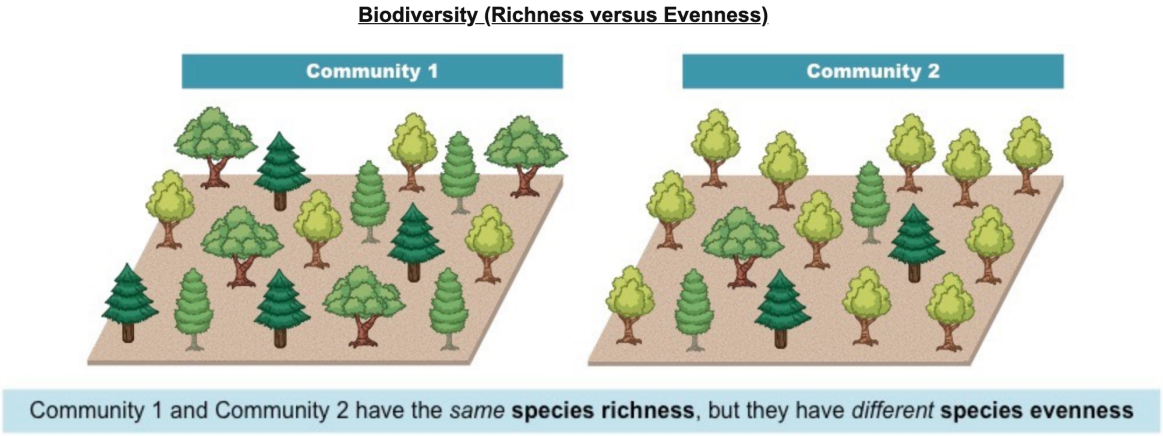
Name _____ Date _____ Period _____

THE SIMPSON INDEX OF DIVERSITY

INTRODUCTION:

The Simpson Index of Diversity is one way for ecologists to measure the diversity of a community (a group of different populations living in the same general area). The value of this index ranges between 0 and 1. With this index, 1 represents infinite diversity and 0 represents no diversity. **A higher value indicates a more diverse community.** *The index represents the probability that two individuals randomly selected from a sample will belong to different species.*



PRE-LAB QUESTIONS:

1. How do the species compare in terms of species richness? In other words, are the same species present in each community?

2. How do the species compare in terms of species evenness? In other words, do they share the same diversity or is one community more diverse than the other?

3. Which community would recover more quickly from a natural disaster, such as a forest fire, or a bottlenecking event? Why?

PROCEDURE:

1. Calculate the Simpson's Index for *Forest Community 1* by counting the trees and filling in the appropriate data table.

2. Calculate the Simpson's Index for *Forest Community 2* by counting the trees and filling in the appropriate data table.

3. Calculate the Simpson's Index for a SMALL population of singing rodents:

   Randomly select 10 Chipmunk/Chipette cards to serve as your population. Fill in the appropriate data table and determine the Simpson's Index. Then return the 10 cards to your teacher.

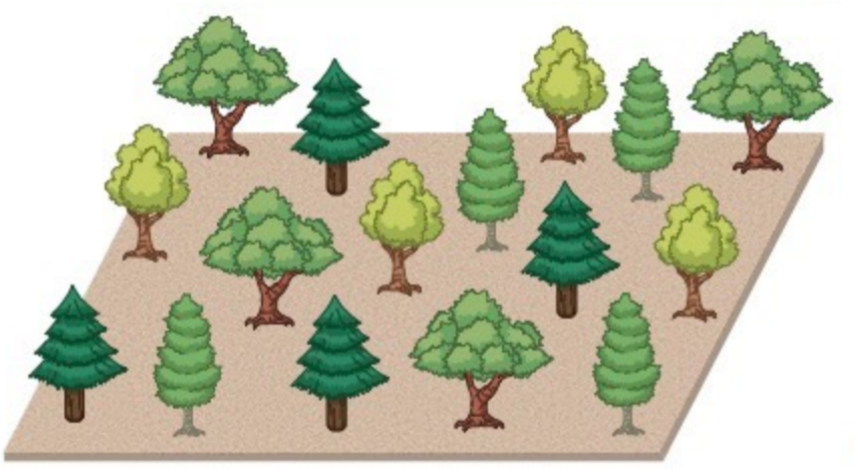
4. Calculate the Simpson's Index for a MEDIUM population of singing rodents:

   Randomly select 25 Chipmunk/Chipette cards to serve as your population. Fill in the appropriate data table and determine the Simpson's Index. Then return the 25 cards to your teacher.

