

### **Part III**

Selected Presentation Slides Given at the 59<sup>th</sup> Annual Center  
Directors Meeting, Austin, Texas, October 28, 2001

## III.2 K-12 Outreach Technologies, University of Arizona COEP

Presenter: Stefani Hines

## K-12 Outreach Technologies

The UA



Uses the Web



### Four Ways We Use the Web

1. Basic information delivery
2. Provide downloadable curricula
3. Organizational and delivery tool for a complex, "webbed," integrated curriculum
4. Fun, highly interactive activities



## Basic Information Delivery

- Straight HTML
  - [Water & Health Activities](#)
- Basic & easy to read
- Simple interaction to raise interest
  - Q & A



## Provide Downloadable Curricula



- Teachers have access to the web
- Teachers may want to use partially web-based or nonweb-based materials
- Provide free, high quality materials
- [Educational Resources](#)



## Organizational Tool for a “Webbed,” Integrated Curriculum

- Year-long
- Completely integrated across all subjects
- Student pages
- Teacher pages



## Fun, Highly Interactive Activities



- Uses more “advanced” web programming
  - Flash, Shockwave, Databases, Java
- Advantages
  - Kids (& adults) love it
  - Effective teaching tool
- Disadvantages
  - Requires more skilled personnel
  - Requires “plugins”
  - Requires higher memory & speed



## Examples

- CHH - Environmental Tobacco Smoke & Lung Development
- Air and Health Activities
  - A Recipe for Ozone
  - Lung Attack
  - CO City
- Teachers guides &/or accompanying student worksheets

III.3 K-12 Outreach Technologies, University of Texas M.D.  
Anderson Cancer Center COEP

Presenter: Robin Fuchs-Young



**Center for Research on  
Environmental Disease**

**Community Outreach and  
Education Program**



**A new environmental health and science  
website for kids, grades 3 - 8**

**IICOMOH  
stands for  
“I’m in charge of my own health”**

[www.Veggie-mon.org](http://www.Veggie-mon.org)

## **The Plan**

**I. Early Concepts:**

- **Friendly website for kids  
disease prevention  
diet and sunlight**
- **Characters - the “Veg”**
- **Teacher involvement  
paid internships  
bring ideas**

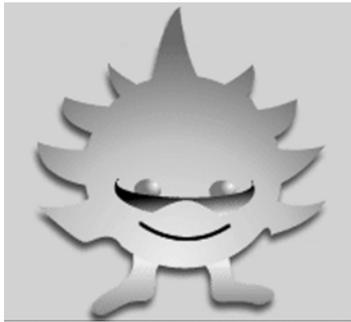
**Veggie-mon**



## II. Content

- A. Assess needs and areas of potential impact
- B. Key on Center strengths
- C. Teachers translate

Sunspot



Strawberry girl

## III. Site design

- Format - maximum flexibility
- Classroom access

**Informative Fish**

Veggie Mon Nutrition | Veggie Mon Under the Sun | The Laboratory | Ask a Scientist | Glossary

UV Did You Know? Bacteria Blues **Informative Fish**

**Major Sections:**  
Nutrition  
Under the Sun  
The Lab  
Ask a Scientist  
Glossary

**Veggie-Mon**

Hi Kids!  
I'm Veggie-Mon, your guide to the website called Ick-o-Moh. That stands for "I'm in charge of my own health".

**How to find your way in this web site.**

You can go through the different sections of this web site using this menu system. Each colored section will point to its sub-sections as they are available. Each sub-section will be the same color as its main section. Sub-sections may also expand in the same way.

Veggie Mon Nutrition | Veggie Mon Under the Sun | The Laboratory | Ask a Scientist | Glossary

Sub-section 1 | Sub-section 2 | Sub-section 3

Sub-section 2A | Sub-section 2A | Sub-section 2A

IICOMOH Home | Student Index

Veggie Mon Nutrition | Veggie Mon Under the Sun | The Laboratory | Ask a Scientist | Glossary

**Did You Know These Things About NUTRITION?**

**Oxidation Experiment**

Veggie Mon Nutrition | Veggie Mon Under the Sun | The Laboratory | Ask a Scientist | Glossary

Nutrition | Food Pyramid | Kid Cuisine

Nutrition is particularly important when the body is growing as in childhood and adolescence. The nutritional information shown below will teach you about a balanced diet that will help you be a healthier person.

