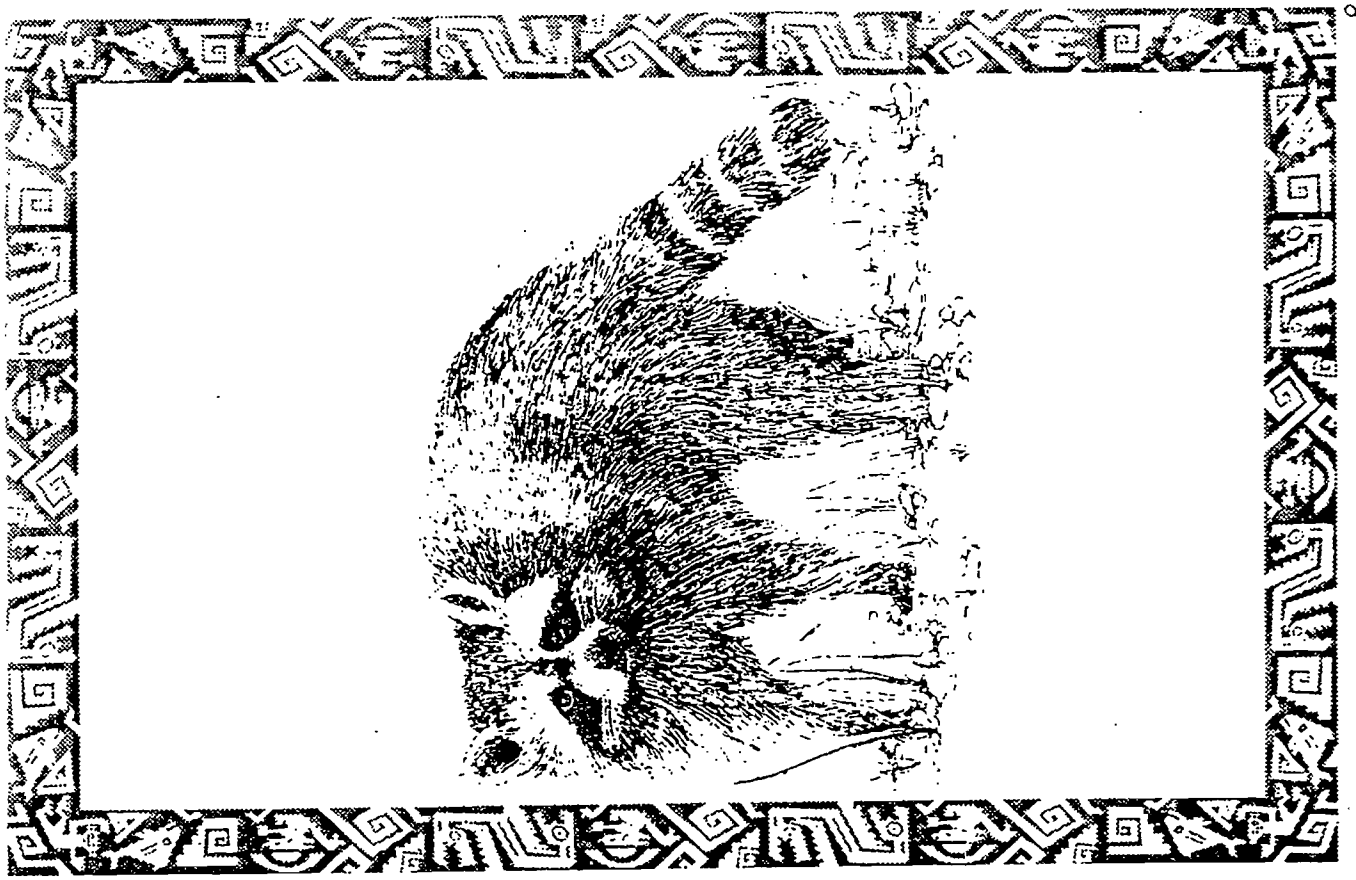
What it eats: **mice, rabbits**

What eats it: **nothing**

Adaptations: **sharp teeth, ability to climb trees, good sense of smell**

Predator or prey: **predator**

March 1993 3.2.6 Jordan Lake State Recreation Area, NC



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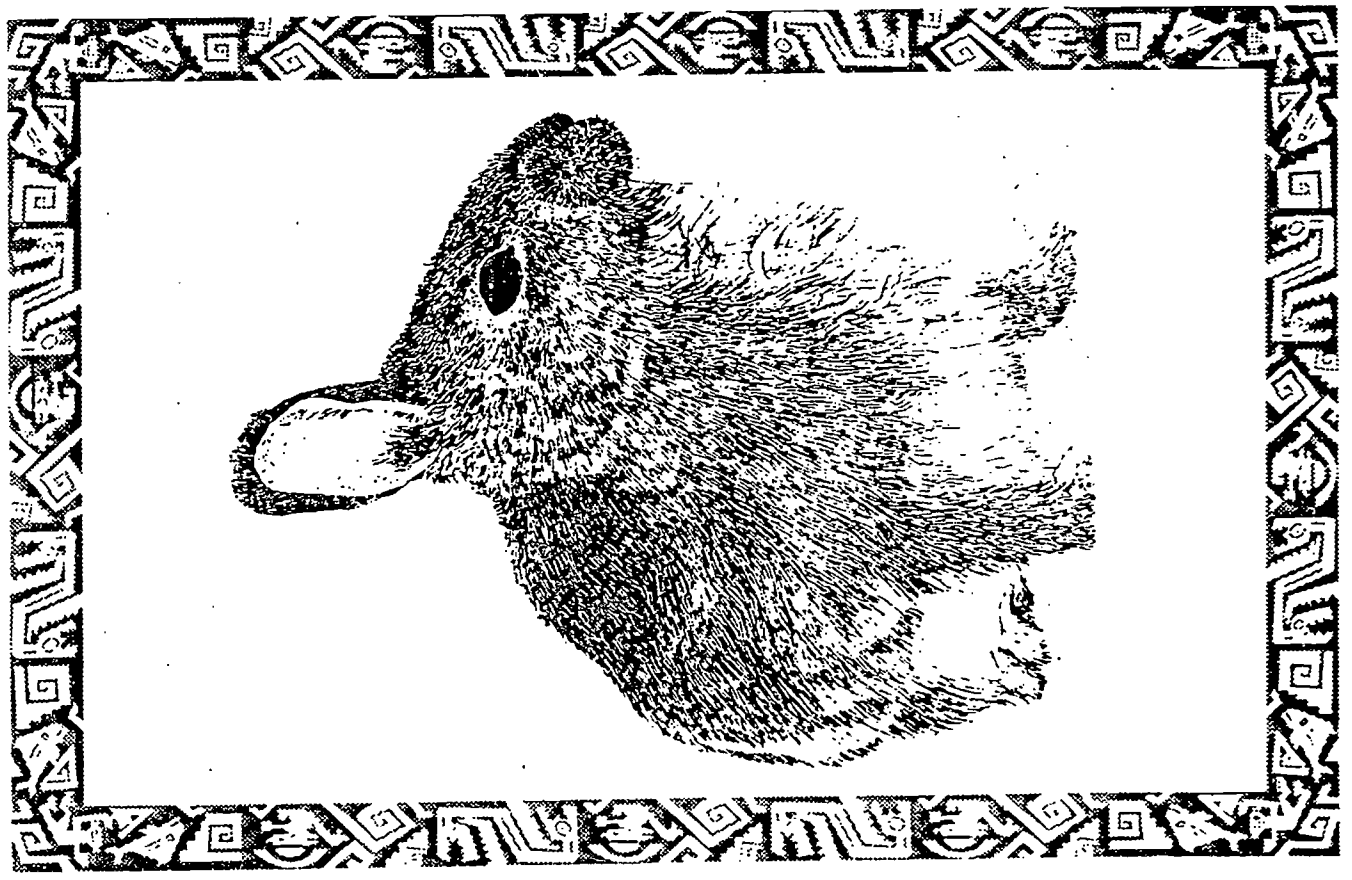


11

Animal: **raccoon**

Habitat: **forested areas**

What it eats: **almost everything, plants and animals**

What eats it: **bobcats, foxes, great horned owls**

Adaptations: **can use front paws like hands, good night vision**

Predator or prey: **both**

Animal: **Eastern cottontail**

Habitat: **fields, edge of woods**

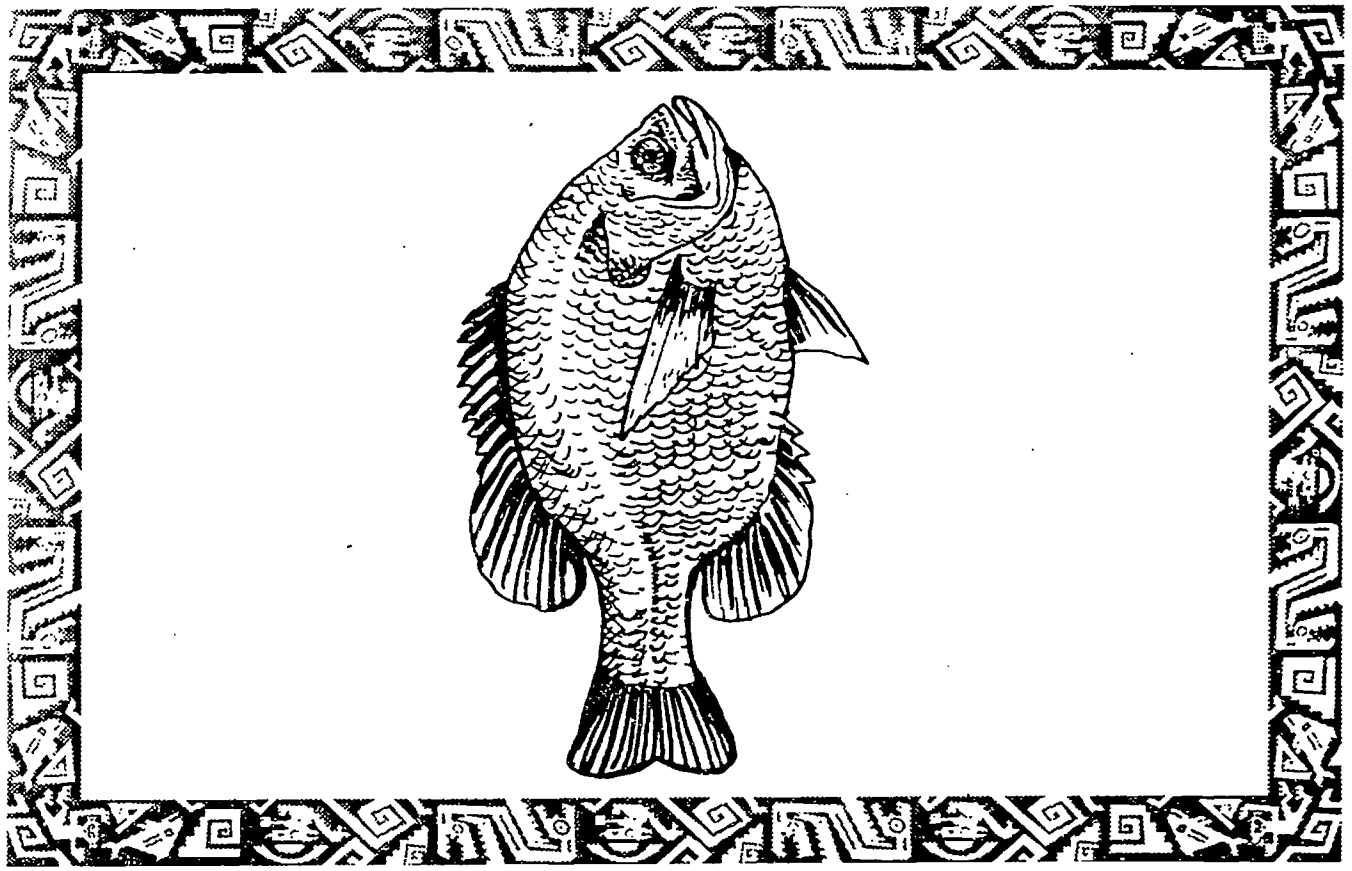
What it eats: **grass and leaves**

What eats it: **hawks, foxes, bobcats**

Adaptations: **ability to run fast, ability to hide**

Predator or prey: **prey**

Jordan Lake State Recreation Area, NC 3.2.8 March 1993



Animal: **bluegill**

Habitat: **lakes and ponds**

What it eats: **insects, small minnows, plants**

What eats it: **largemouth bass, wading birds, ospreys, eagles**

Adaptations: **gills, scales**

Predator or prey: **both**

Animal: **Fowler's toad**

Habitat: **forests and open areas**

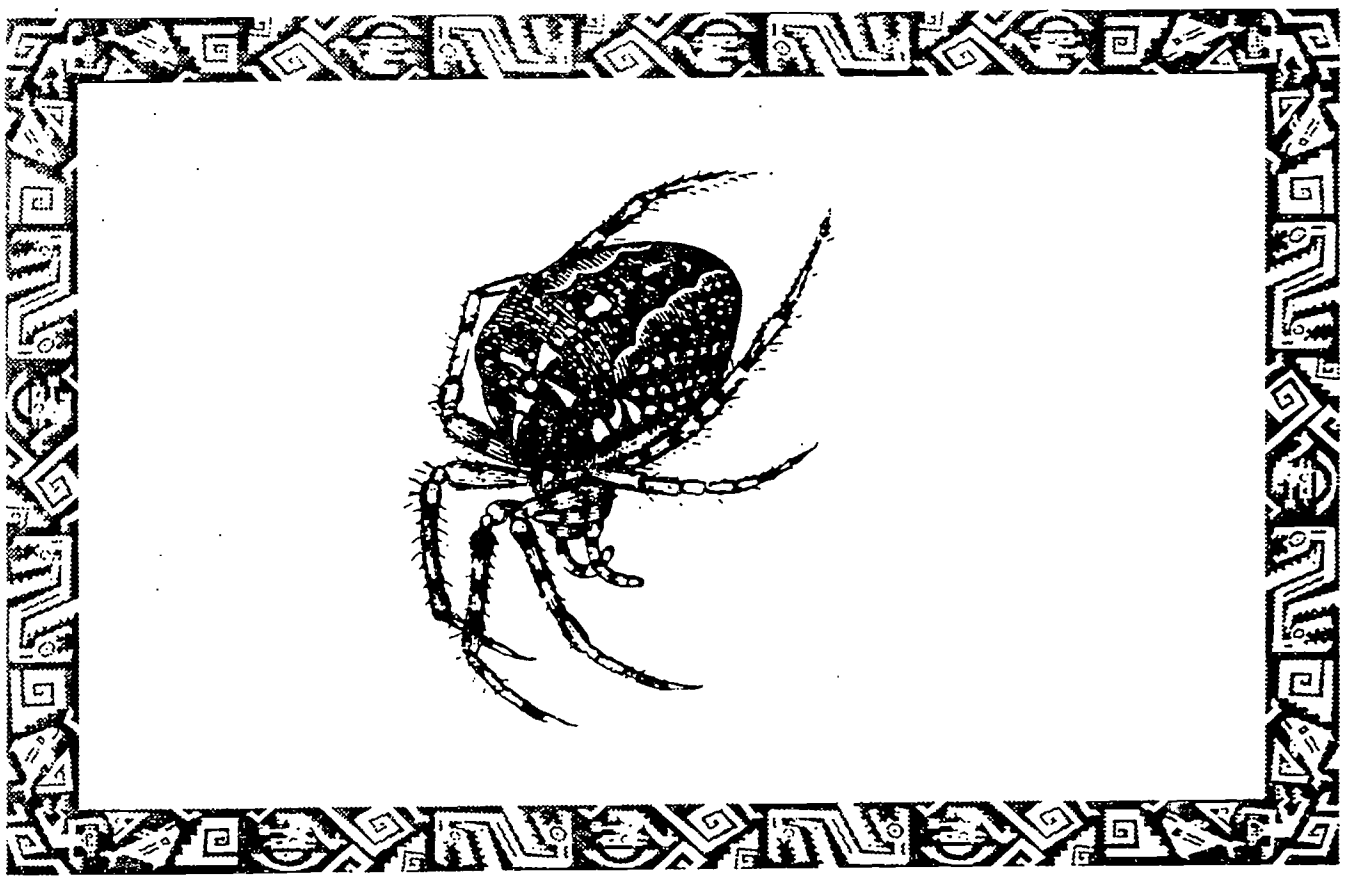
What it eats: **insects**

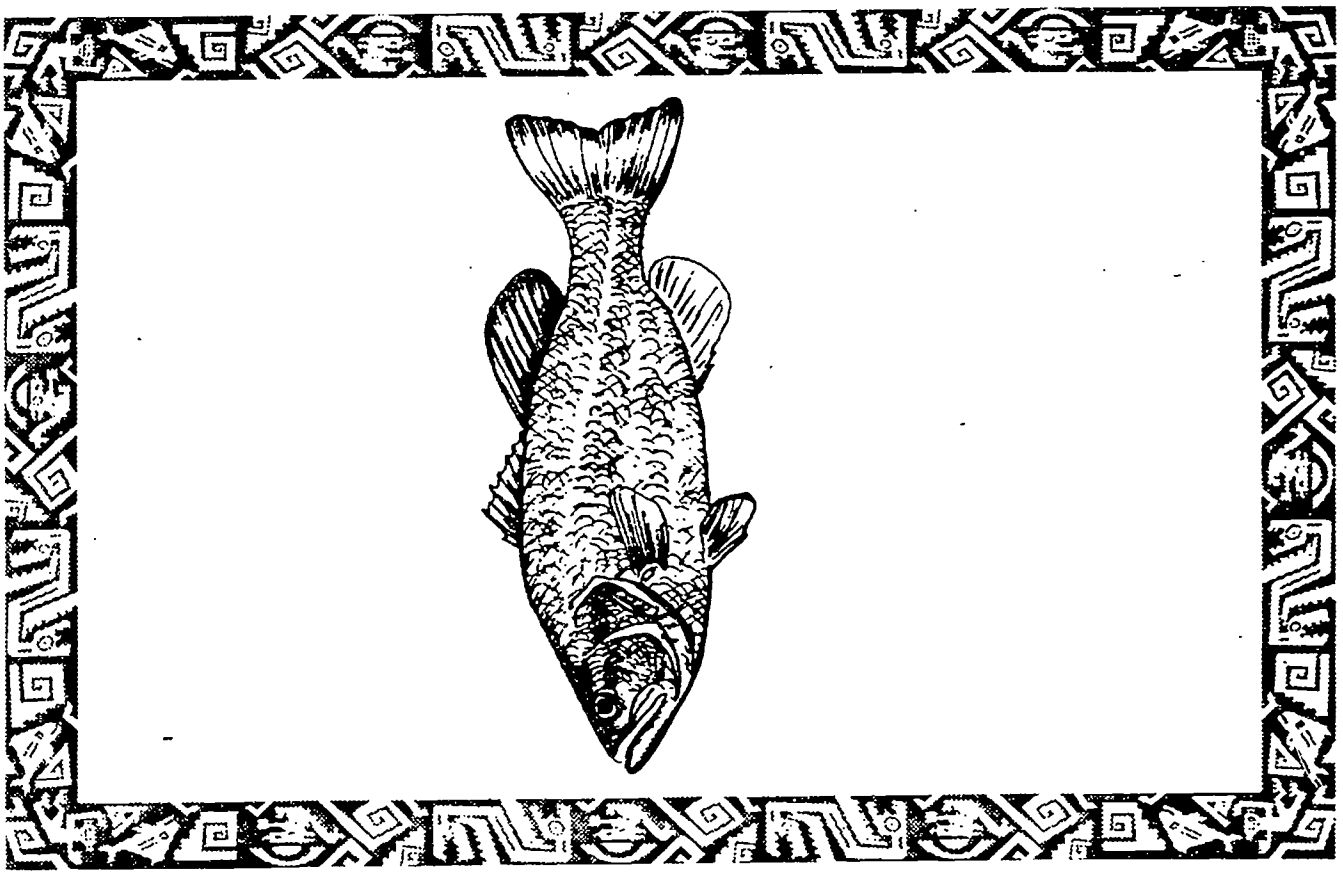
What eats it: **snakes**

Adaptations: **sticky tongue**

Predator or prey: **predator (mostly)**

March 1993
3.2.10
Jordan Lake State Recreation Area, NC





Animal: **garden spider**

Habitat: **forests, fields**

What it eats: **insects**

What eats it: **birds, wasps**

Adaptations: **ability to spin a web**

Predator or prey: **predator (mostly)**

Animal: **largemouth bass**

Habitat: **lakes and rivers**

What it eats: **smaller fish, frogs, snakes, mice**

What eats it: **eagles, osprey**

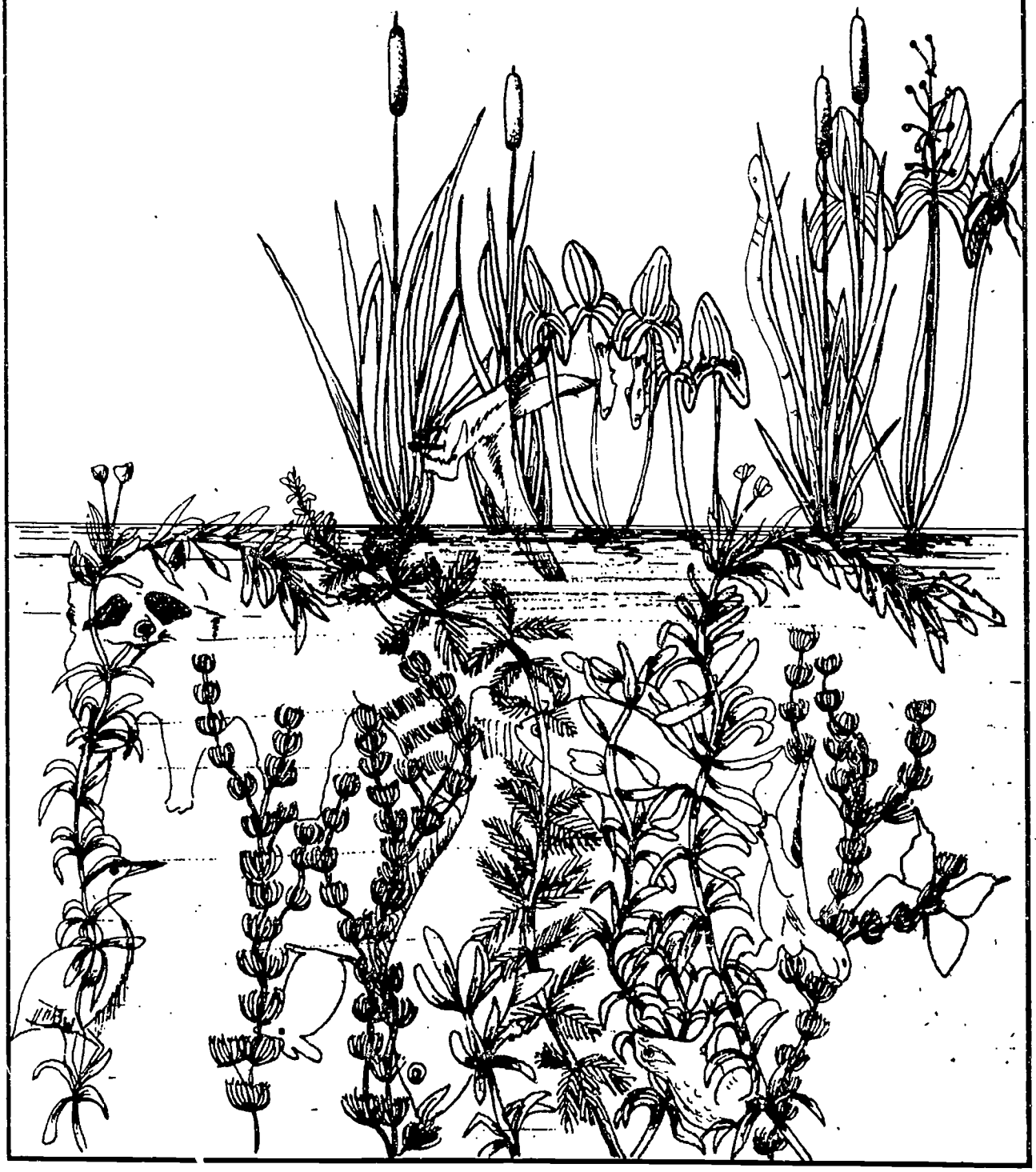
Adaptations: **gills, large mouth for catching prey**

Predator or prey: **predator (mostly)**

March 1993
3.2.12
Jordan Lake State Recreation Area, NC

Who's For Dinner?

