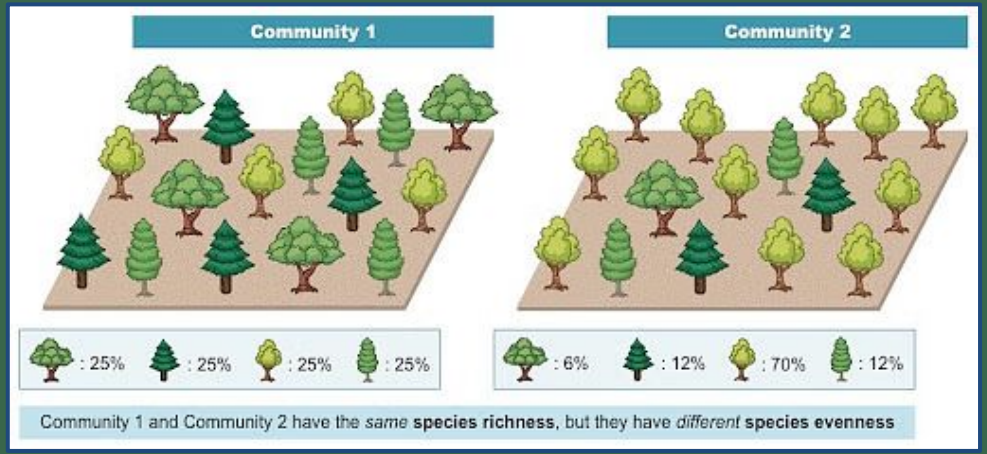
Measuring Biodiversity

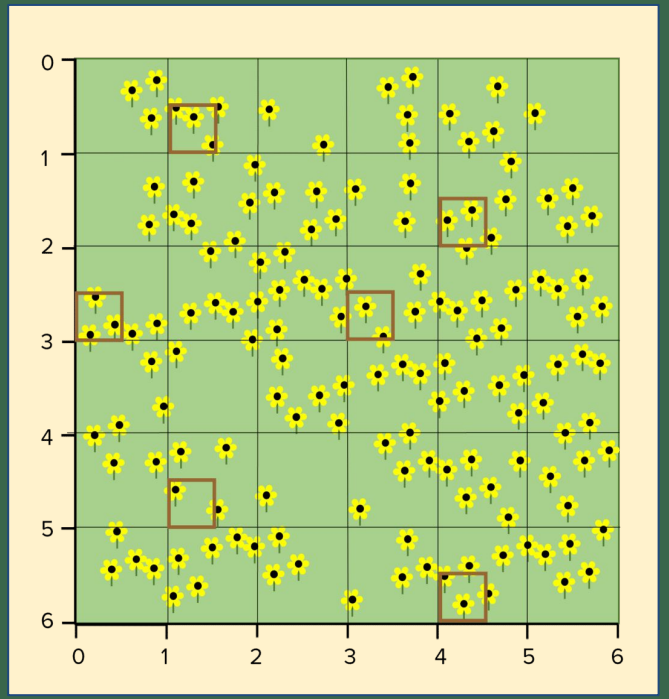
Biologists measure biodiversity in an area using different methods and collecting data in the field, depending on what they want to know about a habitat or ecosystem. Below are some methods for measuring biodiversity.

- Species Richness
- Species Evenness
- Diversity Index
- DNA Barcoding



Sampling Biodiversity

Taking samples using **quadrats** allows biologists to obtain reasonable estimates of the populations of each species living in a particular habitat. **Quadrat sampling** is very useful for measuring species richness and evenness.

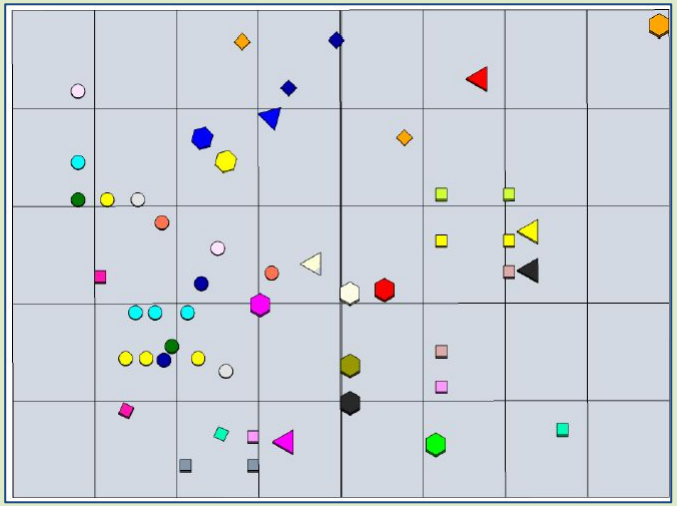


SAMPLING BIODIVERSITY

Let's practice quadrat sampling to determine **species richness** and **species evenness** in a simulated habitat!

