



Animal Signs

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Program Purpose: Through hands-on exploration, participants will recognize how animal remains as well as signs in the wild can reveal animal adaptations and behaviors.

Length of Program: 1 – 2 hours

Ideal Age: 5th – 9th grade, 10 – 13 year olds

Maximum Number of Participants: 30 participants

Objectives:

After participating in this lesson, participants will be able to:

- Recognize and observe things that can be learned by studying animal remains.
- Recognize signs of wild animal activity and understand how the signs were made.
- Predict how animal signs might change between seasons.
- Infer animal behavior based on what they see in a lab as well as in a natural habitat.

Materials: see Appendix A

Teacher Preparation:

Set the classroom up with several lab stations, each with two artifacts, a Venn diagram, and a wet erase marker.

Gather and prepare desired teaching materials from the Animal Signs Program Inventory. Obtain relevant Animal Tracking books for reference. If using clipboards, be sure to prepare enough recording materials for the class.

Background Information (embedded into the lesson activities, as well as artifact guide document).

Introduction:

Introduce yourself and the title of the class. Explain to the class that they are going to practice using some important scientific skills and learn more about Wisconsin Wildlife at the same time. [4-LS1-1].

Program Activities:

1. Animal Artifacts lab (Indoors)- 45 minutes maximum

Begin by asking students if they are familiar with what an observation is. An observation is just something that a person notices about an object (I Notice). Observations are not the same as identifications, nor are they opinions. For example, just saying that something is a bone does not tell anything about the bone. Also, saying something like “I hate snakes” may not be true for all people, making it not an observation.

Observations can lead students to ask questions (I wonder). Inform the students that they will be seeing some things today that may be new to them and encourage them to ask questions about those items. Remind them that it is important to think about whether or not the question they have is one that they are able to investigate during the class. For example “How many trees are on Blackhawk Island” is not a good question for this class, but “what kind of animal left this track” is one that can be investigated and answered.

Although students may not have ever seen the exact items in this lab before, they may have seen something similar in a different place (this reminds me of). Encourage students to make connections to things that they have seen before, as this can help them understand their current surroundings with more depth and clarity. For example, students may begin to recognize that two different species of animals may still have very similarly shaped body parts for doing similar things. For example, both a deer and a caribou have two toed hooves.

Show the students that the classroom has been set up to have several stations in it. Each station has two natural items (either a part of an animal body or an object that an animal has used). Also at each station is a Venn diagram and a wet erase marker. Ask the students to write down observations that they have about the items in the diagram, as well as questions they have about the artifacts or things the artifacts remind them of on the back side of the Venn diagram.

To facilitate the lab, break the students into groups of two or three and assign each one a starting station. Remind them to use the provided markers and sheets to record their observations, questions, and other thoughts about the items. Instruct them that when you call a rotation, they will move to the next station in order until they have been to every station. Allow two to three minutes per station before calling a switch

For more information on the “I notice, I wonder, It reminds me of” activity, check out the BEETLES website: <http://beetlesproject.org/resources/for-field-instructors/notice-wonder-reminds/>

Guidelines for station set up

There is no pre-determined way to set up the lab. However, be sure that each station shows two artifacts with a few things in common but some noticeable differences as well. For example.....

- A. **Use two different skulls to show differences in herbivore, omnivore, and carnivore teeth and skull shape.** Herbivores will have flat, blunt teeth for grinding, and carnivores will have sharp teeth for tearing, where omnivores will have a mix of each.
- B. **(Also with skulls) Show differences in predator and prey animals.** Predators will have forward facing eyes while prey animals will have eyes pointed to the side. This can be shown by sliding a marker into the eye socket and seeing where it naturally rests when set down.
- C. **Compare a snake skin to a turtle shell.** Both have scales, but there are some clear differences as well

Be creative, and feel free to rely on the Artifact guide for helpful information about some of the artifacts. Artifacts may be pulled from the bin in the program closet, or the skull display box in the blue room.

