Teachers Guide

Classification

Wildlife

Education Service

Adaptation

Threatened & Endangered

4 5 6

U p p e r   P r i m a r y

Teacher's Guide

Upper Primary

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Review of text by: *Kathy Hodges*, *Marla Harker*, and *Shelby Stevens*

Resource section by: *Erika Nighswonger*

The educational material is dedicated to the children of Kansas. May they develop an awareness and appreciation for Kansas' wildlife.

Foreword

Dear Educator,

    As Kansans, we have been blessed with an environment capable of providing us with the natural resources to enjoy life to its fullest. Our wildlife is one such resource enjoyed by many Kansans. The future of this resource and others will directly depend on an enlightened citizenry which understands and appreciates the practices and commitment needed to insure the quality of these natural resources.

    We believe one can nurture within children an environmentally sound attitude. The combination of children's spontaneous interest for living things, our informative materials and resources, and your expertise in teaching and motivating children will assist us in this objective. You, as the instructional leader, are the catalyst; without your commitment the other two remain dormant. We need to care about our young people, their future, and the future of Kansas' natural resources. "Children who care about our earth today can change the world tomorrow."

    As part of our commitment to assist educators, the Kansas Department of Wildlife and Parks created the Wildlife Education Service section in 1981. The WES, with its comprehensive resources, is dedicated to instilling an awareness, understanding and appreciation in Kansas' youth of our natural resources, especially wildlife. Together we will make a difference. Assist us by making your fellow teachers aware of what WES has to offer.

    Feel free to direct any concerns or questions regarding WES to the Pratt Operational Headquarters. We look forward to working with you and wish you and your students a successful learning experience.

<div align="right">

Sincerely,
The WES Staff
Kansas Dept. of Wildlife and Parks
512 S.E. 25th Avenue
Pratt, Kansas 67124
(620) 672-5911
ShelbyS@wp.state.ks.us

</div>

"Never doubt that a small group of thoughtful committed individuals can change the world; indeed, it's the only thing that ever has."
                   Margaret Mead

Introduction

This wildlife education resource was developed to assist educators in establishing a greater awareness and appreciation in children for their natural environment and Kansas' wildlife. Everyone, especially our children, needs to become more knowledgeable and aware of their bio-physical and cultural environment. We need to increase our sensitivity and understanding of how our behavior and actions affect the ability of our natural environment to maintain and enhance the quality of all life forms.

The materials and resources provided will spark the natural attraction and spontaneous interest children have for wildlife. You, as the instructional leader and motivator, provide the most important component in the nurturing of students to become environmentally enlightened individuals with a caring attitude for all living things. One need not be a wildlife expert to teach children about their environment and wildlife. The most important ingredient for successful presentations will be your enthusiasm and imagination.

These instructional materials are multi-disciplinary, flexible, and will enrich all aspects of your on-going curriculum with minimal preparation or equipment. But, to be effective, the activities and information must become an integrated part of your on-going instruction. The material is appropriate for use throughout Kansas. We encourage you to utilize the out-of-doors as a learning site whenever possible. When outdoors, remind your students they are company in the homes of wildlife and their behavior should reflect it. Technical assistance and resources can be obtained from the Wildlife Education Service Section of the Kansas Department of Wildlife and Parks through the following materials and services.

The Reference Center in Pratt has over 4,000 resources on wildlife and related topics in a variety of formats. Nature's Notebook, a collection of education features from the Kansas Wildlife and Parks magazine, provides educators with a wide variety of wildlife information sheets, hands-on activities and support materials. The On T.R.A.C.K.S newsletter provides information and resources to assist educators in developing a basic understanding and appreciation of ecology in children. Project WILD, Project Aquatic and Project Learning Tree, nationally acclaimed environmental education programs, emphasize basic concepts about our natural resources, wildlife, water and our forests. The learning experiences in their activity guides provide an interdisciplinary, hands-on program for pre-schools to adults. They are also a simple way for educators to gain confidence in using the out-of-doors as an effective learning setting.

The Linkage is There

The Curriculum Standards for Science, issued in 2002, by the Kansas State Board of Education, was used to define the desired student outcome for this resource. The general mission statement of the above document indicates the need for students to be prepared decision makers. To develop this skill, students need to become adept at acquiring new knowledge while developing a better understanding and awareness of the technology, economics, and social applications that are associated with the many problems they will confront throughout their lives.

The enclosed activities emphasize a group-setting approach, encouraging students to become skillful thinkers and problem-solvers. Other components such as curiosity, creativity, perseverance, and flexibility-important in the inquiry and problem solving process-are also fostered in this guide.

The inquiry areas included within this resource are: Classification, Adaptation, and Threatened and Endangered. The Curriculum Standards for Science utilizes the following identified themes: Patterns of Change, Systems and Interactions, Patterns of Stability, and Models. These organizers show how knowledge, principles, and concepts connect one aspect of inquiry to another.

The first area of inquiry, 'Classification', encourages students to gather information through direct observation to create models thru which they can identify and classify wildlife.

The second area of inquiry, 'Adaptation', expands the model to show how wildlife are modified in structure and/or function for survival purposes. The difference in the shape, size, color, and life patterns (adaptations) of the various forms of wildlife helps us to identify wildlife and their special diversity.

Finally, the third area of inquiry, the 'Threatened and Endangered', illustrates what can happen when patterns-of-stability within the system are altered by human activities which impact the ecological system. Through the investigation of 'Classification' and 'Adaptations', students will be better suited to identify why some species of wildlife are more prone to be threatened and/or endangered than others.

The theme organizers utilized in this guide are similar to those used in the Kansas State Board of Education Curriculum Standards for Science. We have also tried to link the guide's format and objectives closely to those stated in the Curriculum Standards for Science. We do wish to stress the materials and activities are not just science oriented, but can be integrated into a variety of subjects within the on-going curriculum.

The Kansas Department of Wildlife and Parks realizes the environmental issues and decisions the young people of today will face requires a combination of factual knowledge and a motivating concern which will result in taking some form of action to resolve the problem. Your role as an educator is a vital link in achieving this environmental literacy.

Primary Resources

KANSAS ORGANIZATIONS

Agriculture in the Classroom
Kansas State University
124 Bluemont Hall
Manhattan, KS 66506
(785) 532-7946

Audubon of Kansas
813 Juniper Dr.
Manhattan, KS 66502-3180
(785) 537-4385

Blue River Watershed Assoc.
10312 W 49th Place
Shawne, KS 66203-1618
(913) 288-3500

Botanica - The Wichita Gardens
701 N Amidon
Wichita, KS 67202
(316) 264-0448

Brit Spaugh Zoo
PO Box 274
Great Bend, KS 67530
(620) 793-4160

Chaplin Nature Center
US 166, Box 216
Arkansas City, KS 67005
(620) 442-4133

Children's Museum of Wichita
435 S Water
Wichita, KS 67202
(316) 267-3844

City of Overland Park
Arboretum & Botanical Gardens
8500 Santa Fe Dr.
Overland Park, KS 66212-2866

Clement Stone Nature Center
7240 W Tenth St.
Topeka, KS 66615
(785) 273-5806

Dillon Nature Outdoor Ed Center
3002 E 30th
Hutchinson, KS 67501
(620) 663-7411

Dych Arboretum of the Plains
Hesston College
PO Box 3000
Hesston, KS 67062
(620) 327-8127

Emporia Zoo
75 Soden Rd.
South Commercial St.
Emporia, KS 66801
(620) 342-5105

Materials Center
Environmental Ed Curriculum
Education Division
Farrell Library K-State University
Manhattan, KS 66502
(785) 532-6516

Ernie Miller Nature Center
909 N K-7 Hwy.
Olathe, KS 66061
(913) 764-7759

Flint Hills RC&D Area, Inc.
PO Box 260
Strong City, KS 66869
(620) 273-6321

Grassland Heritage Foundation
PO Box 394
Shawnee Mission, KS 66201
(913) 262-3506

Great Plains Nature Center
6232 E. 29th St. N
Wichita, KS 67220
(316) 683-5499

Fick Fossil & History Museum
700 W 3rd
Oakley, KS 67748
(785) 672-4839

Kansas Academy of Science
1930 Constant Ave.
Campus WEST
Lawrence, KS 66047
(913) 864-2700

KS Association for Conservation &
Environmental Education
2610 Claflin Rd.
Manhattan, KS 66502
(785) 537-7050

KS Assoc. of Conservation Districts
522 Winn Rd.
Salina, KS 67401
(785) 827-2547

KS Bass Chapter Federation
816 Capitol View Dr.
Topeka, KS 66617
(785) 264-1364

KS Biological Survey
Foley Hall
2101 Constant Ave.
Lawrence, KS 66047-3759
(785) 864-1500

KS Department of Wildlife & Parks
512 SE 25th Ave.
Pratt, KS 67124
(620) 672-5911

KS Geologic Survey Campus WEST
University of Kansas
1930 Constant Ave.
Lawrence, KS   66047-3726
(785) 864-3965

KS Herpetological Society
Museum of Natural History KU
1345 Jayhawk Blvd.
Lawrence, KS 66045
(785) 864-4540

KS Museum of History
6425 SW 6th Ave.
Topeka, KS 66615-1099
(785)-272-8681

KS Ornithological Society
Dept. of Biological Sciences
Fort Hays State University
Hays, KS 67601
(785) 628-4000

KS School Naturalist
Division of Biological Sciences
Emporia State University
Emporia, KS 66801
(620) 343-1200

KS State Conservation Commission
109 SW Ninth St. Suite 500
Topeka, KS 66612-1299
(785) 296-3600

KS State Department of Education
Science, Math, &
Environmental Education
120 SE 10th Ave.
Topeka, KS 66612-1182
(785) 296-3201

KS Department of Health and
Environment LSOB
1000 SW Jackson, Suite 320
Topeka, KS 66612-1366
(785) 296-1540

KS State Extension Services
Dept. of Animal Sciences & Industry
K-State University
Animal Damage Control
128 Call Hall
Manhattan, KS 66506
(785) 532-5654

KS State Extension Forestry
K-State University
2610 Claflin Rd.
Manhattan, KS 66502
(785) 537-7050

KS Seirra Club
J Scott Smith
2111 Snowbird Drive
Manhattan, KS 66502-1960

KS Water Office
901 SW Ninth St. Suite 300
Topeka, KS 66612-1249
(785) 887-6057

KS Wetlands and Riparian Area
Alliance
PO Box 236
McPherson, KS 67460-0236
(620) 241-6921

KS Wildlife Federation, Inc.
214 SW 6th Ave., Suite 205
Topeka, KS 66603
(785) 232-3238

Kaw Valley Heritage Alliance
Streamlink
414 E 9th St. Suite B
Lawrence, KS 6604-2629
(785) 840-0700

Kouffman Museum
Bethal College
North Newton, KS 67117
(316) 283-1612

Kirwin National Wildlife Refuge
702 E Xavier Rd.
Kirwin, KS 67644
(785) 543-6673

Lake Afton Public Observatory
250th St. W & 39th St. S
Wichita, KS
(316) 689-3191 or (316) 794-8995

Lakewood Park Nature Center
Salina Park & Recreation
300 W Ash
Salina, KS 67401
(785) 826-7335

Lee Richardson Zoo Finnup Park
312 E Finney Dr.
Garden City, KS 67846
(620) 276-1250

Milford Nature Center
3115 Hatchery Dr.
Junction City, KS 66441-8369
(785) 238-5323

Museum of Natural History
University of Kansas
Jayhawk Blvd.
Lawrence, KS 66045
(785) 864-4540

Nature Conservancy
700 SW Jackson, Suite 104
Topeka, KS 66612
(785) 233-4400

Nature Reach/Science Education
Center Pittsburg State University
Pittsburg, KS 66762
(620) 231-7000

Diane Johnson
Operation Wildlife
23375 Guthrie
Linwood, KS 66052
(785) 542-3625

Pine Ridge Interpretive Center
Pomona Reservoir
RT 1
Vassar, KS 66543
(785) 453-2201

Pheasants Forever
205 S Santa Fe
Salina, KS 67401-3931
(785) 823-0240

PSU Science Education Center
College of Arts & Science
Pittsburg State University
Pittsburg, KS 66762
(620) 235-4292

Pratt Nature Center
512 SE 25th Ave.
Pratt, KS 67124
(620) 672-5911 ext. 176

Project Learning Tree Forestry
Extension Kansas State University
2610 Claflin Rd.
Manhattan, KS 66502
(785) 537-7050

Project WILD / Aquatic
Kansas Dept. of Wildlife & Parks
512 SE 25th Ave.
Pratt, KS 67124
(620) 672-5911

Quivera National Wildlife Refuge
RT 3 Box 48B
Stafford, KS 67578
(620) 486-2393

Schmidt Museum of Natural History
Emporia State University
1200 Commercial
Emporia, KS 66801
(620) 341-5611

Sedgwick Co. Dept. of
Environmental Resources
Historic County Courthouse
510 N Main St.
Wichita, KS 67203
(316) 721-9418

Sedgwick County Zoo
5555 Zoo Blvd.
Wichita, KS 67212
(316) 942-2212 EXT: 213

Soil Conservation Services
PO Box 600
Salina, KS 67401
(785) 823-4500

State Assoc. of KS Watersheds
PO Box 182
Newton, KS 67114-0182
(316) 283-0370

Sunflower RC&D Area, Inc.
705 E Main St.
Harper, KS 67058-1725
(620) 896-7378

Sunset Zoological Park
2333 Oak St.
Manhattan, KS 66502
(785) 587-2737

Topeka Zoological Park
Zoo Education Program
635 SW Gage Blvd.
Topeka, KS 66606-2066
(785) 272-7595

U.S. Fish & Wildlife Service
Kansas Field Office
315 Houston, Suite E
Manhattan, KS 66502
(785) 539-3474

USDA Forest Service
Cimarron National Grasslands
PO Box 654
Elkhart, KS 67950-0654
(620) 697-4621

Wildcare
PO Box 901
Lawrence, KS 66044
(785) 583-9800

Wildwood Outdoor Education Center
7095 W 399th St.
La Cygne, KS 66040
(785) 757-4500

Western Prairie RC&D
Area, Inc.
350 S Range Suite 13
Colby, KS 67701-2901
(785) 462-2602

Wolf Creek Environmental
Education Area
1550 Oxen Ln. NE
Burlington, KS 66839
(620) 364-4141

National Tallgrass Prairie Preserve
RT 1 Box 14
Strong City, KS 66869
(620) 273-8139

ADDITIONAL RESOURCES

Kids for Saving Earth
620 Mendelssahn Suite 145
Golden Valley, MN 55427
(612) 525-0002

National Audubon Society
950 Third Ave.
New York, NY 10022
(212) 832-3200
(913) 537-4385

Kansas Regional Office
National Audubon Society
813 Juniper Dr.
Manhattan, KS 66502

National Park Service Interior BLDG
U.S. Department of Interior
PO Box 37127
Washington, DC 20240
(202) 208-6843

National Wildlife Federation
1400 - 16th St. NW
Washington, DC 20036
(800) 432-6564

Sierra Club
730 Polk St.
San Fransico, CA 94109
(415) 776-2211

Natural Resourse
Conservation Service
760 S Broadway
Salina, KS 67401
(785) 823-4500

The Wildlife Society:
Kansas Chapter
(Contact KDWP @ Pratt)

U.S. Fish & Wildlife Service
Kansas Field Office
315 Houston, Suite E
Manhattan, KS 66502
(785) 539-3474

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This page is organized to assist you in locating the suggested activities for your grade level.

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Sixth Grade - ●

Section III   THREATENED & ENDANGERED

Classification

INTRODUCTION AND RESOURCES

As scientific knowledge expanded over the last few centuries immense volumes of information emerged. The number of known animals grew from a few hundred to over one and one-half million species. With so many different organisms, it became necessary to name and organize them, otherwise, there would be no way to study and communicate about an individual species. Out of this need was born the science of taxonomy. Taxonomy is both the classification of animals and the nomenclature of animals. Classification is the arrangement of the kinds of animals into a hierarchy of smaller and larger groups. Nomenclature is the assigning of names to the kinds and groups of organisms.

Classification. Today, all animals are classified according to their relationship to one another. We group animals and plants together which share similar characteristics. Characteristics such as structural features, size, coloration, or locomotion may be used as well as countable features such as the number of teeth or the number of fin rays, etc. Since external features, like color, may change with the seasons, it is safer to classify animals by structure. Structure refers to how something is put together and may include features such as a skeleton, chambers in the heart, lungs, teeth, hair, etc.

The purpose of classification is really based on convenience, to make sure that all people in all parts of the world can learn about the same animal. For example, in the time of the Ancient Greeks, the word "eagle" was used for any large bird of prey that flew by day. There was no attempt to distinguish between the different kinds of "eagles". As knowledge grew and scientists of different countries began to communicate, people realized they were not always talking about the same "eagle" and that there were many different kinds of "eagles".

Binomial nomenclature. The Swedish botanist, Carl Linnaeus, was the first to purpose a binomial system of naming animals. His system, published in 1757, is still accepted as the standard. Using the universal language of Latin, each animal is given two names—the first name is always capitalized and is the Genus, the second should not be capitalized and is the species. This name, Genus species, is the organism's scientific name and is unique to that organism. The scientific name for humans is *Homo sapiens*. Only humans have this particular name. No two organisms will have the same scientific name unless they are members of the same species.

Categories. Our present system of classification ranks creatures from broad similarities down to the specific. Thus, every animal has a place in the following groups: kingdom, phylum, class, order, family, genus, and species.

The kingdom is the broadest division possible. Five kingdoms exist today: Animal, Plant, Fungi, Protist (single-celled organisms), and Monera (blue-green algae and bacteria). With a glance, most people can place an organism in the plant or animal kingdom, however, it is not so simple when one begins to look at single-celled organisms. Some single-celled organisms show both plant and animal characteristics, that is why they are now placed in their own kingdom. Fungi and bacteria are also different enough from the other organisms to merit placement in their own respective kingdom.

Kingdoms are separated in phylums. The most familiar animals fall into the phylum of the Chordates or animals with a backbone. Those without backbones, or invertebrates, make up the other phylas. Invertebrate phyla include Arthropoda (all joint-footed animals), Annelids (all segmented worms), Mollusca (mollusks, clams, and snails), and Porifera (sponges) to name a few. In reality, invertebrates far outnumber the vertebrates.

