Winter Wildlife Mysteries

*Adapted from Prairie Wetlands Learning Center

Grade: Second Grade   *Group Size:* 1 or 2 Classes   *Time:* 1 hour- 2 hours   *Season:* Winter

Summary:
Using the KWHL approach, students design and conduct a field investigation about active winter animals and the clues they leave behind. They practice "reading the land." They use those clues to try and solve animal mysteries (or answer their investigation questions).

Performance Objectives:
After completing this activity, students will be better able to:

- Observe animal sign without destroying it.
- Name two animals that are active in winter.
- Use the synonyms *sign* and *evidence* for *clue.*
- Describe an animal clue using two different characteristics (size, shape, distance, pattern, habitat, etc.).
- Use evidence of a winter animal to infer about the animal (direction of travel, pace, gait, etc.).
- Enjoy exploring outside in winter.

Materials Needed:
- Ruler
- Flagging sticks (optional)
- Animal track guide
- Journal Sheet

Background Information

The purpose of this field investigation is to introduce 2nd-graders to animals that are active in winter and the signs they leave behind, such as tracks, tunnels, and scat. This field investigation would also make a suitable review of a unit on seasons, winter, animals, or adaptations.

According to the position of the sun, the first day of winter is around December 20-21, and last day of winter falls about March 19-20. During this timeframe, the sun's position is the farthest possible south of the equator due to the earth's tilted axis and annual path around the sun. At the Sherburne NWR, we experience colder air temperatures, wind chill, frozen ponds and prairies, snowfall, and the shortest day-length (photoperiod) of the year. According to the National Weather Service, we experience the following ranges of normal conditions in winter: high temperatures of 20-25 degrees Fahrenheit; low temperatures of minus five to five degrees Fahrenheit; less than one to two inches of precipitation per month; and five to 15 inches of snowfall per month. Recent phenology records indicate that Sherburne NWR wetlands freeze over mid- to late December and thaw completely by the last week of March or the first week of April. The first measurable snow falls in the last two weeks of November. In winter, life slows down considerably. Reproduction and growth are temporarily suspended, food becomes scarcer, and survival becomes the first order of business.

Colder temperatures, snow, and ice force animals and plants to adapt to this dramatically different season. Animals respond in mainly three ways: by leaving the area in fall (migration), hibernating, or by staying active (resisting). The lists below provide examples of resistors found at the Sherburne NWR. We search for these active animals that remain here and most often actually find the signs they leave behind.

Resistors	Most Common Evidence at SNWR
chickadees, crows	calls
great horned owls	pellets, kill sites
deer	tracks, buck rubs, browse
muskrats	huts
mink	tracks, snow tunnels, snow slides
weasels	tracks, snow tunnels
mice	tracks, snow tunnels, scat, urine
grey squirrels	nests
rabbits	tracks, trails, browse, scat, urine
fox, coyotes	tracks, trails, scat

We can infer many things about nature by studying animal signs.

For example:

Winter Animal Sign	Inference
chickadee calls	an individual is separated from the flock and the flock breaks up in late winter to form breeding pairs (depending upon the call)
owl pellet	diet and food chain
size, shape, and gait of tracks, and the distance between sets of tracks	the type of animal present and its pace
Hoar frost (ice crystals) around the entrance to a mouse burrow	an active burrow
Blue urine	rabbits have switched to browsing on buckthorn

Tracking animals involves its own set of terminology, which is helpful when making observations with students at the Sherburne NWR. For example, the following normal pace gaits may be discernible. Gait means how an animal moves (walking, trotting, hopping, etc.). Long ovals indicate back feet; small ovals indicate front feet.

Gait	Speed/Pattern	Animal	Illustration
Waddling	Slowest, shuffle	Raccoon, skunk, opossum	
Walking (2 legs)	Slow, alternating	Goose, person	
Walking (4 legs)	Slow, alternating and diagonal	Cat, coyote, fox, deer	
Galloping (4 legs)	Faster, hind feet land in front of front feet	Dog, coyote	
Hopping	Hind feet land in front of front feet	Rodent, rabbit, bird, squirrel	
Bounding	Tight clusters of prints, front prints directly behind back	Weasel, mink	

Some other helpful track terms and observations include:
- Trail: a path or the series of track patterns
- Straddle: the total width of the trail, all tracks included
- Register: when a back foot lands in the print of a front foot
- Dragline: a print left by a foot or tail dragging over the surface

From the evidence, we can also discern the types of adaptations these animals have for surviving winter, such as larger/fur-covered feet that spread out their weight over a greater surface area, allowing easier navigation through snow (snowshoe hare, some rodents), feather-covered feet (some birds), changing diet as food becomes scarce (rabbits), and worn paths for easier travel in deep snow (rabbits). Nature has much to teach us about wildlife and winter when we slow down, observe carefully, and try to interpret the mysteries laid out before us.

Humans must also respond to the change of seasons. Like foxes and rabbits, most of us remain here all winter and are actively resisting winter stressors. At the Sherburne NWR, teachers and students alike adapt to the weather and safely explore and enjoy the often overlooked world of winter ecology. Dress in layers and wear insulated boots, winter mittens, scarves, and hats. When needed, to stay warm in the field, we keep moving, sit out of the wind, turn our backs to the wind, make snow angels, walk briskly, do jumping jacks, wiggle our fingers and toes, and/or check each other's cheeks for any early signs of cold exposure (frost-nip: pale spots on cheeks, nose, earlobes, fingertips). We shorten our time outside if necessary, and stay inside entirely if the temperature exceeds -15 degrees Fahrenheit. We see winter as an opportunity instead of a barrier; a challenge to be met.