The purpose of the lab is for students to practice their observational skills, not to overload with lots of vocabulary terms. At the end of the lab, you may do a short “reveal session” in which you go to a few stations to share a little about the artifacts. Instead of just saying what they are, point out some of your own observations first, then explain how your observations lead you to the correct identification.

2. Animal Signs Hike (Outdoors) 45 minutes minimum

Ask the students what some things that animals might do in the wild could be. These activities could include hunting, hiding from predators, eating, or building homes just to name a few. Then, ask the students if these activities will impact the surroundings of the animal. Whenever an animal does something, it’s surroundings are impacted. Sometimes, the activities will leave behind indicators that the animal was there, these indicators are called signs. Common Kinds of Animal Signs include:

- Tracks and Trails
- Scat and Urine
- Eat/Chew Marks
- Homes
- Remains
- Other markings, including Territory Marks
- Sounds and Smells

Explain each category of sign.

- A **Track** is a single print made by an animal, and a set of tracks is called a **Trail**. Different animals have different shaped feet, and they can be easily distinguished from each other. For instance, ungulates (deer) have very different tracks than canines (dogs) and felines (cats). Tracks can show how fast and at what gait an animal was moving, based on depth and spacing of the tracks. For instance, was the animal walking or running? A series of tracks and trails can show an encounter between different animals or different animals visiting the same place.
 - **Questions:** What does the shape of an animal's feet tell us about how the animal lives? [Analysis] How does it help the animal survive, grow, behave and reproduce? [Comprehension, Analysis]. Example: A duck's webbed feet indicate it spends time in water. The claw marks on a badger's print indicate it digs.
 - **Teaching Tools:** Tracks and Trails Box
 - **Exploration Activity:** Guess that Track! (Indoors or Outdoors)
Lay out a series of rubber or plaster signs, and give each student a card with the name of an animal that one of those signs came from. Have the students try and match up their card with the correct animal. Wait to reveal the correct answers until the end.
- **Scat and Urine** are animal wastes. Animals must eat plants or other animals to get energy. All animals have a digestive system that extracts energy from food through chemical reactions; these reactions rearrange the food into molecules which either promote growth or release energy [MS-LS1-7]. Not all of the food molecules can be utilized by the digestive system; the parts that are left over are excreted as scat or urine. Based on the scat's size, shape and consistency, it can be determined not only what left the scat, but what the animal was eating, and when it deposited the scat. In cold conditions, scats may remain frozen for long periods of time, but may decompose more quickly in the summer, spring and fall. [5-LS2-1]
 - **Questions:** What can the contents of scat tell us about an animal's interaction with other organisms in the ecosystem? Example: Carnivore/predator, herbivore/prey. [MS-LS2-2] [Comprehension]
 - **Teaching Tool:** Scat and Urine Box
 - **More information:** Owl Pellets may not be the exact same thing as scat, but they reveal many of the same things. Pellets are produced by raptors and contain the undigested bones and fur of their prey. They are usually found at the base of roost trees. Scat Identification Tips: Carnivore's usually leave tubular droppings (set up of the digestive system is tubular), while herbivores generally have pelleted scat. Feline droppings are somewhat pointed, while canine scat is more often blunt at the end. Predator scat may contain hair or bones of prey.
- **Eat/Chew Marks** include holes or gnaw marks usually left on trees or sometimes other animal body parts. These may include woodpecker holes in trees, beaver chews, deer browse on spring twigs, insect marks on bark or chewed animal body parts. It may be difficult to determine how old an eat/chew mark actually is.
 - **Teaching Tool:** Eat/Chew Marks Box
- **Homes** take many different forms and can be found on the ground, brush or on trees. Every animal home is as individual as each animal that inhabits it. Examples of animal homes include holes in trees or ground, nests, cocoons, galls, wasp nests and beds. Turtle shells may also fall into this category of animal sign.
 - **Questions:** Why do animals make homes? What advantages does having a home give an animal. How do animals make their homes to specifically fit their needs.