Phylums are divided into classes. There are five vertebrate classes: Fishes, Amphibians, Reptiles, Birds, and Mammals. Fish are the simplest vertebrates while mammals are the most complex. Briefly, the differences between classes are:

Fishes: All have fins and gills; two-chambered heart; most with scales; live in water; cold-blooded.

Amphibians: Soft, moist skin; three-chambered heart; eggs laid in water, young are aquatic and breathe with gills, adults are land dwelling and usually breathe with lungs; cold-blooded.

Reptiles: Body usually covered with scales; eggs laid on land not in water; young resemble parents; toes with claws; incomplete four-chambered heart; cold-blooded.

Birds: Body covered with feathers; breathe with lungs; complete four-chambered heart; hatch from eggs; warm-blooded.

Mammals: Body usually covered with hair; breathe with lungs; complete four-chambered heart; give birth to live young; nourish young with milk produced by the mother; warm-blooded.

Those animals in a class that share even more characteristics are divided into Orders. Mammals that carry their young in pouches are in the order of Marsupials; those that gnaw with large, curved incisors (like mice and beavers) are Rodents; or those that possess long canine teeth (fangs) are Carnivores.

Even more similar are the members of a Family. All the dog-like members of the order of Carnivores, such as coyotes, foxes, and wolves, are grouped together as the Canids and all the cat-like members are Felids.

All family members that are similar are grouped as a Genus. Members of a genus are very closely related. All members of the canid family that are fox-like share the genus Vulpes.

Finally, we come to the species which is the basic unit of the classification scheme. We defined a group of individuals that can breed with one another and produce fertile young which resemble the parents. A species name is reserved only for those individuals that can interbreed, thus, only the swift fox has the scientific name Vulpes velox.

So, the complete classification of the swift fox is:

Kingdom: *Animalia*
Phylum: *Chordata*
Class: *Mammalia*
Order: *Carnivora*
Family: *Canidae*
Genus: *Vulpes*
Species: *velox*
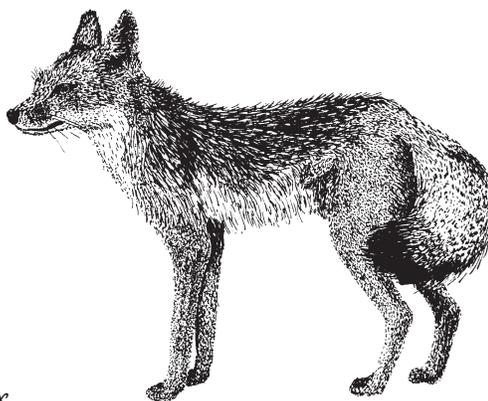
The scientific name of the swift fox is ***Vulpes velox***.

The scheme of classification is like a tree having many leaves which are the species. One or more leaves may be found on a small twig to make a genus. Several twigs may be found on a larger twig, thus a family. Two or more twigs will make up a branch to become an order and a number of branches will form a larger branch or class. The main framework of the tree is the phyla and the tree as a whole is the kingdom.

The following additional resources to available to assist you:

REFERENCE CENTER

Books
BK 1-3	Amphibians and Reptiles in Kansas
BK-2-2	Fish in Kansas
BK-4-3	Wild Animals of North America
BK 4-6A	Field Guide to North American Wildlife
BK 12-9A	NatureScopes: Incredible Insects
BK 12-9B	NatureScopes: Digging into Dinosaurs
BK 12-9D	NatureScopes: Birds, Birds, Birds
BK 13-3	Trees of North America
BK 14-18	Finder Series—Trees, Flowers, and Ferns
BK-14-20	Illustrated Guide to Fossil Collecting

Computer Software
CD-RO-3	Animal Encyclopedia

Game Kits
GK-6	Animal Kindgom
GK-7	110 Animals
GK-13	Yotta Know Birds
GK-15	Yotta Know Mammals
GK-28	Animal Track Matching Card Game
GK-39	Animal Families Game
GK-59	Quik Pix

Filmstrips
FS-13B	Amphibians—Investigating Vertebrates
FS-13D	Fish—Investigating Vertebrates
FS-13F	Mammals—Investigating Vertebrates
FS-41	Alike and Different
FS-45	How Plants and Animals are Grouped

Learning Kits
LK-26	Replitracks
LK-67	Project Classify: Mammals
LK-78	Project Classify: Dinosaurs
LK-92	What Leaf Is It?

Posters
PP-45	Kansas Birds
PP-61	Tree Identification Chart Series
PP-75	Warm Water Game Fish Identification
PP-77	America's Pearly Mussels

Slide Series
SS-12   Waterfowl Identification
SS-23   Mammalian Predators

Video Tapes
VT-52   Fish and Their Characteristics
VT-59   Insects
VT-64   Birds
VT- 174   Bats

NATURE'S NOTEBOOK

ON T.R.A.C.K.S. NEWSLETTER

The On T.R.A.C.K.S. Newsletter can be obtained for free by contacting the Wildlife Education Services section of the KS Dept of Wildlife & Parks by writing to C/O WES, KDWP 512 SE 25th Ave. Pratt, KS 67124 or phoning (620) 672-5911 or by E-mail at ShelbyS@wp.state.ks.us.

PROJECT AQUATIC

ACTIVITY	PAGES NEW GUIDE	PAGES OLD GUIDE
Fashion a Fish	56	88
When a Whale is Right	94	

PROJECT LEARNING TREE

ACTIVITY	PAGES
Can it be Real?	30
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Name That Tree	244
Tree Lifecycle	302

PROJECT WILD

ACTIVITY	PAGES NEW GUIDE	PAGES OLD GUIDE
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Classification

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TAXONOMIC TERMS

Taxonomy is the study of animal and plant classification. See which questions you can answer right away. Complete the remaining questions with further study.

1. Animals with backbones are
   A. invertebrates
   B. vertebrates
   C. characteristics
   D. mammals

2. The five main groups of vertebrates are
   A. mammals, birds, reptiles, amphibians, and fishes
   B. mammals, insects, birds, amphibians, and fishes
   C. mollusks, mammals, reptiles, fishing, and insects
   D. reptiles, spiders, fishes, mammals, and birds

3. Herbivores are
   A. hungry
   B. plant-eaters
   C. meat-eaters
   D. eat both plants and meat

4. Reptiles breathe with
   A. air pockets
   B. gills
   C. lungs
   D. both gills and lungs

5. Putting animals into groups to make study easier is called
   A. phylum
   B. cold-blooded
   C. classification
   D. herbivore

6. Animals are covered with
   A. hair
   B. scales
   C. moist skin
   D. feathers

7. Animals that maintain a constant body temperature are
   A. amphibians
   B. cold-blooded
   C. reptiles
   D. warm-blooded

8. Animals that are active during the day are
   A. hibernators
   B. nocturnal
   C. tired
   D. diurnal

9. Omnivores eat
   A. plants
   B. animals
   C. both plants and animals
   D. fish

10. Animals that change body temperature to match their surroundings are
    A. cold-blooded
    B. mammals
    C. vertebrates
    D. warm-blooded

Bonus List at least three ways by which animals are classified.
e.g. egg layers, non egg layers _____

_____

_____
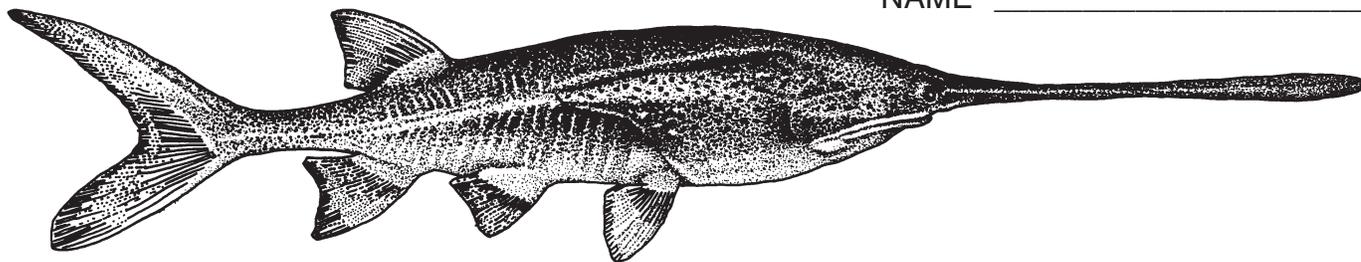
DISTINGUISHABLE CHARACTERISTICS

Directions: Listed below are characteristics which describes various groups of vertebrates. In the blanks provided write the number of each characteristic which best applies to each of the vertebrate groups. Some numbers will be used more than once. Remember there may be exceptions (not all fish have scales). Give two examples of Kansas animals for each group.

1. are warm-blooded
2. are cold-blooded
3. bodies are covered with hair
4. bodies usually have scales
5. have feathers
6. have moist skin without scales
7. adults generally have 4 legs
8. have two legs and wings
9. have short legs or no legs at all
10. have fins

11. breathe through lungs
12. breathe through gills
13. young breathe with gills but usually develop lungs as adults
14. live in water throughout life
15. live on land part of life and in water part of life
16. feed their young milk
17. have beaks
18. young are hatched from eggs
19. most young hatched from eggs but some born live
20. most young born live but a few hatched from eggs

Characteristics of Mammals

__ __ __   1._____

__ __ __   2._____

Characteristics of Reptiles

__ __ __   1._____

__ __ __   2._____

Characteristics of Birds

__ __ __   1._____

__ __ __   2._____

Characteristics of Amphibians

__ __ __   1._____

__ __ __   2._____

Characteristics of Fish

__ __ __   1._____

__ __ __   2._____

WHERE DO THEY BELONG?

NAME _____

Directions: Classify the following animals by class.
M=mammals, **B**=birds, **R**=reptiles, **A**=amphibians, **F**=fish, **I**=insects, **O**=other.

1. _____ antelope
2. _____ turkey
3. _____ crayfish
4. _____ elk
5. _____ cardinal
6. _____ bluegill
7. _____ monarch butterfly
8. _____ pheasant
9. _____ great-horned owl
10. _____ bass
11. _____ egret
12. _____ seal
13. _____ white-tailed deer
14. _____ otter
15. _____ rattlesnake
16. _____ spider
17. _____ leopard frog
18. _____ anteater
19. _____ eel
20. _____ kangaroo
21. _____ bat
22. _____ armadillo

23. _____ turtle
24. _____ mosquito
25. _____ crocodile
26. _____ cow
27. _____ catfish
28. _____ dog
29. _____ osprey
30. _____ pigeon
31. _____ mallard
32. _____ ant
33. _____ trout
34. _____ whale
35. _____ centipede
36. _____ great blue heron
37. _____ seahorse
38. _____ alligator
39. _____ shark
40. _____ hornet
41. _____ starfish
42. _____ salamander
43. _____ clam
44. _____ toad

3 ▼
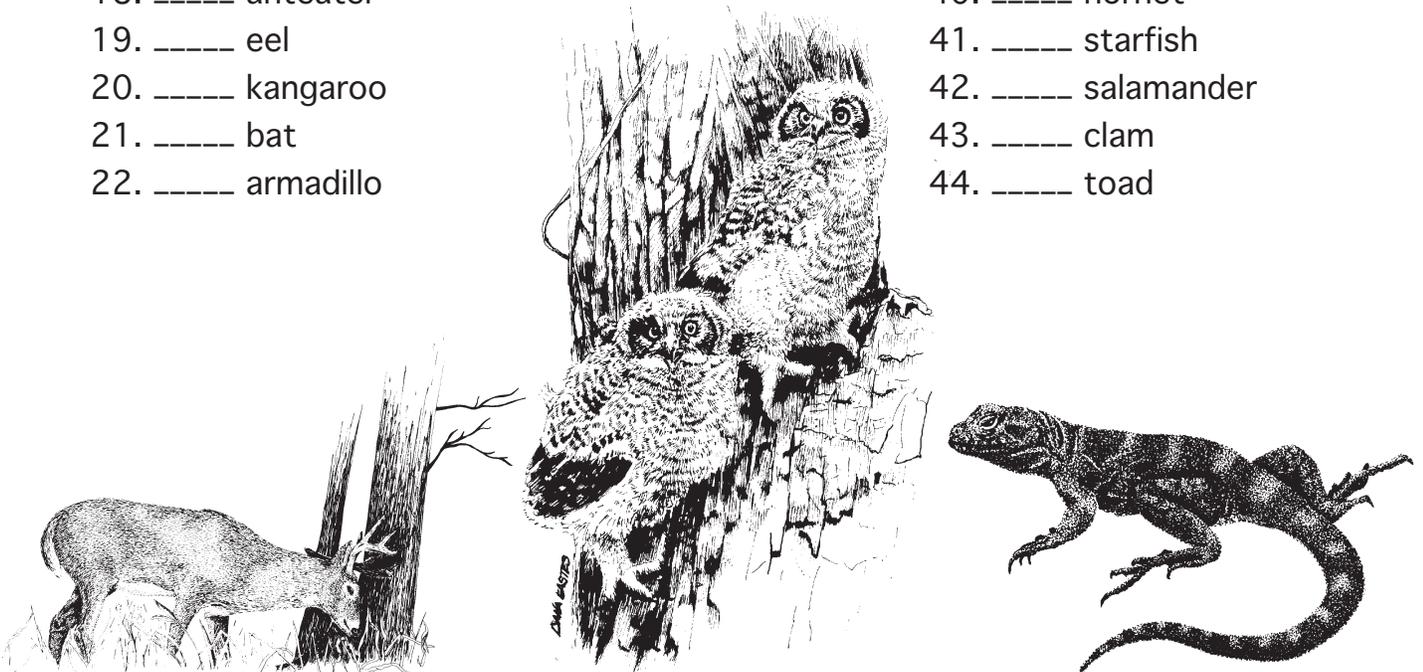
VERTEBRATES

Similarities and Differences

Directions: Fill the space under each vertebrate class with the correct characteristic.

VERTEBRATE CLASS

CHARACTERISTICS

	Mammals	Birds	Reptiles	Amphibians	Fish
Warm or Cold-blooded					
Body Covering					
Type of Appendages (legs, wing, etc.)					
Mechanism used to breathe					
Live born or hatched					
Where they live					

CATEGORICALLY SPEAKING

Directions: Name an animal for each category beginning with the letter in the letter box. See how many you can complete. To make it more difficult add more categories, such as cold-blooded, and lives in water.

CATEGORIES

Letter	Carnivore	Warm-blooded	Kansas Animal	Herbivore	Animal with Scales
T	tiger	toucan	teal	termite	trout
R					
D					
L					
C					
B					
S					
W					
G					
H					
I					
A					
M					
F					
E					

THE KNEE BONE'S CONNECTED TO THE . . .

Directions: By comparing human bones to those of animals we see how they are similar in structure and function.

Deer walk on two fingertips.

The wing of a bat has developed from a hand.

Members of the dog family walk on what would be the first and second joints of our fingers.

Reccoons are flat-footed and walk palm-down.
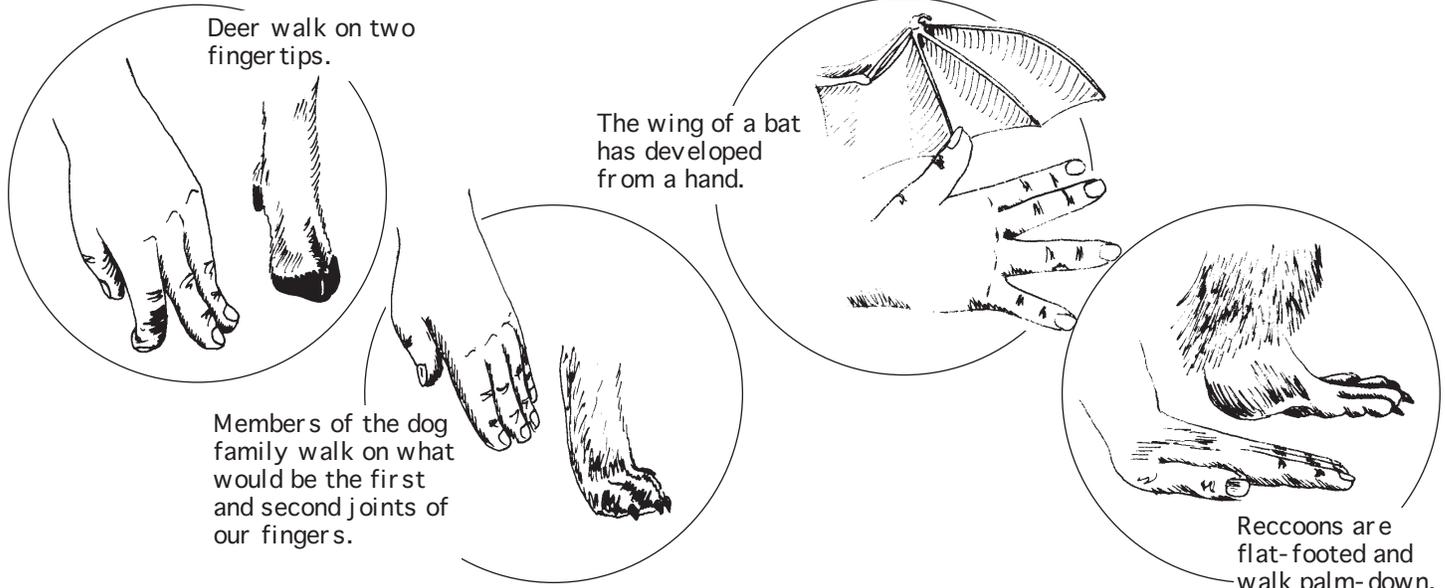
Label the upper arm bone, forearm bones, wrist bones, and hand bones on each of the forelimbs below.

| Human | Whale | Bat | Bird | Alligator | Frog | Rabbit |

Upper

Forear

Wris
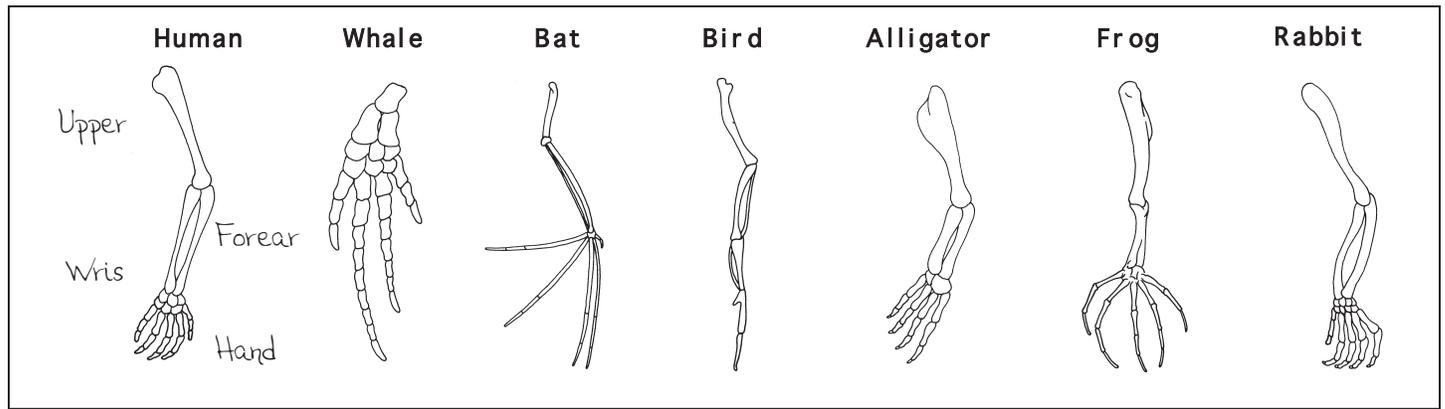
Hand

ALL THUMBS

Humans are not the only animals to have an opposable thumb (capable of being placed against one or more of the fingers). To see how important this arrangement is, tape down your thumb to the palm of your dominant hand and try to perform some of the following tasks. Write your name with a pencil, staple two pieces of paper together, pick-up an orange or a tennis ball, tie your shoe, or button a shirt.

