RESOURCE LIBRARY
ACTIVITY : 1 HR

Biodiversity in a Wetland Ecosystem

Students explore biodiversity, research species of interest, and use the National Geographic FieldScope tool to predict where those species would live in a wetland ecosystem.

GRADES

6 - 12+

SUBJECTS

Biology, Ecology, Experiential Learning, Geography, Geographic Information Systems (GIS), Physical Geography

CONTENTS

2 PDFs, 4 Links

OVERVIEW

Students explore biodiversity, research species of interest, and use the National Geographic FieldScope tool to predict where those species would live in a wetland ecosystem.

For the complete activity with media resources, visit:

http://www.nationalgeographic.org/activity/biodiversity-in-wetland-ecosystem/

DIRECTIONS

1. Build understanding about biodiversity.

Engage students in a short brainstorming session to investigate what they currently know, what they want to know, and what they will learn about biodiversity. Give each student a copy of the KWL chart to help them organize their ideas. Ask: *What do you think biodiversity is? Is biodiversity important? How so? What would you like to learn about biodiversity?* Then have students read the National Geographic encyclopedic entry on biodiversity, either

independently or with a partner. After students have finished reading, ask: *What did you learn about biodiversity?* Explain that biodiversity includes all types of taxa, or groups of organisms, such as birds, fish, amphibians, reptiles, mammals, and plants. Also explain that there are many different types of biodiversity such as genetic, species, and <u>ecosystem</u>, and therefore there are many ways to measure biodiversity. For example, richness is the number of different species in an area, while evenness is the abundance of each species in relation to the total number of organisms counted. For this activity, students will focus on the richness aspect of <u>wetland</u> ecosystems.

2. Explore the wetlands of America.

Have students navigate through the American Wetlands GeoStory. Have them write at least three interesting facts they learned. Then discuss as a class. Ask: *How are wetlands different from other ecosystems like forests, prairies, or deserts?* (They are covered by water permanently or seasonally, experience flooding, and have aquatic plants.)

3. Investigate the biodiversity of the Barataria Preserve.

Tell students that next the class will investigate the biodiversity of a specific wetland habitat—the Barataria Preserve. Explain that this preserve is dedicated to protecting the wetland habitats near New Orleans, Louisiana, and is just one part of the six-part Jean Lafitte National Park. Show students the lists of species present in the Barataria Preserve collections on Encyclopedia of Life. Have students select between three and five species that interest them from any taxa. Then give students the Five-Column Chart to record information about these species by investigating them on the Encyclopedia of Life website. Ask students to write these heads in the five columns: physical description, habitat, food habits, conservation status, and relevance to humans. Check in with students as they work to ensure that they write summarized notes.

4. Make habitat predictions in FieldScope.

Access the National Geographic FieldScope website for the Barataria Preserve and New Orleans area. Follow the short tutorial in FieldScope with students to explore how it works. Then have students carry out the following steps:

- Turn on these two layers: Boundaries and Places and <u>Land Cover</u>.
- Zoom into the Barataria Preserve.
- Use the Query Tool to identify the different land cover types in the preserve.
- Using what you now know about your <u>species</u> and their <u>habitat</u>s, place markers that represent your species on the map to show where you think they are likely to be found in the preserve. To use the Markers, drag and drop them on the locations you want.
- Once you have placed all your markers, save the map by clicking on the Save button in the top right corner, and print the map.

5. Engage students in a wrap-up discussion.

Have students look at one another's charts and maps and compare their species selections and predictions. Ask:

- *How did adding a spatial element help your ability to predict species' locations?*
- *How might the plant and animal biodiversity in this wetlands ecosystem be similar to or different from other ecosystems, such as mountains, prairies, or hardwood forests?* (more amphibians, fish, water-dependent species; concentrated around water resources; more grasses)

As a class, generate a list of factors that influence how biodiversity manifests in different areas, such as water, temperature, <u>elevation</u>, soil, latitude/longitude, or human presence. Revisit the encyclopedic entry on biodiversity for ideas if needed. Finally, have students write a short paragraph on the back of their Five-Column Chart about why they think biodiversity is important in the Barataria Preserve, encouraging them to reference the information they found about their species' relevance to humans. Finally, as a class discuss the variable importance of biodiversity. Ask: *For whom or what is biodiversity important? Why should we care about biodiversity?*

Modification

For more advanced groups, include discussion about the scientific process and its role in measuring biodiversity after students make predictions about where species live. Discuss what the scientific process is, how it is done, and who can do it.

Tip

If strapped for time, select 3-5 species that are present in the Barataria Preserve before the activity for students to investigate, rather than having them select species on their own. You can also split the class into groups and assign one species per group.

Informal Assessment

Assess students' species worksheets for completeness and accuracy of information. Also review their species habitat prediction maps to ensure they are complete and display reasonable predictions. Finally, check students' KWL charts for completeness and their paragraphs about biodiversity for an explanation of why biodiversity is important in the Barataria Preserve.

Throughout the activity, walk around the room and ensure students are carrying out the FieldScope instructions, including taking notes about what they find as they go through FieldScope explorations. Assess students based on level of engagement and competence development—whether they understand the tasks and apply their understanding to their performance.

Extending the Learning

Add a math/science connection by calculating species richness for the Barataria Preserve. Have students consider the number of species in all taxa listed on the Encyclopedia of Life's Barataria Preserve collections website. Then compare and contrast richness within each taxa and determine which one is the most diverse.

OBJECTIVES

Subjects & Disciplines

Biology
- Ecology
- Experiential Learning

Geography
- Geographic Information Systems (GIS)
- Physical Geography

Learning Objectives

Students will:

- research species' life histories and biology
- make predictions about locations of species' habitats
- use GIS technology to explore ecosystems
- describe biodiversity and its importance in wetland ecosystems

Teaching Approach

- Learning-for-use

Teaching Methods

- Brainstorming
- Hands-on learning
- Inquiry
- Multimedia instruction

Skills Summary

This activity targets the following skills:

- 21st Century Student Outcomes
  - Information, Media, and Technology Skills
    - Information Literacy
  - Learning and Innovation Skills
    - Communication and Collaboration
    - Critical Thinking and Problem Solving
  - Life and Career Skills
    - Initiative and Self-Direction
- Critical Thinking Skills
  - Applying
  - Remembering

- Understanding
- Geographic Skills
  - <u>Analyzing Geographic Information</u>
  - <u>Answering Geographic Questions</u>

National Standards, Principles, and Practices

IRA/NCTE STANDARDS FOR THE ENGLISH LANGUAGE ARTS

- **<u>Standard 12</u>:**
Students use spoken, written, and visual language to accomplish their own purposes (e.g., for learning, enjoyment, persuasion, and the exchange of information).
- **<u>Standard 8</u>:**
Students use a variety of technological and informational resources (e.g., libraries, databases, computer networks, video) to gather and synthesize information and to create and communicate knowledge.

NATIONAL GEOGRAPHY STANDARDS

- **<u>Standard 1</u>:**
How to use maps and other geographic representations, geospatial technologies, and spatial thinking to understand and communicate information
- **<u>Standard 3</u>:**
How to analyze the spatial organization of people, places, and environments on Earth's surface
- **<u>Standard 8</u>:**
The characteristics and spatial distribution of ecosystems and biomes on Earth's surface

NATIONAL SCIENCE EDUCATION STANDARDS

- **<u>(5-8) Standard A-2</u>:**
Understandings about scientific inquiry
- **<u>(5-8) Standard C-4</u>:**
Populations and ecosystems
- **<u>(5-8) Standard C-5</u>:**
Diversity and adaptations of organisms
- **<u>(9-12) Standard A-2</u>:**

Understandings about scientific inquiry

• **(9-12) Standard C-4:**

Interdependence of organisms

Preparation

What You'll Need

MATERIALS YOU PROVIDE

- Paper
- Pencils
- Pens

REQUIRED TECHNOLOGY

- Internet Access: Required
- Tech Setup: 1 computer per learner, Printer

PHYSICAL SPACE

- Classroom
- Computer lab

GROUPING

- Large-group instruction

BACKGROUND & VOCABULARY

Background Information

A preserve is a space set aside to protect certain biological and/or geological features, such as individual species of plants and animals or an entire ecosystem. These spaces are then managed to conserve these features, often allowing public access for education, research or appreciation. A preserve is different from a park because of this specific focus on ecological conservation and protection. The Barataria Preserve is just one part of the six-part Jean Lafitte National Park.

Prior Knowledge

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Recommended Prior Activities

- None

Vocabulary

Term	Part of Speech	Definition
biodiversity	*noun*	all the different kinds of living organisms within a given area.
ecology	*noun*	branch of biology that studies the relationship between living organisms and their environment.
ecosystem	*noun*	community and interactions of living and nonliving things in an area.
elevation	*noun*	height above or below sea level.
geographic information system (GIS)	*noun*	any system for capturing, storing, checking, and displaying data related to positions on the Earth's surface.
habitat	*noun*	environment where an organism lives throughout the year or for shorter periods of time.
land cover	*noun*	physical material at the very top surface of the Earth, such as grass.
species	*noun*	group of similar organisms that can reproduce with each other.
wetland	*noun*	area of land covered by shallow water or saturated by water.

For Further Exploration

Websites

- National Geographic Education: BioBlitz
- National Geographic: BioBlitz

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