Take Out Your Cell Phones; It’s Time for Science

Over the past few years, school districts throughout the country have recognized a growing trend. A mobile “cell-a-bration” amongst our teenage students has occurred and it’s not going away! What are we talking about? Student cell phone use is on the rise, and in many cases their mobile phones are more sophisticated than ours. Put another way, students know how to access the plethora of functions built into these tiny social devices. According to Michio Kaku, in his new book, Physics of the Future, “Your cell phone has more computing power than NASA circa 1969.” To think that all this technology is available to our youth, and yet, many school districts ban the usage of cell phones within the classroom.

Teaching Chemical Interactions
Last fall, Pierce Middle School began implementing the FOSS Chemical Interactions Course. I have taught middle school science for 15 years, yet have never before seen a better opportunity to integrate mobile technology into my instruction. In one investigation, students were asked to figure out what the difference was between melting and dissolving. They were given the following materials per group of four.

- Two sheets of 10-by-10 cm aluminum foil squares
- 150 mL of hot water
- 150 mL of cold water
- Two glass beakers
- Four M&M’s® of the same color
- Goggles
- FOSS Chemical Interactions
  notebook sheets 60–61

The students’ first job in this activity was to create two foil cups that, when made properly, would float on the surface of the hot and cold water contained in the glass beakers. After having completed this task, students were instructed to place in each of the two beakers one

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Take Out Your Cell Phones continued

Upon completion of the investigation, students were asked to replay the video footage in their groups in order to gather as much data as possible. Students were able to freeze frames, allowing them to write down observations that they may have missed the first time. Many students walked around the classroom and shared these images with their classmates. At the end of the class, at least one student for each group e-mailed me images of their investigations, allowing me to create a digital slideshow for all my students. Students were given a grade for how well their group was able to document the findings of the investigation.

Capturing the Data
As the investigation unfolded, students nonchalantly took out their cell phones to perform their required responsibilities within the group. The recorder’s job was to take video of segments of the investigation with a cell phone. He or she could be heard narrating a play-by-play account of what was happening to each of the four M&M's® over the course of 20 minutes. The photographer’s job was to capture images of the candies that would be useful for communicating the results of the investigation. The timekeeper kept track of elapsed time using the counter on a phone, and finally, the group leader kept busy gathering all the data presented by his/her group and recording it on the more traditional lab sheet.

Students record melting and dissolving candies with their cell phones for later analysis.

Improved Student Descriptions
I assumed that since each student had photos to put in their write-ups that their descriptions would not be as rich. To my surprise, the descriptions improved. I think this was because students could go back to their images and review them again and again. The videos they took allowed them to relive exactly what had happened.

This experience showed me that the positive outcomes of using cell phones outweigh the negatives. There are always going to be students who don’t listen to rules that govern cell phone use. However, in my experience, a few ground rules help me to control the potential misuse of cell phones in the classroom. For example, all
students and parents must sign a contract acknowledging that if digital devices are used inappropriately in the classroom or without authorization from the teacher, the privilege of using cell phones in class by that individual will be prohibited. Second, I tell the students that I pick the opportunities in which they will use digital devices in the classroom, not the other way around. It would be nice to use cell phones for each lab investigation, but the reality is certain activities do not warrant the use of hand-held devices.

I believe integrating traditional teaching methodologies with current technology available to teenagers is an exciting way in which to teach science. Give it a try, you might like it. But always remember, as much as I promote mobile devices in the classroom, as Bill Gates says, “Technology is just a tool. In terms of getting the kids working together and motivating them, the teacher is the most important.”

David Romeo is a National Board Certified Teacher at Pierce Middle School in Milton, Massachusetts. He teaches seventh-grade science, and this is his first experience using the FOSS Middle School Program. Photos were provided by Julia Butler (student) and Jessica Royster, Library Media Specialist at Pierce Middle School.

Editor’s Note: The students in this article are comparing dissolving and melting of substances using the FOSS Chemical Interactions Course. Investigation 7, Part 1. By analyzing their results, students conclude that melting is an interaction between a single solid substance and heat, and dissolving is an interaction between two substances, a solvent and a solute. Now that students have differentiated between these two often-confused processes, they can continue to study each in more depth in later investigations.

Creating a Science-Centered Elementary School in Riverside, California

Integrating Reading, Writing, Excitement, and Wonder

By Cathy Klinesteker, Co-Director, FOSS California Professional Development, Lawrence Hall of Science

...nitiating a new curriculum, using FOSS, not only to improve science, but as the focus for developing English language literacy and reinforcing math skills, is a gargantuan task! But that’s just what Dale Moore, District Instructional Specialist, and Raul Ayala, Principal, proposed to Richard Pacheco, Delta Education Regional FOSS Representative. In short order, they began the implementation at Hyatt Elementary School in Riverside Unified School District (Southern California), using the FOSS program as the curriculum core for engaging students in learning and in developing language skills.

Here’s a peek into one of the classrooms. Amanda Bonales, Hyatt Elementary fifth-grade teacher, begins with experimentation using pendulums. Students decide what variables they think will affect their pendulums’ swings. Each group of students discusses and comes to an agreement about what they want to do (no small task for enthusiastic 10-year-olds). Before getting materials, they write a plan describing what variable they will test and how they’ll go about it. They must include a plan for data collection. The investigation has designed junctures for summarizing and reflecting.—With 42 students in her class, Ms. Bonales has challenges—with space for active investigation, with different groups moving through the inquiry at different rates, and with supporting those student groups who are struggling with process and/or the content. But she is up for the challenge and allows time for students to develop their own understanding, flowing around the classroom assessing progress, and asking guiding questions to nudge students in productive directions. Most groups are progressing well, but a few have stalled. Ms. Bonales calls those students to a gathering place near the front where she uses visuals, materials, and English-language learning strategies to assist the small group until all students understand the process and concept of controlled experimentation using a pendulum. When these students return to their workstations, all students are engaged in their swinger experiments, recording data in their science notebooks, talking to one another about results, and making adjustments to their thinking about variables as they continue the investigation. There is a lot of laughing, thinking, talking, and writing!

Similar science and language stories play out in all the third-, fourth-, and fifth-grade classrooms at Hyatt. Amazingly, the transformation of Hyatt to an active science-centered school has taken only one year. This short transformation time is due to very thoughtful, deliberate planning and implementation, the commitment of great administrators at the site and district level, Mr. Pacheco’s continuing support of high quality professional development, and a teaching staff willing to work hard and put in the extra time to better meet the learning needs of their students. The District Board of Trustees has also expressed its support for this innovative program.