**Bacteria Blues**

Home About Us Contact Us News Archives Ask a Scientist Glossary

Home News Archives Ask a Scientist Glossary

**News**

My name is Jarah A. Meador and I am a graduate student working under David L. Mitchell, Ph.D., at the UT MD Anderson Center for Research on Environmental Disease at Smithville Texas. My project involved collecting bacteria and spores from water and sea samples in Antarctica in order to measure DNA damage caused by ultraviolet (UV) light. The two kinds of bacteria that are most harmful are called *Escherichia coli* and *Staphylococcus aureus*. I thought that it was important to study this damage because all living organisms have DNA and can be injured by UVB or UVA. We were also interested in how these organisms repaired themselves after being damaged.

The reason that we chose Antarctica for our samples is because of the ozone hole over the Antarctic. The ozone layer allows UVA to pass through it while blocking most of the UVB from reaching the earth's surface. Since there is a thinning in the ozone layer over the Antarctic, more UVB reaches the earth's surface there than anywhere else in the world.

**Dr. David Mitchell and graduate student Jarah Meador study UV induced DNA damage in microbes in Antarctica**

## II. Content

- Base content on Center research and contributions from Center members
- Teachers help communicate



## Adventure, Animals and Cool Toys

**Journey to Antarctica**

I began my journey by boarding a jet and flying to Punta Arenas, Chile, on October 6, 1999. Chile is a country on the west coast of South America. Next, I took a 240 foot research ship named the Laurence M. Gould to a research station on the coast of Antarctica called Palmer Station. This ship is used by the National Science Foundation to conduct scientific research at sea and to take people to the different research stations in Antarctica.

The boat trip took seven days. I was worried about getting seasick, but luckily the seas were calm. The rooms on the ship were small and each person had a roommate. I spent most of my time reading. The rest of the time I watched movies or talked with other scientists. We were served three meals a day and the food was really good!

Return to Map Continue Trip

**Wildlife**

Several types of whales, seals, penguins, and other sea birds lived near the station. All of these animals are adapted to life in the frigid conditions of the Antarctic. As you look at the pictures of these animals, try to identify some of these adaptations.

While I was there I saw Mink whales, Crab-eating seals, and Leopard seals. On the peninsula next to the station there was a family of Elephant seals with one male, several females, and many young seals called pups.

The penguins that I saw there were the Adelle, Gentoo, and Chinstrap penguins. The Adelle penguins had a large coolbox that we could visit with the Zodiacs.

Some of the birds that I observed were the Giant Petrels, Snow Petrels, Cape Petrels, Wilson's Storm Petrels, Imperial Shags, Greater Black-backed Gulls, Arctic Terns, and Southern Skuas. The Skuas were the main predators on the penguin rookeries and would work in pairs to steal the eggs and young chicks.

On the trip from Chile to Palmer Station we also saw many birds including different types of Albatrosses.

## Involve scientists who are passionate about their work

### Why Study Fish At All?

Fish and humans are very different, right? The next question that you might ask is "so why do you study fish to learn about a human disease?" The answer to that question is that fish and humans have many things in common.

One thing that fishes and humans have in common is that they are both vertebrates. Vertebrates are animals that have a backbone. Vertebrates, such as fishes and humans, have between 35,000 and 60,000 genes. These genes hold all the genetic information for an organism.

Another thing that they have in common is that fishes and humans have similar genes. One of these similar genes is found in melanocytes. Melanocytes are cells that produce melanins, which are a group of pigments that range in color from brown to black. In some hybrid fish, like the ones we study, a particular gene pigmented mel divide more or normally do. If control in melan lead to the development of melanomas in the process occurs.

The primary source of environmental UV radiation is the sun. We are protected from much of the damaging UV radiation by the ozone layer. The ozone protects us by absorbing UVB light. Unfortunately, as the ozone becomes depleted due to pollution, a larger amount of UV radiation makes its way to the earth's surface.

With the increase of UV radiation in our environment, there has also been an increase in the cases of melanoma. We have been using hybrid fish to study how UV radiation can contribute to the formation of melanoma. The hybrid fish that we use have a high risk of developing melanoma. We expose some of them, the test fish, to certain amounts and types of UV radiation. The control fish are not subjected to UV radiation. We then compare the percentage of how many fish got melanomas in the test group to how many fish got melanomas in the control group.

The table below shows the results of one of our experiments.