- **Teaching Tool:** Homes Box
- **More information:**
 - **Gall:** A mass of cells which a plant produces to protect itself from something. A gall is usually produced when an insect lays eggs on or in it, although bacteria, viruses and fungi can also be a cause. In insect caused galls, the plant produces a mass of cells to protect itself from the insect, but the insect instead uses the mass of cells to lay eggs, providing a protected area for larval and adult development. By stimulating growth around the site of infection, the insect can effectively tap into the plant's growth system, possibly hindering the plants water and nutrient circulation system, stunting the plant [MS-LS1-3].
 - **Wasp Nest:** How does a wasp make paper for its nest? The wasp chews wood from different trees and other plant material. This woody material mixes with the wasp's saliva to create a paste. This paste is then spit out and layered to create the nest. Different plant materials can cause different colors within the nest.
- **Remains** can include fur, hair, feathers, bones and even skulls. They can be found snagged on twigs or branches, or on a trail, such as the case of molted feathers or shed antlers.
 - **Question:** What can you conclude/infer about the animal based on what body part is found, where it is found etc.? [Application, Justify]
 - **Teaching Tool:** Body Parts Box and various materials found in Program Inventory
 - **Exploration activity:** Show participants different animal body parts. Have them guess what the part is, and how the animal might have lost it.
- **Other markings, including Territory markings** are signs that animals leave to mark their home range or territory against other animals. Territory markings can be used as a warning between animals of the same type (such as canine scenting on trees) or between different animals. Other signs that do not fall into other categories also fall into this one.
 - **Questions:** Why is it important for animals to mark their territory? How might this help them reproduce? [Comprehension, Application] [MS-LS1-4]. Territory markings are evidence of what type of relationship with other organisms or individuals in the ecosystem? [Evaluation] [MS-LS2-2].
 - More information:
 - **Deer rubs:** Deer rubs are NOT territory markers. When deer antlers are growing they create a covering to protect them, which is called "velvet". Once the antlers quit growing, the velvet dries and is itchy to the animal. Bucks attempt to rub off this velvet on tree bark. While it does leave a scent, it seems to be more enticing to females, rather than a deterrent to other bucks. Bucks may mark their territory with scrapes prior to rutting, but not all scrapes are considered territory markers.
 - **Beavers:** To ensure food availability over winter, beavers will store trees in muddy backwaters by partially burying saplings. To protect and claim these piles, beavers will deposit castoreum – oil from their castor glands- onto this mound.
- **Sounds and Smells:** animals create a variety of sounds either to each other, or with their movements. Some examples include chattering squirrels, rustling leaves, calls between animals. Animals also leave a variety of smells as evidence. These can include urine, scat, musk, and decomposition of body parts.

Explain to the participants that they are now going on a hike to try to identify animal signs. Ask the participants to make some predictions about what they might find. How many different animal signs do they think they will find? Would more or less signs be found depending on the season? Why? [Comprehension, Analysis, Synthesis]. Seasonal differences may exist due to resource availability, migrations, hibernation, seasonal behavior such as mating, and weather and substrate conditions. [MS-LS2-1]. For groups that find tracks or trails, have them compare what they find with the pictures in an animal track book. How do the natural tracks compare to the idealized images found in the text?

Select a hiking route that goes through several of the more natural areas of the main campus. Also think about where signs are easy to detect. For example, the sand pit is easy to find tracks in, and many beaver chews have been found near the old and new canoe launches. When examining a sign, be careful not to accidentally destroy it so that future groups may see and learn from it as well. If the group is having difficulty finding signs on the ground, a short listening activity may help them detect noises made by birds and other arboreal animals

Technology inclusion (optional)

- Use a microscope/magnifying glass for a look at any detected signs from smaller animals. For example, turning over a fallen log may reveal a network of tunnels used by small insects. Just because something is not easy to see does not mean it does not play a role in the environment
- If there is any fresh scat found on the trail, it may still be warmer than the surroundings. Getting a temperature with the thermometer or thermal imager may reveal how recently the animal crossed the trail.
- If any very large or very fresh signs are found, consider creating a waypoint on the GPS so that other groups can come back and see it as well. Be sure to name the waypoint in a manner that describes what the sign is.