Here’s how they did it. After an initial planning meeting, Mr. Moore, Mr. Ayala, Continued on page 4
and Mr. Pacheco agreed that implementing a science-centered curriculum would require a detailed initial professional development workshop. This initial workshop was designed to expose the design and philosophy of the specific grade level FOSS modules, to engage teachers in experiencing the activities, to introduce the use of student science notebooks, and to provide a FOSS Teacher Guide walk-through (to make certain that teachers understood where to find the details for each lesson, the science background information, and strategies for managing the student materials). Teachers were also introduced to how to use the online FOSSweb digital resources that accompany the curriculum. This introductory workshop also included planning time so teachers would be ready to immediately begin Investigation 1 of their grade level module. FOSS consultant Kristen Moorhead was brought on to develop the detailed plan for the entire professional development process. For the first year, the focus was on grades three, four, and five. In addition to being the project coordinator, Ms. Moorhead continued to work with the fifth-grade teachers throughout the year. Two other consultants, April Holton (fourth grade) and Janey Kaufmann (third grade), participated in the initial teacher professional development and worked with their grade level teachers throughout the year.

Two to three weeks after the introductory in-depth workshop, and after teachers had time to finish Investigation 1, the consultants came back to provide additional training and planning for Investigation 2. Follow-up professional development happened on extended early release days, providing 3.5 hours of collaborative grade-level specific professional development, repeated several times throughout the year. These days were always on a Thursday. The consultants stayed the next day, Friday, for in-class coaching geared to individual teacher needs. This coaching was a combination of content coaching and cognitive coaching (a metacognitive process focused on teaching practice). In other words, the two educators in the classroom focused on the specific content/process as defined by the teacher, then spent time in post-conference discussing what happened and how to make it even better. This reflective learning was taken forward into the next lesson. Coaches came two or three times for each FOSS module. Because of this content support and professional development structure, in the words of Mr. Ayala, “This was the most intensive, most supportive, best professional development my teachers have ever had.”

The plan also included ongoing planning meetings with Ms. Moorhead, Mr. Pacheco, Mr. Moore, and Mr. Ayala. They worked throughout the year to make adjustments to the professional development and to help cultivate close relationships between teachers and consultants so that email and phone contact could occur as needed between workshops and coaching sessions.

As the project unfolded, Mr. Moore and Mr. Ayala reported seeing full student participation, teachers feeling very supported, and good student performance, in terms of engagement and academic growth. They discussed this with Mr. Pacheco and Ms. Moorhead and decided to work together to make a presentation at a district-wide principals’ meeting with the purpose of sharing their work and inviting other schools to initiate a similar process. The four members of the planning team developed the program for the administrator meeting and had equal voice in its presentation.

The entire presentation took 45 minutes and included:
- Mr. Moore setting the context for how the project was initiated and how it worked.
- Mr. Ayala sharing his goals for the school. This included the need to strengthen science and integrate language arts and mathematics so these subject skills could be addressed through a content focus that was engaging and motivating for students.
- Ms. Moorhead bringing samples of Hyatt School student work and showing a video of a FOSS lesson in a Hyatt classroom.
- Mr. Pacheco ending the presentation by sharing the FOSS philosophy, how FOSS meets the needs of all students, and describing how it is designed to strongly support teachers during all phases of the science lesson.

Hyatt is continuing its program. Mr. Ayala transferred to another campus in the district to initiate the FOSS program at a second elementary school. Other schools are implementing FOSS incrementally as resources become available. Most importantly, in the FOSS classes at Hyatt Elementary, as exemplified in Ms. Bonales’s fifth-grade, teams of motivated students are organizing, planning, questioning, talking, testing, collecting data, and reporting on their experiences with drawings and oral and written responses, and enjoying the opportunity to learn in the exciting context of science.
Mention science as a high-interest topic for young children and you get a resounding “yes!” from parents, families, and educators. Science engages early learners as they explore the living and physical world around them. Through investigation and play, young children learn how the world works by observing pill bugs, splashing in the bathtub, or searching for rocks in the park. Science is child’s play and an integral part of child development.

Children are surrounded by science opportunities, and if they’re in kindergarten, they may be doing FOSS modules, such as the Animals Two by Two Module. The Animals Two by Two Module provides teachers with investigations that address the learning needs of young children and build important science practices and content. In this module, children investigate and care for living organisms and experience them firsthand. Teachers guide the students’ natural curiosity toward developing observation and communication skills, along with cultivating a respect for living things. Knowledge about how animals are structured, how they live, and how they interact with their habitats is gained through experience instead of just being told.

FOSS acknowledges how young children learn best, yet guides them in a gently structured way to help them learn science concepts as well as scientific practices. FOSS kindergarten modules assist teachers in bridging student experiences from the informal to a more formal learning of science while supporting the wonder of being a child!

Here in the United States, kindergarten is for five-year-olds and is the first year of their elementary school experience. Younger children, three- to five-year-olds, may attend preschool where the emphasis is on the development of social, emotional, and cognitive practices in the context of play and exploration with materials in their environment.

In Japan, kindergarten is for three- to five-year-olds. On a recent trip to Osaka, Japan, I visited Nishigori Kindergarten, a school just next door to Osaka Ohtani University. This school is composed of three classrooms, one for each age group. Nishigori Kindergarten is also a lab school for those researching child development. Professor Yoshiko Nagase and Kyoko Mine at Osaka Ohtani University, School of Early Childhood Education, explain the Japanese kindergarten program through the following discussion.

At kindergartens and daycare centers, the focus of educational activities is on realms, which are set up as a context to evaluate children’s development and their participation in activities. By comparison, elementary schools focus on subjects, which are systems comprised of knowledge and skills based on accumulated scientific knowledge, which children in elementary school and higher grades are to acquire. Realms and subjects are substantially different not only in name but also conceptually. As a result of this distinction, no sessions in kindergartens or daycare centers are labeled as “an hour targeting such and such subject.” Instead, children’s activities are viewed through realms, those larger contexts identified as most important for early learners.

The current five realms [health, human relationships, environment, language, and expression] each contain goals based on the focuses...
Kindergarten Science continued

of sentiment, motivation, and attitude. For example, the goals of the environment realm are to familiarize children with their surroundings; to intrigue them with various phenomena through interaction with nature; to engage them in their surrounding environment; to allow them to enjoy discoveries and think about different topics; to encourage them to incorporate such discoveries into their daily life; and to develop their senses towards perceiving the characteristics of objects, quantities, characters of written language, etc. These goals define the environment as the realm that encourages children to develop their interest in daily phenomena and to actively participate, think, and discover.

