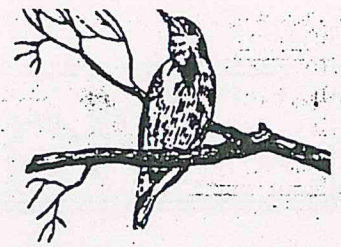


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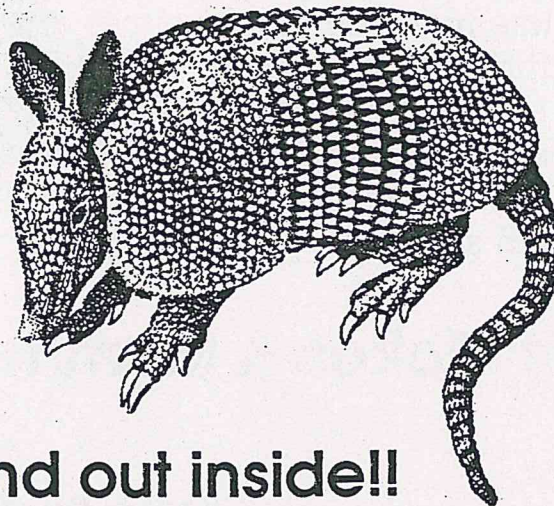
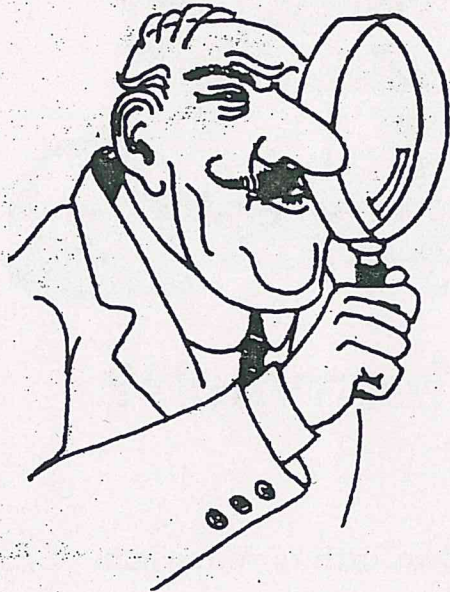
Teaching Resource Activities and Conservation to Kansas Students

Vol. 5 No. 1

Kansas Wildlife & Parks

Fall 1993

Is It A Mammal??



Find out inside!!

What's Inside

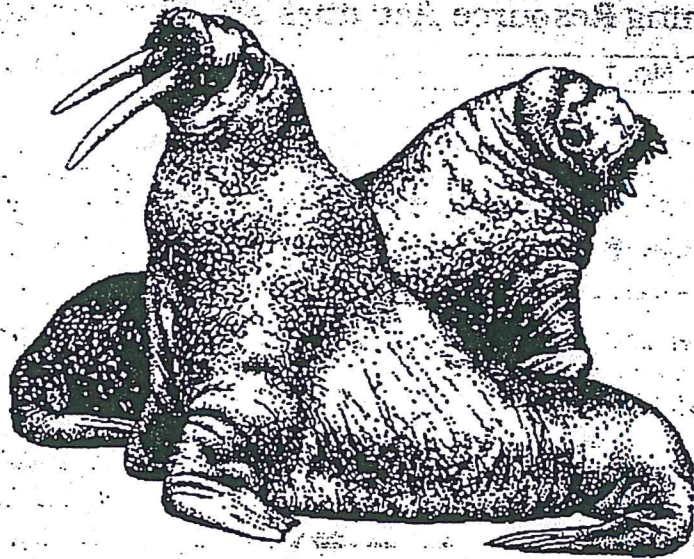
- * It's no Buffalo . . . it's a bison lumbering on page 12.
- * What Kansas mammal has a thumb kind of like you?? It's in the spotlight on page 4.
- * Looking for neat programs or field trips?? Head over to pages 14 and 15.
- * What's new and happening in WILD on pages 16 — 20.
- * Feel the electricity in "Chain Reaction" — charge over to page 18.
- * Park your favorite mammal on page 10.

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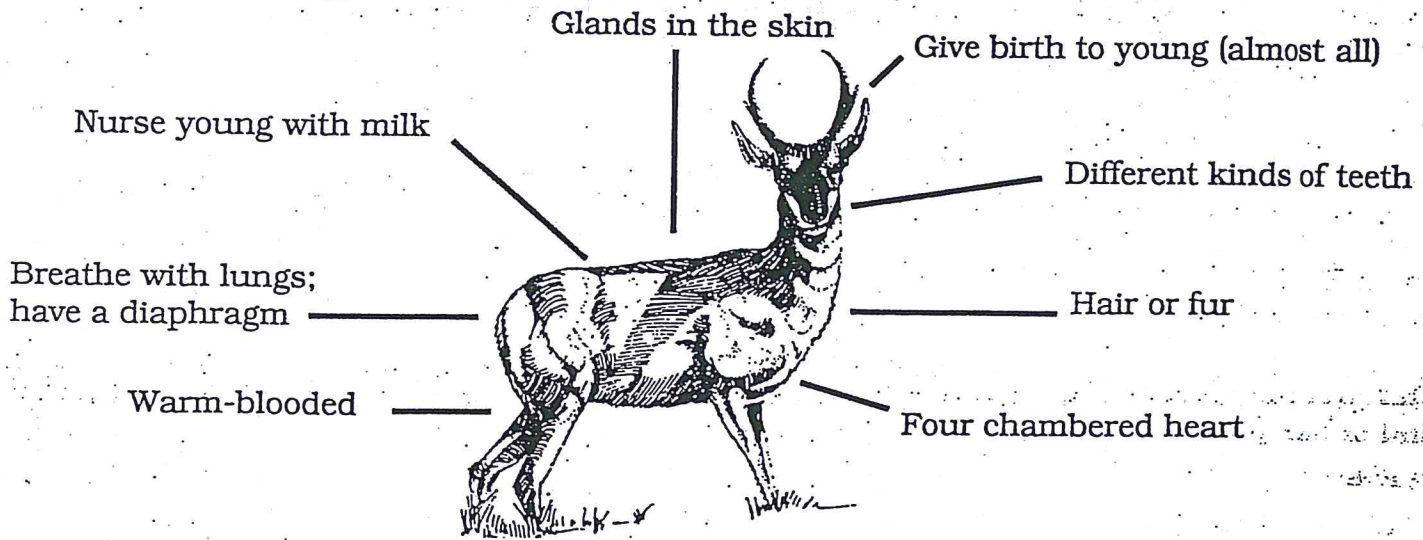
Mammalmania!!

Kingdom: Animalia
Phylum: Chordata
Subphylum: Vertebrata
Class: Mammalia

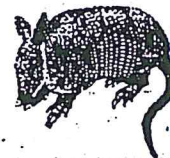


Worldwide there are approximately 4,000 living species of mammals. This group has many common animals including humans, deer, dogs, mice, beavers, raccoons, and moles. It also includes whales, armadillos, shrews, voles, manatees, and seals.

What Makes A Mammal A Mammal??



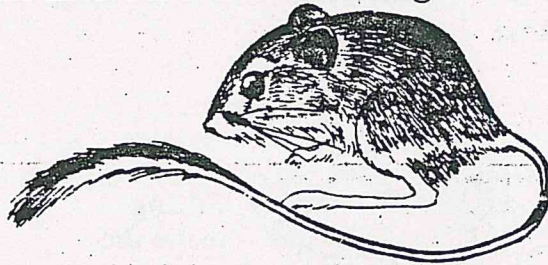
After much research, I have determined that the armadillo has hair, gives birth to its young and has the above characteristics, by golly – it is a mammal!!



