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Delta Education

FOSS

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N E W S L E T T E R

In this issue:

- *FOSS Middle School Winning DOL Project*
pg 1
- *Notes from the Field*
pg 2
- *LHS Korean Institute: FOSS Middle School*
pg 4
- *FOSS Science Preparation of Preservice Teachers*
pg 6
- *Weather Report: Norman, Oklahoma*
pg 8
- *Populations and Ecosystems Workshop*
pg 12
- *Earth History at Grand Canyon* pg 12
- *New from the Wordsmiths*
pg 13
- *Calendar* pg 15
- *About this Newsletter*
pg 16

FOSS Middle School Students Create a Winning DOL Project!

By Susan Berglund, Manager, MGH/Timilty Partnership, Roxbury, Massachusetts

In Mr. Cho's seventh-grade science class at the James P. Timilty Middle School in Roxbury, Massachusetts, science does not end when class is over. The students have become so involved with their investigations from the **Diversity of Life Course** that they have extended their research to the development of science fair projects.

Questions always arise during class lessons, but two students took their questions and continued to investigate the way they learned in class, as a team. Yeriseli and Roytel investigated vials of "mystery"

Continued on page 3



YERISELI AND ROYTEL DISPLAY THEIR AWARD-WINNING SCIENCE PROJECT.

Notes from the Field...

Technology Enhances the FOSS Science Program in the Greece Central School District, Rochester, New York

By Lisa Buckshaw, Director of Math and Science, and Aimee Lyon, Elementary Science Mentor Teacher, Greece Central School District, Greece, New York

Greece, the eighth largest school district in New York State, adopted FOSS in 2002 because it provided them with a science program that was matched to their standards and promoted instructional practices that were consistent with their district goals. Along with the commitment to improve science education, the district also has a commitment to provide technology resources and has encouraged teachers to embed technology into the curriculum.

At the elementary level, there is a wired computer lab, capable of serving an entire class; a wireless, mobile computer lab; five student computers in each grade 1–5 classroom; and three student computers in each pre-K and kindergarten classroom. In addition, all 12 elementary schools have cordless microscopes and a flex cam camera. Classrooms are outfitted with an Imagination Station that includes a monitor connected to a computer system that can project Internet sites, presentations, etc.

The teachers have been implementing FOSS and finding creative and interesting ways to enhance the investigations through technology. And the results of this emphasis on science and technology show increased student achievement in both science and reading. In 2003–04, student performance on the fourth-grade New York state science test increased by 7% compared to the previous year, with 44% of the fourth-grade students exceeding the state standard in science. There were also significant gains by fourth graders in English language arts scores, which may be a result of the science/technology program.

At each grade level, teachers have enhanced the FOSS science modules by integrating the technology resources available to them with the science investigations. We have highlighted some examples.

○ Erin McElheran, a kindergarten teacher at Pine Brook Elementary

School, integrated technology into the **Animals Two By Two Module**. Her class observed and sorted pill bugs and sow bugs by using two different tools. While half the class observed with hand lenses and recorded observations, the other half of the class used the flex cam to see if they could uncover more details. The groups then switched to see if either tool left out important details in their observations. This helped reinforce how tools are helpful to scientists in different ways.



STUDENTS VIEW A MAGNIFIED IMAGE OF A LARVA ON THEIR MONITOR. THE COMPUTER IS CONNECTED TO THE MICROSCOPE TO THE LEFT OF THE MONITOR.

○ Theresa Kermis, a first-grade teacher at English Village Elementary School, found a unique way to integrate technology to enhance students' retention during the **Balance and Motion Module**. She walked around and took pictures with a digital camera while her students investigated balancing the crayfish with clothespins. She put these pictures into a PowerPoint slide show. The next day, they recounted their experiments by flipping through the slide show. Ms. Kermis used the drawing tool to circle and highlight ideas on the slides as students discussed and explained what they did. The kids loved it so much that

she taught them how to use the drawing tool so they could point out the information as they were sharing what they remembered. This set up the students for success by reviewing previous learning before engaging in a new lesson.

- Maryrita Maier, a second-grade teacher at Parkland Elementary School, found that technology made her **Insects Module** come to life. Her students used the flex cam to observe the different insects. The flex cam allowed students to see greater detail than they could with a hand lens alone. The students were able to critically analyze changes in the insects as they progressed through their life cycle stages, and their observation records were flooded with detail. At each stage of metamorphosis, they took pictures with the Intel® Play™ scope and printed them to create a timeline. The students then wrote descriptions to narrate the metamorphosis process. Mrs. Maier worked with small groups to show them how the technology worked.
- Judy Davis, a third-grade teacher at Buckman Heights Elementary, used technology during the **Earth Materials Module**. In Investigation 1, Part 3, students observed the results of evaporation. Mrs. Davis had the students start crystal observations with a hand lens. Then she used the flex cam to magnify the crystals on the TV monitor. She placed samples of the crystals on black construction paper for better visibility. It was amazing how much more detail students were able to see. They then drew their observations, compared their results with the two tools, and discussed what they saw and how it got there. Finally, they compared their observations to a key to try to identify the crystals.

