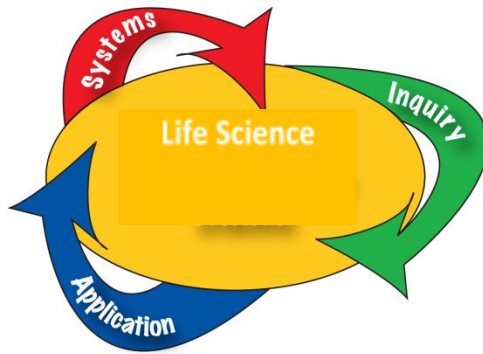


Biology Field Study



Biology

Field Study “Quadrats”

*based on Quick Lab “Quadrat Sampling” from McDougal Littell “Biology” pg 399



Name:

Period:

Background:

A field experiment gives a more accurate picture of how organisms interact in a natural setting than in the artificial setting of a lab. However, it is more difficult to determine cause and effect due to the large number of factors at work in nature. A field experiment is performed where the organisms live. Like lab experiments, field experiments also have controls and manipulated variables.



Ecologists often use quadrat sampling-square or rectangular frames-to collect data about population numbers in an ecosystem. These frames are randomly placed on the study site. To determine the amount of biodiversity (# of different species), scientists identify and count the number of different plants with each randomly selected plot. The total number of counted plants species is then plugged into a mathematical formula to determine the plant biodiversity in an entire site. In this lab, you will use a quadrat to collect data on the number of different plant species of various areas of the Skyline Outdoor Forest

3 study areas:

- Big (Mature) Forest -324 m²
- Smaller (Younger) Tree Forest -513 m²
- Pond area (no trees)-284 m²

Prelab: Tour of the three locations. Observe the amount of plant biodiversity at each location.

Questions:

1. What kind of data will you be recording?
2. Describe the 3 locations you will be observing. What characteristics do they have in common? How are they different?
3. What validity measure will you put in your procedure?
4. What reliability measure will you put in your procedure?

Plan a field study to answer the field study question on the next page. You will use the following materials and equipment in your procedure: random number generator, 1 quadrat (1 m²), 3 natural areas, 1 calculator.

Be sure your procedure includes:

- logical steps to do the field study
- conditions to be compared
- data to be collected
- method for collecting data
- how often measurements should be taken and recorded
- environmental conditions to be recorded
- at least one validity measure
- at least one reliability measure

Field Study Question: What is the effect of the amount of shade (increasing or decreasing) on the number of one type of plant?

Manipulated/Independent Variable:

Responding/Dependent Variable:

Controlled Variables:

Experimental Group:

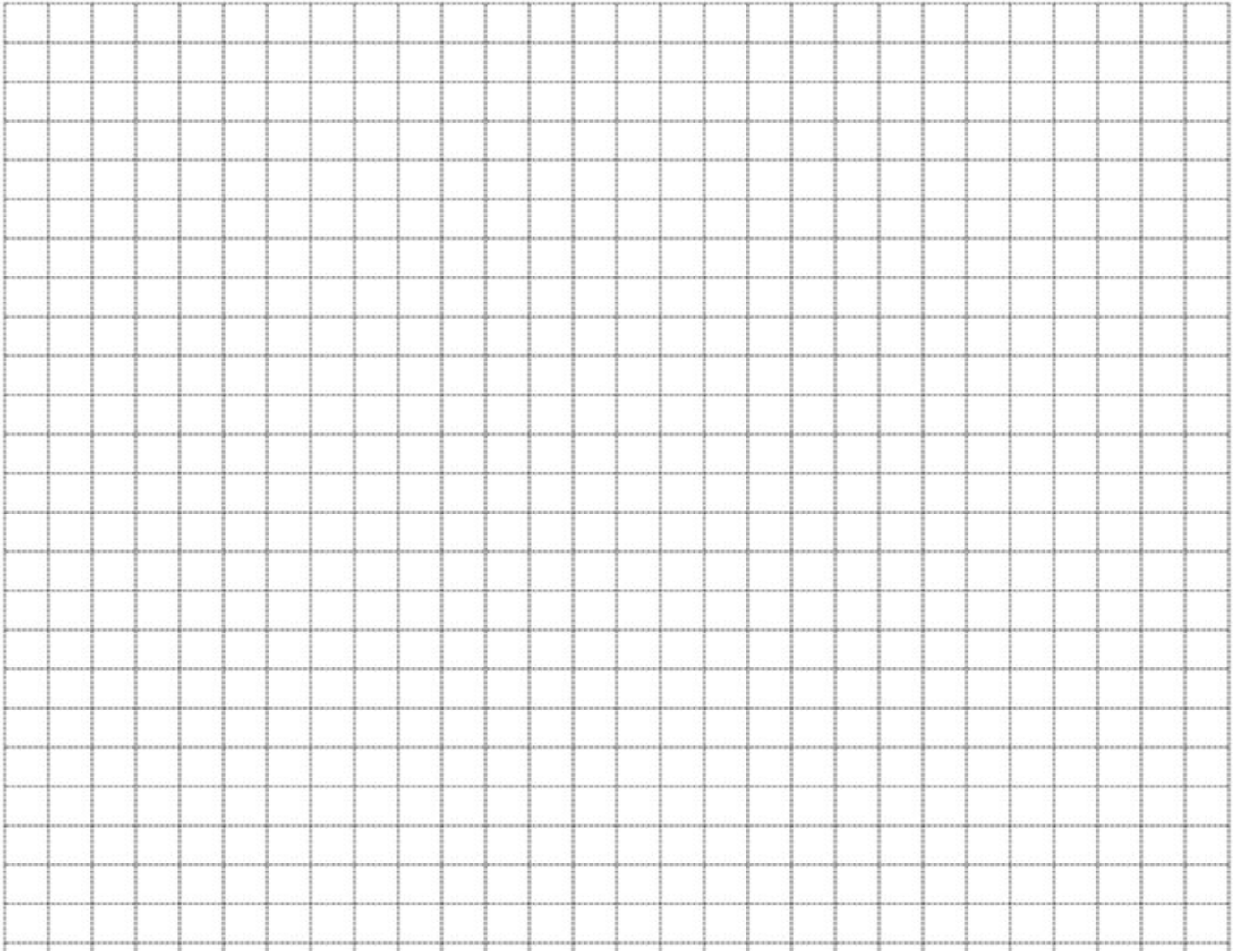
Control Group:

Hypothesis:

Procedure:

Diagram of Set Up: Include the 3 locations and all the materials used. Label your diagram.

Analysis: Bar graph of number of plant species in each area. Make sure to include a title and to label each axis.



Questions:

1. Which of the three locations had the most plant biodiversity? Which had the least amount?
2. Why do you think the areas from question one had the most biodiversity? Why did that area have the least amount?
3. Which of the characteristics listed in question #2 are considered non-living?
4. Which of these characteristics are considered living?

5. Calculate an estimated population density using the following formula. Include the general formula and the values you plug into the formula in your formal write up. *You will need 3 calculations for each.*

Estimated Population Density of Each Location = Avg Number of individuals/Area (units²)

Estimated Total Population of Each location= Estimated Population Density of Each Location x Total Area (m²)

Conclusion:

Claim:

Evidence:

Reasoning:

Depth and Development:

1. How would a change in season affect biodiversity (example: more sun in winter due to leaf loss).
2. How would you find the population number for a mobile species? Do some online research!