Can you identify other mammals with an opposable thumb?

HIDE N' SEEK

NAME _____

Directions: Find and circle the wildlife in each animal class represented below. Answers may run horizontal, vertical (up and down), backwards, or diagonally. Try making your own word search puzzle.

HERPTILES

larva
skink
salamander
newt
mudpuppy
toad
spadefoot
tree frog
spring peeper
bullfrog
tadpole
turtle
slider
lizard
massasauga
garter (snake)
box (turtle)
copperhead
rattlesnake
gila (monster)
gecko
mud (turtle)
racerunner
coachwhip
stinkpot
python
pygmy(rattlesnake)
cobra
water (snake)
ribbon (snake)
map (turtle)
egg
frog

```
S A L A M A N D E R M A R R B
P C T O U D E L T R U T E P N
A E A K D L W B F G D T D Y O
D A D C P I T O A D O A I G B
E V P E U Z E X H O L I L M B
F R O G P A M G C I J K S Y I
O A L S P R I N G P E E P E R
O L E L Y D A E H R E P P O C
T R E E F R O G O R F L L U B
M A S S A S A U G A R T E R M
E K A N S E L T T A R B O C N
O C O A C H W H I P Y T H O N
P W S K I N K T O P K N I T S
R A C E R U N N E R E T A W R
```

NAME _____

BIRDS

Directions: Find and circle the wildlife in each animal class represented below. Answers may run horizontal, vertical (up and down), backwards, or diagonally. Try making your own word search puzzle.

ibis
swift
stork
loon
wren
veery
vireo
oriole
tern
teal
pheasant
bluejay
coot
duck
quail
chickadee
dove
eagle
finch
gull
heron
kingfisher
jay
owl
hawk
crow
lark
junco

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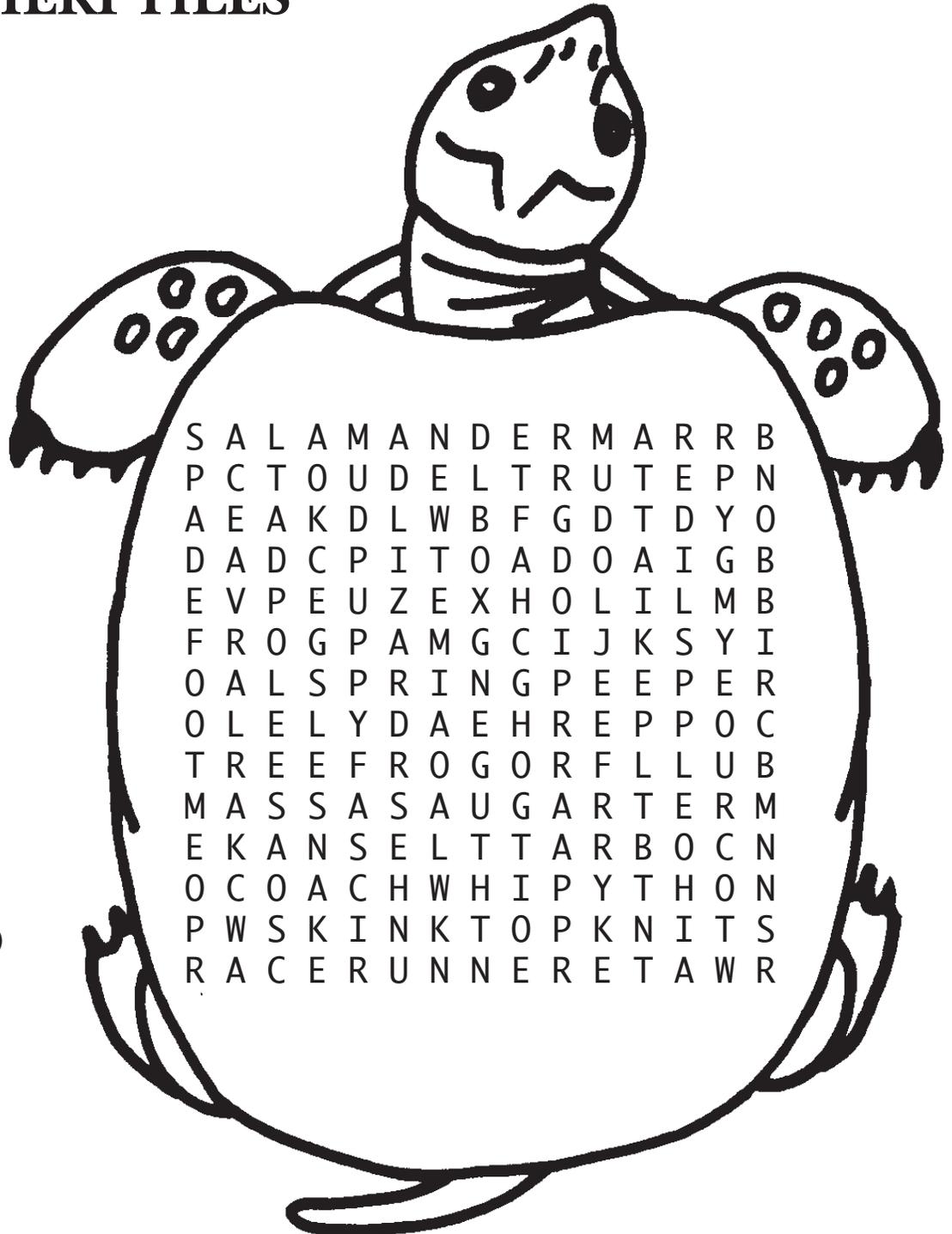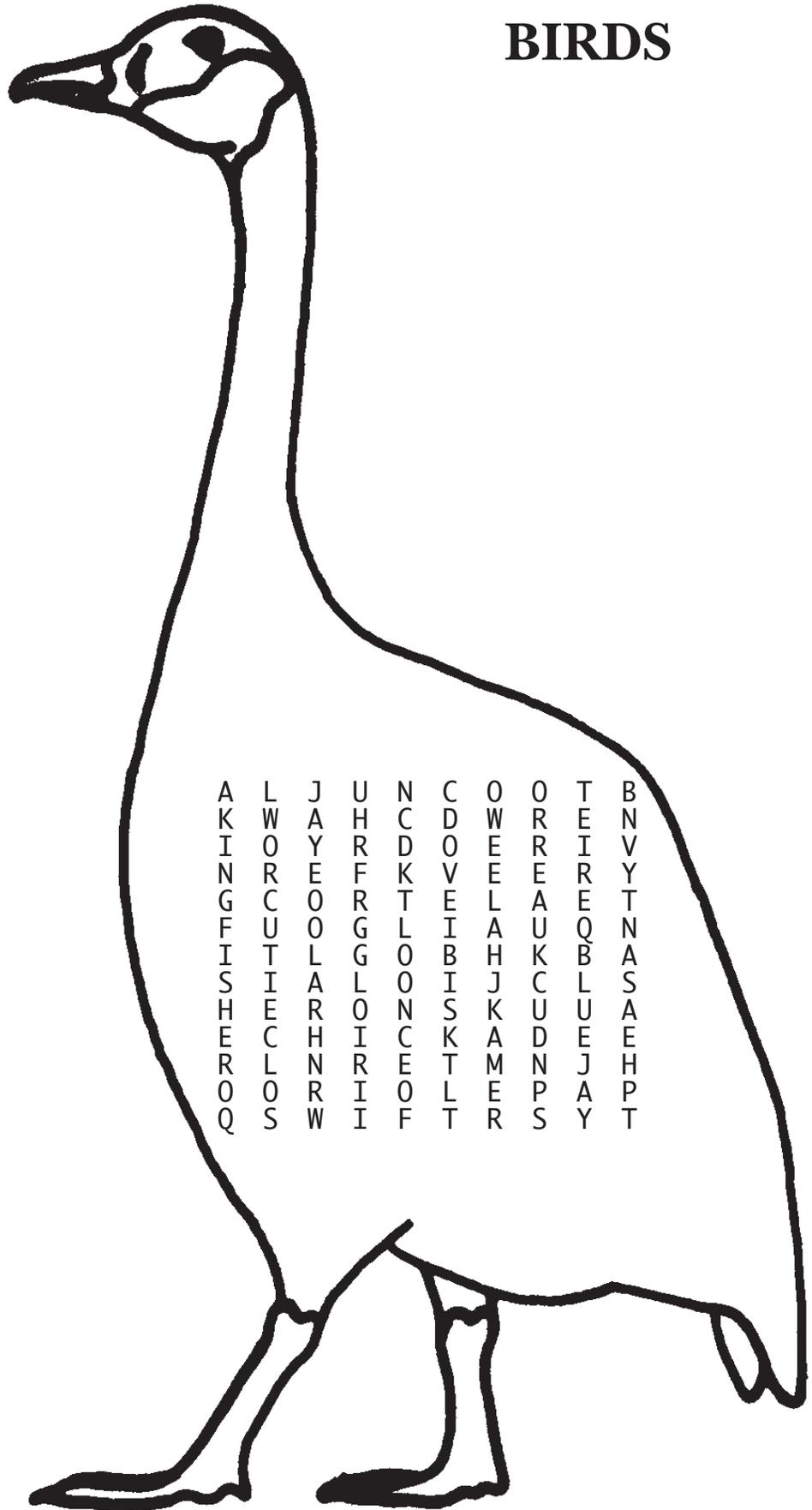
HIDE N' SEEK

NAME _____

Directions: Find and circle the wildlife in each animal class represented below. Answers may run horizontal, vertical (up and down), backwards, or diagonally. Try making your own word search puzzle.

FISH

```
H S I F D L O G L A M P R E Y T L E M S
S T U R G E O N K S U C K E R A E D E R
I H L R A Y S H I N E R M U S K E Y A C
F E A T R O U T L C L L I G E U L B S O
E M A D T O M D L A T U N A R E T R A D
L B C A T G A R I T S U N F I S H A U G
D G D C H U B U F F A L O M O L L Y G U
D A A E E L N M I I E F W A L L E Y E P
A R E N G P S A S S A B U R B O T G R P
P I K E P E R C H H C R A P P I E E L Y
```

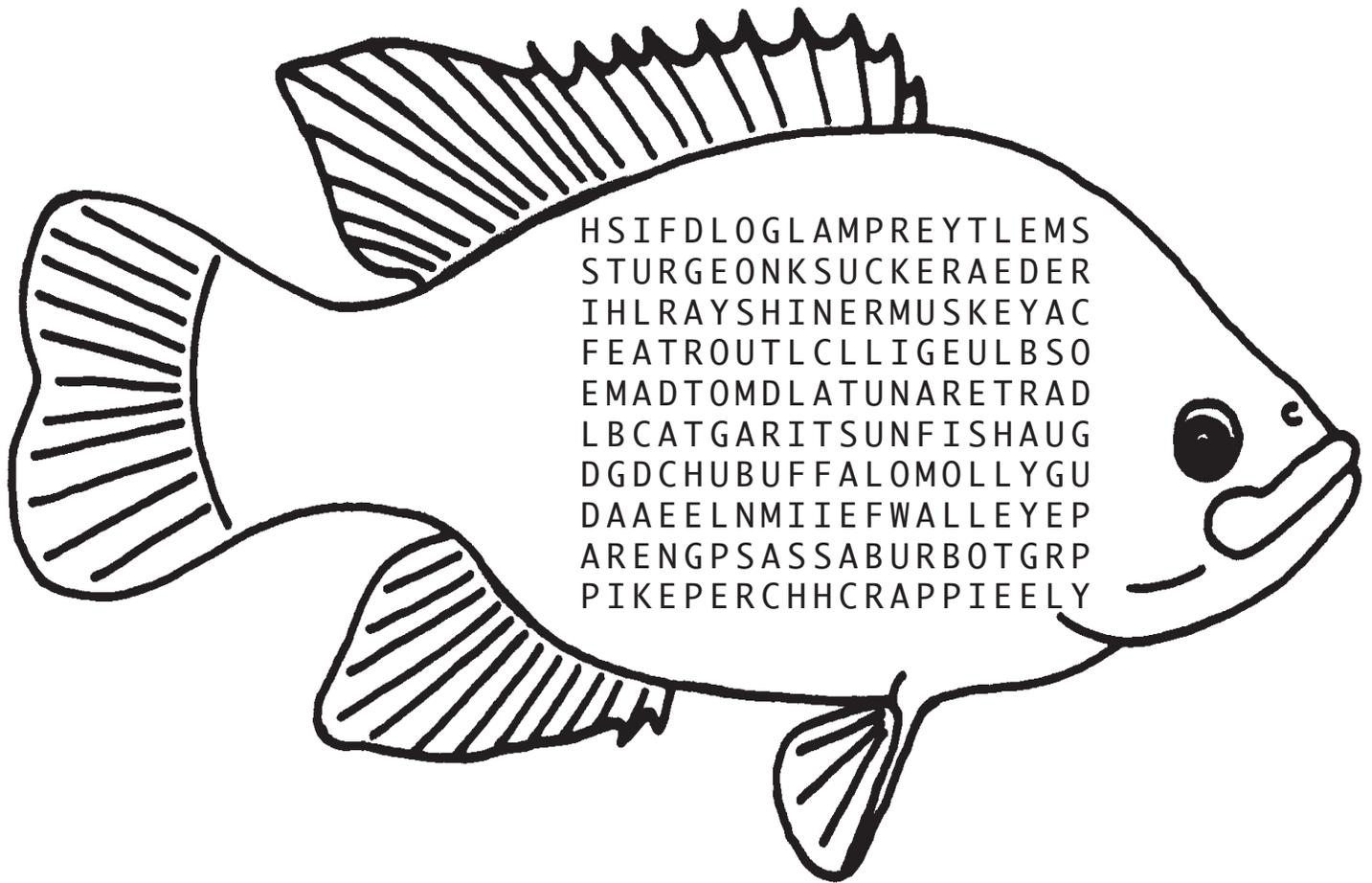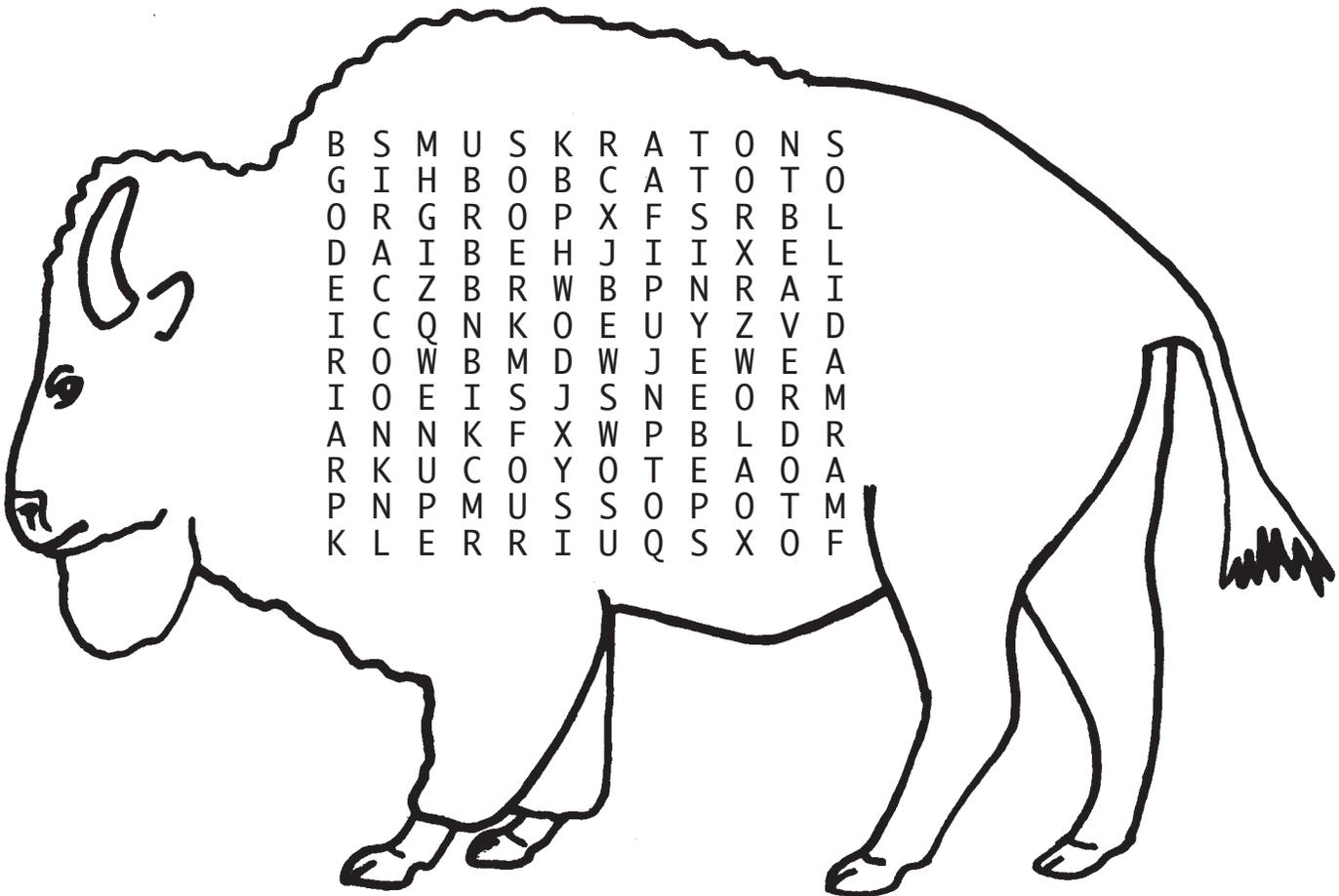|			
sucker	trout	madtom	cod
darter	pike	bass	tuna
crappie	carp	sunfish	muskey
burbot	shiner	bluegill	ray
perch	chub	drum	smelt
sturgeon	dace	sauger	walleye
paddlefish	buffalo	redear	lamprey
gar	minnow	molly	
eel	killifish	goldfish	
shad	catfish	guppy	

9 ▼■●

HIDE N' SEEK

NAME _____

Directions: Find and circle the wildlife in each animal class represented below. Answers may run horizontal, vertical (up and down), backwards, or diagonally. Try making your own word search puzzle.

