

NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION

Reinstein Woods Environmental Education Center

93 Honorine Drive, Depew, NY 14043

P: (716) 683-5959 | F: (716) 686-0210 | ReinsteinWoods@dec.ny.gov

www.dec.ny.gov

Dear Educator:

Thank you for your interest in Reinstein Woods' environmental education programs. You have scheduled the program "Animal Tracks" as an in-school program. In this packet, you will find an overview of the "Animal Tracks" program and post-visit activities to supplement your program. Please try to go over the vocabulary list (found in the overview) with your students before the program.

We feel that our program will be of more value to students if related classroom activities are done after the lesson. The enclosed activities are designed to reinforce concepts learned during the program.

The New York State Department of Environmental Conservation is currently sponsoring educational workshops for teachers. These workshops include Project WILD—a program that emphasizes awareness, appreciation, and understanding of wildlife—and Project WET, an education program that teaches about water resources. We also offer Project Learning Tree trainings for educators in grades PreK-12. To learn how you can attend a workshop to obtain these materials for use in your classroom, please contact Reinstein Woods or visit <http://www.dec.ny.gov/education/1913.html>.

We hope that this information is helpful to you and your students, and feedback is encouraged. Please take some time to complete and return the program evaluation following the lesson. We look forward to seeing you soon!

Sincerely,

Reinstein Woods Environmental Education Center Staff

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ANIMAL TRACKS

Grades: Prek – 3

Length: 45 min.

Maximum Students: 25

Standards

State learning standards addressed through our program are listed below.

2017 P-12 Science Learning Standards

Science and Engineering Practices

- Developing and Using Models
- Analyzing and Interpreting Data

Disciplinary Core Ideas

- **ETS1.A:** Defining and Delimiting Engineering Problems
- **ETS1.B:** Developing Possible Solutions
- **LA1.A:** Structure and Function
- **LS3.C:** Adaptation

Cross Cutting Concepts:

- Patterns
- Structure and Function
- Influence of Engineering, Technology, and Science on Society and the Natural World

ELA/Literacy

- Speaking and Listening (K-3)

Mathematics

- Measurement and Data (K-3)

Excellence in Environmental Education:

Guidelines for Learning (K-12)

- **Strand 1**— Questioning, Analysis and Interpretation Skills: Guideline A, B, C
- **Strand 2.2**—The Living Environment Guideline A, B

Objectives:

Students will understand that...

1. Animals leave behind footprints (tracks) and other signs when getting food, water and shelter from their habitat.
2. Using shapes, sizes and patterns, we can use tracks to determine what animal visited an area.
3. Animals have feet adapted to best suit their environment.
4. Humans have designed solutions to problems by mimicking the feet of animals.

Background

We may rarely see wild animals in our neighborhoods, but, if we look closely, we may find one of the many signs of activity that they have left behind. Animal footprints, or tracks, are an easy sign to interpret and identify. By looking at track patterns and shapes, students can determine what animals are living in their neighborhood.

Animals leave other signs behind as well—scat (poop), food remnants, nests, holes, hair or feathers, and more. These signs—along with animal tracks—can be used to better understand a local ecosystem. Animal signs help tell the complex story of animal interactions and behavior. By investigating these signs and their locations, students can determine habitat requirements, animal size and activity, and methods of movement.



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Background continued

Studying animal feet and movement give us a better understanding of how feet are adapted to different environments; for example, the large feet of the snowshoe hare allows it to distribute its body weight over snow and travel more easily in deep snow. Humans have used their understanding of animal feet to engineer many solutions to problems; for example strapping snowshoes on our feet, we mimic the large feet of the snowshoe hare and can travel more easily in snow. Students can apply their understanding of animal tracks to scientific investigations and engineering solutions.

Spelling/ Vocabulary List

Adaptation: a body part or feature or a behavior that helps a living thing survive and function better in its environment.

Bound: to move by leaping

Claws: a sharp usually slender and curved nail on the toe of an animal

Den: the resting or living place of a wild animal

Footprint: an impression on a surface left by a foot

Front feet: feet closer to the animal's head

Gallop: a bounding run

Hind feet: the back feet closer to an animal's rear

Hoof: the foot of a deer

Hop: move by leaping (i.e. rabbit)

Length: how far from end to end

Pattern: repeated design

Scat: animal excrement or poop

Stride: the length of a step or manner of taking steps in walking or running.