Can you find all fourteen creatures? Color predators red, prey green and if an animal is both predator and prey, color it yellow.



Pre-Visit Activity #3 — No Free Lunch

Curriculum Objectives:

Kindergarten
- Visual Arts: art appreciation
- Communication Skills: effective listening and visual comprehension, drawing
- Guidance: listening skills
- Science: plants and animals
- Social Studies: work independently, effective problem solving

Grade 1
- Visual Arts: art appreciation
- Communication Skills: effective listening and visual comprehension, drawing
- Guidance: listening skills
- Science: animal differences and similarities, plant and animal needs, energy
- Social Studies: work independently, effective problem solving

Grade 2
- Visual Arts: art appreciation
- Communication Skills: effective listening and visual comprehension, drawing
- Guidance: following instructions
- Science: animals and plants around us, animal environments
- Social Studies: work independently, effective problem solving, importance of the environment

Grade 3
- Visual Arts: art appreciation
- Communication Skills: listening and visual comprehension
- Guidance: following instructions
- Science: interdependence
- Social Studies: work independently, effective problem solving

Location: Classroom

Group Size: 15 to 30, class size

Estimated Time: 20 minutes

Materials:
Provided by the Educator:
"Food Chain" worksheet (one copy per student), crayons, pencils

Major Concepts:
- Food chain
- Animal interactions
- Predator
- Prey

Objectives:
- Define the source of energy in a food chain.
- Describe two food chains.

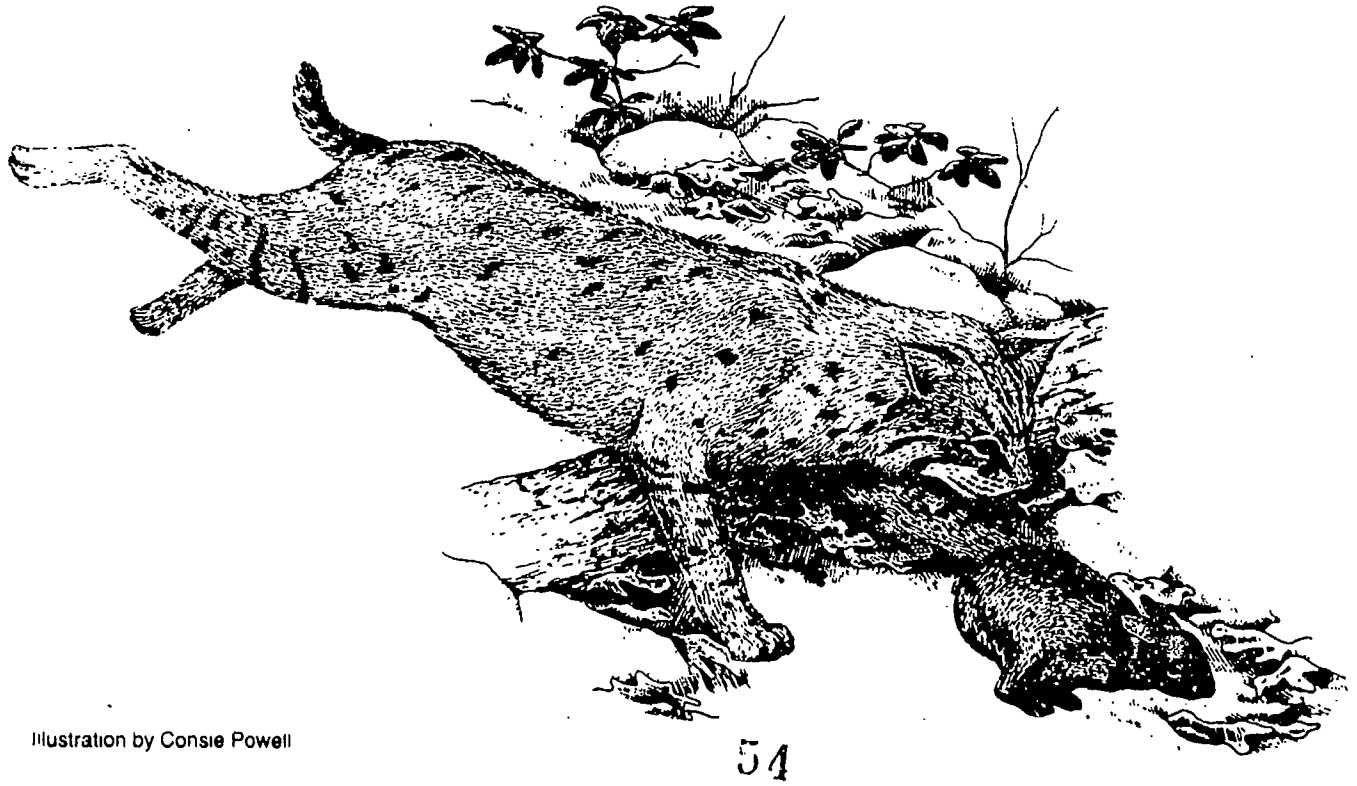


Illustration by Consie Powell

Student's Information:

This activity is about **food chains**. A food chain is a sequence or "chain" of living things in a **community** which is based on one member of the community eating the member below it on the chain. The basic source of all **energy** is the sun. For example: plants get energy from the sun; plants are eaten by insects; insects are eaten by frogs; and frogs are eaten by snakes. The **animal** who catches and eats another animal is called a **predator**. The animals who are eaten by a predator or **carnivore** are called **prey**. An animal, such as the frog in the example, can be both a predator and a prey.

Instructions:

1. Make copies of the "Food Chain" worksheet.

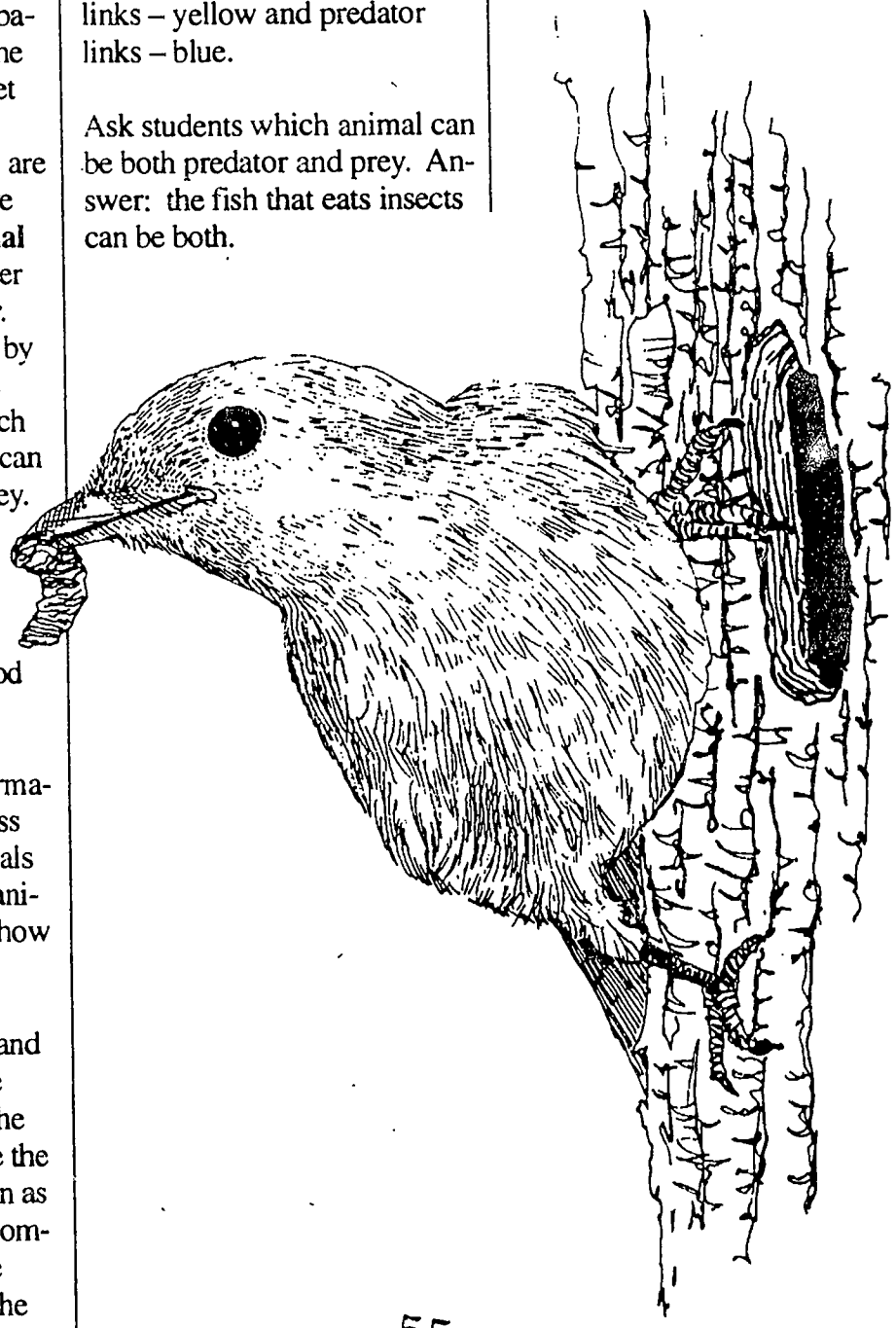
2. Read the Student's Information to the students. Discuss with them how some animals are dependent upon other animals as a food source and how the food chain works.

3. Pass out the worksheet and go over the example of the completed food chain on the left side of the page. Have the students use this food chain as an example to help them complete the food chain on the right side of the page. In the first link they should draw a water plant, in link two a water insect, in link three a fish and in link four a bald eagle. After completing the drawings have the students color the worksheet as follows: sun – orange, plant links – green, herbivore links – yellow and predator links – blue.

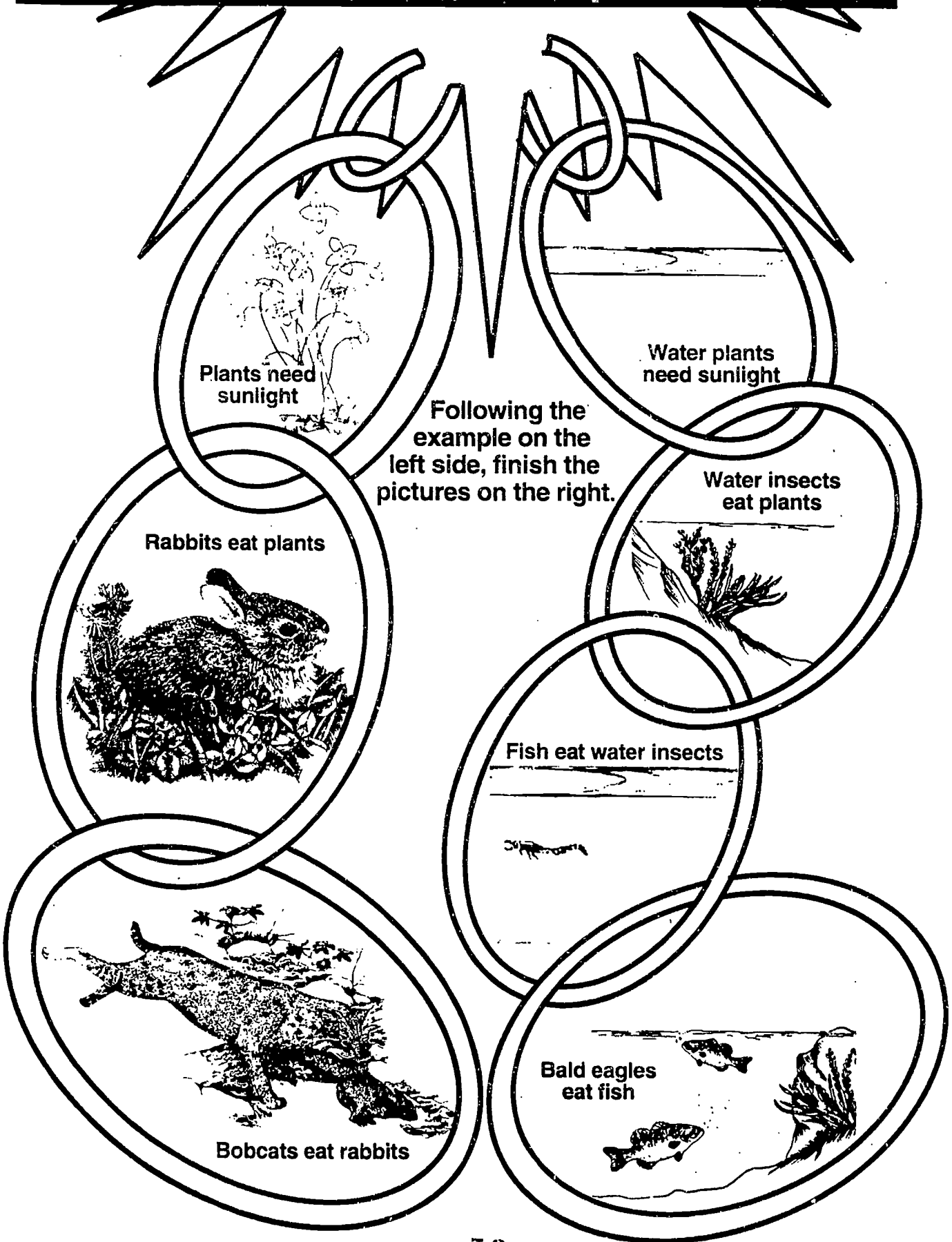
Ask students which animal can be both predator and prey. Answer: the fish that eats insects can be both.

Suggested Extension:

Discuss other food chains with which the students might be familiar.



Food Chain


Plants need sunlight
Following the example on the left side, finish the pictures on the right.
Water plants need sunlight
Water insects eat plants
Rabbits eat plants
Fish eat water insects
Bobcats eat rabbits
Bald eagles eat fish

On-Site Activity #1 Predator Safari

Curriculum Objectives:
Kindergarten
- Communication Skills: effective listening, effective speech, reading comprehension
- Guidance: group participation, effective listening skills
- Science: plants and animals
- Social Studies: effective problem solving

Grade 1
- Communication Skills: effective listening, effective speech, reading comprehension
- Guidance: group participation, effective listening skills
- Science: animal differences and similarities, animal needs
- Social Studies: effective problem solving, importance of the environment

Grade 2
- Communication Skills: effective listening, effective speech, reading comprehension
- Guidance: group participation, effective listening skills
- Science: animals around us, animal environments
- Social Studies: effective problem solving, importance of the environment

Grade 3
- Communication Skills: effective listening, effective speech, reading comprehension
- Guidance: group participation, effective listening skills
- Science: defense mechanisms, interdependence
- Social Studies: effective problem solving, importance of the environment

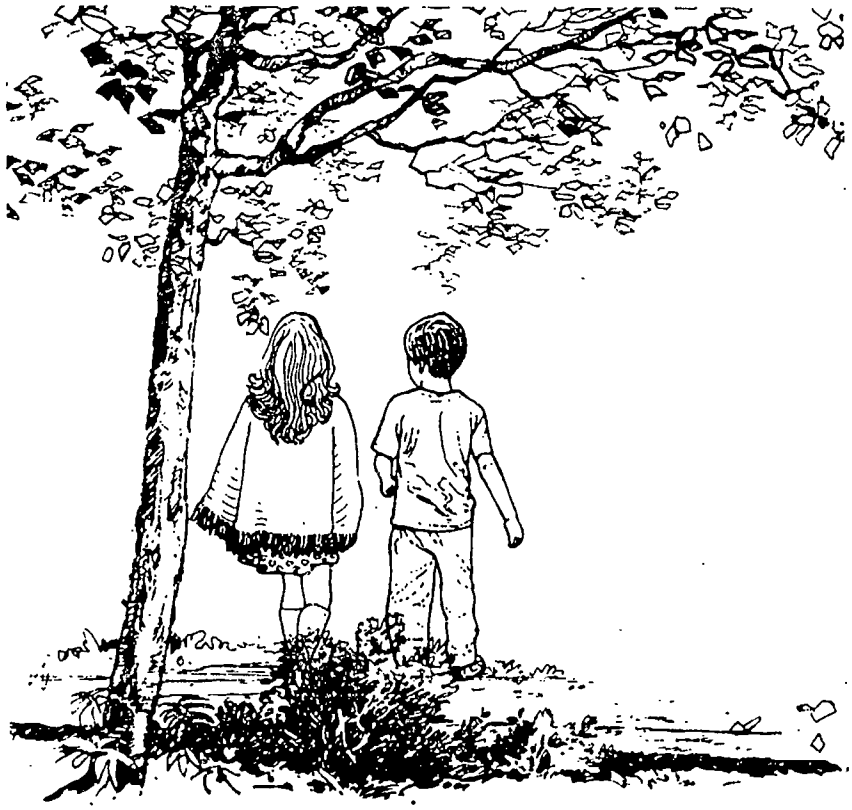
Location:
Ebenezer Picnic Loop A, Jordan Lake State Recreation Area

Group Size:
15-30 participants

Estimated Time:
1 hour

Materials:
Provided by the Park:
Flash cards showing different examples of predators, mounted examples of predators, "Predator Safari Field Guide" (one copy per student)

Special Consideration:
Park staff will discuss hiking safety and state park rules.



Major Concepts:
- Predator
- Prey
- Adaptation
- Habitat

Objectives:
- Identify two signs of prey.
- Identify two signs of predators.
- List four predators found at Jordan Lake.

Educator's Information:

Tracks, burrows, droppings, dens, nests and many other **signs** show that **animals** are, or have been, in an area. In this activity, your group will go on a hike at Jordan Lake with a ranger to look for these and other **predator** signs and see some of the predator and **prey habitats** found in the park. After the hike, the park staff will use flash cards, bird nests, track casts, and animal mounts to discuss what the students saw, what they didn't see, and why.

Instructions:

Prior to the park visit:
1. Discuss the following tips with students to give them a better idea of what to look for.

HOMES: Animal homes can be almost anywhere – in trees, under the ground, along the edge of water, in the water, in grassy fields, and so on. Here are a few tips for finding homes.

- Keep an eye out for raised ridges of soil or mounds of earth where moles and other animals may have tunneled.
- Look for entrances to burrows and dens where soil may have been scraped away or piled up in unusual ways.
- Sniff. Many homes, such as fox dens, have **characteristic** odors.
- Look at trees for hollowed-out trunks where a den might be located. Droppings at the base of the tree may be a clue that a tree-dwelling animal, such as a raccoon or opossum, found **shelter** there. Holes in the trees are usually made by woodpeckers, either for their own home or while pecking for insects in the wood.

RESTING SPOTS: Some animals leave shallow depressions or flattened grasses where they've been lying to rest. The larger birds will often leave some "white wash" below a branch where they have rested.

FOOD CLUES: The larger birds of prey will often leave feathers or bits of fur in the area of their "kill". Squirrels often leave broken nutshells or shredded pine cones where they've been eating. Other clues to **herbivores** are bark stripped from trees (deer), small branches trimmed from trees (deer, squirrels, insects), and stem tips nipped off by browsers (deer, rabbits).

SCAT: Although the students may be a bit squeamish about looking at animal droppings, these materials can sometimes be great clues for identifying what animals are present in the area and what they are eating.

RUBS, SCRAPES, AND SCRATCHES: Large **mammals**, such as deer or wild dogs, sometimes leave hair and broken branches behind in places where they stop to mark their scent. Wild and domestic cats often leave scratch marks on trees. Squirrels will often scratch off loose bark to use as nesting material.

TRACKS: Some commonly found tracks are shown in the "Predator Safari Field Guide".

2. Read the following information to the students.

Years ago, when there were no grocery stores, people had to grow or hunt for their own food. One of the ways that hunters tracked animals was to look for the animal signs that we discussed earlier. But before hunters looked for these signs, they made preparations for the hunt. One of the things Native Americans hunters used to do was to stop eating for several days to reduce their body scent, so that the animals they hunted couldn't smell them. We won't be hunting animals, just looking for them, and we don't need to do anything as drastic as fasting, but, just as the Native Americans did, there are some things that we can do to increase our chances of seeing animals.

- Wear only quiet clothing (like cotton), that does not rustle.
- Camouflage yourself by wearing brown and/or green clothing that matches the colors of the area.
- If you wish, darken your exposed body parts, such as

arms, hands and face.

- Wear quiet walking shoes.
- If you have a magnifying glass at home, you may wish to bring it.

While we are on our safari, we can do the following things to increase our chances of seeing animals and animal signs. A good detective does not want to be noticed. Remember to:

- Always stay near or under cover.
- Move very slowly, pausing every few steps to look around.
- Avoid walking in the same direction as the wind, so body scents will not be carried ahead.
- Be very, very quiet.

We must pay careful attention to our safety on our safari. A good detective is not very effective if he/she gets injured on the job. Remember to:

- Watch your step. You don't want to trip and hurt yourself.
- Avoid touching poison ivy. If you do not know what it looks like, a park ranger will show you.
- Avoid putting your hands in or under places that you cannot see.

Follow the leader and remain on the trail. A good detective also follows the rules. It wouldn't be good to be arrested on the job, so a detective remembers the following:

- Do not pick any flowers or plants.
- Do not remove any object from the park.
- Do not leave any litter in the park.

Let's Go On a Predator Safari

We are about to go on a special mission. Our objective is to search the surrounding area thoroughly, missing nothing. Using our extraordinary sleuthing skills, we are to search for clues and to observe and remember all of our physical surroundings – plants, animals, tracks, dens, etc. We will see many different animal signs and will discover many of the predators that live here at Jordan Lake.

Before we embark on our safari, we will see some mounted predators here in the picnic shelter. On our hike through the woods, we will look for these predators and signs of them. Your field guide has some pictures of predators and some clues that will help you to locate animal signs. It also has a map of the area we will be searching. After the hike, you may keep the field guide and color the pictures at school or home.

