

# Lichen Study Final Report

## *Field Biology*

This report is an individual assignment. It should be written in the PAST TENSE (because you will be completing this report after your project is complete). When you are done, e-mail your work to dan.bregar@corvallis.k12.or.us with the subject line “per X *your name* lichen report”.

### **Introduction:**

This section of your report consists of a description of your original question and background information about your project. You should use the information you found in the “Lichen Project Proposal”.

In one paragraph, explain the “What is the Relationship Between” question that you originally came up with. Add some supporting details to clarify the purpose of your proposed question.

In another paragraph, summarize the research that you did on the interactions between lichens and other factors. Again, this can and should come largely from the “Lichen Project Proposal”.

In a third paragraph, explain what you think the answer to your proposed question might be and describe why you think your hypothesis is correct.

### **Methods:**

This section of your report will describe how you collected your data. Your methods should take the form of two step-by-step lists. The first list should describe what you measured about lichens and how you measured them; the second list should describe what you measured about your abiotic or biotic factor and how you made those measurements.

Make sure that your instructions are clear, detailed, and describe the actual steps you took to make your measurements.

### **Results:**

This section of your report will describe the information you found and should include data tables (NOT graphs!) that summarize the measurements and calculations you made.

This section should include at least two data tables – one for each day of data collection. If it is meaningful, you should also include a third data table that is a combination of both days of data collection (check with your instructor if you’re not sure if your data should be combined or not). You may not need to show a third data table if it would be redundant; however, you may still need to create this data table in order to use it in your discussion. (In other words, this data table might not appear in your final report but a graph of the combined data will show up.)

This section of your report should also include a paragraph or two that verbally describes the data you’ve collected (see below for an example).

**Discussion:**

In this section of your report, you will use your data to answer your question. This section will include graphs that show the trends in your data along with your interpretation of those graphs and an overall critique of your study.

You will need to have at least two graphs showing your results. Depending on the project that you created, these may be x-y scatterplots or some other type of graph that visually represents your data and a possible correlation (check with your instructor if you're not sure if a scatterplot will work for your data). If you have two data tables in your results, you'll have two graphs. If you were able to make a combined data table, you should have a third graph for that data.

For your written analysis, answer the following questions (in paragraph form) for EACH graph\*:

1. What was the correlation that your data shows – positive (up and to the right); negative (down and to the right); or none (horizontal line)?
2. What does this correlation tell you about the answer to your question?
3. What ecological factors do you think might have influenced the correlation (or lack thereof) that you see?

Your response to these questions should be about one paragraph in length for each graph in your report.

\*If you did not make x-y scatterplots for your data, check with your instructor about how to interpret your graphs

**Here is an example of what your final report should look like:**

*Lichen Study Final Report – Mr. Bregar*

*Introduction:*

The question I asked for my study was “What is the relationship between the types of lichens and the height of the trees that they grow on?” My goal was to collect data to determine if different types of lichens tend to grow on different sizes of trees. I decided to focus on three tree species that I was able to identify, and I collected data about seven different types of lichens.

There are certain lichen species that are sensitive to specific air quality parameters. For example, some species can survive with higher atmospheric nitrogen levels than others. I found that many species are affected by this and are unable to survive. Lichens are also influenced by rainfall patterns and sun intensity. Because of these interactions, I believe that there is a possibility that different tree heights might also have an impact on lichens.

My hypothesis is that I will see different amounts of abundance of lichen species on the different sizes of trees. This might be because lichens are influenced by sun intensity – in different types of trees, the lichens would be exposed to different amounts of sunlight because of leaf area and branching patterns. If my hypothesis is correct, more lichens will be found on taller trees, where they are exposed to more rain and sunlight than the smaller trees they surround.

### *Methods:*

#### Tree height –

1. We made a 6 foot measuring rod by cutting a 1” x 1” piece of wood to size.
2. For each tree, we measured the height of the tree up to 12 feet by using our measuring rod.
3. For trees taller than 12 feet, we estimated the additional height by having one person stand 25 feet away from the tree while the other person held the measuring rod up to a height of 12 feet.

