

*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

When we study a particular environmental setting we often refer to the area as an ecosystem. An ecosystem consists of all the organisms living in that ecological community as well as the non-living factors with which they interact. Therefore, in order to understand an ecosystem we must study both the living organisms in that area as well as the non-living factors of that area.

Within an ecosystem there are a variety of different types of organisms. Each organism in a community has a different role. The role or job of an organism is called that organism's **niche**. The organism's niche includes its feeding relationships. The feeding relationships within an ecosystem determine how energy is transferred through it and how some of the matter is cycled within it. **Producers** make food by using energy from the sun. **Primary Consumers** eat these Producers and utilize the energy they obtain from this food source. This energy is transferred through additional organisms in the ecosystem as the **Secondary Consumers** eat the Primary Consumers and then **Tertiary Consumers** eat the Secondary Consumers. At each level in this food chain, energy is used to maintain the life processes of those individual organisms. Therefore, as energy is transferred from one organism to the next the amount of available energy is decreased.

In addition to each organism having its own particular job or niche, it also has a particular home. Where an organism lives is often referred to as its **habitat**. A large variety of habitats exist in both natural and human-made settings. Some are **aquatic** where the majority of organisms are found in a water environment. Other habitats are **terrestrial** where the organisms are mainly found on land environments. Within either of these broad categories of habitats there are a number of **limiting factors** that determine which types of organisms can live in that particular environment. Non-living factors in the environment are called **abiotic factors**. Some of the abiotic factors, which limit the type and number of organisms that can live in the habitat, are elevation, slope of the site, wind, moisture availability, light intensity, mineral availability, amount of certain trace gases and the temperature.

In addition to these abiotic factors, there are living factors known as **biotic factors** that limit the type and number of organisms that can live in a particular area as well. Because certain organisms are living in an area, consuming food and taking up space, other organisms may not be able to live there or alternatively the two populations might co-exist but be fewer in number. This is especially true when there is competition for available resources. Whenever resources are limited, competition for these resources increases. When competition is fierce, certain organisms may not be able to live in the habitat because they may be unable to compete for the available resources.

Local parks provide a variety of habitats to study. In this activity, our task is to characterize a number of habitats within a community park. The goal is to study these habitats in enough detail to highlight the major characteristics of the habitats. In particular, look for characteristics that you believe make each of the habitats similar to the rest of the park **and** characteristics that make the habitats different from the rest of the park. Characteristics that help describe the area that you are studying should include both biotic and abiotic factors. You can use this exploration to build understandings about the concepts of ecosystems and habitats, as well as gain skills to measure and identify the factors that influence the organisms that live within them.

### *Learning Objectives*

- ✓ Identify a variety of characteristics that are representative of 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 example of what can be learned in a park ecosystem. Studies in local parks are certain to reveal much more.

*Planning and Designing the Park Habitat Study***Materials**

Access to a community park or outside area with a variety of habitats; Ziploc Bags with items for study to include: Cameras (traditional film or digital), Forest Guide and Tree Guide for the geographic region where you live (e.g. Eastern Tree Guide), Straw, Protractor, String, Water, Matches, Marking Tape, Candle, Marble, Graph Paper, Ruler (others deemed appropriate).

**Note:** If you are conducting the investigation in New York’s Central Park, the habitats can include, but are not limited to the ones listed below in the methods. For investigations conducted in other parks, be sure to identify different environments that exist with the park for your field studies.

**Methods****Period 1 - Planning and Designing the Park Habitat Study****Planning the Field Study**

When a scientist is preparing to study a habitat, he/she first must make a plan. Decisions that need to be made concern the location to perform the study, types of data they will collect and how to collect the data.

**Preliminary Activity**

Consider all the uses of parks. Why were parks an important part of designing towns and cities?

**Preliminary Discussion and Planning**

Each group has been assigned one or more specific habitats to study.

