

*A Walk Through the Forest (virtual or real)***Table of Contents**

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Activity E

A Walk Through the Forest (virtual or real)

Overview

This activity enables students to continue studying the characteristics that make up an ecosystem by investigating a deciduous forest environment. Black Rock Forest in the Hudson Highlands of New York State provides an excellent setting to study a variety of habitats in a more natural setting than a community park. As students hike through the forest in individual groups, they will concentrate on one of four themes. These themes are: 1) Geology and Soils, 2) Plant Life, 3) Wildlife, and 4) Human Impacts. Students will use the skills and knowledge gained in the previous activities of Topic 1 to continue their study of ecosystems.

In working through the previous activities, students identified some of the major factors that characterize ecosystems. The students have also investigated smaller areas with particular factors called habitats. Now the students will understand that a larger area with factors that can be categorized within certain ranges and types make up an ecosystem and can contain a variety of habitats because of slightly different biotic and abiotic factors. In this activity, the students will observe a number of different habitats found in a deciduous forest ecosystem. In Activity F of Topic 1, students will increase the scale of their study further to the level of world biomes. Throughout all activities, students gain experience and practice collecting abiotic and biotic data with which to characterize the habitats, ecosystems and biomes. In addition, students will identify areas where the biotic and abiotic factors are inter-related. With a firm understanding of these relationships, students will develop critical skills, understandings and preparation needed to participate in the research projects presented in this module. These research opportunities have been designed for students to contribute to ongoing studies to improve what we know about how carbon is stored in terrestrial ecosystems.

Learning Objectives

- ✓ Identify a variety of characteristics that are representative of various habitats
- ✓ Collect data characterizing various habitats
- ✓ Identify abiotic and biotic factors in a variety of habitats within a temperate deciduous forest ecosystem
- ✓ Experience and identify a number of diverse habitats within a temperate deciduous forest ecosystem

Relevance

Forests are complex, constantly changing environments made up of living and non-living things. They are an excellent place to study and learn about the interdependence of life. In the world's forests we can find many different kinds of habitats that support the broadest range of plant and animal life. We can study the processes or cycles that support the forest ecosystem and in turn support us. For example, in the forests many interconnected cycles are at work, including water, energy, and carbon, all keys to life on Earth.

Human and natural disturbances to the ecosystem conditions can alter such things as soil type, amount of sunlight, tree species, animal populations, water resources, all of which can potentially have positive and negative effects on individual habitats and even the entire ecosystem. Forest studies reveal the importance of forest management practices. Today, there is a growing interest in improving our understanding of how we are changing the land surface and how this is contributing to a global loss in forested areas. Some of the key areas being studied are the impacts of forest fires, logging practices, urban sprawl and climate change. Without knowledge of ecosystem interactions, humans may inadvertently alter Earth's ecosystems in such a way as to create negative environmental, economic and human health consequences. Therefore, it is essential to understand these ecosystem interactions to ensure that our daily survival needs can be met in the future.

Teacher Preparations

1. Read through the materials and determine if you will be conducting the virtual hike or the real hike. The virtual hike is at the website: <http://icp.giss.nasa.gov/education/modules/carbon/>. Look under Topic 1, Activity E, *Data and Tools*.
 - a) For the virtual hike you will need to download the Student Guide. The remainder of the materials students can access online. Therefore, you will need to have enough computers with Internet access. It is suggested to have at least one computer for each of the four groups. Ideally, pairs of students will share a computer so one student “walks” through the activity while the other records information. Be sure that the students switch roles.
 - b) For the real hike you will need to download the Student Guide as well as the information packet for each of the four different groups (theme-related). In addition you will need to plan a field trip to the Black Rock Forest and make all necessary arrangements at Black Rock (<http://www.blackrockforest.org/>) and with your school. Make sure both school administrators and 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.
2. Review all documents to be sure you have downloaded all that you need.
3. Work through the activity yourself in depth before having students try the activity themselves.

Materials

The materials you need for this activity depend on whether you are doing the real life hike or the virtual version.