5. Calculate the Simpson's Index for a LARGE population of singing rodents:

   Randomly select 50 Chipmunk/Chipette cards to serve as your population. Fill in the appropriate data table and determine the Simpson's Index. Then return the 50 cards to your teacher.

Data Table #1: Species Diversity in Forest Community 1

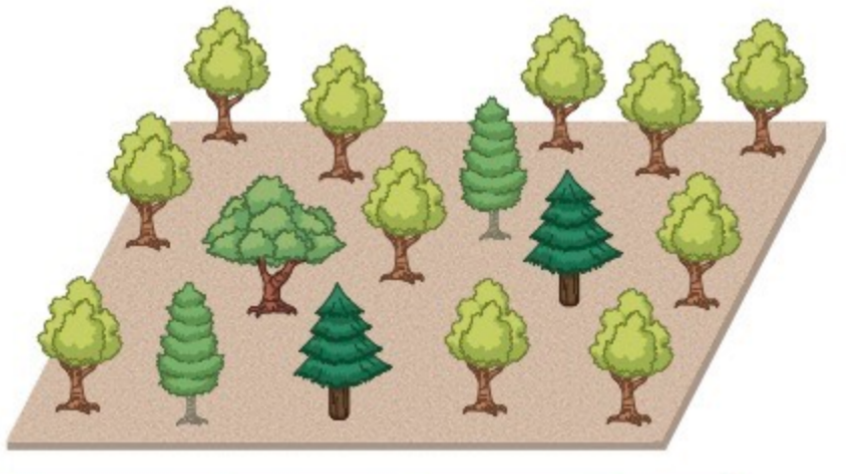


Name of Species	# of Individuals in the Sample Population "n"	n/N	$(n/N)^2$

# of Total Individuals "N"	$D = \Sigma(n/N)^2$

Simpson's Index $1- \Sigma (n/N)^2$

Data Table #2: Species Diversity in Forest Community 2



Name of Species	# of Individuals in the Sample Population "n"	n/N	$(n/N)^2$

# of Total Individuals "N"	$D = \Sigma(n/N)^2$

Simpson's Index $1- \Sigma (n/N)^2$

Data Table #3: Species Diversity in a Small Population of Singing Rodents

Jeanette | Brittany | Eleanor | Alvin | Theodore | Simon

Name of Species	# of Individuals in the Sample Population "n"	n/N	$(n/N)^2$
Jeanette			
Brittany			
Eleanor			
Alvin			
Theodore			
Simon			

# of Total Individuals "N"	$D = \Sigma (n/N)^2$

Simpson's Index $1 - \Sigma (n/N)^2$

Data Table #4: Species Diversity in a Medium Population of Singing Rodents


Jeanette


Brittany


Eleanor

Alvin


Theodore


Simon

Name of Species	# of Individuals in the Sample Population "n"	n/N	$(n/N)^2$
Jeanette			
Brittany			
Eleanor			
Alvin			
Theodore			
Simon			

# of Total Individuals "N"	$D = \Sigma (n/N)^2$

Simpson's Index $1 - \Sigma (n/N)^2$

Data Table #5: Species Diversity in a Large Population of Singing Rodents

Jeanette | Brittany | Eleanor | Alvin | Theodore | Simon

Name of Species	# of Individuals in the Sample Population "n"	n/N	$(n/N)^2$
Jeanette			
Brittany			
Eleanor			
Alvin			
Theodore			
Simon			

# of Total Individuals "N"	$D = \Sigma (n/N)^2$

Simpson's Index $1 - \Sigma (n/N)^2$

POST-LAB QUESTIONS:

1. Check your answers to the 3 pre-lab questions. Did you get the expected results? Change any of your answers if they were incorrect.

2. Is it possible for two communities of the same size to have different levels of diversity? Justify your answer by citing data from the forest community examples in order to support your claim.

3. Make a claim to describe the relationship between **population size** and **Simpson's Index of Diversity**. Justify your answer by citing data from the singing rodent simulations.

4. Describe your answer to question 3 in simple, non-technical terms.