

New Online Resources for Teaching Introductory-Level Geoscience Courses

Carol Ormand, SERC*

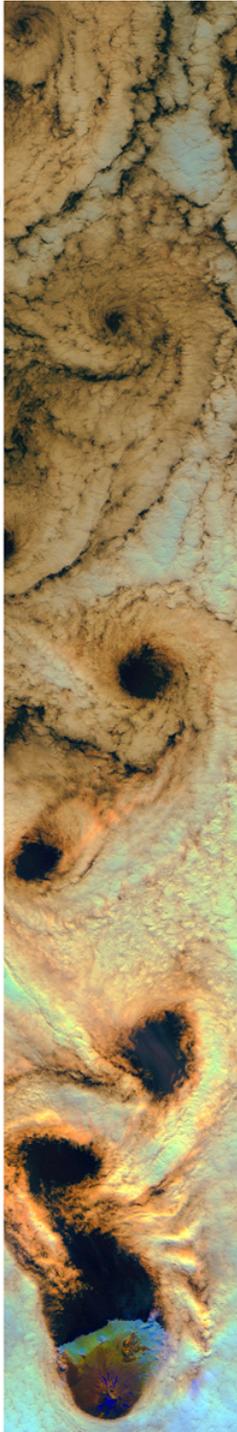
Karin Kirk, SERC*

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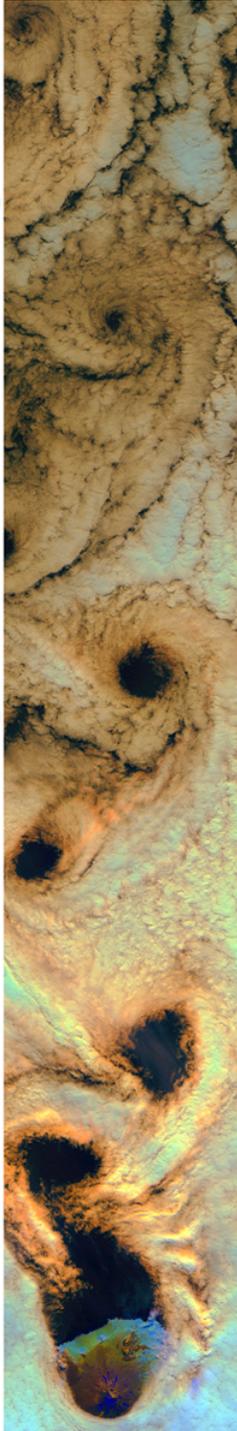


The Pivotal Role of Introductory Courses



Image from the USGS

- ❖ Recruiting future geoscientists
- ❖ Providing experiences in science for pre-service teachers
- ❖ Developing a science-literate public: future policy makers, business people, & other citizens



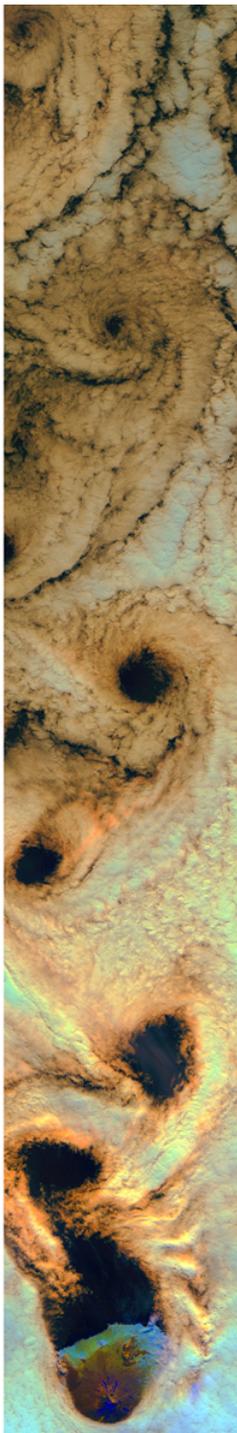
New Resource Collections

Cutting Edge: Teaching Introductory Geoscience in the 21st Century

- ❖ Course descriptions
- ❖ Teaching activities
- ❖ Workshop pages: presentations, discussion summaries, posters
- ❖ Misconception literature, “bookshelf”

Starting Point:

- ❖ The First Day of Class
- ❖ Just-in-Time Teaching (expanded)
- ❖ Experience-Based Environmental Projects



From *On the Cutting Edge* Teaching Introductory Geoscience Courses in the 21st Century

Teaching Introductory Courses

http://serc.carleton.edu/NAGTWorkshops/intro/index.html

Google

Workshops Teaching Introductory ...

On the Cutting Edge - Professional Development for Geoscience Faculty

Teaching Introductory Geoscience Courses in the 21st Century

Cutting Edge > Teaching Introductory Courses

Search Go

Cutting Edge

- Affective Domain
...click to see 15 more...
- Hydrogeology
- Introductory Courses**
- Workshop 08
- Browse Courses
- Browse Activities
- Browse Misconception Literature
- Submit Your Course
- Share Classroom Activities
- Leadership
- Metacognition
- Mineralogy
- Ocean System
- Online Games
- Petrology
- Public Policy
- Rates and Time
- Sedimentary Geology
- Structural Geology
- Student Learning: Observing and

Do you recall your first geoscience course? For many geoscience teachers, it was this first taste of plate tectonics, landforms, fossils or oceanography that suddenly made us realize we had found our calling. We hope that some of today's new students who experience their first earth science courses will become inspired just like we did. Yet some students take a 100-level geology course because it seems to be the least-daunting way through their college's science requirement. Thus, faculty of introductory courses have a big job on their hands, managing a wide range of students, taking them through the basics of earth science, and hopefully imparting some inspiration along the way.



Related Links

- [Preparing for an Academic Career in the Geosciences](#)
- [Building Strong Geoscience Departments - Curriculum](#)
- [Building Strong Geoscience Departments - Student Recruitment](#)

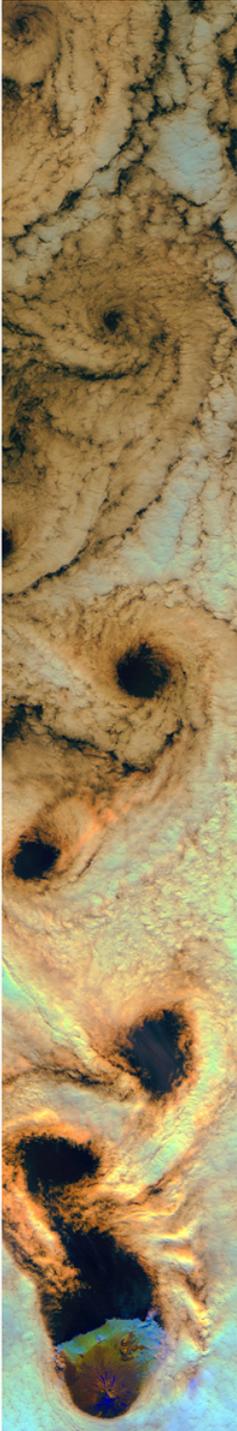
This web module is for those who teach introductory earth science courses. Here you will find ideas for designing a new course, spicing up an existing course design, or adding innovative activities or teaching methods.