Amazing Kansas Mammals

Kansas has 82 species of mammals in eight different orders including:

- 15 species of bat
- 9 species of squirrel
- 3 species of deer
- 5 species of rabbit and hare
- 1 species of jumping mouse



Kangaroo Rat — This amazing rodent needs very little drinkable water — a plus when living in a desert-like habitat. In fact, kangaroo rats in captivity have lived their entire lives without drinkable water!! The only water the Ord's kangaroo rat in Kansas receives is from dew. It can manufacture its own water, in most cases from dry food.

Armadillo — This prehistoric-looking mammal takes the cake on multiple births. The armadillo gives birth to one or two sets of identical quadruplets *every* time she gives birth. Every time!!

Pronghorn Antelope — The fastest land mammal over long distances is the pronghorn antelope. It has a top speed of 55 m.p.h. but can go 28-31 m.p.h. for about 14 minutes!! A well-developed set of lungs and a heart twice the size of comparable animals allows the pronghorn to accomplish this feat.

Prairie Voles — They mature 30 days after birth and may have a litter of 4-9 young soon after. One female may have a litter as often as 3-4 times a year!!

Elk — These mammals have the longest antlers of all mammals. They can reach 5.8 feet in length!! That is taller than most of you!! And they grow new antlers *every* year after the old ones fall off.

Opossum — This animal has the most teeth of any North American mammal - wow!! Count 'em, 50 teeth to chomp, grind, and chew. 🐾

Activity — How Do I Compare



Have students research a mammal and compare its characteristics to theirs. Have them prepare graphs and other reports to present to the class or in written form. Actually perform the activity, i.e. jumping ability — use tape marks to show how far a student jumps in comparison to a mountain lion. Some of the items you may want to compare include: height, food consumption, speed (m.p.h.) — short distance and long distance, weight, life span, jumping (broad or high), heartrate, breathing rate, how many toes, teeth, etc.

Mountain lions can jump 18 feet high and broad jump 30 feet.

Blue whales can weigh more than 150 tons and reach lengths of 100 feet.

A shrew's heart beats 600 times a minute at rest and about 800 times when active.

SPECIES SPOTLIGHT: The Opossum

Family: Didelphidae
Genus: *Didelphis*
Species: *virginiana*



Sitting inside the house one evening a loud clanking of dishes comes from the back porch. Flipping on the light, you see a medium-sized animal with a long, hairless tail and prominent ears. It noisily eats cat food

that you left outside. It doesn't stick around long to be noticed as it scampers away into the bushes. What was it?? It was an American opossum, of course!! This shy, secretive, and nocturnal mammal is not often observed, and even when it is, most simply think of it as common or ugly or not good for much.

Even though the opossum is quite abundant in Kansas and the Midwest, it is very unique. How unique?? First of all, it is the only **marsupial** found in the United States. This makes some of its closest relatives kangaroos, wallabies, wombats, koalas, and Tasmanian devils. **Marsupials** give birth to tiny, underdeveloped young after a short gestation period. At birth, the young crawl along the mother's belly until finding a nipple (usually inside a pouch) where they remain until they finish developing. Before birth, baby marsupials do not attach to the mother by an umbilical cord as in placental mammals. Nutrients and oxygen pass slowly through the marsupial placenta directly to the fetus. Because this method is not very efficient, marsupials are born after only a short time (12 to 13 days for the opossum), very tiny and underdeveloped. Each young opossum measures less than

1/2" long (about the size of a honey bee) and weighs only 1/175 ounce. After crawling to the **marsupium**, the pocket or pouch on the mother's belly, the tiny newborn attaches to a nipple and remains firmly attached for about 60 days. Female opossums possess 13 nipples inside the pouch arranged in a horseshoe shape with one in the center. The average number of young born ranges from 5 -13. The young stay with the mother for about 100 days. They begin to leave the pouch at around 80 days and can sometimes be seen hitching a ride on top of mom's back, clinging to her fur with their feet.

The opossum is unusual in other ways as well. That long, hairless tail is prehensile and comes in handy under many circumstances. The tail can carry nest material of leaves and grass, or sometimes corn husks. The tail can carry as many as eight mouthfuls of bedding. The opossum can also support itself entirely by the tail if at least half of it grasps a branch.

At times, it seems as if the opossum has a foolish grin on his face. When frightened, they will expose their teeth and drip saliva from their mouth. A very logical thing to do when you have the most teeth (50) of any mammal in North America. Surely, the opossum is just explaining to the offending predator, "all the better to eat you with!!". If this tactic fails, another means of defense takes over and the opossum rolls over on its side, becomes limp, shuts its eyes, and lets its tongue hang out, feigning death. Hence, the expression "playing 'possum". In reality, a brief nervous shock causes this reaction. The opossum quickly recovers and leaves at the first opportunity. Its defense is effective since most predators lose interest in a prey animal if movement stops and they know they did not kill it. Opossums are not aggressive and often climb trees or brush heaps in order to escape from a predator. Predators include foxes, coyotes, dogs, bobcats, great-horned owls, and man.

The opossum possesses yet one more feature that few other animals possess. Opossums



have an opposable toe on the hind foot that functions very much like your thumb. It allows the opossum to hold on to small branches as it climbs.

The diet of the opossum consists of just about everything - it is a true generalist or omnivore. Common items include insects like crickets, grasshoppers, beetles, and ants. The opossum also scavenges and feeds heavily on the carrion of squirrels, raccoons, skunks, other opossums, and rabbits (the most important animal food item). It eats many kinds of fruit especially during fall and early winter. The only



This opossum currently lives at the Ernie Miller Nature Center in Olathe. The nature center must have special state and federal permits in order to possess this animal. The opossum is an orphan that will be returned to the wild. In the meantime, this opossum delights hundreds during educational programs. For more information call the nature center at 913/764-7759.

cultivated crop that is eaten to any extent is corn. Contrary to popular belief, barnyard chickens rarely become a meal. Opossums do very little harm to people.

Marsupials are a strange and fascinating mammal group. Over 250 species in this order fill every niche imaginable. There are marsupial "mice", "shrews", "squirrels", "badgers", "dogs", and even "bears". Of course, most live in Australia and the nearby islands, but some also live in South America. Only one lives in the United States - the truly amazing opossum. 🐾

The Cherokee Nation legend relates how the opossum's tail lost its hair. In the old days, Possum had the most beautiful tail of all the animals and he liked nothing better than to wave it around and show off the silky, long hairs. The other animals became tired of hearing him brag about his tail. One day, before an important council meeting, the animals offered to clean it for him. Of course, Possum being so vain jumped at the chance to make his tail look better. Rabbit mixed up some special medicine and placed it on Possum's tail. He wrapped the tail in a skin shed by a snake. The next day, in front of all the council, Possum unwrapped his tail and saw that **all** the hair had fallen off his beautiful tail. When he saw his tail, a foolish grin froze on his face and he was so ashamed that he fell on the ground and pretended to be dead.

(For more on "Why the Possum's Tail is Bare" see "Ranger Rick", Apr 85, page 27 or *Keepers of the Animals* by Michael Caduto and Joseph Bruchac)



Animal Signs



Many people enter natural areas hoping to see the local animal life laid out in plain view in front of them: a deer browsing here, a bobcat scurrying into a ravine there. People with such high expectations will be disappointed. Wild animals refuse to place themselves on exhibit, and are usually hidden out of sight. Learning about the habits of wild animals takes more than a casual glance around an area. Clues to the activities of wild animals are revealed only when you take a deeper look at your surroundings.

Though they do their best to stay hidden, animals do leave clues behind them wherever they go. We call these clues "signs". An animal's signs can help us learn more about its habits.