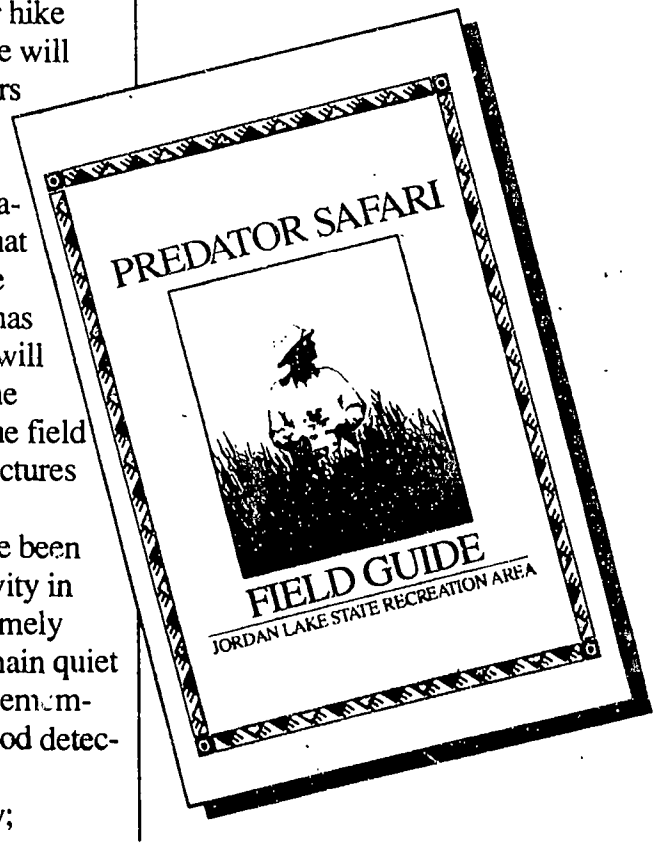
Recently there have been signs of predator activity in this area, so it is extremely important that we remain quiet and go undetected. Remember, if we are to be good detectives, we must:

- walk very quietly;
- only whisper, if we must talk;
- be sure to look, listen and smell very carefully.

Suggested Extensions:

1. Arrange for park staff to present the slide show, "We Care About Eagles," followed by a discussion using eagle mounts. The differences between mature and immature eagles and predator **adaptations** of the bald eagle will be discussed.

2. Ask the students to practice looking for animal signs and habitats by looking around the schoolyard or in their own yards for signs of animals.



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Department of Environment, Health, and Natural Resources

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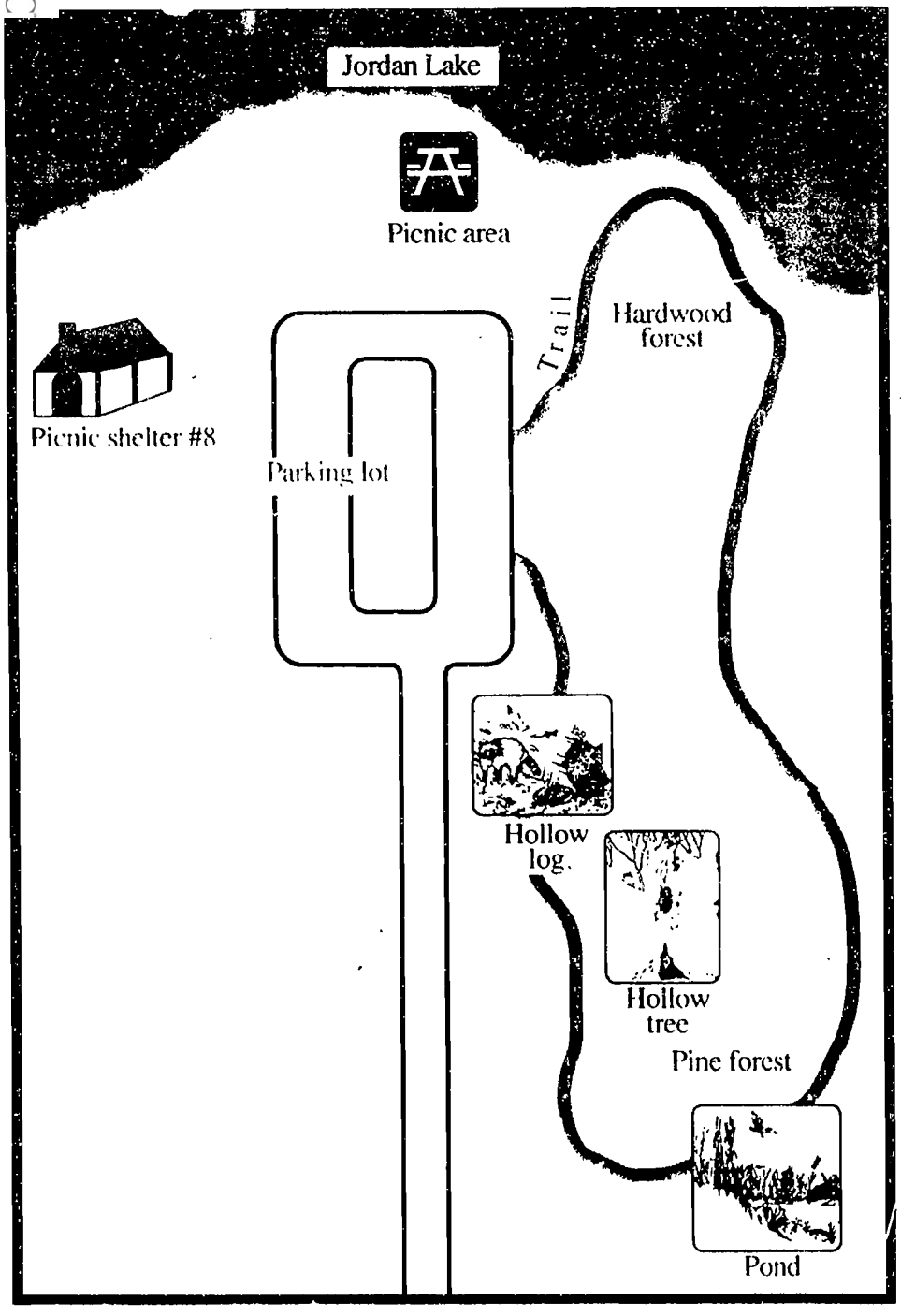
PREDATOR SAFARI

FIELD GUIDE

JORDAN LAKE STATE RECREATION AREA



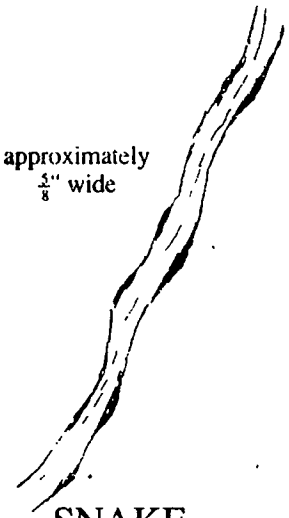
Jordan Lake State Recreation Area

Following a disastrous hurricane which struck the Cape Fear River basin in 1945, the United States Congress directed a study of water resources in the area. Subsequently, it authorized the U. S. Army Corps of Engineers to build the New Hope Lake project to control flooding on the lower Cape Fear. Construction of the reservoir began in 1967.

In 1973, the name of the project was changed to B. Everett Jordan Dam and Lake in honor of the former U.S. Senator from North Carolina. The lake was flooded in 1981, and the Corps of Engineers constructed a variety of park facilities. These facilities and the land around Jordan Lake are leased and operated by the North Carolina Division of Parks and Recreation.

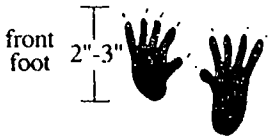
At normal water level, Jordan Lake covers 13,500 acres. It is 17 miles long with 150 miles of shoreline. In addition to flood control, the lake provides water supply, water quality control, and fish and wildlife conservation. Its wide range of recreation opportunities includes fishing, boating, water skiing and camping.

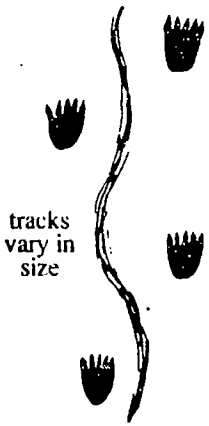
Tracks



SNAKE

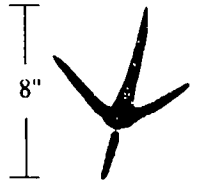
BULLFROG





SNAPPING
TURTLE

RACCOON



GREAT BLUE
HERON

Let's Go On a Predator Safari

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- walk very quietly;
- only whisper, if we must talk;
- be sure to look, listen and smell very carefully.

Let's Be Safe

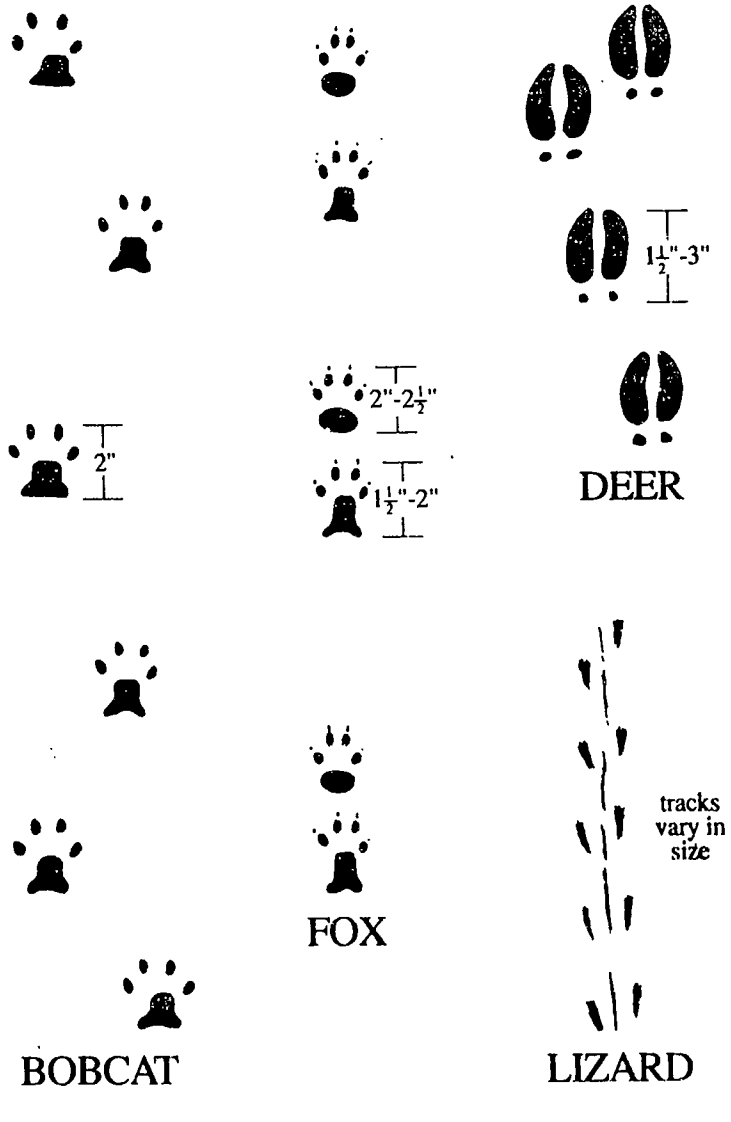
We must pay careful attention to our safety on our safari. A good detective is not very effective if he/she gets injured on the job. Remember to:

- Watch your step. You don't want to trip and hurt yourself.
- Avoid touching poison ivy. If you do not know what it looks like, a park ranger will show you.
- Avoid putting your hands in or under places that you cannot see.
- Follow the leader and remain on the trail.

A good detective also follows the rules. It wouldn't be good to be arrested on the job, so a detective remembers the following:

- Do not pick any flowers or plants.
- Do not remove any object from the park.
- Do not leave any litter in the park.

Tracks

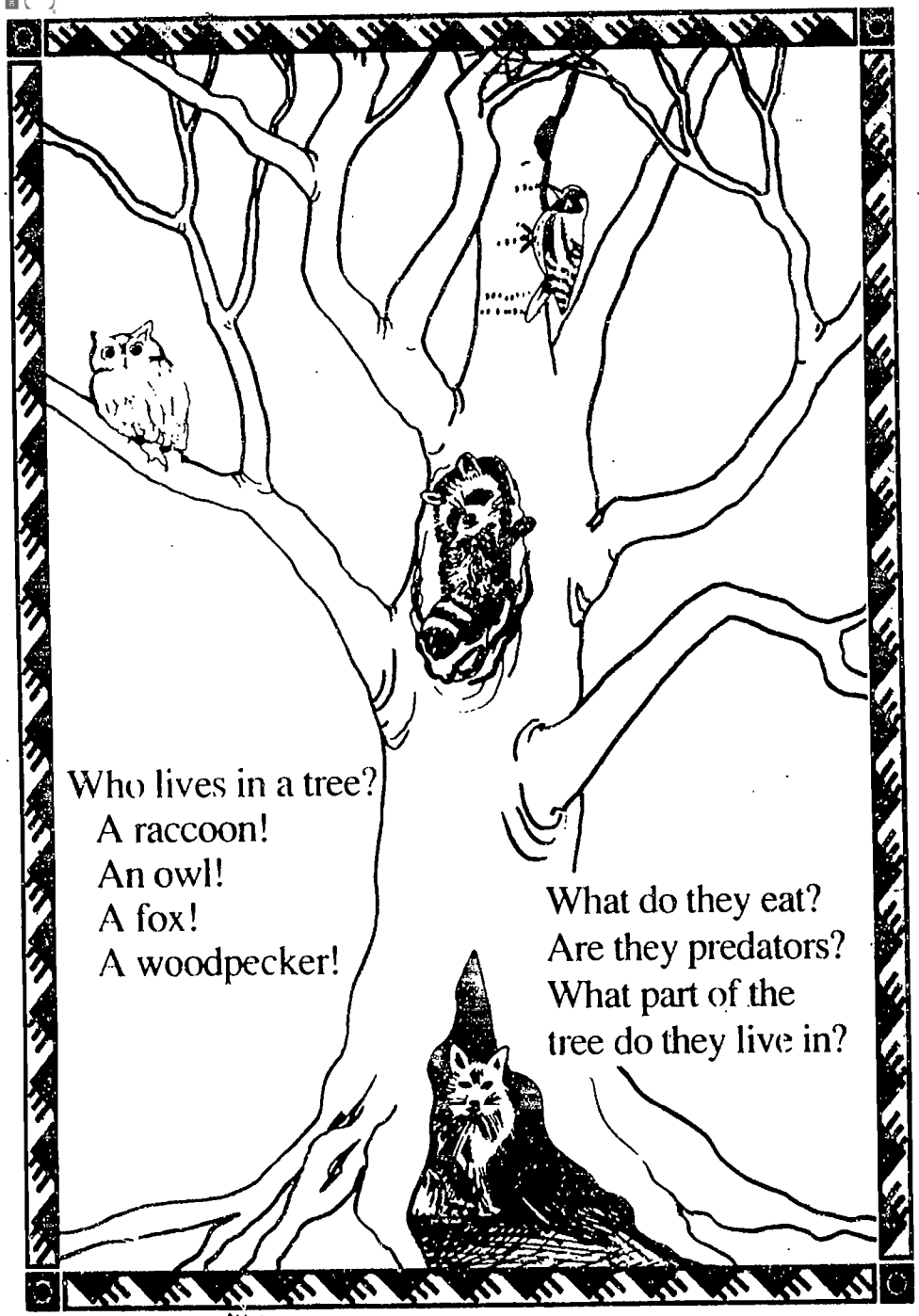


There are often many animals along the shoreline of the lake. Can you identify the:

- bald eagle?
- osprey?
- heron?
- raccoon?
- snapping turtle?

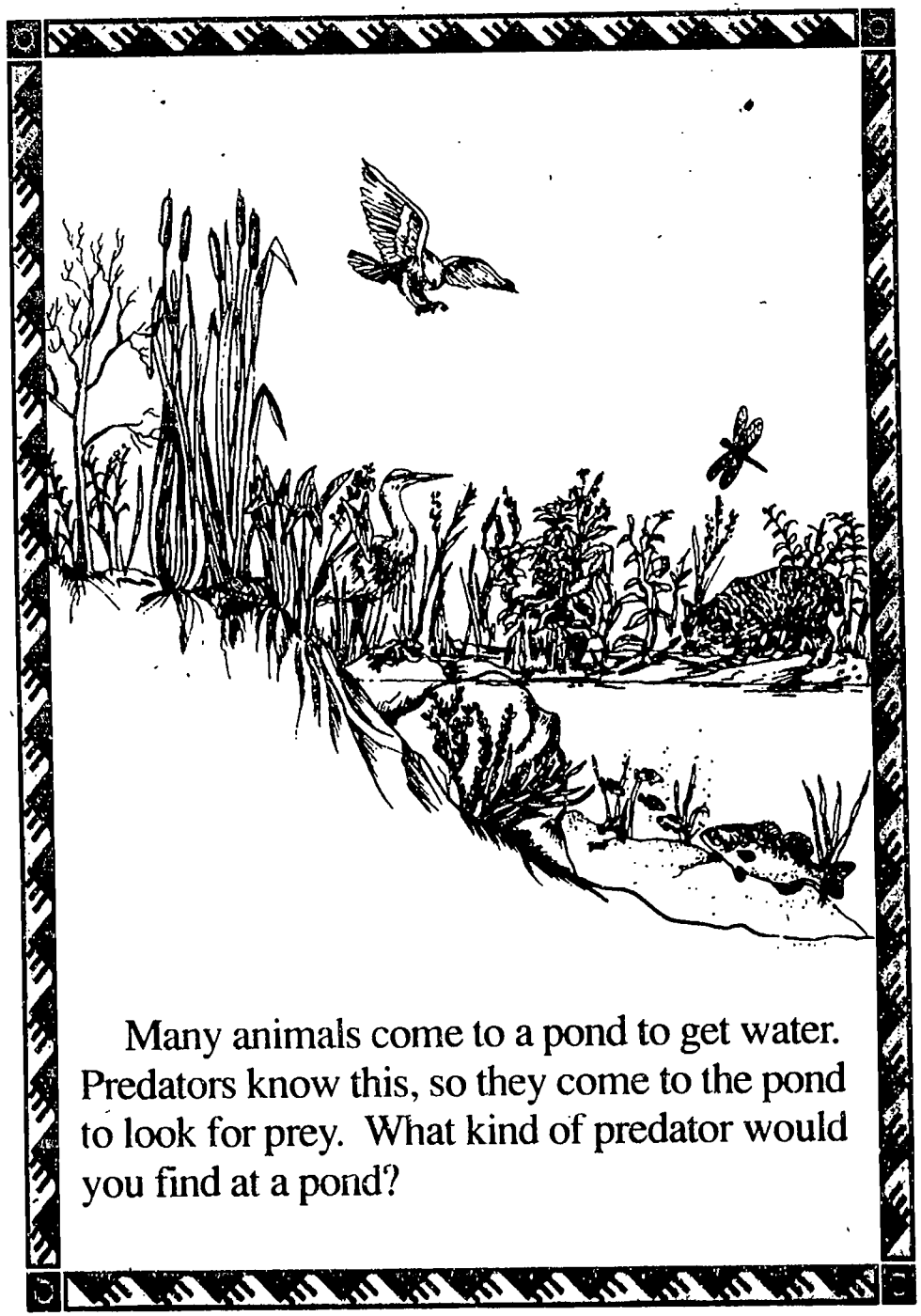
What do they eat? Are they predators?
What signs of them might you see here?
(tracks, fish scales, open mussel shells, feathers)

A hollow log can provide a home for predators. Raccoon, foxes, snakes, lizards, spiders and toads can live in, under, or on a hollow log.



Who lives in a tree?
A raccoon!
An owl!
A fox!
A woodpecker!

What do they eat?
Are they predators?
What part of the
tree do they live in?



Many animals come to a pond to get water. Predators know this, so they come to the pond to look for prey. What kind of predator would you find at a pond?

On-Site Activity #2 — Predator-Prey Game

Curriculum Objectives:
Kindergarten
- Communication Skills: effective listening, effective speech, role of reading
- Guidance: cooperation, group participation, listening skills
- Physical education: locomotive skills, integration
- Science: plants and animals
- Social Studies: effective problem solving, concept of scarcity

Grade 1
- Communication Skills: effective listening, effective speech, role of reading
- Guidance: cooperation, group participation, listening skills
- Physical education: locomotion, safety, and cooperation skills
- Science: needs of animals
- Social Studies: effective problem solving, importance of the environment

Grade 2
- Communication Skills: effective listening, effective speech
- Guidance: cooperation, group participation, listening skills
- Science: animals around us, animal environments
- Social Studies: effective problem solving, importance of the environment, unlimited wants vs. limited resources

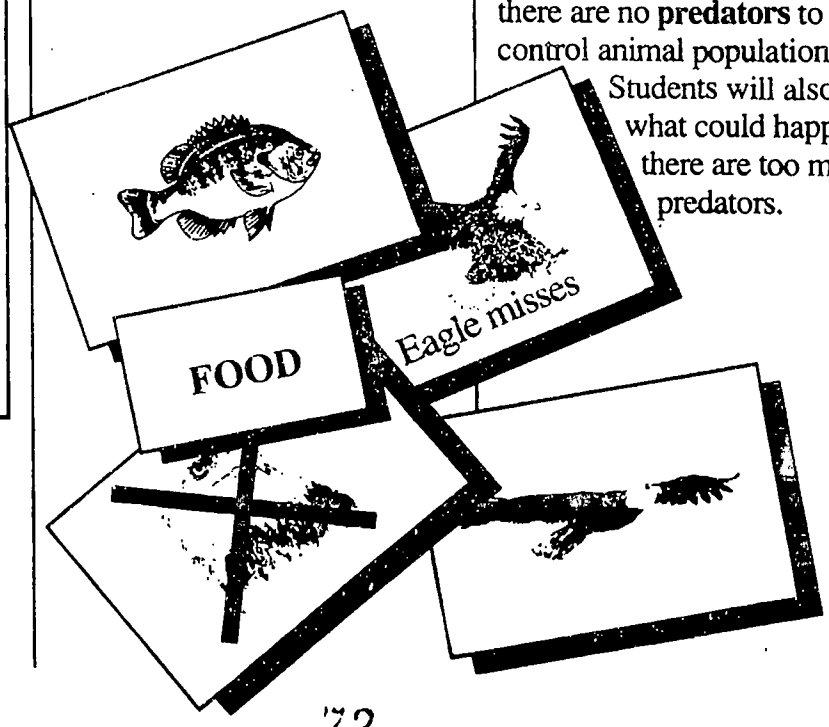
Grade 3
- Communication Skills: effective listening, effective speech
- Guidance: cooperation, group participation, listening skills
- Science: interdependence, defense mechanisms
- Social Studies: effective problem solving, unlimited wants vs. limited resources

Location:
Outdoors is preferable, but can be done in a large indoor area

Group Size:
Minimum of 15, maximum of 40

Estimated Time: 30 minutes

Materials:
Provided by the Park: 200 food tokens, 4 eagle dies cards, 4 eagle misses cards, 4 eagle cards, 40 fish cards



Major Concepts:
- Predator/prey interactions
- Habitat
- Carrying capacity

Objectives:
- List four components of a habitat.
- Explain one benefit of predators.
- Explain two ways humans can affect wild animal populations.

Educator's Information:

In this activity, students will become part of a **community** of **animals** that live in and around Jordan Lake. These animals need to eat, and just like in nature, there is only a limited supply of food in this community. Students will see what happens when there are no **predators** to control animal populations. Students will also see what could happen if there are too many predators.

