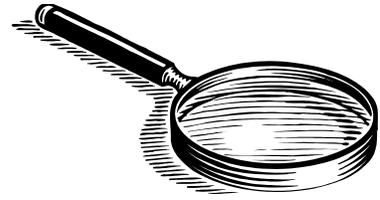


Wildlife Scene Investigators



In a Nutshell

Students learn how to gather and interpret wildlife scenes through observation, measurement, and deduction just like refuge wildlife biologists.

Grade	2 - 3
Season	Winter
Location	Rapids Lake Education Center & Bloomington Visitor Center

Learning Objectives

After participating in this activity, students will be able to:

- Identify the presence of animals on the refuge by the signs they leave behind.
- Give at least one reason why biologists collect and record wildlife data: to confirm the presence of species, to understand and observe changes in wildlife populations, to understand the behaviors of specific types of wildlife.

Literature Connections

- *Tracks, Scats and Signs* by Leslie Dendy
- *In the Snow: Who's Been Here?* by Lindsay Barrett George
- *In the Woods: Who's Been Here?* by Lindsay Barrett George
- *You Can Be a Nature Detective* by Peggy Kochanoff

Pre-Activities

Students will work in small groups to make observations about and discuss their piece of the Wildlife Scene Investigation puzzle #1. After a class discussion about each group's piece, they will work together to put the puzzle together and make observations about the bigger picture the completed puzzle reveals.

On-site Activities

Indoors, students will interpret and make observations about the wildlife mystery scenes on puzzle #2 and puzzle #3, and will also measure the various types of tracks they see. Students will then explore the refuge on a hike, using their observation and interpretation skills to find and identify winter wildlife, wildlife signs, and what stories they tell.

Classroom Connection

Take students on a hike around the school-yard to observe, measure, and record the animal signs they find. Prior to the hike, ask students to develop a list of



questions they want to know about the wildlife that might be living in their school-yard. For example:

- What species are living in the school-yard? (list of tracks or other wildlife signs, list of animals actually seen)
- What areas of the school-yard have the highest number of wildlife signs? Why might this be a popular area? (Divide the school-yard into sections or “areas” such as: against buildings, near feeders, around the base of evergreens....)
- Which track was the most frequently seen?
- What was the average size of a group of tracks?

Back in the classroom, ask students to explain how they can represent their observations using graphs or charts. Compare students’ school-yard observations with the results they collected during the refuge field trip.

Teacher Resources

- ***Animal Tracks of Minnesota and Wisconsin*** by Ian Sheldon
- ***Tracking & the Art of Seeing*** by Paul Rezendes
- ***Discover Nature in Winter*** by Elizabeth Lawlor
- ***Guide to Nature in Winter*** by Donald Stokes
- ***Mammal Tracks and Signs*** by Mark Elbroch
- ***Track Finder*** by Dorcas Miller



Wildlife Scene Investigators

Pre-Visit Activity

Materials:

- Laminated 11x17 w/ different types of tracks for introduction
- Mystery Tracks Puzzle #1 (6 cards total)
- Track and Completed Puzzle Keys
- Floor space will be needed for the track puzzle to lay it out and have students gather around. If there is no floor space, grouped desks to make up one larger table to lay the puzzle on works as well.
- Puppets of each animal in the puzzle – coyote, skunk, mouse, owl, rabbit (*if available in curriculum closet #2 puppet bins*)
- Laminated pictures of coyote, skunk, mouse, owl, and rabbit (*to use if puppets aren't available*)
- *You Can Be A Nature Detective* by Peggy Kochanoff (to read if time)

Introduction-Management Connection

Wildlife managers have developed many tools to increase their understanding about refuge wildlife populations. Ask students to help make a list of techniques (or methods) wildlife managers can use to gather information about refuge animals. Below is a list of possible techniques. If your students are struggling to come up with answers,