ANIMALS

```
B  S  M  U  S  K  R  A  T  O  N  S
G  I  H  B  O  B  C  A  T  O  T  O
O  R  G  R  O  P  X  F  S  R  B  L
D  A  I  B  E  H  J  I  I  X  E  L
E  C  Z  B  R  W  B  P  N  R  A  I
I  C  Q  N  K  O  E  U  Y  Z  V  D
R  O  W  B  M  D  W  J  E  W  E  A
I  O  E  I  S  J  S  N  E  O  R  M
A  N  N  K  F  X  W  P  B  L  D  R
R  K  U  C  O  Y  O  T  E  A  O  A
P  N  P  M  U  S  S  O  P  O  T  M
K  L  E  R  R  I  U  Q  S  X  O  F
```

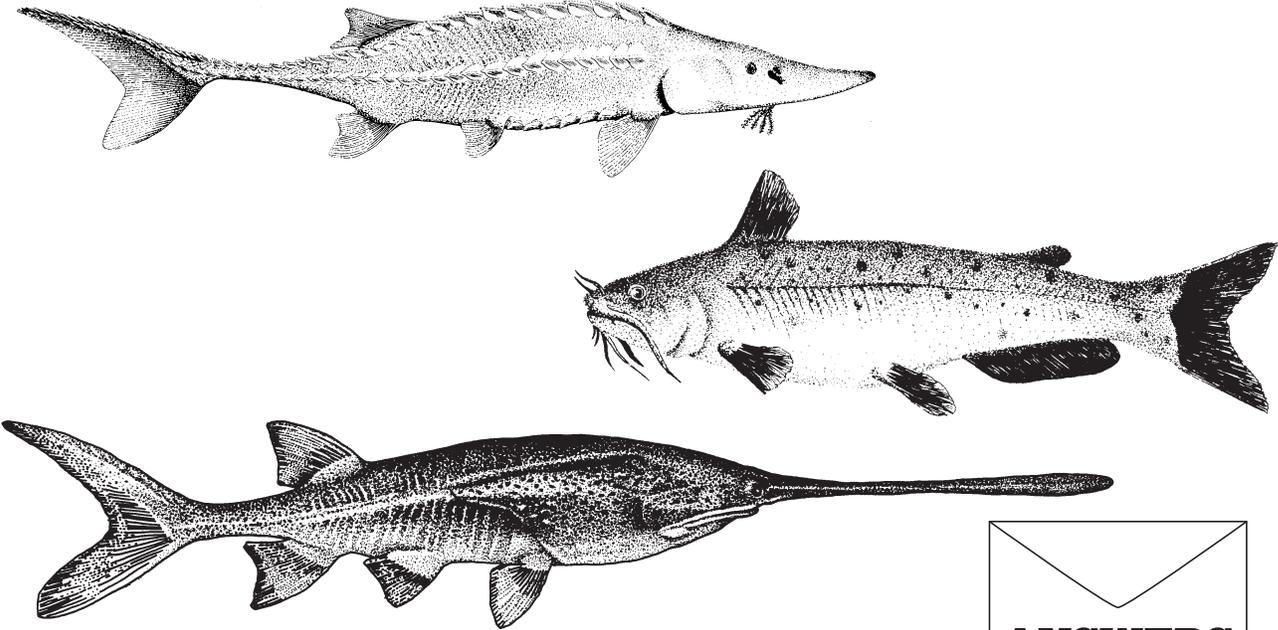| armadillo | coyote | opossum |
beaver	fox squirrel	prairie dog
big brown bat	mink	raccoon
bison	mole	shrew
bobcat	muskrat	striped skunk

▼ ■ ●

BULLETIN BOARD IDEA

Directions: Empty bulletin board or wall space can be put to practical use by deciding how the following groups of animals are alike. Answers can be placed in an envelope and discussed at the end of the week. Below are a few suggestions; add your own ideas.

SIMILAR SPECIES

ANSWERS

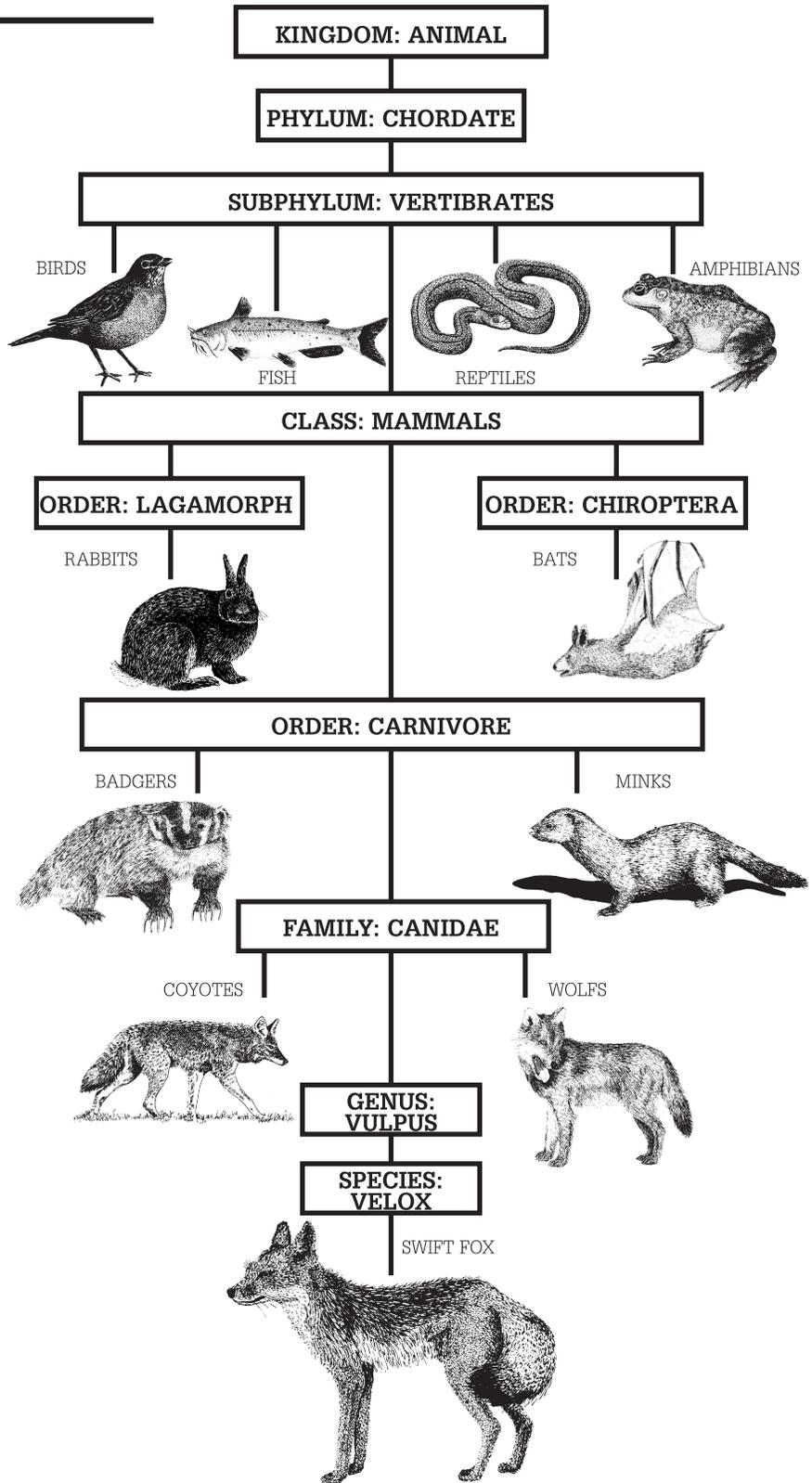|			
channel catfish	whale	passenger pigeon	bobcat
bluegill	otter	Labrador duck	eagle
walleye	elk	Steller's sea cow	hawk
paddlefish	bat	Audubon's bighorn	scavenger beetle
(FISH)	**(MAMMALS)**	**(EXTINCT)**	**(CARNIVORES)**
rattlesnake	brown recluse	deer	black-footed ferret
turtle	owl	grasshopper	whooping crane
alligator	skunk	beaver	gray myotis
chameleon	firefly	antelope	peregrine falcon
(REPTILES)	**(NOCTURNAL)**	**(HERBIVORES)**	**(ENDANGERED SPECIES)**
mouse	dragonfly	western kingbird	scissortail flycatcher
coyote	beetle	largemouth bass	Mississippi kite
whale	butterfly	plains leopard frog	winter wren
antelope	spider	red-sided garter snake	osprey
(EACH END IN SILENT E)	**(INVERTEBRATES)**	**(VERTEBRATES)**	**(BIRDS)**

A HORSE IS A HORSE
(OF COURSE, OF COURSE)

Taxonomy is a system of classification that groups animals according to their similarities. All animals that have backbones are classified into the group called vertebrates. Vertebrates with feathers are classified as birds; those with hair or fur are recognized as mammals. These broad classification are further subdivided. Mammals with antlers are classified as deer, those with large curved incisors that gnaw (like beavers and mice) are rodents. The more physical characteristics animals have in common, the more closely they resemble each other and are related.

Grouping systems classify animals from broad to specific similarities using the following categories: kingdom, phylum, class, order, family, genus, and species.

Try your hand at developing a classification system for an animal by constructing a mobile similar to the illustration. Attach the proper name and category to cards and hang them in their appropriate order. The illustration classifies Vulpes velox, the swift fox.

KINGDOM: ANIMAL

PHYLUM: CHORDATE

SUBPHYLUM: VERTIBRATES

BIRDS   FISH   REPTILES   AMPHIBIANS

CLASS: MAMMALS

ORDER: LAGAMORPH   ORDER: CHIROPTERA

RABBITS   BATS

ORDER: CARNIVORE

BADGERS   MINKS

FAMILY: CANIDAE

COYOTES   WOLFS

GENUS: VULPUS

SPECIES: VELOX

SWIFT FOX

THE CASE OF THE MYSTERY ANIMAL

NAME _____

Directions: You have been hired by the Kansas Department of Wildlife and Parks to classify an unusual animal brought to their main office. Using the rather mystifying observation listed below you must decide whether this animal is a mammal, reptile, bird, fish, or amphibian. You also must state reasons for your placement of this animal in the class you selected.

OBSERVATIONS
1. Hair on parts of body, scales on remainder
2. Predator
3. Front legs short, hind legs long, wing-like structure on both sides.
4. Size: approximately 10 inches in length, weight 6 lbs.
5. Breathes through lungs
6. Teeth present
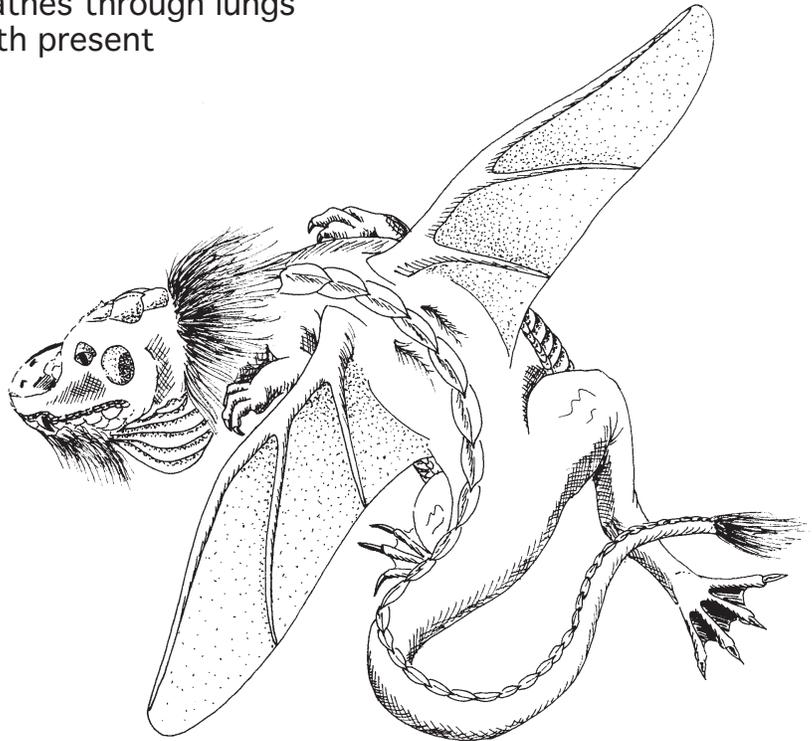
Animal class:

Reason for selection:

Where would you expect to find this animal in Kansas?

What would this animal use as a food source in Kansas?

What techniques would you recommend to manage this species in Kansas?

Key
Classification

TAXONOMIC TERMS - PAGE 1

1=B   **2**=A   **3**=C   **4**=C   **5**=C
6=A   **7**=D   **8**=D   **9**=C   **10**=A

DISTINGUISHABLE CHARACTERISTICS - PAGE 2

Mammals			Reptiles		
1	3	7	2	4	9
11	16	20	11	19	00

Birds			Amphibians		
1	5	8	2	13	15
11	17	18	17	6	18

Fish		
2	4	10
14	12	18

WHERE DO THEY BELONG - PAGE 3

1=M	**2**=I	**3**=O	**4**=M	**5**=B	**6**=F	**7**=I	**8**=B	**9**=B	**10**=F	**11**=B
12=M	**13**=M	**14**=M	**15**=R	**16**=O	**17**=A	**18**=M	**19**=F	**20**=M	**21**=M	**22**=M
23=R	**24**=I	**25**=R	**26**=M	**27**=F	**28**=M	**29**=B	**30**=B	**31**=B	**32**=I	**33**=F
34=M	**35**=O	**36**=B	**37**=F	**38**=R	**39**=F	**40**=I	**41**=O	**42**=A	**43**=O	**44**=A

Adaptation

INTRODUCTION AND RESOURCES

Adaptation for Life. All organisms, plant or animal, are fitted for survival in the environment they inhabit. Adaptations are modification in structure and/or function shared by members of a group that aid survival. Adaptations can be found at all levels, from the molecular level, to the cellular level, to the individual or in the species. No matter how well a species is surviving, adaptations are seldom the complete solutions to problems of environmental adjustments.

Specialist or Generalist? The level of adaptation differs from group to group. When species are narrowly adapted, we say they are specialized. A beaver is a specialized semi-aquatic rodent. Many specializations adapt the beaver for its aquatic way of life. The large hind feet are webbed for swimming but also help support the beaver on soft mud. The large, flat tail serves as both a rudder and propeller when swimming and as a support when cutting trees. Both the ears and the nose have valves that close when underwater. The lips meet behind the large front teeth to permit them to chew while submerged. The beaver has very good eyesight in water although its eyesight above water is only fair. The dense fur next to the body is to insulate the animal from cold water temperatures by trapping air. This air layer not only keeps the beaver warm, but also dry and buoyant.

A hummingbird is a specialized feeder, its long beak and tongue adapted only for obtaining nectar from flowers. Likewise, many flowers have adopted a long, tubular shape to accommodate the pollination action of the hummingbird.

When species are broadly adapted, we say they are generalists. A coyote or a rat are good examples of animals which can survive in many different environments. Humans are also generalists. Species that become too specialized are often at risk of becoming endangered since they are less likely to be able to adapt to sudden changes in their environment.

Protection. Many adaptations aid in protection. The shells of turtles and mollusks, the quill covering of porcupines, and the horns and antlers of some animals are structural adaptations that protect their owners. The venom of a rattlesnake, the sting of a bee or wasp, or the poison from the skin glands of toads are examples of functional adaptations that serve the same purpose.

Camouflage. The natural or concealing colors of organisms are another sort of protective adaptation. When an animal matches the color of its background it is camouflaged. Both predators and prey may be camouflaged. The green of the rough green snake or the variegated browns of ground-dwelling quail make it difficult to find these animals in their natural surroundings. Some animals actually imitate an

inanimate part of their surroundings such as the walking stick which resembles the sticks of bushes in which it lives. Other animals may change color seasonally to match their surroundings such as the snowshoe hare that is white in the winter and brown in the summer. A few animals, like the gray tree frog or the green anole can change their color in a matter of minutes to match their background!

More Than Just Color. Camouflage is more than just a color match. Countershading occurs in many animals and is an important part of the camouflage. The back of the animal (the surface usually toward the light) is darker than the underside which is pale. Dark colors dull the intensity of overhead light making it harder to see the animal. The pronghorn antelope of the Kansas prairie is a good example of a countershaded animal. Most fish are countershaded too. For a predator looking up, the pale underside of the fish blends with the sky above and to the predator looking down, the darker back resembles the lake bottom. Behavior also plays a part in camouflage. Sitting motionless when danger is nearby help protect some animals such as the cottontail rabbit.

