Science Education for New Civic Engagements and Responsibilities is an NSF-supported national science education reform project whose mission is to improve science education by helping to develop and strengthen efforts that teach *through complex social issues* to the basic science necessary to comprehend and intelligently act on them.
SENCER Background

• SENCER Founders
  Wm. David Burns (current PI) and Karen Kashmanian Oates
• Project started in 2001
• Currently housed at the National Center for Science and Civic Engagement
The project focuses on undergraduate courses for nonscience majors. The approach has also begun to be extended into courses within science majors. The project articulates a general philosophy of curricular change that is linked to civic engagement and public policy and is focused on assessing student learning.
SENCER Elements

SENCER Centers of Innovation (SCIs)
SENCER Summer Institutes (SSIs)

Model Courses

Backgrounders
Quarterly Newsletter
Campus Visits

Science Education and Civic Engagement: An International Journal
“The greatest value of models is their contribution to the process of originating new ideas – developing the imagination.”

(L. Pauling, 1983)
SENCER Models

Over 35 models have been selected over the past seven years including:

“Sustainability and Human Health: A Learning Community”
Donald Stearns and Kim Worthy
Wagner College

“Global Warming”
Sharon Anthony
Evergreen State College
A SENCER Model

Chemistry and the Environment exemplifies the SENCER approach through campus- and community-based projects that are required of all the students.
Sustainability and a SENCER Model

Students actively participated in civic engagement as a means of learning science and understanding more sustainable ways of living and working ...

“Local” projects inspired students to view themselves as community stakeholders and, consequently, fostered enhanced civic engagement and responsibility ... and contributed to building a more sustainable future ...
Civic Engagement and Young People

“Programs and organizations ought to address significant problems or passions in young people’s lives, and preferably in the larger community in which they live. In addition, these efforts must allow young people to provide consequential input into decision-making and to produce tangible solutions or products…”


our campus as a learning laboratory ….
Chemistry and the Environment

- a non-science majors environmental chemistry course
- 40-50 undergraduates
- research projects:
  - groups of 4-6 students
  - group project proposal
  - progress reports
  - final report
  - poster presentation
Indoor Air Quality

- Indoor Air Pollution: VOCs, aerosols, molds, radon
- Testing of air quality (Drager tubes), mold growth, radon levels
- Recommendations: particulate testing, new materials, baking of buildings, radon monitoring

Chemistry Connections:

- atomic structure
- nuclear chemistry
- organic molecules
- air quality testing
- OSHA regulations
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<td>Appropriate Handling and Disposal of Hazardous Materials</td>
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Santa Clara University

Science Education for New Civic Engagements and Responsibilities

National Center for Science & Civic Engagement

Saint Mary's College of California
A Biodiesel Laboratory Project

Biodiesel research project in lab optimizing biodiesel production feasibility for the campus used veggie oil as fuel
Sustainability and Civic Engagement

Results were disseminated on campus (poster session, newspaper, and newsletter).
www.sencer.net

Potential resources for “Cooking the Earth”
By incorporating semester long community-based projects into an introductory statistics course, Metropolitan State University aims to connect the discipline of statistics to issues of immediate concern to students and to increase appreciation of how this powerful quantitative tool can improve their ability to make informed decisions in their professional, civic, and personal lives.

http://serc.carleton.edu/sencer/stats_community/linking_science_social_issues.html
Crossing the Border: Online Drugs from Canada
Purpose: To investigate the difference in prescription drug prices between online pharmacies in the United States and Canada. A case study was performed for a 68 year old retired man from Blaine, Minnesota. The man lives on a fixed income and currently takes ten commonly prescribed medications. A simple random sample of online pharmacies from each country was selected and a comparison of the prices was done.

Mercury in Minnesota Lakes and Fish Consumption Advisories
Purpose: To investigate mercury contamination in lakes within the Twin Cities metro area. Data from the Minnesota Department of Natural Resources and the Minnesota Pollution Control Agency was analyzed and summarized in a report.

Crime Rates per Capita Related to 2 Bedroom 1 Bath Rental Properties in Minneapolis
Purpose: To investigate the relationship between apartment rental rates and crime rates in twelve communities of Minneapolis Minnesota.
Ordinary Differential Equations in Real World Situations

Victor Donnay, Professor of Mathematics, Bryn Mawr College

This course for junior and senior math majors uses mathematics, specifically the ordinary differential equations as used in mathematical modeling, to analyze and understand a variety of real-world problems. Among the civic problems explored are specific instances of population growth and over-population, over-use of natural resources leading to extinction of animal populations and the depletion of natural resources, genocide, and the spread of diseases, all taken from current events.
Quantitative Literacy Through Community-Based Group Projects

Thomas M. Zachariah, Department of Mathematics, Suzanne Larson, Department of Mathematics, Jacqueline M. Dewar, Professor of Mathematics, Loyola Marymount University, Los Angeles, California

Projects that were student designed included an analyses of the sufficiency and safety of campus parking, an investigation of college students work hours and their effect on academic work, and calculations of student loan debt and its effect on the financial future of graduates.
SCI-West

✓ SENCER Centers of Innovation (SCI)
  ✓ 6 regional centers
✓ Established in 2009 and hosted by Santa Clara University and NCSCE
✓ Themes: 1) **Sustainability** with emphases on Water and the West and **Indigenous Science** and 2) Undergraduate research
✓ **SCEWestNet** project (funded by W.M. Keck Foundation, launched in 2012)
Building a Community of Practice
Launching SCEWestNet

Goals:

• promote, support, and sustain college-level science education reform

• develop a sustainable structure to overcome obstacles of scale and cost
SCEWestNet Overview

- seven regionally localized organizational units or network nodes

- seven nodal partners will each work with **three** new institutions in their area
SENCER Hawaii

An invitation to SENCER Faculty Institute
University of Hawaii Manoa
Ballroom, 9:30 am – 6 pm
March 1, 2015

Help establish the first SENCER state: Hawaii
SCEWestNet Nodal Areas

Area A – Alaska
Area B – Washington and Oregon
Area C – California, Nevada, and Arizona
Area D – Montana, Idaho, and Wyoming
Area E – Utah, Colorado, and New Mexico

Area F – Hawaii
Area G – Texas, Kansas, Oklahoma, and Louisiana
SENCER Hawaii

Kapi’olani Community College
University Hawaii Manoa
University Hawaii Hilo
Windward Community College