lab 5.1
Calculating the Diversity of Trail Mix

Objective

This lab asks you to practice using Shannon's index to compare communities of trail mix. You will see how the index can be used to compare the biodiversity of different communities.

Approximate Time:

45 minutes

Shannon's Index:

Shannon's index is often used by environmental scientists to compare diversity of ecosystems and quantify species evenness and species richness. To calculate this index, we must know the total number of species in a community (n) and the proportion of individuals within each species (p_i). Shannon's index is represented by H. the higher the H value, the higher the diversity of the community. Shannon's index is represented in the equation below.

$$H = -\sum_{i-1}^{n} p_i \ln(p_i)$$

Materials:

- 2 small paper cups of trail mix (trail mix should be made up of at least 5 components)
- Calculator

Procedure

1. Obtain two cups of trail mix.
2. Label one cup "community A" and the second cup "community B".
3. Assume each component of the trail mix is a different species. Identify and record the types and numbers of each species in your data table.
4. Complete your counts for each community.
5. Using the data tables as a guide, complete the calculations to determine the H values for each community.

Community A

Species	Number of species in sample (*i*)	P_i $P_i = i \div n$ (Number of specific species ÷ total number of species)	ln(P_i)	$P_i \times$ ln(P_i)
	Total Number of organisms (n)=___	Should add up to 1.0		H = _____ (add this column and remove the -)

Community B

Species	Number of that species in sample (*i*)	P_i $P_i = i \div n$ (Number of specific species ÷ total number of species)	ln(P_i)	$P_i \times$ ln (P_i)
	Total Number of organisms (n)=_____	Should add up to 1.0		H = _____ (add this column and remove the -)

Analysis Questions

1. After determining the H value for each community, which one is most diverse?

2. Determine the species richness and species evenness for each community.

	Species Richness (S) **Number of different species** **found in your community**	**Species Evenness (E)** $E = H \div \ln(S)$
Community A		
Community B		

3. Considering all three Shannon measurements (H, S, and E), which community is most diverse? Explain your reasoning.

4. What are two advantages to using Shannon's index rather than simply using an overall population count?

5. What are two disadvantages of using Shannon's index?