# Illinois Wild Mammals

## Background Information for the Teacher

### Characteristics

Classifying animals into categories and groups based on their similarities and differences is the first step in studying and understanding their origins, development and interdependence. In this unit, we will focus on wild mammals that can be found in Illinois.

Mammals have the following characteristics.

- They are covered with hair or fur.
- They are warm-blooded (meaning their internal body temperature is maintained at a constant level regardless of external conditions).
- They are usually born alive and relatively well-developed, having grown inside the mother's body in a special organ called a uterus. The time spent developing in the uterus before birth is called the gestation period and varies in length from species to species (from about 13 days in the Virginia opossum to 210 days in the white-tailed deer). There are five mammal species that lay eggs instead of giving birth to their young. They have all of the other traits of mammals, however. None of these five species live in Illinois.
- After birth the young are fed with milk that is produced by mammary glands.
- They have larger and more complex brains than any other group of animals.

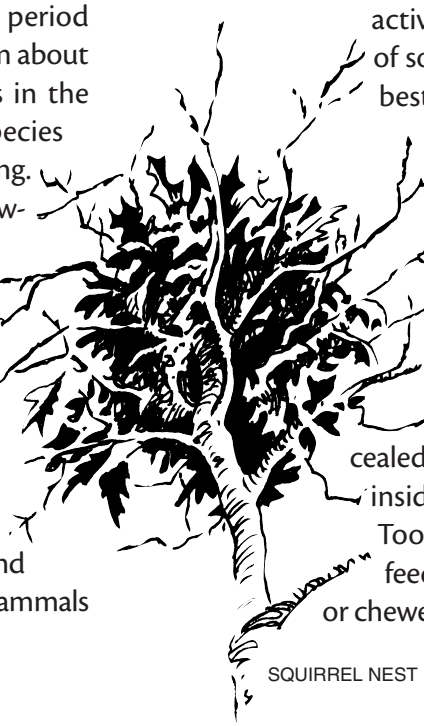
Wild mammals are those species that depend upon themselves to find the food, water and shelter that they need. In Illinois, raccoons, deer mice, foxes and bobcats are some wild mammals. Domesticated mammals are those that have been bred for special purposes. They are related to mammals that were once wild. Cows, horses, sheep and pigs are all examples of domesticated mammals. Domesticated mammals receive some of their survival requirements from humans.

"Tame" mammals are pets. They are domesticated animals. However, not all domesticated mammals are tame. With most mammal species, a single animal may become "tame" while the rest remain wild. Some mammals that were once domesticated have become wild again. They are called "feral," such as feral hogs and feral cats.

### Signs

Wherever they live, mammals produce evidence of their presence. This evidence may be seen in the form of footprints or tracks in the soil or snow, indications of feeding activity and types of habitation. Areas of soft soil, mud, sand or snow are the best places to look for tracks. Along stream banks or at the edge of any body of water you're likely to find the footprints of many kinds of animals that come there to drink or feed.

Evidence of feeding activity includes any collection of nuts, seeds or fruits stored in a concealed spot (under logs and tree roots, or inside log piles and hollow stumps). Tooth marks on anything indicate feeding–look for gnawed mushrooms or chewed nuts, fruits, leaves or twigs. Areas



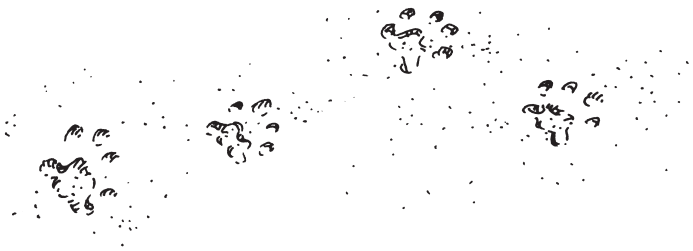
SQUIRREL NEST

of bark are often chewed or stripped off as food–look for tooth marks on the exposed wood.

Signs of habitation can be interesting. Any natural cavity in a tree, stump or fallen log is likely to contain signs of use by some animal. Look for tracks, droppings (solid waste) and bits of food around the opening or signs of nesting within (piles of leaves, grasses or twigs).

Many mammals live underground, and any undeveloped area will reveal openings to such dens and burrows.

