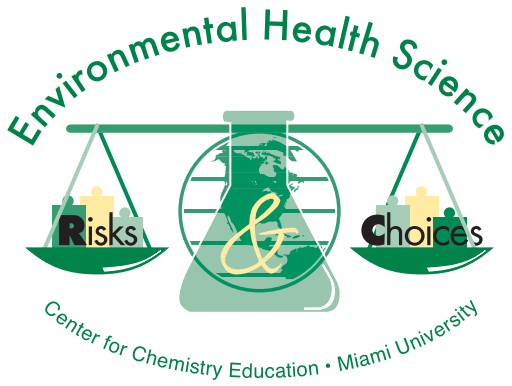
“When you capture a teacher, you capture a generation.”



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Risks & Choices: Teaching Environmental Health Science

- Miami University's Center for Chemistry Education and the University of Cincinnati Medical Center's Institute of Environmental Health
- Funded by the National Institute of Environmental Health Sciences
- NIEHS grant #1 R25 ES08192-01
- 1996–2001

Risks & Choices
Teacher Enhancement Grant

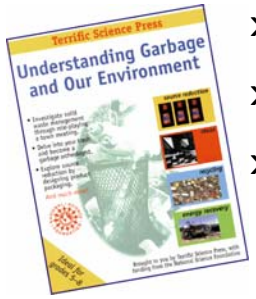
- Goal: to provide teachers with basic scientific knowledge and critical thinking skills necessary to teach students how to make informed personal and social choices regarding the effects on human health of exposure to physical and chemical agents

Risks & Choices Results

- > 525 middle and high school teachers
  - immersed in the theory and practice of EHS issues
  - empowered to engage their students in EHS lessons
    - » ~ 35,000 students reached
- Assessment results documented
  - participants' improved science teaching
  - participants' increased enthusiasm for science teaching
  - increased number of active-learning EHS lessons they would use in their classrooms
- Participants moved away from the common misconception-based attitudes about EHS issues they had brought with them and moved toward the more informed attitudes held by EHS professionals.

Risks & Choices Results

- Development of standards-based instructional materials to support teacher professional development
  - 23 R&C lessons, including student materials for classroom use and instructor notes
  - 5 themed staff development units
    - » Hands-On Use of the Scientific Method
    - » Environmental Toxins
    - » How Safe Is My Water?
    - » Risk Perception
    - » Understanding Garbage and Our Environment



FREE!

Research-Based Professional Development Protocol

- Based on 20 years of study
- > 15,000 classroom teachers
- "Recommendations for Offering Successful Professional Development Programs for Teachers," *Journal of Chemical Education,* 2001, *78* (6), 820–823.
- Award-winning model
  - Chemical Manufacturers Association "Recommended Model Program"
  - National Science Foundation's Project Kaleidoscope "Program That Works"
  - U.S. Department of Education "State Model Program"

CCE Professional Development Protocol

- Program Administration
  - We don't do things *for* teachers but rather *with* them.
- Vision of the Classroom
  - Students are actively engaged in discovering the fun and excitement of doing and learning science.
  - Teachers are empowered to "break down the artificial barriers of subjects as individual units locked into specific time frames."
  - Parents and other family members are involved in students' science education.
  - "Learning is something students do, not something that is done to them."

CCE Professional Development Protocol

- Engaging Teachers
  - Engage teachers in active learning.
  - No single instructional strategy best meets the needs of all.
  - Facilitate integration of both methodologies and materials into the teacher's own teaching repertoire.
  - Participants develop their own lessons based on course materials, use these lessons in their classrooms, refine them, and present them at follow-up.
  - Results in statistically significant decreases in barriers to doing interactive science as well as increases in the use of teaching strategies that support such interactive methods.

CCE Professional Development Protocol

- Mentor Team Approach
  - partnering scientist (researcher, government or industrial scientist, or engineer), college educator, and a K–12 teacher
  - provide a breadth of perspective and experience
  - help teachers bring local relevance to their institution
  - offer cutting-edge knowledge and access to up-to-date equipment
  - “Our scientists and staff have also learned a considerable amount about concerns of teachers; a bonus which we had not considered previously.”
    - » P. McCann, Director of Scientific Administration and the Scientific & Academic Liaison for Merrell Dow Research Institute

CCE Professional Development Protocol

- Continued Follow-Up and Sustained Impact
  - A longevity study showed lasting improvements even after three years.
  - Path of leadership development.
  - insert graphic

CCE Professional Development Protocol

- Continuous Evaluation
  - Documentation to funding agencies provides a means of quality control.
  - Even if you hire an external evaluator, everything from getting the information to maintaining the quality of the program is your responsibility; therefore, you must be proactive.

CCE Professional Development Protocol

- Curriculum Development
  - "Participation in curriculum development, implementation, and evaluation is in itself a rich professional-development experience for teachers." (NRC)
  - Provides an opportunity for participants to integrate program materials into their own teaching environment.
  - Reinforces the nature of science.

CCE Professional Development Protocol

- Outreach
  - Provide teachers with the expectation and mechanism to multiply the impact many times over through outreach.
  - Require advance commitment by district administrators.
  - Typically, district inservices.

Continuous Quality Control Materials Development Protocol

- 10 years of research
- Protocol stages:
  - Framing
  - Alpha Stage
  - Beta Stage
  - Pilot Stage
  - Field Stage

Moving into the Informal Educators Arena

- HealthRICH: Health Risks, Information, and Choices Project (SEPA grant #1 R25 RR16301-01A1)
- The goal of the HealthRICH project is to build an education partnership that will improve the understanding of environmental health sciences (EHS) by young teens and their families through informal education events, and to help them make informed personal choices to reduce environmental health risks.

HealthRICH Materials and Programming

- Essential to the public's understanding of human health:
  - What is the relationship between environmental toxins and human health?
  - What interactions exist between one's genetics and susceptibility to environmentally induced diseases?
  - How can one recognize and evaluate real and perceived risks?
  - How can individuals gain experience in applying scientific evidence?

HealthRICH Project Aims

- Develop EHS-based informal education materials for young teens and family programming.
- Provide EHS-based training programs and supporting materials for museum center educators, youth organization leaders, and others interested in informal education.
- Conduct young teen and family HealthRICH informal education events.
- Document and evaluate the impact of the partnership and its activities.