FOSSweb has a new resource for students and teachers. The FOSS Science Stories for grades K–6 have been made into audio stories and are now available online at FOSSweb.com. The K–2 audio stories produced in the spring of 2007 were so popular with FOSS users that additional audio stories for grades 3–6 were added.

Audio stories can be a great way to introduce new vocabulary to young readers and English language learners. Students can listen to audio files of the books read by a fluent reader while following along with their student books. Hearing the FOSS Science Stories and seeing the written text together can help students increase their comprehension and fluency. Each audio story is divided into the same chapters as the FOSS Science Stories book to make it easy for students to follow along in the books.

The audio files for the K–2 audio stories were developed by the Math and Science Kit (MASK) Center at Educational Service District 113 in Olympia, Washington, and feature readings by Zachary Blanton, a student at Hanson Elementary School in Olympia. Zachary’s voice is also featured in the grades 3–4 FOSS Science Stories. Delta Education professionally produced the remaining grade 5–6 audio stories.

The audio stories can be found on the module home pages on FOSSweb. From the FOSSweb welcome page, select your grade level. Click on the icon representing your module to go to the module homepage. On the module homepage, you’ll see a “Media” button on the left-hand side of the page. Once you click on this button, you’ll see an icon for a variety of media designed for students, including the new audio stories.

The audio player has a listing of all the chapters in the FOSS Science Stories book, including the Glossary. Click on a chapter name to begin listening to the audio files. The audio player also features controls for stopping and pausing the audio recordings and adjusting the volume levels. (Note: Audio recordings of the FOSS Science Resources books are also available on FOSSweb.com/CA.)

To use the audio stories on FOSSweb, you’ll need Flash Player 9 and a browser with Javascript. If you do not have Flash 9 or higher, you can download it at http://get.adobe.com/flashplayer/.
Hi,

How about something for the next *FOSS Newsletter*? Deadline is Dec. 14. It would be great to have pictures and some words from your students. Digital photos with a resolution of at least 300 dpi are best. Text files that can be opened in Microsoft Office Word are the easiest to use. Any photos with students need consent forms. I've attached a copy if you don't have one you use already.

Thanks for letting us know about your green classroom.

Best regards,
Sue Jagoda
*FOSS Newsletter* Editor

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**Notes from the Field...**

**Minneapolis Students Extend FOSS Environments Module**

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On November 11, 2008, at 9:57 PM, msingh@mpls.k12.mn.us wrote:

NAME: Maria Singh  
EMAIL: msingh@mpls.k12.mn.us  
SCHOOL: Pillsbury MST  
CITY: Minneapolis  
STATE: MN  
STATUS: teacher  
TOPIC: FOSS Resources (Books, Videos, Websites)

COMMENTS: My class enjoys the FOSS science kits. We have also taken it upon ourselves to grow over fifty different plants and flowers in our classroom. If you would like our classroom to send pictures or feedback, please let us know. We love it!
These are the photos we received from Maria and her fourth- and fifth-grade students. One of her students provided this description of what the class has been doing with the FOSS Environments Module.

**Environments**

**Room 225 is Going Green!**

We are trying to develop ways of making our classroom environmentally friendly! We use FOSSweb daily in our class. Every student has a science notebook, which has various graphic organizers for success!

Pillsbury Math/Science/Technology students in Room 225 are planting over 200 different seeds. The students have learned a lot about different habitats. The FOSS Environments kit has launched new learning experiences. We have investigated different soil samples within our community using a handheld magnifying glass and a sophisticated microscope. We have taken CSI to a different level. We have placed a camera over the microscope to record our findings. We can identify community soil versus planting soil. We will also collaborate with another school in Texas to explore their habitats by using a Google map. The FOSS Environments kit gave our teacher an idea to explore more. The class is also constructing their own Rube Goldberg (Levers and Pulleys) Machine. We are motivated to experiment. Let us go green all the way. We will keep you updated about our plant-growing experience. We will share our green experiences!
Systemic Reform of Science Education at Grant Middle School in Marion, Ohio

By Gordon Aubrecht, Ohio State University at Marion, and Bill Schmitt, Science Center of Inquiry, Fountain Hills, Arizona

Toward the end of the 2007–08 school year, the FOSS staff at the Lawrence Hall of Science received a phone call from Bill Schmitt, a colleague who had previously teamed with FOSS during the Galaxy Classroom project. Bill heads the Science Center of Inquiry (SCI) in Arizona. He was helping the Marion City School District get some input about inquiry-based curriculum to use in the middle school to help reform science teaching and learning in the district. The Marion City School District includes a single middle school, Grant Middle School, having consolidated all four of its middle schools into one in 2004.