Winning DOL Project continued

materials to determine whether they were living or nonliving. They had many discussions about the materials while working as a team. So when Mr. Cho began talking about science fair projects, they immediately thought about working with seeds. They discussed planting the seeds in vials and making observations just as they had done in class. Yeriseli and Roytel decided to change the growing surface in each vial. The question they would investigate was, "What is the effect of different growing surfaces on the germination of rye grass?"

Yeriseli and Roytel designed an experiment to answer their question. They used four vials to test different surfaces: cotton, paper towels, potting soil, and water. They decided on these materials because they were familiar with the properties of the materials from science class. It was a challenge to grow the seeds at home and to still work as a team. To accomplish this they created identical experiments in each location. Each student recorded data over the course of seven days. Yeriseli said, "We called each other every 12 hours to see if there were any changes. It was frustrating when one person saw seeds

growing and the other didn't because we thought the results should all be exactly the same."

As the experiment continued, Yeriseli and Roytel discovered that it was good to have a partner to share the work. They tried to share the responsibilities evenly when possible. It was also nice to discuss the science fair project and the results of their research with each other. According to Roytel, "It was more enjoyable to have someone to talk with about the project. We were talking about science, and it was fun."

Roytel and Yeriseli were surprised when they were finalists at the school science fair, but they were even more surprised when their project won third place in the Boston Regional Science Fair. "We were intimidated by all of the complex projects at the regional fair. We did not think a simple project on rye grass had a chance of winning." But the judges were impressed by their knowledge of the topic, the design of the project, and most of all by the teamwork that created an award-winning project.

Congratulations to Roytel and Yeriseli on their winning effort! 🌻

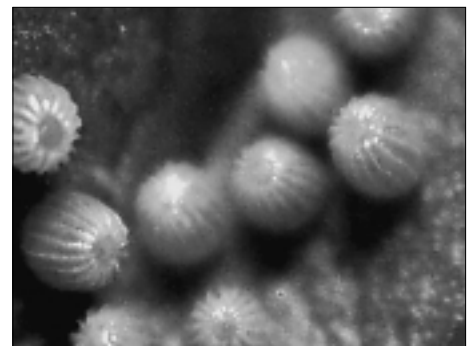
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The Science Connection Program is funded by a grant from the Howard Hughes Medical Institute's Pre-college Science Education Program and the MGH Community Benefit Program. The James P. Timilty Middle School is part of the FOSS implementation for grades K-8 in the Boston Public School system.

○ Heather Wolbert, an administrative intern at English Village and Lakeshore Elementary Schools, found ways to integrate technology into the earth science modules. While teaching the **Water Module**, her students made slides of water on different materials to observe surface tension. They used microscopes to compare results. Her students used the flex cam to observe water absorbency, surface tension, evaporation, and condensation. For absorbency, the class observed how different paper towels absorbed water. They moved the flex cam to get a close-up, side view of the surface tension of water on a penny. Then, using a light as a heat source, they observed the water evaporating from a penny. For condensation, the class chilled a water bottle and used the

flex cam to observe evidence of condensation. Ms. Wolbert also had her students search the Internet for pictures of water in different states of the water cycle. They put these images into a graphic organizer program called Inspiration™ and created their own water cycle posters. 🌻

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PAINTED LADY BUTTERFLY EGGS UNDER MAGNIFICATION.

LHS Korean Institute: FOSS Middle School

By Ann Moriarty, Lawrence Hall of Science, University of California, Berkeley, California

A teacher's dream...all students were completely engrossed, noses buried in their investigations into milkweed bug reproductive cycles. The buzz of voices in lively discussion echoed throughout the room. But we could not understand a word they said! Over the following weeks, the pattern continued, as the students grappled with broken electronic devices, explored rocks, and interpreted Dotcar data. At the end of four weeks, we still could not understand more than a few words. But it did not matter; the important concepts had been communicated, both from teachers to students and from students back to teachers.

From January 9 to February 4, 2005, a delegation of 22 middle school teachers and administrators from Seoul, South Korea, worked with the FOSS staff for a month-long introduction to the excitement of inquiry-based learning. They were accompanied by a group of elementary school teachers who participated in exploring GEMS (Great Explorations in Math and Science), another LHS-developed program. These teachers were part of the first cadre of educators from Seoul to participate in

intensive professional development programs in the U.S. sponsored by the Seoul Metropolitan Office of Education. Lawrence Hall of Science was one of a select few university venues across the country to host educators during the first year of this five-year project. Dr. Sung Jae Pak and Dr. Eun Young Hurh, both scientists and science education professors at Seoul National University, worked closely with the teachers during the institutes. Their support would be invaluable in assisting the teachers in implementing the curriculum back in their classrooms.

The group soaked up the Berkeley atmosphere, staying in a local hotel near famous Telegraph Avenue. They divided their time between daily FOSS professional development seminars at the Lawrence Hall of Science, local school classroom visits, and exploratory field trips throughout California (e.g., Lake Tahoe and the Monterey Bay Aquarium). The ultimate goal of their visit was to learn about high-quality inservice training in the area of inquiry science—with emphasis on gifted and talented education—to improve their own teaching and science programs in Korea. In addition, the project helped facilitate a deeper understanding of how such a program is implemented into a culturally diverse region such as the San Francisco Bay Area.