At Nishigori Kindergarten, I had the opportunity to observe the three-, four-, and five-year-old classes as they participated in environment realm focused sessions. The five-year-olds were rolling various spheres down cardboard ramps. Most were working alone or with a partner, and students could freely choose objects to try. There was a lot of excited discussion and activity among the children. The teacher observed the interactions and didn’t participate other than to answer questions or guide their exploration. This activity was followed by a whole group discussion. The teacher brought a sample ramp with balls to the front and asked for a volunteer to come up. She asked, “What will happen if I roll this ball? This other ball? These two together?” Each student responded, or if he/she needed help, the teacher asked the group to provide suggestions. This was all taking place in Japanese, of course, but I could tell she was skillfully guiding a discussion about their experiences. The students communicated their predictions and explanations to the group prompted by the teacher’s question. The last part of the session had the students involved with a ramp that was three feet tall at the top with a runway of about eight feet. The students were so excited to roll balls and other objects down this giant ramp and compare their findings to their mini-ramp experiences. Again, the teachers had designed the sequence of activities to engage students with a challenge involving familiar materials, to have students discuss and reflect on their experiences, and to apply what they discovered to a new situation. All this went on, while supporting student independence and curiosity. The session reminded me of Investigation 4, Rollers from the FOSS Balance and Motion Module. Not only were the activities and materials similar, but the way the teacher designed and guided the student experiences paralleled what we do in FOSS—scaffold student learning so students discover and inquire on their own. Professor Nagase and Ms. Mine continue their discussion of good kindergarten teacher practice in Japan with the following.

In classrooms, things often do not go as originally planned, no matter how carefully and thoroughly teachers and students have been prepared. Children’s physical condition, classroom atmosphere, and/or the ways teachers deliver instruction affect the course of activities. Keeping in mind the plan they had originally envisioned, teachers carefully observe each child or group, judge the situation, and apply necessary amendments to their plans without clinging too much to their original designs.

When some children are found to have difficulties participating in activities, teachers flexibly modify their methods according to each child’s characteristics and the root causes of his or her difficulty. They give more detailed instructions to students struggling to understand how to conduct activities. At the same time, they provide a friendly and encouraging environment to those who understand concepts but are not confident by accepting their worries and fears instead of giving instructions. By providing personalized care that caters to each child’s needs, every child is enabled to participate and to share a sense of achievement.

I also observed a magnet lesson in the three- and four-year-old classes. Careful attention was made to the classroom environment, the materials, and sequence of activities. The four-year-olds first got two magnets (they had experience with one magnet in a previous session). Trays of different labeled materials were out on tables for them to explore with their magnets. There was quite a bit of excitement and sharing of what would stick or wouldn’t stick. One student made a magnet “ring” by placing one magnet on top of her finger and one behind. She was showing it off, and soon, everyone was wearing one. Another boy discovered that the magnets would stick to the legs of the tables and the frame of the sliding door. After the investigation, the teacher gathered the group and invited students to come up and share and demonstrate what they discovered. It was a wonderful example of a teacher guiding the students to investigate on their own and share their evidence and explanations. Science in action! The three-year-olds had a similar experience but with one magnet. After seeing
what happens with different materials, the children were challenged to go around the room to see what would stick to the magnet. One girl crawled into a cubby and found that her magnet stuck to the coat hook. Another boy discovered that his magnet stuck to a white board. All the children gathered around and excitedly stuck their magnet on the board too. It was very impressive to see the thoughtful design and development that went into these three science sessions. By creating the right environment, and using guiding questions and practices, teachers were able to facilitate student learning of science concepts and foundational skills in an appropriate and engaging way.

Professor Takuya Kotani, a colleague of Professor Nagase and Ms. Mine, is researching a change to the current K–2 curriculum in Japan. The following is a summary of his plan.

Science education in Japan lays much emphasis on the understanding of scientific knowledge. However, our science curriculum shifts the emphasis to the acquisition of science process skills including observation, classification, communication, prediction, measurement, and inference.

We hope to enable young children to think independently and develop new vocabulary or naive theories for various natural phenomena. However, their naive theories are not always consistent with scientific knowledge. Nevertheless, we believe that it is more important for young children to think deeply and develop their own thoughts than to be driven to the right answers.

We think that our curriculum can achieve the above objectives through “scientific play.” Scientific play in our curriculum means play with various materials. Through scientific play, young children can develop science process skills and acquire physical knowledge, such as attributes of materials and the principles behind them. In our curriculum, scientific play consists of three elements: cognitive, emotional, and social. The cognitive element is defined as the skills needed for thinking. The emotional element comprises feelings such as interest, delight, sadness, and pleasure. We think of the emotional element as the motivation for active learning because feelings prompt children to play. The social element is defined as social skills, such as being disciplined, cooperating with others, and controlling one’s emotions. Among the three elements, our model places a greater focus on the cognitive element yet incorporates the other two as well.

Following my classroom visits, I was invited to participate in a symposium to discuss methods of science education in early childhood and elementary school programs. I shared the FOSS philosophy and the newly-released national science framework. A panel discussion regarding science education in Japan and the efforts for reform was conducted. Classroom teachers and pre-service teachers later participated in workshops highlighting hands-on, inquiry-based science activities. It was a well-received symposium with close to 100 educators attending. Participants and organizers agreed that it was an invaluable cross-cultural opportunity to come together and discuss the future of science education in both countries. Dr. Noboru Tanaka, the fourth member of the research team, summarizes the efforts of their early childhood science research and the impact on the future.

Our project team will develop a curriculum for young children that will focus on science education in a consistent manner. We have developed a representative science curriculum for children ages three to five years. Lesson topics include using a magnet and the properties of air. We also observed educational practices in kindergarten and elementary schools. Our efforts advanced the development of a more widely implementable science program grounded in the findings of our research.

The second focus of our curriculum is to create a framework for evaluation. Our model determines the criteria to objectively evaluate a child’s abilities, so that individualized instruction can be aligned with educational objectives. Many evaluation models we examined use a portfolio approach; however, our focus is on attempting to create a model that increases objectivity.

The third focus is to create a curriculum that integrates social and scientific understanding because children regard their world and their society through these lenses. The program we will develop will cultivate general understanding of the world in kindergarten children. In closing, we hope readers will join us in pondering the future of science education for young children.
Public Environmental Magnet Schools in Louisville, Kentucky

By Joanna Snyder, FOSS Outdoor Education Developer, The Lawrence Hall of Science; Darleen Horton, Environmental Education Coordinator, Cane Run Elementary School; Brenda Stokes, Environmental Education Coordinator, Portland Elementary School; Caryn Walker, Environmental Education Resource Teacher, Jefferson County Public Schools; Bryan Thompson, Naturalist, Jefferson County Public Schools

“Students cannot be expected to develop environmental stewardship without the deep understanding that only grows from a coherent intentional curriculum that engages them in the outdoors.” —Jefferson County Public Schools

EPA Grant

The Jefferson County Public Schools (JCPS) began an initiative in 2008 to create magnet schools throughout Louisville, Kentucky. One of the initiatives included the development of two elementary environmental education magnet schools (EEMS). Cane Run Elementary and Portland Elementary School, two predominately low-income and low performing schools, were selected and began components of the magnet in 2009.

