Name: _____ **Section:** _____ **Date:** _____

EXERCISE I: CHATAUQUA PARK FIELD TRIP: FOREST SUCCESSION

REFERENCE: Textbook: Geosystems: An Introduction to Physical Geography
Ch.19 Ecosystem Essentials

PURPOSE: On this trip we will explore the concepts of forest succession and disturbance. We will compare 19th century photographs with present day observations to generate hypotheses about ecological change during the past 100 years. We will sample the vegetation and measure environmental variables in two communities in Chautauqua Park - the forest-grassland ecotone and the forest. You should take notes during the group discussion of the ecology of the study area. This information will help you answer the interpretive questions for this lab and to analyze data next week (Lab Exercise J). The questions about field sampling (p.61 and 62) are due during next week's lab.

KEY TERMS AND CONCEPTS:
*****Hint: Be able to define and compare-contrast each of these terms for your exams!

ecotone	disturbance	size distribution
succession	disturbance regime	size-age relationships
dynamics	land-use change	chronosequence
	climate change	repeated photographs

INSTRUCTIONS: The class will divide into groups to collect data on micro-environment and vegetation of two study sites, one in the forest-grassland ecotone and the second in the forest.

At each study site, your group will set up a 20m by 20m plot. Use a meter tape to measure the sides and mark the corners with flags. Make general observations about the sample plot, its vegetation, and physical and environmental factors. Record this information on your field notes sheet.

Record the ecotone plot data in the Table on pg. 60, and the forest data in the Table on pg. 61. At the end of the field trip, submit your vegetation data to your lab instructor.

Tree data: For each tree in the plot record species, location (x-y coordinates in meters) and size class(seedling < 50cm tall, sapling 50 to 150cm tall, tree > 150 cm tall).

Micro-environmental data :At the center of your plot, measure and record the following micro-environmental characteristics:

(i) slope angle - using a clinometer
(ii) slope aspect - using a compass
(iii) soil temperature - using a subsurface soil thermometer
(iv) soil pH - using a portable pH meter
(v) air temperature at 1.5m (above the ground) - using a thermometer
(i) relative humidity at 1.5m - using a psychrometer and psychrometric tables.

Field Notes: Chautauqua Park Forest Succession Field Trip

Field Data: Chautauqua Park Ecotone

Variable	Group 1	Group 2	Group 3
Slope Angle			
Slope Aspect			
Soil Temperature			
Soil pH			
Air temperature			
Wet bulb temperature			
Relative Humidity			

Tree Number	Species	X-Coordinate	Y-Coordinate	Size Class
1				
2				
3				
4				
5				
6				
7				
8				
9				
10				
11				
12				
13				
14				
15				
16				
17				
18				
19				
20				

General Notes and Observations:

Field Data: Chautauqua Park Forest

Variable	Group 1	Group 2	Group 3
Slope Angle			
Slope Aspect			
Soil Temperature			
Soil pH			
Air temperature			
Wet bulb temperature			
Relative Humidity			

Tree Number	Species	X-Coordinate	Y-Coordinate	Size Class
1				
2				
3				
4				
5				
6				
7				
8				
9				
10				
11				
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15				
16				
17				
18				
19				
20				

General Notes and Observations:

Name: _____ **Section:** _____ **Date:** _____

Questions About Field Sampling

These questions address the sampling exercise conducted in Chautauqua Park. They are due during next week's lab. Use your field notes to prepare your answers. Be concise - use only the space provided.

1. Compare the vegetation structure in Figure 1 (handout) and your present day observations of the vegetation at Chautauqua Park. What is the general pattern of vegetation change in the Colorado Front Range near Boulder during the 20th century?

2. Climate change is one hypothesis proposed to explain the expansion of forests into grasslands during this century. (i) Which climate factor(s) do you think may favor forest expansion? (HINT: what are these trees limiting factors?) (ii) How are those factors predicted to change? Is climate change a viable hypothesis for these factors? Explain your answer.

3. Discuss two alternative hypotheses may explain forest expansion?

4. In the field, we collected data on the size of trees. Next week we will analyze this data and make inferences about patterns of forest change over time. Before making interpretations about forest change, it is important to consider the strengths and weaknesses of our data. We will assume that tree size reflects its age, meaning that large trees are <u>always</u> older that small trees.

1. Do you think this assumption is <u>always</u> true?

2. Would you be confident that a 25m tall tree is older than a neighboring tree that is only 20m tall?

3. Would you be confident that a seedling (height = .5m) is younger than a tree (height = 2m) if they were the same species and 2m from each other?

4. You should be skeptical of the age difference of the 25m and 20m trees!! Discuss two reasons why the shorter tree may be older.

5. Was the relative humidity in the ecotone different from the relative humidity in the forest? Fill out the table. (HINT: You'll need to use the psychrometric tables from Lab D)

	Ecotone	**Forest**
Dry Bulb Temp (F)		
Wet Bulb Temp (F)		
Dry Bulb Temp (C)		
Wet Bulb Temp (C)		
Wet Bulb Depression (C)		
Relative Humidity (%)		
Saturation Vapor Pressure (mb)		
Vapor Pressure (mb)		

6. Remember that Relative Humidity = Vapor Pressure/ Saturation Vapor Pressure. Explain the contribution of the VP and the SVP to the RH you record for both the ecotone and forest.