Footprints, or tracks, are one type of sign. An animal's tracks read like a journal of its activities, left there for a passerby to read. By following a rabbit's tracks, you can learn the location of its hole or its favorite feeding area. You may also read the tracks left when the rabbit galloped off with a coyote in hot pursuit. Farther along, perhaps you will find a few drops of blood or a scrap of hair where the luckless rabbit met its fate.

No two species of animal leave the same track, so identification of the tracks found in an area can provide an inventory of the creatures found there. Some species' tracks look very similar to one another, but there are clues to the critter's identity in the paw print and in the pattern of the tracks.

First, the number of toes on both the front and hind feet should be determined. Examine clear tracks; you may miscount if the tracks are faint. The number of toes may allow you to place the animal into one of four categories: hoofed (deer, antelope, cow), four toes on both front and hind feet (foxes, dogs, cats, rabbits), five toes on both front and hind feet (beavers, raccoons, skunks, opossums, muskrats, weasels), or four toes on front feet and five on hind (rodents, squirrels). Animals such as birds,

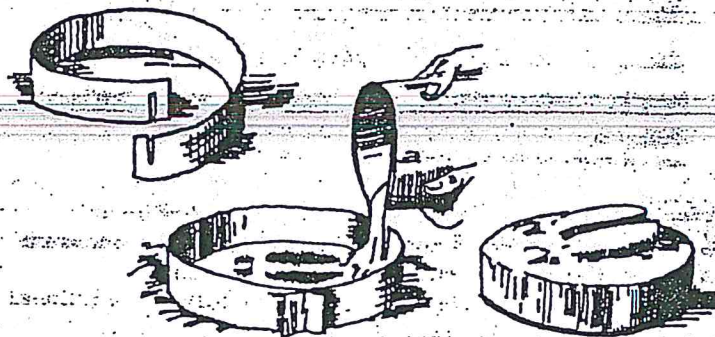
frogs, turtles, and lizards will leave tracks that will not fit in any of these categories; these tracks can be identified with a field guide.

Next, examine the pattern of the tracks. Animals will either walk, bound, gallop, or pace. Some animals will only use one pattern, others will use different gaits at different times depending on how fast they move.

Look for other features of the tracks, such as size and shape of the foot and its pads, length of the animal's stride, and the presence or absence of claw marks.

Once you have noticed all of these details about the track, a good field guide to tracks will help you finalize your identification of the track.

As you learn to identify tracks, it may help you to create a reference collection from the tracks that you find. A good way to preserve tracks for later study is to make plaster casts of them. To make a plaster cast of a track, you will need plaster of paris, water, and a "collar" of heavy paper which will keep the plaster in place while it is drying. Simply mix the plaster according to the package directions (remember to bring a jar in which to do this into the field with you) and pour it over the track. Make sure you place the collar around the track before pouring on the plaster. When the plaster hardens, use a knife to dig the track out of the ground. Later, carefully wash off the mud with water.



Hunt for tracks in mud or in snow. Areas that are always wet, such as stream banks, can have good tracks no matter what the weather conditions.

Animals can leave other signs, too. Look for broken twigs or hairs caught on branches to learn whether an animal has passed that way. Also look for scat, or animal droppings. Scat can be identified just as tracks can: look for a field guide that deals with this subject. A close examination of an animal's scat can reveal not only what animal has passed by, but also what it has been eating.

Some animals leave behind other very specific clues to their identity. Owls, for example, must regurgitate pellets of indigestible hair and bones after a meal. These pellets will be found on the ground under the owl's perch. Beavers reveal their presence in an area by their characteristic chew marks on trees. Flying squirrels will leave behind their calling card in the form of a nut which has a perfectly round hole chewed in its side. Male deer will make rub marks on branches with their antlers during the breeding season.

It's not hard to learn a great deal about the animal life of an area just by looking for animal signs. With practice and patience, you can hone your tracking skills and gain a richer understanding of the natural world around you. 🐾

Some mammal groups:

A clowder of cats
A leap of leopards
A sloth of bears
A skulk of foxes
A labor of moles
A crash of rhinoceroses
A trip of goats
A pod of dolphins
A gang of elk
A cete of badgers
A troop of kangaroos
A route of wolves

MAMMAL TRIVIA

Mammals are the only animals with flaps around their ears. These direct sound down into the ears.

There are about 1,750 kinds of rodents in the world.

Prairie dogs "kiss" (open their mouths and touch teeth) when encountering another family member.

The largest prairie dog colony on record was in Texas and it measured 100 miles wide, 250 miles long, and contained about 400 million prairie dogs!! At this size, it would have covered an area twice the size of Belgium.

A beaver can fell a tree 20" thick in just 15 minutes.

Moles can dig a 6 1/2" long tunnel in about 12 minutes.

Badgers live in setts made up of chambers with connecting tunnels. The same sett may be used over and over again for as long as 250 years. The largest sett had 94 tunnels.

All mammals breathe air.

All the pet hamsters in the world are descended from the same mother. This was a female wild hamster found with a litter of 12 babies in 1930 in Syria (The Usborne Book of Animal Facts).

Burrows are the most common type of home for small mammals.

T or F — Animals must lie down to sleep. F

T or F — The rabbit and the hare are one and the same. F (Hares are born fully furred with their eyes open whereas rabbits are born naked with their eyes closed.)

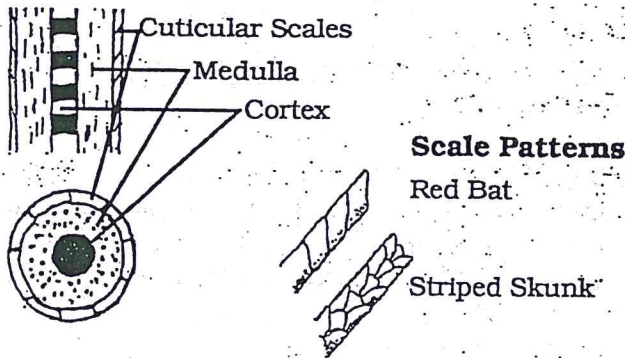
T or F — Flying squirrels fly from one branch to another. F (Flying squirrels are not truly able to fly but glide from branch to branch. Bats are the only mammals able to fly.)

Mammals — A Very Hairy Matter

Fur is warm, soft, slick and handsome. Humans have long envied this wonderful substance of which we have so little. Mammals are the only animals that have this unique covering. Fur insulates, protects, camouflages, and waterproofs. It comes in a wide variety of colors, textures and forms, each adapted to its owner's lifestyle.

Hair is thought to have first occurred in some early reptiles before they lost their scaly covering. Hairs arise between the scales present on opossum tails and between the bony plates of armadillos. Although some mammals, like whales, have only a few bristles on their heads, they possess hair during fetal development.

Hair Cross Section



Hair is a non-living material made up of dead skin cells strengthened by keratin, a tough protein. The hairs originate from follicles located in the skin layers. Each hair grows from living cells in the hair root. The hair consists of an outer layer of cells arranged scale-like around one or two inner layers of packed cells. Color in the hair depends upon pigments in the inner layers. The arrangement of outside cells determines the diameter and texture of the fiber.