This website was launched in November 2007 in anticipation of a July 2008 workshop. In the months leading up to and following this summer's workshop, a wide range of material will be added to this site.

Until then, here are a few resources to get you started.

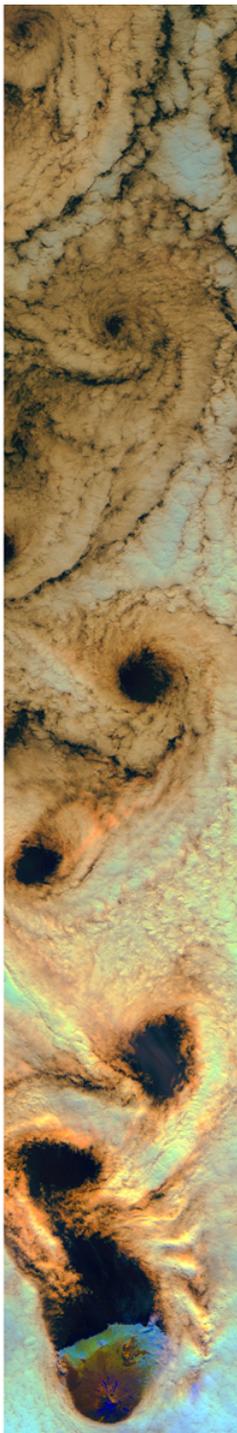
- A [collection of introductory-level geoscience courses](#), spanning a host of geoscience topics.
- The [Starting Point - Teaching Entry-Level Geoscience](#), which contains 22 modules built around pedagogic approaches for introductory courses, plus dozens of example activities.

Join us for a workshop, [Teaching Introductory Geoscience Courses in the 21st Century](#)
This workshop will be held July 14-17, 2008 on the campuses of Carleton College and St. Olaf College in Northfield, MN.



Themes Emerging from the Workshop

- ❖ Establishing learning goals is paramount to course design
 - ❖ Limit content to add depth
 - ❖ Use effective pedagogies
- ❖ Local data, case studies, or service learning add relevance
- ❖ Teach the process of science
- ❖ Address misconceptions
- ❖ Supplement the textbook



Course Descriptions

More than 200 courses

Browse Courses

http://serc.carleton.edu/NAGTWorkshops/intro/browse_courses.html

On the Cutting Edge - Professional Development for Geoscience Faculty

Teaching Introductory Geoscience Courses in the 21st Century

Cutting Edge > Introductory Courses > Browse Courses

search

Help

Results 1 - 10 of **202 matches**

Narrow the View ▾

Course Type: Entry Level

- 17 matches General/Other
- Astronomy 2 matches
- Earth Science 45 matches
- Earth System Science 32 matches
- Environmental Geology 15 matches
- Extinction/Evolution 1 match
- Geologic Hazards 7 matches
- Global Change 13 matches
- Historical Geology 11 matches
- Meteorology 1 match
- Oceanography 6 matches
- Physical Geography 12 matches
- Physical Geology 54 matches

Ready for Use

- Ready to Use 87 matches
- Course Goals Only 34 matches

Global Change - Physical Processes part of Starting Point-Teaching Entry Level Geoscience:Using an Earth System Approach:Earth System Science in a Nutshell:Example Courses
ENVI/NRE/BIOLOGY/GEOG 110 and AOSS/GEOSCI/ENSCEN 171 This is the first semester of an interdisciplinary three semester introductory course sequence that investigates the causes and potential ...
Course Type: Entry Level: Entry Level:Global Change
Ready for Use: Ready to Use

Earth History part of Starting Point-Teaching Entry Level Geoscience:Earth History Approach:Examples
This Earth history class is intended for non-geoscience majors and follows a chronological structure, starting with the Big Bang and finishing in the anthropogenic period. Abridged from the syllabus: ...
Course Type: Entry Level: Entry Level:Earth Science, Global Change
Ready for Use: Ready to Use

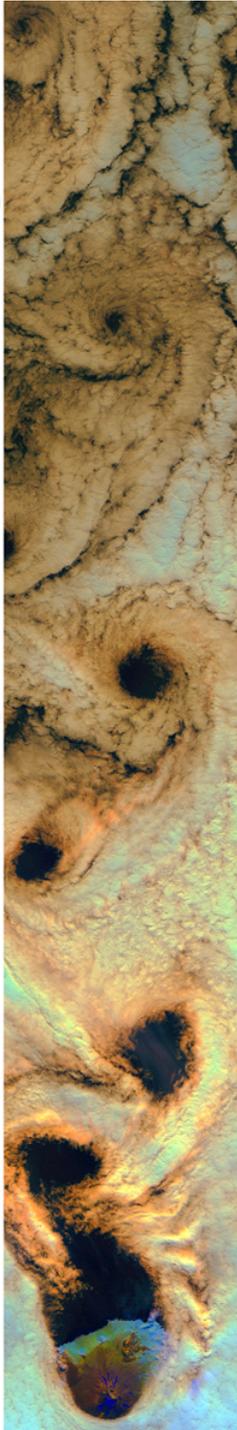
History of Geology part of Starting Point-Teaching Entry Level Geoscience:Earth History Approach:Examples
This is a history-of-geology course that includes a great deal of Earth history material. From the syllabus: The historical development of geology as a scientific discipline from ancient ...
Course Type: Entry Level: Entry Level:Earth Science
Ready for Use: Ready to Use

Global Climate Change part of Starting Point-Teaching Entry Level Geoscience:Earth History Approach:Examples
This interdisciplinary courses focuses on how and why Earth's climate has changed throughout its history and how it is likely to change in the near future. It draws from geology, chemistry, ...
Course Type: Entry Level: Entry Level, :Global Change
Ready for Use: Ready to Use

Biogeography part of Starting Point-Teaching Entry Level Geoscience:Earth History Approach:Examples
This geography course is an example of an Earth history course which stresses not only evolution, but evolutionary forces like migration, and the role they have played in shaping modern animal and ...
Course Type: Entry Level: Entry Level:Physical Geography
Ready for Use: Ready to Use

Cutting Edge

- Affective Domain ...click to see 15 more...
- Hydrogeology
- Introductory Courses
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- Share Classroom Activities
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- Online Games
- Petrology
- Public Policy
- Rates and Time
- Sedimentary Geology
- Structural Geology
- Student Learning: Observing and Assessing
- Urban Geology
- Visualization
- Web-Based



Examples

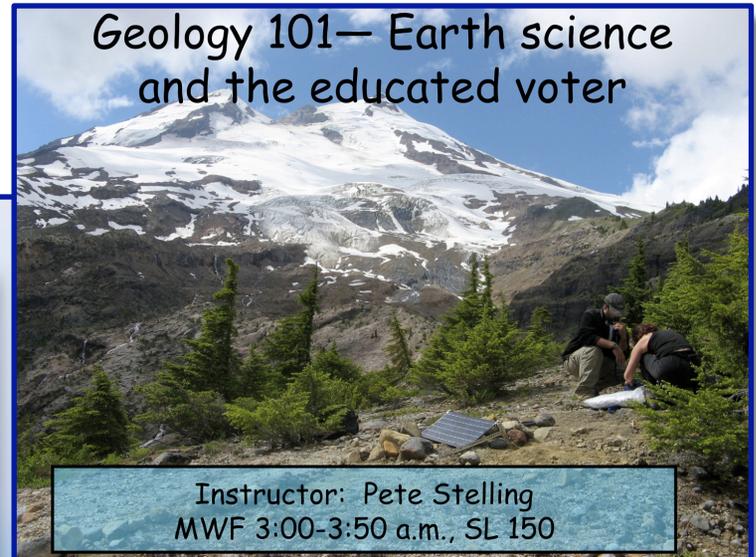
There are many different exciting approaches to teaching introductory geoscience courses