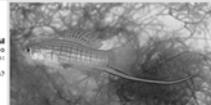
DEVELOPMENT OF MELANOMA			
Not Exposed to UVB		Exposed to UVB	
Melanomas	Total #	Melanomas	Total #
6	121	29	150
5.0%		19.3%	

The hybrid fish that were exposed to UVB showed a significant increase in melanoma development. This data tells us that exposure to UV radiation can lead to development of melanomas in the fish.

We continue our work with these little fish. These informative fish help us to answer some questions about melanoma and hopefully other cancers.



Dr. Steve Kazianis studies fish to learn about skin cancers caused by UV radiation.



Northern Swordtail from Ocampo in Northern Mexico:  
Isn't this a beautiful fish?



Southern Swordtail from Rio Sarabia in Southern Mexico:  
It's at the sword on that fellow!



Southern Swordtail from Rio Llaneta in Belize:  
This is one of my favorites!



Southern Swordtail from Rio Candelaria in Southern Mexico:  
Wow! What a gem!



Halfyfish from Rio Zamapa in Veracruz, Mexico:  
How that's a pretty little gal! Notice the blotches spot on her dorsal (top) fin.

**Drs. Steve Kazianis and Rodney Nairn study UV-induced melanoma in fish.**

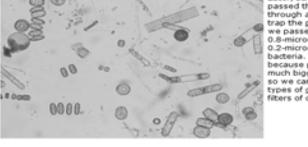
## Teach some science and prevention

### Ocean Sampling

To isolate bacteria from the ocean, we used a small rubber boat called a Zodiac to go to many sites out on the water. We used the global positioning system (GPS) to find these sites. Once we arrived at each site, we sent down containers to specific depths and collected a water sample.

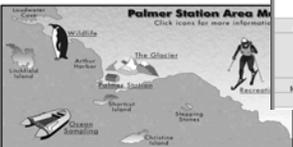


Later, back in our lab, we passed the water samples through a 0.8-micron filter from the phytoplankton. We passed the filtrate from 0.8-micron filter through a 0.2-micron filter to trap the bacteria. This system works because phytoplankton are much bigger than the bacteria so we can separate the two types of organisms by using filters of decreasing size.



### Palmer Station Area Map

Click icons for more information.



### Graph your data using a line graph.

**QUESTIONS**

1. What time of day was the sun's UV intensity the greatest?
2. What time of day was the sun's UV intensity the least?
3. At what time of day would it be safest to take a walk? Explain your answer.
4. If you took a walk at 1:00 p.m., what type of precautions would you take before going out?

**EXTENSION**

- Using the scientific method, plan and conduct your own UV experiment using the Sun Smart UV Intensity Meter.

Skin cancer is the most common form of cancer. By going "undercover" to reduce your risk, it's also the most preventable!



### UV Did You Know?

Hi! I'm Sunspot, I'm a friend of yours. I'm a friendly and trustworthy friend. I'll provide you with information about the sun and its effects on your skin.

I have learned in recent years that some of you may be more Sun Smart than others. It is important to understand how a person can take steps to protect their skin.

Information on the form of energy that travels in waves from the sun to earth is called electromagnetic radiation. The sun emits a wide range of electromagnetic radiation. Some of this radiation is in the form of visible light, which we see as the colors of the rainbow. Some of this radiation is in the form of ultraviolet (UV) radiation, which we cannot see. UV radiation is a form of electromagnetic radiation that is invisible to the human eye.

There are two main types of UV radiation: UVA and UVB. UVA radiation is the most abundant type of UV radiation. It is the type of radiation that causes tanning. UVB radiation is the type of radiation that causes sunburn. Both types of radiation can cause skin cancer.

There are several ways to protect your skin from UV radiation. You can wear protective clothing, such as long-sleeved shirts and pants. You can wear a wide-brimmed hat. You can use sunscreen. You can avoid being outdoors during the middle of the day, when the sun is highest in the sky.

It is important to remember that skin cancer is a preventable disease. By taking steps to protect your skin, you can reduce your risk of developing skin cancer.

### Want to know what a word means?

## GLOSSARY

**Antarctic Peninsula** The southernmost part of the continent of Antarctica. It is a narrow strip of land that extends from the continent to the tip of South America.

**Antarctic Peninsula** The southernmost part of the continent of Antarctica. It is a narrow strip of land that extends from the continent to the tip of South America.

