

ANIMAL TRACKS AND SIGNS

2014 Eco-Meet

Junior Varsity

Going for a walk out of doors is great exercise. Sometimes, along with fresh air, you get the added benefit of hearing a bird sing or seeing a doe with her fawns stand quietly on the edge of a meadow. A walk by a pond or lake might reveal turtles and snakes sunning themselves on a rock or a log. A walk by a flower garden will reveal butterflies and bees busy at work.

Sometimes you won't see an actual animal. But you will see signs that an animal has been there, a broken twig with a tuft of animal fur, a feather, a bird nest on the ground the day after a storm, or animal tracks in the mud by the bank of a stream.

The following guide is part of the BioKIDS project whose mission is to create innovative, inquiry-based k-12 science curricula that utilize current technologies for interactive study. Parents and scientists can participate from classrooms, homes, after-school programs or other educational settings. BioKIDS is sponsored by Interagency Education Research Initiative, National Science Foundation, University of Michigan School of Education and Museum of Zoology. The web site is www.biokids.umich.edu

Scat and Pellets

All animals leave droppings because they all have to eat and then get rid of their waste. Scientists call these droppings, "**scat**." Insects, snakes, lizards, frogs, and mammals all leave scat behind.

Scat is one of the most important signs to look for when tracking animals. All animals leave scat in one form or another. An animal's scat can tell us what they eat, where they spend most of their time, if they're sick, and what kind of animal it is that we're tracking. Different kinds of animals leave different kinds of scat, and knowing how to tell which is which can help us figure out what kinds of animals live nearby.

Mammals

The shape and size of **mammal** scat will tell you the most about who left it. This table will help you to decide what kinds of mammals might have left some scat that you find.

Shape of Scat	Mammal	Example
Thick Tube shaped	Dog, Raccoon, Skunk, Opossum, Bear	
		
		

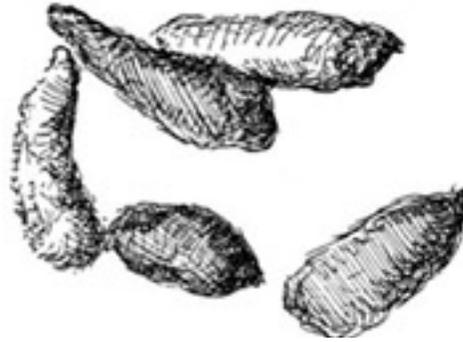


The scat of many wild carnivores, such as coyotes and foxes, will be thick with the fur of the animals they've eaten. The photo above shows aged coyote scat. The photos below show raccoon scat.



Water
Drop
shaped

Cat family



Wide
Thread
shaped

Weasel family



Tiny and
round

Rabbits and
Hares



Pill
shaped

Deer



Long
and thin

Rodents



Long
and thin

Bats



Bat guano is usually small, dry, oval pellets. Guano collects under roost sites (where they sleep during the day), so you often see bat guano in small piles.

Most plants have signs of animals if you know what to look for and look closely. Many plants will have bite or chew marks. Others show rub marks. Another way to recognize that an animal has passed by is to look for trails.

Bite and Chew Marks

Sticks and tree branches can be covered with animal markings at times. Many different animals might peel the bark off of a dead log to get out the bugs that live inside it. During winter, bark itself can provide animals with a much needed food source. It is common to find chew marks on twigs and branches throughout the winter and in spring.



branch chewed on by rabbits

The chew marks that are most identifiable are those of rabbits and rodents. Those animals have enlarged front teeth, so their chew marks often show parallel grooves.



Rabbits and deer sometimes feed on the same plants. Twigs eaten by rabbits are usually cut sharply, at a 45 degree angle. Often the marks of individual teeth can be seen. (You might have to use a magnifying glass.)



Beavers use their strong incisors to cut down trees for use in their dams and to eat the tender branches at the top of the trees. Individual chew marks can be seen on trees near rivers and streams where beavers live.



Twigs eaten by deer are usually ripped off the bush or tree, and the torn edges are rough and irregular. The plants in the picture to the left have been gnawed on by deer.



It is also common to find the remains of nuts that have been chewed open by squirrels or other rodents.



