WORKSHEET

FOREST HEALTH INDICATOR: LICHEN ABUNDANCE

Lichens often grow on trees and shrubs, absorbing nutrients from the atmosphere. Because lichens are very sensitive to air pollution—particularly to sulfur dioxide, fluoride, and ammonia—their presence or absence is an indicator of forest health. The acidity of a tree's bark can also affect lichen abundance.

A lichen is actually two different organisms—either a fungus and an alga, or a fungus and a cyanobacterium—living in a symbiotic relationship. The fungus provides protection and moisture, while the alga or cyanobacterium provides food through photosynthesis.

MATERIALS

String, tape measure, compass, chalk, 100-Circle Grid transparency (page 61)

METHOD

Select 10 trees on your study plot to sample. For each tree, measure a distance of 1.3 meters (4.5 feet) from the ground, and tie a string around the tree trunk at that height. Use a compass to determine north, south, east, and west; then mark the directions with chalk on the tree at the string line. At each of the four directions, place the 100-Circle Grid transparency against the tree, and count the number of circles in which lichens are showing. That number represents the percentage of lichen coverage. For each tree, find the average lichen coverage by totaling the lichens found within the circles and then dividing the total by 4. Find the total average lichen coverage of the plot.

RESULTS

For each tree and direction, record in the following chart the number of circles that show lichens. This number represents the percentage of lichen coverage.

Trees help support many other living organisms, including these lichens. Far from harming the tree, lichens indicate pollution-free air.

Photo by USDA Forest Service - Northeastern Area Archive, USDA Forest Service.

LICHEN ABUNDANCE						
	North Side	East Side	South Side	West Side	Total	Tree Average (%)
Tree 1						
Tree 2						
Tree 3						
Tree 4						
Tree 5						
Tree 6						
Tree 7						
Tree 8						
Tree 9						
Tree 10						
Total of Tree Averages						
Average Lichen Coverage						

For each tree, total up the results from the four directions and then divide by four to get the tree average.

Add up the tree averages and divide this total by the number of trees sampled to get the average lichen coverage for the entire sample plot.

Average Lichen Coverage for sample plot: _____ percent

RATING

Good	Greater than 5 percent lichen coverage	3 Points
Fair	3–5 percent lichen coverage	2 Points
Poor	0–2 percent lichen coverage	1 Point

Overall Lichen Abundance rating for plot: _____

Name: _____

Date: _____

Location: _____

Sources

Pathfinder Science. 2006. "Sampling Procedure for Lichen Coverage." www.pathfinderscience.net/so2/cproto1.cfm

Smith, Gregory L., and Thomas R. Baker. 2003. "Lichens as Bioindicators." NSTA WebNews Digest. www.nsta.org/publications/news/story.aspx?id=48645