3. Conclusion

Have the participants gather together. Have them read out loud, show, or explain the different animal signs they discovered on the hike. Using multiple resources, have the participants infer animal behavior and identification from what they have found [Evaluation] [RIT.5.7, 5.9]:

- Who made the sign? What evidence did you use to form your conclusion?
- What does the sign tell us about the animal who made it?
- What human signs did you find?
- How did some of these human signs affect the environment?

Animal signs can shed light on the functioning of the ecosystem. Discuss how tracking animals can help us figure out where it lives, how it travels around, and even possibly where it migrates to. How can information about where an animal lives and migrates be used for conservation? [Synthesis].

Clean up

Rinse the Venn diagrams in water so that the wet erase marker is washed off for the next group. Wipe any moisture off with a towel. Bones and other materials will need to be returned to the container from which they were taken. If there are more programs later in the day, wait until the last one is concluded before moving any artifacts.

Appendix A: Material List

Categories of Signs sheets

Bag of bird calls

Field Guide to Tracks books

Pictures of Common WI Animals

12 Venn Diagram sheets

Wet erase markers

Tracks and Trails

- Plaster tracks (Deer, Raccoon, 2 Canine, Great Blue Heron, Squirrel, unknown feline)
- 2 Badger paws
- Bag of rubber tracks
- Track ID bandana
- Track ID cards

Scat and Urine

- Bag of rubber scat
- Scat ID bandana
- Owl Pellet

Homes

- Paper Wasp nest
- Galls
- 2 Painted Turtle shells
- Medium Snapping Turtle shell
- Large Snapping Turtle shell

Eat/Chew Marks

- Beaver chews (2 sticks, 1 log)

Body Parts

- Deer antlers
- 4 Deer legs
- Caribou leg
- Bag of Feathers (2 Pheasant, Crow, Goose, 4 feathers from various hawks, 2 Blue Jays, down feathers from an Accipiter, Mourning Dove)
- Skulls
 - 2 Deer skulls (1 doe, 1 buck)
 - Deer skull fragments
 - 3 Deer jaw bones
 - 3 Raccoons
 - Bird
 - Rabbit
 - Small jaw bone- unknown animal
 - Auditory Bulla – unknown animal
- Pelts/Skin/Tails
 - 1 Red Tail Fox
 - 2 small snake shed
 - Beaver
 - Raccoon tail
 - Fox squirrel
 - Badger
 - Coyote tail
- Other bones:
 - Deer pelvis
 - Beaver jaw
 - Deer leg bone fragment
 - Vertebrae
 - Scapula

*Check out “Blue Room” and Treehouse Room in Nature Center for more Track ID Books, taxidermy animals, skulls and body parts that may be useful to include in this lesson.

Appendix B: Standards Alignment

Next Generation Science Standards

4-LS1-1	MS-LS1-4	MS-LS2-2
5-LS2-1	MS-LS1-7	MS-LS2-3
MS-LS1-3	MS-LS2-1	MS-LS2-4

Common Core Standards

English Language Arts Standards

- Reading Informational Text (RIT)- CCSS.ELA- Literacy: 5.7, 5.9
- Speaking and Listening (SL) – CCSS.ELA – Literacy: 5.5, 8.5
- History/Social Studies/Science & Technical Subjects (RST) – CCSS.ELA – Literacy: 6-8.1, 6-8.9

Wisconsin Academic Standards

Science

- SCI.CC1: 3-5, M., H.
- SCI.CC4: 3-5, M.
- SCI.CC5: 3-5
- SCI.CC6: 3-5, M.
- SCI.LS1: A, B, C
- SCI.LS2: A, B, C, D
- SCI.LS4: C, D
- SCI.PS3.D
- SCI.ESS2.E

Environmental Education (draft v.1.0-2018)

- ELS.C1.C
- ELS.EX2.B
- ELS.EX3.B
- ELS.EX4.A
- ELS.EX5.B