

A Lot of Rot

While hiking in the woods, you might have paused for a rest and sat on a stump or log. For us, such a seat is a convenient resting spot, but for many animals, a dead tree is a source of food and a home while it decays. In this activity, students observe examples of plant decomposition and identify some of the organisms that live in and around decaying logs.

Background

Organisms that break down organic tissues into inorganic compounds are called **decomposers**, and they are an essential part of every ecosystem. Although their way of life is generally foreign to us, our lives depend on their work. The quality of the soil also depends on their work. The end product of decomposition is **humus**, the part of the soil once made of living organisms, which provides nutrients for plant growth and improves the soil's ability to hold water.

In both aquatic and terrestrial ecosystems, decomposers play a critical role. Without their work, organic compounds would not be broken down into the simpler chemicals that can be reused by living organisms.

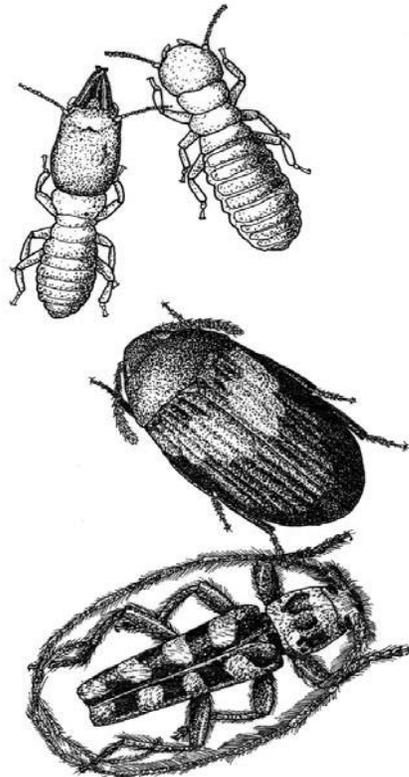
Using dead organisms as a food source not only benefits the decomposers themselves; it also releases the organic compounds trapped in dead bodies so they can re-enter food webs and be re-used by other organisms. Their work makes possible the cycling of nutrients, which is essential to any functioning ecosystem.

Tree bark, living or dead, can provide the necessary nutrients and conditions for many organisms to thrive. Generally, lichens and moss prefer the sides

of trees where the light is low and the conditions are moist. Lichens produce a weak acid that speeds the deterioration of wood. **Fungal spores** and wildflower seeds take root in decaying wood material, which also provides nutrients.

Turning over a decaying log can reveal a very active habitat, teaming with life. Carpenter ants, sowbugs and termites eat or grub their way through wood to find food. Bark beetles feed on the **cambium** tissue just below the bark. Evidence of their activity can be found in the intricate patterns they create as they feed and tunnel under the bark.

Other creatures come to the log not to feed on the log itself but rather to hunt for the many animals they find there. **Predators**, such as spiders and centipedes, search for sowbugs and millipedes to eat. They in turn become meals for birds and other animals that tear into the log for food.



Grade Levels: 3–10

Objectives

Students will:

- locate and examine plant decomposition;
- identify some of the organisms that live in and around a decaying log; and,
- understand that a rotting log is a habitat that serves a vital function in the forest and supports a wide variety of life.

Materials

- paper and pencil
- clipboards or sheets or cardboard with paper clips
- field guides on insects, spiders and nonflowering plants
- hand lenses and bug boxes or plastic baggies

Credits

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While some creatures search for food in rotting logs, others use logs for shelter. Many insects spend the winter in the safety of a fallen log. Others, such as beetles and wasps, lay their eggs in the decaying wood.

Eventually, all the matter that once was a tree returns to soil where the organic matter and nutrients are again used by plants and animals.

Procedure

Before the Trip:

1. Discuss ways in which nutrients are recycled in natural ecosystems. Make an illustration to help students understand. When organisms die, they decay. If not, dead bodies would remain lying about for a long time, and nutrients in them would be unavailable to other organisms.
2. Prepare for the trip by discussing places in the park to look for decomposition and decomposers.
3. Using an insect guide or drawings, discuss common decomposers including what they eat and where they like to live.

