

Name

Date

Plot Study - Comparison of Hemlock and Deciduous Forests

Objectives:

1. Gain experience collecting chemical and biological data in the field.
2. Use Excel to graph data.
3. Analyze data to compare and contrast the ecology of hemlock and deciduous forests.
4. Use data and research from journal articles to state the unique ecological value of the hemlock forest.
5. Predict how the New England forest ecosystem could change if hemlock forests are lost to the hemlock woolly adelgid.

Assignment:

1. Read provided articles in order to research the importance of hemlock forests and the impact of the woolly adelgid on our forests.
2. Collect data on soil pH, nitrogen and phosphorus levels, soil temperature, and abundance of organisms by type.
3. Use Excel to create bar graphs to display your data. Create a series of graphs that compares pH, nutrient levels, temperature, and organism abundance by type in the hemlock and deciduous forests. Include titles and axis labels.
4. Analysis: Compare and contrast the characteristics of each plot. Summarize your results. Use your data and information from the articles to support your answer to the questions above. Refer to the open-ended science rubric to guide you when you write the analysis.
5. Lab Report: Write a lab report. Use this format to report your findings.

Introduction (20 pts.): This should be at least two paragraphs in length. Provide the following information (including Latin name).

Describe the eastern Hemlock tree in one sentence. What percentage of New England forests comprises eastern hemlock? Why is the eastern hemlock considered a foundation species (include a definition of a foundation species)? What role (niche) does the eastern hemlock play in New England forest ecosystems? Include both biotic and abiotic factors.

Describe the woolly adelgid (include Latin name). What is it? Where did it come from? When and how was it introduced to the United States? What does it feed upon and how does it feed? Describe the effect of the woolly adelgid on hemlock forests. How long does it take for the woolly adelgid to kill a hemlock tree? What does current research tell us about how New England forests will change after the hemlock trees have died? Cite your source.

Details of Citing References in your Text

When you cite a reference in your text you should use one of the following two formats:

(1) Give the author's last name in the sentence and then give the year of the publication in parenthesis:

According to Rodgers (1983), the Appalachian mountains were formed in three events.

or

(2) Quote the author exactly--be sure to put the quoted phrase between quotation marks--and then list the author's name, the date, and the page number in parenthesis:

"All the climaxes produced mountainous islands or highlands that shed vast amounts of debris westward to form clastic wedges or delta complexes on the continental margin." (Rodgers, 1983, p. 229).

Methods: (20 pts.): List the steps you followed to collect data about the ecology of the hemlock and deciduous forests. Number each step in a clear, concise manner that could be followed by a scientist who wants to repeat your experiment.

Data: (20 pts.): Report your data in table format. Next, use Excel to create bar graphs to display your data. Create a series of graphs that compares pH, nutrient levels, temperature, and organism abundance by type in the hemlock and deciduous forests. Include titles and axis labels.

Analysis: (20 pts.): Compare and contrast the characteristics of each plot.

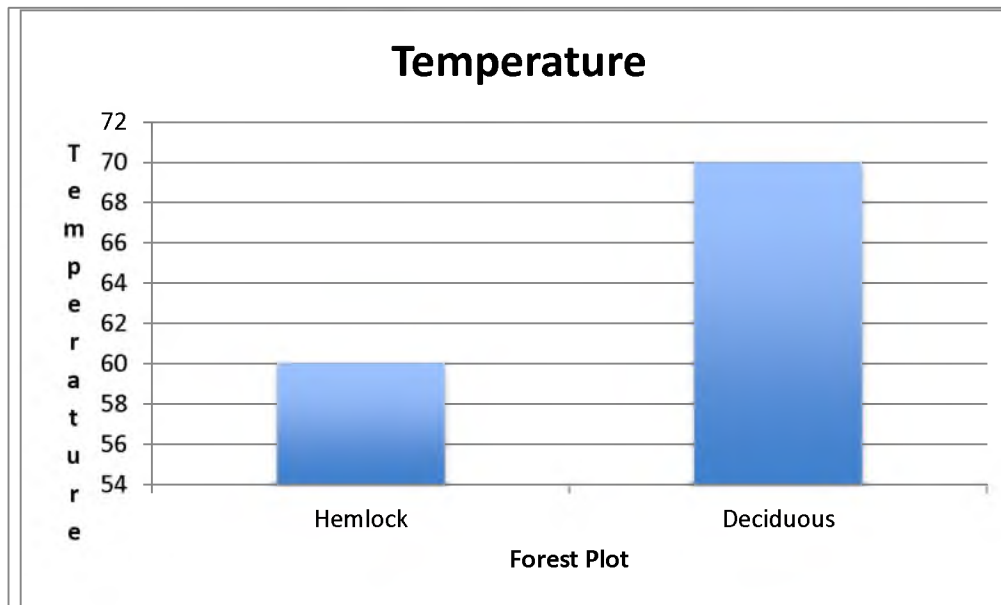
Conclusion: (20 pts.): Summarize your results. Use your data and information from the articles to support your answer to the questions below. Refer to the open-ended science rubric as a guide.

