

*Speaking a Common Language: The Need for Standardization in Scientific Research***Table of Contents**

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Activity D

Speaking a Common Language: The Need for Standardization in Scientific Research

Overview

As you continue to learn more about different conditions that characterize the different **habitats** and **ecosystems**, your work becomes more interesting and more complex. Which characteristics are the most useful to consider when trying to understand and compare different **habitats**? Which measurements are most accurate? How can we record data so it is well understood by other researchers and be used in comparisons with data collected from other regions of the world, including countries where English is not the primary language? These are essential questions in the study of **ecosystems**, and also in many other aspects of global understanding and cooperation.

Learning Objectives

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

Relevance

All human beings and other living organisms play an important role in creating their local ecosystem, as well as our global environment. Likewise, it is Earth's habitable system that sustains life, providing vital nutrients, air and water. So understanding how the Earth system works and changes is vital to our survival. What we know and don't know about its inner-workings is in large part determined by the quality and quantity of data we are able to collect and analyze over time and from many different regions around the world. Without a uniform standard for measurements, the data collected in one place would not be comparable with another. We know that Earth is a changing system and it is important to monitor this system so we avoid surprises that may present a variety of environmental and health risks. For example, the world's population is growing exponentially, with urban areas carrying the greatest burden. Many international science and policy organizations have placed a high priority on creating local, regional and global data sets of environmental characteristics or indicators. In order to do this, we have to be measuring the same quantities and in comparable ways.

*Standardized Measurement Protocols***Materials**

Access to a local park ecosystem or outside area with different habitats. A variety of tools to measure and identify different aspects of a habitat which could include: Cameras (traditional film or digital), Forest and Tree Guides (e.g. Eastern Forest Guide and Eastern Tree Guide), Clinometer, Thermometer, Anemometer, Graph Paper, Ruler, Three cups, Warm water, Ice, Room temperature water.

Methods**Period 1 – Developing Data Collection Standards for the Field Study****Preliminary Activity**

Place one finger from your right hand into ice water. Place one finger from your left hand into warm water. Hold them there for about three minutes. Then, place both of them into the third cup of water provided. Describe how each finger feels. Discuss these results with your partner and the class.

Standardizing Data

1. In order to compare the different local park habitats, it is important to collect the data the same way across habitats and with other researchers. In order to do this, we need to have a common plan that all researchers follow. Begin by determining the different conditions and characteristics that each research group should collect. Determine which kinds of instruments or tools will be used and the techniques. Place this information on Data Sheet 1: Standardized Field Study Techniques.
2. As a final way to standardize the data collection between the different sites decide how large each site will be. Include this on Data Sheet 1: Standardized Field Study Techniques.
3. Present your ideas to the class.
4. Decide as a group the common data, tools and collection methods that the class will use.

Period 2 – Park Field Study Observations: Take 2

You have had a chance to look over each research group's data and determine the most useful data and even the best ways to collect this data. Now, we will return to the local park sites and collect data but only this time all researchers will use the common methods developed in class so that we can all share data in ways that will help us better understand the various habitats in the park.

1. Look over the list that you made in the previous class.
2. Divide into five groups. Each group will be responsible for collecting data pertaining to one of the different aspects of the habitats to include:
 - ✓ Identifying species of biotic factors
 - ✓ Quantifying biotic populations
 - ✓ Measuring various temperatures to include air, water, soil
 - ✓ Designating study site/mapping site area
 - ✓ Measuring miscellaneous abiotic factors other than temperature
3. Collect the tools needed to study the aspects of the site your group has been assigned and decide the jobs each group member will perform. Remember to work in partner teams, with one member collecting the data and the other recording it. Be sure to switch roles during the activity.
4. At the Park Field Study site, wait for the designation of the habitat study area. While you wait, prepare yourself by looking over the site to start your study.
5. Conduct the habitat study. As researchers you should make careful observations and take accurate records. Record your observations on Data Sheet 2: Data Collected from Your Habitat Field Study Site at this time before leaving the site.
6. Discuss and review the data as a research group. As the members go over the different types of data collected, areas of omission or other types of concerns should be raised, discussed and recorded. If any information is found to be lacking, be sure to collect it at this time.

*Presenting Field Study Findings***Period 3 – Preparing a Research Group Presentation**

You and your group have been asked to present your findings to a larger group of park professionals who are responsible for park funding. They will continue the funding if they are convinced that there are a variety of reasons as to ***why monitoring the habitats within the park is needed to protect them***. You need to convince them (but don't confuse them!) through a FIVE minute presentation. In this presentation you will:

- ✓ State the question you were researching and the habitats you are presenting.
- ✓ Make sure the park professionals understand what you are presenting and how you have worked to make sure it is accurate.
- ✓ Briefly describe your work in the park.
- ✓ Present your results to the group.
- ✓ Discuss the results in the context of your study of the habitat. Make the connections between different conditions obvious to your audience.
- ✓ State the conclusion of your study as it pertains to the research question: ***Why do we need to monitor habitats within the park in order to protect them?***

Group Assessment

Your group will be responsible for the presentation mentioned above. You may need a few presentation supplies to help you get your point across and to show your results. Graphs, tables and/or photographs can be powerful tools. You can also develop other ways of clearly highlighting interesting findings.

Synthesis

As the other groups are presenting, be sure to record their findings using **Data Sheet 3: Park Survey Table** to help you organize the data. If other classes are involved in this study, also include information from their results. Once the **Park Survey Table** is complete, answer the Individual Assessment Questions.

Individual Assessment Questions Activity D

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Answer the following questions based on your Park Survey Table and the ideas you learned in this topic.

1. Why is uniformity and standardization so important?
2. What environmental conditions are most easily compared across all habitats? Why?
3. How are habitats in the park similar to natural ecosystems?
4. How are habitats in the park different from natural ecosystems?

