

SCIENCE EDUCATION FOR NEW CIVIC ENGAGEMENTS AND RESPONSIBILITIES

SENCER

SENCER
Summer Institute 2005

Poster Session

Poster Abstracts
&
Presenter Information

Santa Clara University
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**Santa Clara
University**



NATIONAL CENTER FOR
SCIENCE & CIVIC ENGAGEMENT
N C S C E



Welcome to the SSI 2005 Poster Session!
SENCER has always been characterized by the free exchange of work and questions related to helping students learn science. That free exchange has helped form SENCER as a community where participants are able to bring their own expertise, as well as their particular needs, to others who share similar interests and concerns.

In that spirit, our hope for the poster session has been to create a time and space where SSI participants, both poster presenters and others, can share work and exchange ideas. To help encourage this exchange, each of the poster abstracts contains both contact information and a photo of the poster presenter. We hope that this will encourage all of you to continue these conversations throughout SSI and after you return to your home institutions.

Matt Fisher and Barbara Krumhardt
SSI 2005 Poster Session Coordinators

AIDS/HIV in Georgia: Several Steps Away from Death

Presenters: Nino Eristavi, Ia Zhvania, Irina Andronikashvili
Georgian Medical State University, Activities of Teaching and Learning
Center

The SENCER Program Teaching and Learning Center was created in Georgian Medical State University (MSU) in September 2004. American partner's university on SENCER program is Harrisburg University of Science and Technology. MSU teachers involved in SENCER Program developed two courses: *AIDS/HIV in Georgia* (offered since October 2004) and *Several Steps Away from Death* which includes the topics of pharmaco-terrorism, smoking, nutrition, learning, and stress (will be offered beginning October 2005.) In May 2005 the Teaching and Learning Center hosted two American students from Iowa State University for three weeks. Students did research in several different departments of MSU, as well as with other medical and scientific organizations. An American professor from our partner university visited MSU in May 2005. Preliminary lines of future partnership in education and joint research were designed at that time. Since April 2005, MSU Teaching and Learning Center has developed its activities at the high school college of MSU and branch institutes in the regions of Georgia. MSU TLC has regular meetings with professors, teachers, students, interns and young physicians who have interest in the SENCER Program. One of the goals of MSU TLC is the development of SENCER philosophy in Georgian medical and medicobiological institutions.

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The Air Toxics Under the Big Sky Model: Bridging a Research University with 2-Year Campuses, Tribal Colleges and High Schools for Environmental Public Health Tracking

Presenters: Tony Ward, David Jones, Earle Adams, Diana Vanek, Garon Smith and Lois Muir
State of Montana Schools

The University of Montana (UM) has initiated an education/research consortium with community colleges, tribal colleges and public school systems in western Montana to pursue environmental public health tracking. Specifically, we are searching for links between air quality, asthma and cardiovascular disease. We wish to coalesce, in a more formal manner, the University's expertise in air quality monitoring and environmental toxicology with the spatial distribution of sampling locations and the technical personnel available in community colleges, tribal colleges and high schools. In the end, we hope to infuse important environmental public health issues into the campus curriculum and orchestrate a variety of SENCER course intersections (the Vassar model) to draw in broader campus participation. In addition, we want to sow the seeds of the SENCER ideals, philosophy and pedagogic approaches at the campuses of our non-UM partners.

This poster highlights the nascent program we wish to grow to maturity with the aid of SENCER infrastructure development. Existing research partners are: three Missoula-area high schools (Big Sky High School, Hellgate High School and Sentinel High School), the Salish Kootenai Tribal College (60 miles north in Pablo, MT), Corvallis High School (40 miles south) and the Libby public school system (160 miles northwest). (Libby is particularly appropriate since it the only small mountain community in the Western US that has been designated by EPA as a "PM-2.5 nonattainment" area under the 1997 changes to the Clean Air Act. It is also the community that has been plagued by lung disease and cancer promoted by the W.R. Grace vermiculite mines.) Personnel from many health departments in participating counties are also on board.

The first season of our efforts culminated in a daylong research conference on the collaborative research project. Over 80 participating high school students participated on May 20th in a research symposium held on the campus at The University of Montana. Each group presented a poster and PowerPoint slideshow to an audience of scientists from the participating agencies and institutions.

