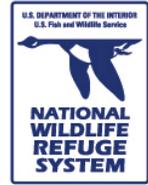


Animal Habitats

Grade: 1st
Group Size: one class

Season: Winter **Time:** 1½ hours
Ratio: 1:5, adults to children



For the Teacher:

Overview	Students investigate winter animals of the prairie and how resisting animals use their habitat to obtain their basic needs in our coldest season. They discover, identify, record, and use evidence of winter animals in the field to support their conclusions. Students also share their discoveries with each other.
Subjects Covered	Science, Language Arts
MN Academic Standards Supported	Helps support 12 standards. See section “Minnesota Academic Standards in Science” and “Minnesota Academic Standards in Language Arts.”
Skills Used	Critical thinking, observing, listening, team work, following directions, exploring, discovering, questioning, using senses, concluding
Performance Objectives	<p>After completing this activity, students will be better able to...</p> <ul style="list-style-type: none"> • Name three animals that are active on the prairie during winter (coyote, mouse, deer, chickadee, etc.) • Identify three of the five basic needs of winter animals (food, water, shelter, air and space) • Choose one animal and give examples of how it finds food, water, shelter, air and space on the prairie or wetlands in winter (fox: eats small mammals and snow, builds den in snow pack on prairie) • List three ways animals adapt to winter (migrate, stay and hibernate, stay and be active) • Name three examples of clues winter animals may leave behind (tracks, scat, shelter, hair) • Enjoy exploring animal wetland habitats in winter
Vocabulary	Winter, prairie, evidence, clues, scat, tracks, habitat, basic needs, wetland

For the PWLC Instructor:

PWLC Theme	The Prairie Pothole Region
Primary EE Message	The prairie pothole region is valuable and in need of restoration and protection.
Sub-message	Habitat: The prairie pothole region is a unique and rare ecosystem.
PWLC EE Objective	Use scientific methodology to explore the environment (ask questions, hypothesize, collect data, analyze data, form conclusions, make recommendations). (Wildlife and Habitat)
Materials	Clipboard, paper, pencil, field activity sheet, orange flags labeled with animal names
Location	<ul style="list-style-type: none"> • Indoor classroom 1 or 2 • Mallard Marsh Trail

Background Information

In this field investigation, students have the opportunity to search for and observe signs of winter animals in three different types of habitat: tallgrass prairie, wetland, and oak savanna. The purpose of the investigation is to make connections between the evidence we see of winter animals and how their habitats help them to fulfill their basic needs of food, water, space, air and shelter.

According to the calendar, the first day of winter is December 21, and last day of winter

falls on March 19th. 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 PWLC, 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 15-25 degrees Fahrenheit; low temperatures of negative five degrees to five degrees Fahrenheit; less than one-half to one inch of rainfall per month; and five to 15 inches of snowfall per month. Recent phenology records indicate that PWLC ponds freeze over mid to late November 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, some life on the prairie slows down considerably. Reproduction and growth are temporarily suspended, food becomes scarcer, and survival becomes paramount.

Animals adapt to winter in three ways. They can leave (migrate), stay and sleep or become inactive (hibernate), or they can stay and continue to be active (resisting). The animals that we find evidence of are active all winter at the prairie. The snowy world (or **nivean** environment) changes how these resisting animals live in winter. All organisms (humans included) must find food, water, shelter, and space to survive.

- Those living above the snow pack live in the **supranivean** region, including deer, foxes, coyotes, and weasels.
- Prairie chickens and rabbits submerge themselves into powder (**intranivean** or within the snowpack) for protection from predators, shelter, and warmth. Like a huge, thick blanket, a dry snow pack of at least six to 10 inches deep insulates the ground beneath it. Dry, fluffy snow provides the best insulation with more air spaces between flakes than wet, dense snow.
- In the small, narrow space between the ground and the snow pack, air temperatures stabilize at around 32 degrees Fahrenheit causing gaps to open and allowing radiant heat from the earth to thaw soil and provide abundant moisture. This layer is called the **subnivean** layer and is inhabited by rodents like mice, shrews, and voles who graze on grass or insect eggs.
- On the surface of the **ground**, huge colonies of bacteria and fungi, eating, breathing, and growing on decaying plants, nitrogen from the soil and snow pack, and producing vast amounts of carbon dioxide.
- **Tunnels** that form along plant stems and rocks allow weasels and small rodents to pass throughout the layers.