#### Lichen Sampling –

1. We selected 3 mature trees of each species for our samples and marked each tree for later identification. We picked one small tree, one medium-sized tree, and one large tree. Each tree was located in an area with similar amounts of shade and sun exposure.
2. At each selected tree, we tied a string around the trunk at a height of 6 feet from the ground.
3. We counted each lichen species that we could find on the tree trunk below the string and noted the abundance of that species (we counted each separate lichen patch as a unique individual). We recorded the total number of species that we found.

On each day of data collection, we picked different trees to study. That way, we were able to combine our data for the two days in order to create a third data table.

### *Results:*

The tables below show the results we found on the two days of data collection.

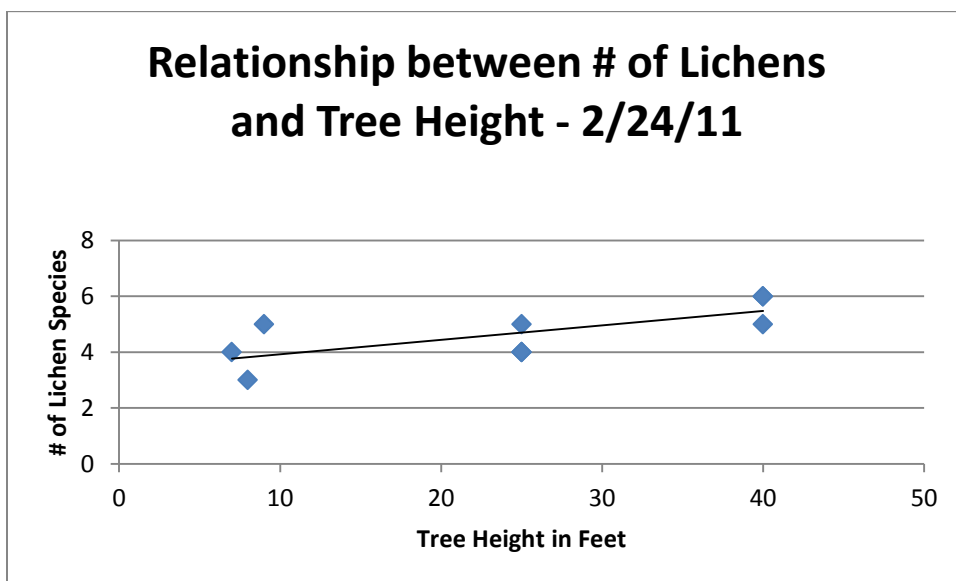
Date	Tree Species	Tree Height (Feet)	# of Lichen Species
2/24/2011	Garry Oak	25	5
2/24/2011	White Alder	25	4
2/24/2011	Oregon Ash	25	4
2/24/2011	Garry Oak	7	4
2/24/2011	White Alder	9	5
2/24/2011	Oregon Ash	8	3
2/24/2011	Garry Oak	40	5
2/24/2011	White Alder	40	6
2/24/2011	Oregon Ash	40	6