- **Observe** and count wildlife (*songbirds, waterfowl, deer, wolves, coyotes*)
- **Listen** for animal calls (*owls, frogs*)
- **Track** wildlife by using radio collars, or identifying and following types of tracks they find in their study area (*deer, wolves, moose*)
- **Catch, band, and re-catch** animals (*common with bird population monitoring, sometimes used with bat population monitoring*)
- **Collect and study** wildlife samples (*macro invertebrates, insects*)
- **Reading the signs** wildlife leave behind (*especially important in nocturnal or very shy animals*)

Engage students in this conversation: *“Have you ever accidentally tracked muddy footprints into the house? How do you think your parent may have been able to tell it was you instead of your brother or sister? Why?”*

Explain to students the size and shape of tracks look different depending on the person or animal that left it behind. Show students picture of different types of animal tracks. Ask them to make observations about how the tracks are different (*size, shape of overall track, shape of toes, number of toes, shape of rear paw pad, claws or no claws, etc.*).

Discuss with students about how refuge biologists are like nature detectives trying to solve what wildlife living on the refuge are doing, how they're interacting,

and what species and populations numbers are present. It is often difficult to observe the behavior of refuge wildlife in person as many of them are shy and stay away from people, so wildlife biologists need to look for signs animals leave behind. These signs are evidence, or clues, that allow them to deduce what the wildlife is up to. Ask students what kind of signs you can look for. Signs could include: Tracks, Scat, Urine, Fur/feathers, Bones, Blood, Chewed seeds/nuts

Interpreting animal signs to gather real scientific data requires good observation skills, taking and recording accurate and meaningful measurements, and forming conclusions based on observations and data.

Mystery Tracks Puzzle #1

Students will work in small groups to make observations about and discuss their piece of a Wildlife Scene Investigation puzzle. After each group has a chance to share their card, they will work together to put the puzzle together. If there's time at the end, read through the book in the bin.

This activity is to get students thinking about the big picture and how things are connected. Have the students work in groups to interpret one piece of the puzzle, making observations about what they see and what type of animal tracks are on their cards. Have the track key out so they can know what animals are there.

Don't tell them its one big picture, let them think each card is separate from the others.

Take time to walk around and talk to all the groups while they discuss, making sure they're on the right track and understand what they're looking at by asking guiding questions (*What do you notice about the distance between the tracks? Based on the tracks key, what types of animal tracks are on your card? If there are more than one type of tracks, does it look like the animals interact with each other?*)

After the students have had time to look at their card, have the groups take turns sharing with the rest of the class what they think is going on in their scene. Ask what **evidence** they have so they're not just making something up. The point is to practice **observing** what is there and what it could mean. For example, looking at the coyote tracks and thinking about whether it was running, walking, or standing in place based on the tracks and how they're spaced apart.

Once all the groups have shared their cards, reveal to them that all the cards actually go together to make one big picture! As a class, they need to put it together to connect the tracks. Give them some time to look at the completed puzzle and then have a class discussion, guiding them through the story of what happened between these animals. As you go through what happened, engage the students to help fill in the blanks. There are guiding questions (in blue) along with the cards' descriptions below to help with the discussion.

Track Card 1

- It all starts with the coyote coming in from the side
- Skunk and coyote tracks cross each other in the middle
- *Do the students think the animals were there at the same time?*
- The skunk and coyote were not there at the same time
- *How could you tell what animal was there first or second with real tracks?*
- The animal that walked by second will have its tracks on top of the one who walked through first. So the skunk tracks will cover the coyote tracks and obscure them

Track Card 2

- The coyote is walking, stops and stands, then starts running
- *Why did it start running?*
- It saw the rabbit and gave chase
- *How can you tell it went from walking to standing to running?*
- The stride length of the tracks change

Track Card 3

- Rabbit hops up from under a shrub one end of the card
- Coyote gets rabbit, blood splotch is where it happened
- *Ask the kids why they think there's blood dripping?*
- The little blood drip is from the rabbit being carried in the coyote's mouth
- *Why would the coyote not eat the rabbit right away?*
- Many predators move their food, if they can, somewhere else safe or hidden to eat