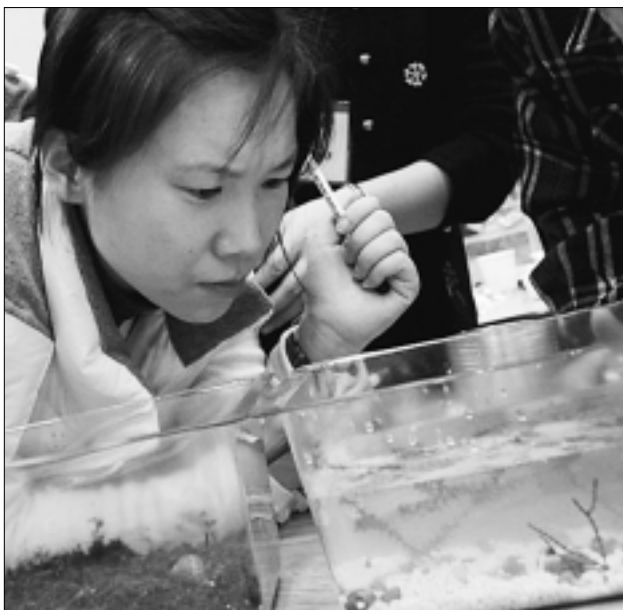
Each day started with a traditional Korean greeting: *Annyong haseyo!* (Hello and welcome!) The FOSS instructors and Korean teachers then dove into an intense day of action, participating in the unfolding of curriculum, sharing anecdotes from the Korean teaching experience, as well



THESE TEACHERS SET UP A TERRARIUM DURING THE POPULATIONS AND ECOSYSTEMS COURSE.

as the North American experience, and dialoguing about science education in the two countries. We managed to pack seven different courses into the month: **Populations and Ecosystems; Diversity of Life; Human Brain and Senses; Electronics; Force and Motion; Weather and Water; and Planetary Science.** At the end of each day, the discussions continued out the door as the teachers left, saying *Kam sah hannida!* (Thank you!)

During the FOSS professional development, interpreters joined us to facilitate the discussions. This sometimes led to amusing interchanges as the interpreters—excellent, but not necessarily proficient in science vocabulary—had difficulties. How do you say “population” in Korean? It turns out that there are two translations: one meaning “human population,” and the other meaning specifically “populations in an ecosystem.” Of course, the interpreters used the more common translations, but the Korean teachers had no qualms



THE TERRARIUMS AND AQUARIUMS FROM THE POPULATIONS AND ECOSYSTEMS COURSE CAPTURE THIS TEACHER'S ATTENTION.

about correcting them. Our wonderful interpreters ended up learning as much as the teachers.

Participants began development of an action plan in which they considered their implementation needs and professional development for the Seoul teachers. They will continue collaboration with LHS, the Federation of Science Teachers in Korea, the Korea Association of Research in Science Teaching, and with U.S.-based groups such as the Association of Science-Technology Centers (ASTC), the National Science Teachers Association (NSTA), and the California Science Teachers

Association (CSTA). Future efforts will focus on assessment, methodologies, and curriculum materials, as well as the development of a national curriculum for Korea.

The month-long "field trip" was an immense success. The Korean teachers returned to Seoul with renewed enthusiasm and excitement about using inquiry-based science and FOSS in their classrooms. And the FOSS staff came away with great respect for the intensity and integrity of the Korean teachers. Below are some comments the Korean teachers left with FOSS staff. 🌸



THE TEACHERS OBSERVE THE SIMULATED MOON ROCKS FROM THE PLANETARY SCIENCE COURSE.

"Students always bring up their questions and think to solve the problem. Diverse teaching materials were used to bring up interests of students that make the science class more fun."

"The teacher's role of facilitating student understanding and guiding their experience was very impressive."

"The class process was innovative and in-depth teaching on each theme is good!"

"Teaching materials are so perfect that teachers can use them effectively and won't have to spend much time on the preparation. The CD-ROM was perfect in terms of the structure and content."



THE MIDDLE SCHOOL TEACHERS VISITED MIT ACADEMY IN VALLEJO, CALIFORNIA, AND SAW FOSS IN ACTION.



Using FOSS in the Science Preparation of Preservice Teachers for the Elementary Classroom

By Dr. Stephen Marvel, Lock Haven University, Pennsylvania, and Dr. Alison Rutter, East Stroudsburg, Pennsylvania

On October 1–2, 2004, elementary education science methods faculty and science content faculty from Pennsylvania met at Lock Haven University’s Sieg Conference Center to explore ways to integrate exemplary elementary science materials into their college classes. This meeting was a first step in forming a collaboration that leaders hope will lead to improvements to the way that elementary education majors are exposed to science. The Lock Haven University of Pennsylvania (LHUP) Science and Mathematics Resource and Technology (SMaRT) Center and Delta Education sponsored the workshop.

The meeting was one of the components of the Collaborative for Excellence in Teacher Preparation in Pennsylvania (CETP-PA) project. CETP-PA represents a statewide initiative to join the science, mathematics, and education faculty of 12 campuses with teams of public school teachers, community college faculty, university students, and representatives of business and industry. The National Science Foundation provided funding for CETP-PA.

The goals of CETP-PA are to facilitate systemic change in Pennsylvania by:

- redesigning teacher preparation and mentoring;
- developing new professional development opportunities for teachers; and
- increasing the variety of precollege and outreach programs available to encourage students and mid-career change aspirants to go into the field of teaching science or mathematics.

