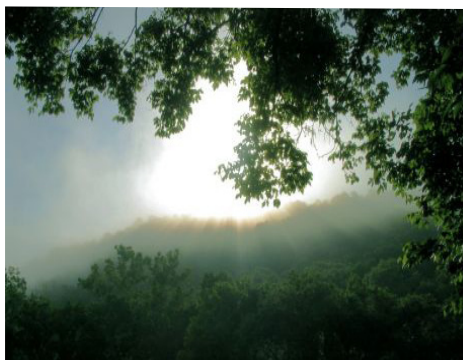


## AMSER Spotlight: ESA21

AMSER frequently teams up with other digital collections so that we can bring the excellent materials from these collections directly to AMSER users. In each issue of our *Quarterly* we highlight one of these collections, and in this issue we are highlighting the Environmental Science Activities for the 21st Century (ESA21). The ESA21 Project is "a consortium of colleges and universities whose purpose is to create environmental science activities that allow students to investigate their impact on the environment." The current consortium is made of faculty from Kennesaw State University, Bowling Green State University, Community College of Baltimore County, and the University of Southern Mississippi.

ESA21 believes that providing students with the opportunity to study impact makes learners better able to "see that they have a place in the ecosystem and are better able to understand how to reduce the harmful effect that they might have in it." To accomplish this, ESA21 has developed activities that are grouped into multi-week modules based around major topics in environmental science, designed to supplement environmental science courses with existing laboratory components. These technology-enhanced, textbook-independent, multi-week laboratory exercises examine one topic for 3-5 consecutive weeks, providing in-depth examinations of various environmental science aspects. Each module synthesizes traditional lab exercises with computer simulations of

environmental topics, online quizzes/communication, and computerized data laboratory instrumentation. The modules emphasize lifestyle examination, ethical considerations, and critical analysis of individual contributions to large-scale regional and global impacts, and this emphasis allows students to see their place in the



environment and how lifestyle changes can facilitate greater environmental sustainability. Some specific topics covered here include nuclear energy, ozone, fossil fuels, and more.

AMSER has integrated ESA21's modules into its collection, enhancing the repository with an excellent collection of environmental science resources. AMSER is pleased to have partnered with ESA21 and believes AMSER users will find this addition exceptionally useful. Some examples from this fine collection include:

### The First Law of Thermodynamics

[http://esa21.kennesaw.edu/activities/human\\_energy/P02\\_energy.pdf](http://esa21.kennesaw.edu/activities/human_energy/P02_energy.pdf)

This lesson builds upon the previous one (Newton's Second Law) by introducing students to kinetic and potential energy. Topics include a

*ESA21 believes that providing students with the opportunity to study impact makes learners better able to "see that they have a place in the ecosystem and are better able to understand how to reduce the harmful effect that they might have in it."*

brief description of these two forms of energy, a discussion of gravity as a form of potential energy, and a discussion of the First Law of Thermodynamics in the context of energy transfer. The lesson includes an activity in which students test the First Law of Thermodynamics by measuring the energy of a system consisting of a cart being pulled by a suspended mass.

### Fossil Fuels: Oil

<http://esa21.kennesaw.edu/activities/oil/oilactivity.pdf>

This lesson provides an introduction to the world oil market and the United States' dependence on it. Topics include our current usage, sources, and the political implications of acquiring oil from an international market. There is also discussion of how petroleum is created and trapped in reservoirs, and

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how oil companies find it. The lesson includes an activity in which students use an online game that simulates the exploration and production of petroleum. To win, they must actually 'produce' commercial quantities of oil or gas by drilling in the ground in a 8-by-8 mile plot of land with a budget of \$2 million dollars.

**Home Energy Audit**

<http://esa21.kennesaw.edu/activities/homeaudit/homeaudit.pdf>

This is the first part of a two-part exercise in which students perform an audit and analysis of energy consumption in their homes. This part provides an introduction to the uses of energy in our homes. Topics include major uses in the home (heating, air conditioning, etc.), sources of energy (fossil fuels), and uses in the United States (industry, transportation, etc.). It includes an activity in which students draw and measure various aspects of their homes (square feet of walls, number and types of windows and doors, number and types of appliances, etc.) in preparation for the second part (Home Energy Analysis) to be performed in the next activity. These two activities should be done in conjunction with one another.

You can find the ESA21 Project at: <http://esa21.kennesaw.edu/>.

*Do you know of a great collection of resources that you'd like to see integrated into AMSER? Do you have a learning object that helps students truly understand a specific concept? If so, e-mail us at [resources@amser.org](mailto:resources@amser.org), or follow the link at the bottom of the AMSER home page to submit a resource suggestion.*

## AMSER Featured Folder: Cloud Seeding

Within the AMSER collection, AMSER staff and users have created a series of Featured Folders. These folders aim to illustrate a given topic by combining multiple resources about a that topic into a single folder. The individual resources in each folder were selected from within the AMSER collection to demonstrate various aspects of each topic. For more details on how to use and find AMSER's Featured Folders, see the Summer 2008 issue of the *AMSER Quarterly* at <http://amser.org/AQSummer08.pdf>.