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Biology 100 Course

Student Assessments to Improve Learning Outcomes

Presenters: Julie Low, Patricia Esplin, Gary M. Booth
Brigham Young University

Biology 100 is a General Education class designed for non-major freshmen. The class consists of 120 students who live and study as a community of learners. This means that they live in the same dormitories, take the same classes, and engage their professors in out-of-class experiences. We have found that a pre-assessment exam, weekly surveys of study habits, daily quizzes, pair-share learning, service learning, reflection papers, peer mentors, and teaching assistants have all enhanced learning outcomes for our students. Overall, these strategies have kept our students engaged in the learning process since day one of the class. The students clearly have seen the relevance of biology because of the service learning and reflection paper activities. Indeed, several of the students became majors in some area of biological science and some came back the following year to serve as undergraduate teaching assistants. The daily quizzes are always graded by the students on the same day they take them. Hence, there is a remarkable dialogue of understanding that occurs during this discussion. The weekly surveys are critical in helping the peer mentors and teaching assistants flag those students who are struggling early in the course. While we are still improving the course each semester, our Biology 100 Freshmen Academy class is quickly becoming a very popular and rewarding experience for our students.



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Connecting Biochemistry to Public Health

Presenter: Matt Fisher
Saint Vincent College

During the 2005-2006 academic year, my work as a Carnegie Scholar will focus on how students understand possible connections between scientific concepts learned in undergraduate biochemistry, broader public policy issues, and their own values. What other perspectives outside of biochemistry (encompassing both naming and salient characteristics) can students purposefully identify as important to a particular public health issue? Is there a change in what students identify as important over the course of a semester and can I observe it?

Both semesters of my upper level biochemistry course for science majors will be modified in the following way:

- 1) Fundamental biochemical concepts will be illustrated through examples that are clearly linked to issues such as HIV, malaria, tuberculosis, and malnutrition; examples will be incorporated in a case-directed manner.
- 2) At two points during the semester students will read material from sources such as UNAIDS, WHO, Roll Back Malaria, The Lancet, the British Medical Journal, and authors such as Paul Farmer. These readings will serve as the basis for both individual reflection and class discussion.
- 3) Students will work in small groups on a project that will involve the analysis of a public health issue from multiple perspectives (biochemical, policy, others).

In addition to providing more information about the course modifications, the evidence of student learning and understanding that I plan to collect will be described.

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Energy and the Environment: A Focused General Education Physical Science Course

Presenters: Martha Riherd Weller and Judith Iriarte-Gross
Middle Tennessee State University

Historically, the goal of science courses for the non-scientist has been to teach students fundamental concepts of the discipline and ensure that students are able to apply these concepts to a set of “do-able” problems and laboratory activities, neither of which necessarily has significant relevance to the students’ everyday lives. The rationale for this approach to science instruction is that it allows the student to learn how scientists think and how science is done. Ironically, these courses often do neither: The excitement of science comes from asking and answering questions that have not been asked before, not solving problems in a textbook and getting the answer in the back of the book. Real scientific experimentation typically involves lengthy planning and numerous failed or partially successful experiments, not a two-hour experiment that works the first time if you are able to understand and follow the cook-book instructions in a lab manual.

An alternative approach to science instruction for non-science majors is to emphasize the contact between the student’s everyday life and the activities of scientists and to help students understand how to evaluate the numerous scientific claims presented to them by the media. Our kitchen cabinet is filled with chemistry and our houses are built with the laws of physics. We are bombarded by claims of detrimental health effects caused by everything from atmospheric pollution to cell phone usage and presidential elections may be won or lost over the public understanding and interpretation of issues such as global warming. By teaching scientific concepts to students in a context that they view as relevant, we increase the likelihood that students carry the science we teach outside of the classroom.



Based on this alternative approach to science instruction, we are developing a new general studies physical science course with a focus on energy and the environment covering the chemistry and physics of such topics as global warming, fuel combustion, and solar energy. In classroom discussions, students debate the merits of all sides of such issues as energy conservation and carbon dioxide emissions reduction. After a two-week introduction to lab safety and basic measurement and graphical analysis techniques, the laboratory activities continue the focus through experiments such as water analysis, building a model solar home and investigating its properties, measuring the energy content of foods and fuels, and investigating the ability of various products to reduce the penetration of UV radiation. Student interest in these activities is enhanced by their frequent use of samples that they supply from their own homes. Preliminary surveys indicate a positive student response to this course.

