

Wildlife Scene Investigators



In a Nutshell



Students learn how to gather and interpret wildlife data 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 some 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.
- Compare the data they collected using one type of basic math picture: bar graph, pictograph or pie chart.

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

A simulated ink track sheet activity will help students learn how biologists identify and measure wildlife tracks and interpret other wildlife signs left behind.

On-site Activities

Students will explore the refuge and use their measuring skills, practiced in the classroom, to observe and identify winter wildlife and wildlife signs. Students will use a variety of calculations and graphs to interpret the data they collect to answer questions about the wildlife found in the refuge.

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



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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 Activities

Materials

- White bed sheets (2) with inked animal tracks and assorted wildlife signs set-up to create a wildlife “scene” as described in the curriculum. *If possible, set-up both track sheets, adding the artifacts as shown on the included schematics, before starting the pre-activity. Allow enough room between the sheets for students to sit along the edges to make their observations.*
- Smokey the Bear Animal Tracks poster
- Commonly Seen Tracks at Minnesota Valley handout- one per student pair
- Rulers- one for each student pair
- Clipboards- one for each student pair
- WSI data sheets- one for each student pair

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 use to gather information about refuge animals. These are some ideas to select from:

- Biologists observe and count wildlife (songbirds, waterfowl, deer, wolves, coyotes)
- Biologists listen for animal calls (owls, frogs)
- Biologists may use a radio collar to follow or “track” wildlife (deer, wolves, moose)
- Biologists might catch, band, and re-catch animals (common with bird population monitoring, sometimes used with bat population monitoring)
- Biologists might collect and study wildlife samples (macro invertebrates, insects)
- Biologists often rely on reading the signs wildlife leave behind (especially important in nocturnal or very shy animals)

Engage students in this conversation: *“Have you ever been scolded for tracking 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. *“Maybe you left other evidence at the scene like your*

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muddy shoes or your backpack!" Did you leave the wrapper from your snack on the floor?

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.

Explain to students, today they will learn how to gather "evidence" or clues to interpret a wildlife scene or story. This includes looking at (observing) and measuring tracks, while noting any other signs wildlife may have left behind.

The Footprint Puzzle activity (how to use):

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 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 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 2 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?

Ask each student to find a partner (or assign teams). Pass out one copy of the "Commonly Seen Tracks" and a datasheet to each student team. As you hand each team their materials, instruct them to sit down along the edge of one of the sheets. Be careful to assign the teams as equally as possible between the two sheets.

Explain to students how to record information on their data sheet. The information students gather and record should include:

- At least two simple track sketches
- The length and width of each track they sketch

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- Other clues to the animal's activity or wildlife signs left in the scene

Wrap-up

Ask each team to take turns explaining 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.

Inform students during their field visit to the national wildlife refuge they will search for real animal signs and measure real animal tracks. Remind students their field visit will include time spent outside, and to wear warm clothes for being outside in the winter (jackets, boots, snow pants, gloves, hats).

Note: (puzzle 1 is not included in this unit)

