Name:_____

Lab: Lichens & Air Quality MAKEUP ASSIGNMENT

Remember: As per GHHS Policy, you have two days for each day absent to makeup assignments.

Background: Lichens are unusual creatures. Lichen is not a single organism the way most other living things are, but rather it is a combination of two organisms that live together intimately. Most of the lichen is composed of fungal filaments, but living among the filaments are algal cells, usually from a green alga or a cyanobacterium. In many cases the fungus and the alga which together make the lichen may each be found living in nature without its partner, but many other lichens include a fungus which cannot survive on its own -- it has become dependent on its algal partner for survival. In all cases though, the appearance of the fungus in the lichen is quite different from its morphology as a separately growing individual. The true identity of lichens as symbiotic associations of two different organisms was first proposed by Beatrix Potter, who is best remembered for her children's books about Peter Rabbit. In addition to her books, she spent time studying and drawing lichens. Her illustrations are still appreciated for their detailed and accurate portrayal of these bizarre organisms. In combination, the lichen symbionts produce a growth form that is unlike either fungi or algae growing alone. Three growth forms are easy to recognize:



Crustose (above left): crust-like, adhering tightly to the substrate by their entire lower surface.
Foliose (above center): leaf-like with a distinct upper and lower surface.
Fruticose (above right): shrub-like, pendulous strands or hollow stalks called podetia.

Lichen are very sensitive to air quality, and even slightly increased levels of ozone and sulfur dioxides will reduce their metabolic activity. In fact, each of the three major types of lichen listed above is sensitive to differing concentrations of air pollutants. Type 3, fruticose, is the most sensitive to air quality. In the cases of highly polluted air or air regularly exposed to pollutants, the fruticose will NOT be present. Likewise, crustose is the most resistant to pollutants. It can often be found in areas with elevated levels of pollutants. Finally, foliose is moderately tolerant of air pollutants. Presence of each of these lichen in varying numbers and concentrations will provide substantial relative indicators of air quality.

Prelab Questions:

1. What is a lichen?

2. What type of symbiotic relationship does a lichen demonstrate?

3. Identify two pollutants that lichens are sensitive to.

4. Relate lichens to air quality.

What We Did in Class:
Each student group identified four trees in the GH wetland forest and determined the lichen coverage. Different colors of lichen indicate different species. Using this information, students made assumptions about the air quality in the area. They found a majority of crustose lichen with some foliose lichen and very little fruticose lichen.

Analysis:
5. Based on the information given, how would you assess the air quality at the GH?

6. Identify two potential sources of air pollution at GH.

Watch the video https://www.youtube.com/watch?v=Z2a5d59mZLI and answer the following
7. Describe the microtopography of the lichens shown.

8. How are lichens like a miniature ecosystem within themselves?

9. What is the unique photography method used in the video?

10. What have you learned from this makeup lab?