

*Exploring the Outdoor Environment: A Field Study in a Local Park***Table of Contents**

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## Activity C

### *Exploring the Outdoor Environment: A Field Study in a Local Park*

#### Overview

This activity enables students to develop the ability to compare environmental data that has been collected by research teams studying different park habitats. When researchers collect and compare their data to observations made by other researchers, it is essential that similar methods or protocols are used. For example, researchers will want to use similar units of measurement or collect data over similar time and spatial scales. Otherwise researchers would be unable to communicate or share their data with other investigators because they would essentially be speaking different languages. Determining appropriate methodologies for data collection also depends on the scientific questions the team is trying to answer.

For example, if two research teams investigating two different park habitats reported temperature data for one site collected every hour from 7:00 a.m. to 5:00 p.m. and another team reported one temperature reading at noon, it would be difficult to evaluate the temperature variability from one site to the other. In this activity, students will develop an understanding of the importance of standardized methods of data collection and presentation in order to appropriately compare different data sets. These skills will then be used in the other activities when students will be performing their own scientific research.

The first activity involves student groups in characterizing park habitats by identifying abiotic and biotic factors present in these habitats. Students are intentionally given vague guidelines as to the types of data to collect and the methods with which to collect the data. Allow the students to think freely of what types of data they believe is important information to collect in order to characterize their assigned habitats. Once the students have collected their data, difficulties in using it to compare with other habitats will be discussed in the following activity.

#### Learning Objectives

- ✓ Identify a variety of characteristics representative of diverse (or various) habitats
- ✓ Collect data to characterize a community park habitat
- ✓ Establish uniform data collection techniques
- ✓ Understand the concept of system

#### Relevance

A system is made up of independent parts that all work together to maintain the functioning whole. If one of the parts malfunctions, the whole system is affected. A cell, the human body, a clock and a computer

are all good examples of systems. Without one part, the whole may no longer work properly. Much can be learned about the idea of a system, in particular an ecosystem, in a local park. Parks are an important part of the local environment, especially in our nation's cities where the majority of the population lives and works. Not only are they important for the social and recreational well-being of the residents, but they also play a role in sustaining the ecological health of an area. Green spaces can help regulate our environment. They provide shade and have other properties that cool intense summertime temperatures facilitated by the built environment in most cities. By absorbing carbon dioxide they help mitigate the greenhouse effect and remove pollutants from the air. Park areas also absorb rainwater in the soil where it is filtered, essentially performing a purifying process and reducing polluted water run-off in cities. These are just a few examples of what can be learned in a park ecosystem. Studies in local parks are certain to reveal much more.

### *Teacher Preparations*

- a) Gather the materials listed below. A table with suggested uses for certain materials is included. Be flexible in the use of these materials. Allow students to suggest their own uses, or to come up with the ones we have suggested.
- b) Select a park near your school that would be appropriate to study. While we have designed the activity for New York City's Central Park, this study can be conducted in a park in almost any area. Once you have selected a park that is appropriate for you, be sure that it will be possible to go to the park to conduct the study.
- c) You will need to select several sites at the park for your students to conduct the study. The number of sites will vary depending on the number of students in your class. Be sure that the sites are near one another so that you can facilitate all of the groups' work. The sites should have different characteristics so that students will get an understanding of the diverse environments that can be found within a community park.
- d) Get appropriate permissions. Make sure school administrators as well as parents have provided permission. If it is school policy to have parents sign permission slips, be sure that you have done so well in advance of the activity.
- e) Review all the documents in the Student Guide for Activity C on the module web site (<http://icp.giss.nasa.gov/education/modules/carbon/>) to be sure you have downloaded all that you need.
- f) Work through the activity yourself in depth before having students try the activity themselves.

### *Materials*

Access to a community park or outside area with a variety of habitats. The habitats or types of habitats can include but are not be limited to the ones suggested in this activity. Cameras (traditional film or digital), Forest and Tree Guides for your geographic region (e.g. Eastern Tree Guide), Straw, Protractor, String,

Water, Matches, Marking Tape, Candle, Marble, Graph Paper, Ruler, Clinometers, Thermometer, Anemometer, Graph Paper, Ruler, and others deemed appropriate.

### *Period 1 – Planning and Designing the Park Habitat Study*

#### **Preliminary Activity – Engagement**

Hand the Ziploc® bag of tools to each group. Tell students that we will be using these “tools” to study an outdoor environment. Each group will study a different area so as to characterize diverse park habitats.

Have each group spread the tools on their desk. Ask each group of students to try to identify the name of each object and how it can be used to collect data about a specific environment. Finding the actual correct name for an item is not important. For all of the objects that they cannot name, have the students make up a name that is related to the function (such as a wind measuring device if they do not know anemometer). You can tell them the actual name later in the activity. Also ensure the students that many of the devices can be used for more than one purpose, and therefore there can be more than one appropriate function for many of the items that have been included in the tool bag.