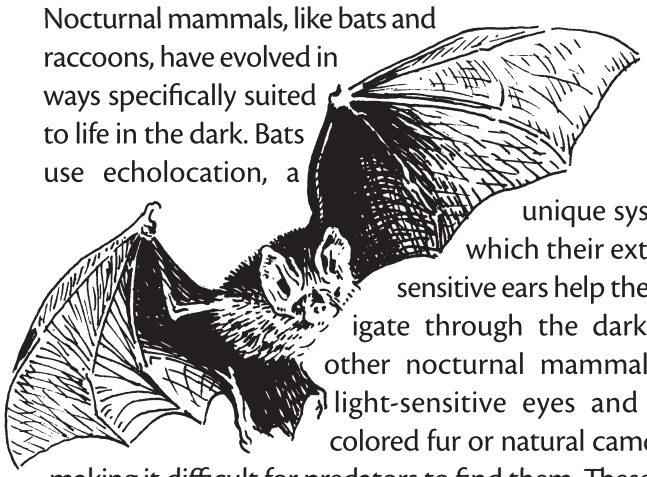
Some mammals build their own homes. Squirrel nests are a common sight in the trees of woodlands, parks and urban areas. Lakes, ponds, streams and swamps are likely to contain muskrat or beaver lodges.



## Activity Patterns

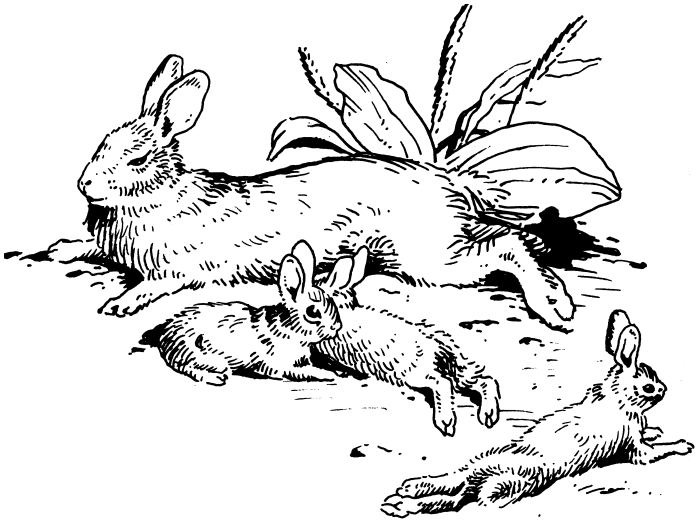
All mammals require some period every day or night for rest and sleep. Whether a mammal sleeps primarily during the day or at night depends on an individual species' particular habits and survival techniques. All mammals adapt to either daytime or nighttime activity.

Those mammals that rest during the day and engage in feeding, mating and other activities at night are nocturnal. Those that rest at night and are active during the day are diurnal.



Nocturnal mammals, like bats and raccoons, have evolved in ways specifically suited to life in the dark. Bats use echolocation, a unique system in which their extremely sensitive ears help them navigate through the dark. Most other nocturnal mammals have light-sensitive eyes and darkly colored fur or natural camouflage making it difficult for predators to find them. These mammals spend most of the day sleeping in dens or burrows.

Diurnal mammals, like tree squirrels, have evolved beneficial ways for daytime living. Most have developed protective coloration or camouflage appropriate to their daytime habitat that makes them less visible to predators. Such mammals' eyes are adapted to bright light, and each mammal has its own special means of escape or protection from predators. For instance, squirrels are very fast and agile, allowing them to outrun or outmaneuver their enemies. Diurnal mammals take their rest at night in dens, nests or burrows.



## Young Mammals

Most mammals are viviparous, which means they give birth to living young. The exceptions are the duck-billed platypus and four species of echidna that live in Australia and some nearby islands. These five mammal species lay eggs from which their young hatch.

Some young mammals, like mice, rabbits and bats, are born blind and hairless, while others, such as the white-tailed deer, are developed enough to move about with the parent soon after birth.

After birth, all newborn mammals are nourished with milk that is produced in the mother's mammary glands. This milk is composed of water, fats, proteins, sugars and mineral salts. Mammals whose young grow the fastest produce milk with the highest protein content.

Weaning usually occurs after the young can eat solid food. Small rodents generally nurse for a week and a half to three weeks. Badgers can eat solid food in the first month but are suckled for four or five weeks.

