

The *Nature* of Teaching

• UNIT 1 •

Animal Diversity and Tracking

Animal tracks are useful to reveal the diversity of organisms within different environments.



Doug Herr

| | |
|---------------------------------------|---|
| Overview | 2 |
| Lesson 1: Animal Tracks | 3 |
| Lesson 2: Scent Stations | 4 |
| Lesson 3: Indoor Track Casting | 7 |
| Lesson 4: Outdoor Track Casting | 9 |

Rod N. Williams and Robert N. Chapman

Department of Forestry and Natural Resources, Purdue University, West Lafayette, IN 47907

Unit 1 • Overview

Estimated Time

Four 30–50 minute Lessons

Vocabulary

- Habitat
- Generalist
- Specialist
- Plantigrade
- Digitigrade
- Track

Unit Objectives

Students will be able to:

- Identify wildlife species using tracks.
- Recognize that animal diversity is high even though we do not see the animals.
- Predict which species tracks they are likely to find based on habitat requirements.
- Create molds of tracks and interpret animal behavior.

Targeted Grade-Level Indiana Standards

K–5 Science Standards

- 1.1.2; 1.1.4; 1.2.4; 1.2.6; 1.4.2
 2.1.2; 2.4.4
 3.1.2; 3.1.3; 3.2.2.; 3.2.4; 3.4.1
 4.1.2; 4.1.5; 4.1.6; 4.2.5
 5.1.1; 5.2.4; 5.2.7; 5.2.8; 5.4.4; 5.4.5; 5.5.1

K–5 Math Standards

- 1.1.10; 1.5.1; 1.5.4
 2.1.11; 2.1.12; 2.5.1; 2.5.3
 3.1.13; 3.5.1
 4.5.1; 4.6.1; 4.6.2
 5.6.1; 5.6.2; 5.6.3; 5.6.4

9–12 Natural Resource Management

- N1; N2; N3

Reference Materials

Natural History of Indiana Mammals (FNR-413)
 by Robert N. Chapman and Rod N. Williams

Required Materials

- Masonry sand
- Yard or meter stick
- 2 ml vials
- Scent or bait
- Flour sifter
- Pen or pencil
- Ruler
- Scent Station Data Sheet
- Camera to document activities
- *Natural History of Indiana Mammals* (FNR-413) by Robert N. Chapman and Rod N. Williams
- *Big Tracks Little Tracks Following Animal Prints* by Millicent E. Selsam
- *Peterson Field Guide to Animal Tracks* by Olaus J. Murie, Mark Elbroch, and Roger Tory Peterson

Acknowledgments

*The authors would like to thank the Indiana licensed teachers, Cheryl Van Laeken and Charity Keffaber, for reviewing previous drafts of this publication.
 The authors would like to give a special thanks to Shelly Williams for her guidance and suggestions during the development of The Nature of Teaching Workshop Series.
 We would like to thank the Ohio Department of Natural Resources for the animal track illustrations.*

Purdue University Agricultural Communication Service • Purdue University Cooperative Extension Service • Editor: Becky Goetz • Designer: Dan Annarino

It is the policy of the Purdue University Cooperative Extension Service that all persons have equal opportunity and access to its educational programs, services, activities, and facilities without regard to race, religion, color, sex, age, national origin or ancestry, marital status, parental status, sexual orientation, disability or status as a veteran. Purdue University is an Affirmative Action institution. This material may be available in alternative formats.

Lesson 1:

Animal Tracks

This activity teaches students to identify animal tracks.



