



Activity #3

School Grounds Vegetation Survey

● ● ● In Advance *Selecting a Survey Site*

- Look around the grounds for a site where students will be able to establish several one-meter-square plots with a range of plant species and cover density to survey (e.g., probably not on the lawn!). Look for an area that has vegetation that is mostly low-lying.

● ● ● Class Period One *Vegetation Survey*

Materials & Setup

Per group of three to four students

- Four large, four- to six-inch nails or tent stakes, with their tops painted orange
- Five meters of string
- One-meter measuring stick
- Student Page “Conducting Your Vegetation Survey” (pp. 32-36).
- Ten copies of “Vegetation Survey Data Sheet” #1 and #2 from the student page (pp. 35-36)

Instructions

- 1) Begin the vegetation survey activity, following the instructions given on the Student Page “Conducting Your Vegetation Survey.” Here are the basics:
 - Each student team establishes a one-meter-square plot.
 - Each team draws a map of the survey site that includes all of the plots. As a class, they agree on (or you impose) a numbering system so that each plot has an identifying number.
 - Each team surveys the vegetation in its plot and records its observations on “Vegetation Data Sheet #1.”
- 2) Leave at least the corner stakes of each plot in the ground overnight. You may leave the string that marks the plot boundaries, as well, if the study site is out of the way.

● ● ● Class Period Two *Vegetation Survey, Continued*

Instructions

- 1) Continue the vegetation survey activity, following the instructions given on the Student Page “Conducting Your Vegetation Survey.” Here are the basics:
 - Teams “swap” plots with another team, surveying the vegetation in the other team’s plot and recording their observations.
 - The pairs of teams that swapped plots compare each team’s recorded observations of the two plots with the partner team’s observations. Since each of these two teams has surveyed the same plots, they can look for differences in their observations, figure out why these differences



exist, and go back and look at the plots again to try to reach an agreement. Student teams should note the differences on the student page as well of whether/how they resolved this difference. (Comparing notes and working out disagreements like this is similar to the process that researchers in Haleakalā used when they monitored revegetation in Greensword Bog.)

● ● ● Class Period Three

Materials & Setup

- “Cover and Frequency Chart” (master, p. 31)
- Overhead projector and screen

Instructions

- 1) Put the blank “Cover and Frequency Chart” on the board or overhead.
- 2) Record data for all of the plots on this chart. Ask each team to contribute its findings. Because students did not identify the species growing in their plots but rather made sketches, completing the chart for the whole class may be a bit of a challenge. Do the best you can, asking student teams to compare sketches when they need to decide whether they have identified the same species or type of plant as another team.
- 3) Using this class chart, illustrate the difference between the concepts of “frequency” and “cover.”
 - “Frequency” refers to how many plots a particular plant species or type appears in. Frequency is expressed as a percentage of the total number of plots. (Frequency is a meaningful calculation only if one is observing more than one plot; otherwise, the frequency can only be zero or 100 percent.) When researchers are studying a large area with many plots, calculating frequency helps them understand how widely distributed throughout the whole site the species is.
 - “Cover” refers to the area of ground covered by the plant species or type. It is expressed as a percentage of the total ground area within a plot. When studying a large area with many plots, researchers calculate the total cover of each species by finding the mean cover value from all of the plots.
- 4) With the whole class, discuss the findings of their vegetation surveys and what they learned from doing the surveys.

Journal Ideas

- How do you think vegetation surveys could be used as a conservation tool in rain forests, bogs, and other ecosystems on Haleakalā?
- When scientists design vegetation studies, they need to decide plot size and how many plots to use. What do you think scientists need to consider when making those decisions?
- Find photographs of different kinds of vegetation from the Internet or magazines. What size plot would you use to survey each different kind? Why?

Assessment Tools

- Student Page “Conducting Your Vegetation Survey”
- Participation in group work and class discussion
- Journal entries



Conducting Your Vegetation Survey

You and your team will be conducting a vegetation survey similar to the surveys used by researchers to study changes in bog vegetation over time. A vegetation survey is an inventory of plants. When repeated surveys are done in the same sites over time, that is called “monitoring.” Researchers monitor areas if they want to know about a process such as regrowth of vegetation or “succession” (how the composition of plant species at a site changes over time).