The reform effort was funded by The Ohio Department of Education with additional funding from the Marion City School District and The Ohio State University (OSU). The project was developed through a partnership involving Carol Ballinger and Robbie Troll from Marion City Schools; Gordon Aubrecht, OSU physics professor; Chris Andersen, OSU Office of Research; Bill Schmitt; the Grant Middle School science teachers; and other community partners. The goal of the project is to increase student achievement in science by moving toward a more inquiry-based and materials-supported teaching and learning model. The FOSS curriculum had been identified as a possible vehicle to support this effort as teachers made the transition from a mostly textbook-based curriculum to a more active, inquiry-focused program of teaching and learning.

The project decided to adopt a number of the FOSS Middle School science courses and several of the grades 5–6 modules. A big element of the project is an extensive teacher professional development program for the 2008–09 school year. The professional development involves all of the district’s middle school science teachers, grades six to eight. The project draws heavily on the success of several past initiatives with Marion City School District teachers that introduced inquiry-based teaching strategies and standards-based science content through summer institutes, online collaboration during the school year, and classroom observation.
This project was made possible by a commitment from the Marion middle school science teachers and the union to undertake reform in their school. In August 2008 all of the 15 middle-school teachers engaged in an intensive institute (64 contact hours). Bill Schmitt and Gordon Aubrecht began the institute by demonstrating inquiry learning through selected FOSS investigations and other activities. They challenged teachers to take on the role of students and to begin struggling in the same way their students might when the responsibility for finding the answers to inquiry questions becomes theirs, and not that of the teacher or textbook.

During the institute, each grade-level team also unpacked and reviewed investigations for the first of three FOSS modules assigned to their grade level. Each grade-level group presented a FOSS investigation to the other teachers by the end of the institute. During the school year teachers in each grade implement two additional FOSS Modules or Courses.

Implementation of the new curriculum continued through the 2008–09 school year with more than 100 contact hours of professional development embedded into the school day. Contact hours include three professional development half-days distributed across the year; twice a week science department grade level meetings; classroom coaching (with debriefs); and weekly facilitated online collaboration. Gordon and Bill make visits to observe classrooms and meet with teachers, and Bill also interacts with students in the classroom via video-conferencing. During the summer of 2009, another institute will promote reflection on the academic year’s work and provide further opportunity to investigate inquiry learning and science content (32 contact hours). This intensive 12-month program is providing teachers with over 210 contact hours of professional development for which they will receive graduate credit.

Gordon and Bill make visits to observe classrooms and meet with teachers, and Bill also interacts with students in the classroom via video-conferencing. During the summer of 2009, another institute will promote reflection on the academic year’s work and provide further opportunity to investigate inquiry learning and science content (32 contact hours). This intensive 12-month program is providing teachers with over 210 contact hours of professional development for which they will receive graduate credit.

Grade 6

Sixth-grade teachers: Barb Beach, Janeen Heilman, Jon Ratliff, Rita Robinson, and Leeann Teynor

Barb Beach (September)
I really admire the attitude of this team of teachers! There have been so many frustrations and obstacles (in particular the behavior and time issues), but they keep plugging away with how to make these frustrations turn into triumphs for their kids—and of course there have been some! They are determined to make it work and I think it’s helped to hear all of the positive comments from others who are seeing successes in their rooms. It also helps to keep a sense of humor, and this team certainly has no problem with that!

Jon Ratliff (November)
I had a discussion with my students about what they learned from the Solar Energy Module. They informed me that this was the most fun they have ever had in science, but honestly “we don’t think that we learned anything.” I realize this comment (which was echoed by the whole class) can be broken down in many ways. I just hope that it’s not true.

P.S. I asked the same question to the next class...and they thought that the previous class was nuts. They expressed

Continued on page 6
that they learn better when they get a chance to “play” with stuff.

At least the second class made me feel a little bit better.

Leeann Teynor (December)
We did the “Saturation Puzzle” in which students are given a mystery chemical and try to figure out what it is by using the saturation procedures we have done with kosher salt and citric acid.