Warning Coloration. Warning coloration is just the opposite of camouflage and is a technique often used by prey animals. Bright or bold patterns on animals usually serve to "advertise" or "warn" an attacker of the animal's defense or bad taste. The most prominent animal to advertise its unique defense is the skunk. Bold white stripes on the skunk's black body warn of the terrible odor any attacker will end up wearing if it does not heed the skunk's warnings. Even a bear will run away from the skunk if it has ever had a fateful encounter! Most insects with stingers are also marked with bold, easy-to-see bands of black and yellow. The ringneck snake, a bad-tasting reptile, reveals its bright red underside when confronted.

Mimicry. A defense popular among some animals is mimicry. The most famous example of this adaptation exists in the insect world between the viceroy and monarch butterflies. The monarch butterfly is bitter tasting because it feeds on the milkweed plant. The viceroy butterfly develops no such bad taste, but is safe from hungry birds because its resemblance to the monarch. Another example exists between the non-poisonous milk snake (found in Kansas) and the poisonous coral snake (not found in Kansas). Sounds may also be mimicked such as a blue jay imitating the call of a red-tailed hawk.

Predator or Prey? Can you tell a predator from a prey just by looking? Well, maybe. There are many differences in structural adaptations between predators and prey. For example, sometimes the placement of the eyes will give you a clue to whether the animal is the hunted or the hunter. Animals which predators hunt are always on the alert for danger. To help them see danger from nearly all directions at once, prey animals usually have their eyes placed on each side of their head. It's hard to stare into the eyes of a rabbit or a mouse or a deer. Predators, on the other hand, need to accurately judge the distance to their prey so both eyes are looking-forward or placed on the front of the face, like you. This is called binocular vision. It is much easier to judge distances if you are using both eyes at the same time. Try reaching for something

with one eye closed. Were you successful? Predators like the owl, bobcat and coyote have good binocular vision. Other differences can be found in the teeth of an animal. Many prey animals are herbivores or plant-eaters. Herbivores have flat teeth with large amounts of surface area for grinding the tough outer parts of plants. Many predators are carnivores or meat-eaters and have long fangs (canines) for holding onto the prey and sharp, jagged teeth for tearing flesh. Animals that eat both plants and animals are called omnivores and have a combination of flat teeth (molars) and sharp teeth (canines). People are omnivores and so are bears, skunks, and raccoons.

While birds don't have teeth, looking at the shape of the beak can be just as enlightening as teeth. Predators in the bird world (like eagles and owls) have strongly hooked beaks for tearing, or long, pointed beaks for spearing, like herons, or sharp chisel-like beaks such as woodpeckers. Non-predators such as seed-eating birds are equipped with a short heavy conical beak for cracking seeds, or perhaps a sieve-like bill for straining out tiny water plants as do many ducks. There are even omnivores in the bird world and they sport an all-purpose heavy beak such as the crow or bluejay.

The following additional resources to available to assist you:

REFERENCE CENTER

Books
BK 4-15	Things with Wings
BK 12-10	Amazing Animals
BK-12-11	Eyewitness Books

Filmstrips
FS-5	Animals and How They Grow
FS-19	Protective Adaptations in Animals
FS-29	Adaptation and Life Form and Landform

Learning Kits
LK-12	OBIS Adaptations
LK-41	Birds of the Environment

Slide Series
SS-21	Animal Courtship
SS-23	Mammalian Predators

Video Tapes
VT-25	Predators of North America
VT-62	Learning About Reptiles
VT-119	Camouflage in Nature
VT-158	Spiders
VT-162	Understanding Birds: Adaptations
VT-186	Animal Behavior: Warm-Blooded and Cold-Blooded Animals
VT-250	How Animals Move

NATURE'S NOTEBOOK

Amphibian & Reptiles
From eggs to legs	A-1 – A-2
Toad	A-3 – A-4
Have Shell, Will Travel	A-5 – A-6

Birds
Bird Adaptation	C-1 – C-2
Ducks	C-13A – C-14B
Flying Mousetraps	C-17
The Haunting Owls	C-29A – C-30A
Crops, Stomachs & Gizzards	C-33 – C-34

Ecological Concepts
Winter Survival	E-7 – E-8

General Wildlife
A Ripe Old Age	I-18 – I-19
Nature's Navigators	I-45 – I-46

Mammals
Night Stalkers	K-7 – K-10
Furbearers	K-11 – K-12
What's Up Doc?	K-41 – K-42

ON T.R.A.C.K.S. NEWSLETTER

The On T.R.A.C.K.S. Newsletter can be obtained for free by contacting the Wildlife Education Services section of the KS Dept of Wildlife & Parks by writing to C/O WES, KDWP 512 SE 25th Ave. Pratt, KS 67124 or phoning (620) 672-5911 or by E-mail at ShelbyS@wp.state.ks.us.

PROJECT LEARNING TREE

ACTIVITY	PAGES
Birds and Worms	77
Charting Diversity	27
Dynamic Duos	79
The Falling Log	92
Tropical Treehouse	160

PROJECT WILD

ACTIVITY	PAGES NEW GUIDE	PAGES OLD GUIDE
Adaptation Artistry	128	114
Muskox Maneuvers	130	130
Polar Bears in Phoenix	125	120
Surprise Terrarium	120	118
What Bear Goes Where?	118	98
Which Niche?	66	158
Who Fits Here?	64	160
Bottle Neck Games	172	
Deer Dilemma	426	

PROJECT AQUATIC

ACTIVITY	PAGES NEW GUIDE	PAGES OLD GUIDE
Fashion A Fish	56	88
Hooks and Ladders	43	
Marsh Munchers	34	
Sockeye Scents	61	

Adaptation

TABLE OF CONTENTS

Fourth Grade - ▼
Fifth Grade - ■
Sixth Grade - ●

INSECT INVESTIGATION

NAME _____

Directions: Insects are the most common member of the animal kingdom. Take the opportunity to explore the variety of insects and their adaptations you have in your backyard or on the schoolgrounds. Use the chart to help record your data. Start from the top of the chart and work your way down.

| Drawing	Found in a Group or Alone	Means of Travel	Communication Technique	What it Eats (if possible)	Size (Approx)	Color and Shape	Location	Kind of Insect
	alone	fly and crawl	with its antennae	plants	1½–2 Long	green and brown long oval body	field	grasshopper

Made to Order

Directions: The special adaptations of an animal are used to classify them. Example: fish have gills to breathe in water. For each adaptive characteristic below select an animal and describe its special adaptations. The first adaptation characteristic is done for you.

Animal is adapted to its habitat or surroundings.
Animal   Walleye
Class   Fish
       Walleye have gills to breathe in water, fins for locomotion. Scales and body shape help
       them move through water. Walleye are generally found in the deeper waters of large lakes.
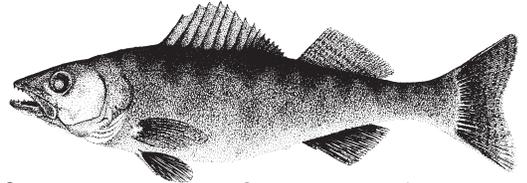
Animal defends itself or escapes from enemies.
Animal
Class

Animal is camouflaged.
Animal
Class

Animal cares for young in an unusual way.
Animal
Class

Animal makes use of its senses (smell, sight, hearing, and taste) in special ways.
Animal
Class

Animal uses its body to store food.
Animal
Class

Animal makes use of its senses (smell, sight, hearing, touch, and taste) in special ways.
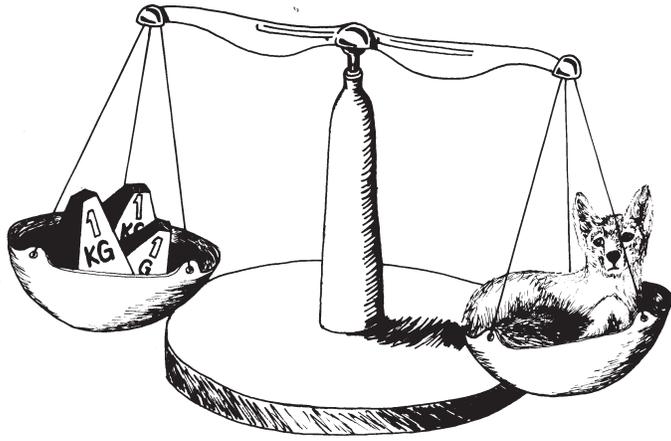Animal:
Class:

Animal uses its beak to obtain food.
Animal:

TIP THE SCALE

Directions: Animals can vary greatly in size. The average length and weight of several Kansas mammals is given below. Use the given information to answer the questions at the end of the chart. The following conversion factor will assist with your work. One kilogram = 1,000 grams.

	Total length (mm)	Weight (kg)
Jack rabbit	553	3.2
Coyote	1220	14.2
Swift fox	798	2.4
Raccoon	808	8.6
Armadillo	728	3.9
Black-footed ferret	514	560.0(g)
Big brown bat	120	24.8(g)
Mink	589	877.0(g)
Flying squirrel	229	77.0(g)
Badger	722	5.9
Striped skunk	678	3.0
Bobcat	912	6.8
Mule deer	1480	135.0
Whitetail deer	1745	128.0
Pronghorn	1358	59.0
Bison	2890	660.0
Porcupine	751	13.5
Beaver	1076	20.5
Gray squirrel	462	548.0(g)
White-footed mouse	176	31.8(g)

Why are some of of the weights given in grams instead of kilograms?

How many species are 30 kg. in weight and 1,000 millimeters or more in length?

Which animal has the least amount of weight (kg) per length (mm)?

In general, as the length of an animal increased does its weight also increase? Can you find any exception(s) to this general rule in the information given?

What is the length per mm of a raccoon, of a bison, of a beaver? Who weighs the most per kg?

Construct a bar graph on the following animals based on their weight per kg, start with the smallest to the largest.

striped skunk, beaver, armadillo, swift fox, badger, mink, porcupine, raccoon, and gray squirrel.

	1(g)	100(g)	250(g)	500(g)	750(g)	1(kg)	5(kg)	10(kg)	15(kg)	20(kg)	25(kg)

Which is the shortest animal in length? _____ the longest? _____

Name the largest animal by weight? _____ the smallest? _____

What is your body weight in kilograms? _____

Your length in millimeters? _____

Which animal are you the nearest to in weight and length? _____

Protective Adaptations

Directions: Animals employ numerous ways to protect or defend themselves from other animals. Some of these protective adaptations are listed below. Name three animals for each adaptation below. Select one animal and describe in detail how it uses this adaptation. One has been done for you.

Protective Adaptations

mimicry (look or sounds like another animal)

    1. viceroy butterfly-monarch butterfly

    2. King snake-coral snake

    3. bluejay mimics hawk's cry

Monarch butterfly's don't taste good. So, most birds
will probably not try to eat a viceroy butterfly
because it looks like a monarch.

jumps or runs

    1.

    2.

    3.

camouflage

    1.

    2.

    3

talons and beaks

    1.

    2.

    3.

poisons or odors

    1.

    2.

    3.

antlers or horns (put "a" behind those with antlers, "h" behind those with horns)

    1.

    2.

    3.

shell, scales, or quills

    1.

    2.

    3.

teeth or claws

    1.

    2.
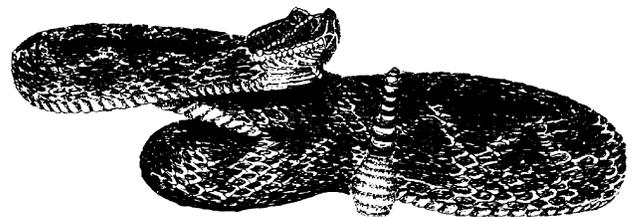
    3.

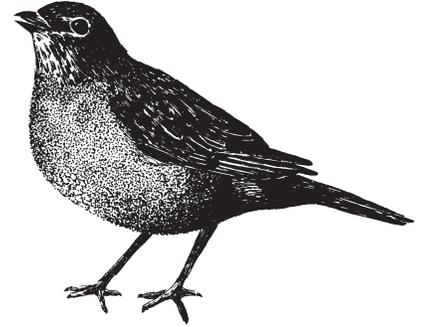**stings or bites**

    1.

    2.

    3.

ROBIN REPORTING

Directions: Robins are frequent visitors to Kansas neighborhoods and school yards. Image you are a robin in Kansas. Use the information below to assist you in completing your "robin report."

Foods include worms, insects, and berries
Nest is constructed of grass and mud, found in trees, shrubs, or within the structure of buildings.
Active during the day (diurnal)
Predators are domestic cats, birds of prey, and being struck by cars (accidental deaths).
Lives along or with a mate during the nesting season. Spends winter in flocks.

Describe the habitat you might live in while in Kansas.

What special adaptations do you have for food gathering?

Why can't Kansas always provide you with the food in the winter?

What adaptations protect you from predators?

Where in the neighborhood would you build your nest?

How are you important to both the human and wildlife communities?

Draw a map of the habitat you live in, include your nesting site, the areas you obtain your food and where you seek shelter from predators and bad weather.

ANTHROPOMORPHIC - refers to giving human characteristics to non-human things. If your robin could give his opinion of people what would he say?

BIRD BUILDERS

NAME _____

Directions: Build a bird that would live in Kansas. What kind of food will this bird eat? Color the bird in a natural setting and print its name. Next, combine body parts to make an imaginary bird. color and name it. What problems will the imaginary bird have when it tries to eat, build a nest, or get away from its enemies.
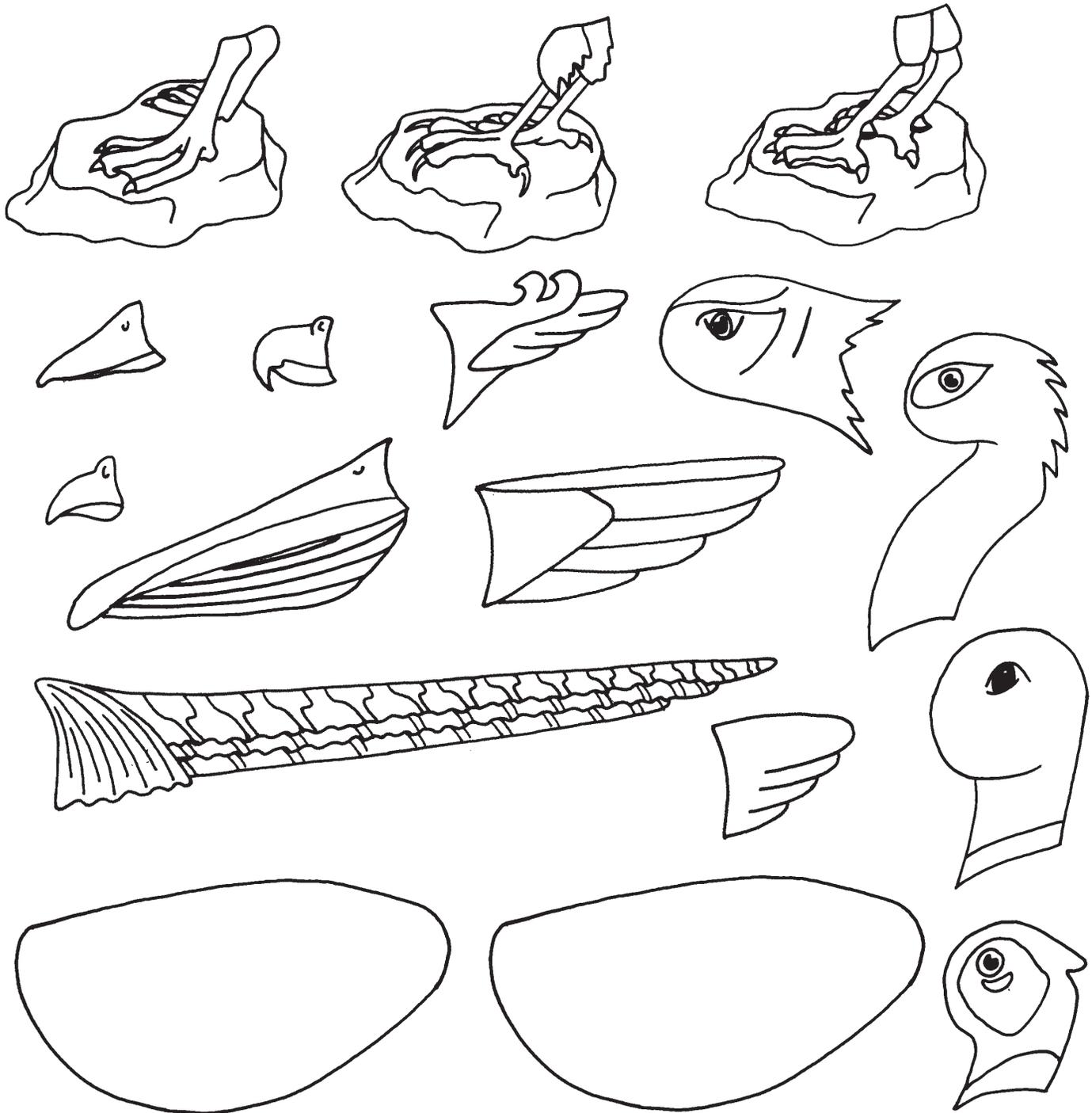
Wings and other body feathers can be added to the bird.

26 ▼■●

Flint Hills' Future

NAME _____

Directions: You have inherited 350 acres of land in the Flint Hills of Kansas. Your acreage includes 200 upland acres of native prairie, prime for grazing cattle, and 150 bottomland acres. The 150 acres includes a stream, timber, overgrown cropland, and field suitable for corn and alfalfa.

The will states that you are to take an inventory of the acreage in order to determine the most suitable and valuable uses of the land.

The upland, native, tallgrass prairie includes the following grasses: big bluestem, little bluestem, Indian grass, switch grass, and side oats grama. There are healthy populations of antelope, prairie chickens (greater and lesser), and a wide variety of other prairie wildlife species.

The overgrown farmland includes shrubs, weeds, and native prairie grasses. The stream has a balanced fish population. The timber, or woodland, is primarily made up of cottonwoods, green ash, elm, burr oak, willow, and eastern red cedar. A variety of wildlife species appropriate, for the habitat types are found in the bottomland. Your first task is to map the area. (Your map should include a legend, compass directional markings, title, etc.)