Harlem Meer Upland  
The Waterfall  
The Beach

Harlem Meer  
The Lawn  
Rock Area

1. Your task is to describe your assigned habitats by identifying both the **biotic** and **abiotic** conditions and some of their interrelationships.
2. Make a list of the **data** you want to collect. Think of the characteristics that you are trying to describe in a quantitative and/or qualitative way. Remember that both the *objects* and *conditions* of a **habitat** can be used to identify that habitat. List the data that you want to collect in the left-hand column of **Data Sheet 1: Study Design**.

3. Make a list of the materials you will use to study the biotic and abiotic conditions in your habitats and briefly describe the way each instrument will be used to obtain the data. Record these descriptions in the right hand column next to the data you are trying to collect in **Data Sheet 1: Study Design**.
4. Outline a general work plan for your research group. Decide which types of data you will collect first. The plan should include a list of materials (from those provided in your Ziplock Bag) that you feel you can use to study the habitats. It should also include how you will use these materials to describe conditions at your habitats (remember to look back at the work from Activity A).
5. Discuss the different roles each researcher will have upon arrival at the habitat and the types of data he/she will be responsible for collecting. Work in partner teams. As one person gathers data the other person should write down the data. Have each partner team responsible for studying different conditions in the habitats. For example, one team can study the living aspects (**biotic**) and another, the non-living conditions (**abiotic**). Researchers should feel free to change roles, taking turns collecting and recording data.
6. Present your plan to the class. Be sure to identify the type of data you will collect, how you will collect the data, and who is responsible for each type of data.

*Study Design*

Make a list of the data you want to collect at your study areas. Then make a list of the materials you will use to study the biotic and abiotic conditions in your habitats and briefly describe the way each instrument will be used to obtain the data. Finally outline a general work plan for your group.

**Habitat of Study:** \_\_\_\_\_

<b>Data to be collected</b>	<b>Materials Needed and Explanation of Method</b>	<b>Who will collect data?</b>

**Additional Comments:**

*Conducting the Park Field Study and Sharing Results***Period 2 – The Field Study****Field Observations and Measurements**

Before leaving the classroom, take out the outline of your plan from the previous class period. Read it over. Look over the materials and procedures for data collection. Review your roles with group members.

1. Once at your habitats in the park, locate your research group's study area. Each area should be large enough to provide information to characterize the habitat, but not so large that the area cannot be studied adequately in the short time provided. Estimate the size of the study area.
2. Conduct the habitat study in the time allotted by your teacher. As researchers you should make careful observations and take accurate records. Use **Data Sheet 2: Data Collected from Your Field Site** to record observations.

**Period 3 – Evaluating Data Collection Techniques**

Back in class review the data that you have collected. Identify what additional information you would need to collect to more accurately describe your habitat. Discuss how this information might be collected and what kinds of instruments would be necessary.

**Period 4 – Sharing Results****Data Analysis, Comparison and Consensus**

Each research group prepares a class presentation describing their measurements and what they learned from them about the habitat they studied. A large poster-size sheet of paper may be helpful to write out results so the others in the class can see them more easily. Be sure that each researcher in your group has a speaking role in the presentation. Questions to consider as you prepare your informal presentations.

- ✓ List specific characteristics that you believe describe the habitats.
- ✓ What specific factors determine what can live in these habitats?
- ✓ What types of organisms survive in these habitats?
- ✓ How can you identify the amount and/or type of organisms found in these areas?
- ✓ How would you find these areas again for future study?

Take notes on all the class presentations concerning the different habitats that are posted in the classroom. Record your notes on **Data Sheet 3: Habitat Field Study Presentations**.





## Individual Assessment Questions Activity C

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

From your work in this activity and your previous knowledge of this topic, answer the questions below.

1. What makes each habitat unique?
2. What makes each habitat similar?
3. What data comparisons can be made between research groups?
4. What data is difficult to compare between research groups? Why?
5. Explain how the park habitats work as a system.