Monitoring the Florida River

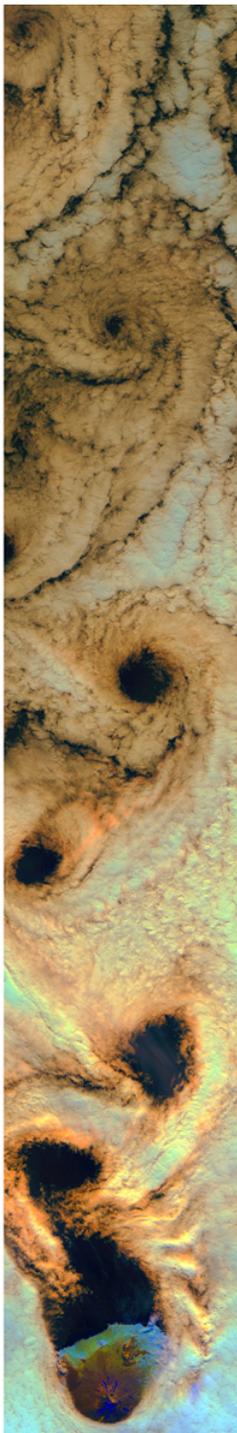


How a class research project took over the labs of Earth Systems Science

Geology 101— Earth science and the educated voter



Instructor: Pete Stelling
MWF 3:00-3:50 a.m., SL 150



Teaching Activities

More than 350 activities

Browse Activities

http://serc.carleton.edu/NAGTWorkshops/intro/browse_activities.html

On the Cutting Edge - Professional Development for Geoscience Faculty

Teaching Introductory Geoscience Courses in the 21st Century

Cutting Edge > Introductory Courses > Browse Activities

Search [Go]

Cutting Edge

- Affective Domain
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- Web-Based

Activities for Introductory Geoscience

Here you will find a wide range of activities for teaching introductory geoscience courses. you can refine your search by selecting the topic or resource type, or by typing in search terms into the search box in the box below.

Please [share your own activities](#) and we will add them to this collection.

[Help](#)

Results 1 - 10 of **367 matches**

What Should We Do About Global Warming? part of Starting Point-Teaching Entry Level Geoscience:Role Playing:Examples
This module contains an 8-lesson curriculum to study greenhouse gases and global warming using data and visualizations. The students will summarize the issue in a mock debate or a presentation. -
Earth System Topics: Atmosphere, Human Dimensions:Policy, Climate
Resource Type: Activities: Activities:Project

Weather Map Interpretation part of Starting Point-Teaching Entry Level Geoscience:Gallery Walks:Examples
Students participate in a Gallery Walk to combine weather variables and create weather forecasts based on four different weather maps.
Earth System Topics: Atmosphere:Weather, Atmosphere
Resource Type: Activities: Audio/Visual:Animations/Video, Maps, Activities:Classroom Activity:Gallery Walk, Audio/Visual:Images/Illustrations

Mock Environmental Summit part of Starting Point-Teaching Entry Level Geoscience:Role Playing:Examples
At the end of a six-week class or unit on global warming, students role-play representatives from various countries and organizations at an international summit on global warming. -
Earth System Topics: Human Dimensions:Policy, Energy, Climate, Atmosphere
Resource Type: Activities: Activities:Project

Floodplains part of Starting Point-Teaching Entry Level Geoscience:Field Labs:Field Lab Examples
In this lab, students measure a topographic and geologic cross-section across a floodplain by

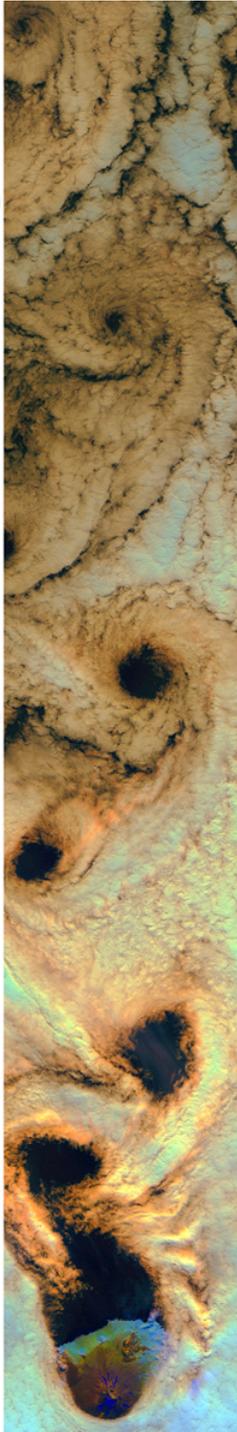
Narrow the View

Earth System Topics

- Atmosphere [71 matches](#)
- Biosphere [90 matches](#)
- Evolution [10 matches](#)
- Climate [62 matches](#)
- Surface Processes [65 matches](#)
- Human Dimensions [90 matches](#)
- Hydrology [74 matches](#)
- Oceans [41 matches](#)
- Solar System and Astronomy [22 matches](#)
- Solid Earth [134 matches](#)
- Earth's Cycles [31 matches](#)
- Time/Earth History [40 matches](#)
- Geography [36 matches](#)

Resource Type: Activities

- [32 matches](#) General/Other
- Problem Set [6 matches](#)
- Classroom Activity [163 matches](#)
- Lab Activity [147 matches](#)
- Project [72 matches](#)
- Field Activity [39 matches](#)
- Virtual Field Trip [2 matches](#)
- Writing Assignment [30 matches](#)



Examples

Many of the teaching activities are capstone projects, synthesizing course material & concepts

*"I will tell you something about stories; they aren't just entertainment. Don't be fooled. They are all we have, you see, all we have to fight off illness and death. You don't have anything if you don't have the stories."
- Leslie Marmon Silko, Laguna Tribe*

Earthquake Hazards: Case Study Analysis

Kaatje Kraft
Mesa Community College

Using Google Earth to Investigate Physical
Geography Concepts

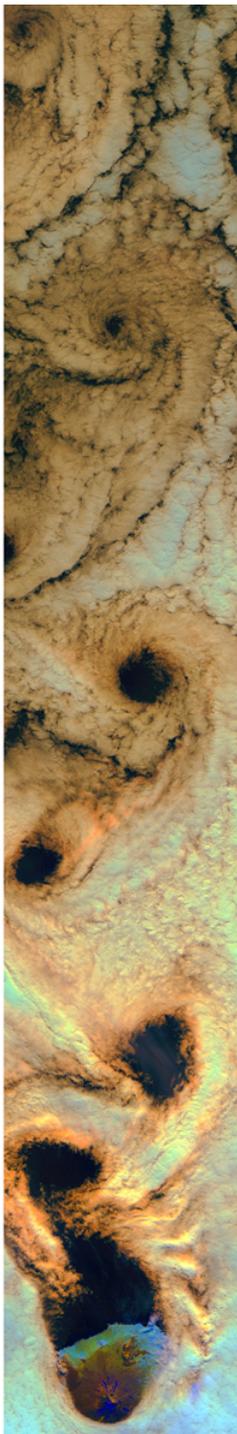
Allison Dunn
Worcester State College

Image NASA
Image © 2008 TerraMetrics

The Environmental Geology of Your Home:

A Capstone Project in an Environmental
Geology Course for Non-Majors

Michael Phillips
Geology Professor
Illinois Valley Community College
Oglesby, Illinois



Workshop website

Program: links to presentations

Teaching Critical Thinking

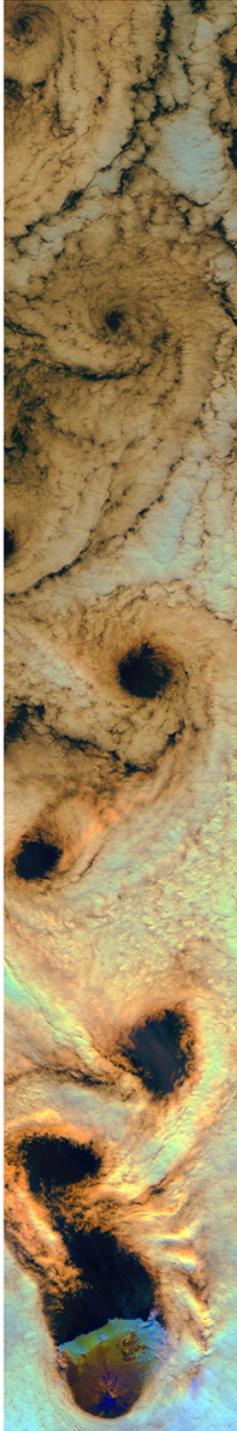
Mary M. Walczak

Associate Professor and Chair of Chemistry
Interim Director, Evaluation & Assessment
St. Olaf College

Teaching Introductory Geoscience Courses in the 21st Century • J

Wayne Powell
Brooklyn College

GEOL 613
Earth Science
and the NYC
Urban Environment



Workshop website

Workshop outcomes: summaries of discussion sessions on the impact of intro courses, teaching the process of science, and teaching large classes





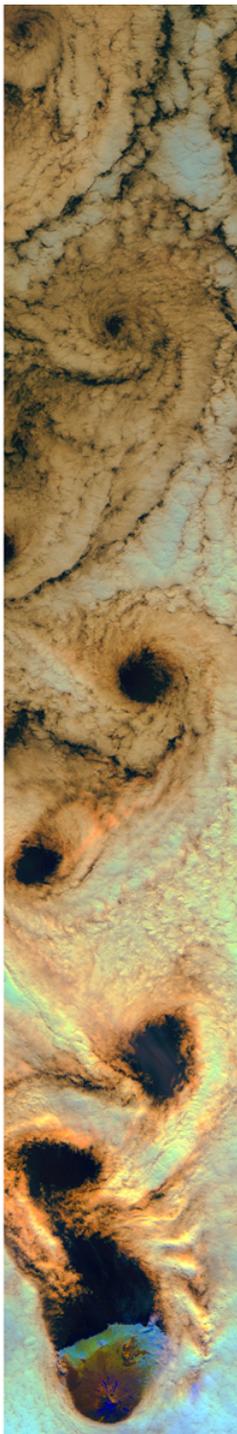
Workshop website

Poster session: downloadable poster files, with links to related courses & activities

Using Notebooks to Support Student Learning

Physical Science Department
Mesa Community College, Mesa, AZ
Kaetje Kraft

<p>Overview</p> <ul style="list-style-type: none"> How can we best prepare our introductory students to be successful in our class and future endeavors? Science notebooks have been a way to record and process data for scientists, by using them in the classroom, students can begin to transform their own understanding. Students learn best when they are able to compare their understanding to what they already know, fit the concepts they learn to a big picture, and reflect on their learning (NRC, 2005). Science notebooks in the classroom are more than just records of data and procedures, they are opportunities for metacognitive thinking, developing writing skills, and processing conceptual change (Their & Daviss, 2002; Bereiter & Scardamalia, 1987; Moon, 2006). 	<p>A Sample Approach</p> <ul style="list-style-type: none"> Step 1. Accessing prior knowledge <ul style="list-style-type: none"> Students are asked to answer the question, "what do you think of when you hear the word, 'landslide'?" Feel free to draw a sketch that illustrates landslide." Students record their thoughts in their notebooks. "I believe some landslides happen because there are too <i>(sic)</i> much building and pressure builds up causing the land to slide." -Louise" "Amy" Step 2. Defining terms in their own words through experience <ul style="list-style-type: none"> Students are exposed to materials commonly involved in mass wasting, they have the opportunity to manipulate materials. Step 3. Students read primary source material working toward a common goal <ul style="list-style-type: none"> Students work in groups Examine a case study, determine claims and evidence to present to fellow classmates. 	
<p>Student Population</p> <p>Reasons for Enrolling in Community College</p> <p>Enrollment & Demographic T</p>	<p>A Sample Approach, cont.</p> <ul style="list-style-type: none"> Step 4. Students apply their learning to a new situation <ul style="list-style-type: none"> Black Canyon City Application Exercise: A local landslide with similar conditions to those of system studied, but undeveloped. Write a letter to a friend that is asking them to invest in development in the area. Assessment applies to a new situation: <ul style="list-style-type: none"> Predict which layer would most likely cause slope failure to occur. Justify your response. Step 5. Students reflect on their learning <ul style="list-style-type: none"> Look back at your original ideas about landslides, what would you add or change about your original definition? <ul style="list-style-type: none"> Louise wrote, "I would add to my original ideas on landslides in that I would incorporate different rocks that make up a slope different layers that are present. Factors that can cause landslides, if the layers are parallel or perpendicular, slope steepness, different types of movement." Amy wrote, "I still consider landslides include falling rock, but it is not limited to it. I did not realize there were so many different types of landslides that affect us in different ways. I now know that the different types of material can influence the type of mass wasting." Reflections provide powerful formative assessment for the instructor and can guide the class direction based on original reflections. 	
<p>References & Acknowledgements</p> <ul style="list-style-type: none"> AACC (2008). American Association of Community Colleges. Statistics Page. Information obtained 7 July, 2008. http://www2.aacc.edu/colleges/colleges.htm. Bereiter, C., & Scardamalia, M. (1987). <i>The psychology of written composition</i>. Hillsdale, NJ: Erlbaum. Klentschy, M. P., & Molina-De La Torre, E. (2004). <i>Students' Science Notebooks and the Inquiry Process</i>. In E. W. Saul (Ed.), <i>Crossing Borders in Literacy and Science Instruction: Perspectives on Theory and Practice</i> (pp. 340-354). Newark, DE: Arlington, VA: International Reading Association & National Science Teachers Association (NSTA) Press. Kozerski, C. A., & Brooks, J. B. (2006). Emerging Institutional Support for Developmental Education. <i>New Directions for Community Colleges</i>, 138(Winter), 63-73. Moon, J. A. (2006). <i>Learning Journals</i> (2nd ed.). London & New York: Routledge. Mesa Community College Office of Research and Planning (2007). <i>Fast Facts</i>. 2007. 08. Information obtained 7 July 2008. http://www.mcc.maricopa.edu/about/statistics/documents/fastfacts07-08.pdf NRC (National Resource Council). (2005). <i>How Students Learn, Science in the Classroom</i>. Washington, D.C.: National Academies Press. Their, M., & Daviss, B. (2002). <i>The New Science Library: Using Language Skills to Help Students Learn Science</i>. Portsmouth, NH: Heinemann. U.S. Department of Education. (2003). <i>Community College Students: Goals, Academic Preparation, and Outcomes</i>. Document Number NCES 2003-164. Some of the work for this project resulted from work in conjunction with the Communication in Science Inquiry Project, funding from NSF DRL grant # 0353469. Printing was paid for by the Physical Science Dept. at MCC. 		