A U.S. Environmental Protection Agency Grant was awarded to the EEMS to support the implementation of the environmental magnet schools. This community-based endeavor included developers from FOSS, educators at the Louisville Zoo, naturalists from Blackacre State Nature Preserve, working with the principals of the two schools, and Environmental Education Coordinators appointed at each school to support school culture transition. The goal was to integrate local outdoor environments into the FOSS science program, but it quickly moved beyond science and throughout the school learning culture.

Although this was a top-down initiative, the schools have embraced this mission, and the transformation has been profound. It’s remarkable to see the changes, from barren asphalt schoolyards to schoolyards with pond habitats, fruitful garden beds, and numerous outdoor gathering spaces for students. Within just three years, the environmental magnet mission has permeated throughout all aspects of the schools. Below are three first-hand accounts of the transformation, each told by the people who were a part of the work.

Cane Run Elementary School (by Darleen Horton, Cane Run EE Coordinator)

The Cane Run Elementary School is located in the low-income industrial corridor of Louisville, Kentucky. Our students live in nearby neighborhoods where there is
little green space, few parks, and few sidewalks, and 95% live below the poverty level. When the Cane Run Elementary Environmental Magnet began, classes only went outdoors for recess or fire drills, and teachers and families were not comfortable in nature.

Although the school underwent an extensive renovation in 2009, which included many environmentally friendly features that set the stage for an environmental focus, student engagement was still missing.

The school is fortunate to have a large schoolyard for creating an outdoor classroom, but we realized that with budget constraints, partnerships would be crucial for our success. Faculty and students began making wish lists for things they’d like to see in an outdoor classroom. The classroom would provide a setting for increasing environmental literacy and making natural, real world connections to the curriculum. We invited managers from the neighboring chemical plants to a partnership breakfast where we shared the school’s vision to foster real-world connections through teaching, guiding, inspiring and challenging our students. These new partners embraced our vision, rolled up their sleeves, and went to work building additional gardens, a physical science space, a large close up sundial, boulder seating areas, a boulder amphitheatre, a discovery zone, and an amazing water feature with a pond, stream and waterfall. We added a huge decomposing log, a walking trail, butterfly and bee gardens, and an in-ground geologic map of the state. Each of these features provides outdoor experiences with a curricular purpose.

Even with the school’s commitment, there were still challenges as teachers struggled to find time and methods to add an environmental component to their day. In response to this challenge, with support from FOSS, the Green Leadership Team was formed in the summer of 2011. Now the Green Leadership Team lends support and encouragement to the entire staff, who work to connect daily outdoor learning with an environmental emphasis to the curriculum while enhancing the love and understanding of nature and of the world. They strive to be a cooperative and collaborating staff, leading students in becoming inquisitive, critical thinkers who care for the environment. We have meaningful professional development and intentional conversations to break down barriers and plan quality outdoor experiences.

Environmental education (EE) is cross-curricular by its very nature and helps children expand their intellectual development and problem solving skills. Children learn to collect data and produce written products that make sense in a real world. Math lessons abound in the gardens. Some examples include second graders using jump ropes to create a grid for planting and older students calculating the area and perimeter of gardens or learning about angles in the pizza garden. Young scientists may also measure, compare, and contrast pumpkins, beans, and critters.

Children see and understand the interrelationship of life within their environment as they use nature as a looking glass. Outdoor education can level the playing field for children with diverse learning styles.

While observing dragonflies at the pond, a student commented, “Our school is like a living museum of science!” Students are discovering the diverse world around them and are making connections that will become a part of who they are. We believe that creating meaningful outdoor experiences will enhance the lives of our students, their families, our staff, and our community.

Cane Run’s vision for the future includes a plan to embed technology, Continued on page 10
more fully utilizing iPads®, cameras, and video to support curriculum in the outdoor classroom. Our EE Club will continue their work with the Recycling Project, Green and Healthy Schools Program, and NEED (National Energy Education Development), where they won a state and national award for their environmental projects this year. Our garden club will work throughout the summer to care for school gardens and the community garden, built as one of our many service learning projects. We will invite engineers and scientists from our business partners to bring their expertise to our students and continue to provide evening events that include families and community. We are committed to further embedding EE throughout the curriculum, increasing impact of both the academic and natural worlds on our students.

Portland Elementary School
(by Brenda Stokes, Portland EE Coordinator)

Portland Elementary School comprises a small city block in a densely populated neighborhood on the west end of Louisville, with 90% of the student body considered at-risk. When Portland was designated as an environmental magnet, the schoolyard was mostly blacktop and bare soil from which nothing could grow. Through the EPA grant, several smaller grants, and JCPS funding, our schoolyard has transformed into one containing multiple outdoor classrooms. Teachers go to the schoolyard to extend FOSS science lessons but also go outside for reading, writing, math, and social studies—all interdisciplinary lessons, which make learning so much more meaningful to students.

In the beginning, many faculty members had little knowledge about environmental issues and how to connect what they taught in the classroom to the outdoors. Many students (and some teachers) had little connection to the outdoors. We started by pushing the comfort zones of both students and faculty before we could begin our environmental journey. We have come a long way in developing a respect for nature. During our first field studies, students were in a place so unfamiliar to them that they didn’t notice the small important things. Now they investigate each little thing, curious to learn more. We feel we are growing citizens that will be advocates for preserving outdoor spaces as adults. Teachers also found their comfort zone outdoors and now so many teachers want to use the outdoor classrooms that it is necessary to have a schedule board to avoid overlap of classes.

The outdoor classrooms consist of different areas featuring unique habitats. We have native grassland, a shade garden, wildflower meadow, and stream and pond habitats where students collect organisms and explore actual living structures, life cycles, and predator/prey relationships. Each grade level tends to a raised garden bed that features food grown from different countries to help students gain respect for different cultures. Students grow, tend, harvest, and eat these foods while studying that country. Math is also extended outdoors with a variety of connections: shapes, area, symmetry, perimeter, measurement, and more.

Teachers also use each part of the outdoor classroom as a springboard for writing. Students take pictures with iPads and cameras while outside to guide writing pieces with incredible detail. Teachers quickly discovered that students are more focused outside, and so, many days you will find students outside reading under a tree.

We now provide professional development for teachers planning field studies and raised bed gardens, along with support on how to integrate curriculum. Grants from local companies and organizations continue to provide funds to make our environmental program successful. Portland’s popular after school environmental club meets weekly to focus on community service learning. Portland has an extended recycling program for food, paper and plastic waste in our cafeteria, as well as cell phones, chip bags, and ink cartridges. We also compost waste from the lunchroom in our raised beds and worm compost bins. Cafeteria and janitorial staff have been very supportive in moving our recycling program forward. They train students from each grade to manage the lunchroom program, giving students ownership in what’s going on. Our environmental club has participated in the Kentucky Green and Healthy Schools program, conducting an energy audit of our school, a transportation audit that guided us toward reducing idling at the student pickup area, and the installation of a bike rack to encourage students to ride to school. This year we moved to a School in Progress level.
With guidance and training through FOSS, Portland began an environmental leadership team. We meet at least monthly to find ways to make teaching outside easier for teachers and to move the environmental program forward. Planning Earth Day and environmental family nights are among the many things on our agendas.

