



Grade Level:
5th

Time:
60 Minutes

Season:
Fall

Objectives:
Students will be able to...

- List 5 benefits of leaf litter.
- Identify macro-invertebrates that live in leaf litter.

Key Concepts:

- Biodiversity
- Soil
- Macro-invertebrate

Materials:

- Leaf sifter
- Pooter/aspirator
- Tweezer
- Trowel
- Minibeast Key
- Hand lens
- Garden gloves
- Clipboard
- Pencil
- Worksheet

Leaf Litter Investigation

Summary

Leaf litter is full of life, students will explore the biodiversity of it by using tools to help them identify invertebrates. They will learn of the benefits of leaf litter and its uses.

Background

Leaf litter is the layer of dead leaves, needles, twigs, and plants found on the forest floor. It acts as a protective layer for the soil, keeping moisture in and helping to prevent erosion from precipitation. Decomposers break down leaf litter, releasing nutrients for further plant growth.

Even though leaf litter might look like a pile of dead stuff it is teeming with life. It provides the perfect habitat for many animals and macroinvertebrates like worms, snails, spiders, and microscopic decomposers like fungi and bacteria. These creatures use leaf litter for nesting materials, hiding places, and protection.

Biodiversity is the variety of life in the world or a particular habitat or ecosystem. The level of biodiversity in an ecosystem helps indicate how healthy the system is. More biodiversity equals a healthier ecosystem.

Most species that will be found are macroinvertebrates, meaning they lack a backbone and are large enough to see without a microscope. They feed on the litter and break it down, from there microscopic organisms will then decompose the litter so that it can later be absorbed by plants. Some of these macroinvertebrates spend their whole life in leaf litter, while others will only be there certain times of the year specifically for nesting and hibernation.

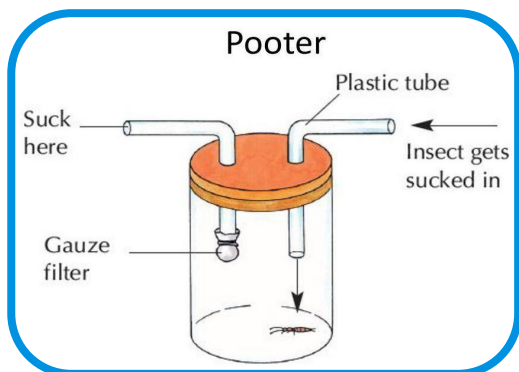
Set-up

1. Gather all your materials for the students.
2. Have a predesignated area for leaf litter investigation.



Procedure

1. Review the four layers of a forest with the students; canopy, understory, herbaceous layer, and forest floor.
2. Define leaf litter.
3. Ask students to discuss in small groups potential benefits of leaf litter. Then list them on the board.
 1. Shelter for animals.
 2. Habitat for insects to lay eggs.
 3. Holds moisture in the soil.
 4. Regulates soil temperature.
 5. Insulates; protects plants and animals from extreme cold.
 6. Helps prevent erosion from precipitation.
 7. Release nutrients into the soil.
4. Review important vocabulary.
5. [Play the bioturbation time-lapse video.](#)
6. With the students fill out the top part of their worksheet: date, wind speed and direction, air and soil temperature, and the location.
7. Explain to the students that we are going to look for macroinvertebrates (define macroinvertebrates) in leaf litter using a leaf sifter and an aspirator or tool called a pooter.
8. Demonstrate how a pooter works: keep one hand on the red bulb, squeeze all the air out, and hold. Use the straw on the other end and line it up to a macroinvertebrate, then release the red pump. When it fills with air it should suck up the invertebrate into the observation chamber.
9. Divide students into groups of two or three.





Procedure (continued)

9. Each group will receive a leaf sifter, pooter, trowel, tweezers, hand lens, and Minibeast Key. Each student should have their own worksheet, clipboard, and pencil.
10. Lead students to the predesignated areas where there is a lot of leaf litter.
11. Instruct students to scrape the top layer of soil and leaves into their leaf sifter for best results they need to dig into the leaves a bit and get some humus in their containers.
12. Once students have a good sample, they will lightly sift their container.
13. Remove the box with the mesh screen and observe the sifted sample for movement.
14. Using their pooters, gather up any macroinvertebrates to be able to examine more closely with the hand lens and identify what they are with their minibeasts key.
15. While they are exploring, they should be filling out their student worksheet. If there is a macroinvertebrate that they cannot identify have them write down as much description as they can about it on their sheet.
16. When there is 10 minutes left have the students empty out their pooters and leaf litter sifters and gather back in the classroom.
17. Discuss your findings as a class.
 1. What type of animals did you find?
 2. Was there anything that surprised you?
 3. Do you think that it would look different in the spring and summer?
 4. How might life in leaf litter differ from here to your homes or a park with more landscape maintenance?





Vocabulary

- **Biodiversity:** variety of different life forms in a particular habitat or ecosystem.
- **Invertebrate:** animal lacking a backbone.
- **Pooter/aspirator:** instrument/jar used for collecting small insects by suction.
- **Humus:** organic component of soil, formed by the decomposition of leaves and other plant material.
- **Decomposers:** organisms that decompose organic material such as bacteria, fungus, or invertebrates.
- **Dichotomous Key:** A scientific tool used to identify organisms based on observable traits that consists of a series of statements with two choices at each step.

Extension

Explore an area around a school yard or your own homes. What difference did you notice from the Refuge to a place more maintained.

Resources

1. <https://carnegiemnh.org/exploring-the-role-of-leaf-litter-in-our-forests/>
2. Minibeast key:
https://i0.wp.com/deballdis.tripod.com/sitebuildercontent/sitebuilderfiles/minibeast_key.jpg
3. Bioturbation time lapse video: <https://youtu.be/Mxp1nnrUG0Q>
4. <https://www.scientificamerican.com/article/bring-science-home-leaf-litter-biodiversity/>

North Dakota Curriculum Standards

This lesson supports these standards

5-LS2-1 – Develop a model to describe the movement of matter among plants, animals, decomposers, and the environment. (decomposers and soil)