Estimated Time ► 30–40 minutes

Required Materials

- Pen or pencil
- Ruler
- *Natural History of Indiana Mammals* (FNR- 413) by Robert N. Chapman and Rod N. Williams
- *Peterson Field Guide to Animal Tracks* by Olaus J. Murie, Mark Elbroch, and Roger Tory Peterson
- *Big Tracks Little Tracks Following Animal Prints* by Millicent E. Selsam

Procedure

1. Introduce the term “track” (a footprint made by an animal). Ask the students where they are likely to find animal tracks (snow, mud, sand, river banks, etc.). Explain to the students that tracks can tell you a lot about an animal. You can tell what kind of animal left the track, how fast it was moving, the direction it was moving, and whether it was alone or with other animals.
2. Read *Big Tracks Little Tracks Following Animal Prints* by M. Selsam (or any grade-level-appropriate book) to the class.
3. Introduce the following terms that describe foot types to the students:
 - a. Plantigrade: walking with the entire sole of the foot on the ground
 - b. Digitigrade: walking on the toes

Ask the students to give examples of animals with each foot type: plantigrade (e.g., bears, raccoons, and people); digitigrade (e.g., dogs and cats).
4. Have the students examine a selected group of tracks from the *Natural History of Indiana Mammals* sheets (note: the tracks are not printed to scale here). Make sure to have examples from each foot type. Have the students practice taking measurements of the length and width of each track, record their measurements on paper, and compare them to *Peterson Field Guide to Animal Tracks*. Point out that tracks from the front feet often differ from those left by the hind feet. Explain to the students that taking accurate measurements of an animal track is an important part of identifying the animal that left it.



Lesson 2:

Scent Stations

This activity familiarizes students with techniques used for assessing wildlife diversity.



Missouri Department of Conservation

Estimated Time ▶ 50 minutes

Required Materials

- 50 lbs of masonry sand
- Yard or meter stick
- 2 ml vials
- Scent or bait
- Flour sifter
- Pen or pencil
- Ruler
- Notebook paper
- Scent Station Data Sheet
- *Natural History of Indiana Mammals* (FNR- 413) by Robert N. Chapman and Rod N. Williams
- *Peterson Field Guide to Animal Tracks* by Olaus J. Murie, Mark Elbroch, and Roger Tory Peterson

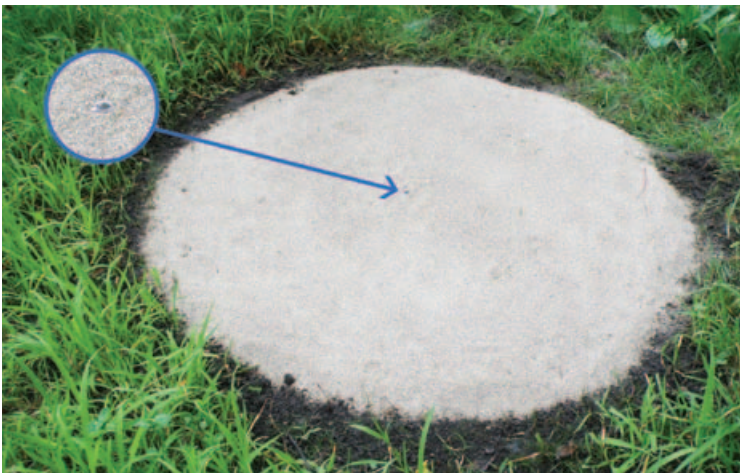
Procedure

1. Introduce the term “habitat” (the area that provides adequate food, water, space, and shelter). Explain to the students that different animals can be found in different habitats (forest lands, agricultural lands, wetlands, deserts, etc.). Some animals are habitat specialists and occur only within a few types of habitats (e.g., northern water shrews only occur in clear, fast-moving streams with forested edges). Other species are habitat generalist and can be found in a wide range of habitats such as forests, grasslands, agriculture lands, and wetlands (e.g., raccoon).
2. You may want to further discuss which species are likely to be found within various habitats (use the natural history sheets provided with your trunk). Explain to the students that different animals have different habitat requirements and, thus, different

habitats may contain different species. Some habitats can contain a great diversity of wildlife species. Despite this diversity, however, many wildlife species are seldom seen. Many are shy, nocturnal animals that are best identified by the tracks they leave within their environment. An effective way to obtain an animal’s tracks is to lure it to a station using various scents or attractants.

