Equity in science instruction means ensuring that each and every student engages in the science and engineering practices and develops an understanding of the core ideas of science. Will this look the same for all students? No, equity is not uniformity. Every child comes to class with unique experiences, cultural and linguistic backgrounds, and a range of physical and cognitive attributes. Equitable science instruction, therefore, requires a differentiated approach in order to effectively capitalize on students’ individual strengths and potential.

Let’s take a look at how the FOSS instructional design inherently addresses a wide range of learning modalities and provides intrinsic opportunities for differentiated instruction.

Ms. Jackson has her first graders sitting at the rug. Her students live in an urban community and most fall into at least one of the four accountability groups defined in No Child Left Behind (NCLB) and the reauthorized Elementary and Secondary Education Act (ESEA)—economically disadvantaged, major racial and ethnic groups, children with disabilities, and students with limited English proficiency. Ms. Jackson is helping to trial test the upcoming FOSS Sound and Light Module. She begins by activating her students’ prior knowledge about sound. It is only October, but it is evident that these first grade students have learned the structures and behaviors for productive talk. They try very hard to listen when others are speaking and to stay focused on the topic. Ms. Jackson uses a call-response protocol to get students’ attention. Then, she explains that students will be investigating sound. She hands out pictures of people and animals making sounds for students to examine. The people in the photographs represent different races and ethnicities, including those of the students. The musical instruments in the images are also familiar. Ms. Jackson has students think-pair-share to make sure all students have the opportunity to talk with a partner about how they think sound is represented in the photographs and how the images relate to their own experiences with sound. She then calls on a few enthusiastic students to share their stories with the whole group.

How is Ms. Jackson meeting the needs of her diverse students so far? For one, she is tapping into her students’ “funds of knowledge” and cultural practices (an effective strategy for engaging economically disadvantaged students) by asking them to share their knowledge.

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

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The deadline for the Fall 2015 issue is June 1, 2015.

Science for all Students continued

and experiences with sound. She also asks students to interact in culturally responsive ways (call-response and think-pair-share), which are familiar and engaging for her African-American students. Activating prior knowledge, using visuals, holding students accountable to discussion norms, and allowing time for oral practice also supports the language needs of her emergent bilingual students.

Now that the context has been set, Ms. Jackson’s students are ready to explore what makes sound. The content objective for this lesson is to discover that vibrating matter makes sound (NGSS PS4.A). To develop this concept, students engage in a variety of hands-on activities as well as teacher demonstrations involving objects that produce sound.

Students begin their exploration by working independently with simple objects such as a tongue depressor and a cup and rubber band system to observe how plucked and twanged objects make sound. The volume level rises as students make sounds not only with their materials but also with their voices, as they exclaim, question, and test different ways to produce sounds. Ms. Jackson monitors the activity, asking guiding questions to focus attention on the relationship between the vibrating objects and the sounds students observe. She notices that one of her students seems baffled. Ina is a recent immigrant who does not speak English. Ms. Jackson sits down next to her and models how to make a sound with the rubber band stretched over the cup. She points to the vibrating rubber band and says “vibration” and then points to her ear, “sound.”

Ina’s face lights up and she plucks the rubber band. Ms. Jackson again repeats the words and gestures for vibration and sound. Ina is not yet ready to generate or use English words, but she is clearly developing the concept of sound along side her English-using peers. After a few more minutes, Ms. Jackson calls for attention and conducts a whole group discussion about what students observed. She writes their observations on the board and makes word cards for the words “vibration” and “sound” and puts the cards on the class word wall. Ms. Jackson then has students turn and talk with a partner about what they think makes sound based on their observations so far. She encourages them use the new vocabulary words in their talk.

In the next part of the investigation, the class splits into two groups. One half of the class works with a partner to make sounds with simple instruments while the other half works with Ms. Jackson as she demonstrates vibrations with a table fiddle—a string tied around a table with wood blocks as bridges. She also shows students how to produce sounds with tuning forks. Students are amazed that a tuning fork can make a ping-pong ball jump when it comes into contact with a sounding tuning fork, and Ms. Jackson is pleased with how fast students have incorporated the science vocabulary word vibration into their discussions. When the groups switch, Ms. Jackson reminds the group working in pairs that their job is to help each other to explore and discover new things about sound and vibration and to follow the classrooms norms for collaboration.

Let’s hit the pause button. An outside observer may wonder why so much activity? Isn’t seeing it (or hearing it) once enough to develop the concept of sound? Not for most children. The research tells us that students need multiple exposures to learn a new concept. This is especially true for students from diverse backgrounds and those with disabilities who learn most effectively when presented with multiple representations and multimodal
experiences. As the investigation progresses, students will make vibrations/sounds in different ways—plucking, tapping, strumming, hitting—and will observe how sound varies in volume and pitch. After a few days, Ms. Jackson might have a slight ringing in her ears, but all her students will be able to explain that sound is a result of vibrating matter, which prepares them to engage in the sense-making portion of the lesson.

Students have been acquiring and using language to process and communicate their observations throughout the investigation. They have been introduced to new vocabulary words in context, as they are developing the concept during the hands-on activities. Now comes the heavy lifting. Ms. Jackson’s objective is that students learn the science concepts while engaging in the science and engineering practices. She is also tasked with developing her students’ academic language—the more complex and precise content specific language of school. This requires more than learning new science vocabulary. In order to construct lucid explanations and engage in argument from evidence, students need a good handle on appropriate language forms and functions. They also need strategies for extracting meaning from complex texts.

Ms. Jackson’s classroom walls are covered with printed materials—not store-bought posters, but charts, diagrams, and lists she made with students as they grappled with ideas such as the cause and effect relationships involving the variables that result in variation in pitch and volume, what words they could use to describe nuances of sound (squeaky, sharp, tinny, hollow), and explanatory models for how sound travels from a source to a receiver. These charts are now visual references that will assist them in understanding the concepts. Maya has not been tested yet, but it is clear that she is a gifted and eager student. Ms. Jackson occasionally asks Maya to help other students, but she knows that her responsibility is to keep Maya challenged, not by giving her more work, but by giving her more complex tasks to wrestle with. She asks Maya to consider an instrument like a flute or penny whistle and based on what she knows so far about sound, to develop a model to explain how she thinks these types of instruments make variable sounds.