Instructions:

1. Begin by reviewing the terms predator and **prey** with the students. Discuss the elements of a **habitat**. Using the students' homes and Jordan Lake as examples, compare the elements of these habitats. Important elements of a habitat are FOOD, WATER, **SHELTER**, and **SPACE**. When humans want food, they may go to the kitchen or cafeteria, but wild animals need to find their food. If we want water, we get it from the nearest water fountain or sink. The wild animals that live around Jordan Lake have a lot of water available to them. For shelter, most of us live in a house or apartment. The wild animals around Jordan Lake live in different kinds of shelters. Birds live in nests, spiders live in webs, and **fish** live in the water. The space that we live in is our community. It includes our school, our home, the stores where we shop, etc. The space wild animals live in is the forest and water around Jordan Lake where they are undisturbed. This is their community. You can see that wild animals share many of the same needs that we have.

2. Arrange the students in a circle and tell them that they will represent a **population** of fish living at Jordan Lake. Explain to them that they have plenty of water, and lots of shelter and space. There is only one other element that they need in their habitat and that is food. Explain to the students that you will have them walk around a circle and collect "food tokens" as they pass by the educator (see diagram #1). It is important to explain to the students that fish do not talk, push, scream, or shove, and that any student who cannot act like a fish will be removed from the game.

3. Give each of the students a "fish" card. Discuss what a fish eats.

4. Have the students turn to their right and slowly walk around the circle, picking up one food token each time they pass the educator.

ROUND 1

Give the educator only enough food tokens to allow each student to get 1 or 2 before all the food is gone. When the food runs out, stop the game and ask the students what they think would happen if they were a fish in the lake and the food ran out in their area. (They might starve to death, they might move to another area, or they might eat each other.) Collect all the food tokens from the students.

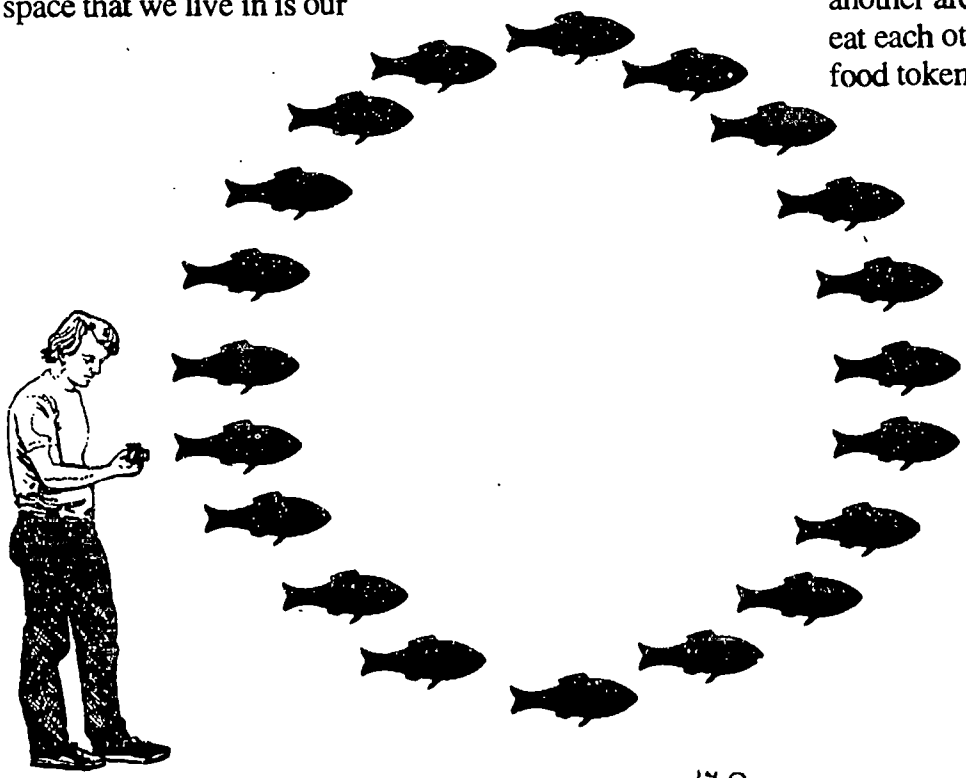


Diagram #1

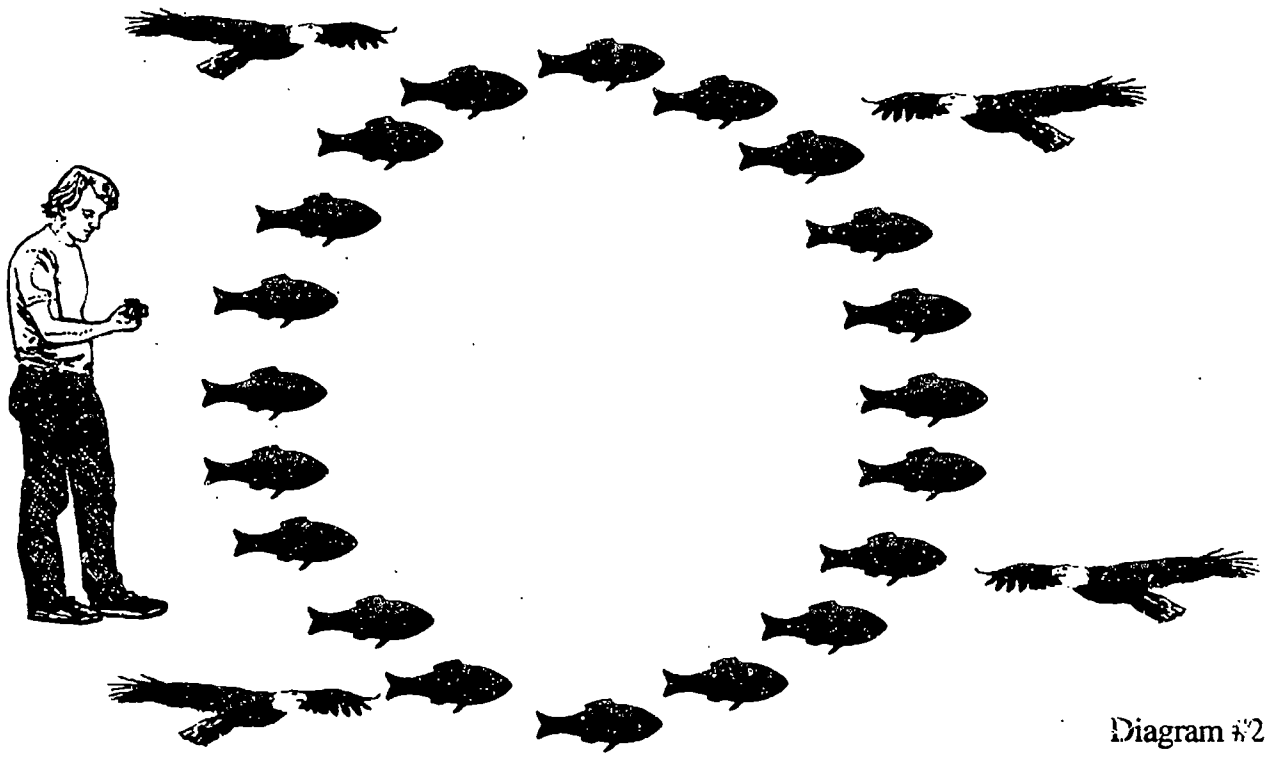


Diagram #2

ROUND 2

Pick four students to be eagles, number them, and give them "eagle" cards to hold. Have the "eagles" stand outside the circle (see diagram #2). Explain that when you call the eagle's number, they are to remove a "fish" from the circle. Tell the fish not to run or dodge, but to stand behind the eagle when they are caught.

Give the educator all the food tokens and have the "fish" begin walking around the circle. Have each "eagle" remove "fish" until there are no "fish" remaining. Stop the game and discuss what may happen to the eagles now that there are no more fish. (They may starve to death, they may move to a new area, they may begin to eat different animals.) Collect all the food tokens from the students.

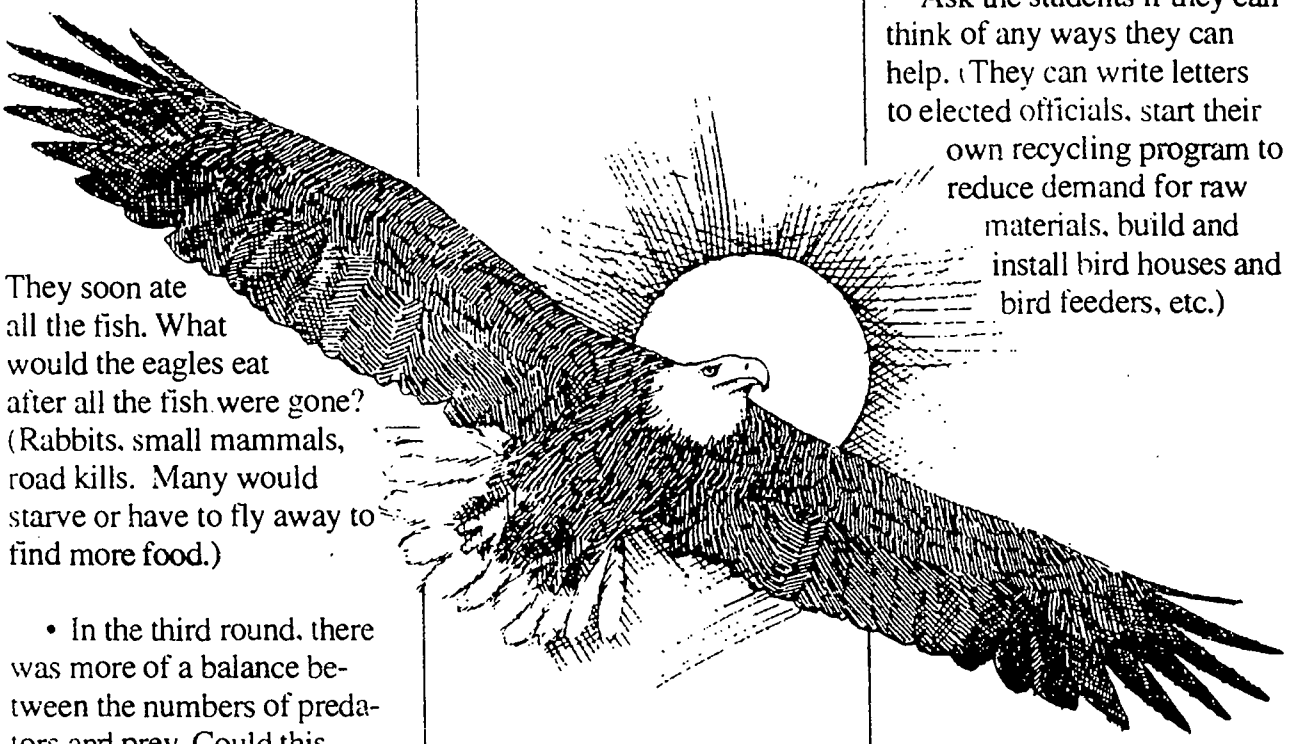
ROUND 3

Explain to the students that some special cards will be given to some of the "fish". The special cards say "eagle dies" or "eagle misses". If an "eagle" picks a "fish" that has an "eagle dies" card, that "eagle" and the "fish" are out of the game. If an "eagle" picks a "fish" that has an "eagle misses" card, the "eagle" misses a meal and the "fish" stays in the game. Have the "eagles" turn their backs and pass out 3 "eagle dies" cards and 4 "eagle misses" cards. Have the students with these cards keep them hidden so the "eagles" can't tell which "fish" have them. Tell the "fish" to call out if an "eagle" catches them and they have one of the special cards.

Give all the food tokens to the educator and begin the game as in Round 2. When there are only 2 "eagles" remaining and the educator still has some food, stop the game. Have the students re-assemble and collect all the tokens and cards. Discuss the following:

5. Ask the students what happened during each round of the game. See if they can figure out why, and then explain the reasons for each outcome to the students.

- In the first round, there were no predators. The population of fish remained large and food soon ran out. Would this happen in real life? (It could if all the predators were killed.)
- In the second round, there were four eagles and nothing to control their population.



They soon ate all the fish. What would the eagles eat after all the fish were gone? (Rabbits, small mammals, road kills. Many would starve or have to fly away to find more food.)

• In the third round, there was more of a balance between the numbers of predators and prey. Could this condition last for a while? Why or why not? (Yes, that is how things work in undisturbed ecosystems.)

Ask the students what they think would happen to the eagles if somebody or something drained Jordan Lake and all the fish died. (The eagles would have to either find something else to eat, or go somewhere else to find fish.) Ask the students if there are any other ways humans could affect the habitat. Suggest some positive ways: (don't pollute, clean up litter, recycle, protect wildlife habitats) and some negative ways: (kill animals, destroy dens, bother nests, pollute water, litter).

Ask the students if they can think of any ways they can help. (They can write letters to elected officials, start their own recycling program to reduce demand for raw materials, build and install bird houses and bird feeders, etc.)

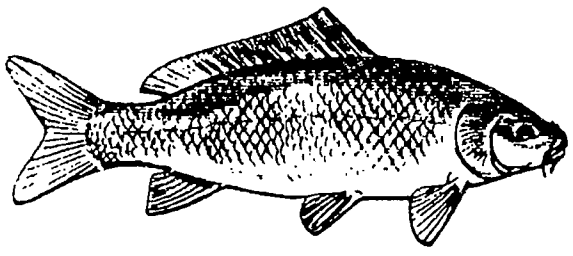
Suggested Extension:

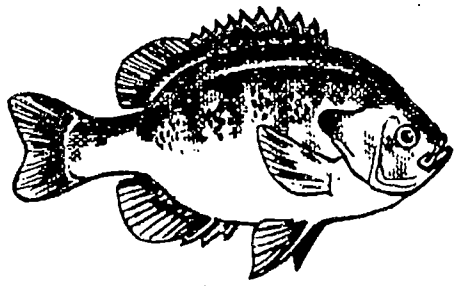
North Carolina Wild Notebook's "Crime at the Bird Feeder" tells an important story about the relationship of predators and prey. This reading activity will provide the students with examples and explanations of how the predator-prey relationship applies in other communities.

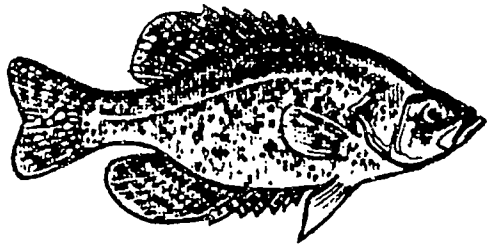
Food Token Cutouts

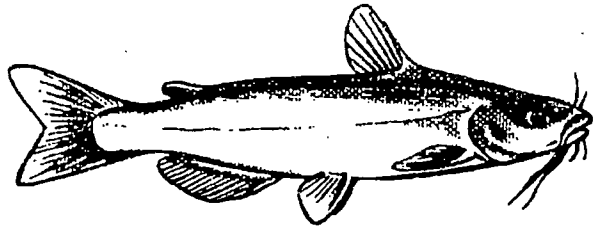
FOOD	FOOD	FOOD
FOOD	FOOD	FOOD
FOOD	FOOD	FOOD
FOOD	FOOD	FOOD
FOOD	FOOD	FOOD
FOOD	FOOD	FOOD
FOOD	FOOD	FOOD

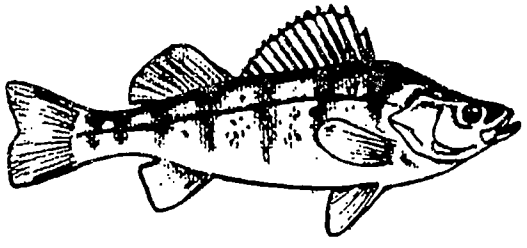
Fish Cutouts

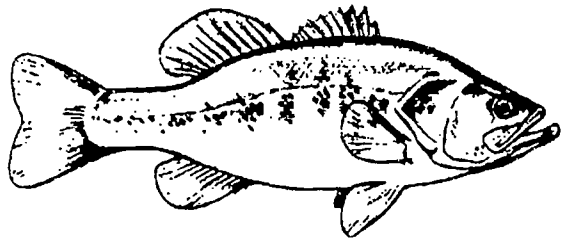


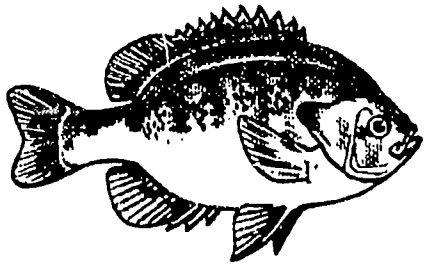


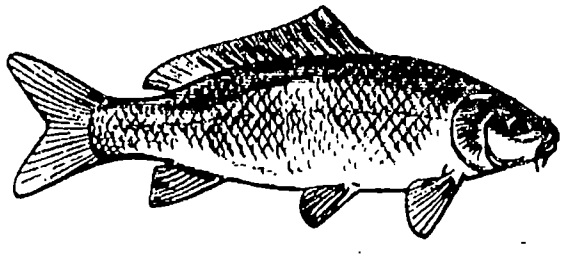




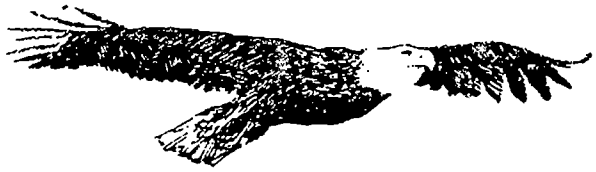


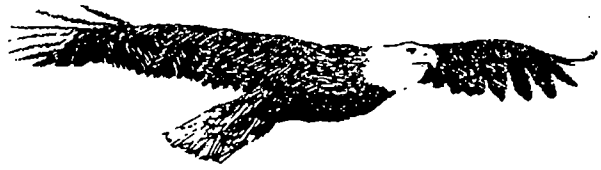


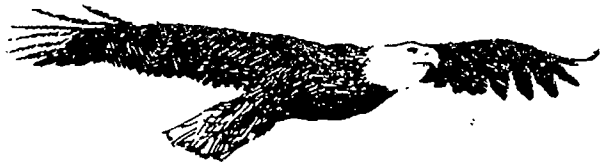




Eagle Cutouts







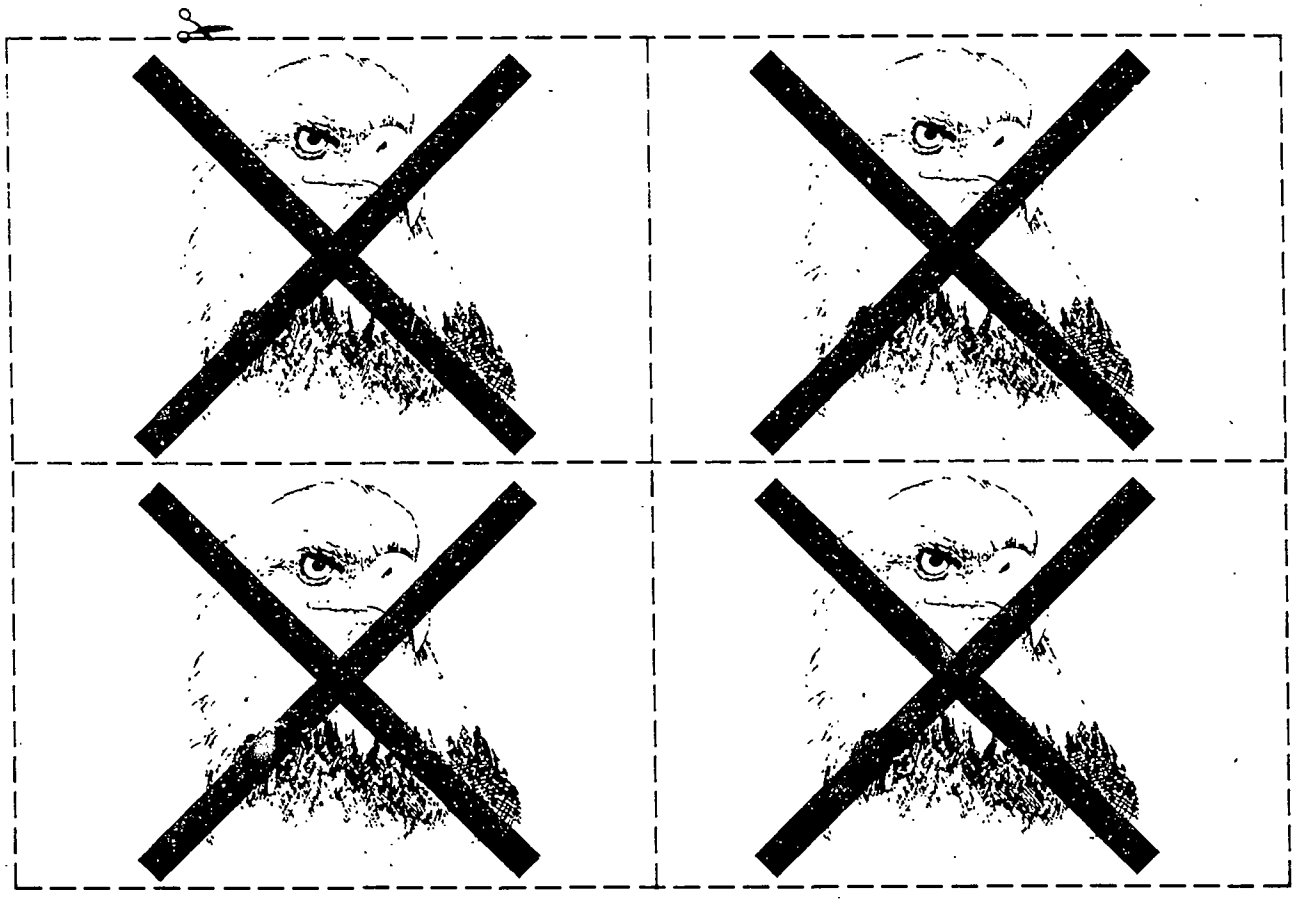
Eagle misses

Eagle misses

Eagle misses

Eagle misses

Eagle Dies Cutouts



March, 1989

Crime At The Bird Feeder?

While eating breakfast, Amy liked to look out the kitchen window and watch birds on her feeder. Since she had to catch the school bus at 7:15 she was up plenty early to see the morning scramble. The feeder was always crowded this time of morning, and today was no exception.

A blue jay tried to hog the feeder but was fighting a losing battle. He was simply outnumbered. While the jay had his back turned scolding a cardinal, two chickadees and a titmouse flew down, picked up sunflower seeds and flew back to a safe perch. A house sparrow flew in and started scratching in the middle of the pile. Seeds flew everywhere much to the delight of the 20 or so juncos on the ground. The first cardinal was joined by four more, and they took turns playing tag with the blue jay.

As Amy reached for a bite of bacon, a streak of blue suddenly flew past the window. Two juncos fleeing for cover flew straight into the kitchen window, striking the glass. One recovered its senses and flew weakly to the nearest cedar bush. The other lay dying on the ground a couple of feet from the window.

What could have caused such panic? What was that she saw flash past the window? Amy ran out to see about the junco. As she reached down to pick it up she saw something on one of the low limbs of a pine near the feeder. A hawk was perched there clutching one of the five cardinals in its talons. It looked straight at Amy but refused to give up its breakfast and fly away. Amy was furious. She reached for a stick and drew back to throw. The hawk never moved, but stared straight at her with its head lowered and red eyes unblinking. Amy, knowing there was nothing she could do for either the junco or the cardinal, quietly backed away and went inside the house.