Track: an animal footprint

Trail: the path of an animal, often marked by scent or tracks

Waddle: to walk with short steps swinging the body from side to side

Walk: to move on feet

Width: how far from side to side

Wild: not tamed by humans



MYSTERY TRACKS :

Observation vs. Inference

Grades: 2 – 3

Length: 20 min.

Subjects: Science, ELA

Materials:

- Track Story Panels
- Whiteboard or Student Journals
- Paper
- Pencils

Background:

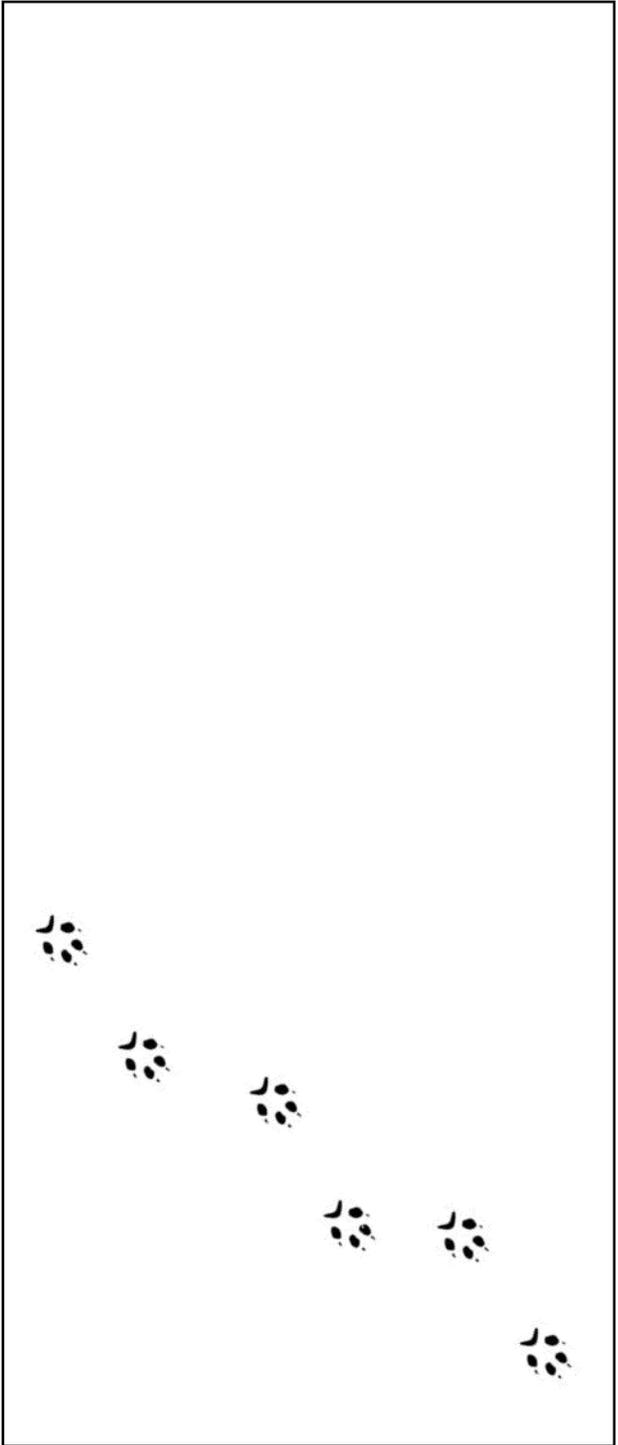
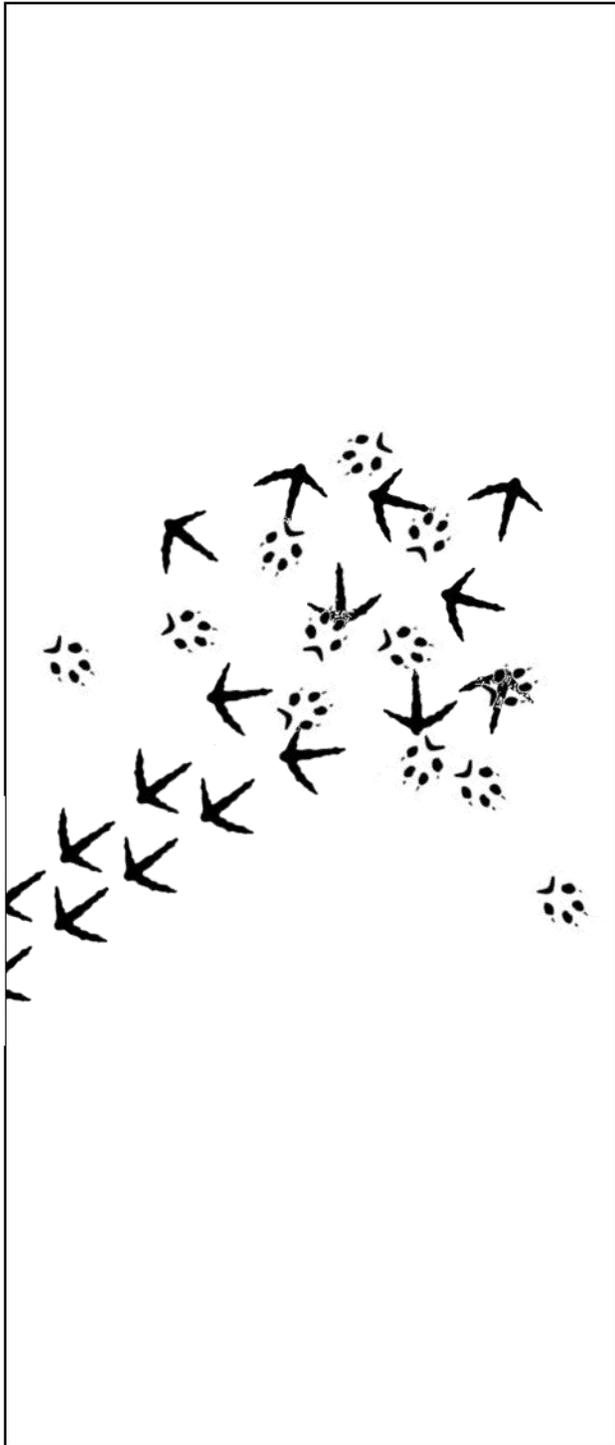
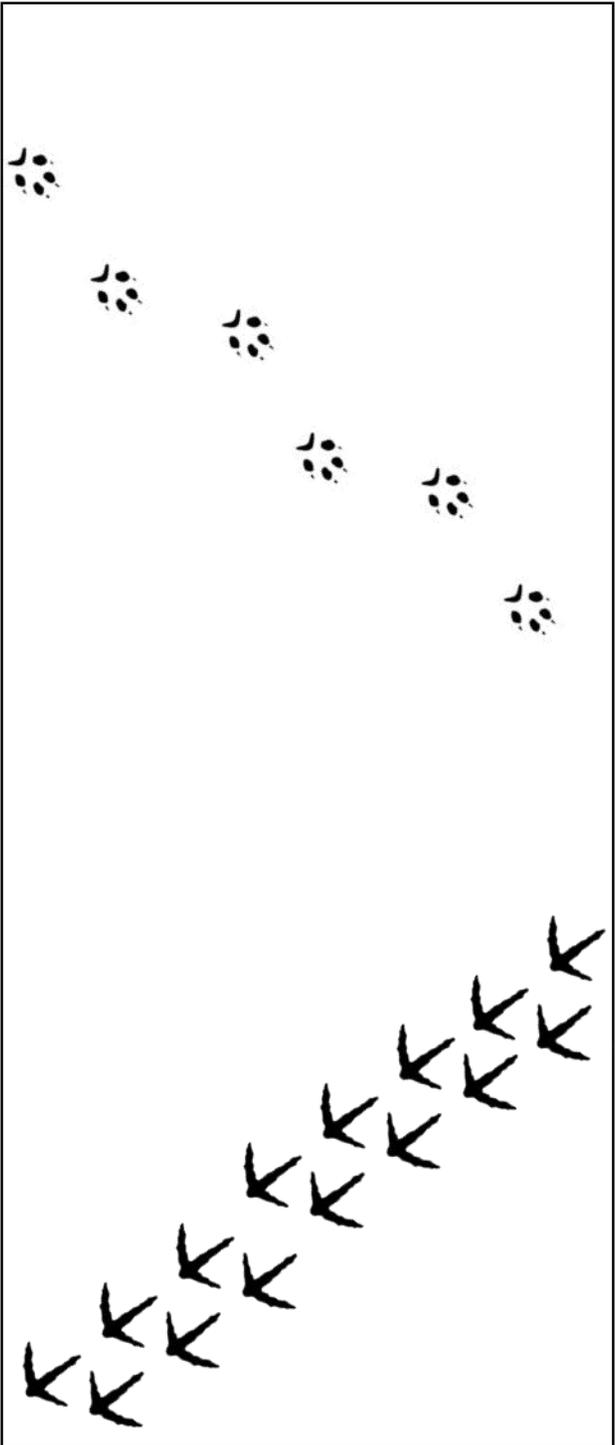
All scientific data is based on observations. It is important that young scientists understand the difference between **observation** and **inference**. **Observations** are statements that are based on one or more of your senses: what you see, hear, taste, smell, or feel. **Inferences** are statements that explain or interpret what was observed. For example, it is an inference to assume a turtle draws its head into its shell because it is trying to protect itself. Seeing a turtle draw in its head several times when the turtle is approached or handled, you may infer that it is doing so to protect itself.