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 PWLC, teachers, students, and chaperones adapt to the weather and safely explore and enjoy the often overlooked world of winter ecology. We 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 frost nip. 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!

Tallgrass prairie, oak savanna, and wetland are the three main habitats found at the PWLC. Plants in these habitats lie dormant all winter as moisture is locked up in frozen ice or soil. The tallgrass prairie is characterized by plants such as big bluestem, Indian grass, switchgrass and a diversity of forbs. Because the PWLC is located along a transition zone between the tall grass prairie and big woods, oak savannas are found here adjacent to some water bodies. Burr oak trees tower above a wide variety of shade and sun loving grasses and forbs. As the PWLC is located within the Prairie Pothole Region, many wetlands are also located here. A wetland is an area of land that is either seasonally or permanently filled with water such as cattail marshes. During their visit students discover which winter animals correspond to each of these three habitats.

Often times in winter, we do not see animals that stay active but we do see evidence or signs that reveal their presence! These clues provide information on how or if that animal is meeting its basic needs. The following chart describes the common signs we see of winter animals. It also explains how each animal meets its basic needs in its habitat. (All breathe atmospheric oxygen.)

Animal	Sign/Evidence	Winter Habitat Needs
Black-capped chickadee	Calls “feee-beee” or “chicka-dee-dee dee”	Food: sunflower seeds Water: snow Shelter: trees, shrubs, cavities Space: oak savanna
Coyote	Tracks, trails, scat, kill-site	Food: small mammals, carrion Water: snow Shelter: snow, drifts, shrubs, den Space: prairie
Deer mouse	Tracks with tail drag, scat, urine, vents, trails	Food: grass/forb seeds Water: melting snow Shelter: snow pack, grasses Space: prairie, wetland
Eastern cottontail rabbit	Tracks, trails, browse, scat, urine	Food: gooseberry bushes, buckthorn Water: snow Shelter: snow pack Space: oak savanna, wetland
Muskrat	Huts	Food: cattails Water: water, plant food sources Shelter: cattail huts Space: wetland
Weasel	Tracks, snow tunnels	Food: small mammals, carrion Water: snow Shelter: snow pack, den Space: wetland, prairie
Red fox	Tracks, trails, scat	Food: small mammals, berries Water: snow Shelter: snow pack, den, shrubs Space: prairie

For more information on identifying certain tracks and scats, please refer to our 2nd

grade winter lesson, “Wildlife Mysteries.” See also the section in this lesson, “References and Resources.”

As students investigate at the PWLC, they search for find animal signs, make connections between that evidence, describe how basic needs are being met, as well as identify each habitat.

Teacher Preparation

- To maximize outdoor classroom time at the PWLC, teachers may
 - Conduct steps 2-4 in the section “Field Investigation Procedure” at school. Upon arrival at the PWLC, teachers may provide PWLC staff with a written list of what students know and wonder for quick review before heading out into the prairie.
 - Organize students into small groups at school, each led by a chaperone, and everyone wearing nametags.
- We highly recommend conducting one or more of the suggested extensions before your visit in order to integrate this field investigation into the classroom study of animal life, winter, habitat, seasons, adaptations, or other topics. (See section, “Teacher-Led Extensions/Adaptations/Assessment Ideas.”)

PWLC Staff Preparation

Collect and organize clipboards, pencils, and field data sheets. Check for ice safety according to the PWLC Ice Safety Plan.

Field Investigation Procedure

1. In the classroom, welcome students, teachers, and chaperones to the Prairie Wetlands Learning Center.
2. Organize the class into smaller groups with one chaperone for every five children. The role of the chaperones will be to manage their small group of children and make sure they are following through with directions given by the PWLC staff instructor. Their job is not to provide the answers but to guide students to make their own discoveries. The PWLC staff person’s job is to manage and guide the entire large group, distribute equipment to chaperones, and provide trail leadership.
3. Explain to students that they have the chance to search for signs of winter animals and to explore three habitats: prairie, wetlands, and oak savanna. What do they already know about what winter animals and habitats? Record responses on the white board. (This is the K part of the KWL model; what do students already know?) Provide prompting questions if needed: What do all living creatures need in order to live? (Food, water, air, shelter and space) How do animals survive the winter? (migrate, stay and hibernate, stay and be active) What kinds of clues can we find outside that tell us a winter animal is living near by? (Tracks, scat, shelters, hair)
4. Next ask students what we could find out about winter animals and their habitats by going outside today. What do they wonder about that? (This is the W part of the KWL model). Take note of their questions on the whiteboard. Explain that in each