Track Card 4

- Coyote comes in from one corner carrying the rabbit, dripping blood
- Skunk comes walking in from the opposite corner
- They meet in the middle
- Skunk turns its tail toward the coyote
- *How can you tell the skunk stops and turns its tail?*
- Can tell by the way its tracks turn to a standing position
- *What happens to the rabbit?*
- The coyote drops the rabbit and the rabbit hops off, still alive but dripping blood
- Coyote walks off without rabbit and skunk continues walking off after confrontation

Track Card 5

- The coyote tracks are crossing over from where it caught the rabbit
- *What do the students holding the card think the tracks mean before putting the puzzle together?*
- The rabbit tracks are from where the rabbit escapes the coyote during the skunk confrontation

Track Card 6

- The shrub is very important. That's where the rabbit originates from and hops to the top of the card and eventually gets caught by the coyote
- After the coyote releases it, the rabbit hops back into the shrub dripping blood
- *Why does it hop back to the shrub?*
- When animals are injured, they try to get somewhere safe to hide
- *Can we tell if the rabbit dies?*
- We don't know if the rabbit actually dies based on what we can see on the puzzle
- *What happens when the rabbit returns to the shrub?*
- The rabbit coming back startles the mouse out of the bush
- The owl comes down and takes the mouse.
- *How do we know the owl was successful in catching the mouse?*
- We know the mouse dies because there's no evidence it escaped the owl

Extra Time

If you have time to read the book, use **pages 28-43**. Those are more geared towards what they can see in the winter. It has several different tracks you can go over with them so they can start learning about different kinds of tracks and trails.

Wrap-Up

This is all about the big picture and how things are connected. Signs left behind by animals tell a story for biologists about how animals are interacting with each other, the types of predator and prey encounters that are occurring, the health of an animal, and the numbers and types of animals present in an area.

Tell students about their upcoming trip to the refuge and how they'll be looking for sign like these. Talk about what to wear for the trip, especially if snowshoeing is a possibility. Winter boots and snow pants are needed to be outside on the refuge during the winter.

Wildlife Scene Investigators

On-site Activities

Materials

- Puzzle #2 and Puzzle #3 & keys (white bed sheets with inked animal tracks and assorted wildlife signs set-up to create a wildlife “scene”)
- Commonly Seen Tracks & Scat handout (for introduction w/ puzzle 2 & 3)
- Rulers, pencils, clipboards, journals
- “Who Left these Signs Behind” laminated booklets (in classroom)
- Smoky the Bear Animal Tracks poster (w/ large curriculum journal pages)
- Winter Wildlife Signs checklist/clipboard/wet erase marker per group (for hike)

The Footprint Puzzle activity (how to use a ruler):

(45 min)

To begin this activity, first show students how to measure the length and width of a track using the Smokey the Bear Animal Track poster and your foot as examples. To properly measure a track we need everyone to follow the same directions for measuring. This is called a scientific protocol. It ensures that we can correctly compare one track measurement with another.

Start with a basic review of how to take an accurate measurement with a ruler:

- Pass out a ruler to each student. Explain to students that for today, they should use the inch side of the ruler to measure. Show the students the inch side of the ruler. Walk around the classroom and check that every student correctly locates the inch side of the ruler.
- Ask a volunteer to show where they would start their measurement on the ruler; making sure they start at the zero mark. Again walk around the classroom and check that every student correctly locates the zero mark on the ruler.
- Ask for another volunteer to demonstrate how they would measure the *length* of the large cougar track on the Smokey the Bear track poster; starting at zero and measuring the toe to heel of the track. Ask students to measure the length of their foot. Do most 2nd grade students have the same foot length?
- Ask for another volunteer to demonstrate to measure the *width* of the cougar track: start at zero and measure from one side of the track to the other side at the **WIDEST** spot. Now ask students to measure the width of their foot. Do most 2nd grade students have the same foot width?