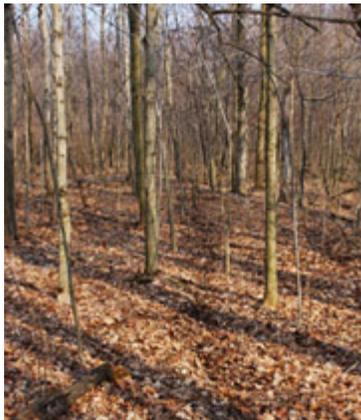
Many leaves have bite marks from insects on them. Sometimes this makes the leaves look rough around the edges. Sometimes the leaves will be riddled with holes.



Many insects chew trails in wood beneath the bark. To find these kinds of tracks you can pull up the bark on a dead branch and see the maze of tunnels that have been made there.

Trails

Another way to recognize that an animal has passed by is to look for trails. Animals will wear down the paths that they choose, just like we do, so it is often easy to tell where they have been walking. Often you can find broken twigs that they passed by or walked on, or trees and rocks that they rubbed up against. Sometimes you can even find bits of hair that got caught on a twig as they passed.



A trail made by white-tailed deer.
(trail in center of photo)



Trail left by deer, rabbit, or woodchuck.
(trail in center of photo)



Trail leading to woodchuck burrow.
(trail at right edge and bottom)

Cocoons and Webs

Many spiders and insects are able to spin webs and build other structures.

Silk Structures made by Insects

Among insects, moths and butterflies can create things out of silk.



For example, tent caterpillars spin a large, web-like structure in a tree or other plant. The structure protects the developing larvae.



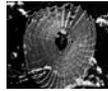
Moths spin a cocoon out of silk. Butterflies on the other hand hatch from a chrysalis, which is made of hardened protein.



Spider Webs

You know there are many kinds of spiders, but did you know there are many kinds of spider webs? And the cool thing is, the spider web is a big clue to the kind of spider that made it. When you know the different kinds of webs that spiders commonly make, you can make a pretty good guess about the kind of spider that left it.

The kind that you are probably most familiar with is made by **Orb Spiders** (Araneidae family). Their webs are shaped like spirals on lines. They are very beautiful. Orb spiders have to repair their webs at least once every day.



Funnel spiders (Agelenidae family) make very interesting webs that might look like a bird's nest made of silk. They make sheets of silk and wrap them up to make funnels. The funnels have one big opening to catch prey. They also have one small opening in the back in case the spider needs to escape. These webs are not actually sticky. The spiders that make them are just better at moving around in their smooth funnel shape.



Funnel spider webs aren't always cupped. They often make flat sheets with a small funnel-shaped retreat off to one side.

Spider webs are a sign that spiders have been nearby, but they aren't the only signs. Spiders also spin webs to protect their eggs and developing young. These **egg cases** look like eggs but actually contain hundreds of tiny spider eggs.



Some spiders don't make webs. These spiders do use silk to make a little hiding place for themselves, especially females with eggs.

Bee and Wasp Nests

Bees and wasps create nests in which to live.

Bees often live underground or in natural cavities such as hollows in trees. In those places they construct hives where they store food and nurture their young. You might notice bees or hornets emerging from a hole, then you'll know that you've discovered a nest (but be sure to stay at a safe distance!).

Many bee and wasp species make nests with little rooms. Each room has just one egg and a supply of food (pollen for baby bees, paralyzed insects or spiders for baby wasps). The baby eats up its food, grows and transforms inside the nest, and emerges as an adult. These kinds of bees and wasps dig holes in the ground or in dead wood for these nests. Other wasps and a few bees (bumble bees and honey bees) make bigger nests, and bring their babies fresh food while the babies are growing.



Wasps often construct nests out of mud or a paper-like substance that they make using their saliva. Where do you see wasp nests? The large, round nests are sometimes suspended from the eaves of houses or from tree branches.



Paper wasp nest in eaves



Bald-faced hornet nest in tree

The mud dauber, another kind of wasp, has a nest which looks like a collection of cell-like chambers. In these chambers, their young develop from eggs, through the larval stage, and into adult wasps. When fully developed the wasps chew a hole in the wall of the nest to get out. You can see such holes in this picture of a wasp's nest made with mud.



Galls

Look for galls on leaves and stems. If you see one, an insect might have been there.