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Enhancing Scientific Literacy Through Civic Engagement

Presenters: Jan Thompson, Barbara Krumhardt, Jim Pease, Sarah Franklin, Tom Isenhardt, Steve Jungst, Lita Rule, and Jean Goodwin
Iowa State University

Specific debate cases (related to human health and biology in agricultural landscapes, and wildlife health and management) are being structured to encourage students to do research, study results, discuss information, and reach their own personal conclusions about controversial environmental issues, and to identify pathways of entry into the public discourse on these issues.

The case of Chronic Wasting Disease in Deer will be used as an example to detail the content and structure of an accessible web site with case materials appropriate for use in courses ranging from speech and communication sciences to natural resource management sciences.

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Environmental Forum:
A SENCER Course
Developed for the
Colleges of the Fenway
Environmental Science Program



Presenter: Ellen F. Faszewski
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With the help of our experience at last year's SENCER Summer Workshop (SSI 2004), Colleges of the Fenway (COF) faculty have developed a unique course entitled *Environmental Forum*. This course serves as the cornerstone to a joint program in environmental science for the six small private institutions that comprise the Colleges of the Fenway. More than an introductory course in environmental topics, *Forum* provides a common ground for all environmental science students at all COF institutions to meet every spring semester to learn about current environmental issues and interact with other COF students and faculty. This course also promotes networking opportunities with local, regional, and national environmental agencies. In addition, students perform service learning in the greater COF community. Offered for the first time this spring, it had great success. In its first run-through, the course covered a broad range of current topics including the arsenic crisis in Bangladesh, environmental reporting in the national press, risk perception, and sustainable energy. Guest speakers included research scientists, environmental career organizations, and science education consultants. Students also performed service-learning in the areas of environmental advocacy and environmental education. Assessment of the course by COF faculty is currently underway to refine course content and implementation.



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ESA21: Environmental Science Activities for the 21st Century

Presenters: John Pratte and Matt Laposata
Kennesaw State University

Activities for undergraduate courses in Environmental Science that integrate "wet lab" and computer-based exercises through simulations, virtual tours, and environmental calculators can enable students to quantify and analyze their personal contributions to regional and global environmental impacts, and examine ways to reduce these impacts through changes in lifestyle.

This poster will demonstrate how civic engagement, environmental introspection, and real-world issues can encourage students to adopt more sustainable lifestyles. (<http://esa21.kennesaw.edu>)

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Family Values/Family Violence

Presenters:

Kavita Bathia, Andrea De Palma, Jinbo Lu, Julie Tharp
University of Wisconsin Marshfield/Wood County

The University of Wisconsin Marshfield/Wood County will present an early stage of development poster that will describe our SENCER-related work. The course will be a learning cluster composed of four thematically linked courses all connected through the service learning project and its theme. The *Family Values/Family Violence* cluster will consist of a Statistics class, a Computer Science course, a Sociology class on Marriage and the Family, and a one-credit Freshman Seminar class in which the subjects will be integrated. Data on education level, ethnicity, profession, sex of the abuse victims and their family members and the usage of existing services will be gathered from the Personal Development Center and based on the knowledge gained within the sociology class.

Students in the Statistics class will learn related statistical methods and techniques, and apply them, as term projects, to fine tune pre- and post- test surveys designed in the sociology class in the learning cluster, evaluate the programs at the relevant local agencies and centers in Marshfield, collect, analyze and interpret further data.

Students will learn to apply these techniques to real data using a standard and popular statistical program, Microsoft Excel, in order to collect, analyze and display data, as well as policy and program recommendations for the agency.