During this winter visit, students have the chance to become nature detectives and search for clues left behind by active winter animals. Each track, trail, feather, or call provides a new mystery to marvel at and solve as they explore and become completely immersed in the relatively undisturbed wintry setting of the oak savanna.

Naturalist Aldo Leopold called this skill reading the land. In his book *A Sand County Almanac*, he wrote:

January observation can be almost as simple and peaceful as snow, and almost as continuous as cold. There is time not only to see who has done what, but to speculate why.

The Sherburne NWR is like an open book, each track or clue a word in the story we read as we follow the trail. Who are the main characters? What is the setting? Will there be a conflict? How will it be resolved? What genre is this story? A drama, romance, mystery, comedy? The same powers of observation and inference used in reading the land are also used in reading other stories and books. When visiting the SNWR for this field investigation, though, you can leave your library card at home, but be sure still to bring your critical thinking and sleuthing ability. In the words of expert tracker Tom Brown, "I learned to track not animals but disturbances, things knocked out of place, minute and indistinct traces, the ghost of a print, a stone turned wrong-side up, a fragment of hair on a branch."

Procedure:
1. Sherburne Volunteer: In the classroom, welcome students, teachers, and chaperones to the Sherburne NWR/Oak Savanna Learning Center.
2. Teacher: Organize students into small groups, each led by a teacher or Sherburne volunteer.
3. Lead Volunteer or Teacher: Explain to students that they will have the opportunity to become nature detectives and search for clues left behind by animals outside. What are some examples of clues they might find? Record their answers on the white board (the K or know part of KWHL). Ask them other questions to find out what they already know, such as, what kinds of animals might be active in the winter here? What can animal signs tell you about the animal?
4. Lead Volunteer or Teacher: Ask the students what they wonder about these animals and their signs? Record their responses on the white board (the W or wonder part of KWHL).
5. Lead Volunteer or Teacher: Encourage them to make predictions. What do think they will find out today about animal signs when we search for them outside? Record their answers on the white board.
6. Lead Volunteer or Teacher: How do they think we should search for animal signs? Where do they think we should go? What should we do if we find some? If we find tracks, should we walk on them? Record their responses on the white board (the H or how part of KWHL).
7. Teacher: Set up field journals accordingly. Possible quadrants might include tracks, scat, burrows, homes, etc. You might also add a wonder word quadrant titled mystery or drama. Be sure to save space for recording weather data such as air temperature, snow temperature, wind speed, and sky.
8. Sherburne Volunteer: Show students any equipment that will be taken outside and how to use it properly. Possible materials include animal tracks cards, rulers, and weather instruments. Keep the materials simple, though, only taking what is necessary to complete the investigation and asking adults to carry and distribute to students when appropriate. Provide equipment to adults before heading out.
9. Sherburne Volunteer: Review rules for the trail. Explain that each time a new clue is found, you will

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mark it with a flag. As each group encounters a flag, they should observe, sketch, measure, and wonder about the track. Who made it? Which way was the animal traveling? Did it keep the same pace and gait the whole time? What was it doing? Does it travel in a straight line? They should record their observations and thoughts in their journals. The last person in line should remove each flag after the last small group has passed by.

10. <u>Volunteers and Teachers</u>: Outside, search for clues of animal signs, and proceed as described in step 8 above. The most typically observed animal signs include mouse tracks and vents, mink, rabbit, squirrel, and weasel tracks, squirrel nests, muskrat huts, chickadee calls, owl prints, and coyote or fox tracks.

11. <u>Volunteers and Teachers</u>: Record observations as words, sketches, and measurements in field journals (depending upon the questions and journal set-up). Before coming back indoors, allow students to observe and record weather data in their journals.

12. <u>Lead Volunteer or Teacher</u>: Return to the classroom and use data recorded in student field journals to answer the questions they first suggested when designing the investigation. Suggest that students write down a complete sentence to describe their biggest discovery. Offer a sentence starter, such as, "Today I discovered …." Or "Today I was really surprised by …." Or "The mystery I solved today was …." Ask them to write down a new question they now have about animal signs. If they could be any winter animal at the refuge, which one would they chose? Why?

13. <u>Sherburne Volunteer:</u> Thank class for visiting Sherburne NWR and remind them of upcoming events and volunteer opportunities. Invite them back to their refuge again soon!

2009 Minnesota Academic Standards in Science

2. 1. The Nature of Science and Engineering:

    1. The Practice of Science

        2. Scientific inquiry is a set of interrelated processes incorporating multiple approaches that are used to pose questions about the natural world and investigate phenomena.

            2.1.1.2.1 Raise questions about the natural world and seek answers by making careful observations, noting what happens when you interact with an object, and sharing the answers with others.

2.2 Physical Science:

    1. Matter

        1. Objects can be described in terms of the materials they are made of and their physical properties

            2.2.1.1.1 Describe objects in terms of color, size, shape, weight, texture, flexibility, strength and the types of materials in the object.

2.2 Physical Science

    2. Motion

        1. The motion of an object can be described by a change in its position over time.

            2.2.2.1.1 Describe an object's change in position relative to other objects or a background. For example: Forward, backward, going up, going down.

2.4 Life Science

    1. Structure and Function of Living Systems

        1. Living things are diverse with many different observable characteristics.

            2.4.1.1.1 Describe and sort plants into groups in many ways, according to their physical characteristics and behaviors.