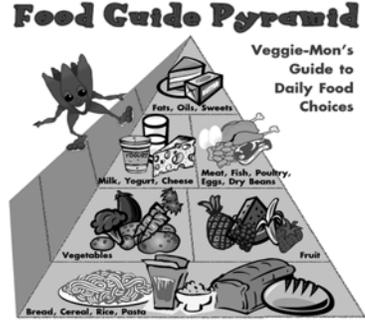
**Antarctic Peninsula** The southernmost part of the continent of Antarctica. It is a narrow strip of land that extends from the continent to the tip of South America.

**Antarctic Peninsula** The southernmost part of the continent of Antarctica. It is a narrow strip of land that extends from the continent to the tip of South America.

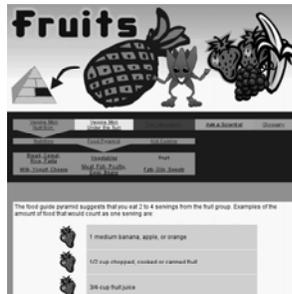
**Antarctic Peninsula** The southernmost part of the continent of Antarctica. It is a narrow strip of land that extends from the continent to the tip of South America.

## Diet and Nutrition Information, Recipes





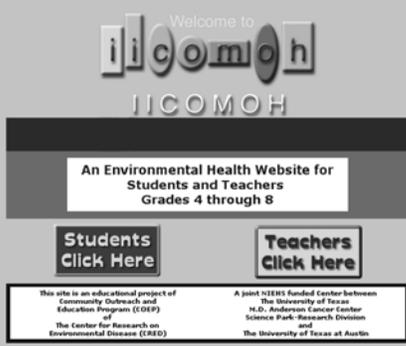
**Diet is a major contributor to cancer risk and important intervention target**



### III. Site Design and Development

**Always storyboard,  
Always content poor**





**Design colorful,  
flexible (easy to add to)  
and  
easy to pilot around**

Enthusiastic, organized  
 and talented people  
 Seth Peebles  
 Sherry Scott  
 Marsha Jenkins  
 Teachers



**VEGGIE MON Nutrition**  
 Decisions, decisions. They're all calling my name!!

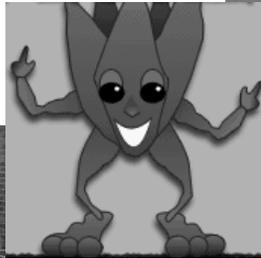
Items needed for experiment:  
 Apple, Lemon, Knife

Instructions:  
 1. Make two shallow apple slices by cutting vertically along the axis of the stem. Look at the picture below to see what your apple cut should look like.  
 2. Put the apple slices peel side down on your paper plates or bowl sections, so they look like two small hubcaps.  
 3. Squeeze a generous portion of the lemon juice onto only one of the apple slices. Leave the slices for an hour.

Don Cook's apple oxidation experiment

## Impact

Numbers:  
 Check "hits" monthly  
 1842 since Dec. 2000  
 Increasing ~ 200/month

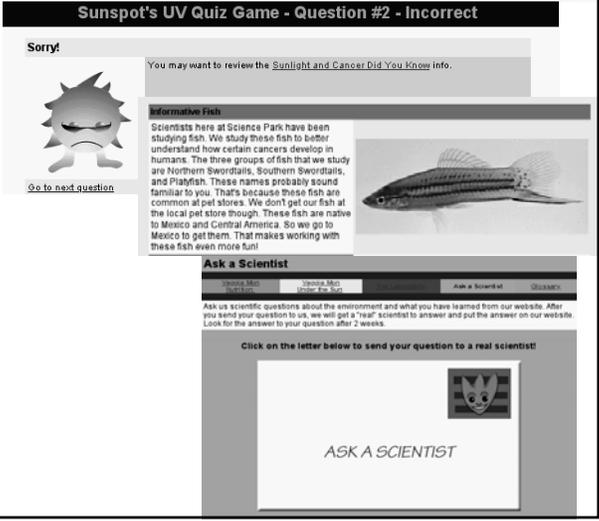
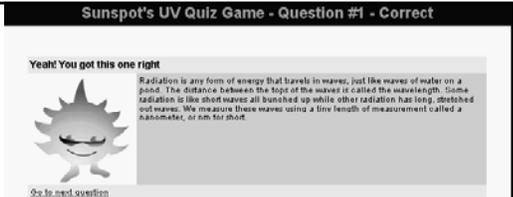