This vignette is one example of how FOSS provides equitable learning opportunities for a diverse student body. All the investigations are similarly structured to maximize full inclusion and equal access to lesson content. At the core is the belief that all students benefit from actively engaging with scientific phenomena and constructing meaning through both cognitive and social processing of information. Let’s recap the components of the FOSS instructional design that together ensure adequate differentiation.

1. **Activating prior knowledge.**

   Establishing the context in which students will be learning is beneficial for all students. The Investigations Guide provides questions and prompts to help the teacher elicit students’ background knowledge. The Science-centered Language Development (SCLD) chapter provides additional strategies that are especially useful for English Language Development. It is important that teachers value the cultural and linguistic backgrounds of their students and use that knowledge to support inclusion and to help students connect new knowledge to their experiences. Every student has something to contribute to help the class as a whole establish the inquiry context and gain a better understanding of the science content.

2. **The active investigation.**

   Exploring with real materials, objects, systems, and organisms assures engagement for all students. To optimize student interactions, students should be in groups of four facing each other and each student should have a role in conducting the investigation ( getters, recorder, reporter). It is important to make sure all students understand the procedures, are grouped strategically, and are encouraged and assisted in connecting the activity to prior experiences.

3. **Sense-making.**

   Recording and analyzing data, engaging in oral discourse, and answering the focus questions all require language skills and strategies. The

   *Continued on page 3*
Science for all Students continued

The success of FOSS is predicated on inspired and inspiring teachers. One such teacher is John Hayes, a dynamic and enthusiastic teacher who has been using FOSS in his classroom since 1994. John is such a champion of FOSS that he has made an extraordinary commitment to encouraging and mentoring others to use FOSS as well. His work has touched many students and teachers alike.

John has been a public school teacher for over 20 years in California and has been teaching with FOSS since the First Edition. He began teaching in a fifth-grade Spanish bilingual classroom in the 1990s at Pajaro Valley Unified School District in Watsonville, California. Later, John taught both elementary and middle school in Santa Clara Unified School District. In 2006, John moved to Cambrian School District, and presently, he is working in Live Oak School District.

Cambrian School District is located in Silicon Valley in the city of San Jose, California. Cambrian has four elementary schools with approximately 2,800 students. John was the principal at Farnham Elementary School in Cambrian School District from 2006–2009 before he decided to go back to teaching.

As a teacher, John was an integral member of the Science Leadership Team in Cambrian; he and four other teachers and the assistant superintendent participated in Cohort II of the FOSS California Leadership Academy, a collaboration between the FOSS staff at the Lawrence Hall of Science and K–12 Alliance/West Ed. The Academy provided a four-year opportunity for teacher-leaders and administrators to develop school-based leaders who can sustain the implementation of the FOSS California K–5 science program and cultivate science-centered schools.

John and the Science Leadership Team were instrumental in developing FOSS-centered Family Science Nights, integrating literacy lessons to accompany each FOSS investigation, and integrating ELD strategies for each FOSS investigation. The Science Leadership Team also provided FOSS PD workshops each year, focusing on notebooking, literacy integration, and instituting science buddies.

Lani Potts, former assistant superintendent and member of the team describes John’s work: John Hayes was involved with the deep integration of FOSS inquiry-based science and language arts in elementary classrooms. This included designing and implementing professional development and coaching to support this integration across the district. He also successfully created and maintained a science-centered classroom integrating various content areas as he moved toward sustaining a STEM environment.

The science-buddies program John helped to start in Cambrian brings upper grade students into primary classrooms to assist with FOSS lessons. (For more details see “Science Buddies,” FOSS Newsletter, Fall 2011). John explains, “The program benefits not only students—upper-grade students are trained to teach science lessons to their younger buddies—but it also brings teachers together as partners and collaborators. It’s truly the most authentic and rewarding ongoing professional development I’ve been a part of.”

Lisa Landsberg, fifth-grade teacher in Cambrian, shared, “He provides ways for students to involve solving real-world problems into their learning of the content standards. . . . Students are asked to think critically as they collaborate, communicate, and use technology to solve meaningful and real problems.”

Most recently, John has had a significant impact on the Live Oak District, a small public school district with three elementary schools and one middle school in Santa Cruz, California, where 83% percent of students qualify for free and reduced-price lunch, and 65% of students are English Language Learners.

Investigations Guide provides questions, prompts, and information-processing structures. The SCLD chapter provides additional strategies and scaffolds to support all students, specifically English language learners. The notebook is a dynamic medium for differentiation, allowing each student to express her/his own thinking in her/his own way. Teachers should use the same strategies they use in other content areas and in English language arts to support reading comprehension, writing, and oral discourse.

4. Assessing. Making thinking visible is critical for differentiation. The embedded assessments and the benchmark assessments show the teacher where her students are with their learning, and what next step strategy students may need to advance or refine their science knowledge. (See the “FOSS Assessment Corner” on page 14 of this issue for more on this.)

For more information on differentiated instruction, see the section on differentiated instruction in any FOSS Third Edition and Next Generation Edition Investigations Guide and check out FOSS for All on FOSSweb.com.

A special thank you to Michelle Williams and her students in Oakland, CA, for their time and generous assistance in helping to develop the activities detailed in this article.

References

FOSS in Action in Live Oak School District

By Joanna Totino, FOSS Elementary Specialist & Director of Bay Area Science Project, The Lawrence Hall of Science

FOSS Newsletter, Spring 2015, No. 45
When John arrived at the Live Oak District in 2013, it was a time of transition in the district. The district was just starting to integrate Common Core State Standards, and this provided an opportunity for John to propose science-language arts integration at Live Oak Elementary. The prior emphasis at Live Oak had been on language arts and math curricula from textbooks, and FOSS offered experiential approach to learning, a new concept and an instructional shift for a school with a state-test-focused teaching/learning philosophy.

John’s classroom became a pilot demonstration site to show how science could be the context for ELA, particularly with vocabulary and writing with notebooks. He was able to consign the FOSS Water Planet Module from Delta Education, which he used during ELA time. Teachers and administrators came to observe his integrated approach.

