

Seeking the Wolf Tree

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Seeking the Wolf Tree is a story for upper elementary students about an adventure two students take through the Hubbard Brook Experimental Forest. It communicates core ideas related to the nature of science as well as energy flow and cycling of matter in ecosystems, and can serve as an intriguing and fun introduction to a unit on ecology. It can also be read at the beginning of the year and used as a platform for ecological concepts from which to refer back to throughout the school year.

Concepts	Highlighted vocab words
Food webs	Old growth forest
Succession	Succession
Habitat	Gauge stations
Symbiotic associations	Watersheds
Cycling of matter	Production
Flow of energy	Composition
Science Practices	Mast years
Questioning	(Tree) diameter
Observation	Growth rings
Measurement	Weir
Investigation	

Activities to enhance concepts and skills related to book

- PLT activities are found in *Project Learning Tree: Pre K-8 Environmental Education Activity Guide*. American Forest Foundation. ©2012. Several PLT activities are also found on the HBRF website, but PLT recommends that you attend a professional development workshop in your area to receive the complete curricula.
- See also [Focus on NH Forests](#), a supplement to PLT's *PreK-8 Environmental Education Activity Guide* that is specific to the state of NH.
- Project WILD activities are found in *Project WILD: K-12 Curriculum and Activity Guide*. Council for Environmental Education. ©2008
- HBRF activities are found on the [Hubbard Brook Research Foundation](#) website.

Concept	As relates to StWF	Activity
Food webs, energy flow	Energy is transferred in an ecosystem through food webs (pgs 10, 12, 20, 26)	Web of Life (PLT)
Plants and animals depend on trees	Examples on pgs 10, 14, 20, 26	Trees as Habitats (PLT)
Dead trees play important role in ecosystem (decomposition)	Producers, consumers and decomposers play important roles in energy transfer (implied)	The Fallen Log (PLT)
Matter cycles through an ecosystem	Producers, consumers and decomposers play important roles in the cycling of matter (implied)	Nature's Recyclers (PLT) The Forest of S.T. Shrew (PLT)
Some organisms depend on each other in various ways (symbiosis)	Tree roots and mushrooms help each other (p14)	Dynamic Duos (PLT)
Succession is a natural pattern of change that takes place over time in a forest or other ecosystem.	Old growth forests have a mixture of trees of all ages and stages (p4)	Nothing Succeeds like Succession (PLT)

Skills and Practices

Maps and scale	Researches must be able to read maps to locate study areas. (p9)	Mapping: legend, scale USGS Science Resources for Primary Grades (K–6)
How to prepare for working outside?	Researchers must be prepared to be safe and comfortable while working outside. (p8)	White Mtn National Forest Hike Safe program , 10 Essentials
Observation is an important scientific skill	Researchers observe many living and non-living things in the forests during all of the seasons.(throughout)	Learning to Look, Looking to See (Project WILD)
Observation of animal tracks	Signs of animals living in the forest are found all over the forest. (p26)	Animal tracking (winter is best time) Schoolyard Safari (PLT)
Migratory Bird research methods	How do researchers study food source of birds? (p12)	Hunt and Peck (HBRF)
Identifying and counting leaves	Researchers want to know about the composition and production of trees in the forest. (p18)	Looking at Leaves (PLT) Name That Tree (PLT)
Measuring temperature, precipitation and stream water	Temperature and water affect all the plants in the forest. (p22)	Water In, Water Out (precip and stream charts) (HBRF)
Counting growth rings	One way to learn about tree growth is to look at its annual rings. (p28)	Tree Cookies (PLT)
Measuring diameter and height of trees	Researchers like to know how big a tree is. (p24)	How Big is Your Tree? (PLT)
Find your own special tree	Does your tree have wolf tree characteristics? (throughout)	Wolf Tree Checklist (HBRF)

Assessment for Student Learning

Related directly to book

- Questions for written response or discussion:
 1. What is meant by a Wolf Tree?
 2. Trees are important to humans and other animals.
 - a. In what ways do wildlife use trees? Give three specific examples.
 - b. In what ways do people use trees? Give three specific examples.
 - c. Are these two uses compatible, incompatible? Both? Discuss.
 3. Researchers collect many different types of data in the book. List 4 types of data collected and the tools needed to do so.
 4. Scientists ask questions and then try to find answers by observing, measuring or experimenting.
 - a. Think of a question that one of the Hubbard Brook scientists was asking whose answer could be found through observation.
 - b. Think of a question that one of the Hubbard Brook scientists was asking whose answer could be found through measurement.
 - c. Can you think of a question that a Hubbard Brook scientist might ask that could be answered through an experiment? Describe how you would set up the experiment, and what kinds of data you would collect to answer your question.
- Find your own special tree and sharpen your observation skills. Use the **Wolf Tree checklist** to see if your tree has wolf tree characteristics.