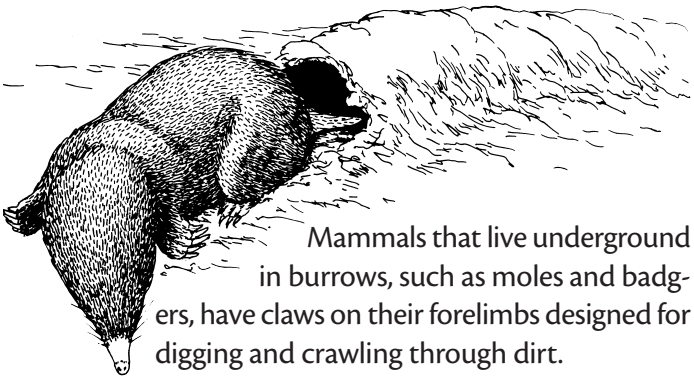
As physical development progresses, behavioral development also occurs. Behavior patterns are either instinctive, learned or a combination of both. Instinctive behavior is automatic and triggered internally, while learned behaviors are picked up by imitating the parents and through play among siblings or other young.

As young mammals mature, their dependency on their parents decreases, and they become independent.

## Mobility

Almost all animals are mobile. To find food, shelter and mates, avoid predators and interact with their environment, animals must have the ability to move.

Mammals live in a variety of environments and have adapted different strategies for locomotion. These strategies are directly related to the specific kind of environment in which they live. Most mammals have four limbs with their related paws, claws or hooves.



Mammals that live underground in burrows, such as moles and badgers, have claws on their forelimbs designed for digging and crawling through dirt.

Predatory mammals that chase their prey, like bobcats, have feet with thick, rough pads for traction and sharp claws for grabbing. Deer and other grazers have flat, hard hooves for solid support on soft earth and kicking for defense. Beavers and muskrats, which spend most of their life in water, have webbing between their toes. Mammals that climb, like squirrels, have very sharp, short claws for holding. In most cases, the greater a mammal's need for speed, the longer its legs will be in proportion to the rest of its body.

The most unusual examples of locomotive adaptation among mammals are present in bats and flying squirrels. In the former, the forelimbs, especially the "finger bones" and the skin between them, have evolved into fully functional wings. Flying squirrels have large flaps of skin connecting their "wrists" to their "ankles" enabling them to glide great distances between trees or branches.

## Hibernation

Survival may be difficult for mammals in Illinois, particularly when harsh, prolonged winters drastically reduce the natural food supply. Some mammals use hibernation to deal with these conditions. Hibernation is a state of extremely reduced metabolism.

Many mammals use varying degrees and lengths of dormancy, or inactivity, to conserve energy and survive periods of limited food supply. Skunks and raccoons, for instance, "den up" during extremely cold weather, remaining in their burrows and living off excess body fat, while not actually hibernating.

Hibernation involves drastic reductions in a mammal's bodily functions as well as physical activity. Body temperature drops dramatically, as do heart and breathing rates. From a normal body temperature of 95ºF, the temperature of a hibernating mammal may be as low as 36ºF. A normal heart rate of more than 100 beats per minute may drop to only four or five, and breathing may slow to less than one breath per minute. Ten wild mammal species in Illinois hibernate: little brown bat; Indiana bat; southeastern bat; northern bat; eastern pipistrelle bat; big brown bat; woodchuck; Franklin's ground squirrel; thirteen-lined ground squirrel; and meadow jumping mouse.

Prior to the hibernation period, these mammals accumulate a thick layer of excess body fat that supplies them with the energy needed to survive. A hibernating mammal may lose as much as one-third of its total body weight during hibernation.

Scientists have discovered that even during hibernation there are periods of wakefulness, which become more

frequent as the hibernation period comes to an end. External temperature is a factor in these periods of sporadic activity. For each species there is a critical temperature above which they will awaken, and all will awaken temporarily if the temperature drops so low that they are in danger of freezing. Wakening allows mammals to move to a deeper, warmer chamber or to warm up a little—by shivering or moving around—until the temperature moderates.

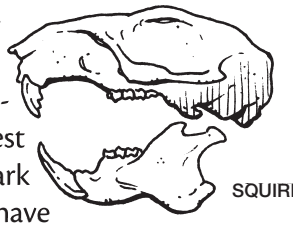
As spring approaches the air warms, food supplies are once again sufficient, and the hibernating mammals return to normal activity.

