Part 2: CIOSS & SMILE

A Partnership for Ocean Sciences Education
What is the SMILE Program?

SMILE is the Science & Math Investigative Learning Experiences (SMILE) Program
Why SMILE?

The purpose of SMILE is to increase the number of educationally underserved minority students:

- who graduate from high school;
- are qualified to attend college;
- choose careers in science or math related fields.
How Does SMILE Do It?

- SMILE collaborates with scientists, mathematicians and Oregon school districts to provide after-school clubs for science and math enrichment.
How Does SMILE Do It?

- SMILE brings students to college campuses to experience a piece of college for themselves.
- SMILE clubs provide science and math enrichment for 4th through 12 grade students.
How Does SMILE Do It?

- SMILE also offers professional development for the teachers who run SMILE clubs.
SMILE students gain personal, practical experiences which help round out their education. It encourages them to think beyond high school and to earn the opportunity to choose careers which require a college education.

John Rademacher, High School Principal
CIOSS & SMILE

CIOSS & SMILE are collaborating to bring oceanography to the high school students through club activities and yearly hands-on scenario based challenge weekends.
The Challenge

The challenge was a community based problem solving model where students applied scientific concepts as evidence to decide upon and communicate a community action plan.
The Scenario

The 2004-2005 school year was the first year the students were exposed to oceanography. The theme of the challenge weekend was how to clean up a near-shore oil spill.
Pre-scenario

- Develop skills and concepts in clubs through simple hands-on activities.
  - Making Waves
  - Comprehending Currents (temp & density)
  - Tracking Tides
  - Weather Stations
  - Mapping activities
  - Oil Spill Clean-up
Pre-Scenario

- SMILE staff teaches the activities to the teachers who run the SMILE clubs at 3 workshops throughout the year. The teachers then present the lessons to their students in after-school clubs.
Scenario Development

The scenario was developed through personal communication with oil-spill clean up professionals (NOAA HazMat, Oregon DEQ) and by reading web-based materials designed for professionals wanting to learn more about their profession.
The OR Conference
The OR Conference

- The event was structured like a professional scientific conference (including acronyms).
- For most high school students the word “conference” implies a parent-teacher conference usually in connection with misbehavior.
- Part of SMILE’s mission is to help acclimate students to the culture of academia.
College student mentors help team members get to know each other and function like a team.
Key Note Speech

“Working on the Same Frequency” – Benjamin Dotson, USCG
The OR conferees were informed that an oil tanker had lost power off the coast of the fictional town of Pete’s Bay.
Teams were given base maps and had to collect key information from other maps arranged by “resources” to compile an ESI map of the area.
ESI Map of Pete’s Bay
ESI Map of Pete’s Bay

Students had booklets with questions to guide them in thinking about the resources in each area, working in teams.
Student and Professional ESI Maps
The next morning the students are told that the oil tanker sank. They disperse into specialist areas to learn how to deal with an oil spill.
Students Become Specialists

The students worked cooperatively in teams. Individuals on each team became "specialists" in a certain discipline. The team combined their collective team knowledge to create a community action plan, taking into account the views of a number of different stakeholders in the scenario.
Specialist Areas

- GIS/Mapping
- Oil Recovery and Remediation
- Shoreline Habitat Assessment
- Communications Specialists
- Oil spill modeling and probability
- Weather
Specialist Area – Using the NOS/Hazmat “Gnome” trajectory model

General processes affecting surface trajectories are discussed – winds, tides, currents.
Specialist Area – Using the NOS/Hazmat “Gnome” trajectory model

A cluster of passive tracers is released and tracked by the model – on different parts of the tidal cycle, without and with winds, changing wind direction, …
Specialist Area – Using the NOS/Hazmat “Gnome” trajectory model

Conditions under which some of the parcels enter Pete’s Bay are discussed.
Making a Plan

Each team is given a limited number of “booms,” skimmers, etc. Scale models and winds blown through straws helps to visualize flows.
Making a Plan

The newly trained experts debate the best ways to use their resources, which areas to select as priorities, etc.
The students set up displays describing their final plans. Teachers and volunteers play the roles of oyster farmers, fishermen, home owners, developers and circulate, asking the students to explain their plans.
The students clearly enjoyed their new roles as experts and the ability to “explain” the situation to the role-playing teachers and college students.
In this group, each team member described their aspect of the decision making process in sequence. They appealed for volunteers to help.
Communicating the Plans

In this group, the responses were more spontaneous, with team members coming forward and sometimes surprising each other with the explanations. Thinking on your feet was essential.
Maps, scale models and verbal skills, along with the newfound training, were the tools employed. Role-playing volunteers were sometimes skeptical.
This group made use of an overhead with a blow-up of the bay, as well as their base maps.
Looking Toward the Future

The SMILE CIOSS partnership will continue next year with another oceanography-based high school event. Next year we plan to focus on a fisheries-based scenario.
Partnering with the SMILE program is a good way to address Broader Impact and Outreach (BIO) requirements of funding agencies.
A successful first Challenge
This presentation is Part 2 of a 3 part series.
Please continue with Part 3: “Informal Education”, “Free Choice Education”