Related to NGSS Performance Expectation (to be done after study of entire ecosystem unit)

Assessment: 5-LS2-1. Develop a model to describe the movement of matter among plants, animals, decomposers, and the environment

Note: a model can be a diagram, drawing, physical replica, diorama, dramatization, or storyboard that represents the cycling of matter in an ecosystem, and can include a writing prompt. You can require students to label parts of their model with vocabulary.

Learn more about wolf trees!

Elliott, Charles. "Woodman, Spare That 'Wolf' Tree!" *American Forests*. 1945. Vol. 51, No. 10.

Gaige, Michael. "Wolf Trees: Elders of the Eastern Forest." *American Forests*. Fall 2014.

Martin, Kevin. *Big Trees of New Hampshire: Short Hikes to the Biggest Trees in New Hampshire from the Seacoast to the North Country*. Portsmouth, NH: Peter E. Randall. 2014.

Seeking the Wolf Tree: Instructional Guide & Resources

Seeking the Wolf Tree can act as an introductory activity to the study of ecology or forests. The reading of the book is supported by a variety of 5E resources that enrich the book's reading and use in the classroom. Educators can choose to do any or all of the "E" activities based on what best suits and is of interest to their students.

BCSC 5 E Instructional Model for Teaching Inquiry Science	
Phase	Summary
1. Engagement	Students' prior knowledge accessed and interest engaged in the phenomenon.
2. Exploration	Students participate in an activity that facilitates conceptual change.
3. Explanation	Students generate an explanation of the phenomenon.
4. Elaboration	Students' understanding of the phenomenon challenged and deepened through new experiences.
5. Evaluation	Students assess their understanding of the phenomenon.

Sources: <http://www.bscs.org/bcs-5e-instructional-model> & <http://www.bioedonline.org/videos/supplemental-videos/5e-model-for-teaching-inquiry-science/>

Engage students with images of [wolf trees](#) from the Northern Woodlands website (<http://northernwoodlands.org/articles/article/a-place-for-wolf-trees#prettyPhoto>). Can they think of any wolf trees they've ever seen? Images are included in a photo gallery following an article written by Michael Gaige called *A Place for Wolf Trees*, published in the Spring 2011 edition of *Northern Woodlands* (note: the same article also appears under the name *Wolf Trees: Elders of the Eastern Forest* in the fall 2014 edition of *American Forests*).

Explore the schoolyard or community for wolf trees. Go outside with your students, look at some trees, and use the [Wolf Tree checklist](#) (http://hubbardbrookfoundation.org/wp-content/uploads/2015/10/Tree_illo_exercise_with_checklist.pdf) to help determine whether a tree has characteristics of a wolf tree.

Explain how wolf trees come to be, and investigate what plants, in general, require to grow.

Activity: [How Plants Grow](#) (PLT) Students design an experiment to test what is required for a plant to grow.

Elaborate on the role that trees play in an ecosystem, not only as producers but as hosts to consumers and decomposers.

Activities to pick from:

[Trees as Habitats](#) (PLT) Students will inventory the plants and animals that live in, on, and around trees and discover how plants and animals depend on trees in many ways.

[The Fallen Log](#) (PLT) Students observe organisms that live in and on fallen logs, and gain an understanding of how decomposition takes place as well as a better appreciation for microhabitats and communities.

[Dynamic Duos](#) (PLT) Students will learn about different types of symbiotic relationships, when organisms depend on each other for protection, transportation, or shelter.

Evaluate student understanding of the role that trees play in cycling of matter and flow of energy in an ecosystem.

[NGSS Performance Expectation: 5-LS2-1](#): Develop a model to describe the movement of matter among plants, animals, decomposers, and the environment.

Note:

- A model can be a diagram, drawing, physical replica, diorama, dramatization, or storyboard that represents the cycling of matter in an ecosystem, and can include a writing prompt. You can require students to label parts of their model with vocabulary.
- Developing a model is also a central practice of the CCSS in math.
- Several opportunities exist to practice and strengthen skills in CCSS areas (see [CCSS Reading and Writing standards](#)).

