

## LESSON 1

### Tracks and Traces

#### OBJECTIVE

Teach students about the different ways we can identify that an animal has passed through a certain location (without actually seeing the animal).

#### TIME AMOUNT

2 Hours

#### MATERIALS

- Single piece of beautiful, seedy scat.
- Paper for compiling lists (can use their nature journals).
- Pencils (for writing lists).
- Tablet to play animal calls (optional).
- 4 large yogurt containers/pots/similar containers with holes drilled into the bottom (to let water drain).
- Paint markers to decorate the plant “pots”
- Small pieces of paper with each animal name on it – can hand write names [4 per animal; 1) snake, 2) blue jay, 3) turkey, 4) male cardinal, 5) cicada, 6) bob cat, 7) raccoon, 8 & 9) deer (twice per group), 10&11) rabbit (twice per group), 12) black bear, 13) coyote, 14) goose, 15) beaver, 16) humming bird, 17) emerald ash borer].
  
- Snake skin (4)
- Blue jay feather (4)
- Turkey feather (4)
- Male cardinal feather (4)
- Cicada molt (4)
  
- Picture of bob cat paw print (4)
- Picture of raccoon paw print (4)
- Picture of a deer print (4)
- Picture of a rabbit print (4)
  
- Picture of coyote scat (4)
- Picture of deer scat (4)
- Picture of rabbit scat (4)
- Picture of black bear scat (4)
- Picture of goose scat (4)
  
- Piece of wood chewed on by a beaver (4)
- Picture of a humming bird nest (4)
- Picture of emergence hole created by an emerald ash borer on an ash tree (4)

## PROCEDURE

### 0-5 min

Discuss the importance of understanding the biological diversity of an area (i.e., why should we care what animals live here?). Explain that a greater number of animals in an area are typically considered good, while a lower number of different animals in an area are typically considered bad. Ask the students why this might be?

*More types of animals potentially means:*

- More food available for predators.
- A single disease, parasite or competitor is less likely to kill all the animals in the area.
- Will use a greater variety of spaces within the habitat (e.g., some frogs prefer living in trees, while others prefer living in ponds; some fish hunt for food at the bottom of the water, while others hunt on the surface of the water).

### 5-10 min

Split students into 3-4 groups. Ask students to brainstorm a list of reasons that might limit us seeing an animal in person?

*Potential answers include:*

- Predator avoidance (e.g., when we hike in a group we are typically pretty loud, so some animals like bears may avoid us).
- Some animals only active at night or really early in the morning (e.g., raccoons and beavers).
- Some animals live in hard to see locations like high in trees (e.g., various birds).
- Some animals are very small, so are hard to find (e.g., insects like emerald ash borer).  
*Note: we see a lot of insects on our hikes, but do you think we actually see ALL of them?.*
- Generally just move quickly.

### 10-15 min

Now have students brainstorm types of evidence we can use to determine that an animal was *once* in a certain location. Prompt students to review their list of reasons we may not see an animal in person and think of other ways we might know that a certain animal is in an area. Can give the example of *hearing* the call of an animal, like a bird or frog. If possible, use a phone or tablet to play examples of these calls.

*Other types of evidence may include:*

- Paw prints.
- Markings on trees (e.g., beaver teeth marks on wood, “D” shaped holes on trees from the emergence of emerald ash borers, and marks from deer antlers rubbing on trees in the fall and winter).
- Animal molt (e.g., a snake skin or insect exoskeleton).
- Scat (i.e., animal poop).
- Fur or feathers left behind.
- A home (e.g., bird’s nest, bare spot in the ground from a turkey sleeping, beaver dam by a stream).

**15-45 min**

Now that we know the different types of evidence, let's practice matching them to organisms in our area. In your groups, try matching each piece of evidence to the corresponding animal. Use the ID guides to differentiate between the various types of paw prints and scats, as well as to look up what your animals look like to aid in the matching process.

**45-60 min**

As a single group, review which animals each small group matched to each piece of evidence. Select a piece of evidence to start and have students hold up the name of the animal they matched it to. Ask each group why they matched that organism to that piece of evidence. Potential factors may include the color, size or shape of the organism, or the diet of the organism.

**60-65 min**

Now that we know what animal left each trace behind, can we learn anything else about their life by looking at the evidence more closely? Ask students to focus specifically on the images of scat and brainstorm differences between each within their small groups.

*If students are struggling, prompt them to look at the color and texture of each piece of scat.*

**65-75 min**

From scat, we can learn what type of food resources an animal relies on. For example, if an animal ate another animal there may be parts of the prey that the predator was unable to digest such as fur and bones. If an animal ate parts of a plant such as their fruit, then there may be seeds left behind in the scat. With animal remains in scat, experts may be able to identify the prey organism based on the size and shape of the bones, especially distinct parts like the skull. Similarly, with plants if an organism ate a fruit, then there may be visually distinct seeds left in the scat (e.g., paw paw seeds look like very large, brown, lima beans). Sometimes, though, the seeds may be small and hard to identify.

So, if we want to identify what type of fruit an animal ate based on the seeds left in their scat, how could we do that? One way might be to try to cultivate the seeds from the scat.

**75-95 min**

In each group, decorate your plant pot using paint markers. Decoration ideas include writing group members names, guesses as to what plant will grow from the seeds, or the animal that students think the scat originated from.

**95-120 min**

Once plant pots are all decorated, fill each pot  $\frac{3}{4}$  the way with soil, distribute  $\frac{1}{4}$  of scat on the top layer of the soil, and add a light top layer of soil and water. Place on porch along railing facing the garden and pond. We will check on these plant pots periodically throughout the week to see what grows!