From *Starting Point*

- ❖ First Day of Class
- ❖ Just-in-Time Teaching (recently expanded)
- ❖ Experience-Based Environmental Projects

Starting Point Teaching Entry Level Geoscience

http://serc.carleton.edu/introgeo/index.html

Search the Site

Explore Teaching Examples

or browse by topic: [Atmosphere](#), [Biosphere](#), [Climate](#), [Earth surface](#), [Energy/Material cycles](#), [Human Dimensions/Resources](#), [Hydrosphere/Cryosphere](#), [Ocean](#), [Solar system](#), [Solid Earth](#), [Time/Earth History](#)

Teaching Methods Field Labs, Interactive Lectures, Teaching with Models, Peer Review and much more.

Designing a Course a variety of strategies and examples.

Teaching about the Earth System comprehensive resources and examples.

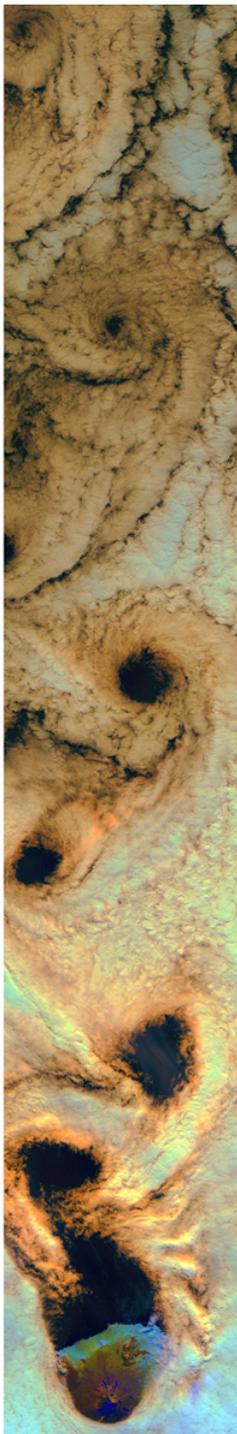
News

New Module: The First Day of Class describes a variety of ways to focus on student learning even on the first day of class, including a collection of examples of activities for the first day of geoscience classes.

New Module: Experience-Based Environmental Projects featuring the [Lifestyle Project](#). This three-week project challenges students to learn about environmental alternatives by modifying their own lifestyles.

New Module: Studio Teaching involves students working together in groups and being responsible for their own learning.

Get Started
Learn about instructional methods that work with entry-level geoscience students. This site is designed for faculty and graduate students teaching undergraduate entry-level geoscience, environmental science, or related courses. Each section describes a teaching method, why/when it is useful, how it can be implemented, and a set of examples spanning the Earth system that can be used in your class.
[Learn More About Starting Point and How to Participate](#)



From Starting Point The First Day of Class

Starting Point
Teaching Entry Level
Geoscience

Starting Point-Teaching Entry Level Geoscience > First Day of Class

Explore Teaching Examples | Provide Feedback

The First Day of Class

Compiled by Carol Ormand, [SERC](#), Carleton College

Why is the first day important?

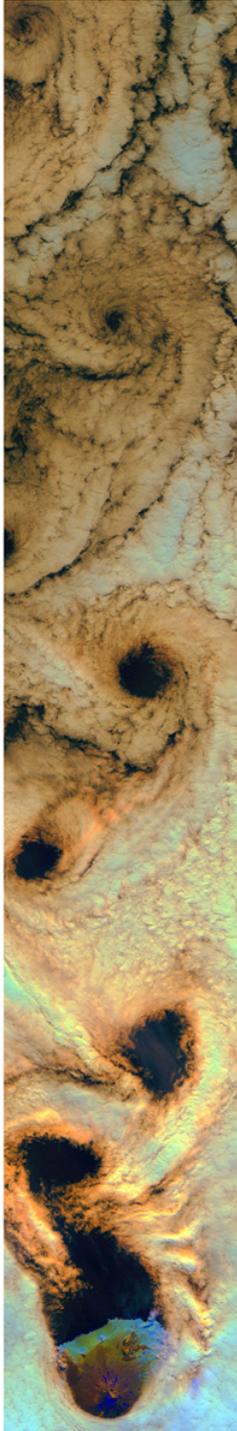
It's the first day of class, and the room is buzzing with excitement and expectation, novelty and nerves, curiosity and uncertainty. In spite of how distracted they may seem, students are paying attention. They want to find out as much as possible about the course and they are curious about the instructor - will you be fair, interesting, easy to learn from?

The first day of a geoscience course or lab sets the tone for the entire term. This is your opportunity to stimulate excitement about the course, give students a sense of classroom dynamics, and establish course expectations.

What can you do the first day?

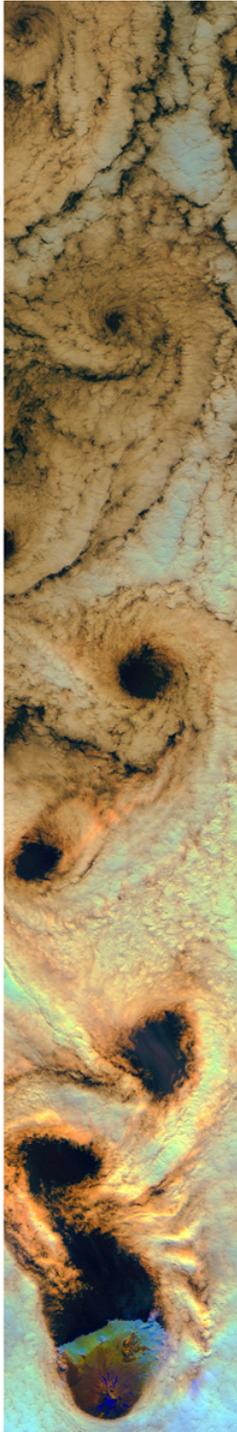
- **Engage students with the course content** in a substantive activity that *stimulates their interest* in the course and *demonstrates your expectations* for their class work. Involve the students in making observations, asking questions, testing hypotheses, solving problems - in short: doing science, even on the first day.
- **Motivate your students to want to learn more.** Make explicit connections between course content and students' lives, present information about careers in geoscience, preview "coming attractions," or stimulate their interest with a challenging task.
- **Establish a positive classroom climate.** Easing students' anxiety facilitates their learning, and it's never too soon to begin. "Icebreaker" activities can be very effective in fostering rapport and a comfortable learning environment.
- **Survey your students.** Finding out what your students want to learn in the course, surveying them about their current attitudes/beliefs toward geoscience, assessing their current knowledge (and misconceptions) about the subject matter, or having them complete a learning styles inventory can provide you with valuable information for your teaching.