**Spreading the word:**  
 In-service programs  
 Fliers, cards  
 Letters to regional service ctrs.  
 EHE Quarterly

**Kids Interviewed:**  
**Liked the site**  
**Would tell their friends**  
**Want Action**  
**Want to “do stuff”**

**Older kids migrated to experiments and expedition**

**Younger ones to food and characters**



**Veggie-mon goes International!**

## Euroskin and WHO Campaign against skin cancer in children

**Primary cause - sun and  
 UV**

Hi! I'm Sunspot. I'm a friend of Veggie Mon and Strawberry Girl. I'll guide you through this portion of the website about the sun and its effects on your skin.

**Under Cover - UV Experiment**

In order to conduct the experiment, you will need a Sun Smart UV SENSITIVE filter. Teachers may order Sun Smart cards for their classes by calling the Public Education Office at the Anderson Cancer Center at 713-792-3363.

**Before you start:**

- Apply SUNSCREEN with appropriate SPF factor about 30 minutes before going outdoors.
- Wear a hat or other protective clothing.
- Remember to stay in the shade as much as possible.

**ACTIVITY PROCEDURE:**

- Use your Sun Smart UV Sensitive Meter to check the sun's UV intensity at 9:00 a.m. It is important that you only expose the card for 30 seconds.
- Record your data in the table.
- Check for sun UV intensity at 11:00 a.m., 1:00 p.m., and 3:00 p.m. Record your data.

Time of day	UV Intensity

What Would You Like to Explore?

- I want to read about sunlight & cancer and I want to play Sunspot's quiz
- Find out about Antarctica! in Bacteria Blues
- Informative Fish

## Coming:

**New sections on Tobacco  
 avoidance - featuring  
 "Igna Ray Mouse"**

**More experiments,  
 games and puzzles in  
 each section**

**Classroom evaluation - Sabra  
 Spaw**

**Veggie-mon en Espanol y  
 Deutch**

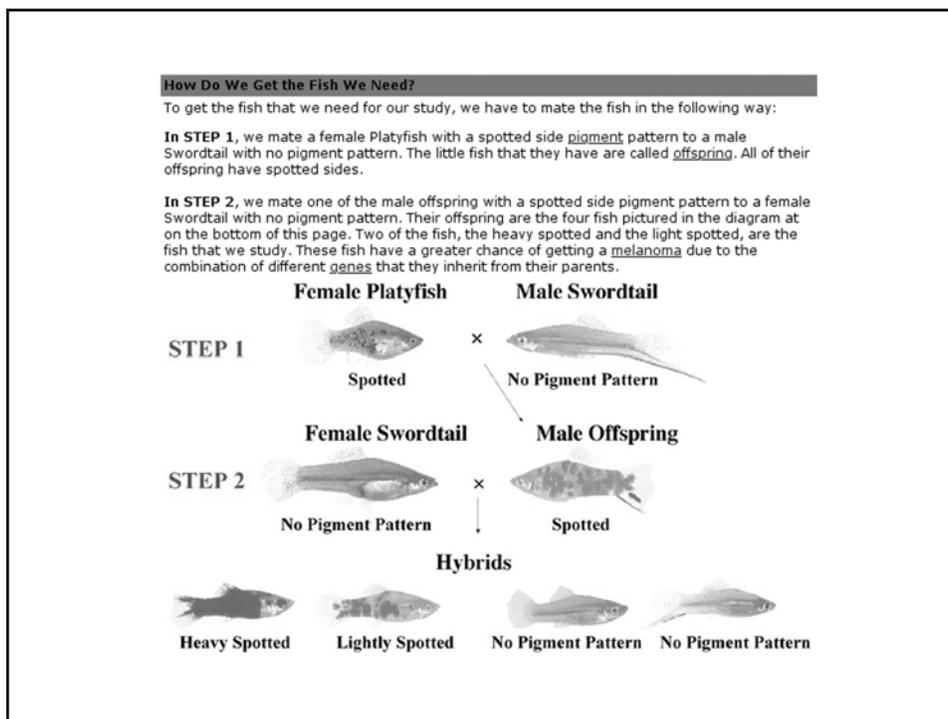
  

**The Laboratory**

Welcome to Veggie Mon's Laboratory

Kids - be sure to visit the laboratory again - we'll be adding new experiments.