What are galls? Galls are modifications of plant tissue and can be caused by various parasites, from fungi and bacteria, to insects and mites. Galls may be smooth, spiny or fuzzy, and resemble everything from marbles and ping-pong balls to dunce caps, saucers and sea urchins. Many provide the food and brooding structure for various species of harmless insects. The female goldenrod fly lays eggs in the stem of the goldenrod plant. After the eggs hatch, the larvae begin to eat the inside of the stem. The saliva of the larvae has a chemical in it which causes the plant to grow abnormally, creating a ball-shaped gall. The larvae live in the gall for a full year undergoing metamorphosis before emerging as an adult.

An insect might lay eggs on or in plant tissues. The plant responds by forming a gall at that site.



One very common gall in North America is the goldenrod gall. This gall is formed when a female goldenrod gall fly lays an egg in the stem of the plant.



Mammal Nests, Burrows, and Tunnels

Mammals create homes for themselves in a variety of places.

Many mammals dig burrows in soil. This is common among **rodents**, such as **woodchucks**, **eastern chipmunks**, and **thirteen-lined ground squirrels**. Although not a rodent, the **Eastern Mole** creates tunnels through which they travel and feed on grubs and earthworms.



Opening of chipmunk burrow under construction. (Chipmunk will carefully hide the excavated earth when finished.)



This chipmunk burrow has been well camouflaged by leaves.



Opening of ground squirrel burrow



Opening of woodchuck burrow



Tunnel or "Run" of an Eastern Mole

Animal Track Key

An animal track is a mark left by a moving animal. You can follow the path taken by the animal and, if you are lucky, find the animal itself at the end of the trail.

The following key will help you to identify tracks that you find.

If the track is sort of fork-shaped, it's probably a Bird

If the track is sort of paw-shaped with 4 or 5 toes, it's probably a Mammal.

For everything else, go to the Other section

Mammals

To figure out what mammal tracks you have, first you need to look at the size and the number of toes:

Step 1: Are the tracks over 1 inch in any dimension?

Yes? Then go to Step 3.

No? Then go to Step 2.

Step 2: (The tracks are under 1 inch in all dimensions)

How many toes does it have?

4 toes front and 5 toes back

5 toes front and 5 toes back

Step 3: (The tracks are over 1 inch in some dimension)

How many toes does it have?

4 toes front and 4 toes back

4 toes front and 5 toes back

5 toes front and 5 toes back

not sure about toes

Mammal Tracks

Under 1 inch in every dimension, with 4 toes on the front feet and 5 toes on the back



House Mouse

size: under 1/2 inch

4 front toes

5 back toes

claws don't always show

House mice have 4 front and 5 back toes. They have claws, but the claws don't always show up in their tracks. Their footprints are generally smaller than 1/2 in.

When you see their tracks, you will generally see one hind foot (5 toes) and one front foot (4 toes) grouped together, and find the other pair about 1/2 an inch in front or behind. The hind foot will usually be in front of the front foot.

The tracks of house mice might easily be confused with the tracks of white-footed mice, because they are so similar.



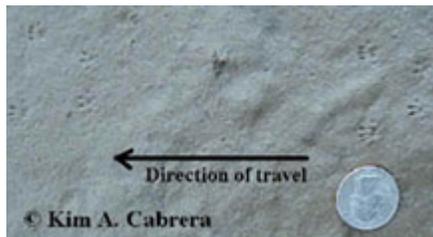
White-Footed Mouse

size: under 1 inch

4 front toes

5 back toes

claws don't always show



White-footed mice have 4 front and 5 back toes. They have claws, but the claws don't always show up on their tracks. Their front and back feet are roughly 1/2 inch wide and long. Their back feet (5 toed) will usually be placed in front of their front feet (4 toed).

The tracks of white-footed mice can easily be confused with those of house mice. If the tracks were left by a white-footed mouse, you are much more likely to see a tail trail along with the prints.



Eastern Chipmunk

size: under 1 inch

4 front toes

5 back toes

claws don't always show



Eastern chipmunks have 4 front and 5 back toes. They have claws, but the claws don't always show up on their tracks. Their front feet are roughly 1/2 inch wide and long, but can be a bit larger. Their back feet will usually be just a little bit longer (at least .7 inches).

Chipmunks have great variety in their diet, so they can be found in many places.



