

SECTION 2:

WHAT MAKES A GOOD SITE

“You don’t have to trek to a far-off jungle to find a good site. Discoveries can be made in a backyard or a field or the wooded area of a local park”

— ERIC QUINTER
(*Selecting a Site*)

TARGET QUESTIONS:

What makes a good site for studying biodiversity? What are the advantages and disadvantages of your site and your team plot?

PREREQUISITES: Core Activities in Section 1



CORE ACTIVITIES:

LESSON 1

Planning How to Measure
and Mark the Plots

LESSON 2

Staking a Claim

LESSON 3



Field Trip to Map the Site



ASSESSMENTS:

Assessing the Class Site
and the Team Plot



WEB COMPONENTS:

FOR STUDENTS

- Site Report (available online as a PDF)
- Profile of Eleanor Sterling*
- Profile of Helen Hays*

* All Web reading selections for students are available both online and as PDFs.

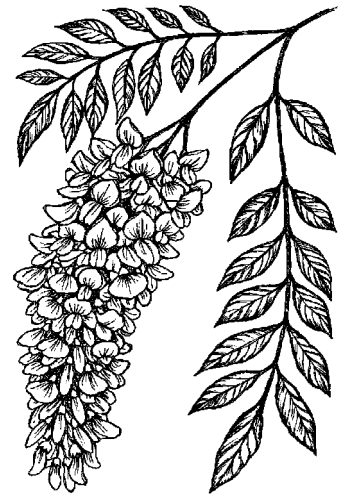
OVERVIEW OF SECTION 2

Students work in teams to develop a plan for measuring and marking their plots and discuss what kinds of tools they need and how they might get or invent them.

In the field, students work in teams to mark, measure and map the plot they will study.

BACKGROUND INFORMATION FOR THE TEACHER

Perhaps the best way to get students invested in the topic of biodiversity is to get them involved in discovering for themselves the breadth and scope of the variety of life-forms that exist locally. At their own site, they will conduct systematic observations of plants, animals, or both. You will pick a specific site in which your students will work, and they will mark their team plots and record observations in their field journals. In this way, students will emulate the fieldwork carried out by biologists. They will observe, record, identify specimens, collect data, communicate, and share results. Like some Museum scientists, students may also exhibit their work to the public at the end of the project. Our hope is that, in the process, students will come to love and appreciate nature and become future stewards of the planet.



SELECTING TEAM PLOTS WITHIN THE SITE

At this point, you have already selected the outdoor site for the study. Now there are choices to be made about the selection of the smaller team plots, or quadrats, within the boundaries of the site. Quadrats are sampling plots, usually square, that vary in size depending on the organisms under study. In Biodiversity Counts, students will set up a 2m² plot (2 meters by 2 meters) for each team of three or more, or about 10 quadrats per class.

There is a wealth of data to be collected from each small square, and taken together the quadrats will help to create a profile of your area. From the quadrats, students can collect data on such topics as the numbers and relative abundance of organisms present, the percentage of ground covered by vegetation, and the environmental factors limiting the occurrence of an organism. They can observe relationships within and among plant and animal communities, and begin to understand why an organism may be restricted to a particular place.

The quadrat technique is a fairly simple way to collect data that can be replicated. And if the same quadrats are studied over several seasons or even over several years, they may reveal patterns or changes that relate to the diversity of organisms and their abundance at a particular site.

It is at this stage that students will begin to discover the importance of measuring accurately, using appropriate tools, asking relevant questions, and keeping good records of their observations. Some of these skills they will learn by trial and error. For instance, in the previous section students learned the importance of keeping good records when their initial records failed to give them enough information.

One of the first decisions students must make is how to position the quadrats within the class site. Consider the following possibilities.

- Allow the teams to select their own plots. This probably will result in a sprinkling of quadrats over the whole general area. There are two advantages to this approach: Students will be immediately invested in the plot they have selected themselves, and they will have done some thinking about what makes theirs a good area to study.
- You could set up plots on alternating sides of one or more transect lines. Here's how it is done.

