

Star Species Biodiversity Inventory

Purpose: This exercise will familiarize students with methods to survey the abundance and diversity of organisms in a given area. These common field-sampling techniques will be used in a variety of habitats in subsequent lessons. By quantifying the organisms that live in contrasting habitats, students will learn about how different organisms need specific environmental conditions to survive.

Required background: Students should be comfortable with math and familiar with using percents.

Materials:

1. A variety of “star species” (or any other “organisms” you want to sample such as stuffed animals, Legos, or candy)
2. Transects (rope or tape measure)
3. Quadrats (any square enclosure)

Introduction: For this study, we will use a **line transect** and **quadrat** to record the plants around Hokulani Elementary School. A **transect** is a line along which organisms are observed or sampled and may be a measuring tape, string, rope, or line-of-sight. A **quadrat** is a sampling plot, usually square-shaped, to survey a selected area.

Scientists use transects to survey large areas, especially areas that change over a given distance. For example, a transect might be laid:

- Across a field
- Through the intertidal zone
- Along a riverbank

Transects may range in length from 1 meter up to several miles long. They may also vary in width. A transect may only be the width of the string or measuring tape, in which case you count whatever touches the line. It could also extend a few centimeters or meters on either side of the transect line.

A quadrat can vary in size and may be any shape. It can be laid on a transect and measured at different intervals (e.g. every 1 meter) or placed in random areas of your sampling site.

Conducting a biodiversity survey in the classroom:

Material developed by Kim Tice and Norine Yeung for the University of Hawaii-Manoa GK-12 program (NSF grant #05385500). www.hawaii.edu/gk-12/evolution. Duplication for educational purposes only.

- 1) Each team will select specialists to do the various tasks:
 - a. Two inventory scientists
 - b. One scientist to organize the data
- 2) Two measuring tapes will be laid out and selected for detailed observation.
- 3) Select one person from each group to take a piece of paper out of a hat (or similar). Each piece of paper will have a different distance and the group will walk along the tape until reaching that distance (e.g. if 6 is chosen, walk to the 6m mark)
- 4) The group will then place their quadrat at their assigned point. The lower left corner of the plot will be touching the tape of their assigned point (e.g. if 6 is chosen, the lower left corner of the plot will be touching the tape measure at the 6m mark).
- 5) Within the quadrat, the students will count the number and area cover of each species and record their data on their worksheets. When conducting a biodiversity survey at a field site, each group will have more than one quadrat to survey.
- 6) Share your observations with the rest of the class.

Follow-up:

- 1) Graph the number of different kinds of stars or plants in each quadrat.
- 2) Graph the number of a specific star or plant in each quadrat.
- 3) Graph the percent cover of the various kinds of stars or plants in each quadrat.
- 4) What happens if the transect tapes cross each other?
- 5) What happens if the quadrats overlap each other?

Biodiversity Inventory Scientists: Name _____

Classroom _____

Classroom Survey:

Sketch and give a simple but clear description of each type of star observed (for example: star is shiny blue or star is red and 5mm across). Use your ruler to help with your descriptions.

Transect # _____ Quadrat # _____

Describe Star #1	(Circle answer) How much area did this star cover in your quadrat? Less than $\frac{1}{4}$ About $\frac{1}{4}$ About $\frac{1}{2}$ About $\frac{3}{4}$ More than $\frac{3}{4}$	How many of these stars were in the quadrat?
Describe Star #2	(Circle answer) How much area did this star cover in your quadrat? Less than $\frac{1}{4}$ About $\frac{1}{4}$ About $\frac{1}{2}$ About $\frac{3}{4}$ More than $\frac{3}{4}$	How many of these stars were in the quadrat?
Describe Star #3	(Circle answer) How much area did this star cover in your quadrat? Less than $\frac{1}{4}$ About $\frac{1}{4}$ About $\frac{1}{2}$ About $\frac{3}{4}$ More than $\frac{3}{4}$	How many of these stars were in the quadrat?
Describe Star #4	(Circle answer) How much area did this star cover in your quadrat? Less than $\frac{1}{4}$ About $\frac{1}{4}$ About $\frac{1}{2}$ About $\frac{3}{4}$ More than $\frac{3}{4}$	How many of these stars were in the quadrat?
Describe Star #5	(Circle answer) How much area did this star cover in your quadrat?	How many of these stars

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	Less than $\frac{1}{4}$ About $\frac{1}{4}$ About $\frac{1}{2}$ About $\frac{3}{4}$ More than $\frac{3}{4}$	were in the quadrat?
Describe Star #6	(Circle answer) How much area did this star cover in your quadrat? Less than $\frac{1}{4}$ About $\frac{1}{4}$ About $\frac{1}{2}$ About $\frac{3}{4}$ More than $\frac{3}{4}$	How many of these stars were in the quadrat?
Describe Star #7	(Circle answer) How much area did this star cover in your quadrat? Less than $\frac{1}{4}$ About $\frac{1}{4}$ About $\frac{1}{2}$ About $\frac{3}{4}$ More than $\frac{3}{4}$	How many of these stars were in the quadrat?

Questions:

- 1) How many different types of stars are there? _____
- 2) Which star is the most numerous? _____
- 3) Which star is the least numerous? _____
- 4) Which star is the largest? _____
- 5) Which star is the smallest? _____