The hair coat of a mammal is known as the "pelage". Its main function is insulation from extremes of temperature. Fur insulates an animal from loss of body heat as well as slows down the amount of heat absorbed from the atmosphere. Animals in cold climates have two layers of fur. A soft inner layer designed to trap warm air next to the body, and a coarse outer layer that protects and sheds water. These mammals often

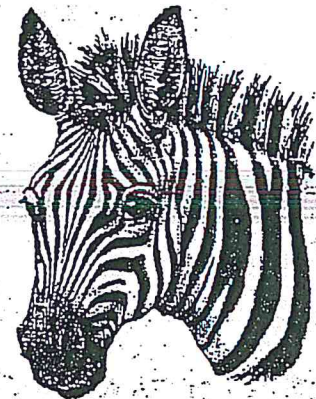
sport a shorter, cooler coat during the summer months. Animals in warmer climates lack the inner layer. The hair of ungulates, such as deer, is hollow to allow for a greater insulating ability.

Mammals replace worn fur periodically through a process called "molting". This shedding and new growth is controlled by chemical signals in the animal's body that may be triggered by changes in the environment such as daylength. Most animals molt once or twice a year. In arctic and subarctic regions many mammals have winter coats of white and summer coats of brown or grey.

The color of an animal's fur is one of its most important survival features. In general, desert and prairie animals that live a more exposed lifestyle are lightly colored. Woodland animals sport darker shades. Many mammals have counter shading, a darker top and lighter underside. This pattern helps to obscure the animal by reflecting more light underneath and less light on the back.

Mammals may show color variations that help them blend in with the area in which they live. Small mammals living on dark soils will tend to have darker coats than those found on lighter soils. Predators will find and eliminate those prey animals which they can spot easily. Camouflage benefits predators as well by allowing them to hide more effectively while hunting.

Many mammals carry color patterns such as spots, stripes, and patches that help to camouflage or signal. The spots on a whitetail fawn serve to break up the image of the animal as it hides from predators. Zebra stripes and bobcat spots combine with natural patterns of light and shade to help an animal blend in against a natural background.



The stripes of a skunk serve different purpose. They warn animals that may attempt to prey on the skunk, that the well armed skunk can certainly defend itself. The bright white tail of a whitetail deer warns other deer of approaching danger.



Fur is adapted in many mammals to perform other functions. Highly sensitive whiskers, attached to nerve cells, send signals to the brain about objects in the environment. Whiskers are also important for balance. The hair in the ears and nostrils of many mammals aids in keeping those areas cleaner of debris. Thick fur on the pads of feet help insulate and protect against injury.

Some fur is adapted for defense. Guard hairs of porcupines have become thickened, stiff, and barbed to form quills that disconnect easily when the animal is attacked. These form an effective defensive shield against predators of this slow moving animal. Burrowing mammals tend to have soft silky fur which is easily cleaned of dirt by shaking and grooming. Mammals, such as coyotes, which spend a lot of time in the underbrush will have the tips of their fur reinforced with extra keratin.

Aquatic mammals such as beavers and otters have dense, soft fur that traps air and creates buoyancy. Some large land mammals such as elephants and hippopotamuses have lost the need for fur. Their large size prevents the quick loss of body heat.

Hair makes the mammal and gives most mammals something they need to survive. Hurray for hair!! 🐾

Mammals' Senses

Keen eyesight in mammals varies from people and primates which have the best daytime eyesight to some bats and moles whose eyesight is poor.

Most mammals have a keen sense of smell. Mammals rely on their sense of smell to locate food, approaching danger, living space and of course, each other. People and some primates and whales have a rather poor sniffer. Dolphins and porpoises lack an olfactory system at all. Deer, coyote, beaver, and other mammals use special scent glands or urine to "mark" their territory. This signals others to keep out or beware. Finding a mate often depends on smell as does recognition of young by their parent. Mammals have the ability to recognize thousands of individual odors.

Activity

This activity emphasizes the importance of smell to mammals. Get several film cannisters and put cotton balls in each one. "Scent" each cannister using flavored extracts such as peppermint, vanilla, almond, and other smells like baby oil, perfume, vinegar, etc. Make two cannisters of each scent so there is a pair of cannisters that smell the same. Determine how many in your group. If you have 30 youngsters you will need 30 cannisters with 15 different smells (two of the same). After a discussion of senses, give each youngster a cannister. Direct them to open the cannister and smell carefully. Now the fun begins. They must find their mate by finding the animal that smells the same as them. You can also have them be mother and young with each mom searching for her young.

Dimension Extension

No other vertebrate group depends on hearing as heavily as mammals. Fill the film cannisters with items that make sound. For example, put uncooked rice, erasers, BB's, dried beans, etc. Using the same activity as above, have them find their mate using their sense of hearing. 🐾

Parking Your Favorite Mammal

First, line up the **front** of your mammal with the **front** of the mammal you'll be parking behind, then spin the wheel, shift into reverse, and gently apply the gas . . .

In recognition of the fact that many of us prefer to do our wildlife watching from the comfort of our tent or RV, sometimes state parks provide more wildlife viewing than many of our state wildlife areas. After all, a state park offers luxuries few wildlife areas can match — convenient access to water, a helpful naturalist, and toilet paper (not listed in order of importance).

Let's take a tour of a state park just at dusk, you and I. While mammal watching can be good throughout the day, the rewards may be better if you wait until the sun turns that lovely mellow golden color near sunset.

Unfortunately, this is also when ravenous carnivorous insects like MOSQUITOES also emerge, so I'll wait here while you slather yourself with repellent.

🎧 Insert Jeopardy Theme Music Here

For our dusk-time tour, we'll start underground and work our way up. I love this part.

Just beneath the surface, mammals thrive. Life here is small and cramped . . . and extremely moist lately. Underground in a grassy area, we come across a vole. There is something insulting about being called a vole (for some reason I think of Frank Burns on the TV show M*A*S*H*), but for all their potential to damage crops and orchards, they're still interesting. Barely half a foot long, they chomp away on roots, tubers, and greens. Numbers of Prairie Voles, common in Kansas, tend to swing up and down on a 3-year cycle. Don't ask me why or where we are in the cycle; if farmers and other land managers seem to be cursing quite a bit, we're probably reaching the high point of the vole cycle.

To find a Prairie Vole, look for a dry (don't laugh . . . we still have them), grassy area. The Prairie Vole is yellowish-brown on top

and duller brown below with a short tail. Because they're so small, you may have to pick a spot and plop down for a while. Give the area a chance to settle down around you; ANY creature is a disturbance when it comes crashing through the prairie, so our motto for this trip is to pick a diverse spot with a few trees, some grass, maybe a small waterhole, then sit down and shush up.

Want more underground mammals?? Let's go over to Glen Elder State Park and walk around. The SASU (sit-and-shush-up) method works very well with prairie dogs. The Black-tailed Prairie Dog is a delight to watch. We could spend a couple of hours watching them pop up out of their mounds like jack-in-the-boxes, chatter, then race away to a nearby hole. About a foot-and-a-half long and golden brown, their towns are models of civic engineering. The whole town is divided into wards. Each ward is a group of separate families. If we could look down from above, the divisions would be clearer. Traffic moves around quite a bit within the wards, but not as much between them. I don't know if prairie dogs run over to the neighbor's for a cup of gramagrass, but the idea's the same.



The mounds they build at the entrance to their homes serve as watch-posts and as protection from minor floods. Personal levees. Sounds like a good idea.

Before we start looking for larger mammals, we have to take a look at one of the most common critters you're likely to see. You see them next to the restroom, in your campsite, in front of the park office. Even places that don't have many squirrels still have these rascals: cottontail rabbits. Believe it or not, some people say they've never seen a rabbit in Kansas, and the reason why will help you spot them in a state park. When a rabbit isn't moving, it's hard to see. The rabbit knows this, counts on it. It's less likely to be snatched by Señor Coyote or Señora Great Horned Owl if it stays . . . perfectly . . . still.

If you're careful, though, and key in on a splash of mottle brown in a sea of green grass, and use the SASU method, your chances of spotting a rabbit go up.

