

# Activity 23: The Fallen Log

## Overview

It's amazing how many things live in and on rotting logs. In this activity, your students will become familiar with some of those organisms. They'll gain an understanding of how decomposition takes place and a better appreciation for microhabitats and communities.

## How to Use This Information

This supplement enhances the information provided in the Background section of this activity. Use this material in addition to the information contained on page 105 of PLT's Pre K-8 Activity Guide.

## Resources

Hunter, Malcolm L. Jr. *Wildlife, Forests, and Forestry: Principles of Managing Forests for Biological Diversity*, Prentice Hall, Inc., Englewood Cliffs, NJ, 1990.

Leak, William B. *Relationships of Tree Age to Diameter in Old - Growth Northern Hardwoods and Spruce - Fir*, US Dept. of Agriculture, US Forest Service, 1985. <http://www.nrs.fs.fed.us/pubs/7810>

NH Division of Forest and Lands, Dept. of Resources and Economic Development, and the Society for the Protection of NH Forests. *Good Forestry in the Granite State*, the Society for the Protection of NH Forests, Concord, NH, 1997. [www.extension.unh.edu/resources](http://www.extension.unh.edu/resources)

Peterson Field Guide Series. Boston, MA: Houghton Mifflin Co. This series contains guides for trees, birds, mushrooms, butterflies, mammals, insects, and many more plants and animals.

Iowa State Univ., [www.ent.iastate.edu/list/](http://www.ent.iastate.edu/list/)  
[www.enature.com/fieldguides](http://www.enature.com/fieldguides)  
[www.mykoweb.com](http://www.mykoweb.com)

## Correlations to NH Frameworks

Literacy:

Reading:

Informational Texts: 1.2

Written and Oral Communication:

Habits of Writing: 2.2, 2.3

Oral Communications:

1.1, 1.2, 1.4, 1.5, 2.1

Science:

Life Science: LS1.1, LS1.2, LS2.1, LS2.2, LS2.3, LS3.1, LS3.3

Science Process Skills: SPS1.1, SPS2.4, SPS3.2

Correlations found at [www.nhplt.org/Correlations.htm](http://www.nhplt.org/Correlations.htm)

# Tree Life Spans

How long do trees live in New Hampshire? The answer depends upon the species and individual tree being considered, as well as its location. If left undisturbed, some hardwoods and softwoods attain great ages. Others may only live a few decades.

The forests of NH began establishing themselves 2,000 years ago and have gone through many life cycles. At the time of European exploration, around 1600, forests covered more than 90% of the state. During the next two and a half centuries, people cleared away half the forest, first for agriculture and later for the wood. As a result of this clearing, most trees in NH are less than 100 years old. Of course, some areas remained uncut and are reaching their biological maturity. For trees in these areas, site conditions largely influence their ability to reach their maximum ages.

The oldest known tree in New Hampshire—a black gum over 700 years old—was discovered in a swamp in Northwood. By contrast, there are trees well over 200 years old surviving the harsh climate of Mount Washington. As of 1999, these hearty mountain trees included a heart-leaved paper birch, a balsam fir, a black spruce, and a red spruce.

Trees “age” differently depending on conditions of soil, sunlight, moisture, and temperature. Climate variations in this state challenge the endurance of each species. The size of a tree does not necessarily indicate its age. For example, a small black spruce may well be a hundred years old!



Red Spruce

Life Spans of Common Trees in New Hampshire			
Species	Potential Life Span (in years)	Species	Potential Life Span (in years)
aspen	30-100	northern red oak	300+
pin cherry	50	yellow birch	300+
striped maple	70	American beech	300-400
paper birch	100-200	red spruce	300-400
red maple	150	eastern hemlock	400+
sugar maple	200-300	eastern white pine	400+
white ash	200-250		

# Decay Time of Trees

No matter how genetically strong trees are or how favorable their site conditions, they eventually die. When they die, the wood decays and disintegrates. In the temperate forests of New Hampshire, the decay process depends on several parameters including fungi activity, moisture, temperature, the size of the tree, and decay resistance of the wood.