- habitat, we will look for answers to their questions.
5. Before heading out on the trail, review the rules of respect for the trail – just the same as at school, plus special trail rules (such as no picking plants, follow the leader, be kind to animals, stay on the trail, etc.)
 6. Explain to students that the PWLC leader/staff will mark the signs of animals with a labeled flag, so that the whole class may see it as they walk by. The next time the leader sees the same type of evidence of that animal, the leader will not mark the sign. Instead, it will be each group’s task to search for and find more examples and draw their own conclusions from what they previously observed. Ask the last chaperone to pick up each flag.
 7. Provide the chaperone for each small group of students with a clipboard, checklist, and pencil. Explain to the students that they will be in charge of telling their grown up when they see animal signs, and if they find evidence that shows how that animal finds food, water, shelter and space on the prairie/wetland/oak savanna habitat. Their small group leader can circle the animal if they actually see it, write what kind of animal sign they see and circle the habitat where they found evidence of that animal. They can then ask their students to brainstorm some ways that animal might find food, water and shelter in that habitat. (See student materials, “Animal Habitats in Winter.”) For example, the group discovers scat alongside the trail, which their PWLC staff leader has marked with a flag labeled “Coyote.” What can students observe about this scat that differentiates it from other scats? (size, hair) Based on the winter animals on their data sheet, which one of those animals might the coyote eat? How could the coyote find water here? Shelter? Is the scat in a prairie, wetland or oak savanna habitat?
 8. The entire group travels and explores together in small groups with chaperones and with the PWLC staff person leading the way. Start on the Mallard Marsh Trail, stopping first to explore the prairie habitat by Butterfly Garden, then explore the wetland habitat around Mallard marsh, and finally end at Mallard Oaks to discover life in an oak savanna habitat. It may not be possible to get all the way to Mallard Oaks based on the amount of sign available to observe.
 9. To wrap-up, sit together as a whole class back inside and ask the class to share what they discovered outside. Answer the questions that students generated as recorded on the board earlier. (This is the L part of the KWL model; what have we learned?) Review the kinds and numbers of different animals and evidence observed as recorded on their check lists and compare to their predictions.
 - What evidence did they find of winter animals? Which was their favorite? Which winter animals did they see? Why might they have not seen certain animals?
 - Were we able to find each animal’s found food, water, shelter and space? Which animals left the most signs behind? In which habitat did we find the most signs?
 - What new questions do students have about winter animals and habitat?
 10. Thank them all for coming, for being respectful to nature, and for exploring outside. Encourage them to keep going outside and making discoveries – even in their yard at home. It is healthy, free, and fun!

Weather Alternatives

Field investigations take place rain or shine. Everyone should dress appropriately for the weather. In the event of unsafe weather (severe cold), everyone must come indoors. PWLC staff makes every effort to make your travel worthwhile despite the weather and prepare indoor, age-appropriate plans. PWLC staff welcomes teacher input into these plans. Some possible alternatives might include:

- Go outside for a very short amount of time, even if only under the deck to look for evidence of animals.
- Set up stations where students can imitate the movements of various winter prairie animals and learn how to identify their tracks. Cut out footprints for the students to follow at each station, taping them to the floor. They could hop like an Eastern cottontail rabbit, bound like a weasel (finding a tail for them to try bounding with would be even better!), walk like a muskrat, coyote or fox. Another idea could be setting up an area where you've already taped animal tracks to the floor. See if they can figure out which animals made which tracks.
- Read The Mitten by Jan Brett. As you read, ask student volunteers to act out the story with props – stuffed animals or pelts, and a large white cloth bag to use as “the mitten.” Ask the rest of the students to pay close attention while you read, and look for clues of winter animals; can they find animal tracks and animal homes on the illustrations? Ask students which animals they saw in the story that we might see here on the prairie, and which animals we would not see. How did the animals in the story find food, water, shelter, air and space? Would real animals hide in a mitten?
- Make animal tracks with track molds and plaster, or with stamps and a piece of paper.
- Create a paper habitat scene using latex track stamps and butcher paper. First, draw the three PWLC habitats (prairie, wetland, oak savanna). Where would you see a coyote (prairie)? A chickadee (oak savanna)? A muskrat (wetland)? Can students think of signs to add to their scene that they might see besides tracks? Put them in the most appropriate habitat (a cattail hut for the muskrat (wetland), or a vent for the deer mouse (prairie)).
- Tour the exhibit area and watch prairie wetlands videos with the objective of studying which animals are found on the prairie during the winter.