In this issue of the *AMSER Quarterly*, we highlight our Featured Folder on Cloud Seeding, one of over 50 Featured Folders in AMSER. Cloud seeding is commonly used to increase precipitation, but the process may also suppress certain weather patterns, such as hail and high winds. While there is some controversy over whether cloud seeding actually does produce more precipitation, it can be useful for arid areas that need additional rainfall to help produce viable crops and minimize drought conditions. This Featured Folder provides links to resources that help examine cloud seeding, including:

**Cloud Physics: The Basics**

<http://www.evac.ou.edu/okwmdp/physics.html>

This website from the Oklahoma Weather Modification Program encourages students consider the controversy surrounding inducing or enhancing precipitation. The exercise describes the two basic tenets of cloud seeding: the Static Phase Hypothesis and the Dynamic Phase Hypothesis. Also provided are links to a weather and climate glossary and further information about clouds and precipitation.

**Can China Control the Weather?**

<http://science.howstuffworks.com/nature/climate-weather/meteorologists/cloud-seeding.htm>

Here, HowStuffWorks explains cloud seeding and its environmental impacts within China. Author Jacob Silverman describes how the process occurs, its benefits, and costs. The information is clearly explained, accompanied by a gallery of images. This site should prove useful to anyone interested in cloud seeding and climate modification.

**Clouds**

<http://www.carlwozniak.com/clouds/>

Created by Carl Wozniak, Clouds attempts to make the study of clouds and the processes of cloud formation more accessible for students. The site accomplishes this by breaking information down into five sections, complemented by both descriptive text and relevant pictures. Pictures and graphics are perhaps the most classroom-friendly section of the site, as they are intended for use in non-profit, educational settings. Another primary section of the site is the glossary, aimed at explaining cloud-related terminology at a very simplistic level, understandable by all students.

To view all the resources from this folder visit: <http://amser.org/amser/topicindepthcloudseeding>.

*Don't forget to become a fan of the Applied Math and Science Education Repository (AMSER) on Facebook at <http://www.facebook.com/AMSER> - or follow us and our tweets on Twitter @AmserDotOrg. We'll keep you connected with updates on AMSER resources, AMSER events, and all things new in AMSER.*

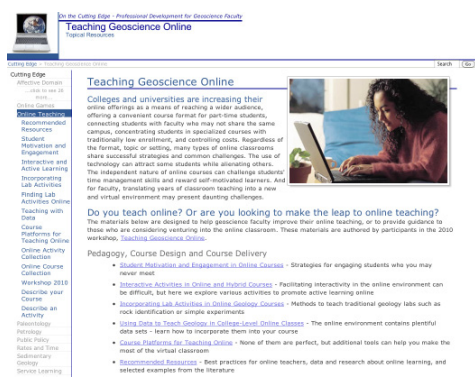
## AMSER User's Corner

AMSER staff members spend quite a bit of time scouring the Internet for high quality resources to include in the AMSER portal. Sometimes we are looking for a specific subject suggested to us by an AMSER user and sometimes we just happen upon something great. Here are some of our favorite finds.

### Teaching Geoscience Online

<http://serc.carleton.edu/NAGTWorkshops/online/>

More and more schools are offering online courses in the sciences, and the geophysical sciences are no exception. Carleton College is deservedly well known for their "Cutting Edge" website of geoscience teaching resources, and here they present some helpful materials for those wishing to teach geoscience online. The resources were developed as part of their 2010 workshop titled "Teaching Geoscience Online." Visitors can scroll through the list of resources, which are divided into sections that include "pedagogy" and "online activities and courses." The materials include titles like "Student Motivation and Engagement in Online Courses," "Using Data to Teach Geology in College-Level Online Classes," and "Course Platforms for Teaching Online."



A number of these resources could be used by anyone teaching online courses, not just those in the field of geoscience.

<http://amser.org>

### National Science Foundation: Predicting Seasonal Weather

[http://www.nsf.gov/news/special\\_reports/autumnwinter](http://www.nsf.gov/news/special_reports/autumnwinter)

How does a meteorologist or other such individual predict seasonal weather? That question forms the basis for this special report from the National Science Foundation. The interactive report starts by offering an explanation of how the U.S. economy is affected by weather conditions, and it reviews a bit of material on how different businesses attempt to mitigate the effect of varying weather conditions caused by warmer sea temperatures and the like.



The remainder of the report is divided into five sections, including "Fall Predicts Winter" and "New Seasonal Forecast Model." The "New Seasonal Forecast Model" section talks about a more accurate model of weather prediction that has been developed in cooperation with NSF scientists. Each section contains a range of graphs and maps that help illustrate the key concepts within each topical area.