John next proposed to the administration that they continue the science-based ELA integration by purchasing the FOSS Mixtures and Solutions Module, Third Edition. The district approved this purchase, and he was given permission to mentor two fifth-grade teachers using FOSS. At that point, those teachers could only use FOSS during science blocks of time; there was no ELA/ELD integration.

As John was able to show the success of the FOSS and literacy integration, the district allowed him to integrate science and ELD, although ELA still had to be taught using the district textbook-based reading curriculum and new writing curriculum. During that time, Shoreline Middle School teachers visited his classroom to see how fifth graders were being prepared with notebooks and hands-on science and to check out FOSS as a possible pilot at their middle school. The University of California, Santa Cruz teacher-prep coordinator also visited his classroom to see how science-language arts integration might affect how student teachers are prepared in a NGSS/CCSS classroom.

John has always been a strong believer in outdoor science education. When he started teaching FOSS Third Edition, he loved the new embedded FOSS outdoor lessons. He has so far taught FOSS outdoor lessons in the FOSS Soils, Rocks and Landforms, Mixtures and Solutions, and Sun, Moon and Planets Modules. John shares, “I definitely love this new outdoor focus, which is one of the many things I like when I compare [FOSS] Second and Third Editions.”

In spring 2014, Live Oak School District decided to fund summer school for the first time in six years, and the superintendent requested that John develop the fourth, fifth, and sixth grade summer school curriculum program that featured FOSS science and ELA/ELD integration, as well as providing the teachers with PD. John recruited Lisa Landsberg and Janelle Lam, former Cambrian colleagues on the Science Leadership Team and FOSS Leadership Academy participants, to train the summer school teachers in FOSS. The Live Oak District Superintendent and Curriculum Director, as well as elementary and middle school principals, visited the program to see how science could be the foundation for ELA/ELD—they were very impressed!

By fall 2014, FOSS Third Edition was being used at two elementary schools in fifth grade, and in John’s classroom, FOSS science is the foundation for both ELA and ELD standards.

At the Superintendent’s request, John gave a 45-minute presentation to the district school board, including an overview of FOSS, its philosophy, and the value of hands-on, constructivist science as the best curriculum and pedagogy to teach language skills, especially writing, to English learners.

In Live Oak, John has been able to get full support for FOSS from the superintendent, school board, district curriculum director, and elementary site principals. John looks forward to expanding FOSS to all three elementary sites in the coming year. There are also plans being considered to continue a FOSS-centered summer-session curriculum.

It is no exaggeration to say that John is an inspiring lead teacher who is changing the lives of students and supporting teachers in a transition from textbook-based science instruction to hands-on investigations for their students. He is an amazing example of how one committed teacher can have a dramatic impact on an entire district. John invites other teachers along on the FOSS journey, encouraging and coaching colleagues to pursue integrated learning, helping others see how the combination of FOSS curriculum and a dynamic teacher can inspire imagination, discovery, and meaningful learning in students’ lives.

John has taught FOSS from the First Edition to the Third Edition and can’t wait to use the upcoming FOSS Next Generation Edition.
Having been a site based administrator in several school systems (and having seen many approaches to teaching science through an inquiry model), I can say that FOSS is by far the most engaging and comprehensive set of resources available to schools today. At Hartwood Elementary, we rely on FOSS to help engage our students in rich experiences where only a hands-on curriculum will do.

—Scott Elchenko, principal

Science Comes Alive in Hartwood, Virginia

By Leslie Lausten, 4th Grade Teacher, M.Ed Science Education, NBCT Early Childhood Generalist, Hartwood Elementary School

Nested in the semi-rural area of Hartwood, Virginia, is a school where science comes alive with FOSS. Hartwood, located in Stafford County, Virginia, is a bedroom community of Washington, D.C., where many of our parents work for various government agencies while others live in poverty in low-rent apartment buildings or rural homes. Our school is a Title One school serving 583 students. Thirty-three percent of these children are economically disadvantaged. It is not unusual to have children whose parents are FBI, DEA, CIA, or Marines in classes with children who are homeless or have parents who are incarcerated or working two jobs and barely making ends meet. Even so, we were awarded a Virginia Title One School of Distinction in 2014 and received a Programs that Work award from the State of Virginia. What are we doing differently to make our school a more engaging place for all students? We are using FOSS in classrooms K–5 in our STEAM centered school.

Hartwood Elementary, Stafford County, VA
It started with one FOSS module. In 2007, we were introduced to FOSS by Kip Bisignano at a conference that I attended as the lead science teacher for our school. I had always embraced hands-on science, but knew instinctively, that something was missing. FOSS added an element of inquiry and thinking that made instruction more than just an activity. Immediately I rushed home and asked my supervisors, Eric Rhoades and Rita Truelove, to let us try it. They were supportive, and Mr. Rhodes, our county Science Supervisor, bought us the FOSS Solids and Liquids Module for second grade. Once the students started to explore the concepts, I was amazed at the level of engagement for all kids. Now, instead of just doing the activity, they were talking about the science behind it. Students were introduced to language and concepts that were of a higher level than ever before and they rose to the challenge. I noticed children come alive with wonder, and soon they were begging for science time. I will never forget the first time a second grader used the words viscous and transparent correctly to describe the bottle of liquid they were holding. The playing field that used to be so wide due to background knowledge that students came to school with was suddenly narrowed. FOSS always starts with a hands-on activity that introduces the concept in a way that is meaningful for all. The children began to use academic language throughout the lessons, and we were thrilled when this transferred to their writing as well.

Soon, other grade levels bought into inquiry-based science through various professional development opportunities presented by our science coordinator and supervisor. As the excitement gained momentum, the teachers started asking about an inquiry-based program that would connect literacy skills and vocabulary that was so desperately needed. FOSS was introduced soon after in fourth and fifth grades. We saw our science scores rise from the worst in the county in fifth grade in the year 2000 to the best in the county in 2010. The next grade level to buy into FOSS was our third grade. They were lucky enough to get brand new modules from the FOSS Third Edition. Within a year, they not only increased scores in science but also in reading and math. In 2013, their science scores were 98% and they were recognized as being not only first in the county, but 39th in the commonwealth.

