

Discovering your Ecosystem



Written By: David White and Mitchell Gage

Lesson Overview

Introduction:

As spring approaches and the snow melts, plants, animals, and insects are starting to emerge. This lesson plan includes two main parts, an exploratory activity that requires going outside to collect data in your backyard or a local park, and a journaling prompt to get students thinking creatively about fascinating aspects of nature.

Guiding Questions:

1. What plants, insects, and animals live around you?
2. What are different ways you can find, observe, and study them?
3. How are your local plants, insects, and animals related? What patterns do you notice (proximity to water, canopy cover, etc.)?
4. How can poems convey relevant information? What other writing styles do you prefer?
5. How can you share this information creatively?

Notes for Parents/Teachers

- This activity is meant to get children outside to explore and observe. No matter how small, large, forested, or open your landscape is, if you look closely there are way more plants than you realize! When doing this activity, don't overlook the small plants that may be dwarfed by some of the bigger ones, they make a big difference in diversity! Allow your kids to place their transect line in different areas and create meaning from the data that you collect.

Age Group:

- 5th and 6th graders

Total Time Needed:

- ~2 hours

Materials Needed

- Notebook
- Pencil
- Ruler
- Scissors
- Cord/Rope/String
- Marker
- Computer

See more from MOSS Adventure Learning at moss.uidaho.edu/adventure

Discover your Ecosystem

Part 1: Looking at Biodiversity

Estimated time: 80 minutes

Do you know what plants live around you? To look at biodiversity among plants, we are going to be using a tool called a transect line. Transect lines are often used in ecology to study what biotic (living) and abiotic (non-living) features can be found at any given point along the line. Lucky enough for you, you can make one very simply at home! Use this time to explore, observe, and be in nature!

Methods:

Additional help and resources before starting:

- Watch this short tutorial video on YouTube:
<https://youtu.be/oBDOqcWVbks>
- Print out the data sheet found by copying and pasting this link into your web browser:
<https://drive.google.com/file/d/1eh48ZdaBybsCeQOxWc3lbgG9vsUwdtsr/view?usp=sharing>
- Copy and paste this link into your web browser if you need more help understanding how to use a transect line:
https://drive.google.com/file/d/1_mCk8KdnWK32mDCsfEK8mNSeT-D_008s/view?usp=sharing

Creating your transect line:

1. Use a rope, string, or twine to create your line. Size can vary, but 40 feet works well for this practice.
2. Mark your line every 1 foot. Find the center of your transect.
 - a. Choose one direction from the center to designate as Arm A on your data sheet and the opposite direction as Arm B.
3. Find a spot in your desired location that is representative of its surroundings (make sure that most of your transect line is not on a path, road, or bare ground in an otherwise vegetated area).



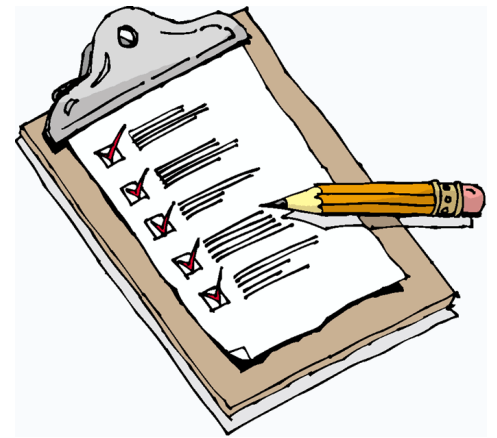
See more from MOSS Adventure Learning at moss.uidaho.edu/adventure

Discover your Ecosystem

4. Your line should help to compare different areas;
 - a. transitions between various ecosystems,
 - b. transitions from a water source, or maybe from a commercialized area to a grassy area.
 - i. For Example: You can look at how plant diversity changes as you move further away from a stream
5. Count and record the number of plant species and the total number of plants on the data sheet. The backside of the data sheet has insects, so you can try that after if you are curious. Does a more forested area have more or less insects?
 - a. Use your line to compare a multitude of factors; plant diversity, insect diversity, canopy cover, soil moisture, etc.
6. Get creative and try multiple areas! Transect lines are used professionally by ecologists and biologists.