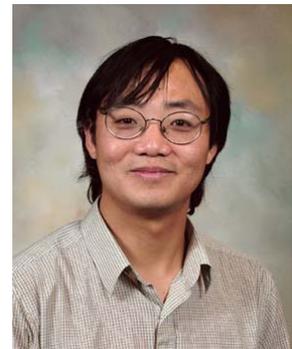


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GTU Environment & Chance of SENCER

Presenters: Lali Ghogheliani, Giorgi Chighladze, and Natia Chachua
Georgian Technical University

Lali Ghogheliani, Natia Chachua, and Giorgi Chighladze represent Georgian Technical University (GTU), where one year ago the SENCER-Ge Project was initiated under the umbrella of SENCER. Lali Ghogheliani is a facilitator of the project at GTU and Dean of the Faculty of Hydro-Engineering. Within the SENCER-Ge Project at the Georgian Technical University new and important activities were realized. The first Teaching & Learning Center in Georgia was established with Giorgi Chighladze appointed as Director. Giorgi is actively involved in establishing new courses, innovative teaching techniques, and effective assessment tools at Georgian Technical University. He would like to collaborate with American colleagues on the above mentioned issues and TLC topics in general.

In addition to the TLC, Lali Ghogheliani initiated two SENCER courses at the Georgian Technical University based on SENCER models and with the help of the model developers of CHANCE and Chemistry and the Environment. Now, she would like to invite American colleagues to collaborate in developing new courses. Lali Ghogheliani is also actively cooperating with high schools in Georgia and is interested in partnerships with American community colleges.

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Integrating SENCER Components into Science, Technology, and Society General Education Courses - A Start

Presenters: Gail E. Gasparich and Sarah Haines
Towson University

At Towson University, the Science, Technology and Society general education category is a series of courses meant to develop one or more issues of current importance to society and place them in broad scientific, technological, and societal contexts. They are designed to help students understand how to approach a problem and develop a sense of social responsibility and ethics as they pertain to science. The courses are designed to have students analyze and evaluate the advantages and disadvantages of scientific and technological decisions that have been considered by society. This category clearly meshes well with the SENCER model. Since our team visit in 2004 we have made significant progress in integrating SENCER ideals into the curriculum. Several courses in this general education requirement (including Human Genetics, Biotechnology and Society, Philosophy of Science, and Natural History Interpretation and Public Education) have been modified to model existing SENCER courses or to integrate SENCER ideas. Additionally a new course, Comparative Social Behavior of Human and Nonhuman Primates—Ethics and Issues, has been developed. The SENCER model will also serve as the cornerstone for the development of a Science, Technology and Democracy Minor, which is designed for science and liberal arts majors.

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Language in Science: Improving Learning by Engaging Students with Science Terms

Presenter: Leila Amiri
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Science That Matters is a freshman level, two semester course series for non-science majors and future educators. The course focuses on four to five areas in science which are each addressed in a three to four week module in both semesters. The modules are designed to engage students through subjects that are relevant to their daily lives. The concepts connect scientific knowledge to public decision-making and policy development with an ultimate goal of producing more scientifically literate and engaged citizens. One means of engaging students in the scientific enterprise is familiarizing them with the culture of science. The focus of this study was elucidating the difference between the common and scientific meanings of words that are used in everyday conversation. Students were provided with activities that explored the specialized use of common words in science. On average students expressed increased confidence in their ability to understand scientific text and more sensitivity to the unique language of science.



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A Math course with a Civic Engagement Component

Presenter: Brian Birgen
Wartburg College

This is a Finite Mathematics course that we teach at Wartburg in which we have incorporated some SENCER ideals while still meeting the syllabus required by our constituencies.

At Wartburg we wanted to incorporate the SENCER ideals into our finite mathematics course while still meeting the varied demands of the biology, business and information systems majors taking the course. We did this by including a series of projects which apply the mathematics to real-world problems tied to social concerns, including credit card debt and genetic diseases.

NASA's Planetary Protection Program as an Astrobiology Teaching Module

Presenter: Vera M. Kolb, Department of Chemistry
University of Wisconsin-Parkside

We are currently developing a teaching module on the NASA's Planetary Protection Program for UW-Parkside SENCER courses. These courses use the SENCER ideals of improving science education by teaching basic sciences through the complex public issues of the 21st century. The Planetary Protection Program is one such complex public issue.

Teaching astrobiology and the NASA's goals via the Planetary Protection module within the SENCER courses seems to be a good formula to reach large number of students in an interesting and innovative way. We shall describe the module that we are developing. It will be launched on our website titled "Astrobiology at Parkside" (http://oldweb.uwp.edu/academic/chemistry/kolb/organic_chemistry or go to Google and then to Vera Kolb Home Page), and thus will be available for teaching to all interested parties.