It was really interesting to hear them make their predictions by just observing the crystals of the mystery chemical. They argued about what they thought it was, and I told them they were to make their own predictions, not a group prediction (which I figured they would all decide as a group—since they rarely follow directions—but to my amazement many students went with their own instincts).

The fun was to have them “rule out” what the chemical wasn’t. They were given a chart which gave the number of grams needed to saturate 50 ml of water for each of the possible chemicals. And as they added more and found it dissolving they could easily say it’s not that because, and it’s not that because. Finally, even though we didn’t have time to actually reach saturation, they knew what it was by observing and comparing it to what they already knew about the salt and citric acid.

Rita R. Robinson (December)
As I walk around my classroom observing each small group of students as they try to identify a mystery chemical I finally feel a bit of relief and think, “So this is what it’s supposed to look like!”

Now don’t get me wrong, my students didn’t suddenly become perfect. In fact my classroom is far from ever quiet. Every surface has a sticky residue on it, and there is always a hint of kosher salt in the air. However, what I am finally able to observe are groups of students solving a problem using inquiry methods with FOSS module investigations. I am not telling them information; my students are working collaboratively to figure out a problem. We haven’t always taught this way at Grant Middle School.

Sixth-grade students determine the properties of a mystery rock as an Earth science extension. What happens when you put blue food coloring on a piece of diatomaceous earth?

Comments by Rita R. Robinson
During two weeks in August 2008, the Grant Middle School science department met at the Ohio State University, Marion campus, to learn how to implement the FOSS science curriculum at each grade level. We have since spent the past 16 or so weeks helping our students to look at learning science in a completely different way than they have in the past. Rather than only reading and writing about science, with an occasional lab experience thrown in during each nine-week period, we are now asking students to experience science daily and record what happens.

As you might imagine, at times it has been like trying to herd feathers in a windstorm. Sixth-grade students new to FOSS tend to expect recess when taken outside for solar energy investigations. But we know we are making progress. The majority of our students are now able to use an inquiry process to conduct independent investigations within the FOSS modules. Asking questions and helping one another in group settings has become more comfortable and commonplace for them.

As science teachers, we have gone above and beyond dedicated this year. We have commiserated and celebrated with each other through our FOSS lessons and in online dialogues. We are finally at a point of seeing progress in our classrooms. Although the change has been and continues to be challenging for teachers and students alike, we all can agree that the level of insight we gain about our own abilities in teaching through inquiry is well worth the effort and energy we’ve put in this program. This is what success feels like.

Grade 7
Seventh-grade teachers: Heather Harper, Karen Hennessy, and Beth Houdashelt

Heather Harper (November)
We made clouds in bottles today, so cool. Students made connections to pressure and temperature with our investigation from yesterday. I was amazed listening to student responses of what needed to
Comments from all of the seventh-grade teachers

Seventh-grade students have made great strides in the Weather and Water Course. We discovered that no other science curriculum has provided our students with a better foundation of inquiry-based knowledge.

Our summer training consisted of two full weeks unpacking our FOSS boxes and completing various investigations with the support of Dr. Aubrecht and Bill Schmidt. The ready access to this expert information was irreplaceable and is still valued during our weekly meetings. This time was also invaluable for us to learn the material in a new inquiry-based direction and to strengthen our professional teaching relationship with one another.

Support from Marion City Schools has been integral to the success of FOSS in many ways. Besides funding the curriculum, they have excused us from district training programs to allow us to learn our new science curriculum. They have invited us to speak at various meetings to share our experiences and redesigned our teaming schedule to allow for weekly meetings.

While we have grown professionally during this undertaking, our students have evolved exponentially. They have gone from expecting reading assignments and worksheets with an occasional hands-on activity thrown in to learning how to work effectively in various cooperative groupings and conduct active investigations. We have noticed an increase in our students’ recollection of various science concepts because of these hands-on activities. Students are also readily able to make connections between concepts that were merely regurgitated vocabulary words previously. Because of their engagement and interest in the investigations, we have also noticed fewer discipline issues. Many students comment that science has become their “favorite” class because they are more interested and excited about the possibilities they could experience everyday. The students also understand that missing a class is now missing an experience.