### Science360: Chemistry

<http://science360.gov/topic/Chemistry/>

Have you ever wondered about the chemistry of a cheeseburger? Well you are in luck because that is one of the subjects covered on the topical

and delightful "Chemistry" section of the popular Science360 website, an initiative funded by the National Science Foundation. As it states on the site, "everything you hear, see, taste, smell and touch involves chemistry and chemicals," and here visitors can watch videos and learn about the molecular structure of water, the science behind glass blowing, and how a curious mud-like mixture is being used to soak up oil spills and insulate homes. Currently, there are about fifteen videos on the site, and visitors can sign up via a host of social media (Twitter, Facebook, and so on) to stay abreast of new additions to the site. Teachers will find that this material can be integrated into the classroom quite easily, and are encouraged to submit their own videos, and images "from wherever science is happening" to the site. Everyone else will just enjoy wandering through these offerings.

### Earth Science Teaching Plans and Classroom Activities

<http://geology.com/teacher/>

Teachers looking for materials to help out in the classroom will find this well-organized site most useful. Created by the folks at Geology.com, Christy Pratt compiled the site's materials, organized into nine thematic areas. These areas include "Volcanoes," "Water," "Weather," "Erosion," "Plate Tectonics" and much more. The resources featured within each section are taken from high-quality institutions and organizations, including the Smithsonian, Harvard, and the National Science Foundation. Each area also includes a "News" section, which features topical news updates and briefs. Visitors can share these sites with other colleagues and friends via Twitter, Facebook, and other social media platforms.

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### Teaching Time Savers

<http://www.maa.org/features/TeachingTimeSavers.html>

The Mathematical Association of America (MAA) has a number of online materials designed for math educators, and their "Teaching Time Savers" feature is quite a pip. This series is edited by Professor Michael E. Orrison of Harvey Mudd College, and the articles are "designed to share easy-to-implement activities for streamlining the day-to-day tasks of faculty members everywhere."



#### Teaching Time Savers

A series of articles edited by Michael E. Orrison

Teaching Time Savers are articles designed to share easy-to-implement activities for streamlining the day-to-day tasks of faculty members everywhere. If you would like to share your favorite time savers with the readers of PODS, then send a separate email description of each activity to Michael Orrison at [pod@amser.org](mailto:pod@amser.org). Make sure to include a comment on "time saved" and "time saved" for each activity, and to include pictures and/or figures if at all possible.

- December 2006/January 2010: **Feedback Codes**, By John Tait
- December 2006/January 2010: **Activities That Make Every Minute Count**, By Matt Elvey, Jeff Meyer, and Vilma Mesa
- October/November 2009: **Using Checklists in Project Assessments**, By George Mathew
- April/May 2009: **Student-Written Executive Summaries**, By Susan Harwood
- February/March 2009: **The List of Grievances and Special Requests**, By Amy N. Myers
- December 2008: **Working for a Week**, By Bill Ferman
- November 2008: **The Microphone Is Muted: Share the Fun**, By Shelly Graydon
- August 2008: **Keeping Homework at Home**, By H. Smith Riser
- May 2008: **The Study Challenge**, By Christopher K. Storm
- April 2008: **Reacting to Analysis**, By Sarajeva Rajanurthy
- March 2008: **Using Problem Problems to Get Ahead of the Syllabus**, By Marlon Deutsche Cohen
- December 2007: **The Exam Practically Wrote Itself**, By Michael E. Orrison
- November 2007: **I Wholeheartedly Recommend Myself**, By Anthony Tongen
- October 2007: **Modular Curriculum Files**, By Larry Leiser
- August/September 2007: **Encouraging Contact Early in the Semester**, By Chad Westphal
- May 2007: **Homework Without Grading**, By John Prather
- March 2007: **Choosing Appropriate Derivative Techniques**, By Pam Crawford and Grading Checks and Consistent Grading Expectations
- January 2007: **24 Homework Grades on Your Nerve(s)**, By Luella de Pilla and Michael E. Orrison
- November 2006: **Some Advice on Giving Advice**, By Michael E. Orrison
- October 2006: **Reviewing Homework**, By Jane Murphy Williams

The feature started in 2006, and visitors to the site can look over the twenty or so pieces here. Some of the pieces featured here include "The List of Grievances and Special Requests," "Keeping Homework at Home," and "Activities That Make Every Minute Count." Faculty members are also encouraged to submit their own entries for inclusion.

*Would you like to be featured in a future AMSER Quarterly? We'd love to hear from you and learn about your favorite AMSER resources and how you've been using them in an educational setting. Please e-mail us at [amser@amser.org](mailto:amser@amser.org) for details.*

## Calendar of AMSER Events

### Where in the world is AMSER?

We'll be at various conferences and meetings this year and we'd love to talk to you about what you're doing with digital resources and how we can make AMSER more useful to you and your students. Here's where we'll be and when:

<p><b>April</b>  <b>AACC Annual Conference</b>          April 9-12, 2011          New Orleans, LA</p>	<p><b>May</b>  <b>NISOD Annual Conference</b>          May 29-June 1, 2011          Austin, TX</p> 	<p><b>June</b>  <b>Joint Conference on Digital Libraries</b>          June 13-17, 2011          Ottawa, Canada</p>
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For more AMSER events and links go to <http://www.amser.org/events>

## Contact Information

Have a question? Want to share information about how you're using AMSER or other digital materials in your classroom? Please contact us!

### Chanda Halderman, AMSER Outreach Coordinator

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