Amy couldn't wait to tell her father that evening when he came home from work. As she told him the story, his reaction was not as she had expected. Instead of being angry with the hawk, he smiled and said "Fantastic, a hawk right here in the suburbs, and you were able to see it make a kill!"

"Gross, daddy!" said Amy. "What's so fantastic about seeing a mean old hawk kill a beautiful innocent cardinal that never hurts anything?"

"Honey, the hawk was only doing what it is supposed to do. It has to kill to eat. You sit at the breakfast table eating bacon from an innocent hog someone else killed for you yet you're thinking how mean and nasty the hawk is. Actually, both you and the hawk are predators."

Amy is not alone in her attitude towards *predators*. The hawk Amy saw was most likely a Cooper's hawk, known as a blue darter by Amy's grandfather and other farmers of his time. This and other hawks have been shot, trapped and poisoned for generations. Other predators such as the fox, bobcat, weasel, and mink are among North Carolina's many predators, and these species have commonly been shot on sight for their "evil ways" Other predators such as the wolf and cougar — maybe even the jaguar — were eliminated from North Carolina even before any good records of their presence in the state could be documented.

Amy watched closely in the weeks that followed, but she didn't see the hawk again. "I guess they belong here as much as we do," she finally admitted to her dad. She began to look forward to moments when she would see the hawk again.

Predators Are Important

If Amy had understood how **predators** and **prey** depend on each other, she might have seen the incident at the bird feeder differently. When you really stop to think about wild animals and how they live, you quickly realize that eating and keeping from being eaten are two pretty important things in the everyday lives of wild animals.

A bobcat, for example, has to catch a rabbit, squirrel, or several mice almost every day of its life in order to survive, grow and take care of its young. If it gets sick or injured and is unable to hunt, it doesn't eat. Also, if there are too many bobcats in the neighborhood, there may not be enough rabbits, squirrels or mice to go around. The bobcat then starves, gets weak and can't hunt. Life can be pretty rough for a predator.

What about the prey—the creatures eaten by a predator? That's also a rough life! Out of 100 rabbits alive in early fall, only about 20 will be around the following spring. Hawks, owls, foxes, mink, bobcats, house cats, and the German Shepherd down the street are all looking for a meal, and the rabbit is trying to avoid being the main course. But if there were not enough predators eating rabbits, the rabbit population would increase so rapidly that soon there wouldn't be enough food and cover for all of them.

Fortunately, nature has a way of keeping populations of both predators and prey in balance so that enough of them can survive. Nature provides what we call adaptations to both predators and prey that allow them to survive. Let's look at a bobcat's adaptations- good hearing, excellent eyesight, claws that retract so they stay sharp and clean, front teeth to catch and hold prey, and back teeth that work like scissors to cut meat. These are all called physical adaptations.

Other adaptations we can't see are just as important. Take territoriality, for example. This is an example of a behavioral adaptation. Behavioral adaptations are ones that help the animal survive by doing something or acting in a particular way. An animal that shows territoriality is one that keeps other animals of its kind off its property — like the blue jay defending its food on the feeder. Bobcats do this, especially when they have young. This ensures that the supply of rabbits, squirrels and mice in their area doesn't run out. This adaptation helps both the bobcat and the rabbits, squirrels and mice to survive.

Now let's look at some adaptations of a prey species like the rabbit. Rabbits have large ears so they can hear a bobcat approaching and eyes on the sides of their heads so they can see in all directions at once, not just ahead. Rabbits also have large strong hind legs that allow them to go from zero to 40 mph faster than a sports car. Their skin and fur also work like a tear-away football jersey in case that's not fast enough. Most important, the rabbit has a **reproductive rate** so rapid that, if unchecked, would fill every square foot of the earth's surface with rabbits in less than 15 years. That usually leaves plenty of rabbits for a few bobcats and other predators, including human predators like hunters.

Predators have many adaptations that make their lives easier, and prey have just as many. The result is that both populations of animals survive and reproduce even though many individual animals of both types will die. A population is a group of animals of the same species. When we think about how predators and prey live together, it is more accurate to think about what is best for the populations.

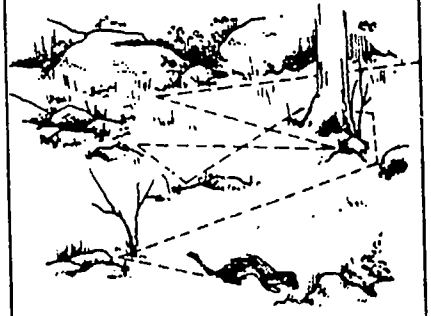
This is what Amy's father meant when he said: "Fantastic!" He understood that what Amy had seen was actually best for the populations of both animals. The cardinal had given its life so that the hawk could eat and so other cardinals could live and have enough food and cover. Amy's father also appreciated the wondrous ways in which nature produced adaptations for their survival. It's hard for us to learn not to view animals as individuals the way we view people, but it is necessary if we really want to understand how wild animals live.

Nature provides adaptations to both predators and prey.

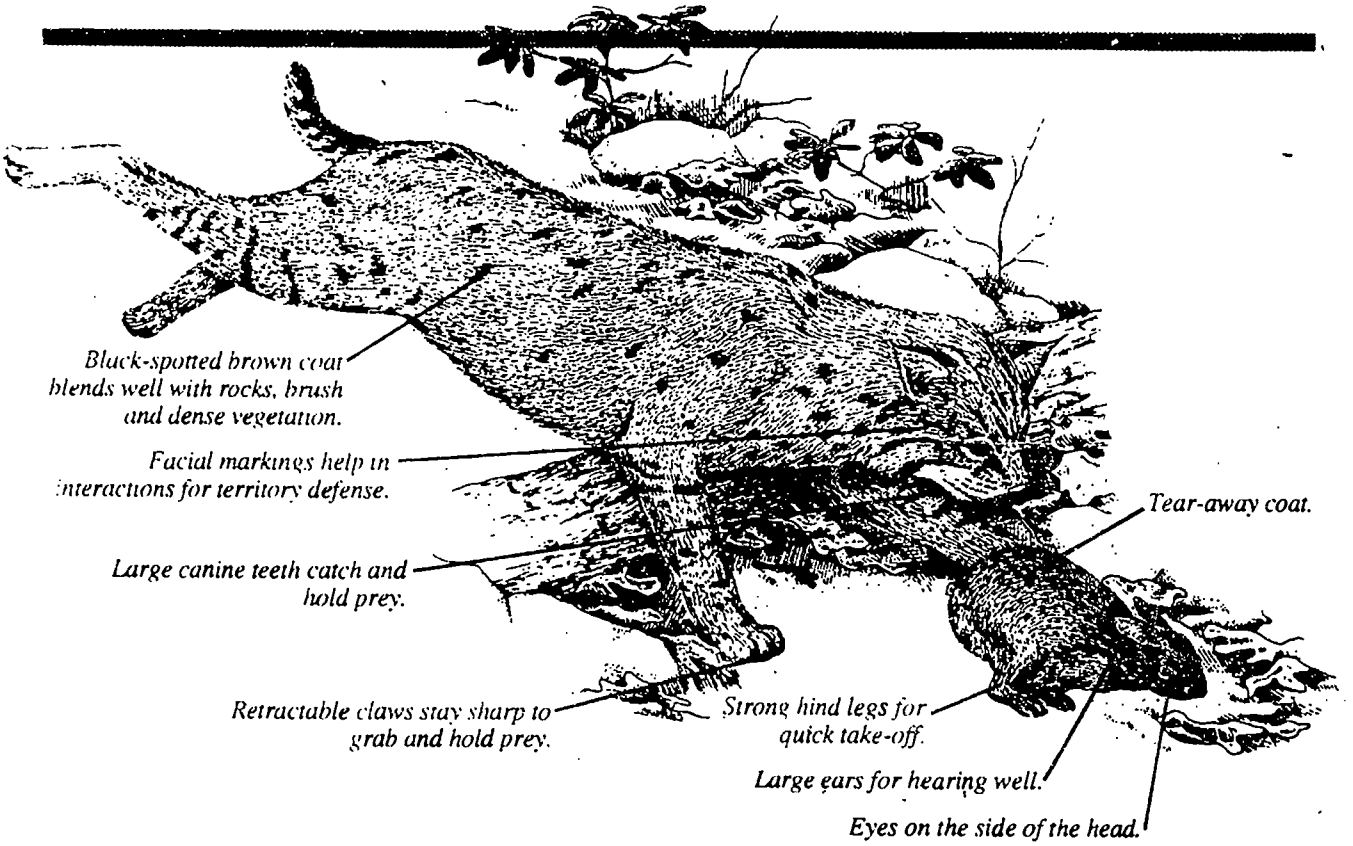
A red fox listers carefully for a mouse in thick groundcover.

A quick pounce may catch the hidden mouse.

The erratic hunting pattern used by a weasel helps it find any possible prey



This also helps the weasel avoid being preyed upon by hawks or owls.



Behavioral Adaptation

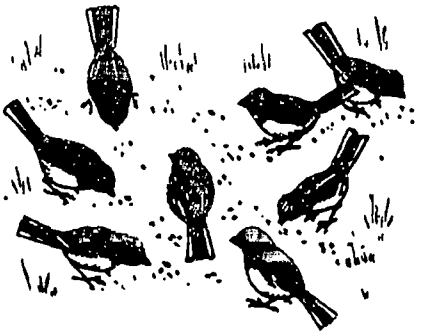
A rabbit's behavioral adaptations include dashing and dodging to avoid capture. It might freeze, holding very still to avoid initial detection by a predator. For a bobcat, solitary hunting makes catching a meal more likely. The play behavior of bob kittens is practice for adult hunting behavior.

Nature provides adaptations to both predators and prey.

A newborn fawn's spots help it blend with its surroundings.

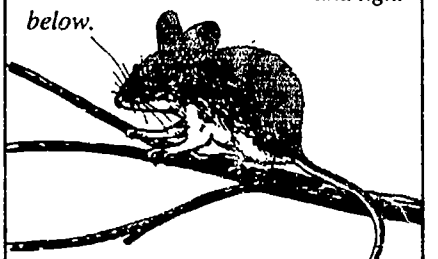
It lies absolutely still for many hours each day to avoid detection by predators.

Juncos and other birds feed in flocks.



A warning movement of a single bird alerts all the others of danger.

Many animals are countercolored like this deermouse: dark above and light below.



Seen from above, the mouse blends with the dark ground. Seen from below, it blends with the light sky.

Resources and References

Definitions

Predator—An animal that hunts and catches another animal for food.

Prey—An animal that is hunted or caught for food.

Adaptations — Special characteristics an animal has for surviving and living.

Physical Adaptations — Special characteristics an animal's body has for surviving and living. Some examples are speed, sharp hearing and eyesight, and a camouflaged coat.

Behavioral Adaptations — Special characteristics in the way an animal acts that help it survive and live. Some examples are freezing in position to escape detection, and "playing" dead like an opossum.

Territoriality—The behavioral adaptation in which animals defend space within their habitat and try to keep other animals out.

Reproductive rate- A measure of how fast an animal can reproduce.

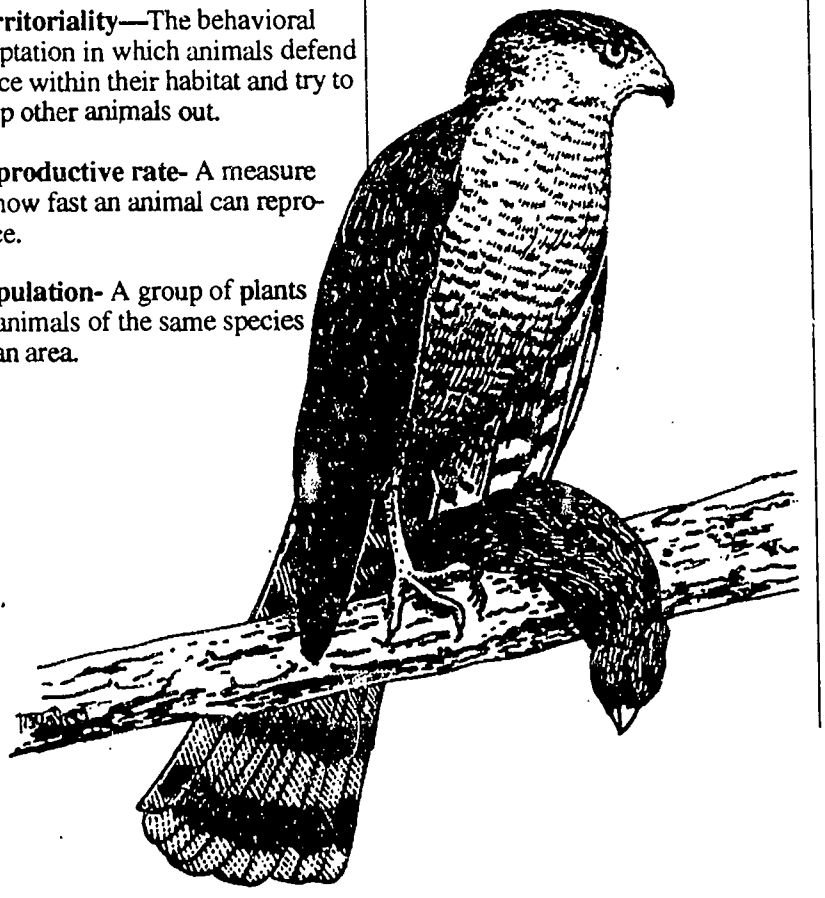
Population- A group of plants or animals of the same species in an area.

Activities

There are many Project WILD activities that demonstrate the concept of adaptations and the importance of predator-prey relationships to wildlife populations. Check the topic indexes in the elementary, secondary and aquatic guides to Project WILD.

"Quick Frozen Critters," in the elementary guide, is an especially useful exercise on predator-prey relationships. Other activities for both elementary and secondary school students are: "Musk Ox Maneuvers," "Owl Pellets" and "Who Lives Here?" On adaptations, see "Adaptation Artistry" (elementary and secondary).

The aquatic guide also contains several activities illustrating predator-prey relationships. Especially useful is "Marsh Munchers" and "Turtle Hurdles." On adaptations, check "Fashion a Fish."



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— "The Nigh Hunters" (owls), by Jane Rohling. Feb. 1983.
—"Life in a Trout Stream, by Lawrence S. Earley. March 1983.
—"Survival in the Pond" (predator-prey), by Lawrence S. Earley. August 1983.
—"How Long Do They Live?" (wildlife longevity), by Lawrence S. Earley. Sept. 1983.
—"Ghost of the Woods" (bobcat), by William S. Lea. March 1985.
—"Kinds of Eyes" (adaptations), by Lawrence S. Earley. Feb. 1986.
—"The Web of Life," by Lawrence S. Earley. August 1986.

Contributors

Articles in this issue of the *North Carolina, WILD Notebook* were written by Carl Betsill of the Division of Wildfire Management. Illustrations were by Consie Powell. The *WILD Notebook* was designed by Nancy Gorgas of the Division of Conservation Education.

N.C. WILD Notebook

North Carolina WILD Notebook is produced seven times each school year, and is intended to help educate young people about the need to conserve our natural resources. Free subscriptions are available by writing the Division of Conservation Education, N.C. Wildfire Resources Commission, 512 N. Salisbury St., Raleigh, N.C. 27611.

On-Site Activity 3 — Food Web Game

Curriculum Objectives:
Kindergarten
- Communication Skills: effective listening, effective speech
- Guidance: group participation, cooperation
- Science: plants and animals
- Social Studies: effective problem solving, concept of scarcity

Grade 1
- Communication Skills: effective listening, effective speech
- Guidance: group participation, cooperation
- Science: needs of plants and animals
- Social Studies: effective problem solving, importance of the environment

Grade 2
- Communication Skills: effective listening, effective speech
- Guidance: group participation, cooperation
- Science: animals around us, animal environments, human-use effects
- Social Studies: effective problem solving, unlimited wants vs. limited resources, importance of the environment

Grade 3 -
- Communication Skills: effective listening, effective speech
- Guidance: group participation, cooperation
- Science: interdependence, human-use effects
- Social Studies: effective problem solving, unlimited wants vs. limited resources

Location:
Outside, if possible, but a large indoor area will work

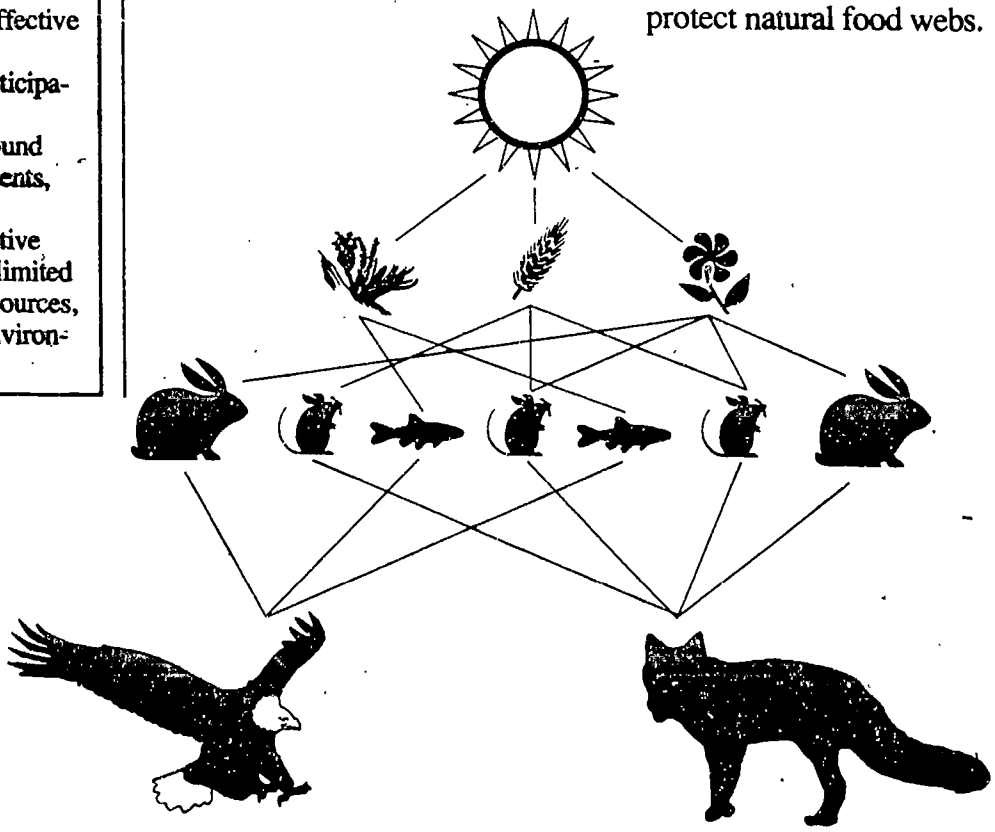
Group Size: 20 to 50

Estimated Time: 40 minutes

Materials:
Provided by the Park:
Animal and plant cards, spindles of yarn or string

Major Concepts:
- Food chain
- Food web
- Interdependence
- Producer (plant)
- Herbivore (prey)
- Primary carnivore (prey or predator)
- Secondary carnivore (predator)

Objectives:
- Create a simple food chain.
- Connect several food chains to form a food web.
- Explain what happens when a food web is disrupted.
- List three ways we can help to preserve and protect natural food webs.



Educator's Information:

The **energy** that each living **plant** or **animal** needs to survive is supplied by the sun. To better understand this idea, the students will follow the flow of energy from the sun all the way to the **secondary carnivore**. **Producers** are plants which can manufacture food directly from sunlight. **Herbivores** are animals which eat plants. Primary carnivores are animals which eat herbivores. Secondary carnivores are animals which can eat either herbivores or carnivores. After the students have a basic understanding of a **food chain**, the activity is expanded to include additional food chains linked into a **food web**. The students will see that anything which interrupts this flow of energy can have an effect on other levels of the food web.

Instructions:

1. Discuss with the students that individuals in a habitat depend on others for their energy. The source of all energy on earth is the sun. The sun provides the energy for plants (producers) to produce the food animals need to live. When an animal (herbivore) eats a plant, the animal carries some of the plant's energy away. When a **predator** eats the first animal, some of the energy is again passed along the food chain.

2. Draw and explain a simple food chain (see diagram #1). The energy begins with the sun. The plant converts the sun's energy into a food energy that the plant can use. As an animal eats the plant, that animal carries away some of the plant's energy, and converts it into a form of energy that the animal can use. If another animal (a primary or secondary carnivore) eats the first animal, energy is again passed along the food chain.