Mystery Puzzle #2 & #3

Split the class in two, with half of them sitting around each of the puzzles. Students should have a copy of “Commonly Seen Tracks & Scat” (1/pair), a ruler, their journal page (data side), a clipboard, and a pencil.

Explain to students how to record information on the data sheet side of their journal page. The information students gather and record should include:

- At least two simple track sketches
- The length and width of each track they sketch
- Other clues to the animal's activity or wildlife signs left in the scene telling the story of what's happening – like in the pre-activity, they should give reasons for their observations

After each team has had the chance to look at their puzzle, have them each explain what they think is happening in their track sheet scene to the other team. Facilitate questioning, discussion and conclusions. Point out any of the details students may have missed. Instead of “correcting” students ask for the group for alternate conclusions.

Today the class is teams of scene investigators. Just like a crime scene, animals leave behind multiple clues that they have been there. It is going to be their job to locate tracks and make observations about what the animals are doing. Other clues to look for include chews on woody stems/branches, scat/urine, kill sites, feathers, food, homes, and tunnels. Putting all of this together tells us the story of animal activities on the refuge.

Hike

(45 min)

Each group should have a copy of the Winter Wildlife Signs Checklist, clipboard, and wet erase marker for their hike. Allow students time to explore the prairie, forest, and wetland** habitats. Encourage students to look for tracks and other signs of wildlife with their groups and chaperones. Allow their curiosity to be their guide in nature.

**** If wetland habitat is frozen and has been tested and deemed safe for walking by a Refuge staff member, students may explore the wetland.**

Management Connection

What new questions do students ask about wildlife found on the refuge? How can students find the answers to their new questions?

Wildlife biologists use their observations, similar to help them understand what is happening to wildlife populations on the refuge. Some questions biologists may be able to answer from the data they collect:

- Are there any changes from previous data collections?
- Have population trends of a specific animal changed over time?
- Do biologists need to make changes to any part of the habitat? (add or take away plants, animals, acreage, etc.)
- Do further studies need to be conducted on this animal?
- Is there a connection between the populations of two animals? (a predator and a prey)