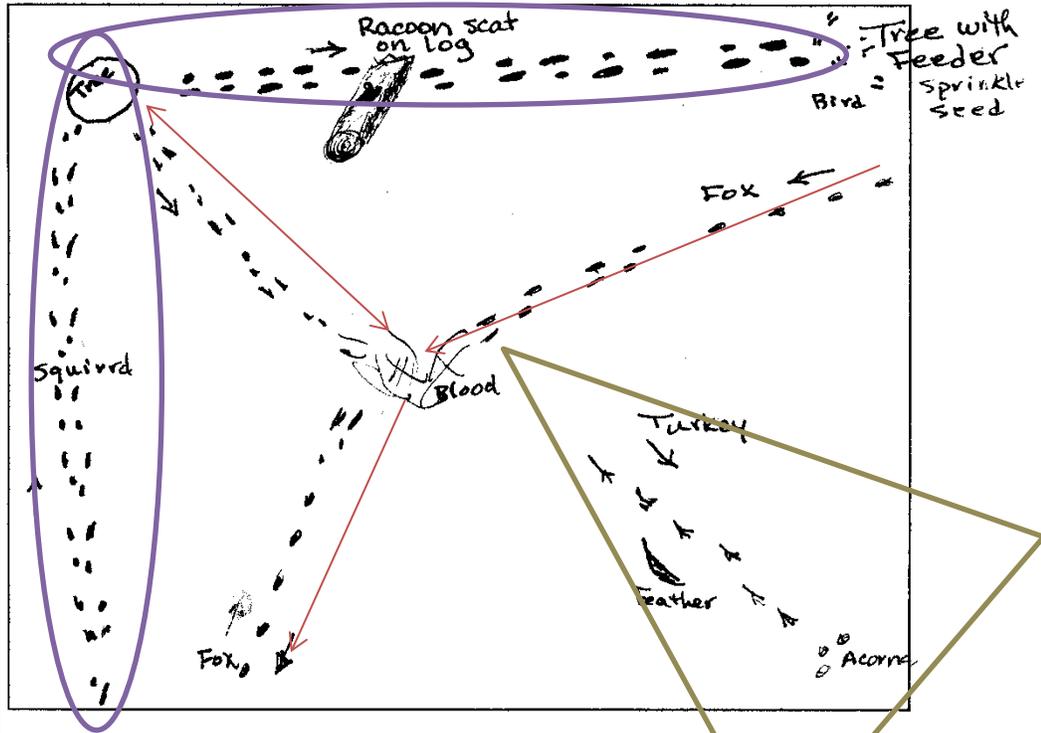
Puzzle #2

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.



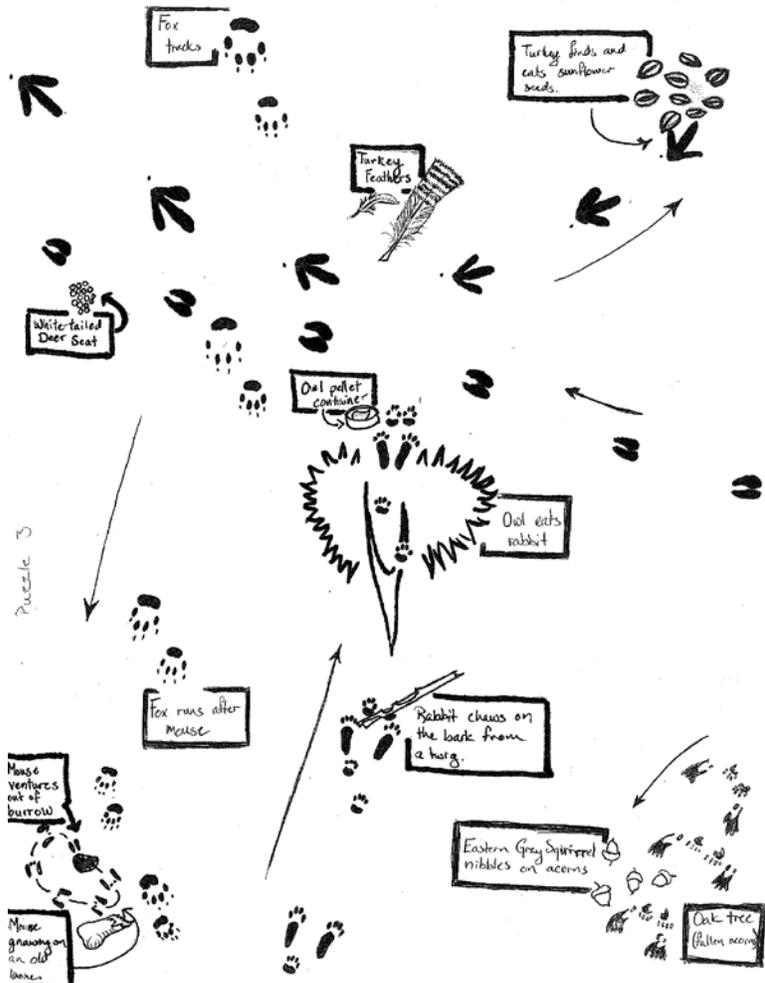
Puzzle #3

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.