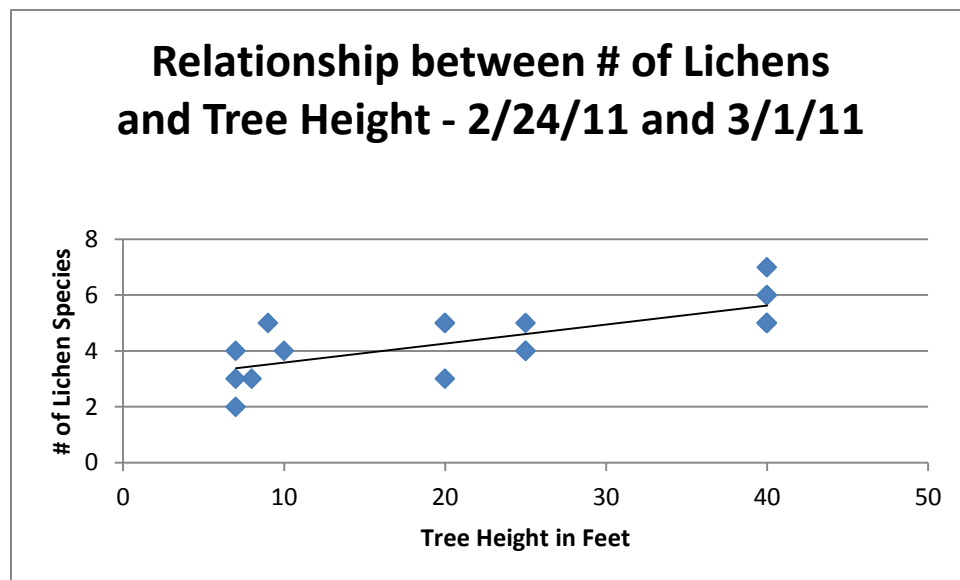
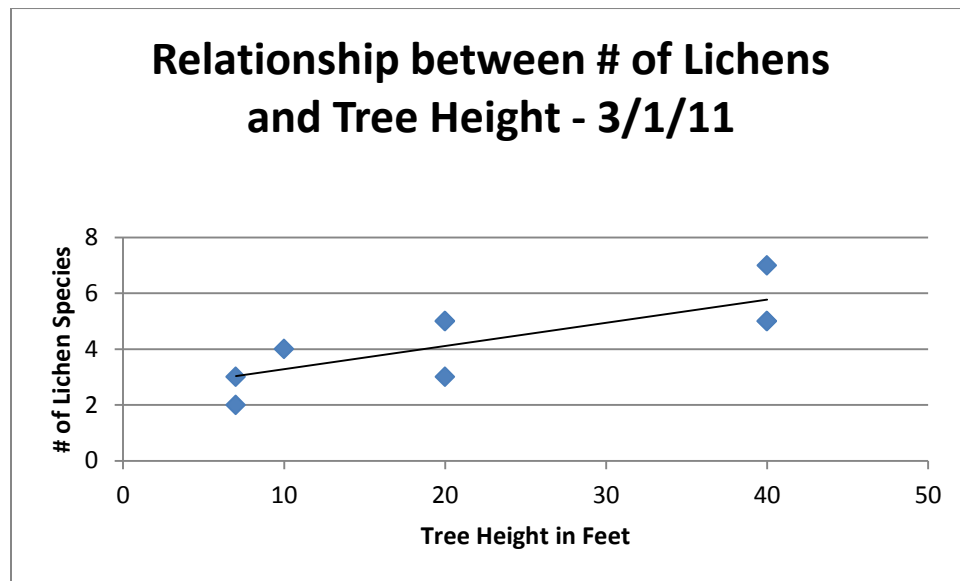
Date	Tree Species	Tree Height (Feet)	# of Lichen Species
3/1/2011	Garry Oak	20	3
3/1/2011	White Alder	20	5
3/1/2011	Oregon Ash	20	5
3/1/2011	Garry Oak	10	4
3/1/2011	White Alder	7	3
3/1/2011	Oregon Ash	7	2
3/1/2011	Garry Oak	40	5
3/1/2011	White Alder	40	7
3/1/2011	Oregon Ash	40	5

For trees taller than 12 feet, we estimated their height, which is why all the medium-sized trees and all the large trees have the same height. We only found one tree with all seven species on it – a 40 foot White Alder. In general, the most abundant species we found were *Usnea s.* and *Ramalina f.*, although in certain spots *Ramalina m.* and *Parmelia* were also quite abundant.

#### Discussion:

We graphed our data using x-y scatterplots. We created three graphs – one for each day of data collection and one for both days combined. The graphs are shown below.





All three of our graphs show a positive correlation, telling us that as the height of the trees we looked at increased, the number of lichen species we found increased as well. We believe that this supports our hypothesis and we think that the increased sunlight and water could possibly contribute to the increased diversity of species on taller trees. It is also possible that air quality played a role, although we are doubtful that there would be a significant different in the quality of air over a height difference of 20-30 feet. However, more research and testing would be necessary in order to be sure.