

The Lichen Labs

*Why did the algae marry the fungus?
Because he's a fungi, and they took a lichen to each other.*

Start here: <http://tinyurl.com/lcf5ets>

Option One: Indicator Species

Go for a walk and look for different types of lichens. Lichens are highly intolerant of atmospheric pollution, particularly sulfur dioxide. A modified Hawksworth and Rose Index (<http://tinyurl.com/kzaycal>) can be used to determine the relative air quality of an area based on the types of lichens you find. Use the scale to determine the air quality of your area.

Types of Lichens	Air Quality Indicator
No lichens present	Very Poor
Crustose/Leprose lichens only	Poor
Foliose and crustose lichens	Moderate
Foliose, crustose and fruticose lichens	Good

Option Two: Gridding/Counting

Students do background research on where/when they will find lichens in a location. Students develop their own hypothesis about the lichen population in the location. Possible tests include: are there more lichens on trees vs rocks? Will lichens appear on different heights of trees? Will lichens appear on different tree species, or all the same ones? Will there be more lichens near the road or in the forest?

Demonstrate a grid technique using a clear transparency or page protector. Place the 1 cm x 1 cm grid over the sample area, and mark each square containing a lichen. Or identify the type of lichen and indicate this on the grid. Consider measuring for density, frequency, richness, evenness and even Simpson's Diversity Index. Students may diagram a map of their study area, including geographic features. You could upload pictures and data to Google Earth as a final product.

Standard lab reports include a section of background research, an experimental design (identify variables & purpose), detailed procedures, data analysis and a conclusion that answers the problem question.

Particulate Matter

Use a notecard with a 1 cm x 1 cm hole cut out of the middle. Put tape across the middle, and leave in a location for a few days/hours. Under trees is especially fruitful. Students can design their own hypothesis about particulate matter composition/amount and place cards accordingly.

Use any microscopes or dissecting scopes to identify the particulates on the card. Most of it will be pollen and, with a good microscope, mold. Students could find a density of particulates per square centimeter.

Students can research predominant pollens in their area online, and compare their sample to the pictures online. To extend the activity, students can research health effects of different particulates, sources, or reduction practices. Students can research face masks or home air conditioning filters, and compare micron sizes of common pollutants to the product to see if it is removed. Students could engineer better filters, or apparatuses to reduce particulate matter based on the source.