Once you find a cottontail, wish it good luck. Most don't live more than year. That's why they tend to spend a lot of their time makin' bunnies. A single female rabbit can produce twenty to forty young before she buys the farm.

We've got two more stops to make before it becomes too dark to see. How's your mosquito juice holding out?? Good.

Moving on up in size, we come to a real show-stopper. Even veteran outdoor lovers ALWAYS stop, point, or at least stare a bit. City-folk, kids, and others out exploring come to a dead stop. WOW!! Look! A deer.

White-tailed deer are common in the east; mule deer are western Kansas dwellers. Just to confuse you, a white-tailed deer's tail looks brown from the back; a mule deer's looks white. When the white-tail sticks its tail up in warning, it's clear how it earned its name. White-tailed deer will spring out of the woodwork at dusk, leaping fences, dashing across roads, browsing near the edge of a grove of trees. Where you see one, they're probably more. Since we're walking today, it's not a problem, but if you were driving you'd need to be careful. When the road crosses a small woody stream or through a thicket, deer are more likely to be around. One charges across the road, you turn to look because they're fun to watch, and you run smack into the next deer trying to cross the road. If you want to look, have fun!! Pull over to the side of the road, leave your parking lights on, and take a good look.

Watch their ears swivel like little radar dishes, straining to pick up threatening sounds. See the tail shoot up to warn the other deer a two-legged critter's nearby. A graceful leap, effortless to the last, and the whole bunch disappears over the nearest fence.

Last comes the peanut gallery: squirrels. Actually, let me take that back. Especially in the state park, feeding peanuts to

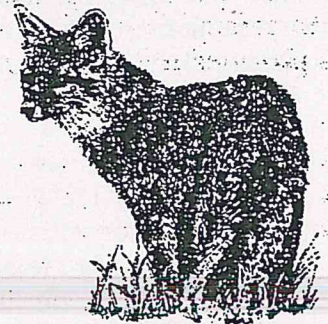
squirrels may be fun, but it also hurts the nearby oak forest. Take that big squirrel on the ground over there: a fox squirrel (you can tell because it's a rusty color and BIG — two feet or more from head to tail). It's digging away, burying acorns for a snack later on. Now, even with my big, human-sized brain (no comments from my co-workers, please), I have a hard time remembering where I put my **keys** let alone several **hundred** acorn-sized objects buried in random spots around a large park. The squirrel doesn't remember either. What starts out as a rodent storing food turns into Johnny Appleseed of the acorn world.

We've gone from the dark, root-filled world of underground mammals to the tops of the tallest trees in the state parks. I'm pretty worn out. How about you?? Of course, we haven't seen everything on this trip, so you need to come back. Try visiting different times of the year to see the mating furor, the raising of young, the changes in fur color from season to season. Pick a favorite spot you know to be popular with the park's wildlife. This'll work better if you select an area where there are lots of tracks and other signs of life. Check out our Wildlife Reference Center guides on tracks to help.

We also haven't seen all the different mammals found in the parks. What have you missed?? Come out and see. We'd love to see you. —Chris Havel, Parks and Public Lands 🐾

Other mammals in state parks:

Skunks
Foxes
Coyotes
Beavers
Bobcats
Humans
Muskrats
Weasels
Raccoons
Opossums
Gray Squirrels



P. S. For a free Kansas State Park Guide, write or call your local Wildlife and Parks office — or any of us listed on the back!!

A Shadow On The Plains

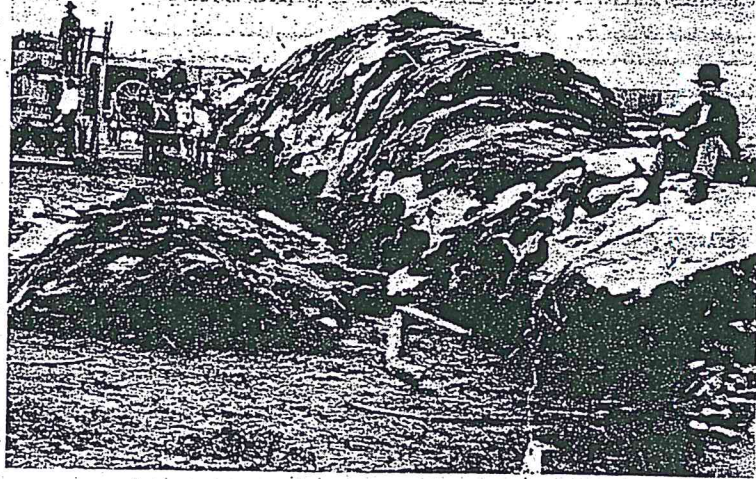
Bison dominated the life of the Western plains like no other animal. They arrived from Asia across a land mass now known as the Bering Strait during the Illolison glacial age. By sheer numbers, they ruled the northern continent with an estimated 75 million strong at their maximum abundance. They ranged as far south as Texas, north to the Canadian northwoods and east to the Atlantic coast. However, it was on the great plains and prairies from the Rockies to the Mississippi River which would host countless numbers of bison. It was here the calves were born in spring and mature bulls could reach a weight of more than 2,000 lbs., and with a little luck, live out a life of twenty or more years.

These enormous herds were always on the move. Coinciding with the changes in seasons and local food supply, they migrated northward 200-400 miles in the spring and southward again in the fall. Wolves followed the herd but rarely challenged a healthy adult, being content to groom the herd of its injured, old, and sick members.

If there was truly a bison people, it was the American Plains Indians who were almost totally dependent on the great herds for all of life's necessities. The meat provided their main food source, hides became tepees and clothing, and bones were fashioned into tools, toys and hair headdresses used in ceremonies. Even the bison chips provided fire and warmth.

The first white man to see a bison was Hernando Cortez in 1521. Like many of us today, his encounter with bison was at a zoo near what is presently Mexico City. As late as the Civil War, huge herds of bison still ranged over the grasslands of western Kansas and most of the plains land. Shortly thereafter, the westward movement was to start and the wanton destruction of the bison was to begin. William Cody, better known as Buffalo Bill, gained his reputation here on the Kansas prairies by harvesting

4,280 bison in a period of 18 months. At first many of the bison were killed to provide food for the railroad crews, but soon bison were being harvested just for their hides. The bison robe market became popular in the 1860's. Only cows were harvested, mainly between November and March, because they had hair over their entire body. Hunters sold the hides for about six dollars each. Later it was discovered that bison hides made excellent leather goods. The word spread like a fire across the prairie that hides would be bought during any time of the year and would bring \$2.25 for cow hides and \$3.50 for large bulls. It is estimated that one to two thousand men were shooting bison for their hides just south of the Arkansas River and west of Wichita.



Piles of 200,000 bison hides at Dodge City in 1874. Courtesy Kansas State Historical Society, Topeka, Kansas.

By 1875, the business of bison hunting had ended in Kansas, but a new bison industry was starting to thrive. Bison bones were being gathered to be used as fertilizer and in the making of bone black for refining sugar. The boom in collecting bones lasted until the late 1870's when the supply of bone, like the bison, gave out. *Mammals in Kansas* describes the desecration of Kansas bison, "One herd alone in southwest Kansas in 1871 was estimated to contain over four million bison. By 1879 the bison was

reported exterminated in Kansas when the last known survivor was killed west of Dodge City." By 1890, only 500-600 bison remained from the huge herds which once inhabited the Great Plains.

"A cold wind blew across the prairie when the last buffalo fell . . . a death-wind for my people."

