Searching for Clues in Pictures: Factors that Help Create Our Environment

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Activity A

Searching for Clues in Pictures: Factors that Help Create Our Environment

Overview

As you look around your city or town, you may notice that there are certain physical characteristics of your environment that influence the way you dress and the activities you do. In the northeastern United States, the environmental characteristics change throughout the year, so that at one time of the year you might choose to wear shorts and a tee shirt, while at other times of the year you choose to wear long pants and a sweater. To take this idea even further, if you switch the channels on the television, you can see a variety of environments with very different physical characteristics. Picture in your mind places people live in the United States and around the world. Some look very different from ours. Consider what people wear to accommodate the unique conditions of their surroundings around the world, the types of buildings they live and work in or the general characteristics of diverse landscapes.

What are conditions that are responsible for these different environments? How do these conditions relate to one another? In this study, students work in groups to identify some of the conditions or **factors** that help create different environments or **habitats**. Our focus is on the natural environment or areas outside the human-created habitat found in and around the buildings where we live, work and go to school. Working in groups, you will make observations from pictures of a local city park to help identify some factors responsible for creating different environments. Each group will have their own park area to study. The aim is to consider the living and non-living objects and the conditions that describe your group's environmental setting.

Learning Objectives

- ✓ Identify <u>TEN</u> characteristics representative of various **environments**
- ✓ Collect initial **data** characterizing one specific environment
- ✓ Define the terms **abiotic** and **biotic**
- ✓ Identify **abiotic** and **biotic** factors in an environment

Relevance

The different environments found around the globe are essential to producing the food we eat and the water we drink. They store atmospheric carbon which is a vital element in keeping the Earth's temperature habitable. Because varied environments exist around the globe our planet supports a variety of life and natural processes. This biodiversity is seen in the various types of plants, animals and microorganisms that exist, as well as in our Earth's land surfaces such as deserts, forests, wetlands, mountains, lakes, rivers, and agricultural landscapes. Earth is a uniquely habitable place for humans due

to this diversity and interactions among life forms. Knowing what factors contribute to these different environments can help us keep these environments stable. A **stable ecosystem** is one that behaves in a general way that we have come to expect. By understanding **ecosystem characteristics** we can also learn many things about a place, including what types of jobs are likely to employ people, clothes to wear, recreational and tourist activities, and conditions that can influence our health and safety.

Observing & Describing Central Park's Environment

Period 1

When a scientist studies in the outdoors or in the "field" they must be prepared to work in all kinds of weather conditions. Not all conditions are easy to work in. At times it is a struggle for even the most seasoned scientist to collect the data they seek in a particular environment.

Before we experience the outdoor environment firsthand, there are many skills that we can learn within the comforts of our indoor environment. These skills include making appropriate observations, writing down data in an organized fashion, classifying data into different groups to better understand the data, presenting the data, and critiquing our own work and the work of others. These are some of the skills we will practice in this first activity.

Materials

See the following Reference materials on the web page for this module under Data and Tools or they will be provided by your teacher in a packet:

- ✓ Map of New York City's Central Park
- ✓ Reference: Central Park Picture Packet

Preliminary Activity

1. Classify the following as either living or non-living. Justify your decision.

   a) Water

   b) Air

   c) Grass

   d) Oak tree

   e) Soil

   f) Earthworm

   g) Fire

   h) Air

   i) Heat

Methods

Divide into six groups. Each group is assigned or elects to study one of six areas in New York City's Central Park, listed below. Obtain the Reference Picture Packet for your study area.

1. The Harlem Meer Upland

2. The Harlem Meer

3. The Waterfall

4. The Lawn

5. The Beach

6. The Rock Area

Observations

1. Look through the pictures found in your packet carefully.

2. Discuss the objects found at your site (by listing objects you see in the pictures) and how they may influence the environmental conditions of the site.

3. Include in the objects found at your site things that you can infer from the photographs but may not actually be able to see (be sure to note them as inferred rather than observed in your list).

4. Decide whether the objects on your list are living or non-living and label them as **biotic** for the living objects and **abiotic** for the non-living objects.

5. Discuss other conditions (not objects) that may also influence the environment at the site. For example, the site is flat which may make the ground wetter after a heavy rainfall or the site is shaded from the sun by trees.

6. Record your observations on **Data Sheet 1: Observing and Describing Central Park's Environment**. Answer the Investigation Questions.

Observing & Describing Central Park's Environment

Tasks for Observing Central Park Site

What makes up an environment? Discuss the objects found at your site (by listing objects you see in the pictures) and how they may influence the environmental conditions of the site. Then, decide whether these objects are living or non-living and label them as biotic for the living objects and abiotic for the non-living objects. Discuss other conditions (not objects) that would also influence the environmental conditions at the site. Record your observations in the table below.