Future vision for Portland’s mission is to move students toward more service learning at all grade levels. We want to advance what we do on with the public schools and the Blackacre Conservancy to provide educational connections with all standards where students won’t have separate classes, helping everything mesh together as a unit. With this move forward, we will have environmental education embedded into each day.

**Blackacre Environmental Education Center** (by Caryn Walker, JCPS EE Resource Teacher; and Bryan Thompson, JCPS Naturalist)

The environmental education magnet schools formed a partnership with Blackacre State Nature Preserve, which helped them to establish an environmental focus by providing a common outdoor experience connecting classroom studies to the natural world for teachers and students of all grade levels. Blackacre is a unique resource to Jefferson County Public Schools; the property was donated in 1979 to the Nature Preserve Commission who entered a ten-year memorandum of agreement with the public schools and the Blackacre Conservancy to provide educational experiences to the citizens of Louisville. This 179-acre property includes a 1790s historic homestead with farm animals and a nature preserve with forests, fields, and streams. Initially, Portland and Cane Run teachers met with JCPS environmental educators to develop a focused field study experience directly connected to student learning in the science classroom. Teachers planned for ways that students would connect in the classroom prior to their site visit, as well as intentional ways to follow up after the field study. This intentional focus provided the students with engaging experiences that created meaningful real-life connections to their learning. First graders, who had been investigating the FOSS Air and Weather Module at school, spent the day as meteorologists at Blackacre, identifying clouds, testing air movement, and recording the air temperature in different environments. It was amazing to watch as students figured out that environmental factors affect animals and plants; the May apples were best suited for the forest and the grasses best suited for the field.

Each grade group was able to visit Blackacre twice a year, allowing for a great comparison between seasons. As the students progressed from kindergarten through the upper grades, their experiences and knowledge about the Blackacre environment continued to grow. Three years after the collaboration began, we asked the fifth-grade students to think about their most memorable experiences. One student said she would never forget the actual aquatic food chain she witnessed when a small bluegill at Dragonfly Pond ate a cricket that had wondered too close to the water! For another student the best memory was exploring the Waterfall Quarry, where he learned about how pioneer families, like the Tylers, who settled Blackacre, were able to quarry the limestone for their homesteads. Whether it was the pond or the quarry, the common denominator among all environmental students (in addition to the reinforcement of classroom learning), was that they had developed a better understanding of the natural world in which they live and hopefully were on their way to becoming better stewards of the land.

**Conclusion**

It is remarkable how far the faculty and students of Cane Run and Portland have come over the last three years. What began as a push of comfort zones to involve the outdoors in teaching has become a faculty-driven effort to integrate the local community and environment into the entire school-learning culture. But such change does not happen overnight. It took several years, starting year one with focusing on the FOSS curriculum and Taking FOSS Outdoors initiatives. By year two, with full administrative support, training, and time to plan, faculty naturally sought use of the outdoor classrooms for use with other subjects.

Darleen Horton summarizes the current success of the program, “Just becoming a magnet wasn’t enough to bring success to these two schools—it took looking into the eyes and hearts of the student population to know that the environmental concept was working. It was through the student learning that teachers were convinced. Teachers were able to see the program’s success in the excitement in students’ eyes and the joy in their hearts every time they turned over a leaf, harvested from their garden, or explored the changes in the pond—this was what learning was all about, engaging students in the world we live in, the natural world!”
Recently, I was listening to Bill Moyers lamenting the woeful state of political affairs in these United States, a nation whose politicians are paralyzed by a debilitating state of denial. Mr. Moyers was thinking specifically of the recent disclosure by a commission of eminent scientists who conclude that Earth is nearing a tipping point at which our species will have degraded Earth’s natural systems to a degree that will render Earth unable to sustain humanity into the future. One key response to this disquieting pronouncement should be to invest hugely in the education of our future citizens; our children are our hope for the future—when they advance to the roles of decision makers. This is our only hope for redemption because clearly the current crop of decision makers is profoundly dedicated to scientific ignorance and steeped in institutionalized denial.

So who is going to reform the science education of our children? The noble science reform efforts mounted by the National Science Foundation during the 1990s challenged large ponderous systems to develop new structures and processes at the state, urban city, and rural consortium levels. The leaders of the massive reform projects labored mightily to effect positive change in the science educations of the children surrounding them. The systems were too big to produce comprehensive systemic reform.

But now there is a new grand marshal in town, leading the new reform parade. The new parade is small—the individual school building. And the new grand marshal is the school principal. I’m seeing tremendous potential for a new distributed science education reform movement—centered in self-selecting schools. As I look around the American education landscape, I see lots of principals with hands up, saying, “Me! Me! Work with my school!”

And there is a commonality among these volunteers. They are principals who are in need of a new vision of hope. The schools that are prime candidates for science reform are schools that have experienced protracted disappointments in the areas of student motivation and academic achievement, staff fragmentation, and community conflict. Persistent underachieving schools in danger of being restructured, schools at the end of their ropes, are prime candidates to embrace a new science-centered curriculum reform.

A science-centered (FOSS-centered) school reform effort has several salient features:

- commitment by the principal (and tacit support by the district) to implement a science curriculum with high fidelity, engaging all of the dimensions of the program
  - active learning (hands-on)
  - use of science notebooks
  - formative assessment system
  - outdoor activity;

- commitment to leadership development at all levels, not just top down, but distributed throughout the school staff;

There are days when I sense a new movement building in science education. It’s in the modest ballyhoo concerning the nature and importance of the emergent Next Generation Science Standards; in the background murmur calling for a STEM-ready generation of students, and in the usual gnashing of teeth and self-flagellation associated with standardized science testing. All this diverse activity feels like a science education reform parade taking shape. But who is marching in the parade, and more importantly, who is leading?

Lately, I’ve been thinking quite a lot about this situation. If there is a STEM, NGSS, accountability reform parade taking shape, those marching will be the usual suspects: classroom teachers, science education administrators, and a few interested members of the community. But who will be leading the parade? Traditionally, the grand marshal is a powerful outsider from uptown who is anointed by the parade organizers to ride at the front of the parade. And if the reform parade is a great spectacle, heralded as a tremendous success, the grand marshal stands forward to accept the credit for a job well done. But if the parade veers off course and dissolves into disorder and chaos, the grand marshal retreats to the high ground and looks down on the disarray, seeking marchers to blame for the failed parade.

But this time the gathering parade is different. It is a much smaller, self-contained enterprise. The classroom teachers are there, flanked by the interested members of the community, but, surprise, surprise, the school site administrator is out in front leading the reform parade. It’s a small, school-based reform parade. Marching with the teachers are, for the first time, the students for whom the parade is staged.

