Greatest of the Great Lakes – A Medley of Model Lessons

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National COSEE goals

• Effective partnerships between research scientists and educators;
• Effective ocean sciences programs and best practices that build on existing resources;
• Vision of ocean education as a charismatic, interdisciplinary vehicle for fostering scientific literacy
COSEE Great Lakes Goals

- Inspire scientific literacy and environmental responsibility
- Link education and research communities
- Add freshwater component to the National COSEE Network
- Improve Great Lakes/ocean sciences education
- Improve Great Lakes/ocean sciences literacy among regional Tribes
COSEE Great Lakes Scope

- Involves educators, research scientists, students and the public
- More than 30 collaborators, including 4 other COSEEEs
- Funded 2005-2010
COSEE Great Lakes Objectives

Facilitate collaboration between scientists and educators:
• enhance teacher capabilities in science
• assist scientists in education and public outreach
COSEE Activities by Group

- **Educators**
  - Lake Exploration workshops
  - Lake Guardian
  - Marine Immersion
  - Teachable Moments
  - Curriculum Development
COSEE Activities by Group

- Research Scientists
  - Lake Exploration workshops
  - Educator House-calls
  - School for Scientists
COSEE Great Lakes Objectives

Facilitate direct student connections to Great Lakes and ocean sciences
COSEE Activities by Group

- **Students**
  - O’LAKERS (Ocean/Lake-Aware Kids Engaged in Relevant Science)
  - Student Summits
  - Great Lakes Ecology Course
  - Great Lakes/ocean Sciences Careers
COSEE Great Lakes Objectives

Integrate Great Lakes and ocean sciences in curricula
Curriculum Objectives

- Enhance teacher accessibility to science
- Integrate research into existing high quality educational materials
Phase 1
Greatest of the Great Lakes

- Existing Great Lakes materials have been rigorously reviewed and tested
- Classroom activities on Great Lakes Overview, Life in the Water, Habitats, Climate and Weather, Hydrology, Coastal Processes, and Issues
Greatest of the Great Lakes

- 41 classroom activities (grades 4-10)
- Great Lakes science, issues, potential solutions
- Aligned to state and national science education standards and ocean literacy principles
- Wide variety of instructional modes--e.g., role playing, experiments, investigation
- Many learning skills - inquiry, data interpretation, hypothesis development, and decision-making
Free Sample Activities (Download)

- How Big is a Crowd? (from the Great Lakes Overview section)
- Who Can Harvest a Walleye (from the Life in the Water section)
- Seeing Purple (from the Habitats section)
- How the Great Lakes Modify the Growing Season (from the Climate and Weather Section)
- Making Great Lakes Connections (from the Hydrology section)
- Indoor Dunes (from the Coastal Processes section)
- What are the Characteristics of Great Lakes Exotic Species? (from the Issues section)
Invasive Species

- Role play
- Impact of invasive species on environment and economy
- Pathways of introduction
Toxic Pollutants

- Simulation and data interpretation
- Bioaccumulation and biomagnification of toxins in the food chain
- Health disorders in animals and humans
Habitat Conservation and Species Management

- Sampling/estimation
- Purple loosestrife’s impacts on wetlands
- Discover how scientists determine population size
Human Health and Safety

- Problem solving/Stewardship
- Diagram 3 reasons for beach contamination
- Write a persuasive essay about beach health

**Summary**

Students learn about bacteria as an indicator of beach water quality for swimming. In groups, they solve hypothetical problems associated with beaches. Then, students write persuasive essays on the issue.

**Objectives**

- Discuss the effect of harmful bacteria on swimming conditions at beaches.
- Diagram reasons for beach contamination.
- Explain solutions for beach health problems.
- Write a persuasive essay about beach health.

**Prerequisite**

Garbage investigation, Unit 11

**Vocabulary**

- Bacteria: single-celled organisms, free-living or parasitic; break down the wastes and bodies of dead organisms, making their components available for reuse by other organisms.
- Sewage: water that is discharged into waterways or stormwater; water that accumulates on the ground during a rain event.

**Setting**

- Indoors
- Outdoors
- Classroom or beach

**Materials**

- Procedures for Healthy Beaches (CD)
- Journal
- Fungi
- Oyster shells
- Biodegradable eutawt

**Subjects**

- Environmental Science, Human Health, Social Studies, Language Arts

**Standards**

- Science: 12.1.2a, 13.4.2b, 13.4.1f, 13.8.2f, 13.8.6b, 17.1.1d, 17.3.1b
- Social Studies: 17.1.3b
- Language Arts: 3.3.2a, 3.3.3a
- Science: 3.3.3c, 4.3.11e, 4.3.14, 4.3.6, 6.5.4, 7.5.2, 8.5.4
- Science: 5.3.4f, 6.3.5, 7.5.6
- Social Studies: 6.3.5f, 6.4.4, 6.4.6
Watershed Stewardship

Hydropoly: A Decision-Making Game

Activity: Students play a board game to hone their decision-making skills. Through the various choices posed in the game, they are asked to consider both economic and environmental well-being in making decisions.

Grade Level: 4-8
Subjects: Science, social studies
Setting: Classroom and/or outside
Duration: 1 hour
Key terms: Land Use, Wetland

OBJECTIVES
After participating in this activity, students will be able to:
- Discuss land-use practices that affect Great Lakes wetlands
- Make decisions and recognize personal priorities with regard to wetlands
- Describe some of the economic factors that often drive land use

SUMMARY
Every day we make choices. We decide simple things like what to wear, what to eat, or how much time to allow for homework. Some decisions, however, require us to think critically and consider the potential consequences of our actions. Through the various land-use choices posed in the game Hydropoly, students must consider both the economic and environmental consequences of their decisions. This type of decision-making helps prepare young people for situations they'll encounter throughout their lives.

BACKGROUND
Coastal and inland communities in the Great Lakes region face difficult land use decisions every day. Land use refers to how land within a community is used—whether for houses, businesses, agriculture, or natural areas. Local leaders must decide where to build houses and what type of industry to support. Communities must also consider another important factor—the health of the environment. A healthy environment that allows for natural areas, open green space, and clean water attracts residents and enhances quality of life.

Protecting wetlands is another way to enhance our natural environment. Wetlands provide important ecological benefits—such as water filtration, habitat and flood control—that need to be considered in land use decisions. Yet wetland benefits are frequently overlooked. Financial gain and economic concerns often override environmental issues. Despite this historic trend, some communities are recognizing that a healthy environment is closely tied to a healthy economy. We could call this principle “economics”—the healthy marriage of ecological protection and economic growth.

- Decision making
- Problem solving
- Land use/wetlands
- Economic and environmental impacts of decisions
Phase 2
Fresh and Salt Curriculum

- Reviewed by teachers and scientists
- Matched with parallel ocean topics
- Introduced at national and state science teacher conferences
Recruit scientists to review for technical accuracy

Recruit classroom teachers for pilot testing

Recruit classroom teachers to align to standards

Recruit nonformal educators in pilot tests

Product ready for distribution
You can get involved in *Fresh and Salt*

- Align activities to education standards
- Pilot test these activities

To learn how to become involved in this COSEE Great Lakes curriculum project, contact Terri Hallesy at thallesy@uiuc.edu
COSEE opportunities for scientists and educators:

- [http://coseegreatlakes.net](http://coseegreatlakes.net)