Teacher-Led Extensions/Adaptations/Assessment Ideas

- Search the school yard. Can you find winter animals, or evidence of winter animals (such as bird nests, tracks, mouse vents)? What kind of habitat do you have near your school? Is it most like the prairie, wetland, or oak savanna?
- Pick a winter animal that you saw outside your classroom or at the PWLC to research a little further, and share your discoveries with your class. Create your own “backyard almanac” of common winter animals (see References – Backyard Almanac: A 365 Day Guide to the Plants and Critters That Live in Your Backyard by Larry Weber).
- Walk to other local habitats where you might see evidence of winter animals, such as along a river or stream, lake, or forest. Compare and contrast your

discoveries with what you observed at the PWLC.

- Compare the animal houses students saw on the prairie with students' own homes. Are they made of similar materials? Can you see how many entrances they have? What makes them warm in the winter?
- Visit Jan Brett's website, www.janbrett.com, and find the coloring pages. There's an opportunity for students to illustrate their own "mitten" animals, or color the ones appearing in her book!

2009 Minnesota Academic Standards in Science

This lesson helps support the following state standards.

Strand 1. THE NATURE OF SCIENCE AND ENGINEERING

Substrand 1. The Practice of Science

Standard 1. Scientists work as individuals and in groups to investigate the natural world, emphasizing evidence and communicating with others.

Benchmark 1. When asked "How do you know?" students support their answer with observations.

Benchmark 2. Recognize that describing things as accurately as possible is important in science because it enables people to compare their observations with those of others.

Substrand 3. Interactions Among Science, Technology Engineering, Mathematics, and Society

Standard 2. Men and women throughout the history of all cultures, including Minnesota American Indian tribes and communities, have been involved in engineering design and scientific inquiry.

Benchmark 1. Recognize that tools are used by people, including scientists and engineers, to gather information and solve problems.

Substrand 4. Life Science

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

Benchmark 1. Describe and sort animals into groups in many ways, according to their physical characteristics and behaviors.

Strand 4. LIFE SCIENCE

Substrand 2. Interdependence Among Living Systems

Standard 2. Understand that natural systems have many components that interact to maintain the living system.

Benchmark 1. Recognize that animals need space, water, food, shelter and air.

Benchmark 2. Describe ways in which an animal's habitat provides for its basic needs.

2010 Minnesota Academic Standards in Language Arts

Strand READING

Substrand Informational Text K-5

Standard Read closely to determine what the text says explicitly and to make logical inferences from it; cite specific textual evidence when writing or speaking to support conclusions drawn from the text.

Benchmark 1.2.1.1 Ask and answer questions about key details in a text.
Standard Analyze the structure of texts, including how specific sentences, paragraphs, and the larger portions of the text relate to each other and the whole.
Benchmark 1.2.5.5 Know and use various text features (e.g., headings, tables of contents, glossaries, electronic menus, icons) to locate key facts or information in a text.

Strand SPEAKING, VIEWING, LISTENING, AND MEDIA LITERACY

Substrand Speaking, Viewing, Listening, and Media Literacy K-5

Standard Prepare for and participate effectively in a range of conversations and collaborations with diverse partners, building on others' ideas and expressing their own clearly and persuasively.

Benchmark 1.8.1.1 Participate in collaborative conversations with diverse partners about grade 1 topics and texts with peers and adults in small and larger groups.

- a. Follow agreed-upon rules for discussions (e.g., listening to others with care, speaking one at a time about the topics and texts under discussion).
- b. Build on others' talk in conversations by responding to the comments of others through multiple exchanges.
- c. Ask questions to clear up any confusion about the topics and texts under discussion.
- d. Listen to others' ideas and identify others' points of view.
- e. Follow two-step oral directions.

Standard Integrate and evaluate information presented in diverse media and formats, including visually, quantitatively, and orally.

Benchmark 1.8.2.2 Ask and answer questions about key details in a text read aloud or information presented orally or through other media (e.g., stories, poems, rhymes, songs).

Standard Evaluate a speaker's point of view, reasoning, and use of evidence and rhetoric.

Benchmark 1.8.3.3 Ask and answer questions about what a speaker says in order to gather additional information or clarify something that is not understood.

Standard Present information, findings, and supporting evidence such that listeners can follow the line of reasoning and the organization, development, and style are appropriate to task, purpose, and audience.

Benchmark 1.8.4.4 Describe people, places, things, and events with relevant details, expressing ideas and feelings clearly.