Red Squirrel

size: under 1 inch

4 front toes

5 back toes

claws don't always show

Red squirrels have 4 front and 5 back toes. They have claws, but the claws don't always show up on their tracks. Their front feet are about .5 inches wide, and usually a little bit longer (up to 1 inch). Their back feet are .5-1 inch long and wide. When they walk they tend to keep their front feet (smaller and 4 toed) together and their back feet (larger and 5 toed) together.

These squirrels are found all over the place as long as there are trees nearby. A good way to figure out if squirrels have passed by is to look for cracked open walnut shells.

Under 1 inch in every dimension, with 5 toes on the front feet and 5 toes on the back.



shrew tracks in snow



shrew tunnel in snow



shrew tunnel after snow melt

Masked Shrews

and

Northern Short-tailed Shrews

size: under 1 inch

5 front toes

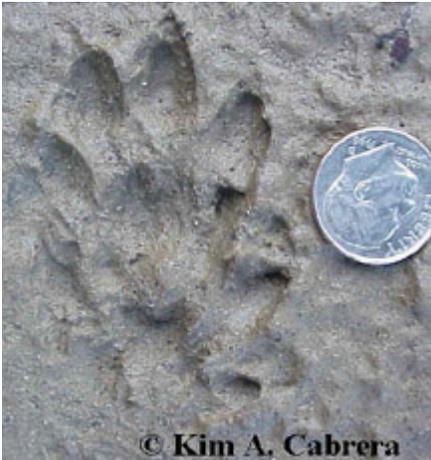
5 back toes

claws might not show up

Both masked shrews and northern short-tailed shrews have 5 toes in the front and back. They have claws, but the claws don't always show up on their tracks.

Their front tracks are about .25-.5 inches wide and long. Their back tracks are .25-.5 inches wide also, but are usually about 1 inch long. Masked shrew tracks will be slightly smaller than short-tailed shrews.

Both kinds of shrews have several different walking patterns, and usually show tail markings of some sort in the middle of them. Their tracks are most easily found in the snow. You're more likely to see the trails they leave as they forage than their tracks.



Least Weasels

size: under 1 inch

5 front toes (may only see 4)

5 back toes (may only see 4)

claws might not show up



Least weasels have 5 toes on both feet, but their smallest toe might not show up, so you may only see 4 toes. They have claws, but the claws don't always show up on their tracks. Their front tracks are about .5 inches wide and .4 inches long. Their back feet are about the same.

You will often find their tracks in a succession of small groupings.



underground mole tunnels

Eastern Moles

size: about 1 inch

5 front toes

5 back toes

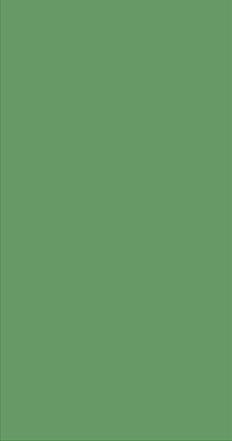
claws

Mole footprints are rarely seen. Moles have five toes on the front feet and five toes on the back feet. They have large claws that help them dig. Their tracks are most likely less than 1 inch all around, but their claws may make the track look longer at times.

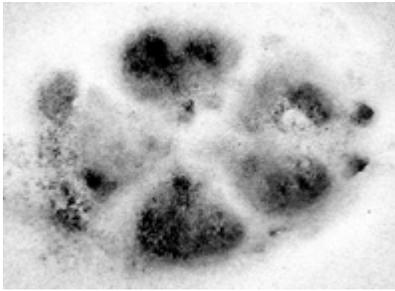
What you will find more often than a track is a long trail of ground that has been pushed up a bit where moles have dug below it. These trails are a reliable way to track and identify moles.



mole trails and tunnel entrances



Over 1 inch in some dimension, with 4 toes on the front feet and 4 toes on the back.



Coyote

size:
over 2
inches

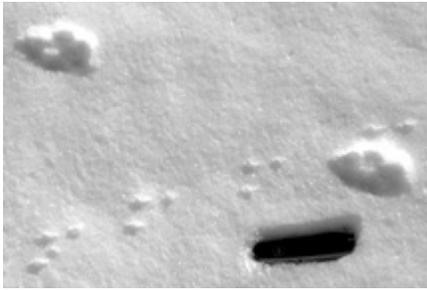
4 front
toes

4 back
toes

claws

You can usually see claws in coyote tracks, especially the ones on the center toes. Their front tracks are 2.25 inches wide and 2.5 inches long. Their back tracks are usually the same, but might be slightly smaller. Their foot pad will probably look something like a nose because of its somewhat triangular shape, but it is also possible that the edges will not be too clear and only a circular shape will be visible.