Diagram 1

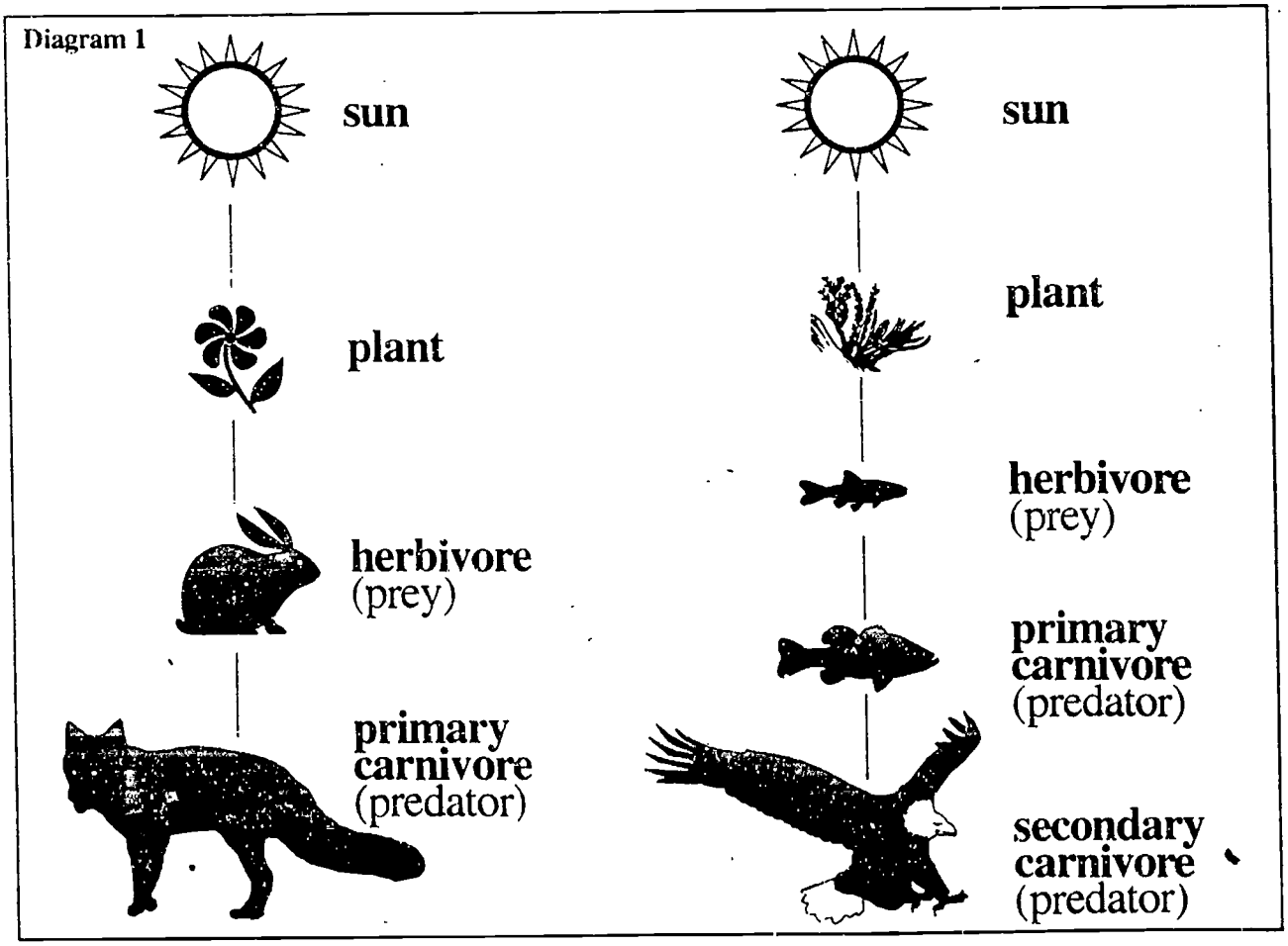
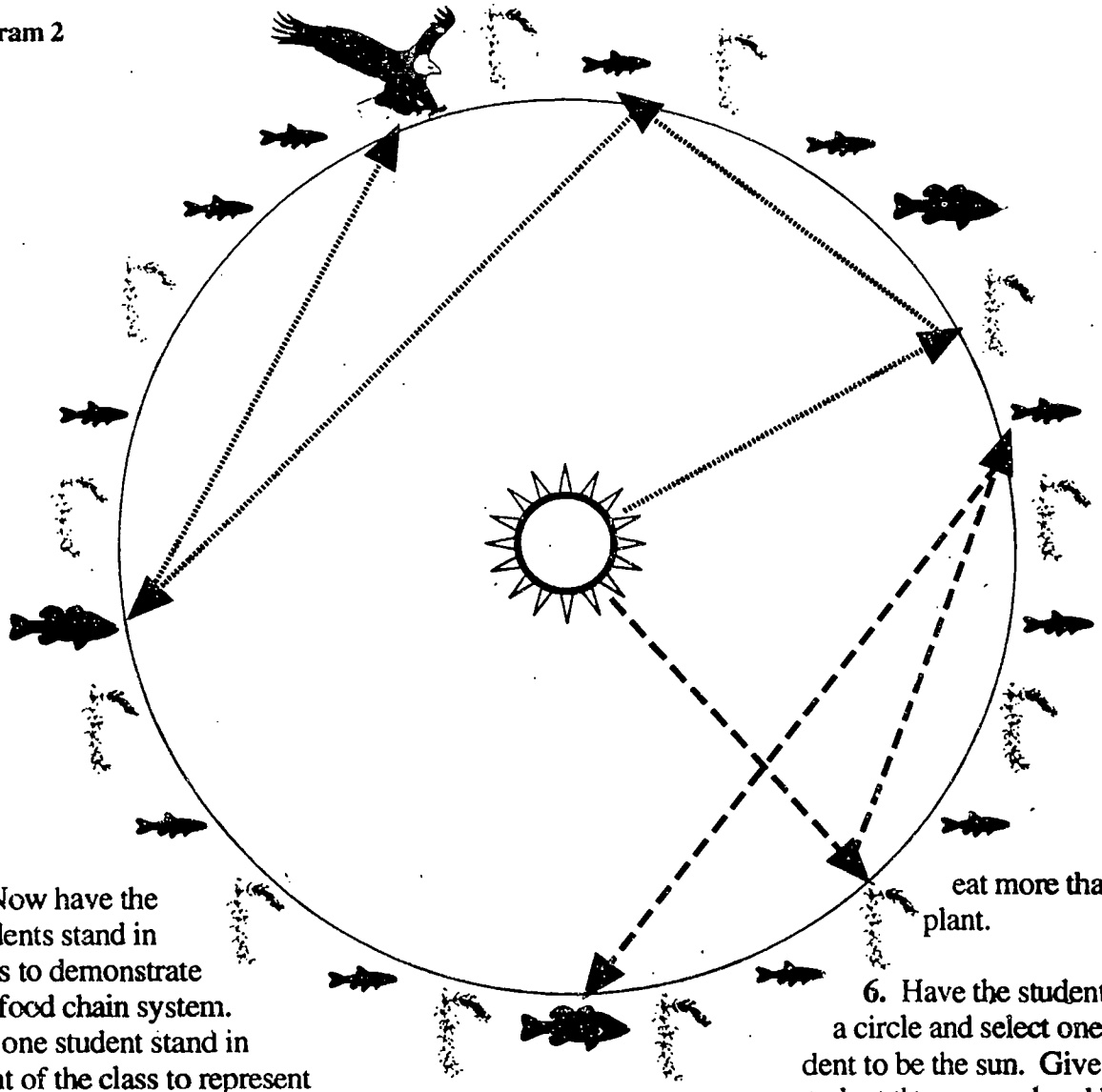


Diagram 2



3. Now have the students stand in lines to demonstrate the food chain system. Let one student stand in front of the class to represent the sun. Let the first student in each line represent a plant, the next, an herbivore, etc. Explain that the plant absorbs energy from the sun and converts it into food energy. The herbivore eats the plant and produces food energy, etc., on up the food chain. Make several food chains with the students using examples they are already familiar with such as:

- sun - algae - minnow - bass;
- sun - water plant - minnow - bass - eagle;
- sun - plant - rabbit - fox.

Explain again that all the energy originally comes from the sun.

4. Have the students create their own food chains and share their chains with the rest of the class. Explain again that all the energy originally comes from the sun.

5. Explain that all of the food chains are only part of a larger puzzle interconnected to form a food web. Explain that the predators eat more than one prey and that the herbivores eat more than one plant.

6. Have the students form a circle and select one student to be the sun. Give this student the sun card and have him or her stand in the center of the circle. Distribute the plant, herbivore, and carnivore cards to the rest of the students. About half of the students should be "plants" and the rest of the students should be given animal cards in the ratio of about three "herbivore" for each "primary carnivore." Select one student as the "secondary carnivore."

7. Start one of the spindles of string at the "sun" and travel through the food chain, ending

the string at either a primary or secondary carnivore. (See diagram #2.) Continue creating string-linked food chains with the other spindles of string until all the students are linked to the other parts of the food web by one or more strings. Explain as you go that these animals are now receiving energy through the string from the level closer to the sun. Tell them that they now represent a well-balanced food web.(The more the strings cross each other, the better the demonstration will be!)

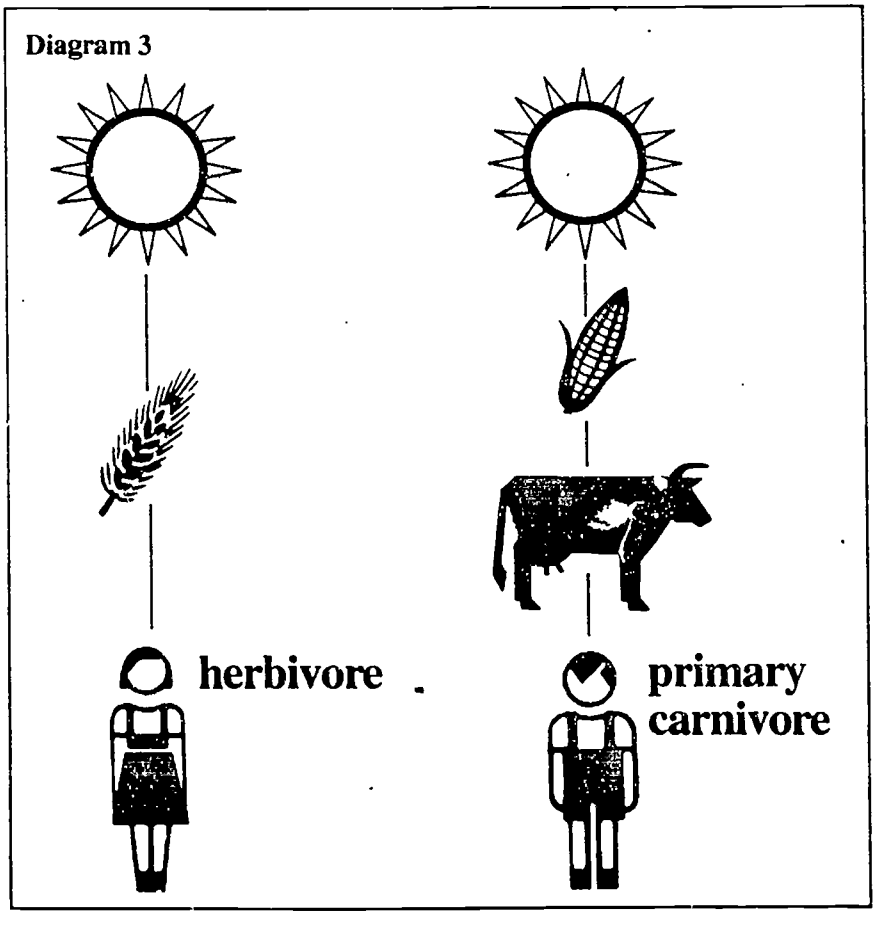
Note: A plant can be eaten by more than one herbivore, hence there may be two or more strings from each plant going to herbivores. An herbivore is only eaten by one carnivore, but a carnivore can eat more than one herbivore, hence only one string per herbivore goes to a carnivore, but most carnivores will have more than one string.

8. Ask the students what they think would happen if something interrupted the flow of energy anywhere in the food web. Ask half the plants to let go of their strings and sit down. Tell them that somebody just built a new shopping center and they were all dug up. How would this affect the two levels of carnivores? (Since many of the producers would die, many of the herbivores and carnivores would also die or have to leave the area.)

Discuss what would happen if small amounts of poison (like DDT) got into the plants. (It would accumulate in the consumers until it got so concentrated it would injure the animals.)

9. Ask the students how they think humans could affect the web. Talk about pollution, land clearing activities, trash disposal and any other negative activities you are familiar with. Then talk about the positive ways humans can work to help maintain many of the food webs we damage with our activities. Discussion could include setting aside and helping set aside protected areas like Jordan Lake, putting out bird food, and learning more about the needs of the plants and animals so we will not unintentionally damage or hurt them.

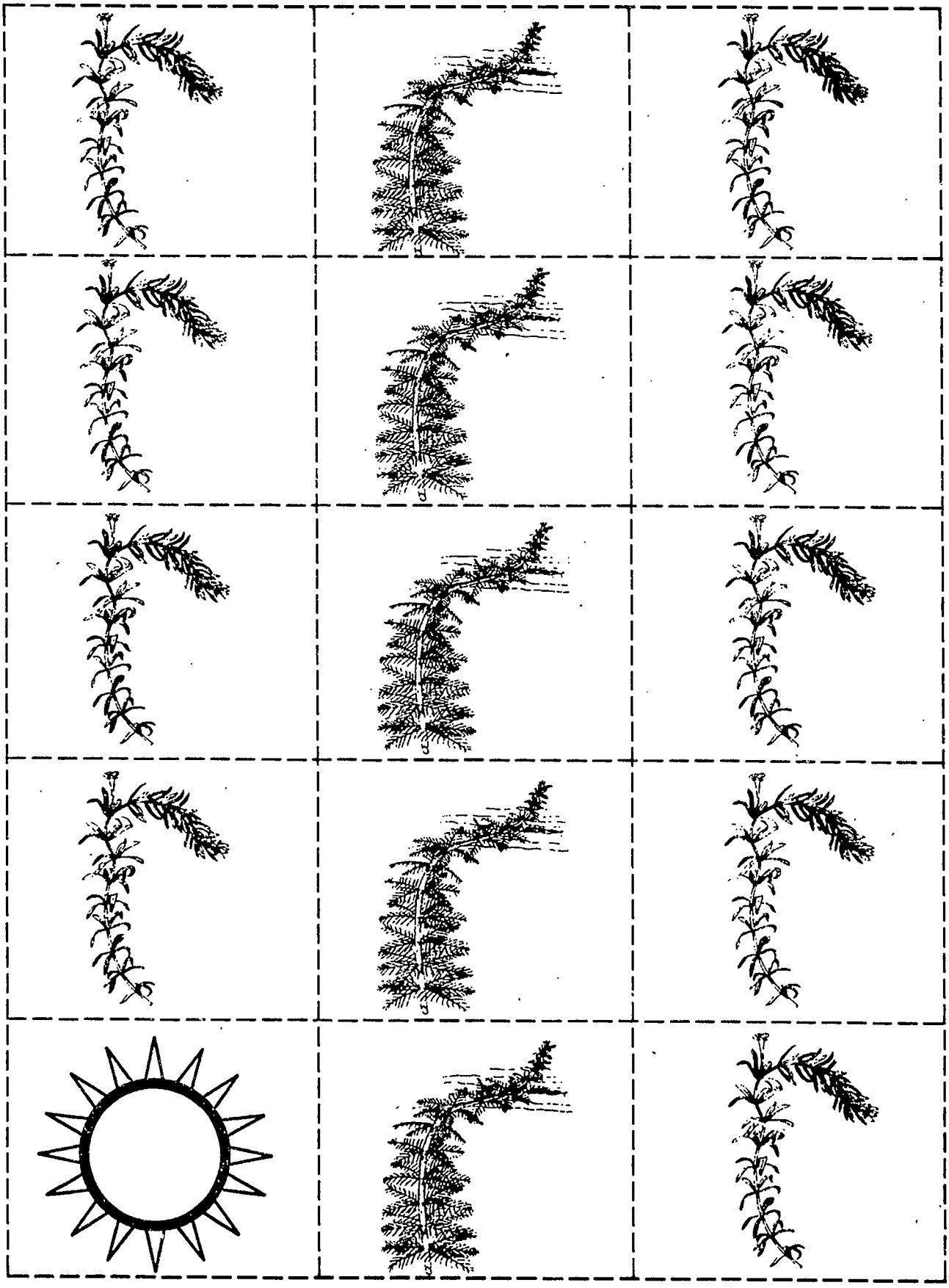
Diagram 3



Suggested Extension:

Have the students trace the flow of energy from the sun to themselves with pencil and paper. They could show two food chains, one with themselves as an herbivore and one with themselves as a primary carnivore. Examples are shown in diagram #3.

Plant and Sun Cutouts



Animal Cutouts

Secondary Consumer

Herbivore

Herbivore

Herbivore

Herbivore

Herbivore

Herbivore

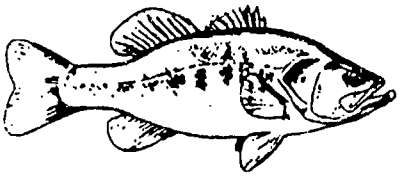
Herbivore

Herbivore

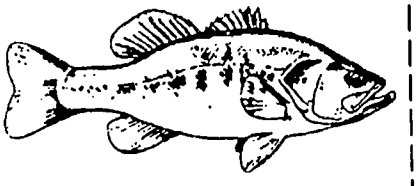
Herbivore

Herbivore

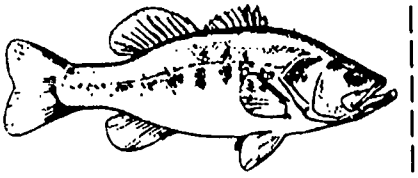
Herbivore



Primary Carnivore



Primary Carnivore



Primary Carnivore

Post-Visit Activity 1 — Produce a Predator

Curriculum Objectives:
Kindergarten
- Visual Arts: art appreciation, perception and observation, art skills
- Communication Skills: effective listening, effective speech, writing/drawing, visual comprehension
- Guidance: group participation, cooperation
- Science: plants and animals
- Social Studies: effective problem solving, concept of scarcity

Grade 1
- Visual Arts: art appreciation, perception and observation, art skills
- Communication Skills: effective listening, effective speech, writing/drawing, visual comprehension
- Guidance: group participation, cooperation
- Science: animal differences and similarities, needs of animals
- Social Studies: effective problem solving, importance of the environment

Grade 2
- Visual Arts: art appreciation, perception and observation, art skills
- Communication Skills: effective listening, effective speech, writing/drawing, visual comprehension
- Guidance: group participation, cooperation
- Science: animals around us, animal environments
- Social Studies: effective problem solving, importance of the environment

Grade 3
- Visual Arts: art appreciation, perception and observation, art skills
- Communication Skills: effective listening, effective speech, writing/drawing, visual comprehension
- Guidance: group participation, cooperation
- Science: defense mechanisms, interdependence
- Social Studies: effective problem solving

Location: Classroom

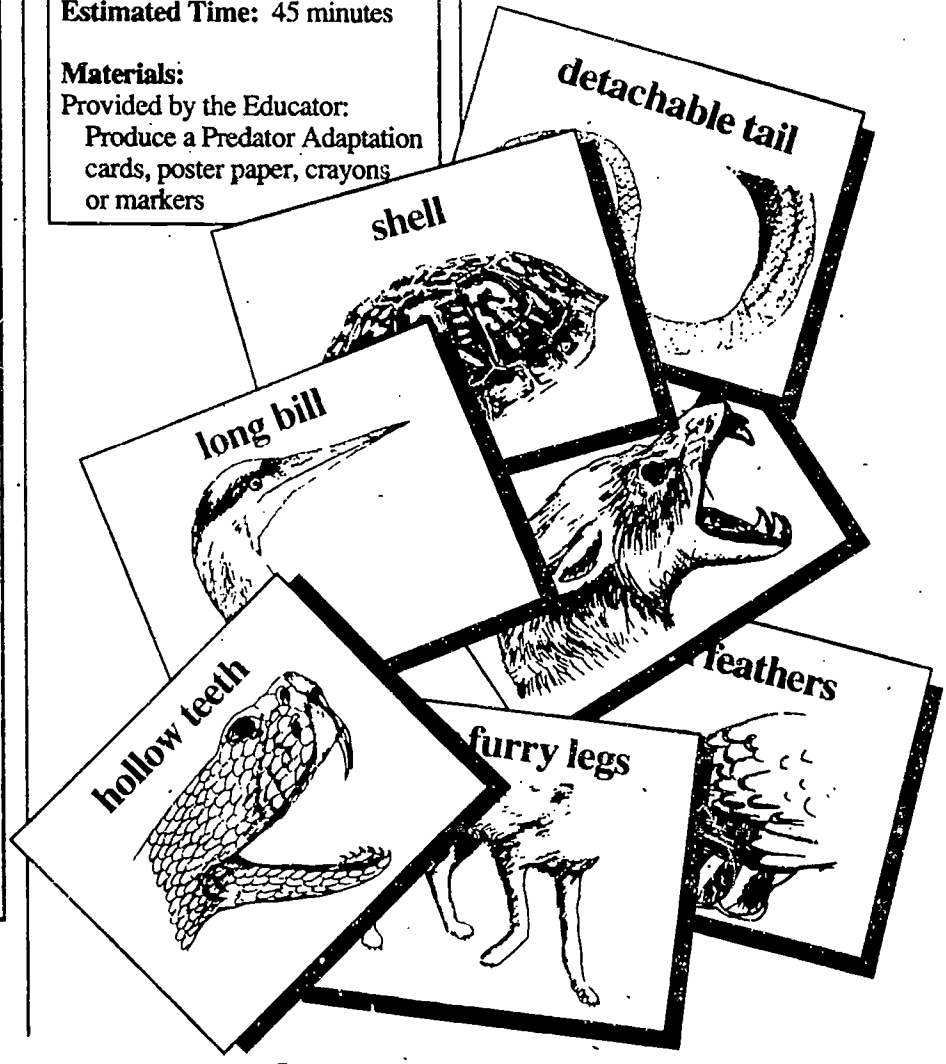
Group Size: 15-30

Estimated Time: 45 minutes

Materials:
Provided by the Educator:
Produce a Predator Adaptation cards, poster paper, crayons or markers

Major Concepts:
- Adaptation
- Predator
- Prey
- Habitat

Objectives:
- List two adaptations of a predator.
- Create a predator from possible adaptations.
- List two things that affect the survival of predators.
- List two things humans can do to help predators survive.



Educator's Information:

In this activity, students will work in small groups to create an imaginary **predator** that is specially adapted to its **habitat**. Each group will present and explain its predator to the rest of the class. Give each group one "head" card, one "body" card, and one "tail" card chosen randomly from the deck. Have the students create a "new" predator using the **adaptations** shown on these cards as guides.

Instructions:

1. Have the students define what a predator is (an **animal** which catches and eats other animals, a **carnivore**).

2. Ask them to name some predators that they know and list them on the board. Remind them that we tend to overlook many of the animals that are predators. Some frequently overlooked predators are common birds, spiders, **fish**, and turtles. All of these predators have some sort of special adaptations which enable them to catch other animals for food. These adaptations are a change in form or action which allow an animal to make the best use of its surroundings.

3. Discuss a few of the adaptations of the predators the students have listed. If necessary, give some examples such as: hawks and eagles have sharp, curved beaks for cutting and tearing **prey**; bats use echolocation for finding prey insects in the dark; foxes and cats have long, sharp teeth for catching and holding prey; owls have good night vision for finding prey in the dark.

4. If time permits, have the students bring pictures of predators to class and discuss the adaptations of these predators.

5. Break the students into groups of four to six. Give each group one adaptation card from each Produce a Predator category, poster paper and crayons or markers. Tell the students to let their imaginations run wild and create a new predator that uses each of their cards. Explain to the students that since this is a new predator, they must give answers to the following questions:

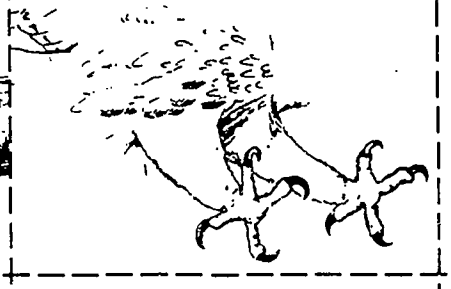
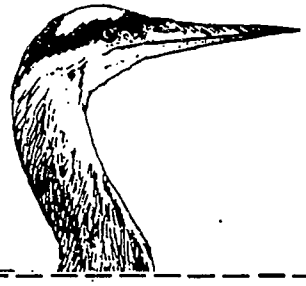
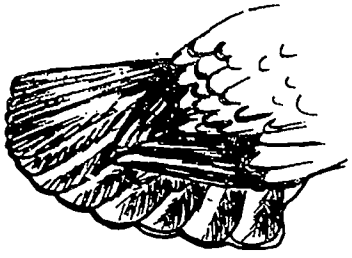
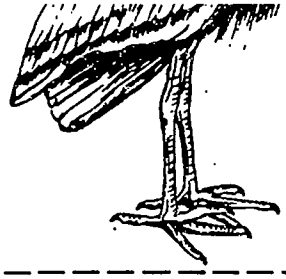
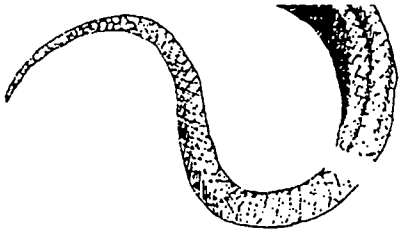
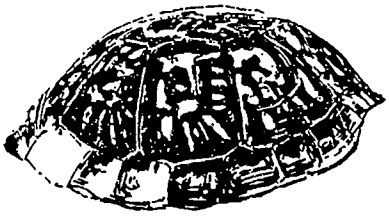
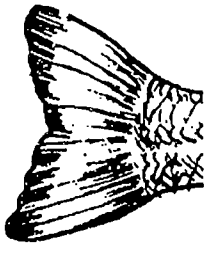
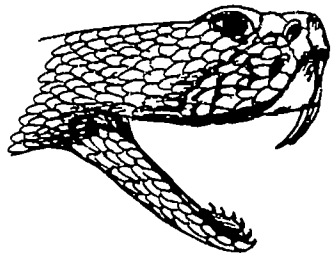
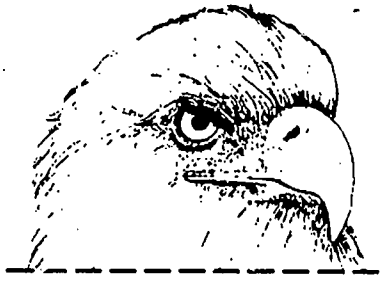
   a. What is the name of your predator?
   b. What type of habitat does it live in (such as the bottom of a lake, the center of a cloud, or in the school yard)? What other plants and animals live in that habitat?
   c. What kinds of prey does your predator eat? Is there a favorite prey?
   d. What adaptations does your predator have that help it live in its habitat? help it catch its prey?
   e. What are issues affecting the survival of your predator? What are its chances of survival? extinction?
   f. What can humans do to help guarantee the survival of your predator?