Have each group complete one list that all group members have reached consensus about. Groups present their ideas to the rest of the class. Encourage the different groups to use any ideas that they hear from the other groups that they think would be helpful in their study. Note: The materials are only suggestions. Their purposes in this study are intentionally vague. This will provide students with an opportunity to use their own understandings to consider what data to collect and how. Encourage creativity! Some possible uses for the materials provided are in the table below. However, see what the students devise themselves.

<b>TOOL</b>	<b>POSSIBLE USES</b>
Straw, Protractor and String	Topographical slope
	Tree Heights
Water	Soil porosity
Matches and Candle	Wind Direction
	Wind Speed
Marble and Ruler	Topographical Slope
Marking Tape	Site Identification
	Tree Labeling
Graph Paper	Site Mapping
	Tree Height Calculations

## Methods

### Preliminary Discussion and Planning

1. If you have not already assigned groups, divide students to the different work groups. There are six sites that have been designated in New York City's Central Park. Remember, you should use a park setting close to your school. Use sites that provide representations of the variety of areas found in your local park. Be sure to identify a variety of different sites within easy reach of one-another and that would be feasible for students to study during ten to fifteen minutes. Six Central Park sites are:

Harlem Meer Upland  
The Waterfall  
The Beach

Harlem Meer  
The Lawn  
Rock Area

2. Discuss the student tasks with the class. Inform students that they will be identifying both the biotic and abiotic conditions found at their study site. In addition, they will be looking for relationships between the different factors. These can include interrelationships among and between the biotic and abiotic factors.
3. Students begin by brainstorming the different types of data that they would like to collect during the study. Counting (quantifying) and describing (qualifying) can both be used to collect data. Not only will students be looking for abiotic and biotic conditions, but they can also think of the data in terms of physical objects and conditions of the habitat. Have students fill in the left-hand column in Data Sheet 1: Study Design.
4. Instruct the students to make a list of the materials that they will use in the study. They should include a method for using the objects also. This information should be included in the right-hand column next to the data they will try to collect in Data Sheet 1: Study Design.
5. Next groups create an outline for their general plan of work. The types of data should be listed first (from those provided in the tool bag). It should also include how these materials will be used. Activity A can be used a reference.
6. Be sure that each group has assigned roles for each member or facilitate the role distribution as necessary. Pairs within each group can be helpful in collecting the data. One student can collect data while the other writes down the data. If there are four or more students in each group then one pair can study abiotic factors while the other pair studies the biotic factors. Data collection and recording roles should be changed as the activity progresses.
7. Have students present their plans to the class. Remind each group to be thorough in their presentations. This means including the data to collect, the tool, how it will be collected and how the different roles have been distributed among group members.

## *Period 2 – The Field Study*

### **Preliminary Activity – Engagement**

#### **What describes our park environments? – Locating our site**

Have students take out their outline plan of work from the previous class period. One member for each group should read the plan to the rest of the group members. As they are listening to the plan they should identify areas that need to be revised based on the other groups' presentations. Also have the students look over the tools and procedure to be sure they are comfortable with the task at hand. Finally, have each group member state his or her role. You may want to have each group hand in the names and assigned roles to facilitate your checking on each group.

#### **Field Observations and Measurements**

1. Lead the groups to their sites. Have each group begin by deciding on a specific study area within their site. Be sure that it is not too big or too small. Remind students they will only have fifteen minutes to conduct the study.
2. Have students conduct the study and at this time fill in Data Sheet 2: Data Collected from Your Habitat Field Site. Move from group to group to facilitate their data collection. Before you leave the park have each group state one of their findings.

## *Period 3 – Evaluating Data Collection Techniques*

1. Have students look over the data they have collected within their individual groups. Have students think about additional information that would be helpful in characterizing their sites. Have them suggest ways that this additional information could be collected.

## *Period 4 – Sharing Results*

### **Data Analysis, Comparison and Consensus**

1. Present student groups with the questions to consider for their presentations.
2. Discuss the questions and the types of answers you are looking for. Tell the students that each person in each group must have a speaking role. Provide students with newsprint and magic markers with which students can make their data presentations. Remind students that the presentations should be brief – only about 5 minutes each.
3. Have each group present their results. As each group is presenting, the rest of the class takes notes on Data Sheet 3: Habitat Field Study Presentations. Also, you can leave the written

newsprint presentations hanging on the classroom walls for the students to review. Allow five minutes for the students to complete this activity following the presentations.

4. Activity C concludes with students responding to the Individual Assessment Questions. Discuss student responses with the class. The aim is for the class to reach consensus on the following questions: What makes each habitat special? What makes each site similar?