Sitting Bull

With the bison threatened with extinction, something had to be done. Some ranchers took it upon themselves to maintain small herds. In 1902, the federal government instituted a bison restoration project in Yellowstone National Park. In 1905, the federal government gave Kansas a six square mile site in Finney County just south of Garden City for a game refuge. Because of the plentiful grass and browse, this area was selected for the development of a state bison herd. This began Kansas' effort to preserve some of the animals which played such a great part in the development of the state. 🐾

Some of the places you can see bison in Kansas:

Maxwell Game Refuge
Near Canton. 316/628-4592

Finney Game Refuge
Near Garden City. 316/872-2061

Byron Walker Wildlife Area
Near Kingman. 316/532-3242

Mined Land Wildlife Area
Near Pittsburg. 316/231-3173

Big Basin
Near Minneola. 316/873-2572

Scott State Park
Near Scott City. 316/872-2061

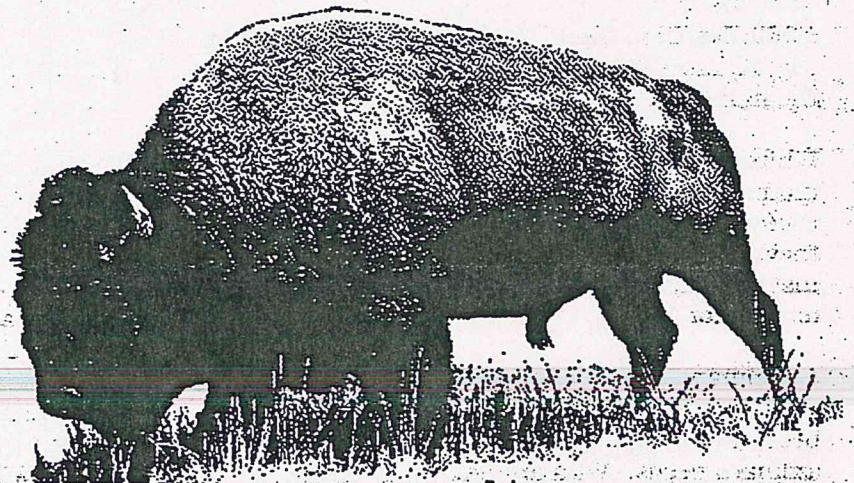
Bison Bits:

The bison was designated the state animal in 1955.

Adult male bison weigh between 900 and 2000 pounds!! Females weigh about 40% less than males.

Bison are herbivores.

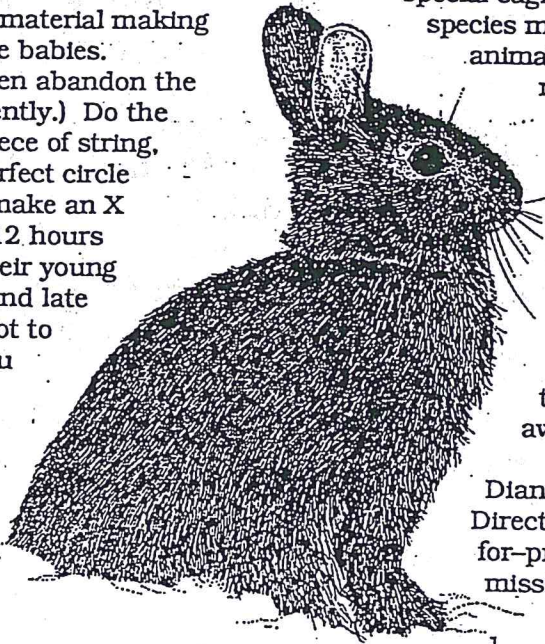
Gestation is nine to nine and a half months with calves born in late April or May. Most females bear one calf, rarely twins.



Mammals Educate and Rehabilitate

One of a rehabilitation center's main functions is informing callers about the natural history of an animal and what stage of development that animal may be in. Although sometimes in a vulnerable stage of development, it is crucial for wildlife to be left alone with their own species so that they may develop social, behavioral and survival skills for their lives in the wild.

For instance, did you know that cottontails leave the nest at 28-35 days and the female may have up to four litters per year?? (They are actually about the size of a tennis ball when they are weaned.) Often people discover a nest of bunnies when they are mowing or doing yard work. If the nest has been mowed over: replace nesting material making sure to touch all of the babies. (Mother rabbit will often abandon the one that smells differently.) Do the string test - place a piece of string, thread or yarn in a perfect circle around the nest and make an X across the top. Wait 12 hours since rabbits nurse their young early in the morning and late in the evening so as not to attract predators. (You are also considered a predator so if you're hovering over the nest the mother isn't going to come feed her young.) If the string has been disturbed you know mother rabbit has been there. Nests are often disturbed several times but that doesn't necessarily keep the mother away.



Whitetail deer fawns can be returned to their mothers up to 72 hours from the time they are taken. The doe has not abandoned them when they are found lying in a field. She merely has instructed her young to stay put while she forages for food.

As humans we spend such a tremendous amount of time with our children that it often becomes difficult for us to relate to a wild animal's needs. Wild animals must forage for food or hunt in order to provide for their young and don't have the same capabilities as we do. Just because you see a wild animal alone in a nest or den does not mean that it has been orphaned.

So follow these simple rules of thumb when dealing with wildlife:

If you have to chase it — leave it alone.

Don't touch . . . call a wildlife rehabilitation center or a conservation officer for help with the particular species you're dealing with (it may be in a natural stage of its development). Remember, it is against the law to possess most species of wild animals. Rehabilitators must have special state and federal permits.

Rehabilitation is very expensive. It just isn't as easy as feeding the dog or cat. Natural diets, special caging and behavioral needs for each species must be provided in order for that animal to achieve any semblance of

normalcy and be returned to the wild.

Removing the "human factor" is often very difficult to do especially when our own species has such strong nurturing instincts.

Education is the only answer. In order to do what's right for the animal in question, one must be informed and able to assess the situation objectively. Most of the time help is only a phone call or two away.

Diane Johnson, RVT, is the Executive Director of Operation Wildlife (OWL), a not-for-profit organization with a twofold mission:

1. To return healthy untamed wildlife back to their environment.
2. To provide an educational resource for Kansans.

OWL is a publicly supported organization relying on donations to continue operating and is run solely by volunteers. OWL receives 1500+ wild animals per year and provides education programs to individuals, school groups, public agencies, and civic and social organizations by offering information on native species, habitat, coexistence and alternative solutions to wildlife related problems. Custom designed programs based on the current curriculum being taught allows OWL volunteers to come into the classroom and discuss environmental issues. There is a fee for educational presentations. If you would like more information, please call 913/542-3625 or write to: OWL, 23375 Guthrie Road, Linwood, KS 66052. 🐾

Out and About

Stone Nature Center

Educators have long recognized the need to expose children early to outdoor experiences to enable them to develop an appreciation and understanding of the natural world. In Topeka, Kansas there is a unique program that uses the natural world to help at-risk children learn to overcome the difficulties of their situations.

The W. Clement Stone Nature Center is a program of the Villages, Inc., a residential program for children who are victims of abuse or neglect. Founded in the mid-1960's by Dr. Karl Menninger, the Villages, Inc. helps children who have grown up in troubled homes experience a more positive family model and share a part in community activities. Fundamental to this approach was Dr. Menninger's philosophy that experiences with the natural world have a beneficial, empowering and healing effect.

The Stone Nature Center is located on 372 acres at the Villages' Eagle Ridge site. Five residential homes and up to 50 children live at this area designated as a nature preserve for over 20 years. The land for the homes and preserve were donated by Chicago philanthropist W. Clement Stone. In 1989, Stone awarded a grant of \$500,000 to the Villages to fund the nature education program for both Villages and community youth. The property was named the W. Clement Stone Nature Center to recognize Mr. Stone's commitment to environmental education.

