

EDUCATION FOR SUSTAINABILITY
Content, Context and Process of Learning and Research

"...The kind of education we need begins with the recognition that the crisis of global ecology is first and foremost a crisis of values, ideas, perspectives, and knowledge, which makes it a crisis of education, not one in education."

—David Orr, *Earth in Mind*

Fostering a healthy, just and environmentally sustainable society will require a large shift in thinking, values and action—a change in mindset. Today's college and university students will go on to become tomorrow's business leaders, research scientists, teachers, politicians, artists and citizens. The degree to which these students are prepared to deal with impending environmental crises, as well as to make decisions for a more sustainable future, depends on the awareness, knowledge, skills and values they acquire during their college and post graduate years.

In the 2000 National Report Card, an indicator of nationwide environmental literacy developed by the National Environmental Education and Training Foundation (NEETF), **68 percent** of the general American public were shown to be environmentally illiterate. Considering the great challenges ahead, and the vision necessary to overcome them, this low level of understanding is truly of epidemic proportions.

WHAT NEEDS TO BE DONE

In order to accelerate the transition to a sustainable future, we must reach the minds of our future leaders. College and university teachers need to integrate environmental and sustainability concepts and themes into their teaching and research in order to confront this challenge. Entire curricula need to be revised so that environmental and sustainability concepts are carried through a student's entire time at the institution.

If the challenge is met, upon graduation students will be ready to embark on a journey of active citizenry. The decisions they make in their work and in their personal lives will be informed by the concepts, values and methods of analysis passed to them during their educational career.

There are a variety of successful approaches to accomplishing this task, and we have outlined only a few in this brief.

More examples can be found by visiting <http://www.secondnature.org>

PROFILES OF SUCCESS

The following three examples were chosen from Second Nature's databases to illustrate how themes of environment, justice and sustainability can be integrated across entire curricula. These projects are creative and interdisciplinary, drawing on faculty expertise from many different areas of the school.

Unity College - Lake Winnecook Water Quality Project

Unity College, a small, private liberal arts college in Unity, Maine, has developed an entire curriculum around the study of one beloved place: Lake Winnecook. The Unity community was concerned about the water quality of the lake, so the Office of Community Service on campus took the lead in creating a cross-disciplinary program that involves courses and students from all areas of the college and involves community members and organizations. Each of the courses listed below participates in the project, integrating the study and concern for the lake into course themes:

- Intro to Drama
- Biology II
- Environmental Pollution
- Freshwater Ecology
- Ichthyology
- Microbiology
- Analytical Chemistry
- Environmental Education
- Advanced Oral Communications
- Composition II
- Intro to Aerial Photography
- Geology of Environmental Problems
- Environmental History of the World
- Great Issues in World Civilization
- Instruction and Evaluation
- Land and Water Law
- Introduction to Interpretation
- Advanced Interpretation
- Fisheries Science
- North American Wildlife
- Statistics I
- Statistics II

Northern Arizona University - Ponderosa Project

A faculty coalition at NAU has developed a concerted effort to strengthen the sustainability effort on their campus, with the goal of reaching the greatest number of students possible. With help from the Second Nature partnership with the Historically Black Colleges and Universities/Minority Institutions, the Ponderosa Group developed a strategy to increase environmental understanding on their campus through the curriculum. Through strategy workshops, the faculty participants are integrating health, environmental justice, and sustainability themes into courses such as Intro to Psychology, Chicano Literature, and Intro to Ethics. Also, by providing a set of guidelines for integration of environmental themes, the Ponderosa Group participants have taken a step toward institutionalization of their principles—and toward sustainability.

Incorporating Environmental Examples into Teaching: The Chlorine Controversy

At a Second Nature workshop, representatives from the Chlorine Chemical Council and from Greenpeace debated the use of chlorine compounds in society. After a brief question and answer period, participants were given fifteen minutes to individually brainstorm how each of them could incorporate the chlorine controversy into classes that they were currently teaching. Here are some of the courses and areas of the college in which this controversy could be successfully applied:

- Personnel Administration
Tuskegee University
- Critical Reading and Writing
Northern Arizona University
- Introduction to Linguistics
Northern Arizona University
- Introduction to Sociology
Xavier University
- American Government
Clark Atlanta University
- International Relations
Clark Atlanta University
- Environmental Economics
Tuskegee University
- Materials Science
Florida International Univ.
- Enviro-toxicology I and II
Florida A&M University
- General Chemistry
Tuskegee University
- Chemical Engineering
Hampton University
- Chemical Engineering Sem.
Hampton University
- Env. Analytical Chemistry
Hampton University
- Clinical Chemistry
Xavier University
- Ecology
Howard University

TOPIC ANALYSIS: CLIMATE CHANGE

The following courses from diverse areas of study were selected from Second Nature's Courses database to show how one topic, Global Climate Change, can be integrated into different departmental areas.