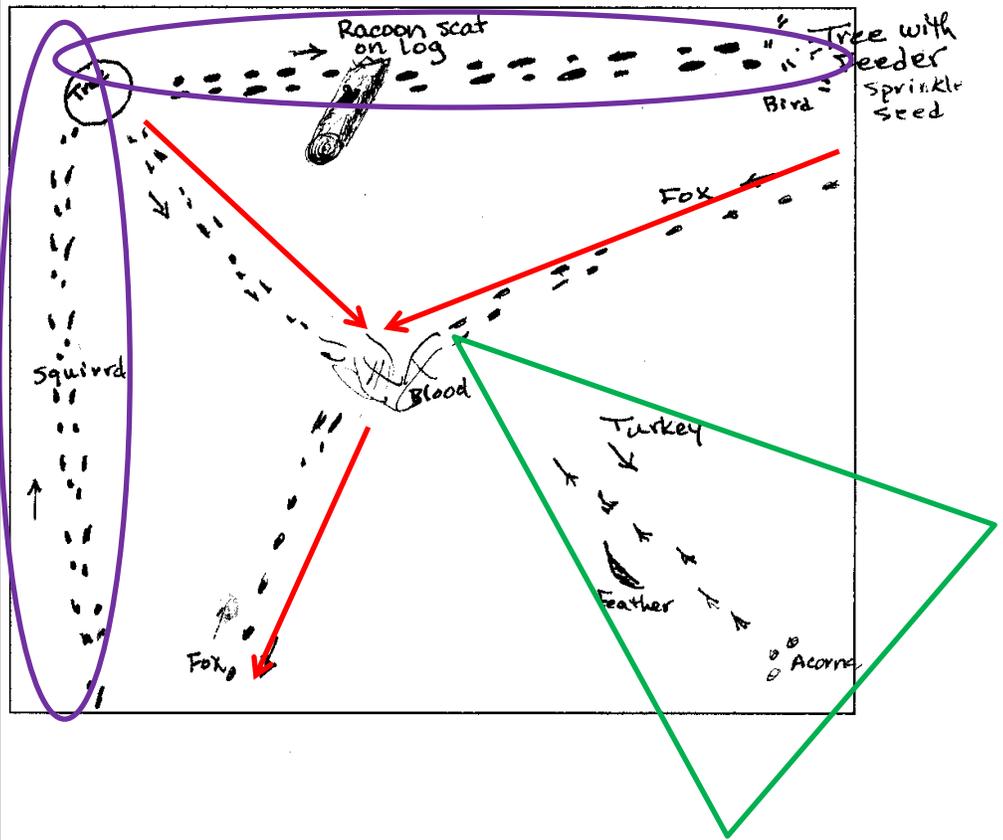
Puzzle #1

Tracks: squirrel, raccoon, fox, turkey and rabbit.

Other signs: replica raccoon scat, bird feeder seeds, blood (really food coloring), turkey feather, acorns

Observations to Note:

- Tracks going toward tree are not the same tracks as the ones leaving the tree: squirrel climbed up, sleeping raccoon came down and left scat on log.
- Rabbit leaving the base of the tree encounters a fox. Fox kills rabbit, carries it off to its den... no more rabbit track leaving the scene.
- Tracks appear to start out of thin air...feather and acorns clue to turkey coming in to feed.