Procedure:

1. Show the students the first panel in the track story below.
2. As a class or in individual notebooks, have students come up with three observations and one inference for the scene.
3. Introduce the next panel. Repeat with three observations and one inference for all three panels.

Sample Observation/Inference Chart

	Observations	Inference
Panel 1	<ul style="list-style-type: none">• There are two sets of marks• The marks are moving in opposite directions• One mark has three lines. One mark has four circles.	<ul style="list-style-type: none">• The tracks are made by animals.• There is a set of fox tracks and a set of bird tracks.
Panel 2	<ul style="list-style-type: none">• There are still two different kind of marks.• Two sets of marks are mixed up in the middle.• The marks do not look paired anymore.	<ul style="list-style-type: none">• Two animals met.• The two animals are fighting.
Panel 3	<ul style="list-style-type: none">• Now there is only one set of marks.• The marks have the same pattern as they did in the first picture.	<ul style="list-style-type: none">• The fox ate the bird.• The fox is carrying the bird.• The bird flew away and the fox kept walking.



DESIGN YOUR GEAR

Grades: 1 – 3

Length: 20 min.

Subjects: Science, ELA,
Engineering

Materials:

- Paper
- Pencils/Crayons
- Gear Worksheet

Background:

Adaptations are special features or behaviors that help an organism survive in its environment. Animal feet have a wide range of adaptations that help the animal in specific ways, including catching prey, traveling on special surfaces, etc. By studying these adaptations, engineers can design solutions to a variety of human problems. This is called **biomimicry**.

Procedure:

1. Review the various adaptations of animal feet. A few suggestions as well as a resource for older students can be found at:
http://files.dnr.state.mn.us/mcvmagazine/young_naturalists/young-naturalists-article/feet/feet.pdf
2. Remind students how humans used their observations of the feet of snowshoe hares and other winter wildlife to design snowshoes. When humans design solutions based on their observations of adaptations in nature it is called **biomimicry**.
 - Break down the word. “Bio” means life and “mimic” means to imitate or copy so biomimicry is imitating life or nature.
3. Ask students to think of their favorite sport or outdoor activity. Have students complete the worksheet to design a new gear product for their activity that is based on their knowledge of animal feet. Some examples include:
 - New roller blade wheels that are as hard as deer hooves
 - Tree climbing gloves with retractable “claws” like a cat
 - Heated soles of shoes resembling the blood vessel in the paws of wolves.