Observations . . . by Larry
Who’s Leading the Parade?

By Larry Malone, FOSS Co-director
FOSS Tech Corner

FOSSweb 2.0 Is Here!
The FOSSweb tech team is very excited to announce the release of the new FOSSweb! Launched in August, users of FOSS Second and Third Editions are now able to use the new FOSSweb.

Have you registered for FOSSweb yet? You will need to register to gain access to some of the brand new features:
- Easy access to eBooks* and eGuides*
- Easy access to all module resources on a single page
- Interactive whiteboard resources*
- Class notes and assignments

Another new feature for our elementary modules is what we call “Resources by Investigation.” Resources by Investigation provides an easy way for teachers to access the necessary resources for each Investigation part in a module. It lists links to the teacher masters, assessment masters, notebook sheets, and focus questions by part. It also links to any virtual tutorials, virtual investigations, streaming video clips, and interactive whiteboard resources for each part.

To access the new FOSSweb, you will need to register for the site. On the FOSSweb homepage, click on the “New FOSSweb User? Click Here?” link. Next, you will be walked through the process to set up an account. Your email address will be your username, and you will create your own password.

In order to gain access to all the resources for a module, you will need to enter an access code. Third Edition users can find the access code for each module on the inside cover of each corresponding Investigations Guide.

If you are a Second Edition user, you will be able to request an access code after you register or by clicking on the “Previous User?” link on the FOSSweb homepage. Once you send the request form, you will receive an access code for the Second Edition modules you are using.

Have fun exploring the new FOSSweb! We hope you love it as much as we do!

* If you don’t see these resources on your teacher page, contact your Delta sales representative for more information.

Tablet Update
As we mentioned in this column last spring, we are working toward making sure all our content is accessible on all tablet and other mobile devices. While this project is still in development, we wanted to alert you to the fact that FOSSweb Flash® assets can be accessed using alternative browsers.

There are a number of available Flash browser apps for iPad®. Rover is an example of a free Flash browser for use on iPads. Designed with educators specifically in mind, Rover has CIPA compliant content filter that will be compliant with most school firewall policies. Simply type www.FOSSweb.com into the Rover URL bar to get started using FOSSweb activities. With any Flash browser app, be sure to test the activities you want to use before you use them with your class.

We’ll keep you updated on our Flash conversion initiative. We hope to soon allow all users to access FOSSweb activities from any browser or device!

We want to hear from you!
Please send us your feedback! We want to hear from you—both the good and the bad—about FOSSweb! Send an email to support@fossweb.com or call our support line at 510-643-6997.
What benefits have you seen with the FOSS program?

Beyond the educational value of FOSS is the social value. Students work in teams; sometimes they might work with a best friend and other times they may work with someone that they don’t get along with. Students have learned to work cooperatively and think flexibly. They don’t just try to find the one answer because usually there is more than one way to solve a problem. When students work in groups they listen to each other’s ideas and use multiple ideas to solve problems. That is what makes my day.

— Matt Heywood, fourth- and fifth-grade science teacher

The FOSS program benefits teachers as well as students. I feel confident in teaching the material and leading students to discover things about science on their own. For the children, they are keyed in on the scientific process and the importance of observations and higher levels of thinking.

— Karleen Schwartz, third-grade teacher

Students love hands-on activities and working together. They are better able to articulate their thoughts with peers. They also are more aware of their peer interactions.

— Brittney Studley, third-grade teacher

What has the student response been like in your classroom?

Very positive! If we aren’t doing science for a day they want a good reason why not! They love their notebooks also… they have the “don’t mess with my notebook” attitude.

— Brittney Studley, third-grade teacher

Students enjoy solving problems in different situations. FOSS allows them to be successful in this problem-solving environment and shows me how to help them. Students have said to me how much more they enjoy science this year because they get to be more active, not just when they are planning and running experiments or collecting data, but also when we are showing what we have learned by doing a give 1 get 1 or a circle share.

— Matt Heywood, fourth- and fifth-grade science teacher

The students absolutely LOVED the Water Module, even more than Measurement. They enjoyed notebooking and took pride in their notebooks as a place to learn and a source from which to study.

— Karleen Schwartz, third-grade teacher

How do you feel the STEM initiative supports the new Common Core for ELA and Math?

I like the way that everything has been put together in a unit of study. The stories and articles that the students read tie directly into what they are doing in the classroom. Students can see how science, math, reading and writing go across the curriculum. I also feel that journaling in my class has become extremely important and the students understand that it is not how fast can you get it done or how much can you do, but the quality of work that matters.

— Matt Heywood, fourth- and fifth-grade science teacher

The STEM initiative definitely supports the common core shifts. It provides the opportunities to use ELA skills and math in science work. This has often been the component missing from our previous science programs. The opportunities for the students to read about real life science stories ties the curriculum together very well. It also provides the excelling student the opportunity to reflect and respond to extended activities that challenge their thinking and problem-solving techniques. In a technology-driven society, the basis of the initiative supports the kind of learning students need to have in order to be competitive in today’s world.

— Karleen Schwartz, third-grade teacher

What changes have you seen in the classroom after implementing FOSS?

I have seen many positive changes while implementing the FOSS program.
The major change is the excitement the children have at science time. They are engaged, thinking, making predictions, and collecting data to support their predictions and see science as a serious class of study.

— Karleen Schwartz, third-grade teacher

I have seen that students are engaged when doing science. I also see they can support claims with evidence in other subject areas. They also can explain their thinking better and write step-by-step plans thoroughly.

— Brittney Studley, third-grade teacher

One major area of growth I have seen since implementing FOSS is the students’ level of confidence in problem solving. In our fifth-grade FOSS unit on Mixtures and Solutions they had a performance assessment. The students had to read multiple directions, follow steps for simple experiments, and make observations. I wasn’t sure how things were going to go. I was amazed when only two out of 58 students did not follow directions for the first half of the test. Only five out of 58 students scored below a three.

— Matt Heywood, fourth- and fifth-grade science teacher

(Reprinted from Empire State STEM Learning Network, Greater Southern Tier STEM Education newsletter, March 2012, pp. 2–3)
http://stem.gstboces.org/STEM%20newsletters/4%20STEM%20newsletter%20March%202012.pdf

A Parent’s Perspective on FOSS
by Elisabeth Bostwick

O ne Saturday afternoon, the sound of water flowing from the bathroom sink continuously, along with the gleeful sound of laughter, piqued my interest. Unsure of what I would see, I slowly opened the bathroom door. My second grader, Julian, quickly explained to me that he was filling a balloon with a little water, then blowing it up with air, so that the air pressure would force the water out creating a child-made “water-squirter.” With my child happily experimenting and applying scientific knowledge, I just smiled at the drops of water rolling down the mirror and walls.

Moments like that are what shape a child’s learning and encourage them to go deeper.