We also share in the many “ah ha!” moments along with our students. We have heard an autistic student speak to help other students understand Earth’s rotation. We have had students that were previously struggling who are now able to accurately pinpoint sunrise and sunset to the minute. We have students that are now able to reflect on their own thinking, with questions and substantial evidence of contemplation. Most monumental are the students who began as uninterested and unreachable through traditional curriculum materials who are now willing to try, willing to fail, and still willing to try again, which we know is at the very core of all science knowledge.

The biggest challenge we face implementing FOSS is the lack of time. Even after adopting 60-minute class periods, we rarely find this to be sufficient to allow for preparation, investigation activities, related readings, discussions, questions, and cleanup. Because the FOSS investigations are the backbone of understanding, student absences are also difficult to manage. But having taught FOSS for the last four months we are fully aware of what our previous curriculum was missing; students must DO science. And we, as their teachers, must be prepared to teach them how to DO science. The FOSS materials provided the guidance to help us address the interests and maturity of the middle school students, as well as the means to meet the content requirements of state testing.

Grade 8

Eighth-grade teachers: Angie Crosley, Rick Fogle, Aaron Miller, Teri Rizzo, and Tim Tanner

Tim Tanner (September)

My word of the month to describe my students is “ENGAGED”!! The biggest difference I see using the FOSS kits is that my students are not always waiting for me to give them more direction with the daily lesson. Now, we discuss what we will be doing as class first begins, then as we get into the meat of the subject matter.

Teri Rizzo (September)

I am very much out of my comfort zone. Never having taught science, and then...
having to teach two FOSS kits (at different grade levels). I don’t know if I am coming or going.

Aaron Miller (November)
We were tracking our shadow data and one of my special-ed students said, “The shadows change from date to date. When we tracked the data from October 2 and October 21, we plotted the points on a graph and connected the dots for each individual date. At the beginning of the year the points went in a ‘frown’ shape and as we got closer to the equinox, the line flattened out. Now the line is turning into a smile.”

Rick Fogle (December)
Engagement is the key word. As the eighth-grade students worked through the Earth History Course, they were more engaged than eighth graders we have worked with in the past. I truly believe this is due to the delivery system of the FOSS program. Students are pulled into the curriculum by the hands-on activities; the readings are short and to the point. The “textbooks” that the readings come from are not viewed as “another book we have to read” but a book that will be used to help increase understanding.

Angie Crosley (December)
Students are engaged and a month after the investigation I have a majority of my students that can still name and describe the different types of sedimentary rock. I am also impressed that many times my inclusion class is among the highest as far as class averages and has some of the most engaging class discussions/questioning.

Comments from the Project Directors
Graduate instructors from The Ohio State University have provided instruction to the Marion middle school teachers to assist in changing teaching practice that could lead to improved student achievement on state science assessments. Early on in the Marion professional development efforts, the teachers experienced how frustrating it can be as students themselves not to have questions answered and then get the satisfaction in coming through with their own answers based on their own observations. Without experiencing the frustration themselves during the summer workshop, their appreciation for inquiry could not have been built. The teachers are to be commended for their willingness to explore uncomfortable new intellectual and emotional territory.

Several special initiatives grew out of the project. Two teachers, Krista Dendinger and Marcia Pitts, have been designated by the district to be math coaches. They have provided support by giving essential tips and valuable assistance as the science inquiry has been implemented. Krista and Marcia had implemented inquiry in mathematics in the Marion elementary schools where they work, and their experience has been invaluable to the middle school science teachers.

Teri Rizzo is a science resource teacher at Grant Middle School and has responsibility for teaching sixth-, seventh-, and eighth-grade special education students. The school expected that she could “pick up” FOSS for each grade level and implement it. Without the
extraordinarily kind assistance of her fellow teacher, Karen Hennessy, Teri would have been seriously challenged by the implementation. Karen assisted by including the seventh-grade resource students in one of her classes. Working together, Teri and Karen made an impossible situation workable.

Finally, Grant Middle School has two science teachers who teach “advanced” students. One of them, Barb Beach, who teaches sixth and seventh grades, found out about the program and joined the project. She has not implemented FOSS, but she has been using inquiry with her advanced classes and using the ideas and strategies she learned during the summer institute.