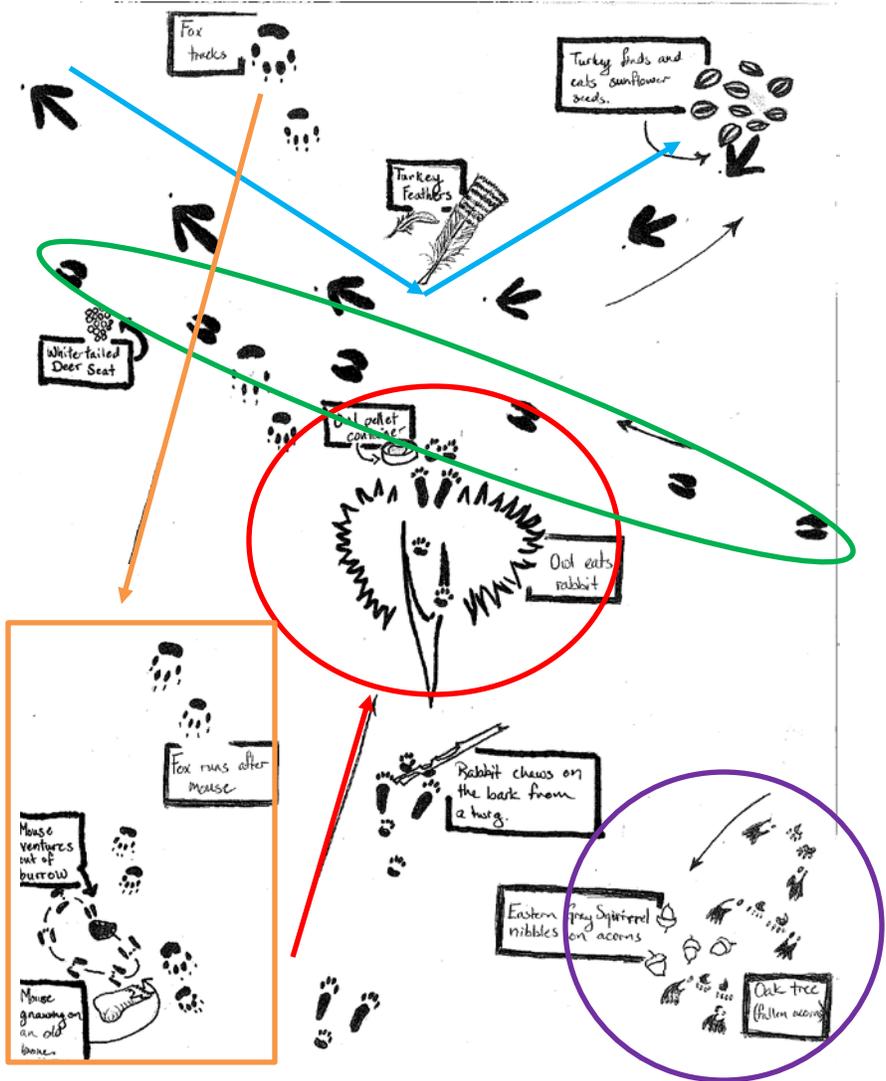
Puzzle #2

Tracks: squirrel, mouse, fox, turkey, deer, and rabbit.

Other signs: replica deer & rabbit scat, real owl pellet (in sealed container), rabbit blood (food coloring), owl wing marks in "snow", turkey feathers, mouse gnawed bone, mouse hole, rabbit chew, bird feeder seeds.

Observations to Note:

- Owl flew in, grabbed rabbit with talons...flew away...no rabbit tracks gone but wing marks visible.
- Deer walked through scene.
- Turkey stopped at bird feeder to eat.
- Squirrel entered scene at the base of the tree...climbed up.
- Mouse gnawing on bone jumps into tunnel...escapes fox.