Julian loves his time of exploration, but my husband and I have also witnessed several occasions of his application of science.

Another time, I entered our kitchen and thought Julian and his brother, Nolan, a preschooler, were about to have quite a smorgasbord of odd foods. They had ranch dressing, ketchup, honey, and soapy water out on the kitchen table. As I stood quietly and observed, I noticed Julian had created a Venn diagram to compare and contrast the items. Julian asked Nolan, “Which liquid is opaque?” Nolan picked up the ranch dressing. Julian then had him place it in the corresponding location on the diagram. This process continued for each liquid. They categorized the items using vocabulary such as translucent, transparent, opaque, and viscous to describe the properties of each liquid. Julian would inquire, “How do you know this is viscous?” and “Which liquid has the greatest viscosity?”

Julian was teaching Nolan how one liquid can have more than one property and that some liquids can have properties in common. He wasn’t telling Nolan, but rather teaching him through inquiry.

Fortunately, Julian is studying science through FOSS this year in second grade. There are numerous times I am stopped in my tracks, amazed by how little details that most of us would overlook in our environment capture his attention. FOSS has taught him to be more observant and to question, and he then finds ways to apply scientific understanding. He even goes further by educating those around him, including his younger brother.

Since Julian has learned science through FOSS, he continuously draws designs for robots, machinery, buildings, and more. He makes lists of materials and other resources he would need in order to complete his projects. I cannot look at him and guess what he will become when he grows up, as his interests are so vast. Thanks in part to FOSS, his thinking of the world around him has been unlocked, his curiosity is insatiable, and his ideas are endless. 

(Reprinted from Empire State STEM Learning Network, Greater Southern Tier STEM Education newsletter, March 2012, p. 4)
http://stem.gstboces.org/STEM%20newsletters/4%20STEM%20newsletter%20March%202012.pdf
New from the Wordsmiths

By Erica Beck Spencer
FOSS Outdoor Initiatives Coordinator

As you embark on trips to the schoolyard with students, it is not necessary that you know everything they might discover. However, if you would like to select some appropriate field guides to use with your students, here are a few of my favorite guides.

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.

Tracks & Sign of Insects and Other Invertebrates: A Guide to North American Species

As we worked on the outdoor life science activities for FOSS Third Edition, one of our editors suggested we check out Tracks & Sign of Insects and Other Invertebrates: A Guide to North American Species by Charley Eiseman and Noah Charney. This groundbreaking 582-page reference guide has won the National Outdoor Book Award and the Outstanding Academic Title by Choice. It boasts almost a thousand color photos and text for tracks and sign of more than two thousand invertebrates.

In this field guide, you will find information about galls (plant deformities caused by another organism such as an insect or mite that enter the plant tissue while it is still forming to provide a shelter for developing larvae or nymphs), leaf shelters (leaves that are rolled, folded, tied, or crumpled by insects or spiders to provide shelter), what critters are causing the holes in leaves, and who may be causing the galleries under the bark of a decomposing log by observing the tracks and sign of invertebrates.

The faint of heart might want to avoid one particularly gross and yet equally fascinating chapter titled, “Parasitism, Predation, and Other Causes of Death.” But most humans who spend any amount of time enjoying mother nature’s gifts will be impressed with this guide. You’ll certainly find some answers to some of your questions and you may even gain a sense of awe and wonder about the natural world.

Although Eiseman and Charney’s book is for adults, there are many wonderful field guides to use with students. We discuss a few below.

Bugs & Slugs: An Introduction to Familiar North American Invertebrates

We at FOSS are quite impressed with the durable laminated foldouts that provide photos of a significant number of organisms. Being able to look at multiple...
butterflies on one page without reading much other than the name, length, and a few words to describe the organism is really useful for a quick identification outdoors. I have also noticed that this style of guide gives students more time to observe the animals in nature rather than spending precious outdoor time thumbing through a thick guide. In particular, we like Pocket Naturalist Guides from Waterford Press. Bugs & Slugs: An Introduction to Familiar North American Invertebrates by James Kavanagh, with illustrations by Raymond Leung, contains over 140 pictures and names of familiar insects and invertebrates.

**Mammals (Golden Guide)**


The Golden Guides from St. Martin’s Press are also pocket-sized and great for students. They have over 30 titles in this collection. Each features around 200 species, color illustrations, list habitats, range maps, family trees, food, enemies, and more. It is simply amazing how much information they fit into these tiny guides, which are so easy to take to the schoolyard or into the field. There are also several illustrations of each organism from different perspectives and in their most common habitats. They may appear somewhat dated at times (they were first published in 1949), but the content is thrilling to children.

![Mammals (Peterson First Guide)](image)

**Mammals (Peterson First Guide)**


I’m also quite fond of another pocket-sized series: Peterson First Guides. They are a condensed version of Peterson Field Guides and feature the most common collection of organisms. The color illustrations of plants and animals are set upon a white background. The Mammals guide lists the animals’ sizes and sometimes weight. Footprints are shown with the length. Each organism has a brief written description with further details about the look of the animal, what they eat, and where they make their homes. The amount of information is just right when you’re trying to identify an animal quickly.

**FOSS in the STEMworks CTEq Database**

The FOSS Program is pleased to announce that it has been accepted into the newly released (July 2012) STEMworks database of programs that deepen young people’s learning in science, technology, engineering, and mathematics (STEM). Hosted by Change the Equation (CTEq), the database aims to be a critical resource for funders, program developers, and STEM advocates alike. Those who develop STEM learning programs can benchmark their work against successful exemplars. Advocates can point to excellent programs as they make the case for quality.

Invited programs were asked to submit documentation that demonstrated how the program addressed each of CTEq’s 13 Design Principles for Effective STEM Philanthropy. The programs in this database had to clear a high bar. WestEd, an independent non-profit research and development organization, rigorously reviewed all of the programs. Only programs that performed well against the principles were admitted. The listed programs had to receive an accomplished rating in two of the design principals: address a compelling and well-defined need and offer challenging and relevant STEM content.

STEMworks is itself a work in progress. The programs in this database are by no means the only excellent STEM learning programs in the country. Rather, they are the first in what will be a growing list of effective programs. CTEq will continuously improve the content and function of this resource.

Change the Equation (CTEq) is a non-partisan, non-profit CEO led coalition of corporate leaders dedicated to mobilizing the business community to improve the quality of Science, Technology, Engineering and Mathematics (STEM) learning in the United States.

www.changetheequation.org

http://changetheequation.org/improving-philanthropy/stemworks
The elementary science community, especially those of us in Charleston, South Carolina, suffered a great loss this year. Jeri Calhoun passed away in March 2012 after a long battle with melanoma. Those of you who had the honor of knowing Jeri would not be surprised to know that science education remained of great concern and importance to her until her last days. She was still involved with her schools and teachers, through conversations and phone calls, working to help ensure that students received the quality of instruction in science she deeply believed they deserved.

