

1. CONTRIBUTOR'S NAME: ALLISON GREENE, BROOKE MCBRIDE, MIKE MACHURA

2. NAME OF INQUIRY: WHO IS IN YOUR SCHOOLYARD?

3. GOALS AND OBJECTIVES:

a. Inquiry Questions:

1. What do the tracks of different animal species look like and how can you collect tracks in your schoolyard?

2. What animal species use your schoolyard in the wintertime?

3. Do different animal species use different habitats in your schoolyard?

b. Ecological Theme(s): Tracking and habitat use by different animals species.

c. General Goal: In this inquiry, students will identify and collect different animal tracks to learn about animal habitat use patterns.

d. Specific Objectives: Students will learn to identify common animal tracks and design and build their own tracking plates. They will make hypotheses about what species will be present in their schoolyard, and how species composition will be different in different habitats or areas of their schoolyard.

e. Grade Level: Grade 4-8

f. Duration/Time Required:

→ Prep time: One to two hours to collect materials for the tracking plates and to survey the schoolyard for potential areas to place the tracking plates.

→ Implementing Exercise During Class: Two 1 ½ to 2 hour blocks two to three days apart (a few extra minutes may be needed each day to check the tracking plates and add more bait).

→ Assessment

4. ECOLOGICAL AND SCIENCE CONTEXT:

a. Background (for Teachers and presentation to students):

Begin the inquiry by asking students if they have noticed different “habitats” in their schoolyard. These can include areas different distances from the school, varying levels of disturbance, and different kinds of vegetation. Write the student’s responses on the board. Even within a relatively small schoolyard, animal species may use these varied habitats in different ways. Small mammals, for example, may prefer grassy fields, while domestic cats and dogs may use the entire schoolyard. If white-tailed deer and mule deer use your schoolyard, the two species may use slightly different areas, as white-tailed deer prefer dense vegetation cover, while mule deer are more common in open areas. Ask the students what kinds of animals they think they will find on their schoolyard, and have them make hypotheses about which animal species they will find in each of the previously identified habitats.

Next, ask the students how they would go about determining what kinds of animals use a particular area and introduce tracking plates. Tracking plates are commonly used by wildlife biologists to collect tracks of rodents and small predators. In order to attract animals, different kinds of bait are placed at the end of the plate. In order to reach the bait, though, the animal first must walk through a powdery substance and then over sticky contact paper. The powdery substance sticks to the animal’s feet and then creates tracks when the animal walks over the contact paper. Some sort of cover is usually placed over the powdery substance and the

contact paper. As many animals like to walk through tunnels, this cover both attracts animals and protects the prints. Sardines can be used for bait, and will attract all kinds of animals.

5. **MOTIVATION AND INCENTIVE FOR LEARNING:** In this inquiry, students are involved in every aspect of the inquiry, as get to build their own tracking plates for specific animal species and collect and identify tracks from their plates. As well, they will gain a deeper understanding of the animal species that use their schoolyard.

6. **VOCABULARY:**

7. **SAFETY INFORMATION:** Deer mice, which are common in many schoolyards, are carriers of the rare but serious disease, Hantavirus. The virus is contracted by breathing in the virus from mouse urine and feces. To be safe, **DO NOT** let students check or touch their tracking plates after they are put outside. As well, place the tracking plates outside the playground so other students will not come in contact with them. After several days, spray the contact paper with a 10% bleach solution and place them in plastic binder sheets before giving them to the students to analyze. Discard the tracking plates (do not give them back to students to take home!) For more information on Hantavirus prevention, see the National Center for Infectious Disease website (listed in the reference section).

8. **MATERIALS LIST** (including any handouts or transparency masters):

- Schoolyard tracking guide

- Habitat/species data sheet

- Materials to construct tracking plates

 - Cardboard boxes (wide variety of sizes can be used)

 - Plastic liter pop bottles

 - Round cardboard containers (like oatmeal containers)

 - Scraps of lumber, PVC piping, flexible metal, and anything else the students can use to build their tracking plates

 - Builders chalk

 - Canola oil

 - Bait (anchovies, oatmeal)

 - Contact paper

Optional: Metal tracking plates (these can be obtained from Dr. Kerry Foresman at the University of Montana, and can be as an example to students when they are building their own tracking plates, or can be actually used along with the student's tracking plates).

9. **METHODS/PROCEDURE FOR STUDENTS:**

First, discuss the data that can be collected from tracks, the different habitats in the schoolyard. Have the students make and record hypotheses about the kinds of animals that are in their schoolyard, and which animals will be found in each habitat (see the background and student presentation section above). Introduce students to tracking plates.

Part I. Break the students into groups of three to four students and assign each group to one of the habitats in the schoolyard. Each group will build tracking plates to target both rodents and small carnivores, so the entire group may build both plates or pairs of students may work together to build a specific plate.

Next, let the students build their tracking plates. Each plate should contain two pieces of cardboard or two shallow boxes; one containing the power, and one containing the contact paper. The section containing the contact paper should have some sort of cover or "tunnel" over it to protect the tracks (this can be constructed out of a box turned on it's side or an oatmeal

container). Lastly, the bait should be placed after the contact paper to ensure the animal leaves tracks on the contact paper before reaching the bait. Remind the students to think about the size of their animals (rodents will be small, so they need only a small tunnel, while small carnivores may need a larger tunnel). Mix the builders chalk and the canola oil to create a paste with the consistency of paste. This will stick to the animal's feet, but will not blow away. Lastly, have the students place the contact paper and bait in their tracking plates.