3. Scent Station Installation
 - a. Choose your location for the scent station carefully. The area should be relatively flat and positioned where animals are likely to encounter it during daily movements (e.g., habitat edges, intersections of paths, etc.).
 - b. Clear an area 1 meter in diameter down to bare soil. The area should be free of grass, sticks, rocks, and other debris that could obscure tracks.

- c. Pour 2/3 of your masonry sand onto the cleared area. Evenly cover the area with sand. Use your yardstick to create a full circle. Take care to ensure your edges are well defined to increase your chances of detecting tracks along the periphery of the circle. Animals will often step on the edge of the scent station while inspecting your attractant located in the center of the station.
- d. Place a 2 ml vial of lure/attractant directly in the center of your scent station (see Figure 1).



Robert Chapman

Figure 1. Completed scent station. Note the small scent vial located in the middle.

4. Divide the class into groups and have them install scent stations in one or more habitats/locations. Scent stations should be at least 20–30 meters apart.
5. Leave the scent stations in place overnight, then check them once daily for 2–3 consecutive days. On the scent station data sheets, have students record the species detected and the number of tracks. Students should only record data for scent stations that they installed. To identify the tracks, have students compare tracks found at scent stations to those printed on the *Natural History of Indiana Mammals* sheets.
6. Practice identifying tracks again by stamping tracks in a tub of sand in the classroom. This will give students an opportunity to identify tracks in a situation similar to the scent stations outside.
7. After checking the stations and recording data, you may need to use the remaining sand to repair stations. Use the sifter to shake sand over the station each day to cover any existing tracks.
8. Explain to the class that this activity will help them identify animal tracks and recognize that some species are found only in certain areas, while others are found in nearly all areas. Students also should be able to determine the diversity of animals in their areas.
9. Additional Activities (advanced)
 - a. Have the students experiment with different scents and attractants. Ask the students to predict how the results will change.
 - b. Have the students simultaneously construct scent stations within different habitats. Ask the students to predict which species are likely to be detected within each habitat type based on their knowledge of species habitat requirements.
 - c. Graph actual results. Use a graph to record the actual species tracks that were found at the scent stations. Some graphs could be bar, frequency tables, pie, etc. The “x” axis represents wildlife species and the “y” axis represents the number of tracks.

Scent Station Data Sheet

Date: _____

Observer(s): _____

Scent Station # / Location: _____

Weather Conditions: _____

Habitat Type: _____



| Day | Species | # Hind Foot Tracks | # Front Foot Tracks | Lure | Comments |
|-----|---------|--------------------|---------------------|------|----------|
| 1 | | | | | |
| | | | | | |
| | | | | | |
| | | | | | |
| | | | | | |
| 2 | | | | | |
| | | | | | |
| | | | | | |
| | | | | | |
| | | | | | |
| 3 | | | | | |
| | | | | | |
| | | | | | |
| | | | | | |
| | | | | | |

Lesson 3:

Indoor Track Casting

This activity provides students with an opportunity to create plaster casts of common species.



Estimated Time ▶ 30 minutes

Required Materials

- Track molds
- Mixing bowl
- Spoon
- Measuring cup
- Plaster of Paris
- Water
- *Tracks, Scats and Signs* by Leslie Dendy
- Paint and paint brushes (optional)
- White sheet (optional)

Procedure

1. Explain to the students that tracks are important signs left behind by animals. They can provide clues about what an animal was doing. Different animals leave different tracks. Explain to the students that you can identify the tracks of different animals by examining key features of the tracks (e.g., presence or absence of claw marks, size of a track, etc.).
2. The students will be creating their own tracks from molds using the following recipe.
 - a. Using the measuring cup, place a full cup of Plaster of Paris into the mixing bowl.
 - b. Measure $\frac{1}{2}$ cup of water and add slowly while mixing, until it is as thick as heavy whipping cream or pancake batter.
3. Immediately pour the mix into a track mold until it fills the entire mold. Let the plaster-filled mold sit for at least 20–40 minutes to harden.