Because of the way coyotes walk, you will often find that their left hind paws are placed close in front of their left front paws and the same on the right side. But coyotes can show many different track patterns depending on how fast they were moving.



red fox and white-footed mouse tracks in snow



gray fox tracks in sand

Red Fox

size:
over 1.5
inches

4 front
toes

4 back
toes

claws

Red fox tracks usually show claws, especially the ones on the center toes. Their front tracks are 1.5 inches wide and 1.8 inches long. Their back tracks are roughly the same.

Red foxes often walk in a straight line, placing each foot directly in front of the other. Though this is a common way to find their tracks, their walking patterns can vary a great deal depending on how fast they were moving at the time.



FRONT



HIND



Dog

size:
over 2
inches

4 front
toes

4 back
toes

claws

Dog tracks look a lot like coyote tracks, except they are often bigger. You can usually see the claws, and the foot pad in the back is triangular.

Dog tracks tend to go in big, loopy, random paths, while coyotes and foxes take direct paths. So if you see a loopy path, you can guess it was a dog and not a coyote or a fox!



cat tracks in snow



House Cat

size:
about 2
inches

4 front
toes

4 back
toes

claws
don't
show

Cats have four toes on the front and rear feet. They keep their claws sharp by not walking on them. Since they don't walk on their claws, you will not see claw marks in a cat print. Cat tracks will be about 2 inches long, and they are usually wider than they are long. The main pad of their paw is not triangular shaped (in contrast to dogs). On a good cat track you will see that the rear edge of the main pad has three "lobes", or rounded parts.

Cats will make different patterns of tracks, depending on how fast they are moving. They often run by bounding, and then you will see sets of four paws separated by the distance they jumped.

Over 1 inch in some dimension, with 4 toes on the front feet and 5 toes on the back.



eastern fox squirrel tracks in snow

Eastern Fox Squirrel

size: over 1 inch

4 front toes

5 back toes

claws might not show up

Eastern fox squirrels have claws, but the claws don't always show up on their tracks. Their front feet are between 1-1.5 inches long and wide. Their back feet are usually a bit longer (up to 2.5 inches).

When they walk they tend to keep their front feet (smaller and 4 toed) together and their back feet (larger and 5 toed) together.

Another good way to figure out if squirrels have passed by is to look for cracked open nut shells. These squirrels live in trees, and are common near trees.



eastern grey squirrel tracks in sand

Eastern Grey Squirrel

size: over 1 inch

4 front toes

5 back toes

claws might not show up

Eastern grey squirrel tracks are basically the same as eastern fox squirrel tracks. If you see squirrel tracks, look around to see what kinds of squirrels may have left them.



muskrat tracks leading to hole in the ice

Muskrat

size: over 1 inch

4 front toes

5 back toes

claws might not show up

Muskrats have four toes on their front feet and five toes on their back feet. They have claws, but the claws might not appear on their tracks.

Their front feet are 1-1.5 inches wide and about 1.5 inches long, making them a little bit longer than they are wide. Their back feet are 1.5-2 inches wide and long. You also might find tail markings in between their tracks.

When muskrats walk they group their front and back right feet together and their front and back left feet together. So, when you see their tracks you will find groups of two tracks at a time.



Woodchuck

size: over 1 inch

4 front toes

5 back toes

claws might not show up

Woodchuck claws don't always show up on their tracks. Their front tracks are about 1.5 in. wide and 2-2.5 in. long. Their back tracks are also about 1.5 in. wide, but can be 1.5-2.5 in. long. Woodchucks tend to walk with only the front part of their back feet touching down; therefore, you mainly find partial tracks of woodchuck feet.

When woodchucks walk, they put their left hind foot in the track of their left front foot and do the same with the right side. So when you see their tracks, it might be hard to tell the difference between the front and back tracks. There will be groupings of a single front foot (4 toes) and a single back foot (5 toes) every so often.



Norway Rats

size: about 1 inch

4 front toes

5 back toes

claws might not show up

Norway rats have claws, but the claws don't always show up in their tracks. Their footprints are usually about 1 inch in length and width.