List the animal life you would find in your upland and bottomland acreage.

Mammals
Upland

   1. _____ 2. _____ 3. _____

Bottomland

   1. _____ 2. _____ 3. _____

Reptiles/Amphibians
Upland

   1. _____ 2. _____ 3. _____

Bottomland

   1. _____ 2. _____ 3. _____

Fish
Bottomland

   1. _____ 2. _____ 3. _____

Insects/Invertebrates
Upland

   1. _____ 2. _____ 3. _____

Bottomland

   1. _____ 2. _____ 3. _____

Birds
Upland

   1. _____ 2. _____ 3. _____

Bottomland

   1. _____ 2. _____ 3. _____

Flint Hills cont.

List the suitable usage of the land for:

	PEOPLE		WILDLIFE		AGRICULTURE	
	upland	bottomland	upland	bottomland	upland	bottomland
	1. _____	1. _____	1. _____	1. _____	1. _____	1. _____
	2. _____	2. _____	2. _____	2. _____	2. _____	2. _____

State what you think *valuable* and *suitable* mean. Do the words apply to people or do they include wildlife also? _____

_____.

Wildlife is (check one:) ☐ very valuable   ☐ moderately valuable   ☐ not valuable

The land-use options available are:

No.1 Nature preserve / Wildlife refuge   **No.2** Cropland / Grazing land
No.3 Wildlife management area - public hunting,fishing and wildlife production
No.4 State park   **No.5** Housing project   **No.6** Your idea

	1	2	3	4	5	6
The variety of wildlife and native plant species would... increase (I) or decrease (D)? Why?						
List visible changes to the terrain of the land.						
Land is now more (M) or less (L) valuable for: Wildlife People						

Your decision is to use the land for _____ because,
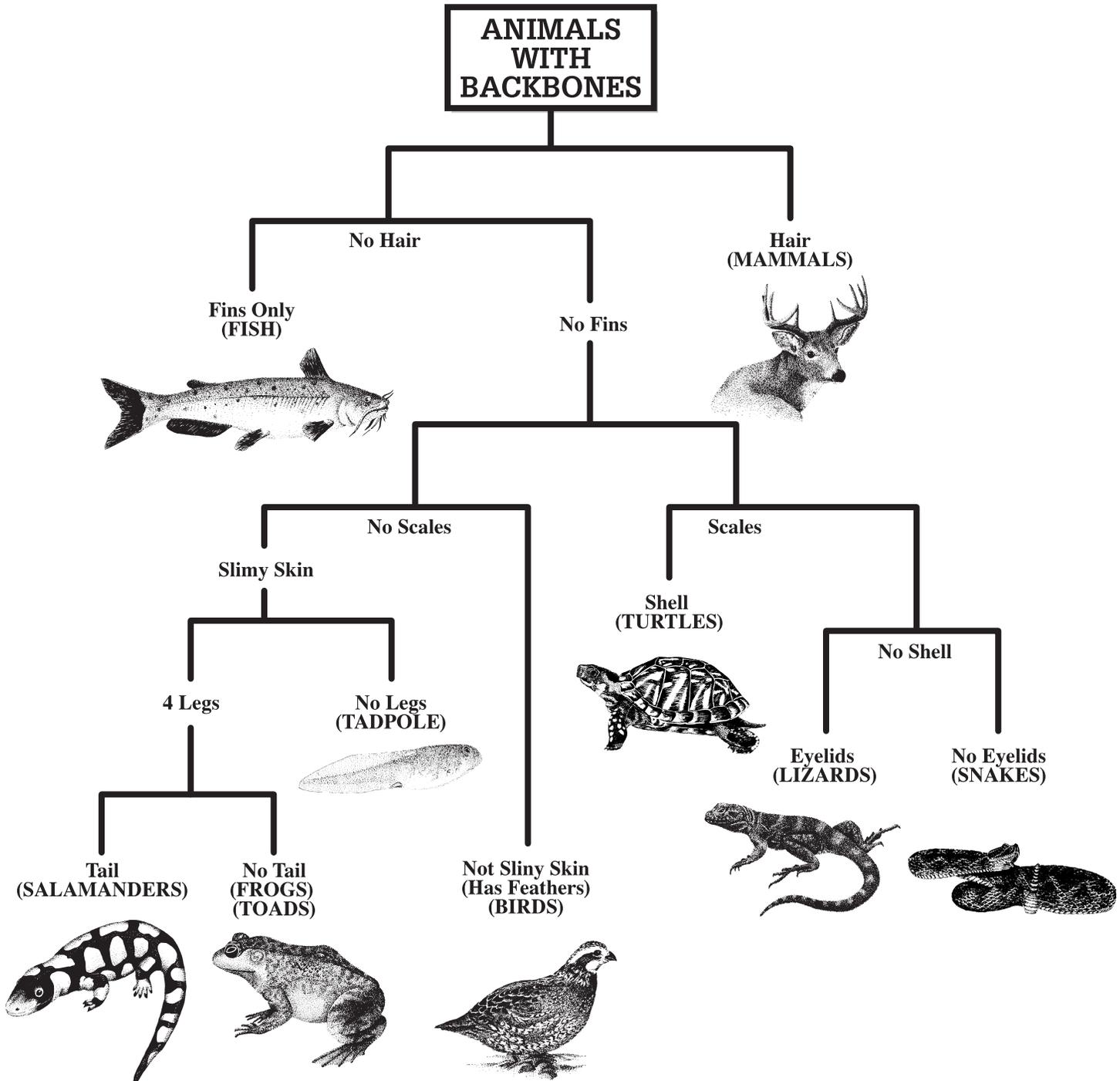
_____

_____.

Can you determine how one could apply several of the land use choices to this area.

_____

_____.

Key to
VERTEBRATES

Directions: Identification keys are used to distinguish animals from one another based on physical characteristics. They can show general or very specific differences between species. This identification key moves across the page from left to right; showing general to specific characteristics. Could you construct your own identification key?

ANIMALS
WITH
BACKBONES

No Hair

Hair
(MAMMALS)

Fins Only
(FISH)

No Fins

No Scales

Scales

Slimy Skin

Shell
(TURTLES)

No Shell

4 Legs

No Legs
(TADPOLE)

Eyelids
(LIZARDS)

No Eyelids
(SNAKES)

Tail
(SALAMANDERS)

No Tail
(FROGS)
(TOADS)

Not Sliny Skin
(Has Feathers)
(BIRDS)

Key

Adaptation

TIP THE SCALE - PAGE 22 - 23

1. A number of animals do not weigh more than one kilogram
2. four - Mule deer, Whitetail deer, pronghorn and bison
3. White-footed mouse
4. Raccoon = 93.90 mm/per kg   Bison = 4.38 mm/per kg   Beaver = 52.48 mm/per kg
   The Bison weighs the most per mm.

PAGE 23

shortest animal = Big Brown Bat   **longest =** Bison
largest by weight = Bison   **smallest =** Big Brown Bat

PROTECTIVE ADAPTATIONS - PAGE 24

Some examples one could use

Antlers or horns	Jumps or Runs	Shell, Scales or Quills
1. Whitetail Deer	**1.** Jack Rabbit	**1.** Ornate Box Turtle
2. Elk	**2.** Pronghorn	**2.** Largemouth Bass
3. Bison	**3.** Bull Frog	**3.** Porcupine

Camouflage	Teeth, Claws or Fangs	Talons and Beaks
1. Cottontail Rabbit	**1.** Bobcat	**1.** Great Horned Owls
2. Copperhead	**2.** Badger	**2.** Red-tailed Hawk
3. Bobwhite	**3.** Rattlesnake	**3.** Great Blue Heron

Stings and Bites	Venom or Odors
1. Honey Bee	**1.** Massasuga
2. Coyote	**2.** Striped Skunk
3. Snapping Turtle	**3.** Stink Beetle

Threatened & Endangered

INTRODUCTION AND RESOURCES

Over the past ten years, endangered animals have received some much needed attention in newspapers, magazines, and on television. Even though we may hear more about them, it doesn't always mean we know what animals are really endangered or, more importantly, what causes animals to become endangered. The surprising result of one college survey revealed that 70% of the students who participated thought coyotes were endangered in Kansas (test your endangered IQ, on page ?). So what makes an endangered species?

<u>Threatened</u> <u>and</u> <u>Endangered</u> <u>Species</u>. An endangered species is a plant or animal that is in immediate danger of becoming extinct throughout all, or a large part, of its range. Worldwide, there are thousands of endangered species. The whooping crane, black-footed ferret, and California condor are all federal endangered species. Threatened means a plant or animal is at risk of becoming endangered due to a rapid decline in its numbers. If the problems facing these animals do not lessen, these species are likely to become endangered. The piping plover and Eastern spotted skunk are threatened Kansas species. Extinct species are no longer living. Dinosaurs and the passenger pigeon are extinct.

Another category found in Kansas is Species In Need of Conservation (SINC). Plants or animals in this category are those whose needs are very specialized, whose habitat is very limited, or for some other reason merit special concern. SINC species could become threatened if current pressures on the habitat or the species continue.

Why are certain species in trouble? The loss of habitat is by far the greatest threat to wildlife species and the number one reason animals worldwide are becoming threatened or endangered. The growth of human populations and the changing use of the land to agriculture and urban development have resulted in a loss of the valuable diversity of habitats that support our wildlife. Kansas is no exception. Chemicals, pollutions, and loss of streamflow have caused some rivers to no longer support native animals. The destruction of cave and woodland habitats in the southeastern part of the state has placed many of its inhabitants in danger. Plowing or development of highly erodible lands causes erosion and loss of top soil which, in turn, reduces productivity and adds more silt to our streams and rivers. Heavy use of water for irrigation and municipal use are causing streams and marshlands to dry up as in western Kansas. Many of these changes occur so quickly or on such a broad scale that animals and plants can't adapt so they become threatened or endangered.

Other reasons plants and animals may become threatened or endangered include: competition from introduced species which displace the native ones (starlings, introduced from Europe, drive out our native bluebird and other songbirds), unregulated

hunting and/or poaching (hunting is not a threat to any Kansas wildlife since all hunting is regulated. The illegal trade and exploitation of wildlife such as for ivory or horns has nearly caused some animals to become extinct), and in fact some species may have always been rare due to very specialized habitat needs (the cave salamander can only be found in the extreme southeast corner of Kansas, the only region of Kansas to contain moist, Ozarkian caves). Some animals are clearly more prone to extinction than others. Factors which might contribute to an animal's decline are:

Migration - Animals which migrate depend on more than one habitat which makes them doubly susceptible to habitat destruction. For example, songbirds that winter in tropical rainforests and summer in the United States.

Interfering with people's activities - animals which kill livestock or ruin crops are often shot or poisoned.

Having few young - animals which give birth to one or two young every one or two years (such as most bats) are very susceptible to declines since it takes much longer for their numbers to recover. Compare several generations of bats, 1 - 2 young/year to cockroaches, 80 young/six months, demonstrates why those animals with low birth rates are often unable to recover from sudden declines.

Becoming too specialized - animals that use only one food source or need one type of tree, for breeding (the spotted owl requires 300+ year old trees for nesting), can become too specialized and unable to change rapidly enough to survive.

There are many things to consider when looking for reasons why an animal or plant may be headed for extinction. Most animals and plants are in trouble because of a combination of factors. One factor, in itself, may not be enough to drive an animal to extinction, but when coupled with pressures from loss of habitat, pollution, or poaching, the demands become too great.

Extinction is a natural process. There has always been extinction. In fact, it is a natural process that has been occurring for millions of years. So, why all the fuss about plants or animals which are nearly extinct? The staggering news about extinction is the rate at which it is occurring. Human activities have caused extinction rates to soar. Some scientists estimate we may be losing hundreds to thousands of species each year. At least one species on our planet is estimated to become extinct everyday! That's a far cry from the 300 species of animals believed to have become extinct between 1600 and 1974. Compare this to the 3,000 years of the Pleistocene Ice Age when all of North America only lost about three species every 100 years. This accelerated rate of extinction can be directly linked to the human population explosion - from less than 1 billion people in 1600 to 5 billion people today. More people need more houses, use more energy, and eat more food than ever before.

Why save threatened and endangered animals? There is a delicately balance, complex interaction between all living things and their physical environment called an ecosystem.

Ecosystems are self-sustaining and provide their inhabitants with food, shelter, clean water, pure air, and the proper climate. The removal of a single species from an ecosystem can set off a chain reaction that affects many other species. Some scientists believe that the disappearance of one plant species can take with it up to 30 other species including insects, higher animals, and other plants. The full significance of an extinction may not always be known. The genetic material that is lost when a plant or animal becomes extinct may hold the key to cancer research or any of a dozen other cures. After all, it was "only" a fungus that gave us penicillin! At least a quarter of all prescriptions written in the U.S. contain chemicals discovered in plants and animals. And what is lost as far as food crops? It has been estimated there are almost 80,000 edible plants of which 20 produce 90% of the world's food.

But, above all, this incredible diversity of life that we see on Earth is an indication of the health of our planet. The more diverse life is (biodiversity), the healthier our planet. Some species can serve as indicators in monitoring our environmental quality. Declines in certain species have shown us where problems have existed. The sudden drop in bald eagle numbers alerted us to the deadly dangers of DDT. Many endangered species today are acting in this capacity.

Our quality of life will decline as the diversity of plants and animals declines. New products to enhance our lives will go undiscovered. Everytime we lose a species, the world becomes a poorer place. How long can it go on before the ecosystems of the world can no longer support its inhabitants? Think of all the plants and animals on this Earth as building blocks in a huge pyramid. Every time a species becomes extinct, we lose one of the building blocks of the pyramid. With thousands of species being lost each year, can we really afford to see how many blocks we can lose before the pyramid collapses? Exterminating other life forms is incredibly shortsighted!

The law. The Federal Endangered Species Act of 1973, protects listed species against killing, harming, harassment, or the destruction of their habitat. Kansas passed its Nongame and Endangered Species Conservation Act in 1975, which directs the Kansas Department of Wildlife and Parks. To list threatened and endangered animals and protect them and the habitats critical to their survival. The Kansas law covers T & E mammals, birds, fish, reptiles, amphibians, and invertebrates but no plants.

What you can do. Endangered means there is still time. If species are to be saved from extinction it will take a concentrated effort from everyone. We all need to become informed and involved. We recommend that private and public landowners implement management plans that focus on sustaining the health and productivity of our natural resources. Recycle and conserve the use of natural resources. Don't buy exotic or wild animals as pets or purchase products made from protected species. Report violations. Visit a nature center, natural area, or zoo. Help clean up habitat and help protect those areas that still remain. Learn all you can!

The following additional resources to available to assist you:

REFERENCE CENTER

Books
BK 12-9L   Endangered Species: Wild and Rare
BK-14-5   Endangered Means There's Still Time
BK 14-9   Teaching About Endangered Species
BK 14-31   Illustrated Guide to Threatened and
                  Endangered Species in Kansas
BK 14-32   Zoobooks: Endangered Animals
BK 14-32.1   Zoobooks: Endangered Animals Thematic
                  Curriculum
BK 14-58   Discovering Endangered Species

Computer Software
CD-R0-2   Discovering Endangered Wildlife

Game Kits
GK-2   Extinction: The Game of Ecology
GK-21   Endangered Species
GK-23   Rare and Endangered Species Cards
GK-27   Endangered Animals Giant Floor Puzzle

Filmstrips
FS-1B   Endangered Species
FS-2   World of Endangered Species
FS-21   Un-endangered Species
FS-35   Endangered Species: Special Report
FS-38   Vanishing From Earth

Posters
PP-63   Species in Trouble A-Z
PP-76   Help Save Their Layers of Life:
                  Rain Forests

Learning Kits
LK-5   Wildlife in Your World
LK-65   Wildlife Casting
LK-26   Replitracks
LK-153   Birds Fandex Guide
SK   Skins and Skulls

Slide Series
SS-13   Saving America's Bats
SS-22   Rare and Endangered Animals
SS-32   Kansas' Endangered and
                  Threatened Wildlife

Video Tapes
VT-7   The American Bald Eagle
VT-16   Protecting Endangered Animals
VT-140   A Special Report:
                  You Can Make a Difference
VT-156   Wildlife on the Brink
VT-205   The Road to Extinction
VT-277   Wildlife for Tomorrow:
                  The Story of Our Un-Endangered Species
VT-278   The Un-Endangered Species
VT-433   Raptors at Risk

NATURE'S NOTEBOOK

Amphibian & Reptiles
        Alligator Snapping Turtle   A-7 – A-8

Birds
        Greener Pastures   C-19
        Honker Restoration   C-23 – G-24

Fish
        Natural Mussel   G-13 – G-14

General Wildlife
        A Ripe old Age   I-18 – I-19

Threatened & Endangered
        Endangered & Threatened   M-1 – M-7

ON T.R.A.C.K.S. NEWSLETTER

The On T.R.A.C.K.S. Newsletter can be obtained for free by contacting the Wildlife Education Services section of the KS Dept of Wildlife & Parks by writing to C/O WES, KDWP 512 SE 25th Ave. Pratt, KS 67124 or phoning (620) 672-5911 or by E-mail at ShelbyS@wp.state.ks.us.

Winter 1991 . . . . **Vol. 3, No. 2**
Spring 1993 . . . .**Vol. 4, No. 3**
Fall 1994 . . . . **Vol. 5, No. 1**
Winter 1994 . . . . **Vol. 5, No. 2**
Spring 1994 . . . . **Vol. 5, No. 3**
Winter 1995 . . . . **Vol. 6, No. 2**
Spring 1995 . . . . **Vol. 6, No. 3**
Spring 1996 . . . . **Vol. 7, No. 3**
Fall 1996 . . . . **Vol. 8, No. 1**
Winter 1996 . . . . **Vol. 8, No. 2**
Spring 1997 . . . . **Vol. 8, No. 3**
Spring 2003 . . . . **Vol. 9, No. 3**

PROJECT AQUATIC

ACTIVITY	PAGES NEW GUIDE	PAGES OLD GUIDE
Net Gain, Net Effect	85	104
Plastic Jellyfish	136	170
Something Fishy Here	145	176
To Dam or Not to Dam	170	134
Turtle Hurdles	158	164
Where Have all the Salmon Gone	166	110
Whale of a Tail	10	26
Sea Turtles International	98	

PROJECT LEARNING TREE

PROJECT WILD

Threatened & Endangered

TABLE OF CONTENTS

Fourth Grade - ▼
Fifth Grade - ■
Sixth Grade - ●

How is your endangered wildlife IQ?