Analysis Questions:

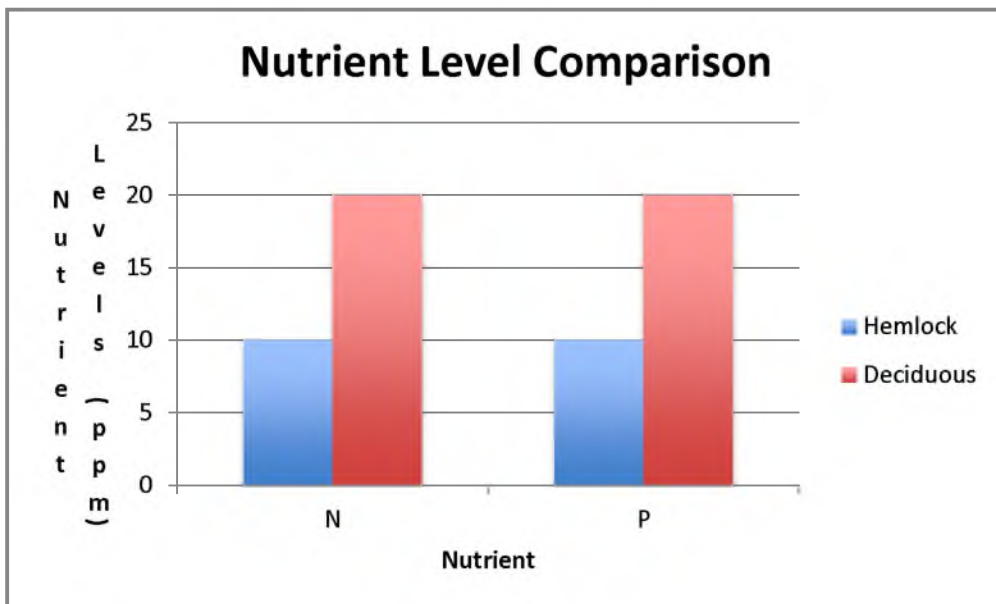
1. How does the ecology of a 1 x 1 meter area differ in a hemlock vs. deciduous forest (plants by type/species, fungi, invertebrates by type, pH, nutrients, temperature, other observations).
2. How is a hemlock forest floor unique?
3. What is the ecological value of a hemlock forest?
4. How do you predict the landscape and the New England forest ecosystems will change if we lose our hemlock forest due to the invasive insect, the woolly adelgid?

*<http://tim.thorpeallen.net/Courses/Reference/Citations.html#when>

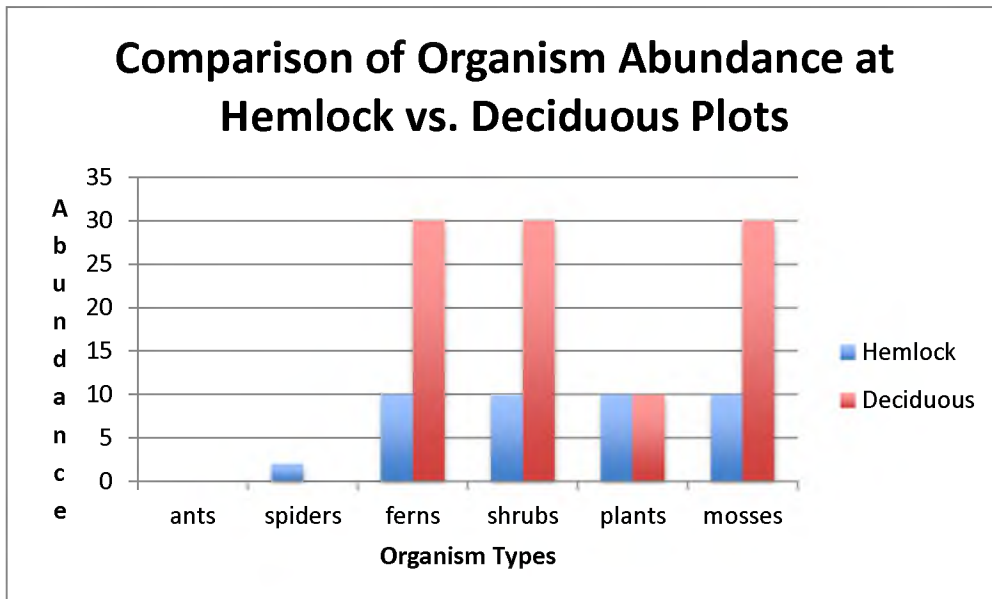
Forest	Temperature	Forest	ants	spiders	ferns	shrubs	plants	mosses
Hemlock	60	Hemlock				10	10	10
Deciduous	70	Deciduous				30	30	30



Nutrient Level	N	P
Hemlock	10	10
Deciduous	20	20



Forest	ants	spiders	ferns	shrubs	plants	mosses	
Hemlock		0	2	10	10	10	10
Deciduous		0	0	30	30	10	30





Harvard LTER Schoolyard Program

Teacher Developed Lessons and Documents that integrate Harvard Forest Schoolyard Ecology Themes into curriculum.

- Lesson Title:
Plot Study - Comparison of Hemlock and Deciduous Forests
- Teacher/Author: Karen Murphy
- School: Amherst Regional High School-South East Campus
- Level: High School
- Date: October, 2013