As Norway rats walk, one back foot (5 toes) will usually be grouped together with one front foot (4 toes). Because of how they walk, you will see several small groupings of a front and back foot in a row. You might also see tail markings.

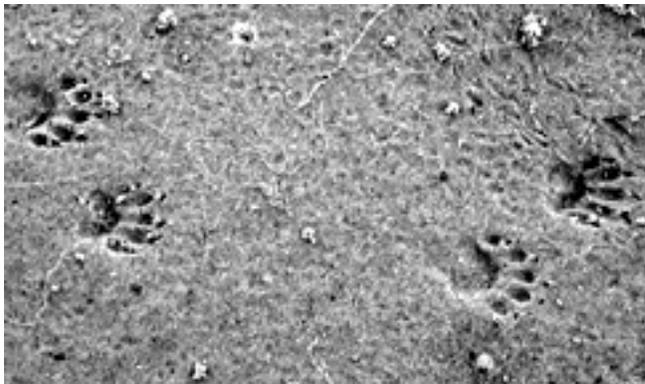
Over 1 inch in some dimension, with 5 toes on the front feet and 5 toes on the back.



hind foot



front feet



Raccoon

size: over 1 inch, back much longer

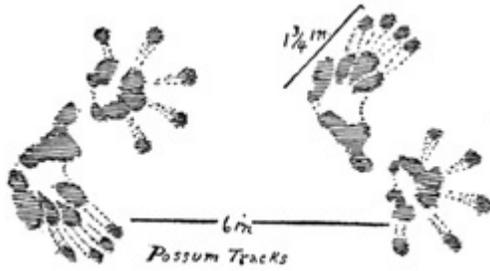
5 front toes

5 back toes

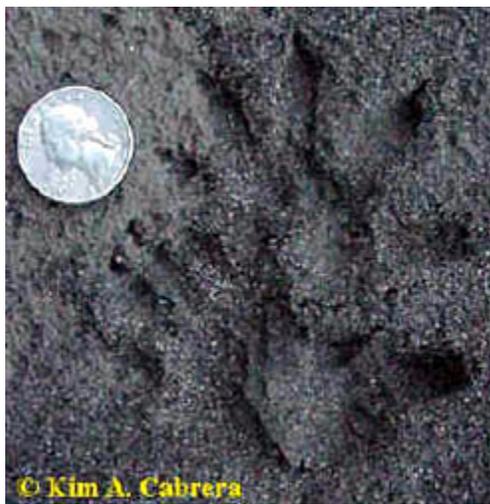
claws

You can usually see the claws on raccoon tracks. Their front feet are between 1 and 2.5 inches in width and length, but their back feet are a bit longer (up to 4 inches long).

Raccoons typically walk by grouping their right and left paws together, so when you see the tracks you will find a long string of groups of two tracks at a time. Raccoons can be found in the woods but they also like to hang out near people and their trash.



front foot



Virginia Opossum

size: over 1 inch

5 front toes

5 back toes ('thumb' separate)

claws might not show up

Virginia opossums have claws, but their claws don't always show up on their tracks. Their front feet are roughly 2 inches wide and only 1.5-2 inches long. This is unusual: their front feet are wider than they are long. Their back feet are roughly 2-2.5 inches long and wide. They are also unique because the 'thumb' on the back feet is separated from the rest of the toes.

When possums walk they bring their back left back foot up to their left front foot and then their right back foot up to their right front foot. So, when you see their tracks, there will be several groupings of a single front foot and back foot together.



Front foot

Striped Skunk

size: over 1 inch

5 front toes (may only see 4)

5 back toes (may only see 4)

claws

Striped skunks have five toes on their front and back feet, but they might only show four toes. You will usually be able to see claw marks. Their front tracks are about 1.5 inches long and 1.25 inches wide. Their back feet are also 1.25 inches wide and 1.7 long. You may find a fairly wide footpad. You will most likely see that all the toes are in the front (none are sticking out to the side).