Place of Study in Central Park: _____

OBJECT OR CONDITION	INFLUENCE ON ENVIRONMENT	BIOTIC OR ABIOTIC

Observing & Describing Central Park's Environment

What makes up an environment?

1. Which biotic factor seems to be most common at your site?

2. Which abiotic factor seems to be most characteristic of your site?

3. Suggest two ways by which the biotic and abiotic factors influence one another at your site.

4. If you were to rename your site, what would you name it? Be sure to make the name descriptive of the characteristics that you found there.

Classifying and Describing Environmental Conditions

Period 2 – Opening Your Research to Others

Sharing Observations

An essential part of any study is deciding how to share your observations with others. Imagine if you were to obtain an important observation from a scientific study that could help many people, but no one could understand what you had found. Therefore, finding a meaningful way to present scientific observations is as important as making the discoveries themselves. In this activity you will present your observations from the Central Park area study to the rest of the class. In preparing your presentations, you may realize an aspect of the area that you need to look at further. Also, by opening your research to others, they may offer new insights into your work which can lead to a deeper understanding of the topic by the entire class.

1. Review your group's completed Data Sheet 1: Observing and Describing Central Park's Environment.

2. Rewrite the information on the Data Sheet by listing the objects in order of the most to least important factors that describe the environment of your site. While all the factors are important, some may be more prominent than others. These should be listed first.

3. Using the materials provided by your teacher, prepare a presentation for the rest of the class. Be sure to include the following in your presentation:

   ✓ Where the site is located in Central Park
   ✓ The land and water features found at your site
   ✓ The different forms of life present at your site
   ✓ How the **biotic** and **abiotic** factors seem to be interacting at your site

4. Present your observations to the entire class.

5. As each group presents, make a list of the objects and conditions (aspects of a site that are not objects) that seem to influence the environments found in New York's Central Park.

Period 3 – Making Sense of Your Data

Data Analysis, Comparisons, and Consensus

A key part of any scientific endeavor is making sense of all of the data. While each of the groups started this process by presenting the observations made at their individual sites, we now have a larger view of many separate sites within Central Park. By looking at all of this data as a whole, we are able to gain a better understanding of the factors and interactions within the larger Central Park environment.

1. Use the list you created from the presentations of all the objects and conditions (aspects of the areas that were not objects) found throughout Central Park and write each object or condition on a separate index card.

2. Discuss and classify each condition as **biotic** or **abiotic** and record this on the back of the index card.

3. There are many ways to classify the conditions you have identified besides **biotic** or **abiotic**. Look over the conditions you have identified one more time, but this time classify the conditions using categories different from **biotic or abiotic.**

   Remember, there are many ways to group the conditions, no one set of **classification** is correct. *So be creative!*

4. Present your major groups to the entire class.

5. Record your results on **Data Sheet 2: Classifying and Describing Environmental Conditions**.

Classifying and Describing Environmental Conditions

Part 1: After discussing your data from the class presentations of Central Park, take your list of the objects and conditions from all the groups that seem to influence the environments found in Central Park and classify each condition as biotic or abiotic. Also, record your results below and on note cards.

Biotic	Abiotic

Part 2: Use the space below to classify the conditions that affect the Central Park environments in any additional ways that make sense to you. Be creative!

Searching for Clues: What Factors Help Create Our Environment?

Use your understanding of biotic and abiotic environmental conditions and the environmental knowledge gained from this activity to answer the following questions.

1. If you were planning a field study in Central Park site you investigated to understand the conditions that help create this environment, describe:

    a) The types of data you would collect (List <u>FIVE</u> conditions that you would measure?)

    b) Describe how you would measure these <u>FIVE</u> conditions.

    c) What instruments you would need for your data collection.

2. In looking over the data from the different group presentations, think about the conditions common to all the groups.

    a) Identify <u>THREE</u> abiotic conditions described as important to all groups.

    b) Identify <u>THREE</u> biotic conditions described as important to all groups.

3. Describe <u>ONE</u> condition that is abiotic, yet is due to a biotic influence.

4. Describe <u>ONE</u> condition that is biotic, yet is due to an abiotic influence.

5. An ecosystem is described as all the abiotic and biotic aspects of an area and the interrelationships among them. Therefore, all independent parts of the ecosystem must work together to create a functioning environment. Describe another example of a system that requires independent parts that work together. Identify <u>FIVE</u> parts of this system and their interrelationships.

6. Scientists perform observational research similar to what you did in this activity when they are establishing baseline data. They use this type of information to begin looking at the relationships that exist, and to start thinking about experiments that they would like to perform to better understand an environment.

   a) From this activity explain at least <u>ONE</u> way that you can now better understand Earth and its components.

   b) Describe <u>ONE</u> area that you would like to know better by performing a detailed study.

7. What are some of the factors that help create the environment you and other students observed in New York's Central Park? Explain how you think these factors help create the environment.