Search for Examples



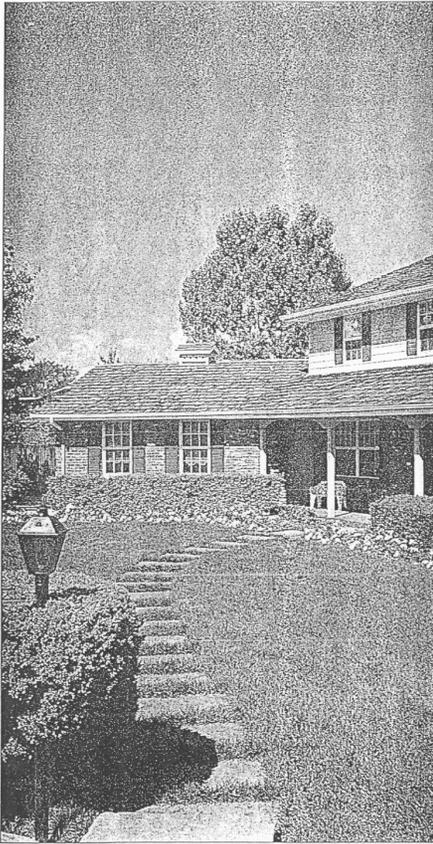
First Impressions are Lasting Impressions

- ❖ Engage with course content
 - ❖ Introduce the first topic
 - ❖ Practice geoscience skills
- ❖ Motivate student learning
 - ❖ Connect the course to students' lives
 - ❖ Challenge students to solve a problem
 - ❖ Highlight career opportunities
- ❖ Establish a positive classroom climate
- ❖ Survey your students: knowledge, attitude, learning styles...



1st Day of Class Activities

More than 50 activities



LIFE IN A 125 TON MINERAL DEPOSIT.

- Concrete 120,528 pounds,
- Concrete block 15,300 pounds,
- Brick 21,440 pounds,
- Gypsum wallboard 14,218 pounds,
- Asphalt felt 376 pounds,
- Aluminum siding 366 pounds,
- Plaster 843 pounds,
- Insulation 779 pounds,
- Copper pipe and wiring 501 pounds,
- Ceramic sinks and toilets 210 pounds,
- Sheet metal ducts 405 pounds,
- Appliances 1,010 pounds,
- Vinyl flooring 290 pounds,
- Sand, gravel and stone 54,000 pounds,
- Glazing (glass) 268 pounds,
- Other mineral products 20,000 pounds.

Add it up. Mineral products in average new home weigh at 250,000 pounds* - 86% of the total weight. That's a lot of minerals.

Mining. We depend on it.

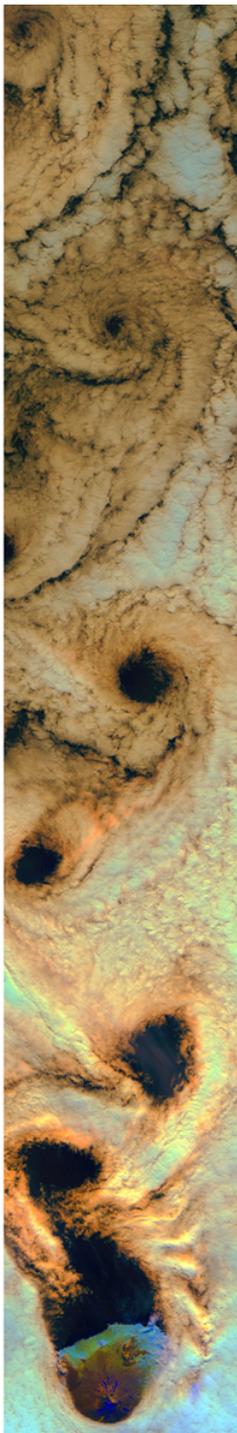
CYPRUS Minerals Company

*Total weight of all mineral products in the typical new home in 1984 = 248,547 lbs. ©2008 National Research Council



Image from Wikimedia Commons





From Starting Point Just-in-Time Teaching

Just in Time Teaching

http://serc.carleton.edu/introgeo/justime/index.html

Starting Point
Teaching Entry Level
Geoscience

Search the Site [Go]

Starting Point-Teaching Entry Level Geoscience > Just in Time Teaching

Explore Teaching Examples | Provide Feedback

Starting Point-Teaching Entry Level Geoscience

- Assessment
 - ...click to see 11 more...
- Investigative Case Based Learning
- Just in Time Teaching**
- What is Just-in-Time Teaching
- Why use Just-in-Time Teaching
- How to Use Just-in-Time Teaching
- References for Just-in-Time Teaching
- Example JITT WarmUp Exercises
- Mathematical and Statistical Models
- Models
- Peer Review
- Role Playing
- Service-Learning in Geoscience
- Socratic Questioning
- Spreadsheets Across the Curriculum
- Student Research
- Studio Teaching
- Teaching with Data
- Teaching with GIS
- Teaching with Interactive Demonstrations
- Teaching with

Just in Time Teaching

Created by Laura Guertin, Pennsylvania State University Brandywine and Carol Ormand, SERC.

"As you enter a classroom ask yourself this question: If there were no students in the room, could I do what I am planning to do? If your answer to the question is yes, don't do it." - Gen. Ruben Cubero, Dean of The Faculty, United States Air Force Academy



What is Just-in-Time Teaching (JiTT) - a combination of active learning and internet technology

Students in introductory courses read assigned material outside of class, respond to short questions online, then participate in discussion and collaborative exercises the following class period. The instructor's in-class use of student responses to questions draws the students in, engaging them with the course material both outside of and in the classroom. Read an interview with Gregor Novak, a JITT pioneer; a detailed description of the JITT cycle of learning; a geoscience example WarmUp exercise; JITT learning goals; and a list of ways you could implement JITT in your courses. [learn more here](#)

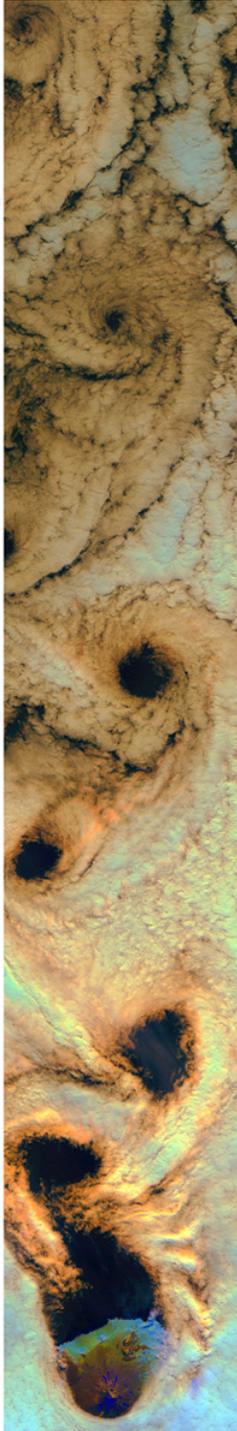
Why use Just-in-Time Teaching - students think about and work through course material outside of class