For the real life version you (and the students) should be sure to dress for the weather. Have a backpack, plenty of water, and snacks. Also, a small first aid kit is essential because the hike is in a remote area and covers some rocky terrain. Depending on the time of year, have layers of clothing available for your use, so that you are prepared for the changes in temperature you will experience throughout the day and from one location to another on your hike. Be sure to wear comfortable walking shoes and carry all medication (inhalers, etc.) that you might need during the hike in your pocket or in a backpack that you keep with you at all times. You will also need a notepad and something to write with, your theme area's Hike Information Packet, a camera (digital works best for easy transfer of photos onto a computer), and any other data collection tools that may come in handy for your group. For example, the geology and soils team might want a thermometer, the plant life team might want some plastic Ziplock bags as well as some tree and plant life identification guides, and the wildlife team might want some animal and track identification guides.

For the virtual version, you will need a computer with Internet access, your notebook, and something to write with. The virtual hike is at the website: <http://icp.giss.nasa.gov/education/modules/carbon/>. Look under Topic 1, Activity E, *Data and Tools*.

Periods 1 to 4 – The Walk Through the Forest

Engagement

Show the students where Black Rock Forest is located on a map. Elicit from students the variety of habitats they expect to find within this Temperate Deciduous Forest. Ask students to think of the variety of habitats that they studied in the community park. Present the names of the ten different sites that you will be studying on the Black Rock Forest ecosystem walk. Discuss with students the general features of the sites.

Preliminary Discussion and Planning

1. Arrange students into FOUR groups, one for each theme but try to have no more than 6 people per group if working outside and 3 people per group at the computer. If your class is large, have more than one group work on a particular theme. Have the students read the Introduction to the Black Rock Forest Hike.
2. Each group decides how their theme is different from the other groups' themes. Information should be placed on **Data Sheet 1: Comparison of Theme Areas**.

3. Discuss with the class the different themes that will be studied on the Forest Walk. Have the students identify abiotic factors that they believe influence the theme they are studying. This information is recorded on **Data Sheet 1: Comparison of Theme Areas**. Discuss the answers with the class. You may need to remind students of the major abiotic factors that can influence a Northeastern U.S. forest (temperature, precipitation, wind, elevation, light, the slope of the land, and fire).

Observations

1. Students read the information for each of the ten stops (either on the Internet or in their theme area's Hike Information Packet). It is helpful for them to have had an opportunity to read through the material prior to leaving for the Black Rock Forest, if you will be going on the actual trip.
2. Students will observe each site from the perspective of their theme, looking for characteristics that make the habitat unique from others, as well as similar. In addition, students will identify areas where they notice abiotic and biotic factors interacting.
3. Pictures should be taken to document their findings if you are going to the actual site. Therefore it is helpful to have enough cameras for the groups. It is possible to share them among groups, just be prepared to work this out in advance of the trip.
4. If you are doing the virtual tour, be sure students reference the pictures when recording observations at a particular stop. Also remind students that for each site there are two sets of information they will need to review, general background and the information specific to their theme.
5. The students should also be expected to take appropriate field notes. Observations are to be recorded on **Data Sheet 2: Observations in Black Rock Forest**. Remind students that a PowerPoint presentation will be made by each of the different groups.

Data Analysis, Comparisons and Consensus

1. Have students answer the questions in this section and discuss them with the entire class.

Period 5 – Interactions in the Forest Ecosystem

Group Assessment

Within an ecosystem there are a large number of factors with complex interactions. Have individual groups prepare formal presentations in which the groups discuss the differences in physical characteristics found in each habitat that influenced their individual theme. Other characteristics (not physical) that influenced their theme throughout the hike should also be discussed.

If possible have students make PowerPoint presentations to the class. In this way they can incorporate the photographs directly into the presentations. Students should use 2 to 3 slides per stop and the last five slides should incorporate a discussion of the Data, Analysis, and Comparison and Consensus questions.

Alternatives to PowerPoint presentations include: using overhead projectors or having the students construct poster presentations. It is important that the students have an opportunity to present and defend their understandings to the class and to question one another.

As each group presents have the rest of the students take notes on the presentation using the Presentation Preparation Sheet. This will assist students in organizing all of the data.

At the completion of all the presentations, summarize the information in a class discussion. Develop consensus concerning why and how having a variety of habitats increases the stability of an ecosystem. Also come to an understanding as to why all of these different habitats would still be classified into one single system. It is important to emphasize the relationship between biodiversity and ecosystem stability.

As a culminating activity, student compete the **Individual Assessment Questions**.