Reflection Questions:

1. Did you find more or less plant species than you thought you would? Did anything surprise you?
2. What factors in your area did you notice which may have an effect on plant life and diversity?
3. What has the temperature been the last few weeks? Has there been much rain?
4. Was it difficult to recognize or identify different plants? Trying using a plant ID field guide or online resources to help you identify common plants.
5. How else could you use a transect line?



Discover your Ecosystem

Part 2: Winter Bees Writing Activity

Read a few poems collected from *Winter Bees & Other Poems of the Cold* by Joyce Sidman and Rick Allen. These are included in the pdf linked below. Make sure to also read the info included about each animal that goes along with each poem. Each animal's poem is on the left, and their behavior info is on the right. You can find these poems in the other document in this lesson's section of the MOSS Adventure Learning website.

Your Turn!

1. Now that you've seen some examples, select an animal that you would like to write about. This can be something you saw while exploring outside, or any other creature that you choose.
2. Learn some more about your chosen animal. Look for more information on your choice online in order to learn more about its springtime behavior and environment to help you write a poem or story. If you choose a creature that you saw or that you know lives in your area, use your observations from your exploration outside today to give you more details to include in your writing.
3. Write 5-10 sentences sharing how your animal survives in winter and/or springtime based on your knowledge and what you found out during your research.
4. Pick your favorite poem style and make a poem about your animal in winter or spring. Use what you wrote about how your animal survives from step 3 to help you figure out what would be good info to use in your poem. Can your chosen creature burrow in the newly thawed ground like rabbits? Are they eating new flower buds like rabbits, squirrels, and deer? Are they eagerly waiting for the flowers to bloom to get nectar like bees and other insects?



Materials Needed

- Notebook
- Writing Utensils
- Computer for further research (Optional)

Notes For Parents/Teachers:

- This exercise is meant to get students to take some of the observational skills they have been working on earlier in this lesson and apply those skills and observations in a creative way. Try to encourage students to relate the behavior of the animals to the environment and the transition from Winter to Spring. This activity should encourage students to see the connections between the various aspects of the natural world that they noticed during earlier exploration.

See more from MOSS Adventure Learning at moss.uidaho.edu/adventure

Discover your Ecosystem

Poetry Writing Tips

- Don't worry about writing your poem "the right way". Poetry is all about using language creatively.
- Use this link to check out 9 common styles of poems and tips for writing them! It also defines some helpful poetry terms that you may not know yet:
<https://www.penguin.co.uk/articles/children/2019/oct/different-types-of-poetry-for-kids.html>
- Try to incorporate some of these elements into your writing to make it more poetic: hyperbole, metaphor, imagery, tone, diction, rhythm, and rhyme.
- If you are still stumped trying to write a poem you can have fun writing a short story about your animal in winter or springtime instead!



Think about....

- How did the authors use information about the animals' interactions with their environment to write each poem?

Citing the Book:

- You can find more cool poems about animals in the Winter if you pick up the Winter Bees book yourself.
- Sidman, Joyce, and Rick Allen. *Winter Bees & Other Poems of the Cold*. Houghton Mifflin Books for Children, 2014.

See more from MOSS Adventure Learning at moss.uidaho.edu/adventure

Snake's Lullaby

Brother, sister, flick your tongue
and taste the flakes of autumn sun.

Use these last few hours of gold
to travel, travel toward the cold.

Before your coils grow stiff and dull,
your heartbeat slows to winter's lull,

seek the sink of sheltered stones
that safely cradle sleeping bones.

Brother, sister, find the ways
back to the deep and tranquil bays,

and 'round each other twist and fold
to weave a heavy cloak of cold.

Snakes, like other reptiles, are ectothermic ("outwardly heated") with no constant inner temperature. They bask in the sun to warm themselves, and in cold weather they become sluggish. Before autumn's warmth turns to winter, they must find a protected place to hibernate or they will freeze to death. Garter snakes often hibernate (or "brumate", as it is called in reptiles) in large groups, choosing underground tunnels, rocks, or caves below the frost line where the temperature is cool but not freezing. Most return to the same "hibernaculum" year after year, using their tongues to smell their way along age-old paths. In Manitoba, Canada, scientists have discovered hibernaculum that host up to 20,000 garter snakes! While brumating, snakes neither eat nor drink. Their breathing and heart rate slow down and their blood thickens. They spend the winter in a communal mass of motionless bodies, waiting for warmth.