## Feeding

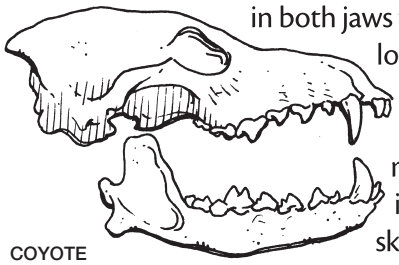
There are three types of mammal teeth: incisors (used for cutting and gnawing) located in the front and center of one or both jaws; canines (used for stabbing and tearing) located on each side of the incisors; and premolars and molars (for grinding and shearing) situated along the sides of the jaws.

Because each tooth type is designed for specific functions, they have evolved differently in different mammal species, depending on eating habits. Based on these relationships, mammals are categorized into four feeding groups.

- Herbivores are mammals that eat mainly vegetation. There are two sub-groups: plant-tearing mammals (deer) and plant-gnawing mammals (beavers, squirrels and mice). Plant-tearing mammals have incisors in their lower jaws only, no canines at all and flat, sharp-edged molars. This arrangement is best for tearing leaves, stems, bark and grasses. Plant-gnawers have sturdy, sharp incisors on both jaws for cutting through nuts, bark, wood and grasses. They lack canines and have flat molars for grinding.


SQUIRREL

- Carnivores, or meat-eating mammals (such as coyotes, bobcats and foxes), have small but sharp incisors in both jaws for grabbing and holding; long, fanglike canines for stabbing and tearing; and large, sharply edged premolars and molars for slicing through flesh, bone, skin, scales, fur and feathers.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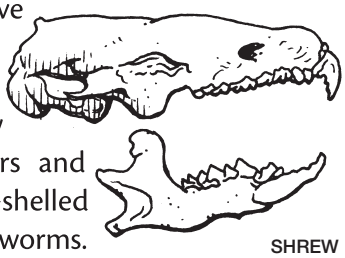
- Insectivores, or insect-eating mammals (like shrews, moles and some bats), have long incisors for picking insects out of dirt and leaves and small but sharply edged canines, premolars and molars for chewing hard-shelled beetles, other insects and worms.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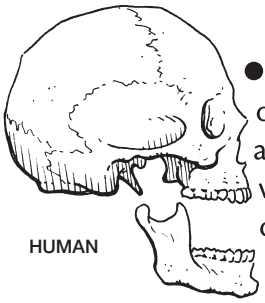
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- Omnivores (such as raccoons, opossums and humans) eat almost anything edible. These mammals develop all three types of teeth, with no one category more prominent than the others.

Among the mammal species in Illinois are some known as predators. From bobcats and foxes to raccoons and weasels, they share a common behavioral trait: they catch, kill and eat other animals (called prey).

There are different degrees of predation. Some strict predators, such as bobcats, eat only meat. But other mammals, such as raccoons and opossums, eat berries, nuts and plants in addition to catching and eating prey.

Most predators are prey to other, larger predators. A weasel that eats a field mouse may then be dinner for a bobcat. Those few predators that are not prey to others are called top predators.

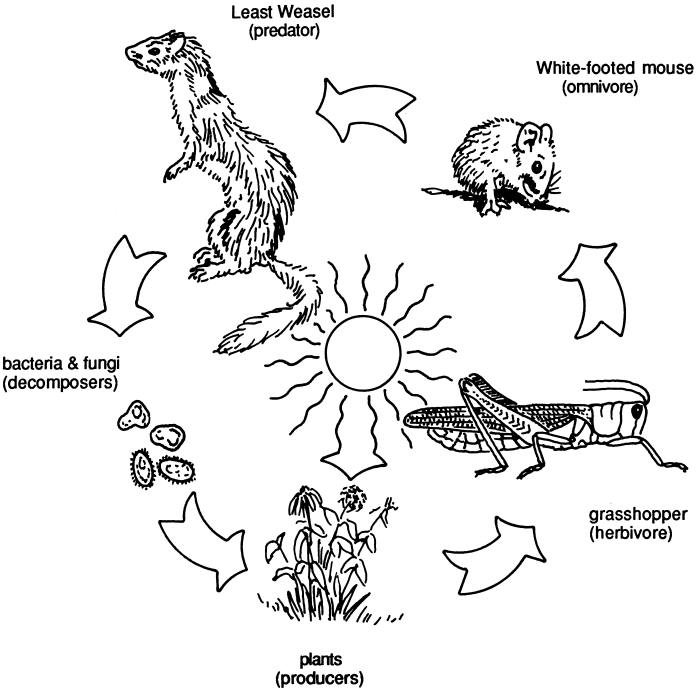
Both predators and prey are links in what is called a food chain. Food chains are the routes along which energy flows through the living world.