Select an area that encompasses a variety of features: trees, bushes, grasses, rocks, bare spots, and human-made features such as trash barrels, pathways, or fences.

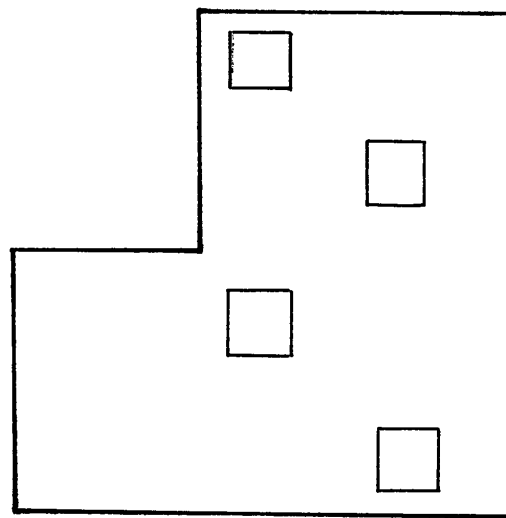
Using a measuring tape or a long piece of twine, lay down one or more transect lines. The length of the transect line depends on how many 2m² plots you want to position along its sides. You will need 2 meters along the line for each plot.

Beginning at the zero mark at one end of the transect line, say on the right-hand side, have a student team measure off a 2m^2 plot, using the line as one of the 2-meter sides of the square.

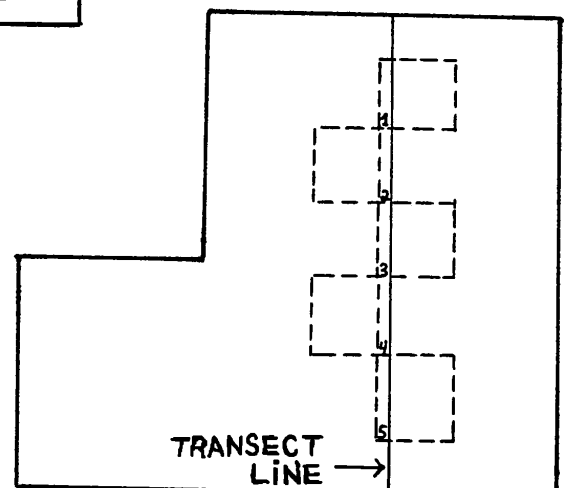
Have the next team position its square on the opposite or left side of the line. They will begin measuring at the 2-meter mark.

The third team positions its square on the opposite or right side and begins measuring at the 4-meter mark. And so on, until all quadrats are marked.

Then, either assign teams to plots or let them pick their own. The advantage of this more structured plan is that it keeps teams working in close proximity and allows for easier communication and comparisons on site.