We are working to extend the FOSS materials beyond the classroom. Teachers are convinced that the socioeconomics of Marion limits the utility of homework. They believe that students’ parents will not be involved with students and their homework and that students themselves are not motivated to make the effort outside of the classroom. The teachers are encouraged to assign simple kinds of homework so that students can extend what they learn in the classroom. Supplemental materials in astronomy for eighth grade are being developed, and teachers give simple assignments designed to help students see the heavens differently. The assignments include monthly trips outdoors, starting in August and continuing through the school year, to track sun shadows. Some homework assignments involve observing the night sky.

**Conclusion**

The process of implementing FOSS curriculum and techniques continues to encourage inquiry learning in the Grant Middle School science classrooms. Bill and Gordon’s team of instructors continue to encourage reflection and model inquiry for the teachers during class sessions, group meetings, and in the Web-based exchanges in which teachers participate. They continue to explore the science content with teachers to extend their understanding beyond what is provided in the FOSS courses and modules.

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**FOSS Chemical Interactions Workshop**

**July 27–31, 2009**

The FOSS staff at the Lawrence Hall of Science, along with the Center for Science and Engineering Education at Lawrence Berkeley Laboratory and Delta Education, are planning a weeklong workshop for users of the FOSS Chemical Interactions Course for middle school. The workshop will include:

- In-depth experience with all of the investigations in the **FOSS Chemical Interactions Course** for grades 7–8.
- Tour of the Lawrence Berkeley National Laboratory research facilities, including The Advanced Light Source’s Chemical Dynamics and Molecular Environmental Science Beamlines, the Molecular Foundry, and the Berkeley Center for Structural Biology.
- Presentations by leading researchers and master teachers in chemical sciences at the lab.

The workshop will be lead by FOSS curriculum developers and is designed for curriculum coordinators, FOSS consultants involved in professional development of middle school teachers, and grades 7–8 teachers planning to use the **Chemical Interactions Course** in their classrooms. We will discuss the FOSS teaching strategies, learning needs of middle level students and teachers, and the use of science notebooks and assessment as they relate to this **FOSS Chemical Interactions Course**. Each participant will receive a set of the teacher and student print materials.

For additional information, contact
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For questions about this project, contact:  
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Carol Ballinger, Marion City Schools, Carol_Ballinger@marioncity.k12.oh.us
What is AMSTI? The acronym stands for Alabama Math, Science, and Technology Initiative. The goal of AMSTI is to provide well-trained teachers and the equipment, materials, and resources needed for hands-on, activity-based math and science education. With AMSTI’s support, students develop the knowledge and skills necessary to succeed in post-secondary studies and in the workforce. The initiative is funded by the Alabama Department of Education. Regional AMSTI master sites provide all services and resources at no cost to participating schools.

AMSTI got its start in January 2000 when the Alabama Department of Education appointed a blue-ribbon committee comprised of K–12 educators, higher education representatives, and business leaders to design the most effective statewide initiative for improving math and science teaching. The committee explored every step possible in creating AMSTI, including reviewing the research into best practices and incorporating what they learned to improve for math and science teaching.

AMSTI provides three basic services: professional development, equipment and materials, and on-site support. Schools become official AMSTI schools by sending all of their math and science teachers and administrators to two-week institutes for two summers. At the institutes teachers receive grade- and subject-specific professional development. Master teachers who have been certified as AMSTI trainers provide the professional development at the institutes.

A variety of materials for FOSS kits and the other AMSTI curricula are stored in these red bins, ready for replenishing consumable items and refurbishing any broken equipment in the returned kits.

Students from the University of Alabama in Huntsville are part of the refurbishment team for the kits supplied by the AMSTI site.

The warehouse at the AMSTI site at the University of Alabama in Huntsville (UAH) keeps a supply of FOSS Science Stories on hand to replenish the kits.
AMSTI sites provide almost all of the equipment, supplies, and resources needed to effectively engage students with hands-on, inquiry-based learning. Equipment includes labware, chemicals, global-positioning devices, plants with growth containers, and many other items. The resources arrive packaged in kits ready for immediate use. Each kit is customized for the specific activities to be taught. Once students complete the activities, the kit is returned to a materials center where it is refurbished to like-new condition. FOSS modules make up part of the Alabama course of study.

Once teachers complete the summer institute, AMSTI also provides extensive on-site support and mentoring. Math and science specialists from the site regularly visit the schools where they serve as mentors, helping teachers implement what was learned during the summer. Such support is vital for teachers to become comfortable and skilled at inquiry-based, hands-on learning.