In 2012, we embarked on a change to create a STEAM centered school. We knew that we would build from our foundation of FOSS. We were also using an inquiry based mathematics program.}

When I first started using FOSS, I was reluctant and nervous about how to introduce all of these interactive and hands-on experiments and activities into my classroom. My first few attempts were definitely learning experiences, and for the first year of trying to implement FOSS, I felt like a little bit of a mess. But year two with FOSS has been amazing! Starting from day one, I was able to build in more of the management structures into my classroom and felt so much more comfortable with the activities. My students are so much more engaged in science lessons and it definitely shows in their assessment results!

― Allison Watson, 5th Grade Teacher

I like the organization in the writing that we do. It helps me understand what we are learning better than just knowing it out of a textbook.

― Emma, 5th Grade Student

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― Emma, 5th Grade Student

Students begin to use academic language in their writing. A notebook entry from the FOSS Weather on Earth Module: “What causes condensation to form?”

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Science Comes Alive continued

program, investigations, which supported building numeracy through hands-on activities as well. The T-E-A in the middle of STEAM, however, was still a little bit fuzzy. We embarked on a mission to find the right fit for Hartwood and explored several engineering curriculum units from Engineering is Elementary, an engineering curriculum developed by the Museum of Science, Boston.

One of the greatest experiments that we participated in was an afterschool tutoring program that focused completely on engineering. We realized that many of our at-risk students, or “at-promise” as our principal likes to say, were having difficulty problem-solving. Our math specialist, Susan Sydla, and I decided to use Hop To It, a free afterschool engineering unit available on Engineering is Elementary. We were shocked and amazed to see how low our children were in creative thinking when we started our first challenge. We gave the students 10 index cards and asked them to build a tower that could hold a small stuffed frog. Several of the students laid the cards on the floor and tried to tape them in a straight line. Others didn’t know what a tower was. After several weeks of working on simple problem solving tasks, they were able to create a trap that would hold a Cane Toad (an invasive species and real-world problem solving task). It was also evident to all of us involved that we had some work to do with this population of students.

Another piece to our puzzle was also being developed: the arts. In 2012, we hired a new principal, Scott Elchenko. Scott was a brand new principal and very eager to create a school with a vision that would be engaging for all children. As part of creating this vision, he took a group of several teachers to visit a CETA (Changing Education Through the Arts) school in Northern Virginia, and they were very impressed. In 2013, we began working with Sean Layne, an artist in residence, on creating tableaus (in which students establish still scenes with their bodies to represent a certain scene or idea) to express thinking through drama. Teachers were trained in classroom management techniques that would help them gain control of their mind, body and voices. This fit in well with our school-wide belief in using the Responsive Classroom approach to create students who treated each other with respect and dignity. Soon students were using tableaus to show what they learned and what they were thinking.

As the pieces to our STEAM vision fell into place, we became involved in a partnership with the University of Mary Washington. Dr. George Meadows, an education professor, had recently received an award through the University that would allow him to partner with several elementary schools in the region in a new STEM adventure. Welcome to the world of technology! We were given a trunk with MaKey MaKeys, Little Bits, Hummingbird kits, and Squishy Circuits. This led to a discussion and creation of an Engineering and Design studio space.

I really like doing all of the engineering challenges like the land rovers and houses that we built. It helps me to understand how stuff works better.
—Sam, 5th Grade Student

The engineering lab has a lot of helpful stuff. It has a lot of fancy equipment that I can build with.
—Michael, 5th Grade Student
A classroom was allocated and soon became full of cardboard tubes, recycled boxes, glue guns and more—all engineering materials for the design endeavors. We added an afterschool club called SeaPerch, that partnered with the Navy, where children created underwater robots and participated in a tournament at the university and actually beat several middle school teams. This added drills and soldering guns to the engineering space. Our kids were really becoming enriched in technology and engineering opportunities.

In our classrooms, FOSS is alive and well. Students across K–5 are using science vocabulary. We use the training in science-centered literacy approaches by our FOSS trainer, Kip Bisignano to integrate literacy skills throughout the day. Teachers are using oral language techniques to get our students talking about the science content. Writing is integrated into the science classroom and suddenly the silos of subject areas are starting to fade away. Third Edition FOSS Science Resources books are used to reinforce science concepts, and our use of nonfiction is growing. We continue to connect reading skills, such as cause and effect and compare and contrast, into all subject areas. Now, it is not unusual to walk into a classroom and see connections being made between math, science and reading. As a fifth grader said, “In my old school we didn’t get to do experiments. We only used textbooks. Here, it’s really hands-on and we get to use really cool science materials.” Hartwood truly is a special place for kids.

I really like the way that Hartwood science teachers aren’t all like ‘Read this science book or else’ and instead have us do different activities and use different resources.

—Orla, student

My son recently graduated from Hartwood Elementary and talks all the time about how much he misses science. I have watched my son’s passion for science exploration grow thanks to the remarkable hands-on learning opportunities he had there.

He is an innovative learner now. He is not afraid to fail during his science exploration because he now sees this as an opportunity to question, re-explore, re-design and re-create until he has better understanding of the subject area.

With this unique hands-on learning approach at a young age, he has been able to develop a deep understanding of science concepts and has been able to apply this knowledge in the real world. He now has a hunger to learn more and a confidence to explore and design. My son thrives in this hands-on style of learning and now has the confidence to be an independent thinker.

Hartwood Elementary has shown us the importance and the positive outcome of learning through hands-on and creative science exploration. It empowers children to think independently, to question their exploration, and to learn by problem solving and through science investigation.

—Catriona, former Hartwood Parent,

Students Comparing the Temperatures of Soil and Water Using the FOSS Weather on Earth Module.

A Parent Volunteer and her son work on building an underwater remotely operated vehicle (ROV) during SeaPerch.

FOSS Newsletter, Spring 2015, No. 45
Differentiation is a hot topic in education these days, and with good reason—our classrooms are scenes of unprecedented diversity. Differentiation has evolved as a response to the complexity of bringing all students in our exceptionally diverse classrooms to an equitable understanding of the subject matter. Let’s see now . . .

Divergent student body—convergent learning outcomes. So the obvious question for FOSS, “How do we differentiate in science?” To get started we first need to parse “differentiation.” Differentiation has two main subdivisions: **differentiated instruction** and **differentiated learning**. Differentiated instruction is teacher work; differentiated learning is student work. Each needs a bit of examination.

Underlying both divisions of differentiation are unifying principles and assumptions.