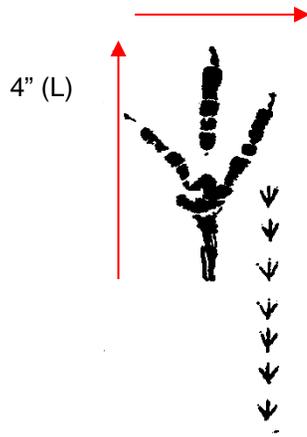


Commonly Seen Tracks at Minnesota Valley National Wildlife Refuge

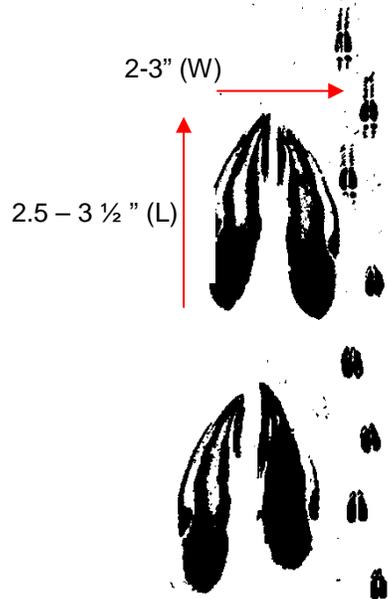
Gray Squirrel



Turkey



Deer

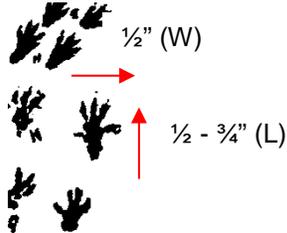


Perching Bird

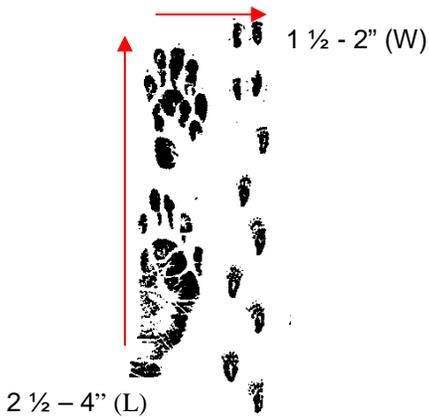
(W) (L) measurements vary



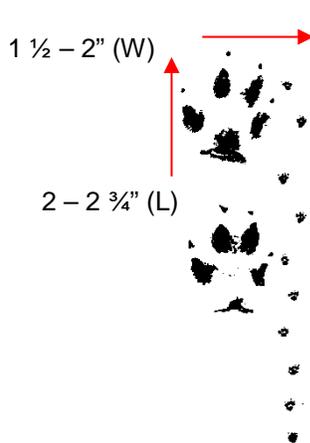
Mouse



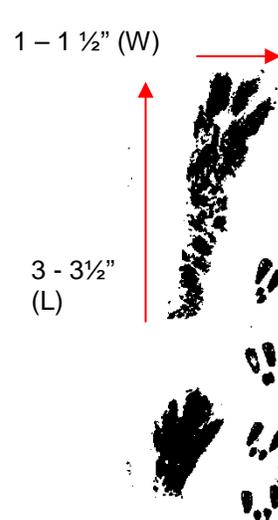
Raccoon



Red Fox



Rabbit



Commonly Seen Scat at Minnesota Valley National Wildlife Refuge

White-tailed Deer



Raccoon



Cotton-tail Rabbit



Coyote



Red Fox



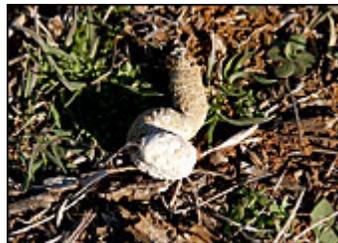
Grey Squirrel



Wild Turkey Male



Wild Turkey Female



Mouse



Wildlife Scene Investigators On-site Activities

Materials

- Track Field Guides
- Minnesota Valley Commonly Seen Tracks handouts- one per team
- Clipboards and pencils- one per team
- Tape measures/rulers- six per team
- WSI data sheets- three per team for each habitat
- Backpacks- one per team for supplies
- Snowshoes (optional)

Introduction

(20 min)

Briefly review what the students learned in the classroom pre-activity. How to use a ruler properly. Using a track as an example, review track terminology (track length, width, toes, pads). Review with students how to record findings on the data sheet. Emphasize to students that in order to compare data, each group must use a separate data sheet for each area or habitat they visit.