Figure 2. Completed set of track casts. (Virginia opossum shown here.)

Robert Chapman

4. Repeat steps 1–2 for each mold you want to create. When finished, rinse the mixing bowl with water (do not pour down the sink).
5. While the molds and mixes are hardening, read *Tracks, Scats, and Signs* by Leslie Dendy to the class.
6. To remove the tracks from the molds, simply turn the mold upside down and pry the plaster out (Figure 2). Take caution not to break off the tiny digits of the feet.
7. Have the students describe how to identify their tracks.
8. Ask the students which of the species tracks are digitigrade and which are plantigrade.
9. Additional Advanced Activities (optional)

Create a landscape in which an animal might live by drawing trees, streams, and grasslands onto a clean white table cloth or sheet. Have the students paint their tracks and stamp them onto the sheet to create a “story” about how their animals move and use the environment.



Lesson 4:

Outdoor Track Casting

This activity demonstrates how to create plaster casts of animal tracks and interpret animal behavior.

Estimated Time ▶ 30 minutes

Required Materials

- Mold ring
- Mixing bowl
- Spoon
- Measuring cup
- Plaster of Paris
- Water

Procedure

1. Explain to the students that tracks are important signs left behind by animals. Tracks can provide clues about what an animal was doing. You can tell what kind of animal left the track, how fast it was moving, the direction it was moving, and whether it was alone or with other animals. Explain to the students that you can identify the tracks of different animals by examining key features of the tracks (e.g., presence or absence of claw marks, size of the tracks, etc.).
2. In this activity the students will be creating plaster casts from animal tracks found within different habitats.
3. Before taking the students to the woods, cut the tops and bottoms off of several 2-liter bottles. The center rings should be 3–4 inches tall and will be used to surround tracks and hold the plaster of Paris. You can keep the bottom portions of the bottles as mixing containers, if needed.
4. Instruct the students to focus on likely paths used by animals (intersections, along habitat borders, along ditches or creek banks, etc.) during their searches for tracks. Once a track is discovered, have the students follow the following protocol.
 - a. Remove any debris from inside and around the track.
 - b. Place the plastic ring over the track and press firmly one-half inch into the ground.
 - c. Using the measuring cup, place a cup of plaster of Paris into the mixing bowl.
 - d. Measure $\frac{1}{2}$ cup of water and add slowly while mixing until it is as thick as heavy whipping cream or pancake batter.
 - e. Immediately pour the mix into a track until it fills the entire mold. Let the plaster-filled mold sit for at least 20–40 minutes to harden.
5. Once the mold hardens, carefully lift the mold and remove the plastic ring.
6. To prepare for later discussion, have students thoroughly inspect the habitat and surroundings where the track cast was made.

7. Have each student return to the classroom to create a mold inset from the track collected from the field. Follow the steps below:
 - a. Rub a thin coating of Vaseline over the track and surface of the entire cast. Replace the plastic ring of the track cast.
 - b. Using the measuring cup, place a cup of plaster of Paris into the mixing bowl.
 - c. Measure $\frac{1}{2}$ cup of water and add slowly while mixing until it is as thick as heavy whipping cream as before.
 - d. Immediately pour the mix into a track until it fills the entire mold. Let the plaster-filled mold sit for at least 20–40 minutes to harden.
8. To remove the tracks from the molds, carefully separate the two layers of track casts from one another. Wipe any excess Vaseline from the casts.
9. Ask the students to interpret what the animal was doing when it left the track. Was it searching for prey? . . . tracking prey? . . . simply traveling from place to place? Were any tracks found nearby? In what habitat was the track found? How many different species were collected? How many habitats were represented? Based on the data collected, what are the habitat preferences of the various wildlife species?



Dan Annarino