The Villages has one of the largest and oldest Adventure Challenge courses in Kansas. This course is a collection of low and high challenge games that promote cooperation, communication, problem solving and good self-esteem. Villages youth and staff as well as community, business, and law enforcement groups have utilized "the ropes course" to gain confidence and trust.

The Stone Nature Center provides outdoor and indoor environmental programs to schools, scouts and youth groups in

Northeast Kansas. These programs range from 50 minute in-class presentations to 2 1/2 hour field trips to the Nature Center. A hands-on, interactive approach is used in all programs.

In addition to its educational programs, the Stone Nature Center is active in habitat restoration. An updated inventory of plant and animal species is kept at the Center. In the past seven years, 55 acres of grassland has been reseeded to native species. The Center is managing 30 acres of undisturbed tallgrass prairie. Nature trails are maintained for hiking.

For more information about programs and the Stone Nature Center, please contact Marty Birrell, Nature Education Coordinator, 913/267-5900. 🐾

📖 See Marty's "hair-raising" article on page 8.

Quivira National Wildlife Refuge

Located in south central Kansas, Quivira National Wildlife Refuge lies in the transition zone of the eastern and western prairies. For untold years, these marshlands have served as a major stopover for thousands of migrating birds. Other wildlife, such as deer, pheasants, quail, and small predators have also benefited from the habitat management programs being employed by the refuge.

The setting provides an excellent opportunity to enjoy the outdoors and learn more about wetland ecology. The new Environmental Education Center at Quivira is now available to school classes, 4-H groups and other youth and adult groups who are interested in wildlife and their native habitat.

For additional information on the Education Center and other educational opportunities available through the refuge contact: Dave Hilley, Refuge Manager, RR 3, Box 48A, Stafford, KS 67578, 316/486-2393. 🐾

The WILD Exchange

New Books

As of June 1, 1993, all participants in a basic Project WILD workshop will receive the new activity guide. The new guide replaces both the elementary and secondary guides. It contains 113 activities, a new "Activities By Grade" cross reference section, new appendix areas such as: The First Classroom is Outdoors - Use It!, Field Ethics, Observation, and Inference: What's the Difference?, and Guidelines for Interviewing People. When appropriate, Aquatic extensions are also given as part of the activity.

Individuals who have successfully completed a basic Project WILD workshop may obtain a new guide by sending \$4.95 (our cost for the guide) and \$1.00 handling fee to:

Roland Stein
Project WILD - Kansas
RR2 Box 54A
Pratt, KS 67124

WILD In Iceland

If all goes as planned, WILD will soon be ready for implementation in Iceland. Some adaptations will be required - ants, grasshoppers, owls, deer and bear do not occur in Iceland. "Oh Deer!" may become "Oh Ptarmigan!" - "How Many Bears" may become "How Many Arctic Fox".

Other international sponsors of Project WILD include: Canada, Czechoslovakia, India and Sweden.

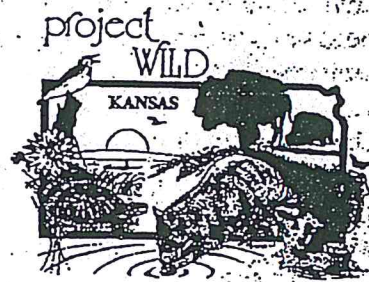
The goal of Project WILD is to assist learners of any age in developing awareness, knowledge, skills and commitment to result in informed decisions, responsible behavior, and constructive actions concerning wildlife and the environment upon which all life depends.

Oh Yeah!!

Project WILD-Kansas has been awarded two grants from the Vulcan Environmental Education (VEE)

Grant Program. A \$900 grant was awarded to sponsor Project WILD workshops for schools who successfully have obtained OWLS funding. Every approved OWLS grant school received an invitation to participate in a Project WILD workshop. The participants will have their registration fees (\$15.00) paid by the VEE grant.

Project WILD-Kansas also received a \$300 grant to conduct regional workshops for Project WILD facilitators. The first workshop was held on March 13, 1993 for regions 2 and 3 at the Ernie Miller Nature Center. A special "Thanks" to George Potts and Connie Elpers for their assistance in obtaining these grants.



The Triple Crown — Update

Fort Hays State University, under the direction of Eleanor Tangeman, offered a combined workshop featuring Project Learning Tree, Project WILD and Project Aquatic. For three days, July 19-21, this "triple crown" workshop provided forty-four participants the opportunity to experience the three best environmental workshops available. Although the meteorologist did not provide us with ideal conditions, it rained all three days, we were part of a great group of individuals who assisted and shared with each other so willingly. The "Fashion a Fish" activity from the Aquatic guide allowed these individuals to really demonstrate their creativity. It only took us three attempts to successfully complete the circle in "Habitat Lap Sit" - we had a few doubting Thomas's.

We are considering offering this workshop again in 1994.

New Director — Welcome

Betty Olivola has been hired as the new director for Project WILD. Betty brings twenty years of experience on the national level in science and environmental education to the position. She holds a Master's Degree in Education from the University of New Hampshire.

Dr. Cheryl Charles has made a tremendous contribution to Project WILD over the last ten years. We appreciate her efforts and dedication and wish her well in her future endeavors.



Grant Monies Available for Outdoor Learning Sites

Most Kansas school sites are landscaped with grass, a few shrubs and perhaps a tree or two. Not what one would consider good wildlife habitat or providing the best opportunity for students to see the value of biodiversity.

The OWLS program can change this by providing the school community with financial assistance to develop the school site into a learning center and habitat development area. Its objective is to assist elementary, middle and secondary schools along with schools of special education and colleges in establishing outdoor wildlife learning sites. For the initial development, grants up to \$2,000 per site can be obtained. Additional follow-up grants may be available depending on the maintenance and success of the initial OWLS project. Dr. George Potts is coordinating this program. The application process involves:

- 1) Contact Dr. Potts for an application.
- 2) Applicant will be contacted by a Kansas Dept. of Wildlife & Parks resource person.
- 3) Applicant submits proposal.
- 4) If approved, grant is awarded.

Contact either Dr. Potts at 2040 N. Kessler, Wichita, KS 67203, or Ken Brunson, KDW&P, RR 2 Box 54A, Pratt, KS 67124.

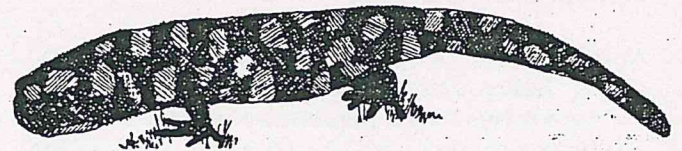
State Amphibian??

Last spring, a class of second grade students at OK Elementary School in Wichita wrote letters to the Wichita area State Representatives and Senators nominating the Barred Tiger Salamander *Ambystoma tigrinum mavortium* as the "declared official state amphibian of Kansas". The legislators were sold on the idea and promised to propose a Resolution in the 1993 - 1994 legislative session. However, they said that "for it to pass, girls and boys all over the state need to write letters of support to their Representatives and Senators".

Alice Potts, educator, urges teachers (at all grade levels) across Kansas to have their students join in the effort, by learning about the Barred Tiger Salamander, then sending letters to their legislators and asking for their support of this endeavor.

Teachers can use this as a motivational learning experience. Research and communication skills can be utilized in purposeful writing. It provides an opportunity to see the government process at work. Our legislators were impressed with our letters and sent wonderful responses. The kids loved it!!

Now meet the candidate, B. T. Salamander. B. T. is well qualified for the distinction of becoming one of our state animals:



— found statewide (is the only salamander that resides in the western half of Kansas).