6. Finally, explain that each group will present their new predator to the rest of the class, giving answers to all the above questions.

7. Have the students draw their new predator with crayons or markers on poster paper. Offer suggestions if a group seems to be having a problem creating their predator or answering the questions.

8. After 20 minutes or so, have the students put the name of their predator on the picture and post the pictures for everyone to see. Have each group present their new predator to the rest of the class.

Produce a Predator Adaptation cards

TAIL	BODY	HEAD
prehensile tail 	feathers, strong claws 	long bill 
tail feathers 	feathers, long legs 	sharp teeth 
detachable tail 	shell 	good vision 
tail fin 	furry legs 	hollow teeth 
furry tail 	scales 	hooked beak 

Post-Visit Activity 2 — Food Chain Rummy

Curriculum Objectives:

Kindergarten
- Communication Skills: listening and visual comprehension, role of reading
- Guidance: cooperation, environment, group activities
- Science: plants and animals
- Social Studies: role of rules, concept of scarcity, effective problem solving

Grade 1
- Communication Skills: listening and visual comprehension, role of reading
- Guidance: cooperation, environment, group activities
- Science: needs of plants and animals
- Social Studies: role of rules, effective problem solving

Grade 2
- Communication Skills: listening and visual comprehension, role of reading
- Guidance: cooperation, environment, group activities, follow instructions
- Science: animals around us, animal environments
- Social Studies: role of rules, effective problem solving

Grade 3
- Communication Skills: listening and visual comprehension, role of reading
- Guidance: cooperation, group activities, follow instructions
- Science: interdependence
- Social Studies: role of rules, effective problem solving

Location: Classroom

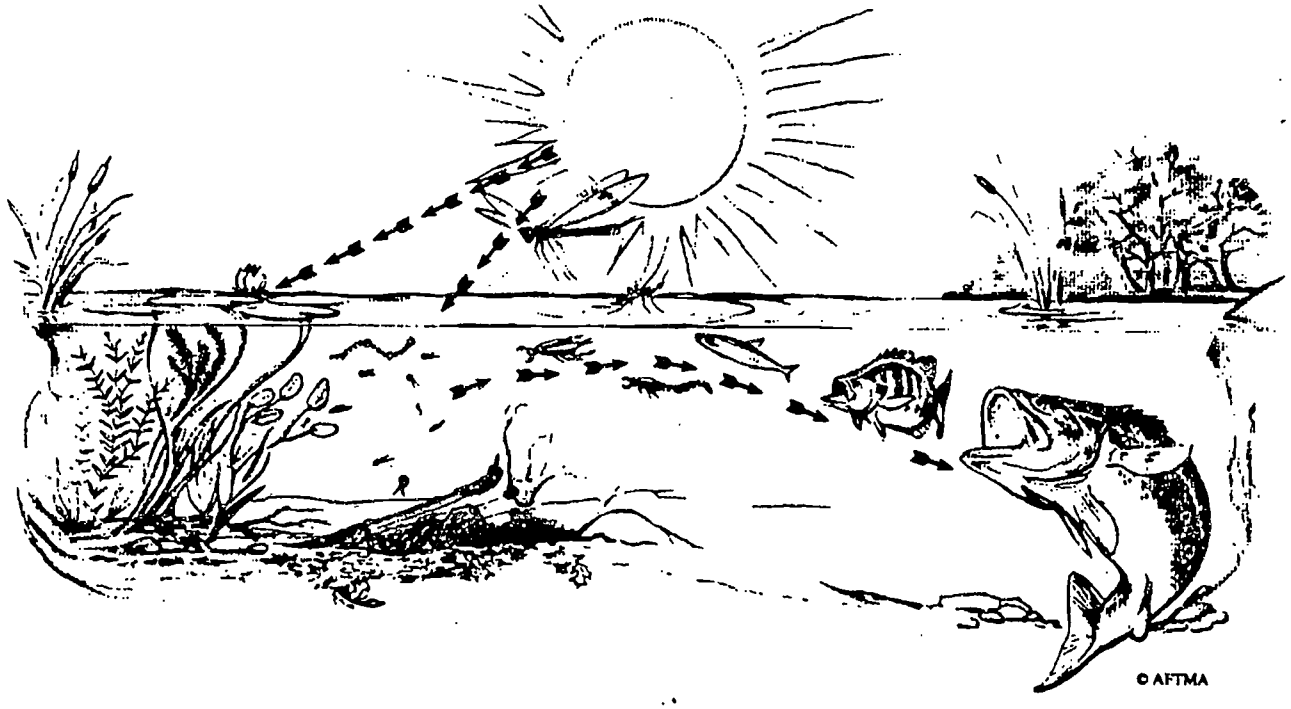
Group Size:
Several groups of 4 or 5 students each

Estimated Time: 20 minutes

Materials:
Provided by the Educator:
Food Chain Rummy cards (one "deck" per group)

Major Concepts:
- Food chain
- Predator
- Prey

Objective:
- Trace the flow of energy through two separate food chains.



Educator's Information:

All living **plants** and **animals** get their **energy** from the sun. In order to help students follow this flow of energy, they will play a card game called Food Chain Rummy. Different land and water based **food chain** sets will need to be collected for the students to get points.

Instructions:

1. Copy the Food Chain Rummy cards page four times to make one set of 48 cards. Cut them apart as indicated and laminate them for durability.

2. Divide students into groups of four or five. Explain to the students that they will be putting together groups of plants and animals in a food chain. An example of a water based food chain may be SUN—WATER PLANT—MINNOW—BASS. A land based food chain may be SUN —LAND PLANT—RABBIT—FOX. All sets must include four different cards. All sets must start with the SUN, then include a PLANT, an ANIMAL that is appropriate for eating that plant, and last, a **PREDATOR** that would eat that animal as **prey**. In order to make things simpler for students, a list of what cards can go together will be on each of the cards.

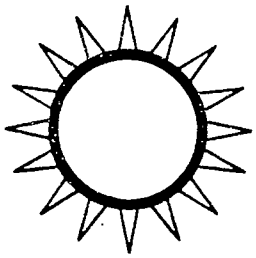
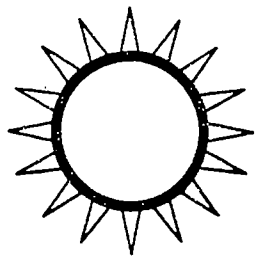
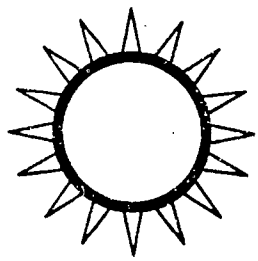
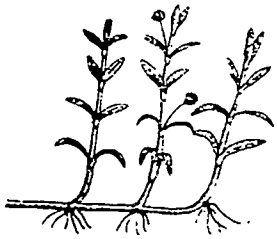
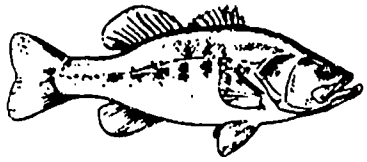
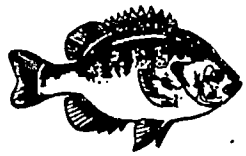
3. Pass a deck of cards out to each of the groups. The dealer passes six cards to each person in their group, including themselves. The dealer then places the deck face down in the center of the group. The top card is placed face up next to the pile. Players check their hands for food chain sets. Play starts with the player to the left of the dealer, and continues clockwise around the circle. Players first draw a card from the deck or from the face-up pile and then check their hands for any food chain sets. If the players have any sets, they may lay them down in front of them. If the player did not lay down a food chain on this turn the player must then discard one of the cards from their hand to the top of the face up pile. The first player with no cards in their hand wins.

Note: A player should win in the third or fourth round. Play can stop then or continue until all players are out.

Suggested Extensions:

1. Invent your own sets with different animals and plants.
2. Have the students color their cards when the game is over.

Food Chain Rummy cards

SUN  SUN ➡ PLANT	**SUN**  SUN ➡ PLANT	**SUN**  SUN ➡ PLANT
WATER PLANT  SUN ➡ PLANT ➡ MINNOW	**WATER PLANT**  SUN ➡ PLANT ➡ INSECT	**LAND PLANT**  SUN ➡ PLANT ➡ RABBIT
MINNOW  PLANT ➡ MINNOW ➡ BASS	**INSECT**  PLANT ➡ INSECT ➡ BLUEGILL	**RABBIT**  PLANT ➡ RABBIT ➡ FOX
LARGEMOUTH BASS  MINNOW ➡ BASS	**BLUEGILL**  INSECT ➡ BLUEGILL	**FOX**  RABBIT ➡ FOX

Post-Visit Activity 3 — Predator Maze

Curriculum Objectives:

Kindergarten
- Visual Arts: art skills and comprehension
- Communication Skills: listening and visual comprehension, drawing skills
- Guidance: effective listening skills
- Science: animals
- Social Studies: effective problem solving

Grade 1
- Visual Arts: art skills and comprehension
- Communication Skills: listening and visual comprehension, drawing skills
- Guidance: effective listening skills
- Science: needs of animals
- Social Studies: effective problem solving

Grade 2
- Visual Arts: art skills and comprehension
- Communication Skills: listening and visual comprehension, drawing skills
- Guidance: following instructions, work independently
- Science: animals around us, animal environments
- Social Studies: effective problem solving

Grade 3
- Visual Arts: art skills and comprehension
- Communication Skills: listening and visual comprehension, drawing skills
- Guidance: following instructions, work independently
- Science: interdependence
- Social Studies: problem solving

Location: Classroom

Group Size: Any

Estimated Time:
15 to 30 minutes

Materials:
Provided by the Educator:
Predator mazes, pencils or colored markers (one each per student)

Major Concepts:
- Predator
- Prey
- Food chain
- Habitat

Objective:
- List three different predators and their prey.

Educator's Information:

In this activity, students will be given copies of different mazes, and are to help the **predators** find their way to the **prey**. The **animals** used in this activity were discussed during the on-site activities at Jordan Lake.

Instructions:

1. Make copies of the Predator Mazes.
2. Discuss the Predator/Prey relationship with the students.
3. Pass out the mazes. Let the fun begin!

Suggested Extension:

Allow the students to color the mazes and draw in backgrounds they may have seen at Jordan Lake.

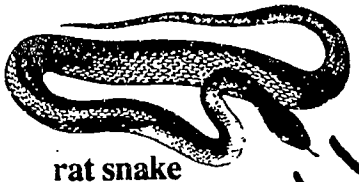
Predator Mazes

Some spiders weave webs to help them catch their prey. Help this spider to catch its prey, but beware of the bird that loves to eat spiders!

fly

garden spider

Help the rat snake keep away from its predators and slither safely along to its prey, the mouse.



rat snake

hawk

king snake

fox

busy road

mouse

Predator Maze

Small fish may hide from predators amongst the water plants.
Help this largemouth bass find dinner.

VOCABULARY

Adaptation - A change in a characteristic of a plant or animal that improves its chances for survival.

Animal - A living organism which is normally able to move. Animals must obtain food by consuming other animals or plants.

Carnivore - An animal that eats other animals for food. A predator.

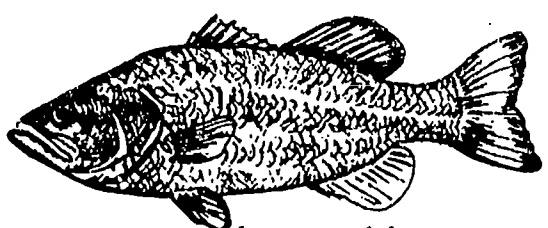
Characteristic - A distinctive feature or quality of an organism, such as an eagle's sharp talons.

Community - A naturally occurring group of different plant and animal species that live in a particular environment. A large community, such as a forest, contains many smaller communities.

Energy - The capacity for activity which is derived from a food source; the ability to do work. Example: a plant has the ability to grow because it absorbs energy from the sun; an eagle has the ability to grow and survive because it absorbs energy from the fish it eats.

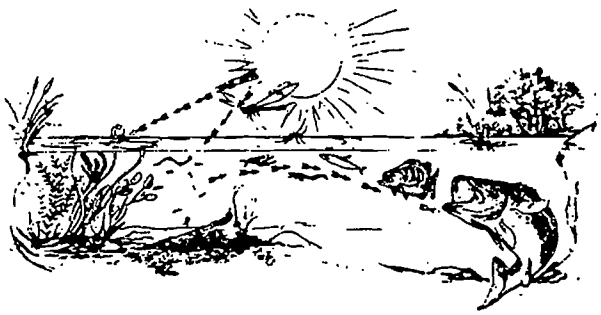
Environment - The sum total of the conditions in which an organism exists. May include water, temperature, light, other living organisms, etc.

Fish - A cold-blooded, limbless vertebrate which lives in water and obtains oxygen through gills (bass, minnow, goldfish).



largemouth bass

Food Chain - The transfer of food energy from one organism to another. A series of organisms in any natural community in which each member feeds on the one before and is, in turn, eaten by the one after.



Food Web - The interconnected food chains in a community.

Habitat - The place in which an organism, population, or community exists. This includes all of the environmental conditions associated with this place, including food, shelter, space, and water.

Herbivore - An animal that eats plants for food. A prey.

Mammal - A warm-blooded vertebrate which is covered with hair/fur and nurses its young from mammary glands (fox, mouse, human).

Niche - The particular place where an individual organism can live.

Omnivore - An animal that eats both plants and other animals. May be a predator or prey.

Organism - Any living plant or animal.

Photosynthesis - The process in green plants in which carbon dioxide (CO_2) and water (H_2O) are converted to food energy in the presence of light.

Plant - A living organism that is not able to move from place to place. Most plants make their own food by photosynthesis.

Population - The number of plants or animals of the same type that live in a given area.

Predator - An animal that kills other animals for food.

Prey - An animal that is eaten by another animal.

Primary Consumer - An animal that eats plants; herbivore. These animals are typically prey.

Primary Producer - Plants which manufacture food directly from sunlight.

Scat - Animal droppings.

Secondary Consumer - An animal that eats other animals; carnivore; predator.

Sign - The clues an animal leaves behind that help to identify it and explain what it was doing. Sign includes animal homes (dens, nests), whitewash from birds, food clues, rubs, scrapes, scratches, scat and tracks.

Shelter - The protected living space for an animal, such as a den, nest, or burrow.

Space - The area in which an organism lives. Its community and niche.

Vertebrate - An animal with a backbone (bird, fish, mammal, reptile, amphibian).

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SCHEDULING WORKSHEET

Date request received_____ Request received by_____

1) Name of group (school) _____

2) Contact person _____ _____
name phone (work) (home)

_____
address

3) Day/date/time of requested program _____

4) Program desired and program length _____

5) Meeting place _____

6) Time of arrival at park _____ Time of departure from park _____

7) Number of students _____ Age range (grade) _____

8) Number of chaperones _____

9) Areas of special emphasis _____

10) Special considerations of group (e.g. allergies, health concerns, physical limitations)_____
_____

11) Have you or your group participated in park programs before? If yes, please indicate previous programs attended: _____
_____

If no, mail the contact person an Educator's Guide.

12) Are parental permission forms required? _____ If yes do you have these forms? _____
If not, mail contact person a Parental Permission form.

I, _____, have read the entire Educator's Guide and understand and agree to all the conditions within it.

Return to: Jordan Lake State Recreation Area
Route 2 Box 159
Apex, NC. 27502

PARENTAL PERMISSION FORM

Dear Parent:

Your child will soon be involved in an exciting learning adventure - an environmental education experience at _____. Studies have shown that such "hands-on" learning programs improve children's attitudes and performance in a broad range of school subjects.

In order to make your child's visit to "nature's classroom" as safe as possible we ask that you provide the following information and sign at the bottom. Please note that insects, poison ivy and other potential risks are a natural part of any outdoor setting. We advise that children bring appropriate clothing (long pants, rain gear, sturdy shoes) for their planned activities.

Child's name _____

Does your child:

- Have an allergy to bee stings or insect bites?_____
  If so, please have them bring their medication and stress that they, or the group leader, be able to administer it.

- Have other allergies? _____

- Have any other health problems we should be aware of?_____
  _____

- In case of an emergency, I give permission for my child to be treated by the attending physician. I understand that I would be notified as soon as possible.

  _____ _____
  Parent's signature date

Parent's name _____ Home phone _____
(please print) Work phone _____

Family Physician's name _____ phone _____

Alternate Emergency Contact

Name_____ phone _____

NORTH CAROLINA PARKS & RECREATION
PROGRAM EVALUATION

Please take a few moments to evaluate the program(s) you received. This will help us improve our service to you in the future.

1. Program title(s) _____ Date _____
   Program leader(s) _____

2. What part of the program(s) did you find the most interesting and useful? _____
   _____

3. What part(s) did you find the least interesting and useful? _____
   _____

4. What can we do to improve the program(s)? _____
   _____
   _____

5. General comments _____
   _____
   _____
   _____

LEADERS OF SCHOOL GROUPS AND OTHER ORGANIZED YOUTH GROUPS PLEASE ANSWER THESE ADDITIONAL QUESTIONS:

6. Group (school) name _____

7. Did the program(s) meet the stated objectives or curriculum needs? _____
   If not, why? _____
   _____

Please return the completed form to park staff. Thank you.

Jordan Lake State Recreation Area
Route 2 Box 159
Apex, NC. 27502

Notes

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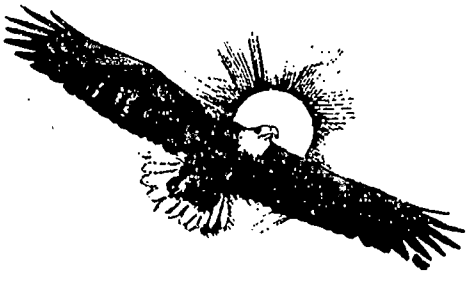

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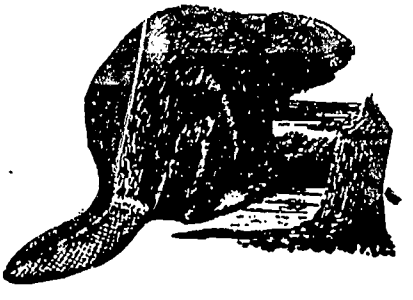

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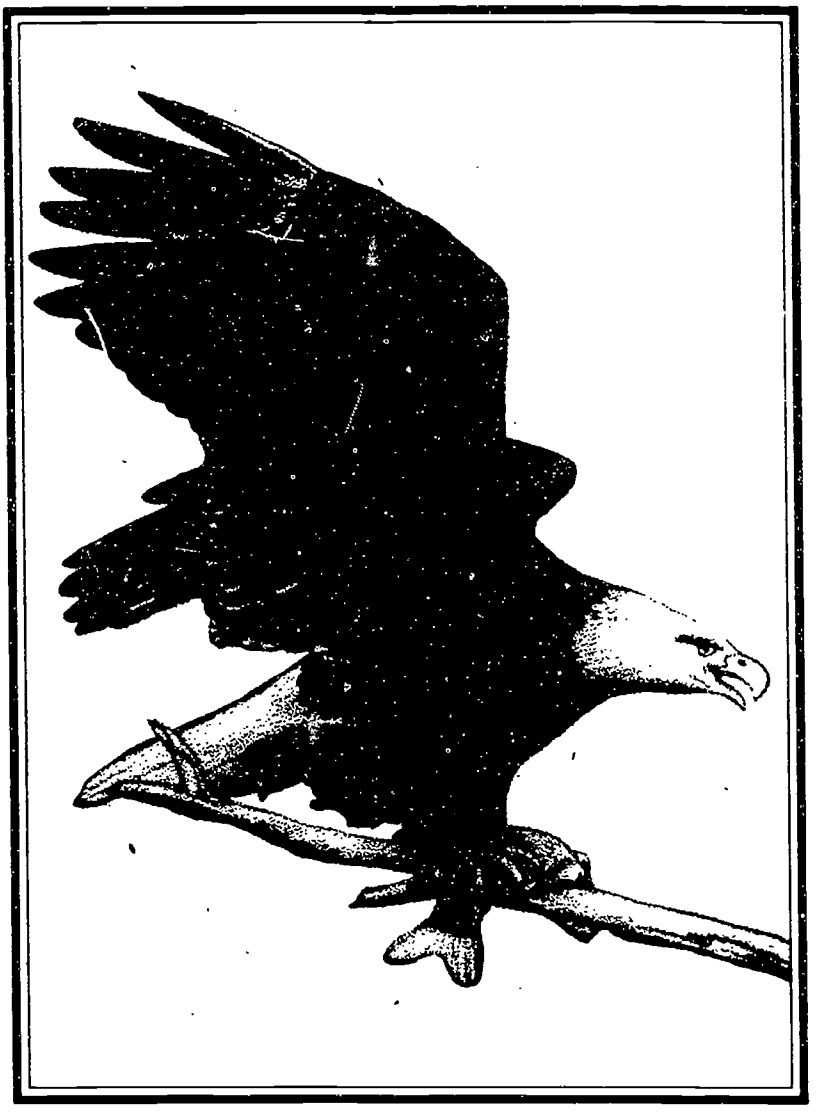
EDUCATOR'S GUIDE



Jordan Lake State Recreation Area

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Department of Environment, Health, and Natural Resources

DEHNR

James B. Hunt, Jr.
Governor

Jonathan B. Howe
Secretar

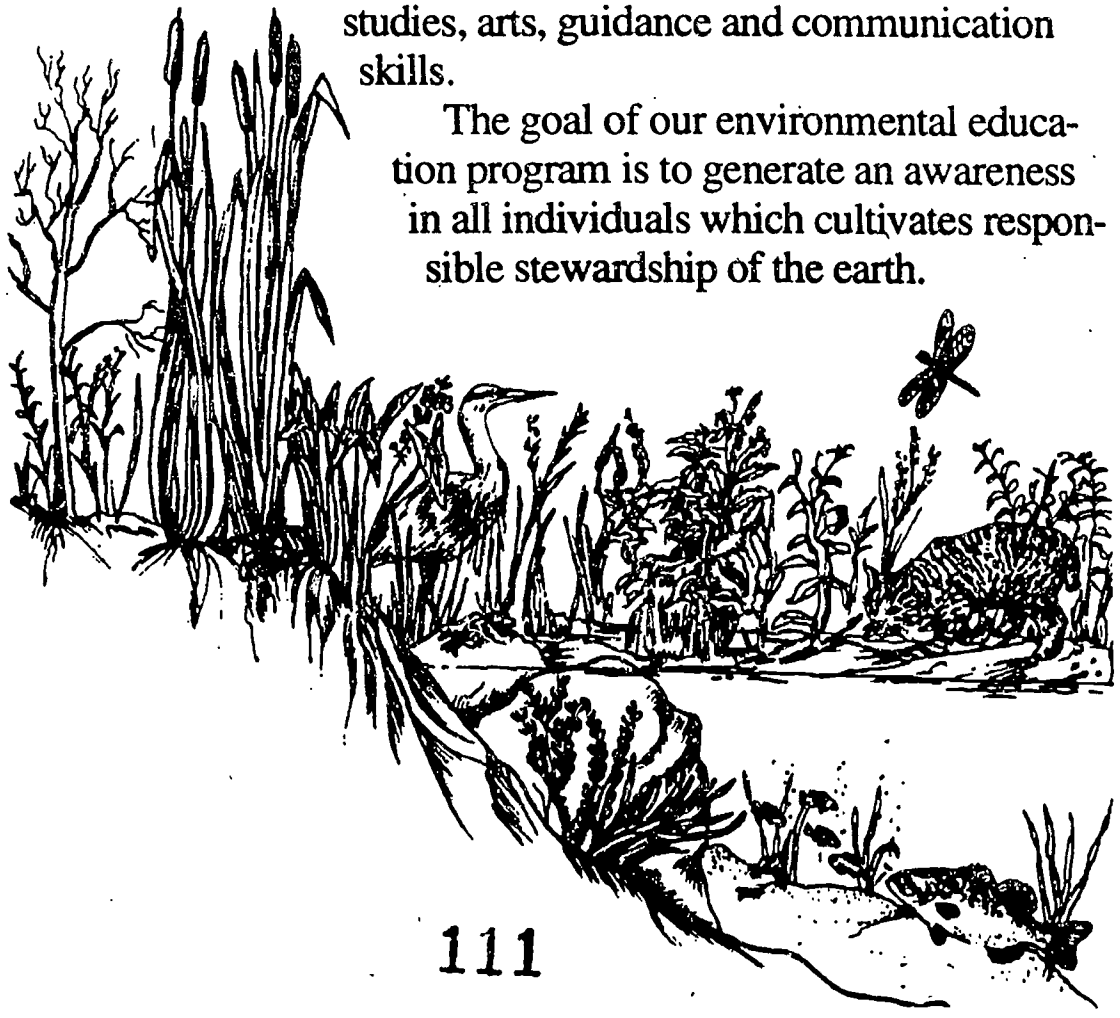
4-93

Introduction to the North Carolina State Parks System

Since its creation in 1916, the North Carolina State Parks System has provided its visitors with opportunities for educational experiences and programs. Through the years, we have continued to revise and update our programming to make it more informative and more tailored to the needs of our state's school system.