The grant is designed to change college curricula to meet new state and national standards for mathematics and science educators, to partner education faculty with scientists and mathematicians, to enhance student teaching supervision, and to establish permanent science and mathematics centers on 12 campuses to coordinate and implement the project.

The meeting at the Sieg Conference Center began on Saturday morning when Dr. Keith Miller, LHUP President, and Dr. Roger Johnson, Dean of College of Arts and Science, Lock Haven University, met with everyone over breakfast. Then Jane Degory, the FOSS representative for Pennsylvania, and Dr. Steve Marvel, Professor of Biology at LHUP, explained the purpose of the workshop and discussed work that the LHUP SMaRT Center was doing with FOSS and local school districts. Dr. Miller seemed very interested in hearing about the projects and offered his support to the group and the CETP-PA project.



TEACHERS EXPLORE THE VARIABLES AFFECTING THE NUMBER OF PASSENGERS (PENNIES) THAT A LIFEBOAT CAN CARRY BEFORE SINKING. THIS IS AN ACTIVITY FROM THE FOSS **VARIABLES** MODULE.

Dr. Kathleen Blouch, Assistant Professor at Penn State University, and Mr. Dick Close presented the rest of the day's activities. Both are long-time FOSS trainers who have used FOSS modules in their teaching at Lebanon Valley College. Kathy provided the participants with a notebook of materials for the day's activities and started the workshop by providing an overview of the FOSS philosophy of science teaching.

She explained how FOSS was developed at Lawrence Hall of Science and how the FOSS units are developmentally appropriate, pedagogically sound, and are supported by current cognitive research. They also are designed to meet the state and national science standards. Kathy also discussed the 5-E (Engage, Explore, Explain, Elaborate, Evaluate) model of teaching, stressing the FOSS program closely follows this model.

The backbone of this workshop, however, was the implementation of two of the FOSS modules designed for grades 5 and 6—**Variables** and **Models and Designs**. These two units were chosen because they stress important scientific process skills that are used throughout the FOSS program. Dick led the group through the **Variables Module**, modeling the *Lifeboats* investigations.

The group performed the activities as though they were students. This hands-on learning helped participants understand the nuances of both conducting the activity and the issues that students may have while doing it themselves. The group was engrossed in the exercise. Through active participation in the investigation, the group was able to go beyond the basic lesson and discussed alternative approaches to the task that might be relevant to elementary education majors. Dick did not treat this activity as an isolated science lesson; instead, he integrated it with a social studies perspective by using a video clip from the film *Titanic* to make real-world connections to the activity. By using the video, he heightened our interest and awareness of the importance of this scientific exploration.

Kathy Blouch modeled the *Black Boxes* investigation from the **Models and Designs Module**. The group was thoroughly engaged in this activity and seemed excited at the prospects it invited. Through this exercise, the group also learned about themselves as learners, as they worked cooperatively with

each other—another important aspect of FOSS. Kathy walked the participants through the major aspects of the investigation, explaining how the individual investigations fit together to develop students as scientific thinkers. The participants commented that the investigation enhanced mathematical reasoning by using data and analysis skills (part of the NCTM standards). Furthering the cross-discipline connections, the group learned firsthand that students would have additional opportunities to work on their reading and writing skills by maintaining science notebooks and doing research using the *FOSS Science Stories*.

Kathy also introduced the assessment design integrated into the FOSS program, an aspect that is becoming increasingly important in Pennsylvania. She pointed out that the FOSS program offers multiple levels of assessment and encourages diagnostic pre-assessment and formative assessments through keeping the notebooks and referring to specific investigation sheets. The program also offers summative evaluations in which students assess their own learning and teachers evaluate the effectiveness of the investigation as a means of student learning. These assessments are related to the state and national standards.

Finally, the group reviewed its progress as learners of FOSS and its implementation as an inquiry science program suitable for their students. They discussed ways in which FOSS can enrich teaching science methods to preservice students and help them learn and understand the process of inquiry science. The group also discussed the implications for using a program like FOSS as a means of helping schools meet standards and improve test scores, as well as improve an interest in science both in teachers and their students.

The session ended by briefly talking about goals for using FOSS and continuing the experience and learning begun at this workshop. There seemed to be general agreement that the participants should continue to meet and learn together. A listserv was discussed as a means for keeping the discussion flowing, as was making plans for another workshop next spring or fall. Both of these would be helpful in sustaining interest as the participants head back to the classroom. 🌻

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Weather Report: Norman, Oklahoma, June 26–July 1, 2005

FOSS Weather and Water Middle School Professional Development Workshop at the University of Oklahoma

The FOSS project and Delta Education sponsored a **Weather and Water** workshop from June 26–July 1 in Norman, Oklahoma. The Oklahoma Climatological Survey and the University of Oklahoma

provided onsite coordination for the workshop through the valuable services of Andrea Melvin.

For more information about the workshop, contact FOSS at

foss@berkeley.edu. You can also view upcoming events and workshops as they are confirmed at the online FOSS Professional Development calendar: <http://www.fossweb.com/news/calendar.php>.