Standard Adapt speech to a variety of contexts and communicative tasks, demonstrating command of formal English when indicated or appropriate.

Benchmark 1.8.6.6 Produce complete sentences when appropriate to task and situation, and respond to stories, poems, rhymes and songs with expression.

Strand LANGUAGE

Substrand Language K-5

Standard Demonstrate command of the conventions of standard English grammar and usage when writing or speaking.

Benchmark 1.10.1.1 Demonstrate command of the conventions of standard English grammar and usage when writing or speaking.
j. Produce and expand complete simple and compound declarative,

interrogative, imperative, and exclamatory sentences in response to prompts.

Standard Demonstrate understanding of figurative language, word relationships, and nuances in word meanings.

Benchmark 1.10.5.5 With guidance and support from adults, demonstrate understanding of word relationships and nuances in word meanings to develop word consciousness.

c. Identify real-life connections between words and their use

References and Resources

Books and Web Sites for Children

- A Grassland Habitat by Bobbie Kalman
- Animals in Winter by Henrietta Bancroft & Richard Van Gelder
- Animals in Winter by Martha E. H. Rustad
- A Wetland Habitat by Bobbie Kalman
- Here is the Wetland by Madeline Dunphy
- Oak Tree by Paul Fleisher
- Squish! A Wetland Walk by Nancy Luenn
- Stranger in the Woods by Carl R. Sams II & Jean Stoick
- The Mitten by Jan Brett
- Wetlands by Shirley W. Gray
- Who's been Here? A Tale in Tracks by Fran Hodgins and Karel Hayes
- Animal Track Identification Quiz, Boy's Life Magazine, <http://boyslife.org/hobbies-projects/funstuff/6662/animal-track-identification-quiz/>
- Interactive Track Quiz for Beginners, Wisconsin Department of Natural Resources, <http://dnr.wi.gov/eeek/cool/trackQuizLVLone.htm>
- Jan Brett printouts and activities, www.janbrett.com
- Neighborhood Explorers, U.S. Fish and Wildlife Service <http://www.fws.gov/neighborhoodexplorers/>

Books and Web Sites for Adults

- A Field Guide to Animal Tracks by Olaus J. Murie (Petersen Field Guide)
- A Guide to Nature in Winter by Donald Stokes
- A Prairie Winter by an Illinois Girl by Belle Owen
- Backyard Almanac: A 365 Day Guide to the Plants and Critters That Live in Your Backyard by Larry Weber
- Prairie, a Natural History by Candace Savage
- Seasons of the Tallgrass Prairie by Carol Lerner
- Scats and Tracks of the Great Plains: A Field Guide to the Signs of Seventy Wildlife Species by James Halfpenny
- Winter: An Ecological Handbook by James C. Halfpenny and Roy Douglas Ozanne
- "Packed to the Hilt" by Jeff Hull. Audubon November-December 2010
- How do animals spend the winter? Science Made Simple,

- <http://www.sciencemadesimple.com/animals.html>
- Nature Tours Minnesota bird list, <http://www.trmichels.com/NatureToursMNBirdsList.htm>
- Pine to Prairie Birding Trail, weekly bird sighting reports, <http://www.mnbirdtrail.com/>
- Wildlife and Bird Sightings at the Prairie Wetlands Learning Center, recorded in 2009 and 2010, http://www.fws.gov/midwest/PWLC/Wildlife_Birds.html

Credits

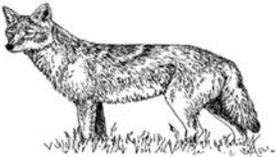
This field investigation was developed and written by Prairie Wetlands Learning Center Staff, U.S. Fish and Wildlife Service. Thanks to the following teachers for reviewing this lesson plan: Donna Gohman, Washington Elementary, Alexandria; Kerry White, Menahga Elementary School; and Laura Handegaard, Underwood Elementary School.

Student material follows.



Prairie Wetlands Learning Center

Animal Habitats in Winter

Animal	Sign(s)	Food	Water	Shelter	Space
Coyote 					Prairie Wetland Oak savanna
Deer mouse 					Prairie Wetland Oak savanna
Black-capped chickadee 					Prairie Wetland Oak savanna
Eastern cottontail rabbit 					Prairie Wetland Oak savanna
Muskrat 					Prairie Wetland Oak savanna
Weasel 					Prairie Wetland Oak savanna
Red fox 					Prairie Wetland Oak savanna