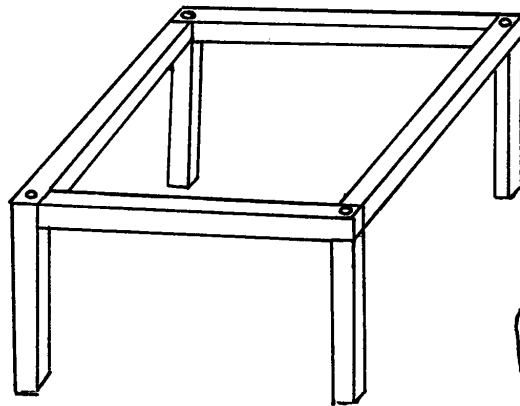
A SITE WITH A
SPRINKLING OF PLOTS



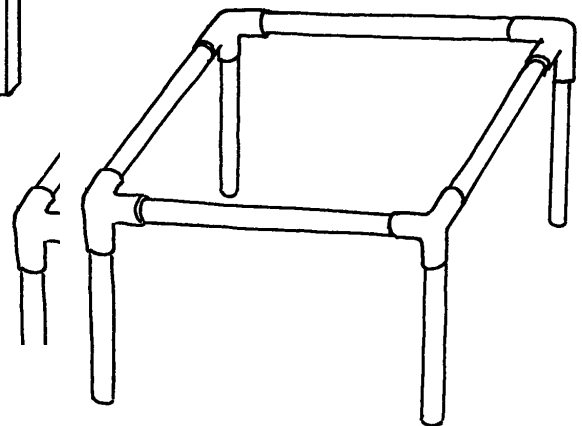
A SITE WITH PLOTS LAID OUT
ALONG A TRANSECT LINE

MEASURING IDEAS

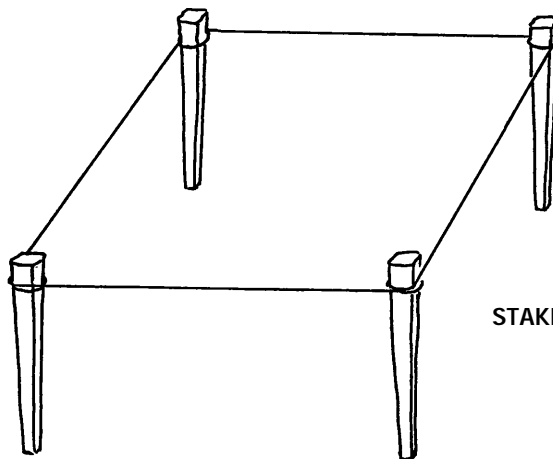
In order to map out and mark their plot, students will need metersticks, tape measures, or other measuring devices of their own invention. They may make a simple measurement tool using an 8-meter length of string knotted every 2 meters and then tied together at both ends to create an easily portable square. They can also build 2m×2m frames made of wood or plastic pipe that they place on the plot each time they visit it. (Try to enlist the help of the shop teacher, the art teacher, or some parents to construct permanent frames.) Other alternatives are stakes or popsicle sticks pounded into the ground and connected with yarn or twine, or small, colored flags.



FRAME OF WOOD



FRAME OF PVC PIPE



STAKES AND TWINE

1 LESSON

LESSON 1

**PLANNING HOW TO MEASURE
AND MARK THE PLOTS**

TIME

1 class session

1. Explain to students that, within the boundaries of the site, each team will select its own smaller plot to study in depth. Suggest that they all use the same-size plot—2m². Describe the two options for selecting plots. (See the Background section for complete details).

- Student teams may select their plots anywhere within the boundaries of the site.
- The class may lay down one or more transect lines, and then teams can pick their location along the line.

Help the class come to a decision on which option they will use.

2. Discuss the logistics of measuring and marking the team plots. Ask students to think about the following and develop a plan:

- What tools will you need to measure out your area? What equipment do we have available? What can you bring in? What might you invent or build so that you do not have to remeasure every time?
- How will you mark your plot so that you can find it again? Can you leave the markers in place, or will you need to set them up and take them down each time you visit?
- How will you find your plot again? How will you record its location? What permanent features could you use as points of reference?

3. Explain that each team will need to begin developing a list of their own questions to research at their team plot. Give them time to discuss the problem with their teams and to jot down some preliminary questions they would like to investigate. Have students read profiles of E. Sterling and H. Hays.

- How do scientists decide what to study in the field? Why is it important to develop good questions?
- What tools and methods do they use that you could adopt?

4. Discuss the objectives for the next field trip with the class. Ask students to share their plans for how to accomplish the tasks.

2

LESSON



LESSON 2

STAKING A CLAIM

TIME

1 or more field sessions

MATERIALS

- ☐ Field journals
- ☐ A variety of tools (brought in and invented) for measuring and marking the plots. These may include rulers, metersticks, tape measures, twine, and 2m² frames.