Human Health and Global Environmental Change, Harvard Medical School

Instructor: Eric Chivian

Subject area: Health / Medicine

Department: Center for Health and the Global Environment

Level: Graduate

Overview: The course will provide an overview of the basic physics, chemistry, and biology of global environmental change, and of the potential consequences of these changes for human health. It will cover global climate change, stratospheric ozone depletion, the effects of toxic substance pollution on global ecosystems, the degradation of terrestrial and marine environments, and the loss of species and biodiversity. The role of rapidly growing human populations and resource consumption, and of the human domination of the earth's biological productivity, in the genesis of environmental change will be examined. Ethical and social considerations will also be covered, as will the policy implications for human health as a consequence of global environmental change.

Environmental Policy Analysis (Global Change), Tufts University

Instructor: William Moomaw

Subject area: Government

Department: Political Science

Level: Graduate

Overview: This course is designed to bridge the worlds of science and policy. Important skills of policy evaluation and policy development will be taught and practiced through two important case studies, stratospheric ozone depletion and global climate change. The important scientific principles that form the basis of concern will be taught so that students will have a clear understanding of the most complex environmental and diplomatic challenges encountered to date. The interaction between what only a few years ago was the isolated world of scientific inquiry and active policy development will be examined to gain an understanding of how they mutually influence one another.

Global Warming: An Emerging Issue for Citizens, Sonoma State University

Instructor: Peter Lydon

Subject area: Interdisciplinary

Department: School of Liberal Studies

Level: Undergraduate

Overview: A fifteen week seminar for undergraduate students, emphasizing student and group discussion of material which has been read before each meeting. Its organizing principle is to work out "How does a citizen assemble the needed elements of knowledge, formulate sensible questions, and think about a major public policy issue such as protecting the climate through an appropriate social response?" It is also useful for the class to think of itself as a public policy group, such as a committee of Congress, or of a local Sierra Club, or a county committee of a political party, confronted by the question of what to do about climate change.

COURSES INCORPORATING GREEN DESIGN ON CAMPUS

Carnegie Mellon University - Green Design Initiative

Overview: Through the Green Design Initiative, Carnegie Mellon intends to reach students at many levels: high school through graduate and lifelong learning. They have developed the Environment Across the Curriculum program that offers all Carnegie Mellon students a basic introduction to environmental issues. Undergraduate and graduate students at CMU are offered elective courses that provide a deeper understanding of scientific, engineering, economic, social, and policy issues relating to the environment. Furthermore, special opportunities exist for talented undergraduates to work with faculty and graduate students on Green Design research projects.

University Planning & Environmental Studies Course at the Univ. of Wisconsin

Overview: This undergraduate capstone experience is intended to integrate and apply the skills and knowledge acquired from previous IES courses. The ES 600 seminar for Spring 2000 centered on a "Greening the Campus" theme. The class explored opportunities to improve the environmental performance of university operations. Issue areas included: environmental health and safety, waste reduction and recycling, energy conservation, and building design for sustainability. The semester's major project was dedicated to researching and preparing a series of green design recommendations for the proposed University Health Services/Student Activity Center, which will be shared with the planners, architects and engineers designing the new building.

TOOLS

Sustainability Curriculum Framework - Second Nature, Inc.

This tool is designed to simplify the complex process of incorporating sustainability content into higher education curricula. By breaking down sustainability into its essential (but inseparable) components, the framework provides content to guide each educator's unique teaching process. Find it online at: <http://www.secondnature.org/guides/faculty_guide/faculty_writings/writings_secondnature.html>

Print Resources

Cortese, A. (2001) *Education for Sustainability*, Second Nature, Inc.: Boston.

Daily, G., et al. (2000) *The Value of Nature and the Nature of Value*, *Science* 289(5478): 395.

Eagan, D. and Keniry, J. (1998) *Green Investment, Green Return*, National Wildlife Federation: Washington, D.C., 77p.

Keniry, J. (1995) *Ecodemia*, National Wildlife Federation: Washington, D.C., 222 p.

Orr, D. (1994) *Earth in Mind*, Island Press: Washington, D.C., 213 p.

Online Contacts and Resources

- World Resources Institute-Management Institute for Environment and Business: <<http://www.wri.org>>
- University Leaders for a Sustainable Future: <<http://www.ulsf.org>>
- National Environmental Education and Training Foundation: <<http://www.neetf.org>>
- Center for Ecoliteracy: <<http://www.ecoliteracy.org>>
- Higher Education Network for Sustainability (HENSE): <<http://www.hense.org>>
- National Wildlife Federation-Campus Ecology: <<http://www.nwf.org/campus>>
- North American Association for the Greening of Education (NAAGE): <<http://www.naage.org>>
- Associated Colleges of the South-Environmental Program: <<http://www.colleges.org/~enviro/>>

Second Nature is a Boston-based national nonprofit organization working to help higher education prepare future professionals for the increasingly complex environmental and social challenges we face. We offer colleges and universities a range of programs, training sessions, one-on-one consulting and resources to make the integration of environmental sustainability thinking "second nature" to higher education.