Part II. After the tracking plates have been left in the schoolyard for several days, collect the contact papers for the students (**see safety information above**). Help the students identify their tracks, and ask them to estimate the amount of animal activity in their habitat. Ask each group to give a short report to the rest of the class about what animals they found, and why their habitat may support these animal species.

Part III. This portion of the inquiry can be done as homework or as a follow-up to parts I and II, and is best for third, fourth, and fifth grade levels, but can be simplified for younger ages. Each student is given a "Schoolyard tracking guide" and a "Track Mysteries" worksheet. Tell the students that they have come on a patch of fresh snow, and they see the tracks shown in the "Track Mysteries" sheet. It is their job to identify the animals that made the tracks and make up a story about how the animals interacted to create the tracks on the worksheet. Stress the fact that there is no correct answer, and there are many possible scenarios that may have taken place. Students may talk about their stories or write them in their nature journals.

10. ASSESSMENT:

11. EXTENSION IDEAS:

12. SCALABILITY

13. REFERENCES:

Sheldon, Ian. Animal Tracks of the Rockies. Copywrite in 1997 by Lone Pine Publishing.

National Center for Infectious Disease, Hantavirus information page.
<http://www.cdc.gov/ncidod/diseases/hanta/hps/index.htm>

14. LIST OF EXPERTS AND CONSULTANTS:

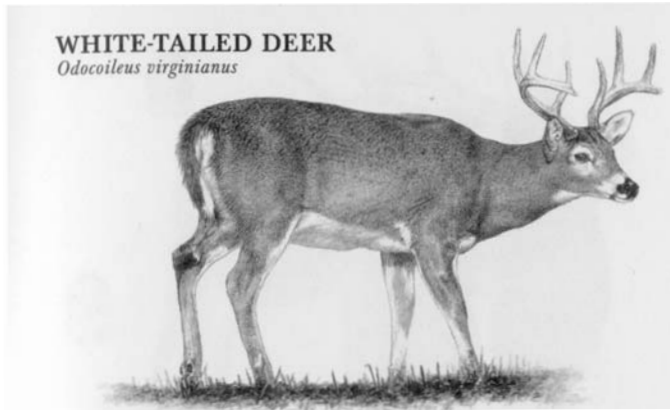
Dr. Kerry Foresman, University of Montana

15. EVALUATION/REFLECTION BY FELLOWS AND TEACHERS OF HOW IT WENT:

The fourth grade students at Target Range School seemed to really enjoy this inquiry, especially the opportunity to design and build their own tracking plates.

Schoolyard Tracking Guide

Common Deer Species



White-tailed deer and mule deer tracks can look nearly identical, but white-tailed deer tracks are often found in areas with dense cover, while mule deer tracks are found in open areas.



Mule Deer

Carnivores



Red fox tracks are usually smaller than coyote tracks, although there may be some overlap. As well, the tracks of domestic dogs may look like red fox or coyote tracks.



Coyote

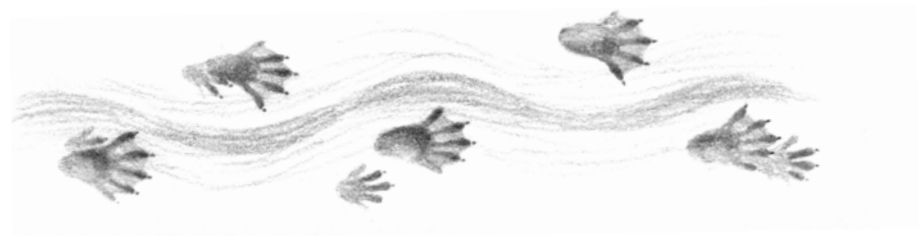
Cats

Unlike dog, fox, and coyote tracks, cat tracks have no claw marks and the main footpad is slightly more square shaped. Domestic cats have quite small tracks, bobcats have slightly larger tracks, and mountain lions have very large tracks.



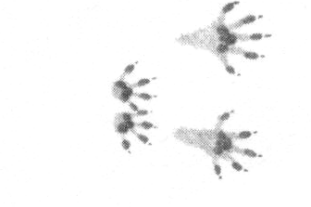
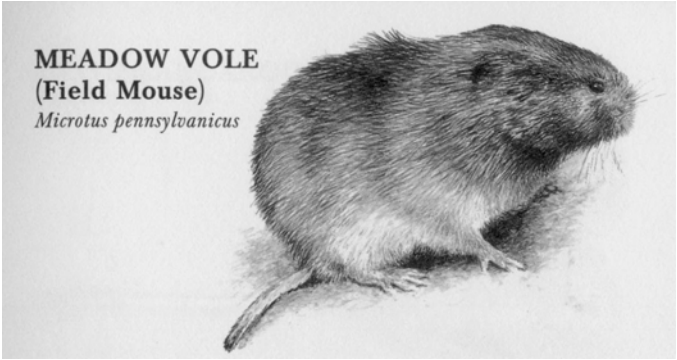


Skunk



Notice the webbed feet and the tail marks in the beaver tracks.

Small Mammals



Deer Mouse

Birds

Great Horned Owl (Sitzmark)