First and most important is the undeniable fact that students come to school with a vast array of differences in: academic history (prior knowledge, school readiness, culture); preparation to learn (resources, attendance, physical and psychological disposition); language proficiency; and economic burden. Students who come to school advantaged with substantial academic history, adequately prepared to learn with English language proficiency, and supportive cultural/economic environments place very different demands on educational systems than students coming to schools with disadvantages in one or more of these areas.

Second, learning is a complex social/cognitive process involving the integration of multiple sources of information. Individual students have particular strong and weak avenues for information acquisition and processing. This idea is elaborated in the theoretical work of Howard Gardner: *Multiple Intelligences*. He identifies several intellectual arenas: Linguistic, Logical-mathematical, Musical, Bodily-kinesthetic, Visual-spatial, Interpersonal, Intrapersonal, and Naturalist. It is a compelling theory, suggesting that every one of us has each of these intelligences to varying degrees. Not infrequently, Dr. Gardner’s work has been misinterpreted as a set of learning styles, suggesting inappropriately that each student has a modality in which he or she is most adept at learning. Gardner is very clear in his explanation as he refutes this notion of learning styles (input filters) being equivalent to his perceived intelligences. The several intelligences are facilities for processing acquired information in the brain, not the avenues through which information is conveyed into the brain. What Dr. Gardner suggests is that every student has his or her most-effective machinery for processing information (learning). Some have keen linguistic computers in their heads, others powerful number/logic processors, others a particular facility for making sense of interpersonal interactions, and so on.

Adding more dimension to the differentiated learning side of the issue is the apparent individual predispositions for the learning of science, which manifest themselves in ways that are exceptionally difficult to both qualify and quantify. But we all know some students who exhibit irrepressible motivation to learn, or who seethe with enthusiasm for active learning and engagement with scientific phenomena, or who are outstandingly reliable and responsible as both individual and team learners.

If these observations are valid, it would seem logical that an important dimension of enacting differentiated instruction would be to determine the kind of processing for which each student is predisposed. This is a tremendous expectation to place on an educational system, in particular on classroom teachers. To have this depth of knowledge of individual students is starting to sound and feel more like parenting than teaching.

And so it is; idealized teachers have a deep personal knowledge of their students. What is the solution to this deep conundrum? One affirmative action is described in the “FOSS Assessment Corner” article in this issue written by Dr. Kathy Long: engage in a systematic program of formative assessment, which helps both students and teachers see and understand the learning as it progresses. The FOSS assessment system for instance, exposes the arc of each individual student’s learning, which puts the teacher in position to respond with precision to the specific needs of each student. Voilà! Differentiation!

Now, what exactly should be done in response to this expert knowledge? That, my friend, is the work of teachers. When a teacher has intimate understanding of a student’s mind and knowledge, she can
move his learning forward with confidence and humanity, contoured
and guided by experience, common sense, recognized effective practice,
and available resources.

Is the answer a leveled reader that purports to provide access to the
science content by lowering the technical and intellectual challenge of
text material? I don’t think so. Nor do forward thinkers in the area of
reading competence. (See also Diana Vélez’s article on page 1 of this
newsletter.) Contemporary strategies for addressing the challenges
imposed by text material involves applying close reading techniques
that allow delayed readers to engage with complex ideas in text
using systematic analytic procedures to extract information from
words, images, and graphic/spatial organization. Various techniques
for engaging students in small and large group productive talk draw
on students’ innate facility to engage in meaningful social conversation
focused on the target subject matter.

So what is the summary takeaway from all this chatter? Slow down and
embrace your classroom as a family. Abandon the externally imposed
urgency to cover unmanageable numbers of topics. Examine interesting
phenomena together in depth. Talk . . . talk . . . talk together about the
shared experiences. Forge each experience into new ideas about the
structure, activities, and implications for the phenomenon and link
them to everyday authentic experiences. Involve every student in the
process of transforming observations into knowledge. Encourage all
students to communicate their knowledge in their most intuitive and
comfortable medium—writing, talking, drawing, movement, music,
etc. Provide time for students to critique and discuss each other’s
communications of learning. Revise; re-communicate; help one another
to improve. Involve everyone in the process of differentiation.

† This article references the 1993 edition of Howard Gardner’s book, Multiple
Intelligences: New Horizons.

Register Now for the FOSS Summer Institutes in Berkeley!

This summer we’re very pleased to be holding four institutes at the
Lawrence Hall of Science in Berkeley, CA. The two elementary
institutes will focus on FOSS and the Next Generation Science
Standards (one is geared toward CA Edition users specifically). The
two middle school institutes focus on two new middle school courses—
Diversity of Life, Second Edition, and Weather and Water,
Second Edition. If the articles on differentiation in this issue have
peaked your interest, attending a FOSS institute is a great way to learn
more about how FOSS makes instruction accessible to all students.

The Lawrence Hall of Science Institutes
Transitioning to Next Generation Science Standards in California
July 6–7, 2015
FOSS California Two-Day Summer Institute

FOSS Next Generation Edition for K-5
July 8–10, 2015
The Next Generation of Active Learning

FOSS Middle School
July 14–17, 2015
Introducing Diversity of Life, Second Edition

FOSS Middle School
July 20–23, 2015
Introducing Weather and Water, Second Edition

Please visit the FOSS PD calendar for more information on registering
for these institutes. We hope to see you here this summer!
http://www.FOSSweb.com/pd-eventcalendar
Secret Lives of Monarchs
Sally Levinson and Bill Levinson, Ph.D.
AlphaSpectrum Environmental Science Research and Education, Oakland, CA, 2014.

Raising caterpillars in the classroom is a treasured science activity that teachers have been doing with students for decades. FOSS believes in this powerful experience and thinks that living organisms and large butterfly houses provide priceless opportunities to observe the development of painted lady butterflies. Yet, even if you raise caterpillars in the classroom and also take your students outside to look for living organisms, there is still so much that is impossible to show children. A classroom of 28 students can’t sit and stare at the chrysalis formation and changes for two weeks, and the eggs and hatchlings are as tiny as poppy seeds, making it almost impossible for the children to observe in the real world. If you want to amaze your students with how extraordinary life can be, show them Secret Lives of Monarchs. This video brings the unobservable parts of a monarch’s life cycle to your computer or TV screen.