Weather Report

Sunday, June 26

Temperature: 35°C (96°F)

Dew Point: 18°C (65°F)

Relative Humidity: 73%

Precipitation: None

Air Pressure: 1015 mb (29.99 in)

Wind Speed: 8 km/h (5 mph)

Wind Direction: South

Visibility: 13 km (8 mi)

Classroom Conditions

Participants arrive for the **FOSS Weather and Water Workshop** and meet for an orientation session at the Marriott Residence Inn in Norman. They leave behind many different weather conditions, including those on the Big Island of Hawaii, the East Coast (Pennsylvania, New Jersey, South Carolina), the Midwest (Michigan), the Heartland (Kansas, Oklahoma) and the West Coast (California). After a brief meeting, the group heads off to sample the local Mexican cuisine.



Weather Report

Monday, June 27

Temperature: 35°C (96°F)

Dew Point: 17°C (64°F)

Relative Humidity: 73%

Precipitation: None

Air Pressure: 1015 mb (29.97 in)

Wind Speed: 16 km/h (10 mph)

Wind Direction: South

Visibility: 14 km (8 mi)

Classroom Conditions

The group carpools to the Stephenson Center at the University of Oklahoma (OU) where they begin their immersion in the **FOSS Weather and Water Course**. Dr. Kevin Kloesel from the OU College of Geosciences provides an introduction to meteorology and weather forecasting. Students discover that coffee is being precipitated at the building café and fortify themselves with lunch and brew for the afternoon of FOSS investigations delving into the properties of air and how solar energy fuels Earth's weather.



Weather Report

Tuesday, June 28

Temperature: 35°C (96°F)

Dew Point: 17°C (63°F)

Relative Humidity: 69%

Precipitation: None

Air Pressure: 1014 mb (29.97 in)

Wind Speed: 18 km/h (11 mph)

Wind Direction: South

Visibility: 13 km (8 mi)

Classroom Conditions

After a good night's sleep and hearty breakfast at the Residence Inn, participants return to OU where heat transfer is the topic of the day. They puzzle over topics like density, radiation, conduction, and convection. Andrea Melvin from the Oklahoma Climatological Survey introduces the group to the Oklahoma Mesonet System (<http://www.mesonet.org>), an online weather data site from which data can be downloaded and manipulated. During the demonstration of the convection chamber with its incense-created smoke, Kevin Kloesel quietly suggests that we might want to shut down the smoke before the sprinkler system is activated over the 100 meteorologists in another workshop happening in the building atrium.

Most of the group chows down on 2-for-1 hot dogs and sodas at Oklahoma City's Bricktown Ballpark while observing a force-and-motion demonstration with balls and bats.



Weather Report

Wednesday, June 29

Temperature: 35°C (96°F)

Dew Point: 17°C (64°F)

Relative Humidity: 73%

Precipitation: None

Air Pressure: 1015 mb (29.97 in)

Wind Speed: 16 km/h (10 mph)

Wind Direction: South

Visibility: 14 km (8 mi)

Classroom Conditions

The day begins within an overview of the FOSS assessment component. Then Jeff Basara, Director of Research from the Oklahoma Climatological Survey, relates his experiences with meteorological research, including stories about damage to his car from golfball-sized hail while collecting data. The rest of the day is spent exploring water-related topics, including dew point, relative humidity, clouds, and more. An afternoon field trip to the National Severe Storms Lab includes a tour of lab, the phased array radar facility (including a trip inside the Doppler radar dome), and some of the storm-chasing vehicles. Viewing a weather-balloon launch caps the day and provides the opportunity to view what they had learned about in the OU classroom.



Weather Report continued

Weather Report

Thursday, June 30

Temperature: 36°C (98°F)

Dew Point: 17°C (63°F)

Relative Humidity: 73%

Precipitation: None

Air Pressure: 1012 mb (29.89 in)

Wind Speed: 16 km/h (10 mph)

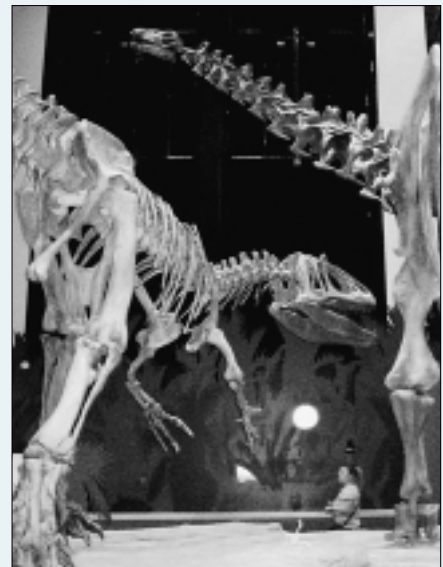
Wind Direction: South

Visibility: 14 km (9 mi)

Classroom Conditions

Kevin Kloesel provides a riveting look at severe weather, in particular, the tornado swarm that struck the Oklahoma City area on May 3, 1999. The videos provide many images that the participants had not seen before of the actual tornadoes and the damage they wreaked. The morning continues with a tour through the water cycle in the Water Cycle Game and a closer look at air pressure and wind. Sue Jagoda of the FOSS staff challenges participants to predict what would happen to the water level in a tube when pressure is exerted on a closed system in an air-tight jar in which the bottle was placed. The group adjourns for lunch to the Sam Noble Natural History Museum where they also have a guided tour of the museum's dinosaur exhibit and other collections.

After the tour, the students head to OU's Sarkeys Energy Center for some hands-on time in the computer lab with the Oklahoma Mesonet system and EarthStorm, the education outreach component of the Oklahoma Climatological Survey (<http://earthstorm.ocs.ou.edu>).