Today the class is teams of scene investigators. They must identify who is on the refuge and what are & have been doing. 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, identify and measure them. However, we cannot just record the tracks. The other clues (chews, scat, kill site, feathers, food, homes) are tell us the story of each animal.

On the data sheet there is designated locations to record the animals identification, draw a picture of the track and the other signs they find close to the tracks. Students may even record the direction of travel for each animal.

If students have not participated in *Introduction to Snowshoe Hiking*, lead a brief discussion about how snowshoes function. Snowshoeing is nothing more than physics at work...

Surface Area: The greater the surface area used to spread your weight, the better you will 'float' in the snow, which partly explains why there are a variety of snowshoe sizes and styles.

Snow Conditions: Sinkage, as we call it, will also be affected by physics! The denser or heavier the snow...the less you will sink. Conversely: the lighter or fluffier the snow...the more you will sink.

As an example, a 150lb person who typically uses a 30 inch snowshoes may sink as much as 8 inches in light snow, or as little as 2 inches in heavy, wet snow. If this person puts on a 40lb backpack and continues to use the same snowshoes,

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the added weight will INCREASE the amount of sinkage. It stands to reason, then, that a lighter weight person on these same 30 inch snowshoes will not sink as much as the 150lb person.

Does this seem like a great amount of sinkage? Actually, it really is not much at all when walking on 3 feet of snow! When snowshoeing, you do not actually float up on top of the snow...unless the snow is extremely dense and hard packed. In this type of snow condition, yes...you very well may 'Walk On Snow' with or without snowshoes!!

Demonstrate the proper way to strap snowshoes on to boots. Before setting out on the hike, allow students about 10 minutes to practice snowshoe techniques of walking, stopping, turning and maintaining proper spacing between hikers. Place an emphasis on proper turning as a better alternative to backing up.

Hike

(45 min)

Divide students into teams and distribute the equipment. Select/assign students a role while outside (recorder, track measurer, identifier, other animal clues) then switch roles so each student does each task. Lead students to the snowshoes and assist students with putting snowshoes onto their boots. Allow students time to explore both the prairie and the forest habitats. Encourage students to look for tracks and other signs of wildlife. Allow your students' curiosity to be their guide in nature.

When a team has discovered a wildlife track and signs they should, as a group, record details on their data sheet.

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

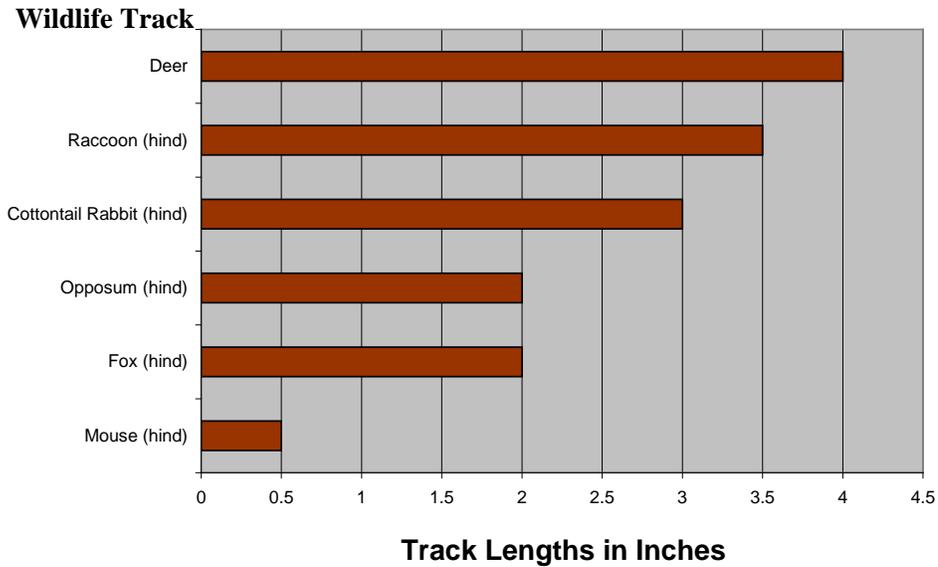
Wrap-Up– Data Analysis

(25 min)