Jeri was a phenomenal classroom teacher. Her students loved her and continued to come back to see her because of the impact she had on their lives. Early in her career, Jeri saw the impact science could have on her classroom instruction as a tool for making learning relevant and fun for her students. She used science as a vehicle for teaching all areas of the curriculum because she saw how enthusiastic her students were when learning about the world around them. Jeri earned the respect of her fellow teachers and administrators because of her talent and knowledge.

I don’t think you will find a classroom teacher who has a longer history with FOSS. You can trace her involvement through relationships with sales representatives and developers to the early green and white boxes. She was one of the first FOSS consultants and continued to be involved in consulting as long as she was able to travel. She loved training people how to effectively use FOSS and integrate reading and writing into science instruction. Being a part of the FOSS family was something Jeri cherished.

However, the most important thing about Jeri was that she was a good person. Those of us who knew her would never question her motives. Everything she did came from the heart. She did for others because she genuinely believed giving was much more important than receiving. Asking yourself what Jeri would do in any given situation would give you a measure of what was right and what wasn’t. There are a lot of people in the elementary science community who are better people because of Jeri. She touched our lives in many ways. We will always remember her giving spirit and her smile. We will always remember Jeri for who she was and who she helped us become.

In 1976, a new project was funded at the Lawrence Hall of Science. The project was called Science Activities for the Visually Impaired (SAVI). Dr. Herb Thier was the principal investigator, and he hired Linda De Lucchi and Larry Malone as curriculum developers and Dennis Schatz as day-to-day director. The project needed additional staff. Phil Larsen, at Western Michigan University, recommended a recent graduate of his program, an earth science middle school teacher, named Sue Kaschner. Phil thought Sue might have the chops for the job, so an interview was arranged. Within a few months, Sue had decamped to Berkeley and begun her new career as a science curriculum developer.

The world turned, and SAVI completed its mission of creating a science program for blind and visually impaired children. While other curriculum work moved forward, Sue applied her professional energies to other activities at the Hall, including the California Earthquake Education Project and work on numerous exhibits in the public science center part of the Hall. Along the way, Sue married, took the last name Jagoda, and started her family, first Rachel and later Allyson.

In 1988, when the SAVI/SELPF work evolved into mainstream classroom science, The Full Option Science System (FOSS) Project was funded by NSF. We invited Sue back into curriculum work to provide leadership for the earth science strand. Sue provided the guidance for elementary school modules, and when in 1995, the FOSS Middle School Project was funded, Sue completed some of her finest work, Planetary Science, Earth History, and Weather and Water. Finally, Sue was involved in some rigorous middle school earth science work—the work she prepared for decades earlier in Michigan.

Now, nearly four decades after relocating from the Midwest to the left coast, Sue has re-located back to the Midwest, and from her home in Ohio, has successfully contributed to the revision process for several middle school courses, including the Planetary Science Course, Second Edition and the Earth History Course, Second Edition. With the completion of her work on these courses and the opportunity to act as a summer (2012) education consultant in Denali National Park, Sue decided to make yet another life trajectory change—retirement. In response to her decision, we at the FOSS Project are retiring Sue’s number, hoisting her jersey up into the Lawrence Hall of Science rafters, so all who come after will know that they walk in the shadow of a giant.

With the exception of Linda and Larry, Sue has the longest association with the development and evolution of the FOSS Program. Thank you, Sue, for providing the earth science oversight for the FOSS program. With Sue’s departure, responsibility for coordinating the biannual FOSS Newsletter will pass from Sue to David Lippman. Sue has also been the voice of FOSS on FOSSweb. Going forward, the new voice will be that of Kimi Hosoume. Sue is retired, but not disconnected; we expect to stay in continuous contact with Sue as we move forward to reinvent and expand the FOSS program.
FOSS Institutes

Delta Education will host three one-day FOSS Institutes before the National NSTA Conference in San Antonio, Texas (April 10, 2013). These Institutes, two for K–6 and one for middle school, will be for educators from districts that have implemented FOSS or are planning to implement FOSS. The Institutes will focus on newly developed FOSS materials which include: K–6 FOSS Third Edition, The Next Generation of Active Learning, and the revision of the FOSS middle school Planetary Science and Earth History Courses. These Institutes are designed for experienced FOSS educators—lead teachers, administrators, curriculum coordinators, professional developers, and university methods instructors. These Institutes are free, but you must register in advance to attend.

To secure your spot at the Institute, please write, fax, or e-mail:

Pam Frisoni
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Sign Up to Receive the FOSS Newsletter

To receive the FOSS Newsletter electronically, sign-up at www.deltaeducation.com/science/foss/newsletter.aspx or send your request to gregory.bayer@schoolspecialty.com. 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 www.lhsfoss.org/newsletters.

If you'd like to be added to the mailing list to receive this newsletter by mail, please send your name and address to:

Gregory Bayer
gregory.bayer@schoolspecialty.com

FOSSweb 2.0 is here! See page 13 to read more.

NSTA 2012 FALL AREA CONFERENCES

K–8 Commercial Workshop Schedule

Louisville, KY October 18–20, 2012
Atlanta, GA November 1–3, 2012
Phoenix, AZ December 6–8, 2012

Thursday (10/18, 11/1, 12/6)
8:00–10:00 Science-Centered Language Development Using FOSS
10:30–11:30 Asteroid! Will Earth Be Hit Again? Planetary Science for Middle School
12:00–1:00 NASA’s Kepler Mission and the Hunt for Exoplanets—Planetary Science for Middle School
1:30–3:00 Engage Students with Active Learning through FOSS Third Edition
3:30–4:30 Materials in Our World—STEM for Early Childhood

Friday (10/19, 11/2, 12/7)
8:00–10:00 Using Science Notebooks to Impact Student Learning with FOSS
10:30–12:30 FOSS Formative Assessment: Making Student Thinking Visible
1:00–2:30 Taking Science Outdoors with FOSS K–6
3:00–4:00 Fossil Evidence: A Preview of FOSS Earth History, Second Edition for Middle School

CSTA 2012 CALIFORNIA SCIENCE EDUCATION CONFERENCE

San Jose, CA October 19–21, 2012

Friday (10/19)
1:00–2:00 New Technology Features to Support FOSS CA

Follow us on Facebook and Twitter!

http://www.facebook.com/FOSSscience
http://twitter.com/FOSSscience
You’re already running with FOSS. Now, with the Third Edition, you can fly.
Sprout wings with these features in FOSS Third Edition:

- Embedded and benchmark assessments provide ways to continually monitor learning.
- Enhanced technology engages students and provides management tools for teachers.
- Embedded science notebook strategies solidify students’ understanding.
- Content area readings provide students with regular encounters with informational text.

Contact us to discuss conversion kits and other transition pathways to help you move to the Third Edition. Special offers are available if you order before December 31, 2012.

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