This is just a snapshot of AMSTI. To find out more, visit online at http://www.amsti.org/index.html.

Editor’s Note
In November 2007, I had the opportunity to travel to Alabama to visit to two AMSTI sites, one in Huntsville and another in Florence. Imagine walking into a warehouse full of FOSS kits! It was a real treat to a FOSS developer to see such active use of the FOSS program. Many thanks to the staff who provided the tours of their facilities. These are just a few photos of the two sites.

In February 2008, the AMSTI Center at the University of Montevallo hosted the national FOSS Materials Management Institute in collaboration with the FOSS Project at the Lawrence Hall of Science. Special thanks to the Montevallo AMSTI staff for this opportunity.

AMSTI site staff and students at the University of Alabama in Huntsville: Reba Turk (second from left, UAH Science Specialist), Carolyn Pistorius (third from left, Assistant Site Director/UAH Science Specialist), Patsy Hensley (fourth from left, Materials Center Manager), and Carol Crowley (far right, UAH Sr. Staff Assistant/Buyer).

Brent Putman (Materials Manager) and Shelley Hollis (Site Director) lead the team that maintains the kits for the AMSTI site at the University of Northern Alabama in Florence, Alabama.

The AMSTI UAH site maintains a separate warehouse for housing the refurbished kits before they are loaded into trucks to deliver to the various schools.

Answers to questions on page 8:
After the activity, the students found out for themselves that black boxes reached higher temperatures after the same exposure to the Sun as the foil-covered boxes.
Students chose foil for their boxes because it is "used in cooking on grills and in ovens."
By the time you read this, we will have experienced another winter with all of the interesting weather it provided. We'll also be anticipating the change to spring weather with all of its variability. The books included in this issue’s Wordsmiths are a good source of information as you and your students try to make sense of the weather where you live.

As always, if you have found a book that you think other FOSS users should know about, please send the reference to foss@berkeley.edu, including author, title, ISBN, and a short annotation.

Can a butterfly flapping its wings have something to do with a tornado? What causes pink snow? Your students can find out the answers to these questions and more as they read about Jemima and her younger brother Rodney who decide to explore weather and keep weather journals. Pages from their journals can be viewed throughout the book and are used to introduce facts, drawings, and humor to augment the main text. Topics covered in the book include the atmosphere, wind, clouds, precipitation, thunder and lightning, weather prediction, and more. Twenty-two projects are also included and illustrated with color photos and drawings. The projects include making a hygrometer, a rain gauge, a barometer, and setting up a home weather station.


Do you know who invented the mercury barometer or who earned the 1995 Nobel Prize in Chemistry for work in atmospheric chemistry? Who answered the question, “Why is the sky blue?” You’ll find the answers in this book, one of the eight-volume Pioneers in Science series. Each volume includes biographical sketches of ten pioneers from diverse cultures and highlights their research, discoveries, and valuable contributions. Students should find their stories fascinating and inspiring, as well as see science as a human endeavor and learn more about the nature and history of science. The book includes a chronology, a section that includes websites and reference books for further reading, and a glossary.
Observations...By Larry

Get Out!

One year ago the FOSS codirectors called a small group of colleagues to a meeting in Berkeley. Their arrival coincided with the 31st annual BAEER Fair. The acronym BAEER stands for the Bay Area Environmental Education Resource Fair, a small, one-day convergence of environmental education resource providers and San Francisco Bay Area educators. It is a day to share resources, renew and expand professional networks, and celebrate the wealth of natural wonders in northern California.

Behind the festive façade of the fair, however, there was serious business at hand. Our friends were there to talk about FOSS beyond the classroom. We needed to redefine the FOSS classroom, rethink the role of FOSS teachers, and reexamine the mission of the FOSS Program. A number of timely factors had conspired to motivate a new FOSS initiative—FOSS Outdoors.

Most important among those motivating factors was the mounting scientific evidence that we, species Homo sapiens, have drifted into a contrary relationship with our planet. We have pushed our natural support systems to the limit—global water supply, global food resources on land and sea, global energy supply, global habitat destruction, global decline of species diversity, global climate alteration...get the idea?