Weather Report

Friday, July 1

Temperature: 31°C (89°F)

Dew Point: 17°C (64°F)

Relative Humidity: 94%

Precipitation: No record

Air Pressure: 1014 (29.95 in)

Wind Speed: 14 km/h (9 mph)
with gusts up to 61 km/h (38 mph)

Wind Direction: Southeast

Visibility: 15 km (9 mi)

Events: Rain,
thunderstorm (6:12 a.m.)

Classroom Conditions

Friday begins with a return to the computer lab and an introduction to Mesonet's WeatherScope software. With the thunderstorm and wind passing through the area early that morning, everyone is particularly interested in viewing the radar and other weather data for that time of day using the WeatherScope software.

Back at the Stephenson Center, Daphne Zaras, a meteorologist and part-time storm chaser, enthralls the group with stories and videos of her tornado-chasing adventures and escapades. At lunch, Derek Arndt, the Acting State Climatologist for Oklahoma, engages participants in a discussion about the evidence for global warming. Afterwards, students revisit the Water Cycle Game, only this time with the effect of global warming added. Formal instruction ends with a quick review of weather and climate in the last investigation.

That evening the group is treated to a traditional Kickapoo frybread and buffalo taco dinner at the home of Terry Shaw, one of the FOSS workshop presenters, and his wife Thelia (shown in the picture below, from left to right, with chefs Marcella Winsea and Kathy Cademan, Thelia, and Terry Shaw). To work off the wonderful food, students go on a backyard spider hunt and collect barite roses, Oklahoma's state rock.



Weather Report

Saturday, July 2

Temperature: 33°C (93°F)

Dew Point: 18°C (66°F)

Relative Humidity: 88%

Precipitation: Trace

Air Pressure: 1014 mb (29.94 in)

Wind Speed: 8 km/h (5 mph)

Wind Direction: Southeast

Visibility: 15 km (9 mi)

Events: Rain

Classroom Conditions

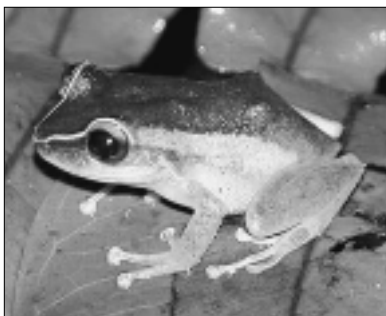
Morning dawns with lightning and thunder as the participants begin their journeys back to their local climates, full of information and ideas to bring back to their classrooms and fellow teachers in the fall. The **FOSS Weather and Water** workshop is deemed a success by all involved, with ideas for the "next time" already starting to condense.



For more information about the **FOSS Middle School Weather and Water Course**, you can view and download a course summary here: <http://lhsfoss.org/scope/folio/html/WeatherandWater/1.html> and <http://lhsfoss.org/scope/msp.html> (includes downloadable pdf files).

Hike in a rainforest and snorkel over a coral reef! Populations and Ecosystems Workshop Summer 2006 in Puerto Rico

During the **FOSS Populations and Ecosystems Course**, students explore and study eleven different ecosystems, ranging from arctic tundra to tropical rainforest. We can't visit them all in one workshop, but we can start with some of the more exotic. The FOSS staff from Lawrence Hall of Science, in cooperation with the University of Puerto Rico and the University of Texas at Dallas, is presenting the **Populations and Ecosystems Course** during a week-long workshop to Puerto Rico.



When and where?

- July 10–14, 2006.
- Workshops will be held at the University of Puerto Rico, Mayagüez.

Who should apply?

- Science leadership educators from universities or districts responsible for implementing the **FOSS Populations and Ecosystems Course**.
- Teachers using or planning to use the **Populations and Ecosystems Course** in their classrooms.

What will happen at the workshop?

- Hands-on training in the **Populations and Ecosystems Course**.
- Presentations by researchers studying the ecosystems of Puerto Rico.
- Opportunity to visit the many ecosystems of Puerto Rico, including terrestrial ecosystems, El Yunque tropical rainforest, dry forest, coastal mudflats, mountain streams, coral reefs, and a bioluminescent bay.



Participants will be responsible for their own travel to and from San Juan, Puerto Rico, and some meals. Group size is limited to 30 participants. Total cost per participant to be determined soon. For more details, please drop us a note at foss@berkeley.edu or call Teri Dannenberg at 510.642.8941.

Earth History at Grand Canyon, 2006

You've probably heard the stories and the glories of studying the **FOSS Earth History Course** at Grand Canyon. Four week-long workshops have been held at the Canyon since 2000, and the FOSS staff is beginning to put out feelers for a possible repeat performance during the summer of 2006. If you are one of the folks who wished they'd grabbed the chance during previous workshops, it's time to let us know about your interest in joining the group next summer. We need at least 25 participants to hold the workshop. It looks like the Albright Training Center will once more be available next summer with refurbished apartments and workshop facilities.

The workshop is designed for

- Science leadership educators from universities or districts responsible for implementing the **FOSS Earth History Course**.
- Teachers using or planning to use the **Earth History Course** in their classrooms.

What happens at the workshop?