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Proposed SENCER Course for Maseno University (Kenya)

Presenter: Dr. Samuel Otieno Wagai
Maseno University

HIV/AIDS and Community

This course connects science education and the complex issues surrounding HIV/AIDS. It embodies the standards and principles of good educational practice set forth by others with a strong stake in improving science learning. Hence it combines interdisciplinary, team teaching, active learning, research, and other pedagogical innovations within higher education.

Course Objectives

- Improve knowledge of HIV/AIDS, science and social issues
- Strengthen science education through civic engagement

Reduce effects of HIV/AIDS epidemic.

Topics covered include: Impact of HIV/AIDS in society; historical background; National and International HIV/AIDS impact; types of virus; virus replication; the cell; T-cells; the AIDS virus (HIV) and its strains and relatives; HIV epidemiology; human sexuality and reproductive biology; HIV transmission and modes of infection; immunology and immunosystem; high risk people; factors enhancing HIV/AIDS spread; sexually transmitted infections; homosexuality; heterosexuality and HIV/AIDS spread; handling people living with HIV/AIDS, cultural practices and HIV/AIDS spread; National and International initiatives to combat HIV/AIDS; impact on agriculture and other sectors of the economy; opportunistic infections of people living with HIV/AIDS; the needs of the infected and affected (AIDS orphans etc.). Elements of Information Technology will be incorporated.

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Scientific Innovations and Their Economic Impact

Presenter: Maria Curtin and Hossein Kazemi
Stonehill College

Non-science majors investigate the impact of innovation on society. Whether directly involved in making decisions about new technologies or just voting as citizens on issues involving science and technology, students need to live with the repercussions of their choices.

This learning community involves a cluster of three courses: Chemistry, introducing basic scientific principles with an environmental emphasis; Microeconomics, introducing basic economics principles; and an integrative seminar bringing together the concepts learned from both. As part of the integrative seminar students work in teams on a project of their choice dealing with a technology and the effect of bringing it to the market.

The science background and economic issues for their project must be researched in detail including any externalities associated with the introduction of the innovation along with its anticipated and surprise costs and benefits. This learning community focuses on SENCER ideals/teaching and challenges students to investigate issues in more depth. SALG results will be discussed.

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SENCER at the Tbilisi State University: Results and Innovation

Presenters: Butsiko Chkhartishvili, Nana Japaridze, and
Revaz Solomonias
Tbilisi State University

To address the need for more environmentally literate citizens, the SENCER Teaching and Learning Center at the Tbilisi State University did the following work during first year of SENCER program (2004-2005):

- adapted and developed new course *Ecology and Health*
- prepared new text-book for students
- introduced SENCER course into the list of optional subjects at the University. 125 students have been attended to the course (faculties of Medicine, Biology, Economics and Business)
- used results of written exams, students' presentations, and interactive interviews for assessment.

In order to involve young people in “new civic engagements and responsibilities” as early as possible, TSU team undertook some innovative activities:

- Introduced the SENCER program into Tbilisi Secondary School #53 and Rustavi 1st Gymnasium (in 10th, 11th grades), medical high school “AIETI”; promoted development of text-book “Ecology and Health” for school children.

For next year (2005-2006) three new subjects will be developed:

1. “Global Ecological Disasters and Georgia”
2. “Socio-Economic Environment and Human Behavior”
3. “The Coming Energy Crisis and Then What...Apocalypses or Sustainable Development”.

Next year new assessment and evaluation forms will be used.



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SENCER Courses in the Loras College General Education Curriculum

Presenter: David Speckhard
Loras College

All Loras College students have a common experience consisting of foundational courses (Mathematical Modeling, College Writing, Public Speaking, and Modes of Inquiry), mission courses (Catholic Tradition and Democracy & Global Diversity), and five advanced courses.

One of the required advanced course categories is titled *Humanity in the Physical Universe* (HPU). Many of the HPU classes have a SENCER focus including: *Nutrition, Global Warming, Water and Energy, Conservation Biology, Issues in Environmental Biology, and Human Genetics*. All HPU classes employ the active learning pedagogy, emphasize writing to learn, and require students to design and complete an original research project. Each HPU class uses information from its specific topic to illustrate the scientific inquiry process, and requires students to apply the process to questions of their own.