Students are engaged with course content outside of and before coming to class, leading to increased student learning and motivation to learn. The exercises also allow instructors to assess student understanding of the course material. And instructors who use JITT also say they have more interesting conversations with students about the course material, both outside of and during class. [learn more here](#)

How to use Just-in-Time Teaching - WarmUp exercises with follow-up in-class discussions

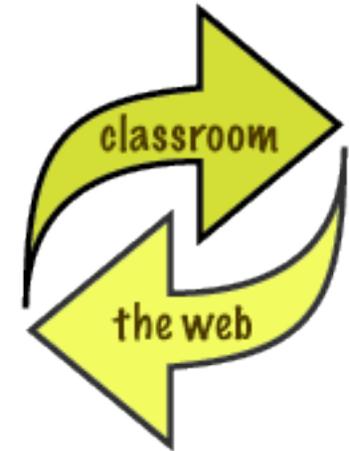
Step-by-step guidance on implementing Just-in-Time Teaching in your classroom, from choosing the technology you'll use to post questions and collect student responses to finding or writing appropriate questions to incorporating your students' responses into your class. [learn more here](#)

Examples of JiTT WarmUps for introductory courses

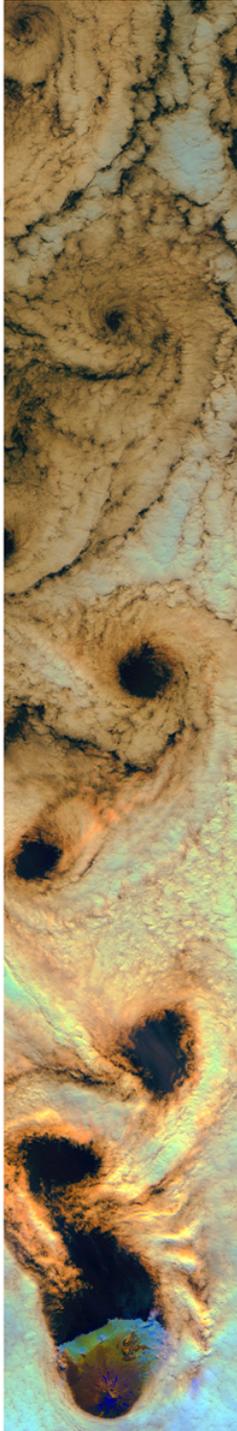


JiTT: What, Why and How, + References & Examples

WarmUps (web-based
homework questions)
are followed by



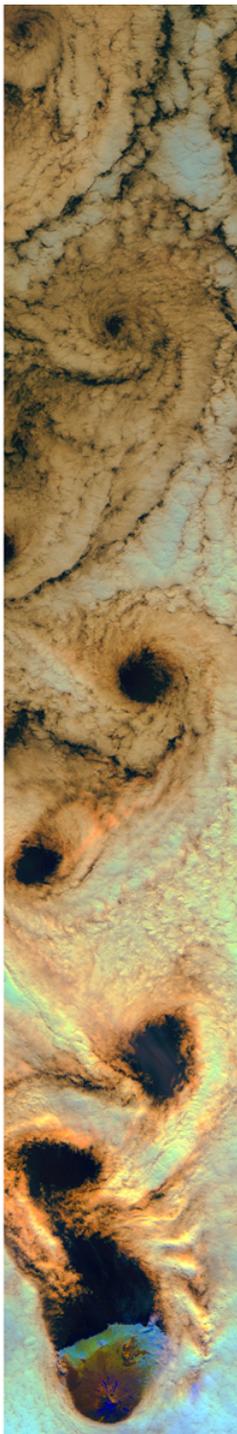
interactive
classroom
sessions
using
students'
responses



NEW: Expanded How to Use JiTT

- ❖ Logistics: technology & scheduling
- ❖ Finding and choosing WarmUp questions
- ❖ Constructing your own questions
- ❖ Reviewing student responses
- ❖ The class that follows





From Starting Point Experience-Based Environmental Projects

Experience-Based Environmental Projects

http://serc.carleton.edu/introgeo/enviroprojects/index.html

Starting Point Teaching Entry Level Geoscience

Search the Site Go

Starting Point-Teaching Entry Level Geoscience > Experience-Based Environmental Projects

Explore Teaching Examples | Provide Feedback

Starting Point-Teaching Entry Level Geoscience

- Assessment
- Campus-Based Learning
- Conceptual Models
- Experience-Based Environmental Projects**
- What is experience-based learning?
- Why use experience-based projects?
- How to use experience-based environmental projects
- Examples of experience-based environmental projects
- The Lifestyle Project
- References
- Cooperative Learning
- Earth History Approach
- Field Labs
- First Day of Class
- Gallery Walks
- Games
- Indoor Labs
- Interactive Lectures
- Investigative Case Based Learning
- Just in Time Teaching
- Mathematical and Statistical Models
- Models

Experience-Based Environmental Projects

Created by [Karin Kirk](#), Montana State University

Get your students involved in their own learning!

This module includes examples of projects, background information and teaching ideas to promote experiential environmental learning. These projects can get your students personally involved and invested, moving the learning experience from the classroom to their own lives.



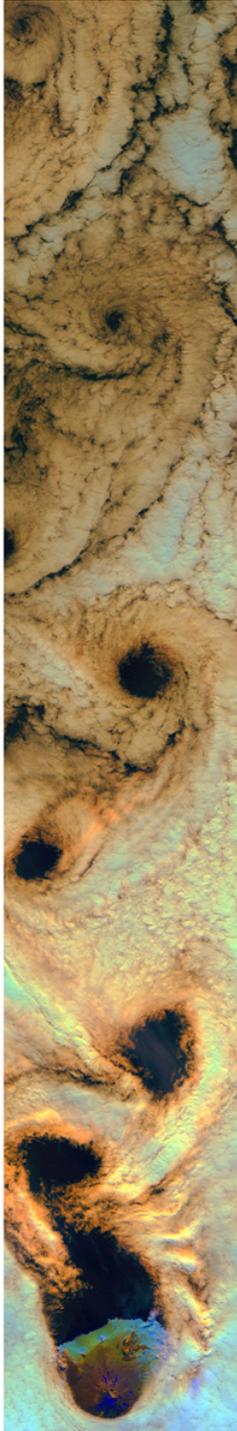
Every student has an environmental impact.

All of our decisions and actions throughout the day affect our environment. What types of transportation do you use? Is your food locally-produced or shipped from another state or country? Does a product's packaging influence your decision to buy it? Do you go through the day using energy and resources without considering the environmental impacts of each of your actions?

These questions can be explored with an experience-based approach. Experience-based environmental learning is an opportunity to learn through one's own lifestyle and actions. In a sense, each student is their own laboratory. Experience-based environmental projects offer a way for students to apply classroom topics like energy use, global warming, water quality and land use to their own lives, and to realize that although these issues may be global or regional, they ultimately have roots at the individual level.