click on the experiment you would like to see



### III.4 K-12 Outreach Technologies, University of Washington COEP

Presenter: Jon Sharpe

## Educational Technology in K-12 Outreach



Jon Sharpe  
Center for Ecogenetics &  
Environmental Health  
Email: [jsharpe@u.washington.edu](mailto:jsharpe@u.washington.edu)

## Presentation Goals

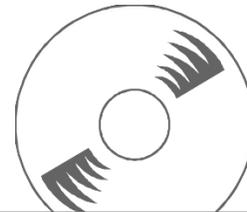
- Present three CEEH K-12 outreach projects that are enhanced by technology
- Compare and contrast strengths and challenges of the various media
- Provide a matrix comparing the media



Community Outreach & Education Program

## Case 1: CD-ROM

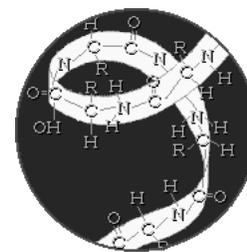
- *Essentials of Cell Biology: Toxicology in Action*
- Development funded by SEPA grant (94-97)



Community Outreach & Education Program

## CD-ROM: Development

- PHASE 1: Beta version was “a textbook with animations” - state of the art for its time
- Cell Biology used as a “hook” for science teachers
- Toxic Connections introduced toxicology concepts



Community Outreach & Education Program

## CD-ROM: Development

- PHASE 2: Second edition adds more interactive shell and introduces Professor Chen, toxicologist
- Much of the new content is recycled from other curriculum projects



Community Outreach & Education Program

## CD-ROM: Dissemination

- SEPA grant funds 1000 CDs of 1st edition
- Partnership with SOT Toxicology Education Foundation (TEF) funds 2nd edition remastering, packaging and printing of 2000 copies
- CD is currently distributed at teacher conferences and through advertisement in *American Biology Teacher* (NABT).



Community Outreach & Education Program

## CD-ROM: Evaluation

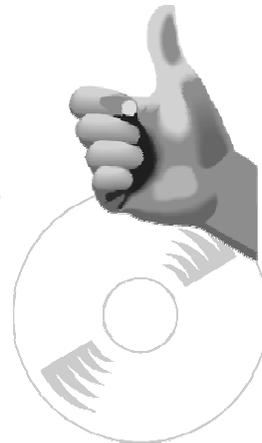
- Each recipient is asked to complete a one page evaluation (return reply envelope provided)
- Distribution list is being compiled and recipients will be sent a reminder to complete the evaluation, possibly with additional incentives



Community Outreach & Education Program

## CD-ROM: Strengths

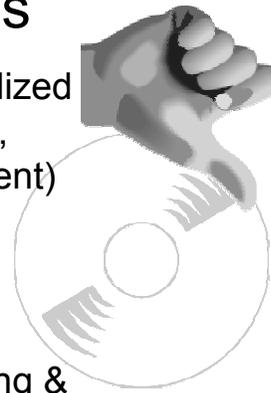
- Tangible product: attractive giveaway at conferences, etc.
- No Internet connectivity necessary to run the program
- High level of control over use and distribution



Community Outreach & Education Program

## CD-ROM: Challenges

- Development requires specialized skills (programming, graphics, multimedia project management)
- Fixed medium
- No real-time interactive possibilities
- High cost of printing, packaging & mailing



Community Outreach & Education Program

## Case 2: Web Curriculum

- *Project Greenskate*
- Partially supported by SEPA grant (96-00) and UW Superfund Basic Research Program (SBRP)



Community Outreach & Education Program

## Web Site: Development

- Created as an adventure game - students seek out “key documents” to understand a fictional hazardous waste scenario
- Program asks students to gather information, then interpret it off-line
- Content shared with 2nd edition of CD-ROM



---

Community Outreach & Education Program

## Web Site: Dissemination

- Site first published in 1999
- Database keeps demographic information about users
- Site is promoted at teacher conferences, in program newsletter and through web links on other sites



---

Community Outreach & Education Program

## Web Site: Evaluation

- Site has been evaluated in focus groups and with teachers during workshops
- Evaluation has been mostly formative, (i.e. it has helped improve the site)
- User tracking through the database provides an opportunity for follow-up with users through email, etc.