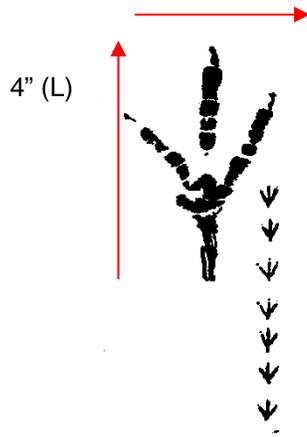


Commonly Seen Tracks at Minnesota Valley National Wildlife Refuge

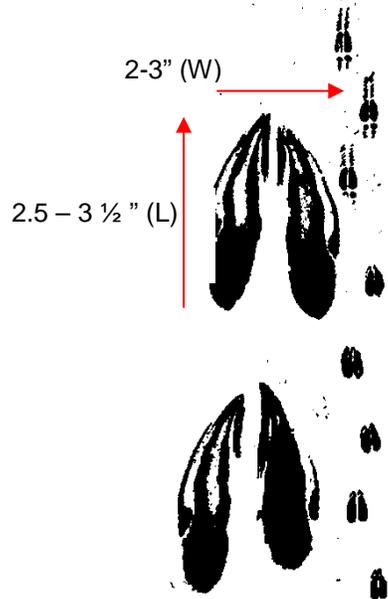
Gray Squirrel



Turkey



Deer

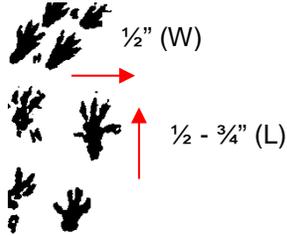


Perching Bird

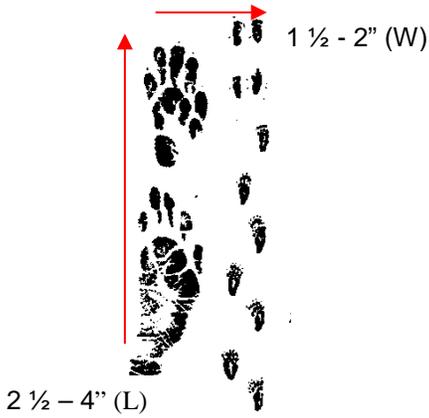
(W) (L) measurements vary



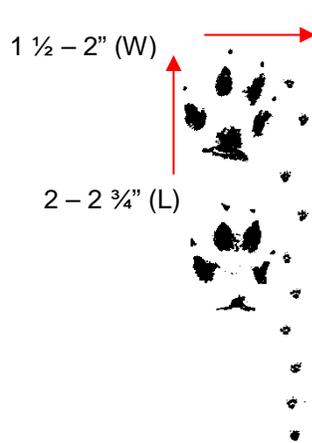
Mouse



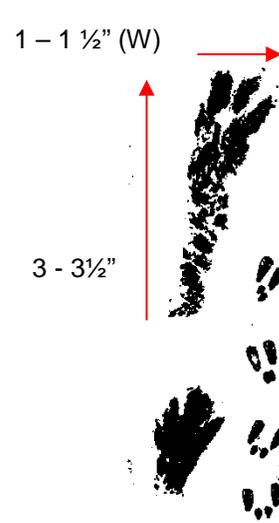
Raccoon



Red Fox



Rabbit



Common Scat at Minnesota Valley



White-Tailed Deer



Cottontail Rabbit



Coyote



Raccoon



Grey Squirrel



Red Fox



Wild Turkey (male)



Wild Turkey (female)

Wildlife Scene Investigators

Rainy Day Hike Alternatives

Materials

- 5 sets of laminated wildlife tracks (coyote, gray squirrel, opossum, muskrat, weasel, mink, or mouse)
- Pelts, skulls and replica scat for each set of tracks
- Shelters for each wildlife species (if available)
- Clipboards and pencils- one per student
- WSI Nature Journal page- one per student
- Rulers- one per student
- Who Left these Signs Behind? field guide- one per team

Naturalist Detectives

Create five wildlife scenes, each representing one species, throughout the Education and Visitor Center using the wildlife tracks and other signs (pelt, skull, shelter). Assemble as realistic a scene as possible. For example, Arrange the mouse tracks so they come out of a hole (represented by a toilet paper roll or hiding spot in the center) to eat some bird seed.

Instruct each student team to rotate to all five wildlife scenes. They should measure tracks, make observations, and record their findings on their nature journal page (record findings for station 5 on the back). Give each team a copy of the *Who Left these Signs Behind* field guide to help them determine the identity of the animal in each scene.

Once every team has rotated to each station, gather back in the classroom to share their observations, compare their conclusions and discuss the management connection (page 9).

Background

Minnesota Valley National Wildlife Refuge is a place where deer, coyotes, badgers, bald eagles and beavers live next to three million people!

Over 220 species of birds, 50 species of mammals, 30 species of reptiles and amphibians, many fish and untold numbers of invertebrates depend on the refuge habitat. Some of these animals are easy to see; many are well hidden. The animals that are hard to see leave many clues that help us to learn about and understand their lives.

Looking at wildlife tracks in sand, mud, or fresh fallen snow is somewhat like reading a morning paper. A story has been written. Wildlife signs can tell us who visited the Refuge the night before, where they traveled – and perhaps, what they did.

- In addition to tracks, other wildlife signs (a single molted feather, a pile of feathers, a bone, a tuft of fur, an antler) add details to the story. Animal homes may be easy to spot; a leaf nest, nest hole, burrow, web, a cattail hut, a beaver-gnawed stump, a dam or lodge.
- Scat (scientific term for mammal droppings) may contain hair, seeds, berries, fish scales, or insect parts to reveal the diet. These clues add to the investigation to determine if the animal is a predator, an herbivore, or an omnivore. Kids love scatological jokes. Go ahead and let them get it out of their system. (Poop, poo, caca, doo-doo, etc.) Share with students some new terms to learn: excrement, dung, droppings, feces, guano.
- Owl pellets, the regurgitation of indigestible food items such as bones and fur, are not easy to find. You may want to carry an owl pellet in your pack to show the group along the trail.
- A log or tree stump with gnawed acorns or walnut hulls may indicate a “dinner table” for a squirrel.
- Look for deer trails, deer beds, browse on bushes, droppings, and buck rubs. Look for tracks. Measure the size of the track to determine if it was a doe, fawn or buck. How many animals were there? Was the deer walking or running?
- Insects are the most numerous residents found in the refuge. Look for frass (insect droppings), cocoons, galls, body parts, and listen for sound