Back in the classroom, have each team present the animal tracks they discovered and their measurements. Record each team's data on the board. Work with students to organize and/or graph their findings to answer any of the following questions:

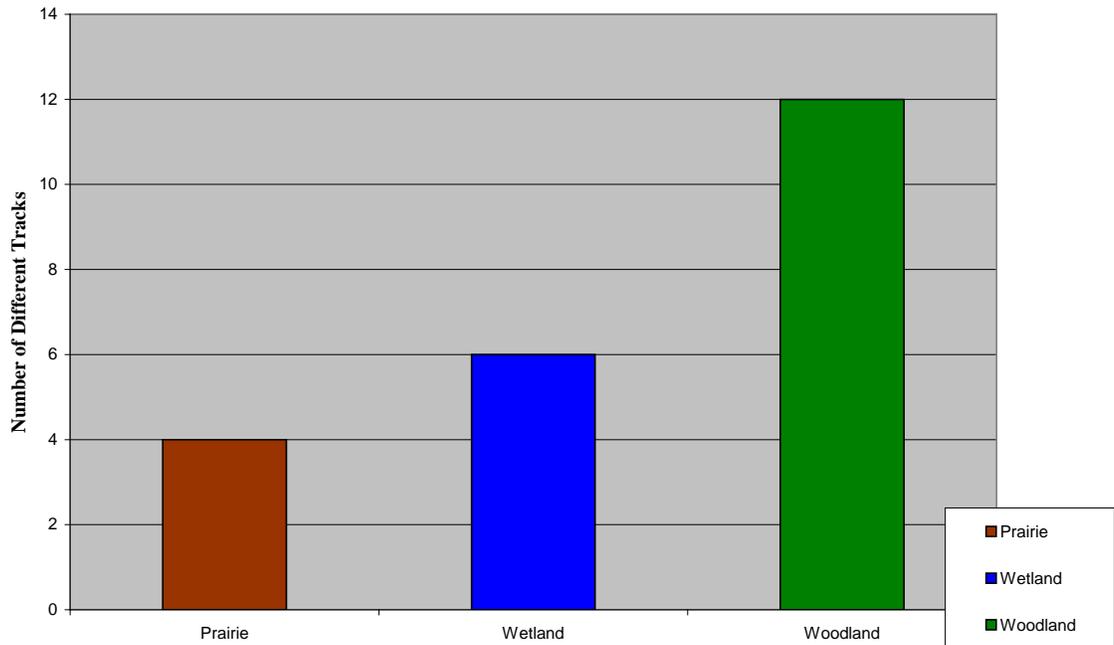
- What is the average length of a deer track (and other animal tracks found)? (Have students add all the measurements for one species together and then divide by the total number of tracks they measured.)

WSI Track Comparisons by Length



- Which refuge animal has the largest tracks? Which refuge animal has the smallest track? (Organize the average measurements from biggest to smallest.)
- In which habitat or area of the refuge is wildlife most active?
(Create a bar graph showing the number of tracks found in at least two habitats. If the groups will not be able to visit more than one habitat type during their fieldtrip, organize their exploration by “area”. For example, explore around feeding stations, at the edge of open water, in areas of dense cover or brush piles, in open fields. Stress to students it is important that they are very specific about their location when filling out the data sheets in the field.)

WSI Track Comparisons by Habitat Type



Management Connection

Ask students for their own ideas on how to manipulate and analyze the information they collected. 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 data, similar to the data we collected today, 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)

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).

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Wildlife Scene Investigators (WSI)

Team Names _____

Record what you see on the wildlife scene sheet

Track Sketch	Track Length (inches)	Track Width (inches)	Other Signs this Animal Left Behind
What Animal Left this Track?			
What Animal Left this Track?			
What Animal Left this Track?			

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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 sounds.