Some HPU classes are clustered with another advanced class. This allows students to explore more fully the interdisciplinary nature of information. Science classes are paired with courses from philosophy, sociology, social work, or art.

The poster will illustrate some of the features of HPU classes *Nutrition and Global Warming* as well as the *Issues in Environmental Biology/ Environment and Society Cluster*. Assessment of the research project required in all HPU classes is being initiated. Model assessment instruments will be described.

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SENCER Courses in the Natural Sciences: Works in Progress

Presenters: Matthew J. Maurer and Stephanie
Morgan Winterrowd
University of Virginia's College at Wise



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The University of Virginia's College at Wise has developed two courses for non-majors as a result of our participation in SSI 2004. They will be offered during the 2005-2006 academic year.

The first course, *A Citizen's Guide to the Environment*, is an introduction to the process of science, including how science works, its limitations, and how science and society influence each other. Focusing primarily on the principles of biology and chemistry, the course attempts to foster a sense of personal responsibility for the environment based on an awareness of environmental issues, including their causes and social, economic, and geo-political implications. Laboratory activities will be primarily inquiry-based and include projects designed to elicit civic responsibility in students.

The second course, *Science, Medicine, & Society*, is an introduction to human health, including how science and society influence each other on health-related issues. Using the principles of biology and chemistry, students will explore current health-related topics to understand the science involved, as well as discuss the individual and societal implications of these issues. The laboratory activities for this course will be primarily inquiry-based, and include projects focused on student civic engagement with health-related issues.



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SENCERizing General Education

Presenters: Juli Eflin, Gail Bader, John Emert, David LeBlanc, David Perkins
Ball State University

Ball State University is embarking on a new program of general education, or what we call the University Core Curriculum. Our new program will integrate general education requirements throughout the undergraduate experience and will emphasize interdisciplinary study. In our new mission and goals statement we emphasize that the University Core Curriculum will enable students to learn how to use their newly gained content knowledge to make sound judgments for acting wisely in the world.

Our presentation will include the structure of our new core curriculum as well as the new mission and goals statement, including sub-goals from which measurable learning objectives will be formulated. Sample learning objectives for some science course will be given. In addition, we will have graphic representations of 1) the agents of change needed to embed SENCER ideals into the core of the university and 2) shifting the assessment paradigm. Finally, we will have a tetrahedron to illustrate the recursive nature of learning where action is both a result and a beginning.



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Teaching Genetics, Evolution, Neurobiology and Sociobiology through Explorations of Complex Problems in Education, Economics, Sociology and Societal Values

Presenters: S. Randolph May and Gale H. Starich
Brenau University

A course entitled *Scientific Analyses as Vehicles for Understanding Unsolved Public Issues* has been designed to involve junior classmen Honors Program students in an assessment of the impact on our society of the revolutionary new data being accumulated about the brain and its function. Several topics currently in public focus offer opportunities to teach not only basic science and its application to these issues, but also to rehabilitate science as a critical thinking framework for problem solving in the minds of non-science majors.

The course will be grounded in the nature-nurture discussion, but with a modern approach. Evolutionary psychology has documented hundreds of behaviors that cross cultural lines and thus may be genetic universals, and now the genetic and neuronal underpinnings of such behaviors are being unraveled. The design of our course is to explore the genetic, evolutionary, and neurological bases for a number of unsolved complex issues, e.g., higher numbers of men than women in science and engineering (education), the bases of religious values (societal values), the role of labor unions in society (economics), why third-world country to which we donate food and medical supplies hate America (sociology), and why nations continue to have wars (sociology). The goal is to teach the importance of science and the scientific method for understanding society and ourselves.

Using Fun and Engaging Science Activities to Enable K-8 Teachers to Teach Science Standards

Presenters: Virginia Carson and Ruth Booth
Chapman University

Many K-8 teachers feel uncomfortable about their knowledge of science and, therefore, when pressured to emphasize basic subjects tend to give little attention to science. This has resulted in a reduction of students pursuing careers in science. We used our Life Science class to show prospective teachers ways to teach science along with reading, writing, and math. Lectures not only taught the life science concepts needed to satisfy the *Science Content Standards for California Public Schools* but included helpful web sites. An elementary teacher showed them how science journals can be used by K-8 students. Labs incorporated field trips to an arboretum and a zoo. In addition to standard life science activities, the lab included two team projects. One project studied how nutrients affected plant growth. In the other project different teams studied the air, water, soil, and biodiversity of the Prado Wetlands. The scientific method was utilized in both projects. Formal posters and oral presentations about the Prado Wetlands project were presented at the W. M. Keck Foundation Student Research Day. Pre and post assessments, including SENCER SALG, showed that the future teachers became more confident about teaching science in K-8 classrooms.