Directions: This activity should be given before and after completing this unit. Compare the results to measure the students' comprehension. Place a "T" in the blank by animals you believe to be threatened and an "E" by those endangered in Kansas. The space by animals which are neither threatened or endangered should remain blank.

Endangered = species facing the prospect of disappearing - becoming extinct.
**Threatened** = species which are in peril of becoming endangered.

Bobcat	_____	Wild turkey	_____	Cave salamander	_____
Mule deer	_____	White-faced ibis	_____	Tiger salamander	_____
Black-footed ferret	_____	Black rat snake	_____	Northern spring peeper	_____
Bison	_____	Common map turtle	_____	Plains leopard frog	_____
Gray myotis (bat)	_____	Copperhead	_____	Beaver	_____
Badger	_____	Texas night snake	_____	Pallid sturgeon	_____
Eastern spotted skunk	_____	Ornate box turtle	_____	Arkansas River shiner	_____
Whooping crane	_____	Broadhead skink	_____	Neosho madtom	_____
Barn owl	_____	Checker garter snake	_____	Walleye	_____
Least tern	_____	Eastern newt	_____	Arkansas darter	_____
Canada goose	_____	Great plains toad	_____	Channel catfish	_____
Eskimo curlew	_____	Green toad	_____	Flathead chub	_____

37 ▼ ■ ●

ARE VOWELS EXTINCT?

Directions: Add the missing vowels to the consonants below to form names of many endangered and threatened species in Kansas.
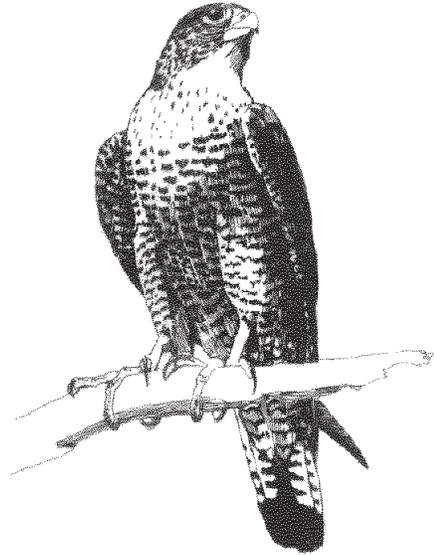
NSH MDTM

BLD GL

PRGRNFLCN

A

GRY BT

BLCK-FTD FRRT

I

CV SLMNDR

PLLD STRGN

SKM CRLW

GRTT SLMNDR

WRTY-BCKD MSSL

HL-SPLTTR MSSL

WHPNG CRN

O

GRY-BLLD SLMNDR

SCKLFN CHB

STRN NWT
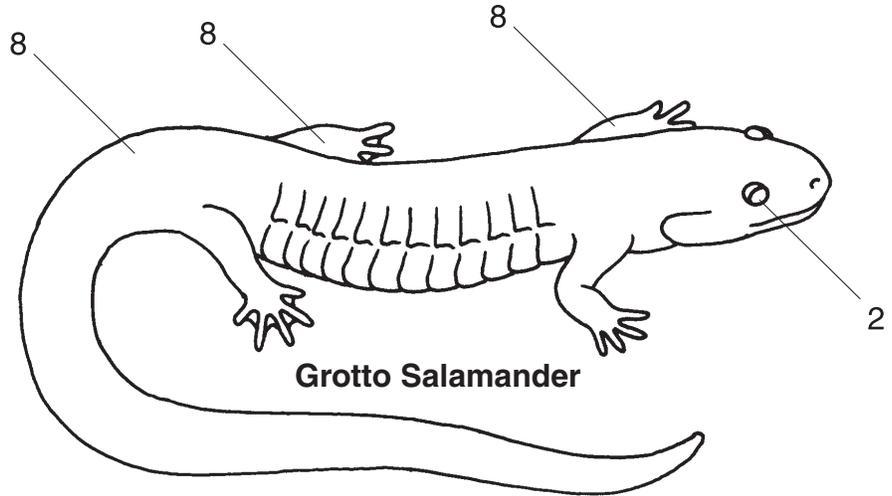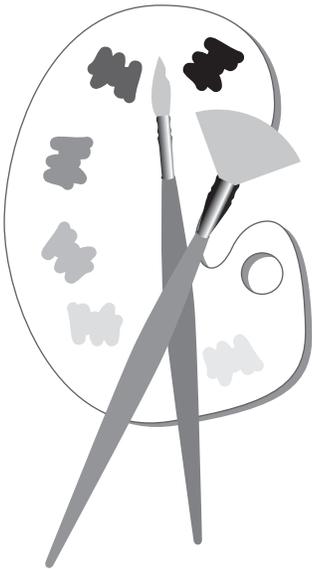
LST TRN

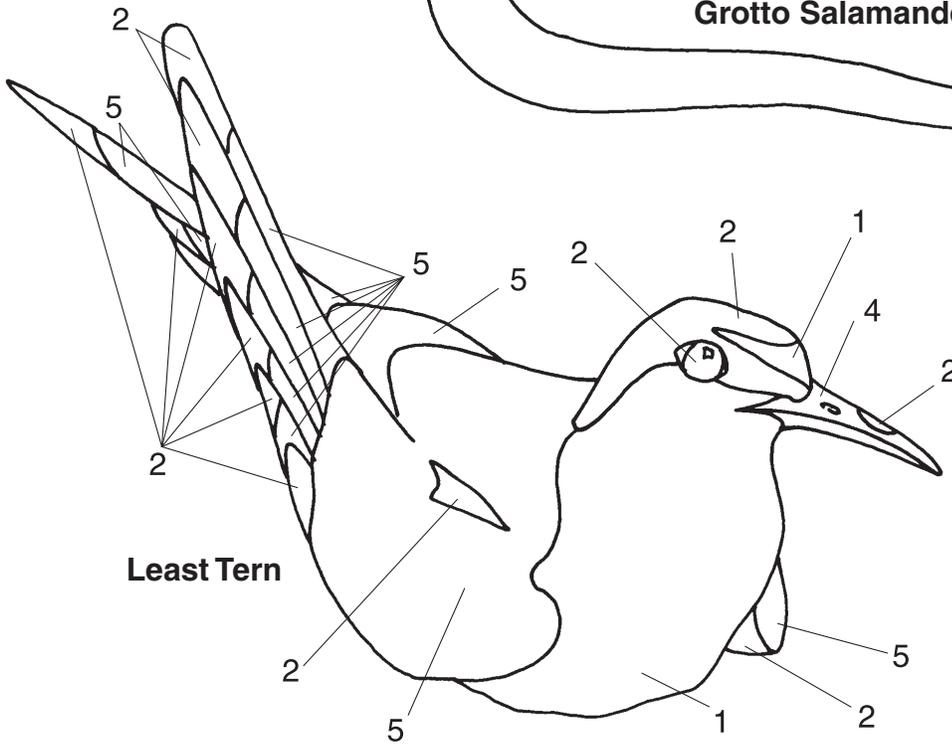NDN BT

RKNSS DRTR

E

SCTT RFFL BTL

TPK SHNR

U

38 ▼ ■ ●

Painter Pallet

8   8   8

2

Grotto Salamander

2

5

5   5

5

2   2   1

4

2

Least Tern

2   5

2

5   1   2

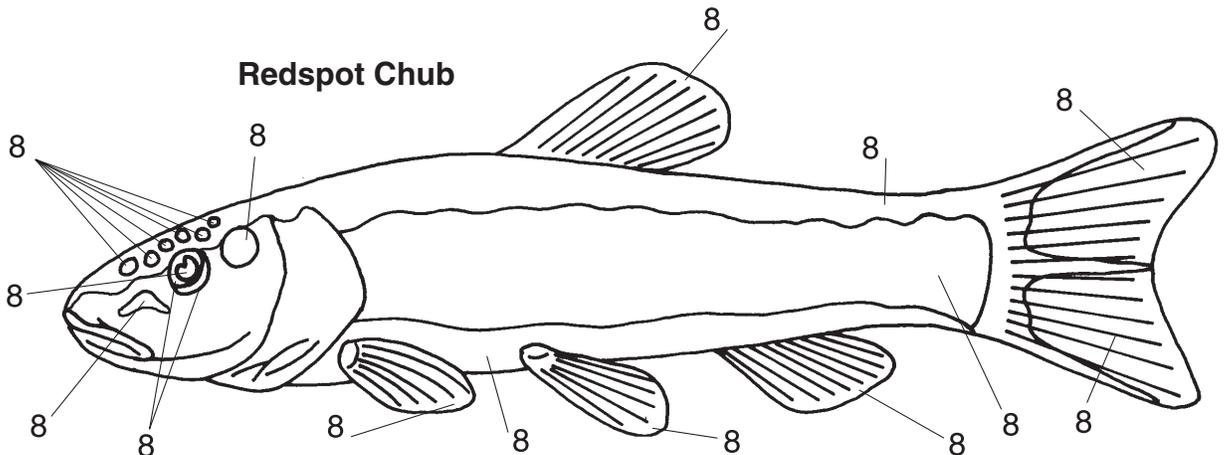**Directions:**
An endangered and threatened species of Kansas is illustrated below. Follow the color key in coloring it.

1= White	5= Gray
2= Black	6= Red
3= Brown	7= Orange
4= Yellow	8= Pink

Redspot Chub

8   8

8   8

8   8

8

8   8

8   8   8   8   8

The Sweet 16 of Kansas

NAME _____

Neosho Madtom
Black-footed Ferret
Grotto Salamander
Sicklefin Chub
Snowy Plover
Eskimo Curlew
Pallid Sturgeon
Central Newt

Bald Eagle
Gray Bat
Bleedingtooth Mussel
Strecker's Chorus Frog
Peregrine Falcon
Cave Salamander
Blackside Darter
Rabbit's foot Mussel

Slender Walker (snail)
Whooping Crane
Graybelly Salamander
Scott Riffle Beetle
Arkansas Darter
Common Map Turtle
Least Tern
Redspot chub
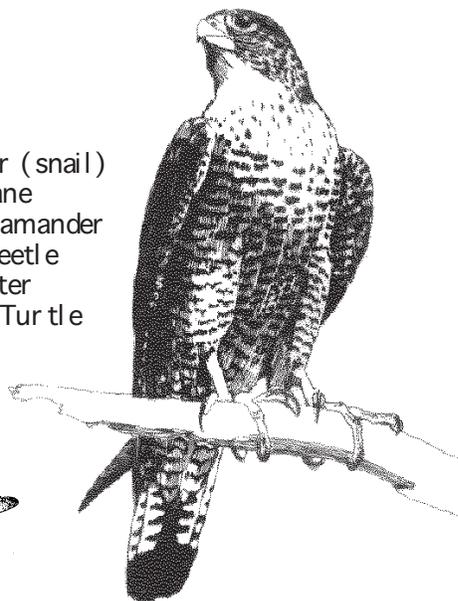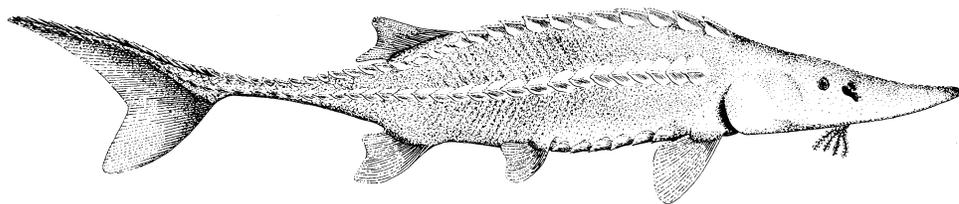
Directions: Above is a list of sixteen endangered species and eight threatened species in Kansas (1993 list). Divide the list into animal groups by writing the appropriate letter behind the name. **B** for birds, **M** for mammals, **F** for fish, **R** for reptiles, **A** for amphibians, and **I** for invertebrates.

Has this list changed since you were born?   How?

What contributed to the endangerment of these species? Select one and write a report on why the animal is endangered or threatened.
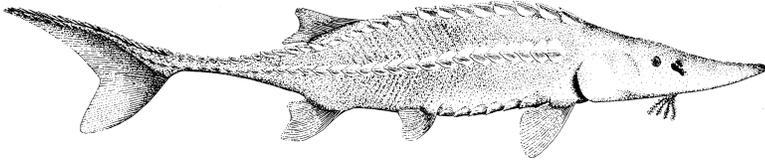
Name the law(s) that protect these animals.

Have some endangered species been reclassified as threatened?
Are some threatened species now endangered?

Besides laws, what has been done to help these animals?
Do you think these activities will be helpful? Who contributes money to the efforts?
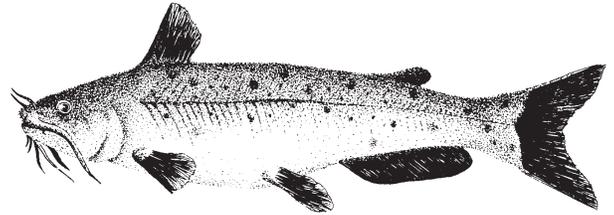
ENDANGERED

Unendangered

Directions: Below are pairs of animals. One of the pair is an endangered species, the other is Not endangered. Circle the endangered species and complete the information below for each species. Choose one of the pairs and compare them in more detail. Why do you think one is endangered and not the other?

Pallid Sturgeon
 Habitat _____
_____
 Main food _____
_____
 Predator or prey _____
___
 Game or nongame _____
___

Big Brown Bat
 Habitat _____
_____
 Main food _____
_____
 Predator or prey _____
___
 Game or nongame _____
___

Whooping Crane
 Habitat _____
_____

 Main food _____
_____
 Predator or prey _____
___
 Game or nongame _____
___

Raccoon
 Habitat _____
_____
 Main food _____
_____
 Predator or prey _____
___
 Game or nongame _____
___

Channel Catfish
 Habitat _____
_____
 Main food _____
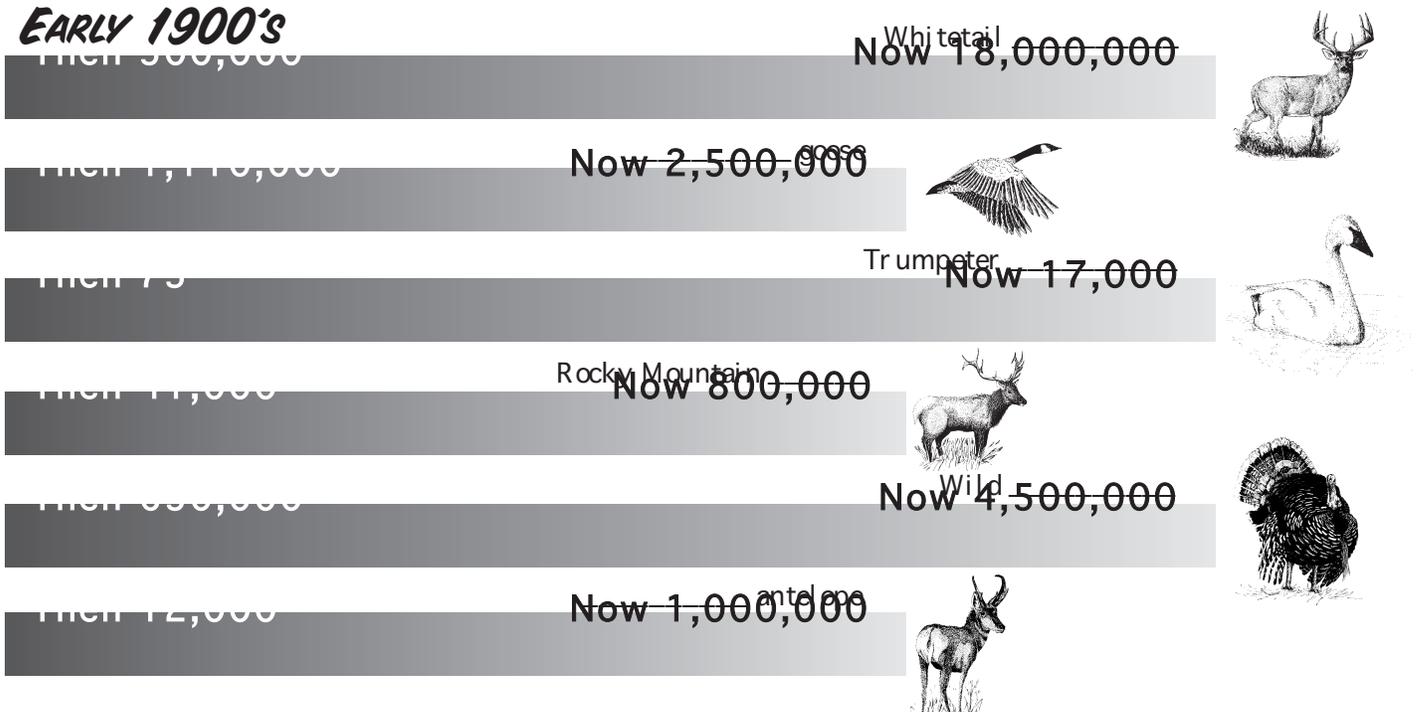_____
 Predator or prey _____
___

THE BUCK STOPS HERE NAME _____

Directions: Sportsmen have taken more than their share of the blame for wildlife destruction, when, in fact they pay more than their share to support wildlife. About $8 billion is paid in the United States each year by sportsmen to support wildlife and natural resource programs.

Since the turn of the century, some wildlife populations have made great progress in the United State. Read the chart below to see the changes that can be made. Complete the animal's name in the blank provided. Place an "X" near all species that live in Kansas.

Early 1900's

Then 500,000   Whitetail Now 18,000,000

Then 1,110,000   Now 2,500,000 goose

Then 73   Trumpeter Now 17,000

Then 41,000   Rocky Mountain Now 800,000

Then 690,000   Now Wild 4,500,000

Then 12,000   Now 1,000,000 antelope

1. White-tailed deer have increased by approximately what amount since the early 1900's? Show your work.

2. Which species has increased the most in number?

3. What percentage of the current trumpeter swan population did we have in the early 1900's?

4. How may more wild turkeys do we have than Canada geese?

5. Biologists estimate that Kansas has 19,000 pronghorn antelope. What fraction of the total U.S. population is that?

6. How many mammals does this chart represent? How many birds?

ENDANGERED
A Word To The Wise

Directions: When people talk about endangered wildlife, new vocabulary appears. We are familiar with some of the words but maybe not all of them. Fill in the blanks with the correct word from the list. Use each word only once.