A second factor was the progressive withdrawal (or exclusion) of our children from healthy relationships with natural systems. Richard Louv put a fine point on the issue with his instructive book, Last Child in the Woods. He cites the decline of informal, self-directed play in the outdoors, such as fantasy games, collecting, constructing, fishing, cookouts, dam-building, and so on. Louv suggests a number of reasons for the retreat from the woods, including access, fear, and restrictions imposed by well-intentioned adults who view such “destructive” activities as environmentally inappropriate. Where, he asks, will the stewards of our natural systems come from if our children never experience those natural systems we will rely on them to defend? Can those rascals damming a creek and collecting wildflowers rise to the occasion? There is evidence that the answer is yes.

Part of our responsibility here at FOSS is to do what we can to reintroduce our children to the outdoors. This will happen in a graduated continuum of levels of engagement. Easiest to enact is simply following a logical extension of the classroom activity out the door and into the schoolyard. Studying rocks in class! Go look for rocks outdoors. Investigating germination in the classroom! Go out and search for emergent plants in the schoolyard. Outdoor activities that confirm, extend, and apply concepts developed in the classroom enrich the understanding of science and redefine the context in which science is meaningful.

At the second level of engagement, a FOSS classroom investigation creates a rationale for going outside, and then the inquiry stays outside. For example, when students studying the Water Module go out to observe evaporation of water on the sidewalk, the classroom experience might continue as designed in the Teacher Guide, but a separate sequence of activities might split off and pursue more information about water in the environment. Where can we find standing water? Where does water flow on the schoolyard? Where is water introduced into the schoolyard naturally and intentionally? A number of parallel environmental education modules will provide more focused experiences for students and teachers that are related to, but are separate from, FOSS modules.

The third level of engagement involves new outdoor curriculum for long-term projects that use the schoolyard and beyond as learning resources. These modules will guide inquiry into phenology studies, weather and climate monitoring, diversity inventory, habitat survey and enhancement, and so on. These modules will be for schools that adopt the environmental and ecological sciences into their educational mission.

And one more factor motivating the FOSS Outdoors initiative is the resurrection of a valuable outdoor education resource that has lain dormant for the last couple of decades, that is, OBIS. Remember OBIS? It is the Outdoor Biology Instructional Strategies program, developed at the Lawrence Hall of Science in the early 1970s...during the first wave of environmental education awareness.

We will use the 100 OBIS activities as a resource pool for developing the learning experiences for FOSS Outdoors. You can review the OBIS activities, and leave a comment about an activity for Joanna and Erica, on the new OBIS website, www.outdoorinquiry.com.

That’s what we’re thinking. We will be encouraging teachers to break down the arbitrary limitation imposed by the classroom door and reach for the environment. When you hear the new FOSS rallying cry, GET OUT!, don’t be offended or feel rejected. It is an invitation to embrace a larger, more inclusive sense of learning place. We look forward to seeing you out there.

For more on FOSS Outdoors, see NSTA National Convention, New Orleans Taking Science Outdoors with FOSS, K–8 (See the Calendar on page 15 for more information.)

The Full Option Science System (FOSS) staff from the Lawrence Hall of Science (University of California), in cooperation with the University of Oklahoma and the National Weather Service, is presenting a FOSS Weather and Water Workshop at the National Weather Center in Norman, Oklahoma, on July 6–10, 2009. The National Weather Center, opened in 2007, is the premier weather research facility in the world.

Who should apply?
- Science education leaders from universities, educational service agencies, or school districts who are responsible for facilitating the implementation of the FOSS Weather and Water Course.
- Teachers using or planning to use the FOSS Weather and Water Course in their classrooms.

What will happen at the workshop?
- Hands-on training in the FOSS Weather and Water Course including information about and examples of notebooking, assessment, inquiry instruction, and effective class discussion techniques.
- Sharing ideas for professional development and assisting teachers who are implementing the FOSS Weather and Water curriculum.
- Presentations on weather-related research and content by research meteorologists from the National Storm Prediction Center, the National Severe Storms Lab (made famous by the NOVA programs featuring their storm chasers), and the University of Oklahoma.
- Field trips to meteorology research, weather-data gathering facilities, and businesses that market weather research and weather data.
- The opportunity to learn how to locate and use local weather information using Web resources that may be unique to your geographical area.
- An introduction to weather visualization software that you can use to enhance the FOSS materials.
- Networking with other teachers and science education leaders from across the country.