Another sure way to tell if a skunk has been around is its smell

Over 1 inch in some dimension, with toes hard to count



Eastern Cottontail Rabbit

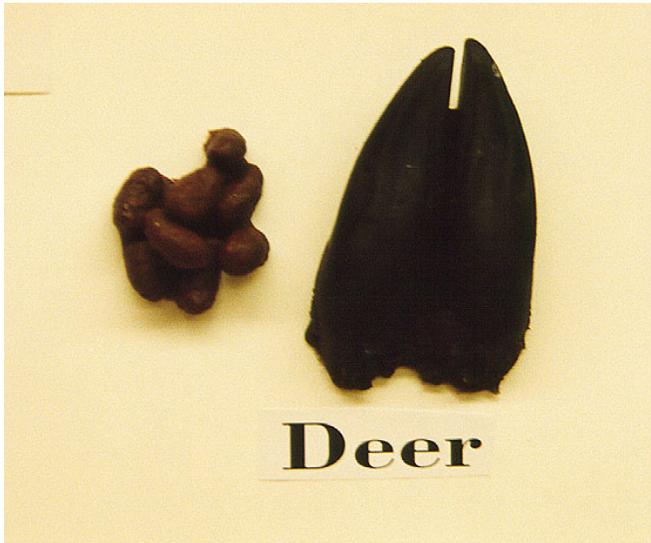
size: over 1 inch (back much longer)

toes hard to count

claws might not show up

The toes of cottontails are hard to distinguish. You might see claw marks in the footprint, but counting the toes would be nearly impossible. Their front feet are about 1 inch wide and just a little bit longer (1 inch). Their back feet are about 1 inch wide and significantly longer (3 inches).

Usually you will find that the back feet will be in front of the front feet in their tracks. This is because rabbits cross their back feet in front of the front feet when they hop. The back footprints will almost always be spread wider apart than the front feet.



White-tailed Deer

size: over 1 inch

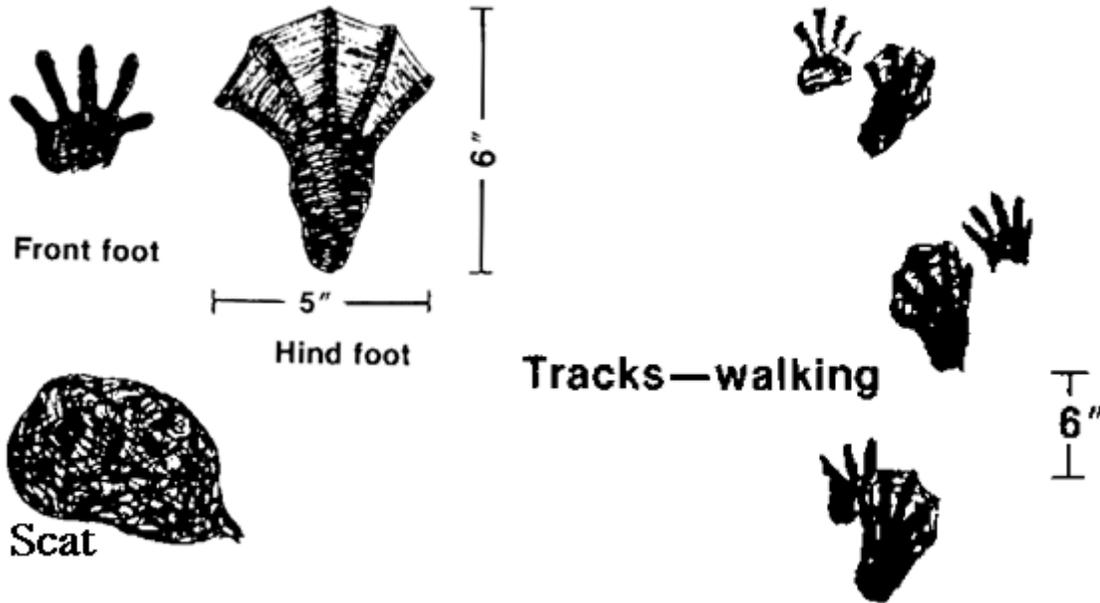
toes hard to count (hooves)

Deer tracks are made of two nearly identical crescent shapes placed right next to each other. They usually make a sort of heart shape because they are rounded on the back end and more pointed on the front. Each half of the track looks a bit like a tear-drop.

Their front hooves are about 1.8 inches wide and 3 inches long. Their back hooves are about 1.5 inches wide and 2.6 inches long, making them slightly smaller than the front tracks.