1. _____ is where an animal lives; where it finds food, shelter, water, etc.

2. _____ helps keep healthy populations of game animals at manageable levels.

3. Animals that were once found in Kansas, but are now only found in other places outside the state are called _____ .

4. Instead of increasing in number or remaining steady, some endangered animals continue to _____ .

5. Plants and animals are _____ ; which means they need each other.

6. Some _____ are natural, others are made by people. They may result in plants and animals becoming endangered.

7. A _____ species may continue to fall in number and be   placed on the endangered species list.

8. _____ means there are no more of this species.

9. With _____ and _____ , wildlife has a future.   These are done by biologists who care about wildlife and habitat.

10. When we misuse _____ , we _____ our _____ .

11. National wildlife _____ are homes for many _____ , of animals.

12. When an animal or plant is put on the _____ species list, it means there is still time for it to _____ if   we care.

13. _____ is the study of living things and how they relate   to their environment.

14. Some species can _____ better than others to changes   we make to the environment.

15. Biologists have tried to _____ , or bring back species like antelope, elk, turkey, sharp-tailed grouse and swallow-tailed kites to Kansas where they once lived. They hope the animals will _____ and raise their young here so

extinct

endangered

species

decrease

ecology

reestablish

threatened

habitat

interrelated

pesticides

hunting

adapt

extirpated

changes

disturb

reproduce

management

environment

survive

pollute

refuges

research

43 ▼ ■ ●

The Decision is YOUR'S

Directions: You are the manager of Cheyenne Bottoms Wildlife Area in central Kansas. This wetland is a concentration point for waterfowl and shorebirds and receives heavy usage from waterfowl hunters and bird watchers. It is spring and you are faced with the dilemma of leaving one of the pools (see map) partially drained for use as a nesting site for the least tern - a threatened species.

The following information needs to be considered in making your decision.

* The only water you can count on for filling this wetland comes in the spring. To hold waterfowl in the area during the hunting season you need high, spring water levels.

* Low, spring waters are better for shorebirds, such as the least tern.

* High water levels also keeps cattails from taking over the wetlands. Too many cattails can ruin the wetland as an ideal habitat for many wildlife species, including the least tern.

* If you lower the water level in spring, you may not be able to fill the wetlands in fall for the hunting season. The only water available during the summer is from rain and stream runoff. Do you gamble on the weather?

* The sale of hunting licenses provide most of the funds to operate and manage this wetland.

* Nongame funds provided an observation tower for viewing wildlife, such as the least tern, in this area.

* The previous hunting season was poor due to a drought. There is a great deal of pressure from hunters for a successful season this fall.

* The number of birdwatchers know your agency (Kansas Department of Wildlife and Parks) is responsible for the stewardship of all wildlife, not just ducks. They believe the wetlands should be managed for all species of wildlife.

* There are five pools in the wetland. You can manage the water level in each pool separately?

   How should you provide a water level to guarantee a reasonable hunting season? How should you also provide wetland habitat for the shorebirds, including the least tern. State your solution to the above dilemma.
   Panels can be formed to represent both sides from the students' responses. Can the group come to consensus on a solution to this problem?

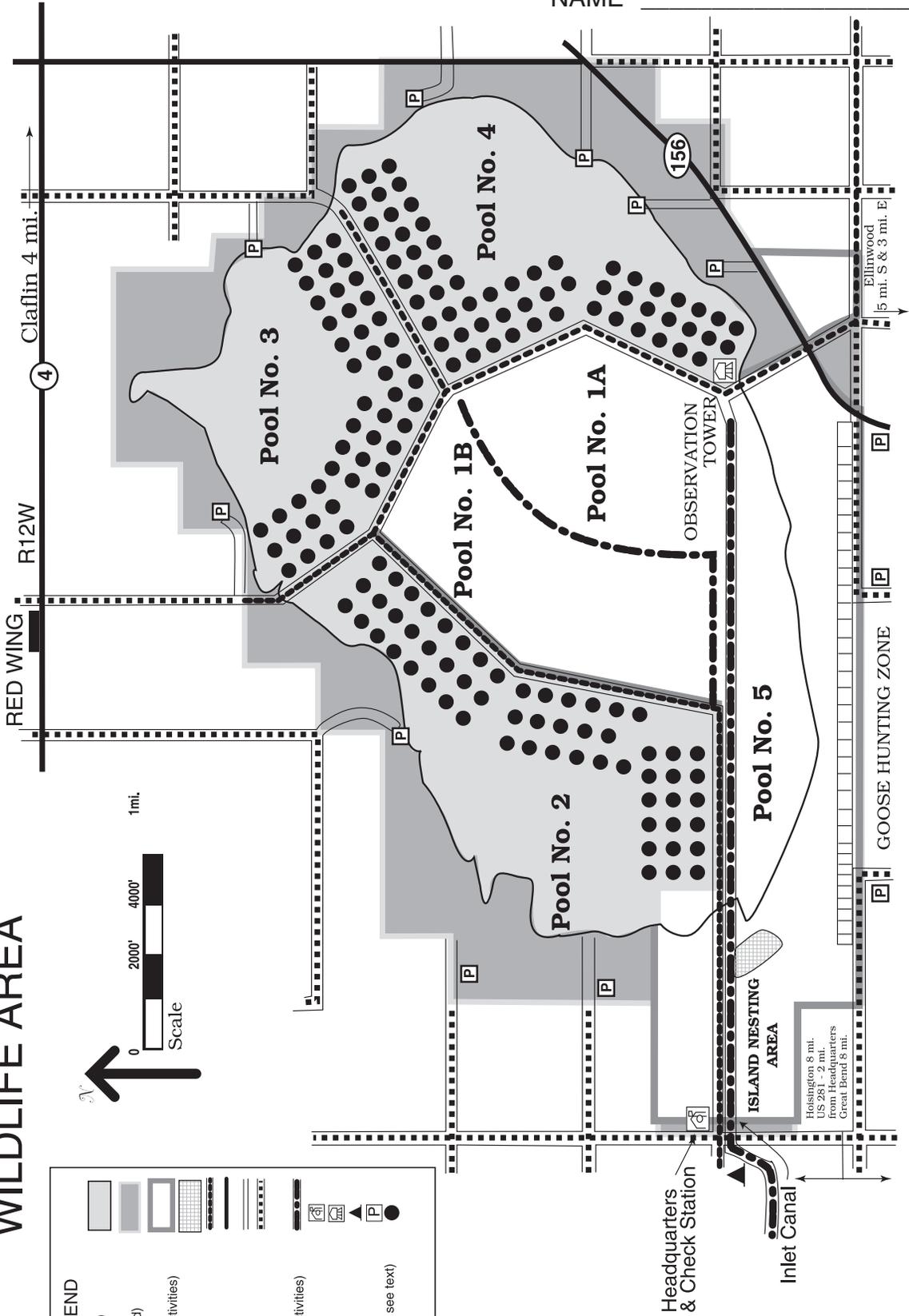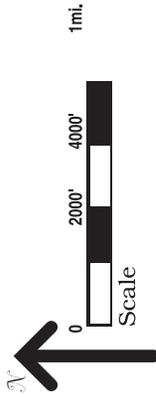**Use this map of Cheyenne Bottoms to make your management plan**

NAME _____

CHEYENNE BOTTOMS
WILDLIFE AREA

N

Scale

0   2000'   4000'   1mi.

Pool No. 3

Pool No. 4

Pool No. 1B

Pool No. 1A

Pool No. 2

Pool No. 5

OBSERVATION TOWER

GOOSE HUNTING ZONE

ISLAND NESTING AREA

Headquarters & Check Station

Inlet Canal

Hoisington 8 mi.
US 281 - 2 mi.
from Headquarters
Great Bend 8 mi.

RED WING

R12W

Claflin 4 mi.

4

156

Ellinwood
5 mi. S & 3 mi. E

LEGEND

Marsh (Hunting Allowed)

Public Use Area
        (Hunting Allowed)

Wildlife Refuge
        (Closed to all Activities)

Island Nesting Area

Dike with Gravel Road

Paved Road

Unimproved Road

Gravel Road

Dikes
        (Closed to all Activities)

Office

Observation Tower

Camping Area, Primitive

Parking

Blinds Hunting Allowed, see text)

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Wildlife Word Review

Directions: You have been exposed to the following words in our discussions on wildlife. See if you can match the following words with their definition. If you require assistance consult a dictionary.

habitat

classify

predator

prey

conservation

ecology

species

adaptation

ungulate

migrate

vertebrate

invertebrate

warm-blooded

cold-blooded

riparian

extinct

endangered

threatened

hibernate

estivate

diurnal

wildlife

nocturnal

herbivore

carnivore

omnivore

granivore

parasite

insectivore

_____ 1. a group of individuals that can breed with one another.

_____ 2. mainly eats insects

_____ 3. animal with a backbone

_____ 4. hoofed animal

_____ 5. the wise use of natural resources

_____ 6. habitat along a stream or river

_____ 7. active during the day

_____ 8. the study of the relationship between organisms and their environment

_____ 9. moves to different areas with changing seasons

_____ 10. all wild, living creatures

_____ 11. plant eater

_____ 12. animal without a backbone

_____ 13. spend the summer in a dormant state

_____ 14. eats seeds or grass

_____ 15. modification that helps an animal in its environment

_____ 16. to group with similar characteristics

_____ 17. active at night

_____ 18. meat-eater

_____ 19. body temperature adjust to surroundings

_____ 20. animals that kills for food

_____ 21. environment animal lives in

_____ 22. species is in danger of becoming extinct - protected by law

_____ 23. an animal or plant that lives on or in an organism to get food

_____ 24. species may become endangered - are watched carefully

_____ 25. eats both plants and animals.

_____ 26. body temperature constant - makes body heat by being active

_____ 27. spend winter in a dormant state

_____ 28. an animal hunted for food

_____ 29. species no longer exists

E IS FOR ECOLOGICAL EXPRESSIONS

NAME _____

Directions: Use the words below to complete the following exercises. Place your word on a separate sheet of paper.

estivate	exotic	energy	echidna	eel
eagle	entomology	ermine	eider	environment
egret	echolocation	ecology	extinct	experiment
eddy	evaporation	elk	eaglet	ecosystem
edentate	endangered	egg	estuary	eland
echinoderm	earth science	edge effect	extirpated	erosion

1. Place the words in alphabetical order. Divide the words into syllables. Double check your work.

2. Look up each word in your dictionary. Write the word, its pronunciation, part of speech, meaning(s), and the guide words found on the dictionary page. Use the word in a sentence. The first one have been done for you. (Note: Dictionaries will vary in pronunciation keys.)

estivate (es'te vat'), verb, 1. to spend the summer, as at a specific place or in a certain activity. 2. to pass the summer in a torpid conditions. (also spelled aestivate).
guide words: essentialist Estremadura
Some desert animals estivate in the summer to save energy.

3. Write at least five sentences using two or more of these words in each sentence.

The bald eagle is <u>endangered</u> because poisons in the <u>environment</u> caused the egg shells to be weakened.

4. Complete the following sentences using the words above.

Bats use a special radar called _____ .
An arm of the sea at the lower end of a river is an _____ .
An _____ species no longer exists.
_____ and _____ are adult birds that live in Kansas.

5. List all the words that name an animal or group of animals.

6. Write the correct word for each respelling.

e'-l nd
e'-myu
eg'
el'
r'-m n

ent'- -mal'- -j
es'ch -wer'-e
in'-vi'-r n-m nt
i-kol'- -je
ik-sper'- -m nt

7. Unscramble these words

gtalee _____   cyeoolge _____   gdnedeeanr _____

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Key
Threatened & Endangered

HOW IS YOUR ENDANGERED WILDLIFE IQ - PAGE 37

ENDANGERED	THREATENED
Black-footed Ferret	Pallid Sturgeon	Eastern Spotted Skunk	Northern Spring Peeper

ENDANGERED
Black-footed Ferret	Pallid Sturgeon
Gray Myotis (Bat)	Cave Salamander
Whooping Crane	Eskimo Curlew
Least Tern	

THREATENED
Eastern Spotted Skunk	Northern Spring Peeper
White-Faced Ibis	Flathead Chub
Common Map Turtle	Arkansas Darter
Texas Night Snake	Green Toad
Broadhead Skink	Eastern Newt

ARE VOWELS EXTINCT - PAGE 38

Neosho Madtom　　Bald Eagle　　Peregrine Falcon
Gray Bat　　　　Black-footed Ferret
Cave Salamander　　Pallid Sturgeon　　Eskimo Curlew
Grotto Salamander　　Warty-Backed Mussel
Heal-Splitter Mussel　　Whooping Crane　　Gray-Bellied Salamander
Sicklefin Chub　　Eastern Newt
Least Tern　　Indiana Bat　　Arkansas Darter
Scott Riffle Beetle　　Topeka Shiner

ENDANGERED / UNENDANGERED - PAGE 41

PALLID STURGEON

HABITAT - Large Rivers - Missouri & Mississippi
MAIN FOOD - Insect lavae and small fish
PREDATOR OR PREY - more predator than prey
GAME OR NONGAME - Was a game fish, but now is
　　　placed on the Threatened species list in Kansas.

CHANNEL CATFISH

HABITAT - Large streams, lakes and ponds
MAIN FOOD - insects, crayfish and other fish
PREDATOR OR PREY - Adults are predators
GAME OR NONGAME - Game

BIG BROWN BAT

HABITAT - Caves, mines, storm-sewers, hollow trees
MAIN FOOD -Insects
PREDATOR OR PREY - Predator
GAME OR NONGAME - Nongame

GRAY BAT

HABITAT - Caves
MAIN FOOD - Insects - primarily over water
PREDATOR OR PREY - Predator
GAME OR NONGAME - Nongame

WHOOPING CRANE

HABITAT - Prairie marsh
MAIN FOOD - Frogs, snakes, insects
PREDATOR OR PREY - Predator
GAME OR NONGAME - Nongame

SANDHILL CRANE

HABITAT - Grain Fields
MAIN FOOD - Grains, Seeds, Small animals such as frogs
PREDATOR OR PREY - Predator
GAME OR NONGAME - Game animal in Kansas

RACCOON

HABITAT - Woodlands, grasslands and riparian areas
MAIN FOOD - Consumes more plant than animal matter
PREDATOR OR PREY - Predator
GAME OR NONGAME - Game

BLACK-FOOTED FERRET

HABITAT - Short grass near prairie dog towns
MAIN FOOD - Primarily prairie dogs (90% - 95%)
PREDATOR OR PREY - Predator
GAME OR NONGAME - Nongame

ENDANGERED: A WORD TO THE WISE - PAGE 43

1=Habitat   **2=**Hunting   **3=**Extirpated   **4=**Decrease   **5=**Interrelated
6=Changes   **7=**Threatened   **8=**Extinct   **9=**Research, Management
10=Pesticides, Polute, Environment   **11=**Refuges   **12=**Endangered, Survive
13=Ecology   **14=**Adapt   **15=**Re-establish, Reproduce

THE BUCK STOPS HERE - PAGE 42

1= 17,500,000   **2=** Whitetail deer   **3=** 0.004%
4= 2,000,000   **5=** 2%   **6=** 19,800,000 Mammals, 7,017,000 Birds

WILDLIFE WORD REVIEW - PAGE 46

1=Species   **2=**Insectivore   **3=**Vertebrate   **4=**Ungulate   **5=**Conservation
6=Riparian   **7=**Diurnal   **8=**Ecology   **9=**Migrate   **10=**Wildlife
11=Herbivore   **12=**Invertebrate   **13=**Estivate   **14=**Granivore   **15=**Adaptation
16=Classify   **17=**Nocturnal   **18=**Carnivore   **19=**Cold-Blooded   **20=**Predator
21=Habitat   **22=**Endangered   **23=**Parasite   **24=**Threatened   **25=**Omnivore
26=Warm-Blooded   **27=**Hibernate   **28=**Prey   **29=**Extinct

E IS FOR ECOLOGICAL EXPRESSIONS - PAGE 47

4= Echolocation, Esuary, Extinct, Eagles and Egrets
5= Eagle, Egret, Ermine, Echinoderm, Elk, Edenttate, Echidna, Eider, Eglet, Eel, Eland
6= From L to R: Eland, Entomology, Emu, Estuary, Egg, Environment, Eel, Ecology, Ermine, Experiment
7= From L to R: Eaglet, Ecology, Endangered, Estuary, Ecosystem, Entomology

Give a person a fish,
they can eat for a day.
Teach them to fish,
they can eat for a lifetime.

(Unknown)
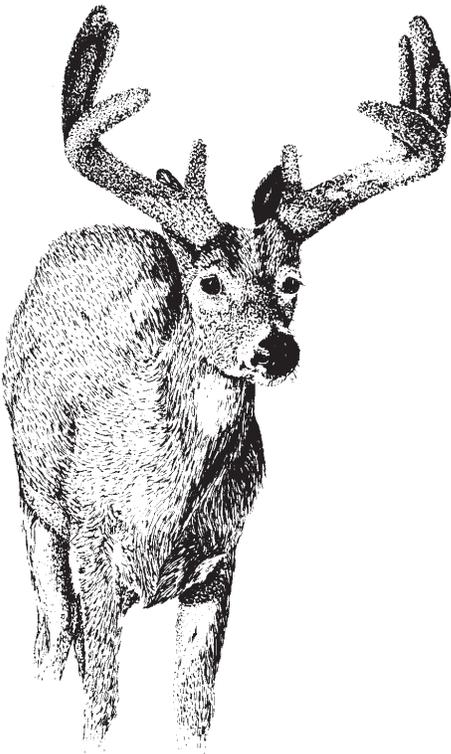
Must we always teach our children
with books? Let them look at the
mountains and the stars up above,
Let them look at the beauty of the
waters and the trees and the flow-
ers on earth. They will then begin to
think, and to think, is the beginning
of real education.

(David Polis)

KANSAS

WILDLIFE
&PARKS