Big Brown Moose

I'm a big brown moose,
I'm a rascally moose,
I'm a moose with a tough, shaggy hide;
and I kick and I prance
in a long-legged dance
with my moose-mama close by my side.

I shrug off the cold
and I sneeze at the wind
and I swivel my ears in the snow;
and I tramp and I tromp
over forest and swamp,
'cause there's nowhere a moose cannot go.

I'm a big brown moose,
I'm a ravenous moose
as I hunt for the willow and yew;
with a snort and a crunch,
I rip off each bunch,
and I chew and I chew and I chew.

When together we slump
in a comfortable clump -
my mountainous mama and I -
I give her a nuzzle
of velvety muzzle.
Our frosty breath drifts to the sky.

I'm a big brown moose,
I'm a slumberous moose,
I'm a moose with a warm, snuggly hide;
and I bask in the moon
as the coyotes croon,
with my moose-mama close by my side.

Moose are built for cold. As the largest members of the deer family, they have huge bodies that trap heat well, and their fur is dense and warm. Their stiltlike legs wade through deep snowdrifts and snow-covered brush with ease, and broad cloven hooves steady them in icy terrain. Winter's main challenge for moose is to find enough plant material to power their enormous bulk; they are constantly on the lookout for food. Moose cows give birth to a single calf (or occasionally twins), and the calf's survival depends fully on the mother's ability to teach it the ways of the woods. Moosecow and calf are rarely apart; they shelter together, evade wolves, and use their large, sensitive noses to seek out stands of nutritious willow and poplar twigs. They remain inseparable until the following spring, when the yearling calf must leave to make way for another newborn.

Vole in Winter

Ambling through the hoary crystals,
thinking of how I love this powdery place
between iron-hard ground
 and snow-crust ceiling...
how it bakes in the winter sun
like a crumbly white cake
studded with delectables:
crunchy roots, savory seeds,
 and tender bark of trees...
How it appeared so softly one night,
just as the bitter wind had almost
 sucked the very life from my bones:
a blanket made of sky-feathers!
Thinking of all the long, lovely tunnels
that smell of food, or sleep, or sky...
the way they twist and dive
in search of their own ends.
Thinking of - *Eeek!*

FOX!

Stop thinking.

RUN!

For small mammals like the vole, a thick blanket of snow in winter can mean the difference between life and death. Snow insulates the ground, keeping it much warmer than the air outside, and the snow layer nearest the earth crystallizes and turns sugary and slick, making it easy for tunneling. Voles, shrews, and mice - even red squirrels - all use this space, called the subnivean zone. Within the cozy subnivean, these animals carry on a secret life, creating a network of burrows and food caches. The snow offers some protection from foxes, owls, and coyotes; however, these predators can use their acute hearing to detect hidden movements, then pounce and dig down to capture prey. As snow melts in spring, subnivean creatures leave behind evidence of their winter lives: squiggles of small tunnels and nests in the grass.

Chickadee's Song

From dawn to dusk in darkling air
we glean and gulp and pluck and snare,
Then find a roost that's snug and tight
To brave the long and frozen night.

We fluff and preen each downy feather,
Sing *fee-bee* - and laugh at the weather!
For if we're quick and bold and clever,
 Winter's chill won't last forever.

The sun wheels high, the cardinal trills.
We sip the drips of icicles.
The buds are thick, the snow is slack.
Spring has broken winter's back.

Quick and bold and brave and clever,
we preen and fluff each downy feather.
Sing *fee-bee* - laugh at the weather-
 For winter doesn't last forever!

How does the tiny chickadee, weighing less than a handful of paperclips, stay alive in the bitter northern winter? By spending every waking moment searching for food. From just before dawn until the last light of dusk, chickadees hunt for seeds, berries, and hidden insects to build up a thin layer of fat, which must last them all night. Their dense feathers - which are not very aerodynamic, but perfect for short-distance swoops - help keep them warm. Chickadees find tiny roost-holes in trees or dense shrubs to conserve heat at night. They can even lower their body temperature to burn less fat. Sometimes a chickadee will hide a seed in a nighttime roost-hole for a much-needed snack upon waking. In late winter, chickadees sense the lengthening days and begin singing their *fee-bee* song, announcing a new nesting season.