Teacher Information
Great Lakes

I. Objectives

A. Forming Concepts (Introductory) Objectives

1. Name the Great Lakes
2. Determine the distance from student's residence to the Great Lakes.
3. Define "Alien" (introduced) species.

B. Interpreting Data Objectives

1. Interpret color-coded maps of wind speed, wave height, water temperature at various depths, and water surface elevation (topographic).
2. Graph monthly rainfall data obtained from a chart.
3. Determine the effects that imported species have on native animal and plant populations.
4. Compare graphs of animal populations at the same location over time.
5. Determine the harmful and beneficial effects of Zebra mussels.
6. Determine the three "best" methods of Zebra mussel control and give reasons for your choices.

C. Applying Principles Objectives

1. Compare maps of wind speed/direction and wave height to determine the relationship between the length of time wind has blown over water and the height of the waves.
2. Write a paragraph describing Zebra mussels' economic impacts.
3. Determine the steps necessary to ensure the recovery of the Great Lakes' ecosystems.

II. Interdisciplinary Uses

A. Social Studies

1. Predict the economic effects on people affected by changes in the Great Lakes ecosystems.

B. Math

1. Interpret graphical data.
2. Convert knots to miles per hour.
3. Convert meters to feet.
4. Graph monthly precipitation data from a table.

C. Language Arts

1. Create written and oral communications about Great Lakes ecological issues.
2. Create written and oral communications about Great Lakes economic issues.

III. Science Standards Coordination

The Great Lakes activity has been designed to incorporate science standards as specified by the National Science Education Standards (NSES) and the National Science Teachers Association (NSTA) Scope, Sequence, and Coordination (SS&C) of Secondary School Science. Only the major topics are listed. For further explanation of each standard see the complete documents:

NSES - National Academy Press, 2101 Constitution Ave, NW, Washington, DC 20481
NSTA – 1840 Wilson Blvd, Arlington, VA 22201-3000

NSES	SS&C
Transfer of energy	Niche, habitat, population, community
Populations and ecosystems	Life cycles
Diversity and adaptations of organisms	Patterns of reproduction
Populations, resources, and environment	Wind
Natural hazards	Precipitation
Science and technology in society	

IV. Advanced Preparation

A. Materials

1. One computer per two or three students is a recommended minimum.
2. One copy of the Student Activity Book for each student or group of students.

B. Time Required for Completing the Activity

1. The Get Info section takes about 20 minutes.
2. The Gather Data section takes about 45 minutes.
3. The Application section takes about 20 minutes.

C. Teacher Familiarity

Preview these materials thoroughly. As with all these activities, before using this activity in class, review the sites and work through the activity yourself to learn about the Great Lakes so you can answer questions or direct students to the answers.

The activity is set up so students are taken to sites containing information that will be used to answer questions regarding the Great Lakes. The sites contain either the answers or the information from which the students can infer the answers. At the end of the activity, there is a list of enrichment activities and related web sites.

D. Select Questions for Students to Answer

It would be prudent for you to read the questions students will be expected to answer. These questions are in order of ascending difficulty. Depending on grade level and ability level, you might want to assign specific questions for your students.

E. Student Grouping

These activities can be done individually or in small groups of two or three students. Students who have Internet access can also do them at home for extra credit.

F. Software Requirements and Duplication Preparation

1. Adobe Acrobat Reader is required to download the pages. Click the "Tech Info" link on the Science with NOAA Research homepage to download Acrobat Reader.
2. Download the Teacher Information, Teacher Key, and Student Activity Book PDF files from the "Teacher Info" web page.
3. Duplicate and distribute student pages. Ideally, each student should have a copy of the Student Activity Book that should be distributed and discussed the day before the exercise.