This energy always starts with the sun. Through the process of photosynthesis, plants use the sun's energy to produce food. Animals such as rabbits and deer eat the plants and transfer the energy from the plants' stored food into their own bodies only to become prey to the predators, who transfer the energy to themselves.

But the flow of energy doesn't end there. Even top predators eventually die, and their bodies become food for scavengers, those animals that eat dead animals and plants. Bacteria and fungi break down bones, scales, fur and feathers into the simplest chemical compounds. These compounds become the nutrients in the soil that

are the raw materials for plant growth. Thus the food chain becomes a closed cycle with no real beginning and no real end.

Most food chains overlap (individual species of plants and animals may be links in the food chains of several species of predator) and the entire system becomes a food web.




## Status

Although extinction is a natural process, extensive and excessive human interaction with the environment has greatly increased its rate. Habitat destruction is the single greatest cause of extinction. Other human-related causes include habitat damage, unregulated or illegal commercial and personal use, disruption of migration routes and breeding behaviors, contamination by pollutants, and competition or predation from artificially introduced species. Some experts expect extinctions of plants and animals to increase from the current rate of one species per year to 100 per year in the near future.

In Illinois, in 2009, a total of 355 species of plants and animals are endangered, and 128 species are threatened. There are five species of endangered mammals and four species of threatened mammals. Rare species, though not in immediate danger, are few in number. Some species have always been rare because their natural range does not include much of Illinois or because they have limited habitat preferences. Threatened species are those still present in their natural range, but whose numbers are declining and are likely to become endangered in the foreseeable future. Endangered species are those in immediate danger of extinction as a breeding species. Extirpated species are those that have become eliminated from a portion of their range. For instance, elk and bison have been extirpated from Illinois.

Early settlers in Illinois found a vast array of plants and animals living in the territory's clear streams, wide prairies and extensive forests.

In the 1820s, forests covered about 38 percent of the state; the remainder was mostly tallgrass prairie and wetlands. Today, about 14 percent of the forest and one percent of the original prairie remain. More than nine million acres of natural wetlands have been reduced to less than 500,000 acres.

Such drastic loss of habitat—whether the result of modern agricultural practices, urban sprawl, pollution, sedimentation, habitat fragmentation or flood control activities— is the most serious threat to the ultimate survival of Illinois' wild mammals.

Since human activity is the primary cause for this habitat reduction, humans are also responsible for controlling and/or reversing this devastating trend. The Illinois Department of Natural Resources (IDNR) administers a number of programs that help to maintain current habitats and slow further habitat loss.

Illinois Acres For Wildlife, a voluntary program, involves rural and urban landowners who want to help provide wildlife habitat on their property. The landowners, in cooperation with an IDNR biologist, set goals for their land.

Hunting and trapping are highly regulated activities in Illinois. Laws limit when, where and how many animals may be taken by hunters and trappers and keep these species from becoming endangered. Fees collected from hunters and trappers for licenses, special stamps and excise taxes go toward conservation programs that benefit all wildlife species.

The Illinois Nature Preserve System includes more than 350 nature preserves across the state, encompassing a total of more than 46,000 acres (as of 2009). These preserves were created to keep unique areas of the state undeveloped

for scientific research, education and public enjoyment. These areas provide homes to a wide diversity of biological treasures and harbor many of Illinois' rare and endangered species.

Through education and a commitment to the importance of preserving our natural heritage, we must all strive, both individually and as a society, to learn to share the world with all living things.

Equal opportunity to participate in programs of the Illinois Department of Natural Resources (IDNR) and those funded by the U.S. Fish and Wildlife Service and other agencies is available to all individuals regardless of race, sex, national origin, disability, age, religion or other non-merit factors. If you believe you have been discriminated against, contact the funding source's civil rights office and/or the Equal Employment Opportunity Officer, IDNR, One Natural Resources Way, Springfield, IL 62702-1271; 217/785-0067; TTY 217/782-9175. This information may be provided in an alternative format if required. Contact the DNR Clearinghouse at 217/782-7498 for assistance.

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