"It seems impossible to not produce garbage for even one day. At first it didn't sound like a big deal, but after trying it for just this first day I realized just how much garbage I normally produce! It's embarrassing!"

excerpt from a Lifestyle Project journal, Skidmore College

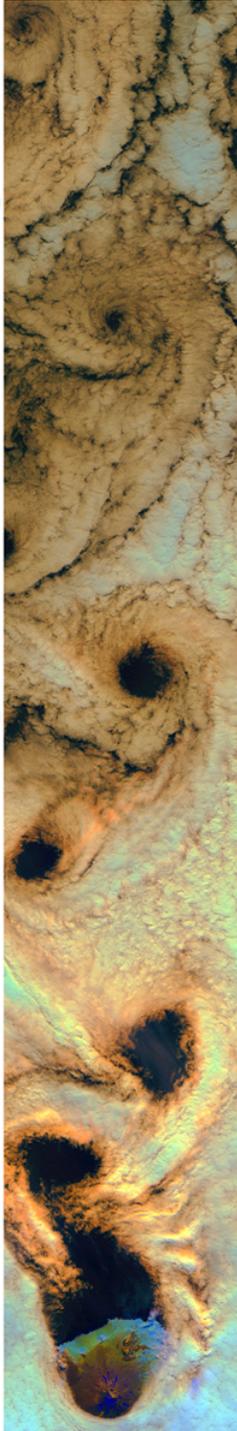


The Lifestyle Project

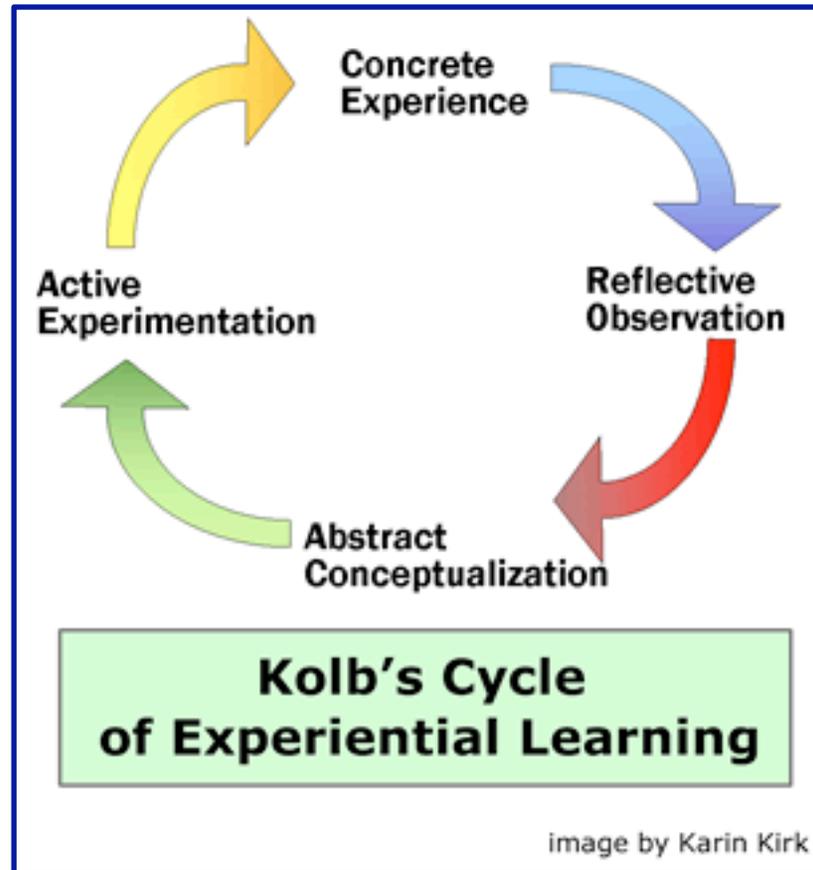
Students make changes to their lifestyle to decrease their impact on the environment:

- ❖ Turn down the heat
- ❖ Create less waste
- ❖ Conserve electricity and water
- ❖ Leave the car at home
- ❖ Eat efficiently
- ❖ Other...

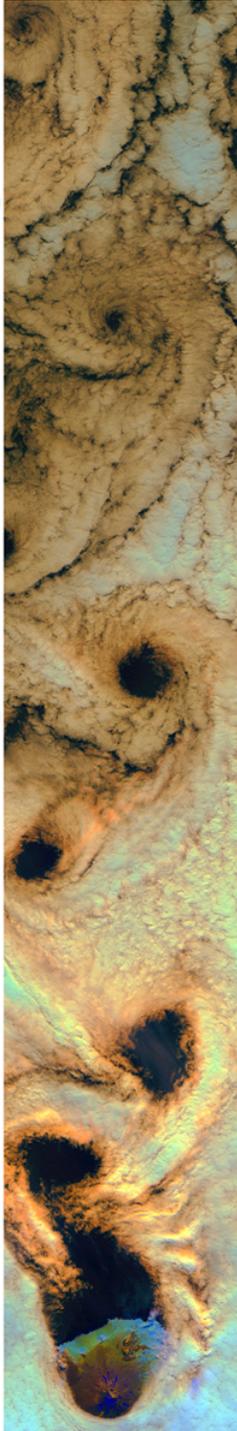




The Lifestyle Project

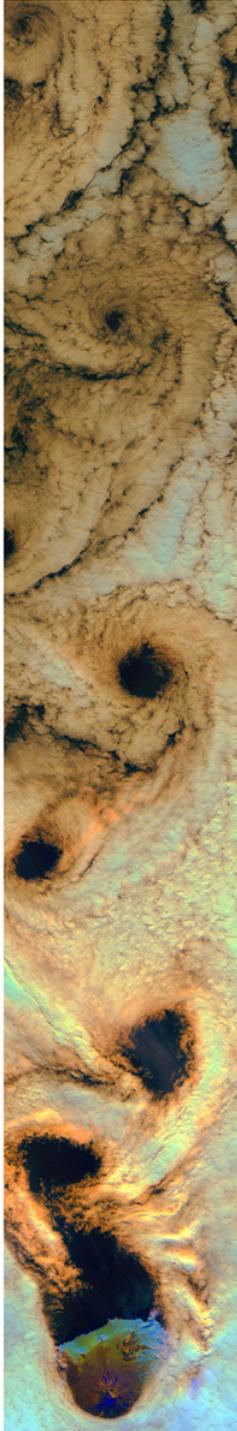


Students choose 3 categories, and are challenged to make greater changes each week for 3 weeks



For the Future

- ❖ Pre-AGU one-day workshop on Teaching Introductory Geoscience
- ❖ Pedagogic modules under development:
 - ❖ ConceptTests
 - ❖ Guided Discovery Problems
 - ❖ Jigsaws
 - ❖ Lecture Tutorials
 - ❖ Structured Academic Controversies
 - ❖ Teaching Large Classes
 - ❖ Teaching Metacognition
 - ❖ Teaching Problem-Solving Strategies
 - ❖ Teaching Urban Students
 - ❖ Teaching with Google Earth



<http://serc.carleton.edu>

On the Cutting Edge:

<http://serc.carleton.edu/NA GTWorkshops/index.html>

Teaching Introductory Geoscience Courses:

<http://serc.carleton.edu/NA GTWorkshops/intro/index.html>

Starting Point:

<http://serc.carleton.edu/introgeo/index.html>