Biomimicry Resources and Extended Lessons:

Wild Ideas, Wild Inventions. (Minnesota Conservation Volunteer)

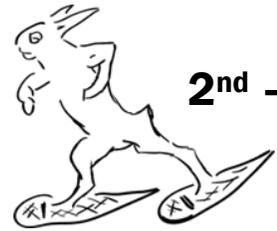
http://files.dnr.state.mn.us/mcvmagazine/young_naturalists/young-naturalists-article/wild_ideas/wild_ideas.pdf

Biomimicry in Youth Education: A Resource Toolkit for K-12 Educators. (Biomimicry Institute)

http://biomimicry-static.s3.amazonaws.com/digital_toolkit/index.html#p=1

NAME:

BioMimicry



2nd – 3rd

Design a new gear product for your favorite sport or outdoor activity. Your product must include at least one feature that is based on your knowledge of animal feet adaptations.

Sport or Activity:

Describe the foot of the animal you are mimicking:

Describe your product. Be sure to include how you have used your knowledge of your animal's foot in the design.

Draw your design:

How will your design help you during your sport or activity?

NAME:

BioMimicry



1st grade

Design new gear for your favorite sport that mimics, or copies, an animal foot.

What animal did you choose?

Draw your design:

A large, empty rectangular box with a thin black border, intended for a student to draw their design.

How will your design help you play the sport?

TRACKS! MIGHTY MATH:

from [Growing Up WILD](#)

Grades: Pre-K - 1

Length: 20 min.

Subjects: Math

Materials:

- Butcher Paper
- Washable Paint
- Paint tray or plate
- Measuring tools

Procedure:

1. Lay out a roll of butcher paper.
2. Have students take off their shoes and dip their feet into paint and walk from one end of the paper to the other.
3. Use a ruler or other measuring tool (such as thumbs) to measure the lengths of the painted prints on the butcher paper. Which is the longest? Which is the shortest?
4. Measure the distance—from toe to toe—between one footprint and the next of an animal or person. This distance is called the stride.
5. Measure the stride for another set of tracks. How does the second person's stride compare to the first?
6. Measure other strides to see if you notice a pattern.

TRACKS!: MUSIC

from [Growing Up WILD](#)

Grades: Pre-K - K

(To the tune of "Soup, Soup, We all love Soup!")

*Tracks! Tracks!
We all make tracks.
Big feet or small paws
With or without claws.*

*Tracks! Tracks!
We all make tracks.
A footprint left in mud or snow
A clue that tells which way to go.*

*Tracks! Tracks!
We all make tracks,
Come follow me and have some fun!*

TRACKS!: MOVEMENT

from [Growing Up WILD](#)

Grades: Pre-K - K

Invite children to move like different animals.

- Bears lumber on all fours (not on knees).
- Turkeys and ducks waddle from side to side.
- Sparrows hop on two feet.
- Foxes and cats stalk and pounce.
- Rabbits hop by placing their front paws on the ground and then moving their big hind feet in front of the front paws.

Encourage children to create their own animal movements.

ADDITIONAL RESOURCES

Non-Fiction

Animal Tracks

by Arthur Dorros

Big Tracks, Little Tracks: Following Animal Prints

by Millicent Ellis Selsam

Mammal Tracks: Life Size Tracking Guide

by Lynn Levine and Martha Mitchell

Tracks, Scats and Signs

by Leslie Dendy

Whose Tracks Are These? A Clue Book for Familiar Forest Animals

by James Nail

Wild Tracks! A Guide to Nature's Footprints

by Jim Arnosky

Fiction

Follow Those Feet!

by Christine Ricci

Footprints in the Sand

by Cynthia Benjamin

Footprints in the Snow

by Cynthia Benjamin

In the Snow: Who's Been Here?

by Lindsay Barrett George

Stella and Roy Go Camping

by Ashley Wolff

Tracks in the Snow

by Wong Herbert Yee

Internet

[Animal Tracks Brochure](#)

NYSDEC

[Become a Winter Wildlife Detective](#)

NYSDEC Conservationists for Kids

[The Greatest of Feet](#)

Minnesota Conservation Volunteer

TAKE IT OUTSIDE!

- Look for animal tracks and signs in your schoolyard.
- Make tracks in snow, sand, mud or even on concrete using wet feet and hands.
- Set an animal track trap in your schoolyard-
link available on our Pinterest board.
- Trace footprints and draw animal tracks outside with chalk.

We've done the
searching for you!

Find links to these resources and
additional activities on our
Animal Tracks Pinterest Board.

Click the link below:

