

## Change Happens

### Summary:

Students will learn about the natural history of Puerto Rico by the teacher demonstrating the process of researching to find the information using various sources. After participating in the model using Puerto Rico, students will apply the knowledge of the process of researching to learn more about how Wisconsin's environment has been changed by natural and human-made causes.

### Background Information:

Puerto Rico is an oceanic island formed via volcanism about 135 million years ago. Subsequent plate tectonic motion folded debris which formed the Cordillera Central Mountains (including El Yunque Caribbean National Forest). In contrast to the warm and moist climate of the region today, dry, cool climates prevailed 15,000-20,000 years ago, and savannas and other ecosystems adapted to this climate were widespread. Plants and animals of the islands' lowlands and lower montane areas were typical of a dry, savannalike habitat until about 13,000 years ago, when a shift to the current moister conditions occurred. As a result, the animal and plant communities gradually evolved toward their present composition.

Hurricanes affect the island of Puerto Rico about every 21 years. After Hurricane Hugo 1989, the Tabonuco forests of Luquillo Experimental Forest were found to display tremendous resilience to wind damage. Rapid regeneration of Tabonuco seedlings were observed and some key ecosystem elements appeared to return to normal five years after the hurricane occurrence.

Puerto Rico and the Virgin Islands were covered with luxuriant forests that consisted of more than 500 tree species when Columbus arrived around 1493. Extensive cutting and modification of natural forests, widespread agriculture, and introduction of many nonindigenous plants from other parts of the tropics have fragmented the original plant associations into remnants of the once-extensive tracts of forests. By 1912, nearly the entire

**Grade Level:** 5<sup>th</sup> grade

**Goal:** The surface of the earth changes due to slow and rapid processes.

**Key Concepts:** When an environment changes, plants and animals move, adapt, or die.

**Objectives:** Upon completion of this lesson, students will:

- 1) List at least five events in Wisconsin history that caused changes to the landscape.
- 2) Explain how plant and/or animal species reacted to the change.

**Teaching Location:** Indoor classroom

**Lesson Time:** two to five classes

**Subject Areas for Infusion:** science, social studies

### Standards:

Environmental Education:  
B.8.2  
B.8.5

Science:  
A.4.1-4.5  
B.4.1

Social Studies:  
A.4.4  
A.4.8

island had been clear-cut for agriculture (coffee and sugarcane), so mostly secondary forest cover exists today, only about 0.2% of the original forest remains. In the second half of the twentieth century, Puerto Rico shifted away from an agrarian-based economy to a modern industrial and tourism-based economy.

For more information:

The US Geological Survey- Terrestrial ecosystems of Puerto Rico

<http://biology.usgs.gov/s+t/SNT/noframe/cr133.htm>

**Materials:**

- Chart paper, notecards, markers
- Access to Internet and/or other researching materials.
- Timeline graphic organizer

**Set-Up:**

1. Read the background information on Puerto Rico's history of change.
2. Make arrangements for access to computer lab and/or LCD.

**Procedure:**

**Introduction (Day 1)**

1. Have students brainstorm a list of events that cause changes in an environment.
2. Conduct a class discussion that classifies these events into rapid or slow processes.
3. Discuss if the event occurs naturally or if is caused by human interaction.

**Activity 1 – Puerto Rico (Day 2 or 3)**

1. Teacher Demonstration – Take two different size containers (must be clear) and fill them with water. Put a few drops of food coloring (the same in each container) into the containers and observe. Discuss that the food coloring is a symbol for an event (change) in an environment. How did each of the containers react to the change? Which container was most like an island? (smaller one because it's more sensitive to change) Explain that the small container is like Puerto Rico and how it's reacted to change.
3. Refer back to the list of changes brainstormed during the previous day. Use those events as key words in searching for information on the Internet about the natural history of Puerto Rico. Place these events on a class timeline using note cards to write out the cause of the event and how it changed the environment.

Two VERY helpful websites are:

UWSP Natural Resource Class 679 Information: Puerto Rico's geology, climate and ecosystems

<https://www.uwsp.edu/natres/nres679pr/Enrolled%20Students/Unit4/Unit%204%20Section%20B%20Revised.htm> –

Puerto Rico's History and Culture

<https://www.uwsp.edu/natres/nres679pr/Enrolled%20Students/Unit4/Unit%204%20Section%20A%20Revised.htm>

### **Activity 2 – Wisconsin (Day 3-5 – computer lab)**

1. Hand out the performance task and discuss the expectations.
2. Allow the next two days for students to use resources for researching.
3. Some helpful Internet sites may be:

U.S. Geological Survey (Wisconsin)

<http://water.usgs.gov/wid/index-state.html#WI>

History of Chequamegon-Nicolet National Forest of Wisconsin

<http://www.fs.fed.us/r9/cnnf/general/history/index.html>

History of natural disasters in Wisconsin

<http://www.treesfortomorrow.com/pubs/naturaldisasters.pdf>

Center for Global Environmental Education- Hamline University

[http://cgee.hamline.edu/see/questions/dp\\_transformation/dp\\_trans\\_succession.htm](http://cgee.hamline.edu/see/questions/dp_transformation/dp_trans_succession.htm)

Department of Natural Resources- History of flooding in Wisconsin

<http://www.dnr.state.wi.us/org/water/wm/dsfm/flood/history.htm>

US Geological Survey Websites:

<http://biology.usgs.gov/s+t/SNT/noframe/gl127.htm> - Great Lakes Natural History

<http://biology.usgs.gov/s+t/SNT/noframe/ne119.htm> - Northeast Natural History

### **Conclusion**

Conduct a class discussion that revolves around the how the changes that have occurred in Puerto Rico (use class chart) and Wisconsin (each student's timeline) are similar and different.