— wears the Kansas colors (similar to several of the other state animals).

— helps to keep nature in balance by eating lots of insects.

— is an indicator of pollutants in water (becomes ill when pollutants are absorbed through its skin), therefore warning us that something could also harm us.

Let us know how you are doing by writing and telling us of your efforts. Send your letter to: Alice Potts, Second Grade Teacher, OK Elementary, 1607 N. West St., Wichita, KS 67203.

Chain Reaction

Trace the flow of energy through a food chain by using this adaptation of the cooperative game called "Knots".

OBJECTIVES: Students will be able to 1) identify consumers and producers in a food chain and 2) trace the flow of energy through a food chain.

Begin by drawing and discussing a simple food chain. Point out that all food chains begin with a producer, in most cases a plant. Discuss how the sun's energy is transferred to the animal that eats the plant. The first consumer in a food chain is called the primary consumer. In most food chains there is another link called secondary consumers. The secondary consumers are usually carnivores.

Discuss how secondary consumers are using the sun's energy even though they are eating other animals. You can even extend the food chain to another link by introducing tertiary consumers or predators that eat other predators.

Divide your students into small groups of five to eight students. The activity can be adapted for younger students by using fewer people. Have your students stand in a circle. Ask them to raise their right hands. Tell them that their right hand is going to be a consumer in a food chain. Ask the students to raise their left hand. This hand is going to be a producer.

Now have your students join hands forming a circle. Ask your students to notice how each consumer has found something to eat. Tell the students that you are the sun and you are going to touch a producer. When you touch that producer you will say energy. The student will pass this energy around the circle (through the food chain) by gently squeezing the right hand of their neighbor. With the squeeze, the students passing the energy will say, "Energy". Energy will pass from the producer to the consumer.

Now for the fun part! Ask your students to release their neighbor's hand. Tell your students that, in nature, energy flow through a food chain can be more difficult to follow. Ask your students to reach into the center of the circle with both hands and take hold of the hands of other students. **In order for the activity to work, there are two rules:**

- a) Students cannot hold the hands of the person standing next to them.
- b) Each student must hold the hands of two different students.

The students should now be held together in one big knot! Tell your students they are going to simulate a food chain. The teacher is the sun once again and taps the hand of any student. The teacher asks that student to squeeze their opposite hand, thereby passing the energy on to the next student and on through the food chain. As above, the energy should be passed through the chain with a gentle squeeze and the word "energy". Ask your students to continue holding hands.

Once the energy goes through the food chain, tell your students that they are now going to be scientists and try to untangle this food chain. Ask your students to try to return to a circle without releasing their hands. They should release their hands if they feel like they might be injured. Or students can release their grip and rejoin their hands in a more comfortable grip. Tell your students that they might not be facing towards the circle when they unravel the knot, and that is okay. If the students end in a figure eight arrangement, this is also a solution.

Once untangled, ask the students to pass the energy around the circle a final time.

EXTENSIONS

After doing this activity, ask your students to research one of Kansas' biological communities. Some examples would be a wetland, grasslands, forested areas, or a vacant city lot. Have your students draw some of the possible food chains that exist in these communities.

Ask students to integrate the different food chains into a food web. Draw the web on a very large piece of paper and post it on the wall.

Ask students to make a food web mobile that demonstrates where humans fit into the web.

Do a related Project Learning Tree or WILD activity with your students. Check for appropriate activities in the Topic Index of both sets of guides under "Food Chain".

REFERENCES

"Knots", *The New Games Book*, New Games Foundation, Headlands Press, 1976.
"A Guide to the Ecosystem Concept", Project WILD Activity Guides.

("Chain Reaction" was developed by Utah WILD Coordinators Bob Ellis and Brenda Schussman.)

What's Happening

September 25, 1993

Project WILD Workshop. Pratt. Call Roland Stein at 316/672-5911 for more information.

October 1, 1993

Project WILD Workshop. Powhattan. Call Roland Stein at 316/672-5911 for more information.

October 11, 1993

Project WILD Workshop. Leavenworth. Call Melinda Furman at 913/682-0361 for more information.

October 15 - 18, 1993

KACEE Workshop. Rock Springs Ranch 4-H Center. For more information call John Strickler at 913/537-7050.

October 16, 1993



Fall Frights & Folklore Open House. Ernie Miller Nature Center in Olathe. Your family will step into the woods and meet a menageries of animals along a nature trail. Could the howling be a werewolf? Is that a witch holding the hawk? You'll discover the secrets of fall folklore as you meet many of the wild animals that started it all. While you wait your turn on the trail, your family will participate in fun autumn activities like making apple-face dolls, creating a tasty fall tree and listening to traditional dulcimer music. For reservations and more information call Ernie Miller Nature Center at 913/764-7759.

October 16, 1993

Project WILD Workshop. Junction City. For more information call Pat Silovsky at 913/238-5323.

October 20, 1993

Ecomeet. Milford Nature Center. For more information call Pat Silovsky at 913/238-5323.

October 26, 1993

Project WILD Workshop. Lake Shawnee. For more information call Pat Silovsky at 913/238-5323.

October 30, 1993

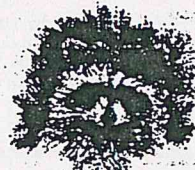
Project WILD Workshop. Syracuse. For more information call Laura Horton at 316/384-5505.

October 30, 1993

Monster Myths by Moonlight. Milford Nature Center. Join the ghouls at the nature center for an evening of wildlife and fun. Includes a hayrack ride through Milford State Park. For more information call Pat Silovsky at 913/238-5323.

November 13, 1993

Project WILD Workshop. Rock Springs Ranch (near Junction City). For more information call Deb Hiebert at 913/257-3551.



We Can Use Your Help

We are currently in the process of revising our popular Curriculum Materials for Preschool through 6th Grade. Most of the activities and information will be updated to reflect changes that have taken place since the materials were developed 10 years ago. The biggest change will be the three-ring binder format to make it easier for update in the future. We plan on developing two books — one for beginning primary and one for advanced primary. Many of the activities you like from the current materials will be included in these new books. We would sure love your input. If you would like to review the drafts of these booklets or have any ideas on how we can improve the materials please let Roland know. Thank You!!

On T.R.A.C.K.S.

Vol. 5 No. 1 Fall 1993

9539 Alden
Lenexa, KS 66215
913/894-9113

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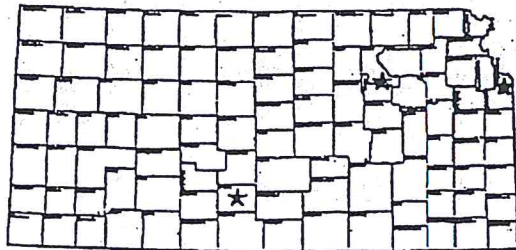
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Mammal Materials

The Reference Center has tons of neat materials on mammals for you to borrow — over three pages of listings. Everything from fun interactive computer programs to exciting videos. Borrow some replitracks so you can make your own tracks in plaster of paris or with a stamp pad. Children love these hands-on rubber replicas of animal feet. One of the most popular items in the entire reference center is the Skins and Skulls Kit. These boxes are filled with native Kansas mammal skins and skulls. This is the way to see and touch wildlife. Compare and contrast the different hair types and kinds of teeth. If you still need your free copy of the catalog which lists these wonderful materials write to Roland (address below) and he'll send one your way. Remember — the only cost to borrow any of these materials is return postage back to Pratt. If you're in the Johnson County area be sure to visit the Satellite Reference Center in Lenexa. A new catalog is available for this center, too. For your copy call or stop by the Lenexa office. Materials at this center must be picked up and returned but there is no fee to borrow them.

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