It would be very difficult and time-consuming to look at all of the vegetation in a large area such as one of the Hāna rain forest bogs, which can cover several acres. So researchers set up smaller areas called “plots” to study in depth. You will use plots to conduct your own vegetation survey on the school grounds.

Step One: Set Up Your Plots

- 1) Choose a spot for your plot. Your teacher will show you the general area in which each team will set up its separate plot.
- 2) Use wooden or metal stakes to mark the corners of a one-meter square area. Measure carefully one meter between the stakes, and make sure your plot is square.
- 3) Tie one end of a string to one of the stakes. Run the string around the outside of the corner stakes, looping it around each stake to hold it in place. When you get back to the stake you began with, tie the other end of the string to that stake, too. Now you have created a string square that measures one meter on each side. Inside the square is your plot.

Step Two: Make a Map of the Whole Site

- 1) All of the plots together make up the research site. With your team members, make a map of this site on the “Map of the Study Site” sheet.
- 2) Now work with the whole class to give each plot a number so the data from all of the plots can be analyzed together later. Note these plot numbers on your map.

Step Three: Survey Your Plot!

- 1) Look at the plants that are growing in your plot. Make a record of these plants, using the “Vegetation Survey Data Sheet #1.”

For now, **fill out the first four columns of this form.** You will make notes about what kinds of plants you see in your plot and how much of the ground they cover. Sketches of the plants will help you avoid duplication and compare notes later with teams surveying other plots. You will also make an estimate of how much bare ground there is in your plot.

Since you are not identifying each of these plants by species for this activity, you will need to give each plant type you find and record a descriptive name. Your naming scheme could be something like “Grass #1,” “Grass #2,” “Flowering Plant #1,” and so forth. Or you could use more descriptive labels, such as “Broad-Leaved Grass,” “Long-Stemmed Grass,” “Plant With Small White Flowers,” and so on.



Step Four: Survey Another Team's Plot

- 1) "Swap" plots with another team. That team will survey the vegetation in your plot, and your team will survey the vegetation in theirs.
- 2) Do the vegetation survey on the other team's plot, filling in "Vegetation Survey Data Form #2" with your results.
- 3) Now compare results with the other team. Working with one plot at a time, compare your data forms. Look for differences in your observations such as these:
 - Did one team see a type of plant that the other did not observe?
 - Did one team make a distinction between similar-looking plants that the other team treated together as one plant type? For example, many grasses look similar but may have subtle differences in coloration, leaf shape, or seed heads. One group may have lumped all these grasses together, while the other group split them into separate types.
 - Are your estimates of ground cover percentages for each type of plant different?

Go back to the plot to work out your differences and come up with results that both teams agree with. Record these adjustments on your data forms.

One difference that you are likely to find is that the two teams gave the plants different descriptive names. Between the two teams, you will need to agree on one descriptive name for each plant type, so you will be able to compare data and results.

Move to the second plot when you are finished comparing and adjusting results for the first plot.

Step Five: Compile Your Class Findings

In class, your teacher will help you create a table that summarizes the findings of all of the research teams and do some basic analysis of your data.



Map of the Study Site

In the space below, draw a map that includes all of the plots created by your class. Include any landmarks or notes about direction (north, east, etc.) that will help you orient the map later and locate the plots.

With the whole class, agree on a number to identify each one of the plots. For example, you may decide to number the plots in order from east to west, or if the plots are in a rough circle, you could number the plots in sequence around the circle. It does not matter what kind of numbering scheme you come up with, as long as everyone in the class uses the same one.



Vegetation Survey Data Sheet #1

Plot #:

Names of team members:

Notes on differences between teams surveying this plot resulting data sheet changes	Estimate percentage of plot covered by this plant (round to nearest five percent)	Sketch of the plant	Plant description	Descriptive name for plant



Vegetation Survey Data Sheet #2

Plot #:

Names of team members:

Notes on differences between teams surveying this plot resulting data sheet changes	Estimate percentage of plot covered by this plant (round to nearest five percent)	Sketch of the plant	Plant description	Descriptive name for plant