Sally Levinson, an entomologist out of Berkeley, wrote and narrated the film with her brother Bill Levinson who produced, filmed, and directed the 17-minute video. The result of this sibling collaboration is a delightful examination of the lives of monarchs.

Soothing music supports the gentle narration that will calm your students as they observe moments in the monarch’s life cycle that are rare to observe in the wild. Together you will watch as the female searches for the newest part of a perfect host plant where she will lay one egg, the size of a poppy seed, by bending her abdomen to the exact proper place on the underside of the newest growth on a milkweed leaf. They will see the exciting transition as the black-headed caterpillar breaks and then wiggles out of the egg casing bit by bit and then eats the egg shell as its first of many nourishing meals found within centimeters of its birth place selected by a wise mother. Observe the fifth instar as it adheres carefully to a leaf and then hangs for a few days before the green chrysalis forms millimeter by viewable millimeter. You and your students will want to watch these processes again and again.

We recommend that you preview the video before showing it to your students. The reality of monarchs mating is that the male doesn’t court his female mate the way some butterflies species do, instead the male forces the female to copulate. Within seconds of the forceful act both male and female seek nectar from one plant while attached. The act of reproduction is presented in a factual and straightforward way, but, nevertheless, it is wise for the teacher to be prepared for potential silly or uncomfortable reactions from students.

The sophisticated language in the video makes this appropriate for older children and would greatly enhance the teaching of the Painted Lady investigation in the FOSS Living Systems Module (Third Edition). It isn’t necessary for students to understand all of the scientific terms presented in the video in order for students to learn from and be amazed by this video.

You can rent Secret Lives of Monarchs online for $1.99 or buy it for $2.50. If you want a DVD, you can order one for $9.95. This is a video that you will want to watch year after year with your students to provide each group with a memorable experience that will make them better observers of the natural world.
May is Living Schoolyard Month!

By Erica Beck Spencer, FOSS Curriculum Specialist, The Lawrence Hall of Science

Pockets of educators across the country are considering how to get children outside on a more regular basis. Often these groups of enthusiastic people are clustered in a school, parts of a district, or rarely, a whole city (such as Boston). In the summer of 2014, in an unprecedented level of support, the state of California passed Resolution ACR-128: Living Schoolyard Month. Essentially this resolution serves as a public endorsement for school gardens and green schoolyards. San Francisco Assemblymember Phil Ting sponsored the resolution, with support from Green Schoolyards America and Education Outside. It asks school districts and county offices of education in California to create more student-accessible green space on school grounds. It also declares the month of May as “Living Schoolyard Month.” Sharon Danks, the author of Asphalt to Ecosystems, and the head of the non-profit, Green Schoolyards America, says, “…the California government is encouraging schools across the state to bring students of all ages outdoors in May, and throughout the school year. I hope schools will be inspired by the government’s powerful statement and use it to bring their students outside more often for a wide variety of learning, play and ecology-related activities.”

To support this resolution, Green Schoolyards America is producing a Living Schoolyards Month Activity Guide that will be available online this spring for all educators to use for free. You can find it at www.greenschoolyardsamerica.org when it is released in March 2015. The guide will include a contribution from FOSS, a much-abbreviated version of Seed Dispersal that is now a part of the Structures of Life Module and is also an Outdoor Biology Instructional Strategies (OBIS) activity (www.outdoorbiology.com). The guide will have activities featured from outdoor educators and institutions from around the state and although it has been produced for California, it is available for all. Even more outdoor activities can be found in the guide produced by the International School Grounds Alliance available at www.internationalschoolgrounds.org.

Sharon Danks also shared with us that she hopes “a strong, positive response from schools and organizations across the state will persuade the state government to follow this resolution with more comprehensive legislation that funds living schoolyard design, construction, management and training, in the future.”

For those of you who do not live in California, this movement to connect learning to the schoolyard is occurring across the country. Many states have created Environmental Literacy Plans (ELPs) that have been adopted by state legislatures. The majority of these plans reference schoolyards and formal education. The language in these ELPs might be useful when writing grants to improve schoolyards. You may find yours by visiting your state’s Environmental Education Association website; if you can’t find it there, then search on your state’s Department of Education website.

For all those California educators using the FOSS Third Edition or Next Generation Edition, just follow the Investigations Guide as it is written—you’ll be going outside soon, as regular outings to the schoolyard are woven into our program. However you get outside, if it is through the use of FOSS or finding inspiration in the 40 outdoor explorations within the Living Schoolyards Month Activity Guide, we hope you and your students take a moment to take a deep breath of fresh outdoor air and open your eyes to the wonders of the natural world.

Congratulations California, we hope you are the first of many to pass legislation like this!

Living Schoolyards Month Activity Guide
www.greenschoolyardsamerica.org
The term “differentiated instruction” can have a variety of meanings in the education world and can refer to many aspects of a students’ learning. For the purposes of this article I am defining differentiated instruction as “the ways in which a teacher plans for and responds to student needs that require attention in order for students to be successful in their academic and conceptual learning.” When differentiated instruction is called for, teachers might modify what is being taught, how it is taught, and/or how students demonstrate what they learned. Differentiated instruction at its best takes into account all aspects of a child’s background and academic profile (see the “Science for all Students” article in this issue on page 1). But where does assessment fit in? Assessment is the bridge between teaching and knowledge and the bridge that connects one learning experience to the next.

In many classrooms across the nation, assessment is seen as an end in itself. A curriculum is taught, a test is given, a judgment is made. Not much happens as a result other than some students are happy and others are not. FOSS has taken the stance that assessment can and should be much more than evaluation of a fait accompli. Perhaps this requires “assessment” to be imbued with a new meaning. We can no longer think of assessment as a test or a grade; students and parents are demanding and deserve more than that. Frankly, grades don’t convey much information. Rather we need to think of assessment as a way to gather information about students’ emerging knowledge so that we can take action to make sure that they are on a trajectory to meet the learning goals at the end of an instructional unit. It’s a dynamic process, not a summary product.