Set-Up:

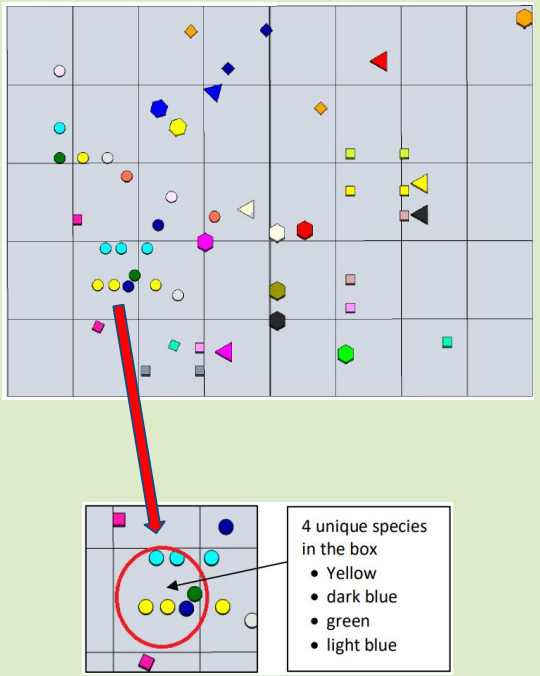
1. Draw the habitat area: 40 quadrats, each is 4x4 inches (see image at right).
2. Number the squares #1-40 from left to right, top to bottom.
3. Carefully spread "organisms" over habitat.
4. Take top view photos/video of habitat.



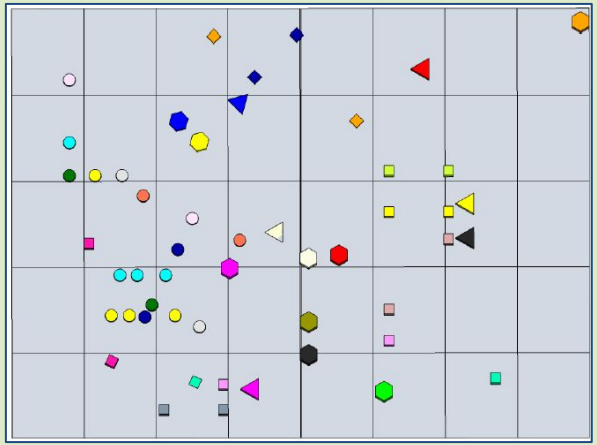
SAMPLING BIODIVERSITY

Procedure (Species Richness):

1. Roll dice, add them up, and observe that quadrat. Record quadrat number in **Species Richness Data Table** for Sample #1.
2. Count number of different species in quadrat, not individuals. Record number in "Species Count" and "Cumulative Total" columns.
3. Roll dice again, observe next quadrat, count and record number of different species. Do not count the **same** species found in previous quadrat (they must be unique!)
4. Calculate cumulative totals as you work (see data table for examples).
5. Continue sampling until all unique species have been counted.



SAMPLING BIODIVERSITY



Procedure (Species Evenness Analysis):

1. Record name of every species found in habitat in **Species Evenness Data Table** (e.g. "Yellow Beads") under "Species Name."
2. Count and record number of individuals in for *each* species in "# Individuals" column. This may take time!
3. Add up all individual counts to get total number of individuals in habitat. Enter number in table as "Total # Individuals."
4. Calculate percentage (%) for each species (see examples in table).

% = (# Individuals / Total # Individuals) x 100

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SAMPLING BIODIVERSITY: SPECIES EVENNESS

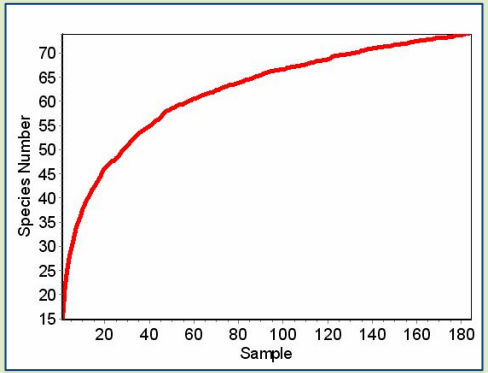
Data Table: Species Richness

Species Name	# Individuals	% Species = (# Individuals / Total # Individuals) x 100
Example: Yellow bead	50	% = (50 / 300) x 100 = 17 %
Example: Green bead	140	% = (140 / 300) x 100 = 47 %
	(Example: 300)	
TOTAL # INDIVIDUALS =		

SAMPLING BIODIVERSITY

Procedure (Species Richness Analysis):

1. Use the data from Species Richness Data Table to create a graph.
   a. **Sample Number** along x-axis (bottom of graph)
   b. **Cumulative Total Species** along y-axis (left side of graph)
2. Label the axes accordingly.
3. Plot points on graph based on data.
4. Draw a curve that best fits the data (see example below).



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RESOURCE AREA FOR TEACHING

SAMPLING BIODIVERSITY: SPECIES RICHNESS

Data Table: Species Richness

Sample Number	Quadrat Number	Species Count	Cumulative Total (Species)
Example 1	26	4	4
Example 2	33	3	4+3=7
1			
2			
3			
4			
5			
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