- Hands-on training in the **FOSS Earth History Course**.
- Slide presentations and discussions on the geology and natural history of the Grand Canyon by NPS staff.
- Hikes along the South Rim, to fossil beds on the Hermit Trail, and down the South Kaibab Trail for a close-up view of Grand Canyon geology.

- Bus trip outside of the park to dinosaur tracks, petrified wood, and more.
- Consultation time with FOSS and National Park Service representatives to begin identifying your local resources and to "personalize" the FOSS/Grand Canyon experience to your area.

If you are interested in participating, please drop us a note at foss@berkeley.edu or call Sue Jagoda at 510.642.8941.

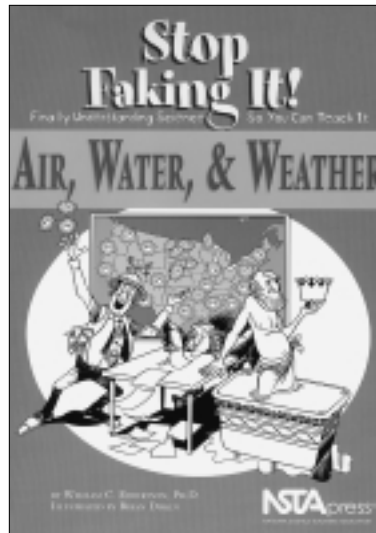




New from the Wordsmiths

This issue of the Wordsmiths includes several new titles that have recently come through the FOSS mailbox. You can find more FOSS reading resources, as well as software and video resources, at this website <http://lhsfoss.org/fossweb/teachers/resources/index.html>.

If you would like to recommend books or other resources to our FOSS users, send your title and other information to the FOSS staff at foss@berkeley.edu.

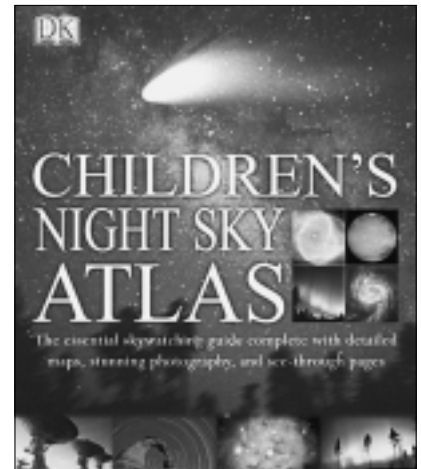


Air, Water, and Weather:
Stop Faking It! Finally Understanding
Science So You Can Teach It

By William C. Robertson. National
Science Teachers Association, Arlington,
VA, 2005. ISBN 0873552385. Grades 5–8.

Want to bone up on your knowledge
of air, water, and weather before you
start teaching the **FOSS Air and Weather**

and **Solar Energy Modules** and the **Weather and Water Course**? Learn about the basic properties of air and water, both of which scientists consider fluids. Delve into pressure, changes in pressure, the Bernoulli effect, density, and explanations of why hot air doesn't rise all by itself and why heating air doesn't necessarily cause it to expand. After you've built a foundation with these concepts, move on to explanations of basic weather patterns, including the jet stream, storm fronts, and the formation of tornadoes and hurricanes. (**Air and Weather, Solar Energy, Weather and Water**)



Children's Night Sky Atlas

By Robin Skagell. Dorling Kindersley
Limited, New York, NY, 2004. ISBN
075660284X. Grades 4–8.

This colorful atlas features the latest discoveries and beautiful space photography, including images from the Hubble Space Telescope. Information and illustrations depict constellations, the evolution of stars and galaxies, and the planets in the solar system. Acetate overlays highlight special points of interest to show even more about what we see in the night sky. (**Solar Energy, Planetary Science**)

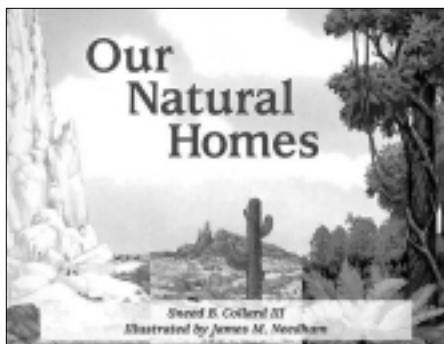
Wordsmiths continued



Footprints on the Moon

By Alexandra Siy. Charlesbridge, Watertown, MA, 2001. ISBN 0613493168. Grades 4–8.

The last time a human being set foot on the Moon was over 30 years ago in 1972. Introduce students to the story of lunar exploration that evolved from ancient astronomers to the Apollo program to more recent lunar probes. This book relates the thrilling story through text and pictures. Includes a list of references, including websites. **(Solar Energy, Planetary Science)**



Our Natural Homes: Exploring Terrestrial Biomes of North and South America

By Sneed B. Collard III. Illustrated by James M. Needham. Charlesbridge, Watertown, MA, 1996. ISBN 0613056442. Grades 3–6.

This book provides an introduction to the terrestrial biomes of North and South America. Includes basic facts about the areas' unique features and explains how their flora and fauna are adapted

to their particular climates. Tundra, boreal forest, mountains, temperate deciduous forests, temperate evergreen rain forests, grasslands, deserts, chaparral, and tropical forests are covered. **(Structures of Life, Environments, Populations and Ecosystems)**



Our Wet World

By Sneed B. Collard III. Illustrated by James M. Needham. Charlesbridge, Watertown, MA, 1998. ISBN 0881062677. Grades 3–6.