The FOSS assessment system is made up of two large components: embedded and benchmark assessments. Embedded assessment occurs on a daily basis. It is a way for teachers to check in on students’ thinking with a short 10-minute process that yields big returns (see the Assessment chapter in any Third Edition or Next Generation Edition FOSS Investigations Guide, as well as previous “FOSS Assessment Corner” articles). Embedded assessments are very narrowly focused, but provide valuable information for differentiating instruction. Benchmark assessments have a broader focus and occur before instruction (survey), after most investigations (I-Checks), and at the end of instruction (posttest). While these look like fairly traditional tests, how they are used is very different. Teachers review I-Checks to look for patterns and trends in students’ learning, but they return the tests to the students with no marks on them. Then they follow up with a series of student self-assessment activities. Because the follow-up activities are self-assessment, they are necessarily differentiated—each student reflecting on her/his own understanding of the subject matter.

We can “train” teachers to do the actions needed to perform this kind of assessment, but the real power cannot be realized until it becomes a belief system and a natural practice, rather than a mechanical routine. This requires a paradigm shift, a shift much harder to accept and enact than many might think.

**1. Teachers must consider themselves action researchers rather than deliverers of curriculum.** No curriculum (even FOSS!) can anticipate the needs of every student in the class. We have researched the activities and know that they are generally successful, but for every student to meet the learning goals requires a teacher, actively keeping an eye (and ear) on what is happening with individual students. The old paradigm was deliver the curriculum and if the students get it, great, if they don’t, maybe they’ll get it next year. The new paradigm requires that we acquire information and build on it to ensure that all students meet the targeted learning goals. You get to play detective and piece together evidence for learning or find alternate conceptions for which solutions can be successfully employed. Art Linkletter was right, kids do say the darnedest things! What makes it so enticing is that when you really stop to think about what they say, no matter how wacky it may seem at first, you can usually find a connection that shows how students were attempting to make sense of the activities, words, and discussions. We have to trust that most of the time students are doing their best to make sense of the world around them and in the case of FOSS, the science concepts they are exposed to.

**2. Having a growth v. fixed mindset.**

If the students don’t get it the first time, it does not necessarily mean that the students “just aren’t ready” or “don’t have the intelligence” nor does it mean that you are a bad teacher or that the curriculum is lousy (as long as you know you’re using a well-researched curriculum like FOSS). ALL it means is that the kids didn’t get it . . . yet.

The old paradigm is that everyone should be able to do everything perfectly the first time (if they are smart and attentive). The new paradigm understands that mistakes and failures are an expected and acceptable part of learning. Many very successful people today made plenty of mistakes and faced failure along the way. But they didn’t give up. They didn’t think “this is too hard” or “I’m just not good at this.” They learned from their mistakes and moved forward. This is the culture we need to instill in our students. Mistakes and confusion are natural parts of learning. We learn a lot by not being afraid of or daunted by mistakes. Carol Dweck’s work (2006) points out that students who develop a growth mindset are those who can deal with failure and make something positive from it. They expect to fail on occasion, but they also know that if they continue to put in the effort, they will succeed.

This is where assessment and teacher feedback come in. Teachers need to assess
students on a daily basis so they know where students need help (as well as helping students know this themselves), or at the other end of the spectrum, when they need to speed things up or provide more complex challenges.

3. Differentiating instruction. The old paradigm for assessment suggests an impersonal, uninformative statistical analysis, “Five students got As, 15 got Bs, 10 got Cs.” The new paradigm suggests differentiated diagnoses. But it is also unrealistic to think that you can create 30 lesson plans for 30 students on a daily basis for every subject or class taught. In order to be realistic, teachers need to look for patterns in students’ understanding that allow them to group students in ways that make differentiation manageable. “The possibilities are many, but the goal is to look for clusters of student need and plan ways to help each group of students move ahead” (Tomlinson, 2014).

It’s important to think about why students didn’t get it, but it’s even more important to ask, “What can I do to take students to the next step of understanding?” There might be many factors playing into why a student didn’t get it. Perhaps they have little background knowledge and need more first-hand experience. Perhaps they need more specific, basic vocabulary to help them explain a phenomenon. Perhaps they are just learning English and need additional support or a modified means of showing what they know. There are many reasons why a student might not get or be able to demonstrate knowledge of the content the first time. FOSS knows that teachers have the expertise to reflect on interactions that occur in the classroom, and plan what is needed to help each student move forward within the context of the larger curricular sequence.

When assessment/reflection happen on a regular basis, the course corrections are often surprisingly small and can be implemented as part of the next lesson.

4. Students need to take a bigger role in the process. Perhaps one of the most difficult transitions for teachers making this paradigm shift is turning over more responsibility for learning to students. This is an important part of developing a classroom culture that embraces a growth mindset. Students need to have an active role in self-assessment and self-differentiation: understanding goals, then assessing their own progress, reflecting on where they may have information gaps, and taking action to make improvements. These are important skills needed for lifelong learning. The old paradigm is to go over the test and give the students the right answers. The new paradigm is to return papers without any teacher marks on them and to engage in additional activities around an item or two that help students identify their own mistakes or limitations and how to correct them. In the FOSS Assessment chapter, you’ll find a starter library of next-step and self-assessment strategies to use for this purpose. Few teachers that have fully embraced this practice have ever reported to FOSS that the students weren’t interested, or showed less effort in learning. In most cases, students are thrilled to take this active role—so much so that they begin asking their teachers when they get to take the next I-Check so they can see what they’ve learned and what they still need to work on! This makes the learning experience unique and transparent for each student. By self-assessing, each child is learning how he/she learns. The task of differentiated instruction may be that of the teacher; however, empowering students to use what they know about how they learn (metacognition) helps them become self-differentiating learners.

Assessment is the bridge that allows teachers and students to differentiate learning. Without a means of making students’ thinking visible, you can teach a series of lessons that make logical sense, but you won’t know if it is making sense to students. Are they getting to a deeper and more meaningful knowledge that can be applied to the world at large? FOSS has spent the last decade developing the assessment system you now see in the Third Edition and Next Generation Edition modules to help answer this question.

References
Interactive Whiteboard Updates

We have good news for those of you who have been using the Interactive Whiteboard (IWB) resources on FOSSweb!

The IWB files on FOSSweb will be updated so that all links in the files will work properly with FOSSweb 2.0! All IWB users will need to re-download and replace the IWB files on their local computers to take advantage of this update. The new links will be in place by May 2015. In the meantime, video and multimedia links can be accessed by going directly to FOSSweb and going to Digital-Only Resources for a particular module.

