

The North Carolina Division of Air Quality



A Little About Lichens

A citizen science activity that can be done almost anywhere outdoors. A magnifying glass is helpful but not necessary.

LEARNER OBJECTIVES:

- 1) describe the three different growth forms of lichen, 2) look at where the lichens grow on your area, 3) describe how lichens can be observed over time.

ENVIRONMENTAL HEALTH QUESTION:

Some lichens are sensitive to air pollution. What would changes in growth from year to year mean about environmental health of your area.

WHAT IS A LICHEN?

Lichen is a type of living thing that can live in almost any place on the earth. They are not plants, animals, or fungus, but something else. Lichens are a symbiotic relationship between fungus and algae. They produce their own energy from the sun through photosynthesis. The water and most of what they need to survive comes from the air, but they do need a tree, rock, building, or other thing to attach to. Lichens come in three forms, and can live a very long time — some are over 1,000 years old. Lichens are also sensitive to a type of air pollution called sulfur dioxide which comes from burning coal and diesel fuel. If there is too much sulfur dioxide the lichens will not grow well. Lichens can be used as a bio-indicator to show the health of the air.

Three Forms of Lichen



Crustose (“Crusty”) lichens form a “crust” on the



Foliose (“Leafy”) lichens that have two sides.



Fruticose (“Bushy”) lichens are three dimensional and grow away from the surface.

WHAT IS CITIZEN SCIENCE?

Citizen Science is the collection of data and other information about the natural world by children, students, and other people in the general public. The information collected and shared can be used by scientists to improve our understanding of the world.

A LITTLE ABOUT LICHENS ACTIVITY

ELECTRONIC DATA FORM

1. Preliminary Research: Watch the video Lichens Grow Everywhere: <https://www.youtube.com/watch?v=GmvZrwYY9GQ&feature=youtu.be>
2. Go outside and find a Lichen, and take a picture of it.
 3. Make sure the photograph includes the edge of the lichen.
 4. Record what the lichen is growing on and any of the things growing with it, including: moss, fungus, plants, other lichens.
 5. Estimate how much of the surface is covered by each type of lichen, moss, fungus, or the surface.
 6. Estimate how much the sun the lichen receives
 7. Record if it is near a river or stream.
8. Use this link to record your observation: <https://arcg.is/1aSiCH1>
9. Check your observation at the NC Streamwatch Page: <https://ncdenr.maps.arcgis.com/apps/opstdashboard/index.html#/7f6fe319f2b3407bbcaf7d5f49401644>
Find another lichen
- For more information about lichens visit: <https://gsmit.org/community-science/lichens>

VOCABULARY AND DEFINITIONS:

Algae: a simple plant form of life that use the sun's energy to survive through photosynthesis, but does not have flowers, roots, stems, or other parts that plants have.

Crustose: crust-like lichen growth form -- the bottom of the lichen firmly attached to its growth surface.

Foliose: leaf-like lichen growth form -- it is flattened body with different top and bottom.

Fruticose: bush or hair-like lichen growth form -- it has no distinguishable upper and lower surface, and can stand or hang down from the surface upon which it is growing.

Fungus: an organism that lacks chlorophyll and reproduces by spores.

Lichen: A lichen is a mini-ecosystem consisting of at least two organisms: a fungus and a photosynthetic partner providing energy for both parts.

Moss: small stemless flowerless plants which absorb water, nutrients and sun through the leaf-like parts.

Sample Plot: The area from which you are collecting data.

Sulfur Dioxide (SO_x): a gas produced by burning coal and diesel fuel (especially off-road diesel, most notably in power plant and the production of paper). Sulfur dioxide plays an important role in the production of air pollution, acid rain, and haze.

Symbiosis: the living together of unlike organisms; it may be for mutual benefit or not.

Thallus: the vegetative body of a lichen consisting of both algal (or cyanobacteria) and fungal components.

The North Carolina Division of Air Quality thanks the Great Smoky Mountains National Park for developing the Lichen Education Activity. The Division of Air Quality adapted this activity for distance learning. The original full activity is found at: <http://pathfinderscience.net/so2/index.cfm>