Take a look at the many different ecosystems that constitute Earth's "wet world." From streams and rivers through marshes to the shore, each ecosystem is described in words and pictures. Includes a glossary. **(Structures of Life, Environments, Populations and Ecosystems)**



Popcorn!

By Elaine Landau. Illustrated by Brian Lies. Charlesbridge, Watertown, MA, 2003. ISBN 0613842693. Grades 3–8.

This book was recommended by a very credible source. One of the FOSS staff kids picked up the book and immediately became engrossed with the popcorn facts, figures, and history. Find out about popcorn's Native American origins, the invention of the popping machine, and the popularity of popcorn during World War II, when sugar for snack foods was in short supply. And what makes popcorn pop? A list of online and print resources is included. **(New Plants, Structures of Life, Environments, Food and Nutrition)**

► FOSS Institutes

Delta Education will host one-day FOSS Institutes in conjunction with the 2005 NSTA Regional Conventions. There will be a K-6 Informational Institute and a Middle School Informational Institute before all three NSTA Area Conventions. These Institutes are designed for all educators—lead teachers, administrators, curriculum coordinators, professional developers, and university methods instructors.

The K-6 Institute will provide an introduction to the elementary school program by focusing on several modules from the different grade levels. FOSS developers will be there to lead each workshop and provide program updates and introduce new components.

The Middle School Institute will provide an introduction to the program by focusing on a few of the eight courses currently available. FOSS development staff and experienced teachers will lead the Institutes. There is no charge, but participants must register in advance to attend. Times and locations are listed in the calendar. To secure your spot at the Institute of your choice, please call, write, fax or e-mail:

Pam Frisoni
Delta Education
80 Northwest Boulevard
Nashua, NH 03063
pfrisoni@delta-edu.com

Phone: 1.800.258.1302 ext. 503
Fax: 603.579.3504

Dates for FOSS Institutes

Hartford, CT Wed., October 19, 2005
Chicago, IL Wed., November 9, 2005
Nashville, TN Wed., November 30, 2005

NSTA FALL AREA CONVENTIONS, 2005 FOSS WORKSHOPS IN THE NSTA PROGRAM (no preregistration necessary)

Hartford, CT October 20-22, 2005
Chicago, IL November 10-12, 2005
Nashville, TN December 1-3, 2005

THURSDAY (10/20; 11/10; 12/1)

8:00-10:00 Integrating Mathematics and Science with the FOSS Force and Motion Course

8:00-9:30 FOSS Forum: Issues in Kit-Based Science

1:00-3:00 Breeding Larkeys in the FOSS Middle School Populations and Ecosystems Course

3:30-4:30 Inquiry Science Teaching: The Importance of Formative Assessment and Student Responsibility for Learning
Nashville, TN; Dec. 1, 2005 *only*

4:00-5:00 Inquiry Science Teaching: The Importance of Formative Assessment and Student Responsibility for Learning
Chicago, IL; Nov. 10, 2005 *only*

FRIDAY (10/21; 11/11; 12/2)

8:00-11:00 Using Science Notebooks Featuring FOSS

12:30-1:30 Inquiry Science Teaching: The Importance of Formative Assessment and Student Responsibility for Learning
Hartford, CT; Oct. 21, 2005 *only*

1:00-3:00 Valuing Academic Progress—A New Accountability

For more details about these workshops and other upcoming events, visit the online FOSS Professional Development Calendar at <http://www.fossweb.com/news/calendar.php>.

If you would like to be added to the mailing list to receive this newsletter, send your name and address to:

Gary Standafer
Delta Education
80 Northwest Boulevard
Nashua, NH 03063
gstandafer@delta-edu.com

Phone: 800.338.5270 ext. 487

About This Newsletter . . .

The intent of the *FOSS Newsletter* is to help FOSS users develop a network of support across the country. Delta Education and LHS will work together to bring you news two times per year, including articles regarding the latest development of modules, tips about management from teachers and administrators, ways to make connections with other teachers and districts, extensions and reading materials to add to modules you are already using, and informative articles about good educational practices.

So, we need your help. If you have a tip that enhances the teaching of FOSS or would like to submit an article (with photos) about exciting activities or school programs, management, implementation projects, etc., please send them in. We would also like to hear from your students, whether they have questions about the content, projects they have done, photos or other images they have created, or insights into how they use the World Wide Web with FOSS. Send your contributions to:

Sue Jagoda, Editor
skjagoda@berkeley.edu
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University of California
Berkeley, CA 94720-5200

The deadline for submissions to the next issue is December 12, 2005. We're waiting to hear from you.

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Would you like to receive the *FOSS Newsletter* electronically? Please send an e-mail to gstandafer@delta-edu.com to start receiving this newsletter via e-mail. Include your name, title, school, and e-mail address. You can also view both the recent and previous *FOSS Newsletter*, as well as archived articles, at lhsfoss.org/newsletters.

For More Information

For information about purchasing FOSS or for the phone number of your regional representative, call Delta Education toll free at 800.258.1302, or log on to www.deltaeducation.com/foss

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See you at the NSTA Regional Conventions this Fall!

For replacement parts, go to <http://www.delta-education.com/science/foss/replaceparts.shtml>
To order call Delta Education at 800.258.1302.