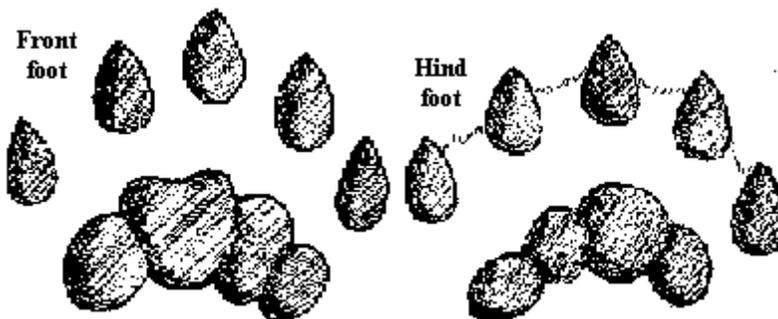
An interesting fact about deer tracks is that expert trackers can tell if the deer is a male or a female based on how far apart their hind tracks are.

Beaver



The Beaver is North America's largest rodent and a common sight around water. Look for its conspicuous dams and lodges and for the stumps of felled trees. Check trunks gnawed clean of bark for marks of the Beaver's huge incisors. Scent mounds marked with castoreum, a strong-smelling yellowish fluid that Beaver's produce, indicates recent activity. Check the large hind prints for signs of webbing and broad toenails. The nail of the forth toe usually does not register. It is rare to see the print with all five toes on each foot. Irregular foot placement in the alternating walking gait may produce a double print. The Beaver's thick, scaly tail may mar its tracks, as can the branches that it drags about for construction and food. Repeated path use results in well-worn trails.

River Otter



The best place to for River Otter tracks are muddy riverbanks. They have five toes on the front feet and five toes on the hind feet. Their toes are partially webbed, which help them swim. Tracks in the mud sometimes show the webbing. The claw marks are so close to the toes they give the toes a characteristic pointed appearance. The tail drag is sometimes visible in an otter trail. Often, their prints are found in groups of four. Otters roll on riverbanks and leave a musky scent. Dens are dug into banks with underwater or above ground entrances. Nests are made inside the den out of leaves, sticks and grass.

Snakes

You can also track snakes by looking at their tracks. Unlike tracking mammals and birds snakes will not leave foot prints, but rather a wavy or straight line where it has moved. It is sometimes harder to track a snake by its trail since the shape of its trail can resemble normal patterns found in the dirt. Both the width and length of the tracks depend on the size of the actual snake that left it. When searching for a snake it is best to look for them basking in the sun on rocks or in the road. They can also be found hiding under rocks or in tall grass. Looking in a stream bed is also a good idea, since several species of snakes can swim and even hold their breath under water for an extended period of time. The Common Garter Snake can actually hold its breath for up to 10 minutes.



Turtles

The tracks of turtles can be more easily distinguished. When looking for turtle tracks the claws usually leave good marks, while the feet themselves may or may not make a distinct mark. Most tracks from turtles in Illinois can be found on the sand that is near a source of water. Some turtle species also have webbed toes to assist them in swimming, but this is normally hard to tell from its tracks. Usually turtles of Illinois will have 5 toes. The sizes of these prints vary from species to species and even turtle to turtle, but the majority that you would find around here would be smaller than 1 inch in size. The best thing to look for when looking for turtle tracks is just to remember to look for tracks that have very prominent claw marks.



Insects

Many **insects** shed their skin, but in a very different way. For mammals, the hard bones are on the inside and the soft skin and muscles are on the outside. For insects, the soft part is on the inside and it is surrounded by a hard exoskeleton. The only way these animals can grow is by shedding their old exoskeleton and making a newer, larger one. It is not uncommon to find the exoskeleton of an insect on a leaf or tree branch or just sitting on the ground. The exoskeleton can look a lot like the actual bug itself, but is no more alive than a shell.

For instance, **cicadas** emerge from the ground when they are ready to transform into adults. They climb out of the old shell they occupied as a pupa, and emerge as a winged cicada.



cicada emerging from pupal case

Near ponds and streams you may also find the shed pupal cases of **dragonflies**.



dragonfly emerging from pupal case

The remains of insect **chrysalis** are similar to shed exoskeletons. When caterpillars change into butterflies or moths they create a case for themselves (a chrysalis) that hangs on a short stem off the bottoms of leaves and stems. While examining plants for chew marks, take a moment to look beneath the leaves - especially garden plants or flowering plants - because you might just find a butterfly or moth chrysalis.

