



Name: _____

Section: _____

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DEFINING AND MEASURING BIODIVERSITY

Introduction

Science is often concerned with the number of different types of organisms in a given area, referred to as *biodiversity*. Biodiversity is frequently counted as the number of different species in an area (referred to as *species richness*); however, there are many competing definitions of biodiversity. Biodiversity can also consider the different roles that organisms play in their environment (referred to as *functional biodiversity*). For instance, deer only eat plants (herbivores) and jaguars only eat animals (carnivores). These are very distinct behaviors and an area with only herbivores could be considered less biodiverse than an area with both herbivores and carnivores. This is important to consider, since an area with only herbivores may actually have a higher number of species than an area with both herbivores and carnivores.

Accurate measures of biodiversity are important for understanding how ecosystems function and for making informed decisions about conservation. Do we prioritize the conservation of one area over another if it has a greater number of species? What if there is a greater total number of species in one area, but greater functional biodiversity in the other area? These are some of the questions that scientists and policy makers have to consider when making conservation decisions. Additionally, biodiversity measures do not necessarily include the number of each individual species occurring in each area (referred to as *species evenness*). Incorporating the number of each individual species occurring in the area (i.e. species density) may help identify rare species and inform conservation decisions.

The plant and animal biodiversity of the cloud forest canopy is absolutely stunning. For instance, there are literally thousands of plant species that only live epiphytically (growing on other plants), spending their entire life in the canopy. Here, you will explore the complexities of biodiversity and measuring it accurately by exploring the epiphytic plants species in the canopy of a tropical montane cloud forest.

To begin, open the canopy panorama in the “**Middle Elevation Forest**” by clicking on link #2 and navigating to the canopy. Turn off the links by clicking the “Natural Scene” button. Proceed by counting the number of different plant species growing epiphytically on the branches of the tree. Do not worry about counting how many of each different species there are on the branches. Write your estimate below:

Canopy Plant Diversity Count #1 _____

Following the class discussion of your initial biodiversity count and the revision of your method, write your new estimate below:

Canopy Plant Diversity Estimate #2 _____



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Discussion Questions

- 1) Provide a definition of biodiversity, as measured in this exercise, and explain how it differs from other definitions?

- 2) What are the primary components to achieving an accurate estimate of biodiversity?

- 3) How does one decide what to count and what not to count?

- 4) How would including the number of each individual species occurring in a sample (i.e. species density) have changed the process and how might this additional information prove valuable?



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Student Assessment

Please respond to the following scenario:

A non-profit conservation organization has the opportunity to buy and preserve two different forest properties, but they only have money to buy one of the two. They would like to do a biodiversity assessment to help them make a decision about which property to buy and have asked you for your assistance in designing and interpreting the results. Provide them with five suggestions for insuring that they make the right decision.

1)

2)

3)

4)

5)