Our state park system provides a wonderful outdoor classroom for learning about our North Carolina heritage. Each of our unique state parks offers a variety of environmental education opportunities which highlight our state's natural and cultural resources. All of our environmental education programs are designed to meet the curriculum requirements of the North Carolina Department of Public Instruction. Subject areas covered include science, social studies, arts, guidance and communication skills.

The goal of our environmental education program is to generate an awareness in all individuals which cultivates responsible stewardship of the earth.



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Introduction to Jordan Lake State Recreation Area

Jordan Lake State Recreation area is located on B. Everett Jordan Lake in Chatham County. It is between Apex and Pittsboro on US 64, about 30 miles west of Raleigh and 20 miles south of Durham.

B. Everett Jordan Dam and Lake can be traced to a disastrous hurricane that struck the Cape Fear River Basin in 1945. Following the hurricane, Congress directed the Corps of Engineers to undertake a comprehensive study of water resource needs. In 1963, it authorized construction of the project, then known as New Hope Lake. Actual construction began in 1967. The lake was formed by a dam on the Haw River at its confluence with the New Hope River and encompasses two relatively large drainage basins. In 1973 the name of the project was changed to B. Everett Jordan Dam and Lake to honor the former Senator from North Carolina.

The Jordan Lake project serves multiple purposes including flood control, water supply, water quality control, outdoor recreation, and fish and wildlife conservation. It encompasses 46,768 acres—13,900 of which are permanently flooded to form a reservoir at 216 feet above mean sea level. The land surrounding the reservoir is managed as open space for recreation and wildlife habitat.

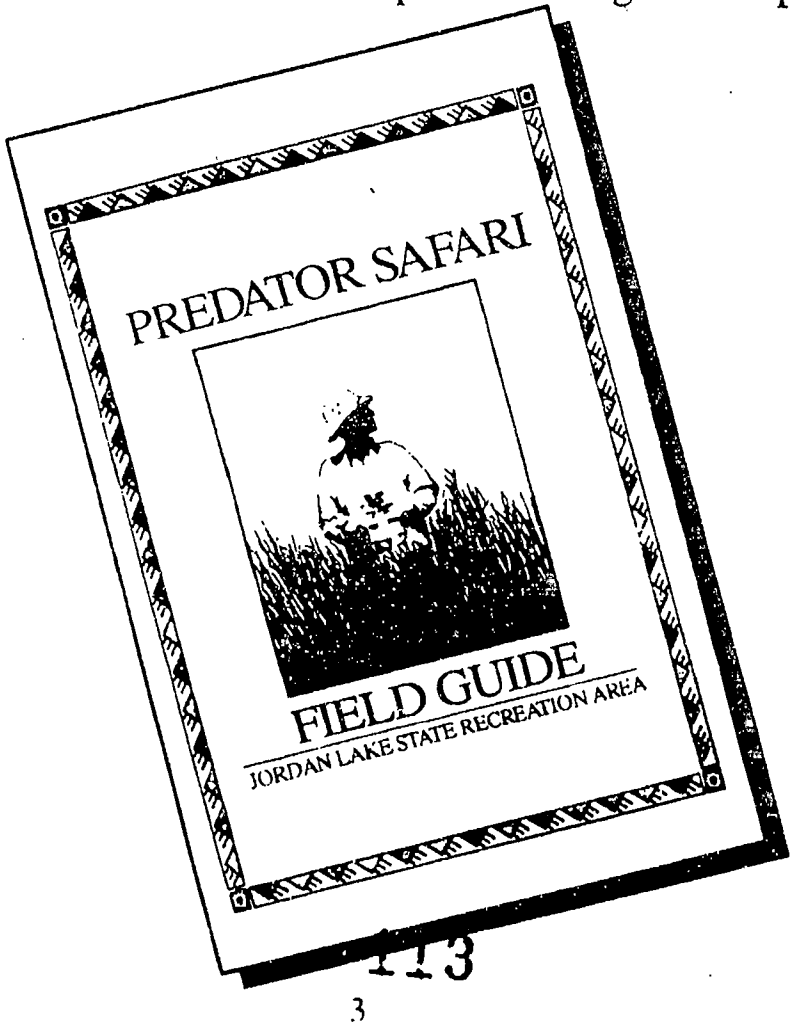
Numerous recreation facilities and a variety of education opportunities make a visit to Jordan Lake's eight separate facilities an enjoyable experience. The natural resources of this unique area open the door to a world of learning and discovery. Combine easy access, acres of land and water, and diverse animal and plant life, and you have the recipe for a rewarding educational experience.

Program Options

Programs are geared to different grade levels and provide a fun and exciting way to learn about different topics. Topics include: birds, mammals, pond life, predators and prey, animal tracks, astronomy, Native American artifacts, reptiles and amphibians, fishing, habitats for plants and animals, bald eagles, raptors, and colonial life. Many of our programs can be adapted to meet special needs.

Our specially developed, curriculum-based Environmental Education Learning Experiences are available by reservation only (see section on how to schedule a program). These programs are supplemented by an activity packet which includes suggested activities for before and after your visit.

Groups are welcome to visit the park for self-guided expeditions.



Life in, on and over Jordan Lake

Jordan Lake State Recreation Area's most valuable resource is Jordan Lake itself and the aquatic and bird life it supports. It provides habitat for one of the largest populations of bald eagles east of the Mississippi River. These magnificent birds live here all year, with as many as 15 commonly seen on a summer day. During the winter months, sea gulls and many species of waterfowl, including loons, grebes and ducks, can be seen on the lake. The lake also provides habitat for some of the aquatic species that formerly lived in the New Hope and Haw Rivers. It was initially stocked with bass, crappie and hybrid striped bass which continue to provide enjoyment to anglers.

Life around Jordan Lake

The park provides important habitat for a large number of plant and animal species. The bald eagle is the most famous resident of the lake, but in 1992 a barking tree frog was found in the park. It was the first known specimen of a barking tree frog to be found in Chatham county. A wide variety of birds are found throughout the park, including wood thrush, pine warbler, white-throated sparrow, red-shouldered hawk and barred owl. There is an abundance of deer and rabbits. Gray foxes roam in good numbers, and beaver, bobcat and mink are occasionally seen.

A variety of plant life is also found at Jordan Lake. Mountain laurel grows on some north-facing slopes and large stands of bamboo can be found in low areas. Relict specimens of exotic species left from the days when this was farm land lend diversity to the flora of the park.

Trail Descriptions

Old Oak Trail: This easy trail is 0.9 miles in length. It can be reached from the parking lot in picnic loop A in Ebenezer Church Recreation Area. The trail winds along the lake shore, goes through old growth hardwoods, passes an old farm pond and returns to the parking lot through a large stand of young loblolly pine. Water-loving species are found near the lake and the pond. Many water birds may be seen in this area in the winter and during migration. The trail is marked with red diamonds.

Ebenezer Church Trail: Also easy, this 1-mile trail begins at the southwest end of the beach parking lot at Ebenezer Church Recreation Area. It passes through bottomland forest before reaching the site of the old Ebenezer Church. Mixed hardwoods and some old-growth pines surround a picturesque pond midway on the trail. Fishing for bass and panfish is good in the pond. The trail returns to its starting point through beautiful hardwoods hanging with vines. The trail is marked with red diamonds.

Pond Trail: This 1.4 mile, easy trail begins across the parking lot from the bathhouse at Seaforth Recreation Area. The trail passes through mixed hardwoods and boasts three ponds, with a beaver lodge at the second pond. Scenic views of the lake and at least 5 species of fern are just a few of the rewards of a hike along Pond Trail. The trail returns to the opposite side of the parking lot near the large picnic shelter. This trail is marked with white rectangles.

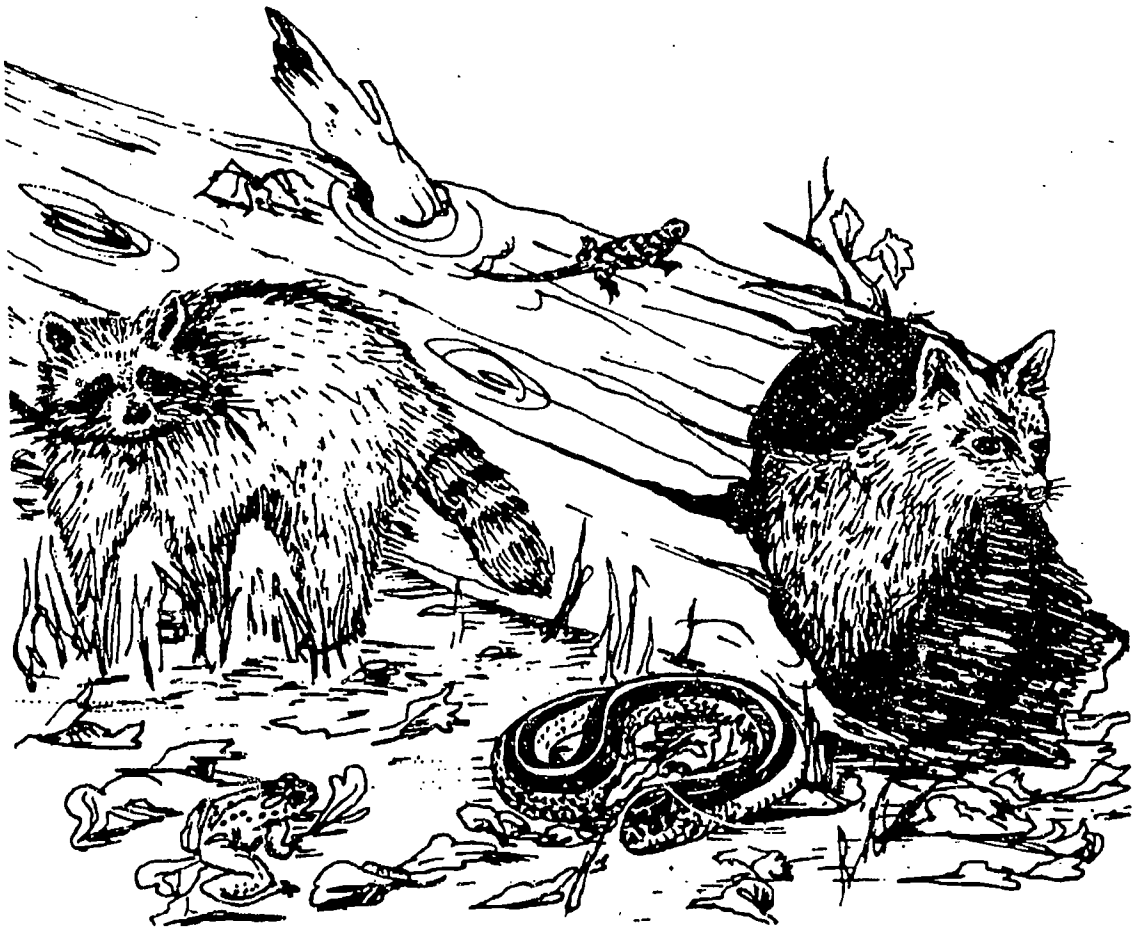
Vista Point Trails: A 1-mile children's trail begins behind the picnic shelter at Vista Point Recreation Area. It winds near the lake shore, passes through pine woods and ends at the group campground. A 3 mile trail is presently under construction and should be open by late summer of 1993.

Scheduling a Trip to Jordan Lake State Recreation Area

Groups are encouraged to visit the park during all seasons of the year for hikes, exploration, environmental education programs and activities. Leaders may choose to conduct their own activities or enlist the help of the park staff.

To Make a Reservation

Because our Environmental Education Learning Experiences involve additional park staff, it is necessary to contact the park at least one month in advance. For other types of programs, including special requests, please contact the park at least three weeks in advance.



Please provide the following information:

- Name of group (school).
- Name, address, work and home telephone numbers of the group contact person.
- Date and time of arrival and meeting place at the park.
- Departure time from the park.
- Number of participants and adult leaders. *(A maximum of 30 participants is recommended. Please have one adult leader per 10 students. Adult leaders are responsible for maintaining control of the group).*
- Age range and/or special needs of the participants.
- Desired activities; assistance from park staff.

Bad Weather Policy and Cancellations

Our Environmental Education Learning Experiences are held outside. If weather conditions preclude us from conducting the program outside, we will provide a modified program at the park office. If you make a reservation for an Environmental Education Learning Experience (or another program) you <u>may</u> come regardless of the weather or we can reschedule if you desire. *If you wish to cancel or reschedule, please notify the park office as soon as possible.*

Before You Make the Trip

1. Complete appropriate pre-visit activities.
2. Visit the park without the participants prior to the scheduled group trip. This will give you a chance to become familiar with the park facilities and staff, and provide you with an opportunity to identify potential problems.
3. Discuss behavior expectations with adult leaders and participants when planning the trip. Discuss the park rules listed and emphasize safety.
4. Inform the group about poison ivy, ticks and snakes. Discuss the need to use insect repellent and sunscreen.
5. Inform the group of the need to dress appropriately for the season. Shoes suitable for walking should be worn.
6. Have everyone wear a name tag. For safety, please color code them by groups. A buddy system for younger students is encouraged.
7. *Group leaders are responsible for obtaining a consent form from each participant, including a list of any health considerations and special medical needs.* These forms are available at the park office and in the Environmental Education Learning Experience packet.
8. If your group plans to collect any plant, animal or mineral within the park, a Research Activity permit is required. Contact the park office to obtain a permit application at least 30 days in advance of your visit.
9. Assigning jobs to students and/or leaders is recommended. Leaders could be responsible for lunches, moving groups from one area to another and enforcing rules.

While at the Park

Please obey the following rules:

1. To help you get the most out of this experience and increase the chance of observing wildlife, be as quiet as possible while in the park.
2. On hikes, walk behind the leader at all times. Stay on the trails. Running is not permitted.
3. All plants and animals within the park are protected. Breaking plants and harming animals are strictly prohibited in all state parks. This allows all visitors the same opportunity to enjoy our natural resources.
4. Picnic only in designated areas. Help keep the park clean and natural. Do not litter.
5. In case of accident or emergency, contact park staff immediately.

Following the Trip

1. Complete post-visit activities provided in the Environmental Education Learning Experience packet.
2. Build upon the field experience and encourage participants to seek answers to questions and problems encountered at the park.
3. Relate the experience to classroom activities and curriculum through reports, projects, demonstrations, displays and presentations.
4. Give tests or evaluations, if appropriate, to determine if students have gained the desired information from the experience.
5. File a written evaluation of the experience with the park. Evaluation forms are available from the park office and from the Environmental Education Learning Experience packet.

Park Facilities

Most programs will be conducted at Ebenezer Church Recreation Area and Seaforth Day-Use Area. These two areas have the following facilities:

- **Restrooms**
- **Picnic Areas with shelters, grills and tables.**

Other facilities at Jordan Lake State Recreation Area:

- Family camping, with electricity and water, is available at Parker's Creek, Poplar Point and Crosswinds campgrounds.
- Group camping is available at Vista Point and Parker's Creek. Contact the park office for reservations.
- Hike-in camping is available at New Hope Overlook.
- Boat ramps are available at all campgrounds and at all day-use areas.
- A canoe access area and a boat ramp are available at Robeson Creek.
- Designated swimming areas are available at all areas except New Hope Overlook, Robeson Creek and Crosswinds boat ramp.

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Park Information

Location:

The park is located in Chatham County between Pittsboro and Apex. The park office is located on US 64, one mile west of the crossroads of Wilsonville.

Address:

Jordan Lake State Recreation Area
Route 2 Box 159
Apex, North Carolina 27502

Telephone:

(919) 362-0586

Office Hours:

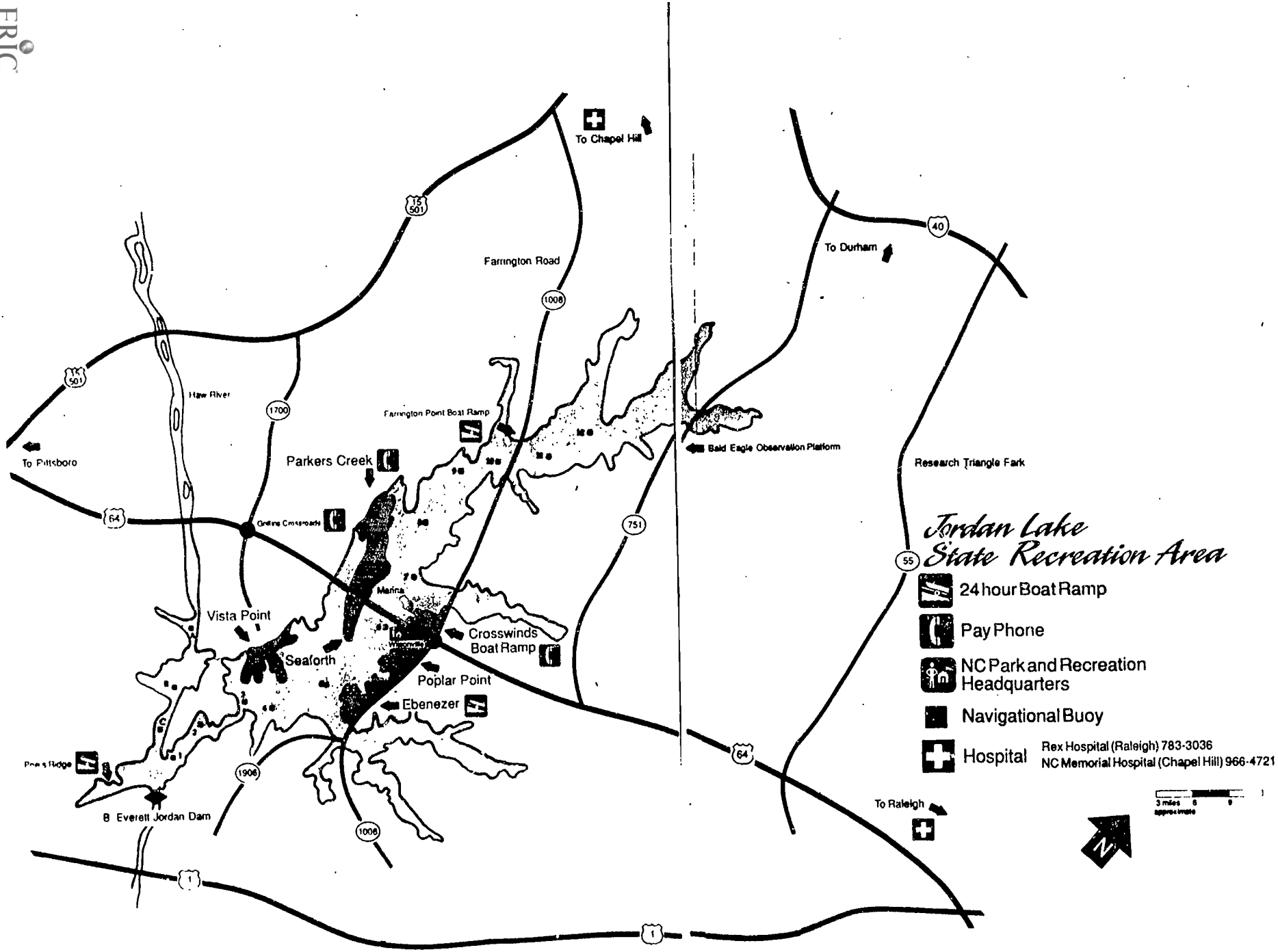
Monday-Friday 8:00 a.m. to 5:00 p.m.

Park Hours:

November-February	8:00 a.m. - 6:00 p.m.
March and October	8:00 a.m. - 7:00 p.m.
April, and September	8:00 a.m. - 8:00 p.m.
May-August	8:00 a.m. - 9:00 p.m.

Park Fees:

Daily entrance fees are charged for cars and buses on weekends and holidays during the months of April, May and September and daily from June through August. Additional fees are charged for camping and facility reservations. For specific fee schedules contact the park office.


To Chapel Hill
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Farrington Road
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To Durham
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Haw River
1700
Farrington Point Boat Ramp
Bald Eagle Observation Platform
Research Triangle Park
To Pittsboro
Parkers Creek
64
751
Jordan Lake
State Recreation Area
55
Marina
Vista Point
Crosswinds
Boat Ramp
Seaforth
Poplar Point
Ebenezer
64
1908
1008
To Raleigh
1
1
24 hour Boat Ramp
Pay Phone
NC Park and Recreation
Headquarters
Navigational Buoy
Hospital
Rex Hospital (Raleigh) 783-3036
NC Memorial Hospital (Chapel Hill) 966-4721
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