For more information contact Terry Shaw at terryshaw@aol.com.

Kit Management Program Available from Delta Education

FOSS users can take advantage of a kit scheduling and replenishment service called the Delta Science Resource Service. Delta Education will pick up your used kits and deliver replenished kits to your school based on a predetermined teaching and rotation schedule. The “teacher-ready” kits will arrive with many materials already prepped, many teacher-provided items included, and living material shipments automatically scheduled. Teachers receive email alerts to notify them of scheduled kit pick-up and delivery dates. To learn more, contact your Delta Education professional or visit www.deltaeducation.com.

Read about ASK in a New NSTA Publication

FOSS Project staff Kathy Long, Larry Malone, and Linda De Lucchi contributed a chapter to the NSTA publication Assessing Science Learning: Perspectives from Research and Practice. The volume was released last summer. The FOSS-authored chapter, entitled “Assessing Science Knowledge: Seeing More through the Formative Assessment Lens,” grows out of the NSF-funded Assessing Science Knowledge Project (ASK). It describes the emerging classroom assessment system that will become a part of FOSS in the next revision.

The chapter focuses on classroom assessment practice with emphasis placed on embedded diagnostic assessment. “The goal of embedded assessment is to monitor and guide student progress toward understanding of complex scientific process and ideas. Embedded assessment activities require teachers and students to rethink their responsibilities in the classroom learning community and to (ideally) redefine the teacher/student and student/student relationships.”

FOSS Formative Assessment Institute

Delta Education will host a one-day FOSS Institute before the 2009 NSTA National Conference in New Orleans, Louisiana. This Institute will be for educators from districts that have implemented FOSS for at least a year. The focus will be on new assessment tools and strategies designed specifically for FOSS modules grades 3–6. This Institute is designed for FOSS experienced educators—lead teachers, administrators, curriculum coordinators, professional developers, and university methods instructors.

The Institute is free, but you must register in advance to attend. To secure your spot at the Institute, please call, write, fax, or e-mail:

Pam Frisoni
Delta Education
80 Northwest Boulevard
Nashua, NH 03061
pfrisoni@delta-edu.com

Phone: 1.800.258.1302 ext. 503
Fax: 603.579.3504

FOSS Newsletter

Would you like to receive the FOSS Newsletter electronically? Please send an e-mail to tisaacs@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 issues of the FOSS Newsletter, as well as archived articles, at lhsfoss.org/newsletters.

Or if you would like to be added to the mailing list to receive this newsletter by mail, please send your name and address to:

Tara Isaacs
Delta Education
80 Northwest Boulevard
Nashua, NH 03061
tisaacs@delta-edu.com

Phone: 603.579.3487

NSTA 2009 NATIONAL CONFERENCE

New Orleans, LA March 19–22, 2009

FOSS WORKSHOPS IN THE NSTA PROGRAM
(no preregistration necessary)

THURSDAY, March 19

8:30–9:30 What’s New in FOSS?
10:30–12:00 Taking Science Outdoors with FOSS K–8
1:00–3:30 FOSS Chemical Interactions Course for Middle School

FRIDAY, March 20

8:30–11:30 Using Science Notebooks with FOSS Middle School Courses
1:00–2:30 FOSS Assessment—Valuing Academic Progress in Grades 3–6
3:30–4:30 Introduction to Planet FOSS for Middle School

SATURDAY, March 21

8:30–11:30 Using Science Notebooks with FOSS Modules K–6
1:00–2:30 Explore Weather and Water with FOSS Middle School

FOSS SUMMER 2009 MIDDLE SCHOOL WORKSHOPS

July 6–10 FOSS Weather and Water Workshop, Norman, OK (see announcement on page 14).
July 27–31 FOSS Chemical Interactions Workshop, Berkeley, CA (see announcement on page 9).

For more information about these workshops and other professional development opportunities, visit the FOSS Professional Development calendar at http://www.fossweb.com/news/calendar.php.
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 Internet with FOSS. Send your contributions to:

Sue Jagoda, Editor (skjagoda@berkeley.edu)
FOSS Newsletter
Lawrence Hall of Science
University of California
Berkeley, CA 94720-5200

The deadline for submissions to the next issue is June 12, 2009. We’re waiting to hear from you.