### **Assessment**

Students will construct a timeline for Wisconsin's natural history that will include a minimum of five events that caused change to the landscape. On their timeline, students will identify whether the changes were rapid or slow, as well as being caused by natural events or

human-made. Students will also be required to explain how at least two animal and/or plant species reacted to the change. (See specific performance task attached)

**References:**

“Wisconsin Forests Forever”, CD-ROM and teacher’s guide, Wisconsin Forest Resources Education Alliance, 2000, pp. 15-26

Center for Global Environmental Education- Hamline University

[http://cgee.hamline.edu/see/questions/dp\\_transformation/dp\\_trans\\_succession.htm](http://cgee.hamline.edu/see/questions/dp_transformation/dp_trans_succession.htm)

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UWSP Natural Resource Class 679 Information: Puerto Rico’s geology, climate and ecosystems

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Puerto Rico’s History and Culture

<https://www.uwsp.edu/natres/nres679pr/Enrolled%20Students/Unit4/Unit%204%20Section%20A%20Revised.htm>

Name \_\_\_\_\_ Date \_\_\_\_\_ Score \_\_\_\_\_

### Ecosystems Benchmark Assessment

**F3: Knows that when and environment changes, some plants and animals *move, adapt, or die*.**

**F5: Knows that all organisms, including humans, cause changes in their environment where they live.**

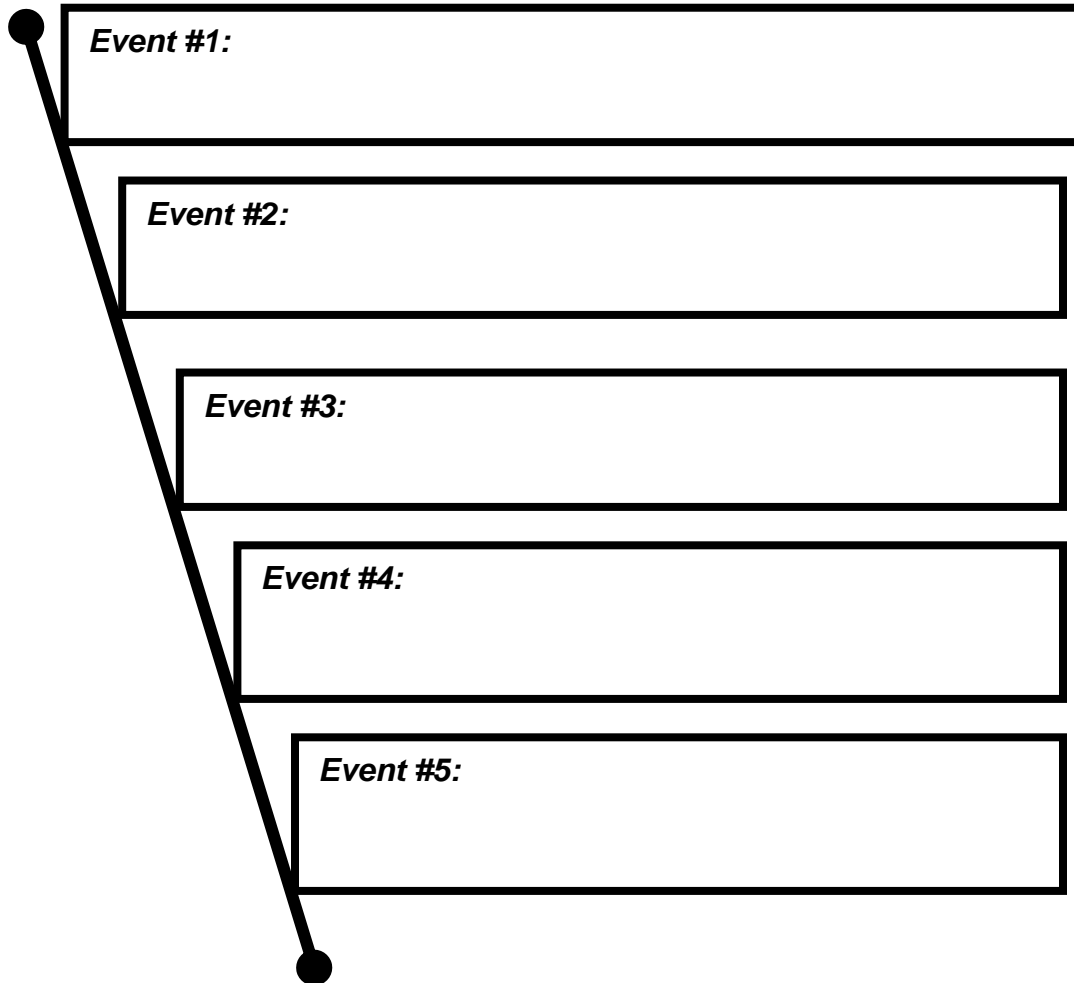
**FB7: Knows that the Earth's surface changes due to rapid and slow processes.**

**Directions:**

Over the past few days you have been researching the history of Wisconsin and the changes that have occurred in the state's ecosystems. Some of these changes are **naturally made**, others are **man made** or **human made**. Changes to an ecosystem can be **beneficial** (positive) or **detrimental** (harmful/negative) to animals and plants. When changes occur some plants and animals are able to **move** or escape the change, some plants and animals can **adapt** to the change and survive, and some plants and animals simply **die**.

Using the Internet and other resources that are available, you will make a timeline of events that will include at least 5 changes that occurred to an ecosystem in Wisconsin. Include the above listed items to show what effect that change has. Be sure to include comments about the bold face words above.

**Organize the Information**  
*Time Line Patterns: Notetaking*



***Information Processing Standard:***

*3----- I find useful and accurate meaning in the information I gather for my task, and then I combine and organize the information so it makes sense to me and others.*