Fungal activity plays a significant role in the decay of wood in the forest. While hundreds of fungi may be involved with the decay process, only about 50 cause the greatest decay. Fungi need both moisture and air to decay wood. Once these are present at appropriate levels, air temperature becomes a significant influence on fungal activity. Fungi cannot function at air temperatures below 40°F. Above 70°F, decay proceeds more rapidly. The length of time to reduce a tree to soil components depends on the size of the tree and what type of wood it is. Heartwood decays more slowly than the sapwood.



wood decaying fungus

# Fallen Log Decomposers

Fallen logs are important to the survival of animal species, with many spending all or part of their lives on them. Thirty percent of mammals, 45% of amphibians, and 50% of reptiles living in New Hampshire use this woody debris as habitat. Some are scavengers feeding on the wood. Others are predators eating the scavengers. Some species use the logs as hide-outs or nurseries. Plants, fungi, and bacteria are part of the fallen log micro-ecosystem. Below are listed some of the species that make use of fallen logs.

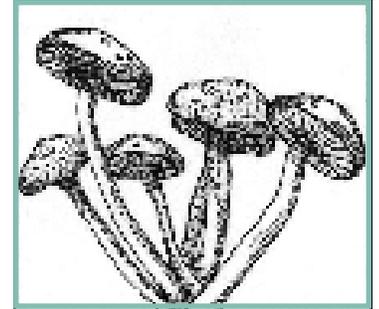
**Wood Munchers** eat or tunnel through fallen logs. As they chew their way through the wood, they help break down the log. In New Hampshire, wood munchers include sowbugs, black carpenter ants, pigeon horntail wasps, wood wasps, giant European hornets, red turpentine beetles, pine sawyer beetles, and millipedes.



pine sawyer beetle

Many creatures **hide out** in fallen logs. They use the logs to avoid predators and find shelter from the elements. Some of these species are lady

bugs, sac spiders, redback salamanders, eastern newt salamanders, porcupines, southern red-backed voles, masked shrews, short-tailed shrews, wood turtles, eastern box turtles, black racer snakes, garter snakes, raccoons, and fishers.



Armillariella mellea

Fallen logs often serve as **nurseries** for animals. They include bark beetles, pine sawyer beetles, ground spiders, hackleban weavers (spiders), crab spiders, jumping spiders, sheet-line weavers (spiders), sac spiders, organ-pipe mud-daubers (wasps), eastern giant ichneumen (wasps), wood wasps, horn tail wasps, wood nesting bees, carpenter bees, slugs, and woolly bear caterpillars.

Some animals feed on other creatures that live in, on, and around fallen logs. These **predators** include checkered beetles, flat bark beetles, centipedes, ground spiders, hackleban weavers (spiders), crab spiders, eastern chipmunks, deer mice, short-tailed shrews, masked shrews, black bears, flicker woodpeckers, hairy woodpeckers, downy woodpeckers, nuthatches, black and white warblers, wood turtles, milk snakes, red belly snakes, organ-pipe mud-daubers (wasps), horn tail wasps, wood wasps, giant European hornets, fishers, and raccoons.

A number of plants live on fallen logs. This **vegetation** absorbs nutrients from decaying wood and helps to break the log apart. In New Hampshire, mosses, lichens, fungi, and tree seedlings, are commonly found on fallen logs.

Typical Decay Rates for Wood		
	Softwoods	Hardwoods
Woody debris* and diameter less than 5 inches	7 years	9 years
Diameter of 5-10 inches	20 years	16 years
Diameter of 11-16 inches	20 years	16 years
Diameter greater than 16 inches	30 years	20 years

\* Woody debris is woody material remaining on the ground after a tree falls and is in varying stages of decay. Examples are logs, limbs, stumps, and unrooted tree roots.

## A Typical Fallen Log in New Hampshire's Forest

This illustration depicts a typical fallen log found in the woods of New Hampshire, along with the plants and animals that live in, on, and around such logs. In general, species shown in the upper border of the illustration can be found on top of fallen logs; species shown on the side of the illustration can be found in the log cavity or on the sides of the logs; and, finally, those species shown in the bottom border of the illustration may spend all or part of their lives underneath fallen logs.

Start at the upper left-hand corner of the illustration's border, and travel clockwise to learn the names of the plants and animals that belong to the fallen log community:

- |                               |                                   |  |
|-------------------------------|-----------------------------------|--|
| 1. Wood decaying fungus       | 7. Downy woodpecker               | 12. Armillariella mellea (a parasitic fungi) |
| 2. Adult wood wasp            | 8. Eastern box turtle             | 13. Wood wasp larvae                         |
| 3. Adult pine sawyer beetle   | 9. Milk snake                     | 14. Red-backed salamander                    |
| 4. "British Soldiers" lichen  | 10. Pine sawyer larvae in gallery | 15. Raccoon                                  |
| 5. Adult carpenter ant        | 11. Ground spider                 | 16. Black bear cub                           |
| 6. Red eft (found under logs) |                                   |  |