Community Outreach & Education Program

## Web Site: Strengths

- Instant availability once the site goes live
- Higher level of interactivity - users can easily connect to developers in real time and can jump to other sites
- Content can be continuously updated
- Users can be tracked and queried



Community Outreach & Education Program

## Web Site: Challenges

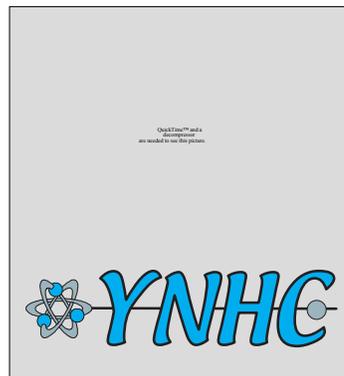
- Intangible product - tough to compete with the many other sites out there
- Depends on reliable connectivity in classroom and a robust server
- Low level of control over use and distribution



Community Outreach & Education Program

## Case 3: Videoconferencing

- *Youth Network for Healthy Communities*
- Funded by Center COEP supplement (00-01)



Community Outreach & Education Program

## VC: Development

- Project began as part of the CEEH town meeting, *Voices for Health Environments, Healthy Communities* (9/00)
- Partnership with 2 high school teachers
- Uses new statewide K20 network
- Materials include a *Teacher's Guide* and taped orientation session



Community Outreach & Education Program

## VC: Dissemination

- Teachers are recruited through word of mouth and at regional teacher conferences
- Teachers attend a one hour orientation videoconference
- After five weeks of classroom work, students present a community-based EH research project via videoconference



Community Outreach & Education Program

## VC: Dissemination

YNHC  
Participating  
sites  
Fall 2000  
through  
Fall 2001



Community Outreach & Education Program

## VC: Dissemination

Student research topics in 2000-01 included:

- Health hazards from diesel power generator emissions
- Health impacts of a proposed Gold Mine
- Heavy metals in the Coeur d'Alene watershed
- Safety of reclaimed water
- Human health effects of wildfires
- Migrant farmworkers at risk from pesticides
- Water quality in Lake Osoyoos



Community Outreach & Education Program

## VC: Evaluation

- Overall project rating: Teachers = 4.2, Students = 3.8 (5 = outstanding)
- Teachers liked the use of new technology, the community connection, and the interaction between schools.
- “I found that it helped bring our class together. It made us be creative and insightful. We learned a lot about our town.” - *student*



Community Outreach & Education Program

## VC: Strengths

- Minimal development time - orientation content and teacher materials only.
- Excellent “presence” and interactivity - especially for rural schools
- Students are active, not passive users of technology
- Easily involves CEEH experts



Community Outreach & Education Program

## VC: Challenges

- Hook-ups can be unstable, technology is still new
- Steep learning curve for staff
- Teachers and students don't take full advantage of CEEH resources
- Researchers are somewhat hesitant to participate



Community Outreach & Education Program

	Ease of development	Max # students reached	Interactivity/ Presence	User enthusiasm
CD-ROM	<b>LO</b>	<b>MED</b>	<b>MED</b>	<b>LO</b>
Web-based	<b>LO</b>	<b>HI</b>	<b>MED</b>	<b>MED</b>
Video conference	<b>MED</b>	<b>LO</b>	<b>HI</b>	<b>HI</b>



Community Outreach & Education Program

### III.5 K-12 Outreach Technologies, University of Wisconsin at Madison COEP

Presenter: Kevin Niemi

# Selected Web Resources in EHS

Kevin Niemi, Ph.D.  
UW-Madison, EHS Center for  
Developmental and Molecular  
Toxicology

1

## Center research topics

- Developmental biology
- Model organisms
- Genomics
- Bioinformatics
- Stem Cell research

10/24/01



2

# Microarray Technology

Davidson University

<http://www.bio.davidson.edu/courses/genomics/chip/chip.html>

10/24/01



3

# Molecules

Visualization of molecular structures

<http://molvent.com>

10/24/01



4

## Campus class visit activities

- Day-long visit of local Madison area high school and Tribal school group of 11th and 12th graders
- 50 students total, split group into two
- Dr. Ralph Albrecht, Advanced Microscopy FSC leader

10/24/01



5

## Biotechnology Center activities

- DNA discussion (10 minutes)
- Computer lab activities (see PP handout, 90 minutes)
- Walking tour of building (e.g, sequencing lab, 20 minutes)

10/24/01



6

Questions?

10/24/01

UNIVERSITY OF WISCONSIN

EHS Center

7