At the Park:

1. Divide students into groups of three or four.
2. Begin by leading a review and orientation discussion. What causes decomposition? Where should we look for examples of decomposition? Why is decomposition a necessary part of the life of a forest?
3. Students are to find examples of plant decomposition in action. Give them instructions on where to look, how long to look, and when and where to reassemble.
4. Depending on the age or level of the class, you might suggest a number of examples for them to look for, or mention specific examples that each group should find. Dead leaves can usually be found in wooded areas but be sure to include

rotting stumps or logs.

5. Safety notes: Explain that students should not handle broken glass or other potentially hazardous materials if they happen to find them. Also, be sure they know what poison ivy looks like.
6. Stewardship notes: Explain and model appropriate environmental study procedures. Be sure students handle rotting logs as little as possible. Make sure they realize they will be handling a fragile habitat where many creatures live. Soon after any close examinations, animals should be returned to the same spot where they were taken.
7. Have each group locate a rotting log and carefully observe the plant and animal life on and around the log. Students should note the different species and the number of individuals they find.
8. Have specific tasks for group members to perform. For example, one student might look for evidence of decay while another student looks for signs of animal life.

Follow-up:

1. Gather students back together either at the park or upon return to the classroom.
2. Have each group give a report to the class about the data they found. Have a list of specific items or topics for them to include in their report. Example questions and discussion topics include:
 - Describe the position and characteristics of the fallen tree. Is it flat on the ground or is it raised in some places? What condition is the tree in? How long do you think the tree has been on the ground and on what evidence do you base your estimate? How do you think the tree died? What evidence is there to support your idea? What plants are growing on or

When

Warmer months during daylight hours.

Where

Accessible areas at any park where trees are decaying.

Extension

1. Read aloud or have students read the story "In the Forest of S. T. Shrew." This can be found on pages 40-44 of the copyright 2008 Project Learning Tree PreK-8 Environmental Education Guide. Please refer to the credits section for information on how to obtain this book. Have students work in small groups to list what things Jackie saw on her trip through the rotten log. Make a list on the chalkboard and circle the things they observed at the logs they looked at in the field.
2. As an ongoing environmental project, create and maintain a compost bin on school grounds. Design monitoring procedures and mini-projects around the compost bin as a micro-habitat. In this way, concepts related to conservation and decomposition could be combined.

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- in the debris around the log?
How many plants are there?
- What animals live on the log, in the log or in the debris around the log? How many animals are there?
 - How do the animals live? What are they doing? What do you think they eat? What evidence do you have for your answers?
3. After all the groups have given their reports, discuss the similarities and differences there were between their logs. Have students come up with theories that might explain these differences and similarities.
4. As a way of wrapping up the activity, brainstorm the ecological importance of plant decomposition. To extend the idea, on a chalkboard or flip chart, list as many benefits as possible of fallen logs. Don't stop until several good ideas are listed.

Resources

National Arbor Day Foundation
www.arborday.org

Scholastic's the Magic School Bus: Meets the Rot Squad
<http://www.scholastic.com/teachers/lesson-plan/magic-school-bus-meets-rot-squad>

Virginia Big Tree Program
<http://bigtree.cnre.vt.edu/>

Virginia Tech's Forest Biology and Dendrology Educational Site
<http://www.fw.vt.edu/dendro/>

Virginia Cooperative Extension Composting Your Organic Kitchen Wastes with Worms
<http://www.pubs.ext.vt.edu/442/442-005/442-005.html>

Cornell Composting: Composting in the Classroom
<http://compost.css.cornell.edu/CIC.html>

Books:

Lavies, Bianca. *Compost Critters*. Duttons Children's Books. 1993.

McGinty, Alice. *Decomposers in the Food Chain*. Powerkids Press. 2002.