WEB COMPONENT

Site Report

1. *Before you take the class to the site, check that each student has a journal and that they have brought along all the tools they think they will need to measure and mark their team plots.*
2. *Remind students of their objectives for the field trip. (Note: You may want to spread the tasks over several field trips.) Review the following objectives:*
 - Each team will begin the survey of its 2m² plot. Teams should measure it out precisely and mark its borders. If the markers cannot remain in place, students will have to remove them before they leave the area. Students may also want to create a map in their field journals so that they can locate their plot easily the next time.
 - The teams will spend some time observing the plot and discussing questions they might ask about it. They should note their observations and questions in their field journals.
 - Each team will also fill in as much information as possible on its copy of the Site Report. Go over the form with the class. Encourage them to speculate about why the items are important and how they might affect what students will discover as the study progresses.
3. *As students work on site, use some of the questions below to guide them:*

Tasks	Focus Questions
<i>To mark and measure their team plots</i>	How did you measure your plot? What tools did you use? How will you mark the boundaries of your plot?
<i>To develop a system for finding the team plot</i>	How will you find your plot the next time? Did you draw a map? What permanent features did you use as points of reference?
<i>To make preliminary observations</i>	What have you observed about the plants and animals in your plot? Where have you recorded your observations?
<i>To record data on the Site Report</i>	How much data have you been able to record on the Site Report? What tools have you used to collect the data? Which items will require further research? What reference materials will you use?

The task and focus questions on the following page can be copied and distributed to students.

TASKS AND FOCUS QUESTIONS

SECTION 2

LESSON 2

FIELD TRIP

STAKING A CLAIM

Tasks	Focus Questions
<i>To mark and measure their team plots</i>	How did you measure your plot? What tools did you use? How will you mark the boundaries of your plot?
<i>To develop a system for finding the team plot</i>	How will you find your plot the next time? Did you draw a map? What permanent features did you use as points of reference?
<i>To make preliminary observations</i>	What have you observed about the plants and animals in your plot? Where have you recorded your observations?
<i>To record data on the Site Registration Form</i>	How much data have you been able to record on the Site Registration Form? What tools have you used to collect the data? Which items will require further research? What reference materials will you use?

**TEACHING TIP: LAST-MINUTE CHECKS**

Help students to get into the habit of doing a quick last-minute check before leaving the site. Have them check:

- The condition of site itself. It should be as good as or better than the way you found it.
- Their field notes. Make sure entries are legible, intelligible, and complete. Include notes about what needs to be followed up, either at the field site or back at school.

3

LESSON

LESSON 3

MAPPING ACTIVITY

TIME

1 class/field session

MATERIALS

- ❑ A variety of tools for mapping the site. These may include graph paper and clipboards, rulers, metersticks, tape measures, twine, and a compass.

1. Before you visit the site, discuss the objective of the field trip, which is for students to make a map of the entire site. Give students time to discuss how they will approach the job in order to create an accurate, complete, and clear map in a reasonable amount of time.
2. Then take the class to the outdoor site. Define the boundaries of the site, remind students of the safety rules, and then ask them to work in teams to map the site. You may want to divide the site into zones and have different teams responsible for each zone.
3. As students work, circulate among them and use some of these questions:

<i>Tasks</i>	<i>Focus Questions</i>
<i>To develop a plan for mapping the entire site</i>	How shall we divide up the area? How have you divided the tasks within your teams?
<i>To collect data necessary to create an accurate map of the site</i>	How are you measuring distances? What tools are you using?
<i>To draw a map of the site</i>	What symbols will represent the different objects at the site? Have you created a legend for the map?



ASSESSMENT: ASSESSING THE CLASS SITE AND THE TEAM PLOT

TIME 1 class session

1. Ask students to assess their class site and their team plot within the site. Try these questions:
 - For studying biodiversity, what are the advantages and disadvantages of the whole site?
 - What are the special advantages of your team plot? Why did you select it?
2. Have teams prepare statements describing why they think theirs is a good plot in which to study biodiversity. Post the statements on-line.

Record the statements on the class chart or concept web.