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Visualize the Mathematics of Voting

Presenter: Mariah Birgen
Wartburg College

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Recently Donald Saari has developed a new, geometric, tool called a voting triangle for investigating the mathematics behind three- and four- candidate elections. The main advantage of the voting triangle is that it simplifies the analysis of elections so that all college-level students can perform high-level analysis of the possible paradoxes that can arise out of a simple three-candidate election. The poster will introduce the voting triangles and show through examples the power and ease-of-use of this tool.

Water Quality Analysis in General Chemistry

Presenter: Joan Kunz
Augsburg College

Students in general chemistry (typically science majors) collect and analyze water samples as part of the laboratory component of the course. Students can walk from Augsburg's campus to the Mississippi River, where they collect and analyze water samples. Data collected includes temperature, pH, turbidity, total suspended solids, total dissolved solids, conductivity, hardness, dissolved oxygen, coliform bacteria, nitrate, phosphate, chloride, calcium, and ammonium ions. In the fall, the linked first year seminar group (a portion of the general chemistry class) worked with the Seward neighborhood group painting notices on storm sewers. The students collected water quality data in both fall and spring, comparing results. In addition, the students in the spring learned about elemental analysis using ICP and analyzed the water for heavy metals, including lead, mercury, calcium, and cadmium.

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Students performed all chemical tests; students did library research on water quality parameters and gave oral reports to the class on their findings. Students wrote brief papers interpreting their results and making recommendations on improving water quality in the Minneapolis-St. Paul metro area.

Wetlands, An Interdisciplinary Approach

Presenters: Pearl R. Fernandes, M.E. Bellanca, M.R. West, C.A. West, and J.F. Logue
University of South Carolina Sumter

At USC Sumter we are developing a pair of linked courses for Fall 2005 which will study wetlands from literary, biological, mathematic and economic perspectives. The objectives of the linked courses are to:

- 1) Develop a learning community composed of ENGL (English) 102 where the students will study literature pertaining to natural history and wetlands, and ENVR (Introduction to the Environment) 101 with a special focus on southeastern wetlands issues.
- 2) Make information based on quantitative analysis and mathematical modeling less intimidating for students who may have limited math and science backgrounds.
- 3) Help students develop interconnections among academic disciplines that pertain to the environment.
- 4) Develop coordinated delivery strategies for interdisciplinary learning and civic engagement.

To achieve our objectives, Literature and Southeastern Nature will be offered as a special section of ENGL 102, Composition and Literature. By reading selected short fiction, poetry, and nonfiction relating to nature and the environment, students will articulate, analyze, and compare the diversity of human interactions with, and attitudes toward, southeastern wetlands from the colonial era to the present. ENVR 101 will emphasize physical parameters used to delineate wetlands and use the biological and ecological structure and function of wetlands as a bridge to connect broader ecological issues of regional, national and global importance. The course will use case studies that involve or have connection to communities around the university as a point of departure for discussion of broader environmental issues.

The objective of the mathematics component is to include mathematics in the context of civic and environmental issues. Quantitative reasoning skills of mathematics will be introduced in a non-threatening context and will be reinforced as practical means of perceiving and solving problems.

Students will learn to critically examine information sources that employ quantitative data. By the end of the semester it is hoped that the students have developed an appreciation of wetlands and will better understand the interdependence between society and the environment, and how economic decisions made by humans can impact the environment.



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Table Displays



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Educational Reports and Resources from the National Academies

Jay Labov
National Research Council

Jay Labov will be at the SSI 2005 Poster Session as a representative from the National Research Council. At a table, he will present information from the National Academies, answer questions, and distribute materials to interested faculty members.

LookSharp

Nancy Jacobson
Ithaca College

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This is a program on media literacy primarily directed towards K-12 students. Visitors may obtain literature on the program during the poster session.