For FOSS Second Edition users, IWB resources are now available for download at no cost (IWB resources for 2nd Edition are for grades 3-6 modules). If you haven’t given them a try yet, you can now for free!

Setting Up a Class Page

If you want your students to access the student online resources on FOSSweb, you’ll need to set up a Class Page. You should never share your personal FOSSweb password with anyone, especially your students. To set up a Class Page, follow the steps outlined below.

1. Visit your Teacher Home Page and scroll down past your My FOSS Modules section to the My Class Pages section.
2. Click “Add a New Class.”
3. Insert a Class Page Title (the title on the page students will see), a Class Login Name (the login name students will use), a Class Password (for students’ use), and select the Modules to Use (modules this class will need access to).
4. Please note the password for your class must conform to requirements that are slightly different from our teacher password requirements. Student passwords must:
   - Be at least 8 characters in length
   - Contain both letters and numbers
   - Contain at least one upper-case letter

Example Passwords:
FOSS1234 Science1

After clicking “Submit,” you’ll quickly receive an email containing the login information you just entered. If you don’t see the email, please check your spam folder.

Now that the Class Page is created, you’ll be able to “Edit Class Login Info” (update the Login Name and Class Password), “View Class Page” (see what students see), “Add a New Note” (notes for students to read when they log in), and “Manage Class Page” (change which modules students see, enabling you to add modules as you begin teaching them).

Students log in from the FOSSweb.com homepage, then they click on “Class Login” and enter the Class Login Name and Class Password. They’ll be taken to the Class Page that you set up.

Remember, you can set up as many class pages—for as many periods or different classes—as you’d like.


Permanent Access Codes

FOSS K–6 2nd Edition
Access Code
AME2ELS260

FOSS Middle School 1st Edition
Access Code
AME1M56770

FOSS CA Edition (K–5)
Access Code
AME1CA3968

FOSSweb Help

Account Questions/Help Logging In:
School Specialty Online Support
loginhelp@schoolspecialty.com
Phone: 800.513.2465, 7:30 am–5:00 pm CT

General FOSSweb Technical Questions:
FOSSweb Tech Support
support@fossweb.com

Access Code Questions
Delta Customer Support
customerservice@delta-edu.com
Phone: 800.258.1302, 8:00 am–5:00 pm ET
During the summer, the main room of the SMART (Science Materials And Resources for Teachers) Center in Oakland Unified School District (OUSD) is transformed into a hub for FOSS kit refurbishment. You can hear the chatter and laughter of teenage interns, the thud of boxes placed on stations and carts, the rhythmic sound of various objects being dropped in bins as they are sorted, and sounds from the occasional mishaps—sounds which are uniquely FOSS—metals disks clanging as they drop and roll and plastic cups hitting the floor and scattering.

The Internship Process
The interns are participants in the Exploring College and Career Options (ECCO!) Work Experience Education (WEE) Summer Program through the College and Career Readiness Office of the Oakland Unified School District. The students receive 10 elective credits, a paid stipend, and real work experience. The SMART Center is one of the more than 45 sites across the San Francisco Bay Area that hosts interns in the summer. From this program, students gain work experience and develop skills that will help them be successful in college and the workplace. Once students have selected host sites from the list that interest them and are aligned to their career goals, they must then contact the site and submit the résumés and cover letters that they have created.

Students interested in an internship at the SMART Center attend a group interview, during which they review the job description and workplace expectations, receive a tour of the facility, and are asked a series of questions. Once selected, students receive an orientation and on-the-job training. During their SMART Center internship, the students receive information about careers in science, teaching, and college preparation—they learn about the various local science institutions, they strengthen their science content knowledge, and they learn about their rights and responsibilities as employees. Students develop skills in time management, attention to detail, workplace safety, self-advocacy, and interpersonal and communication skills. Students are also given the opportunity and the challenge to bring innovations to the refurbishment process and use critical thinking to improve efficiency. Additionally, students develop their leadership skills by serving as crew leader. This position rotates to each intern weekly, and they are responsible for pulling materials needed for the current kits, copying inventory sheets and labels, and serving as liaison by conveying the needs and concerns from the floor to the supervisor.

Interns choose to participate in the SMART Center internship because they have an interest in the fields of science or education. The interns often express that the most challenging aspects are dealing with the repetitive nature of the job that requires being indoors at a workstation for long hours and learning to manage their time and develop efficient processes. The biggest gain for interns is most often in their communication skills. They must learn to work in a diverse environment and communicate with those who have different perspectives and experiences from their own. Many interns reflect that they had little hands-on science in their elementary years and enjoy the idea that they are making this possible for current elementary students. They feel that they are supporting teachers and students with science instruction by ensuring that all the materials they need are in the kit. They really have a sense of pride about their role in making science possible.

Continued on page 18
Teen Interns continued

for the elementary students. They feel like celebrities sometimes when teachers come in to return kits and praise them highly!

**The SMART Center Setup**
The typical day for the interns start at 8:30 am during June, July, and August, while most of their classmates are sleeping in. Several days are spent refurbishing each box of each kit, depending on the number of items enclosed. Eight workstations occupy the center of the room from wall to wall, each with an ergonomic chair and a supply bin containing frequently used items, such as masking tape, a black permanent marker, labels, masks, gloves, aprons, and more. On every table is a scale used to save time by weighing sets of items rather than counting them, as well as battery testers, stacks of inventory forms, and a trash can and recycling bin. Posted in the room are tips and measurements and specific tasks for the current kit being refurbished, a check of list with names of all 18 kits in order of refurbishment, files with inventory forms for all 18 kits, labels of all sorts (such as labels needed to replace the FOSS logo in grade level colors and to denote Box A, B, C), a tally chart of daily kits completed by interns, and a timer for breaks. Items needed for the kits line the counter on the east wall and the floor, as well as collection containers for various items (such as spent batteries and lightbulbs headed to recycling). There are stations for sorting and bagging items like element tiles, test objects, and minerals. Two carts are stacked with boxes—one to be refurbished (Coming In), the other with boxes that have been refurbished (Going Out). Many times a day, each cart is filled and emptied as they travel from warehouse to work floor and back again.

The feeling to me in the SMART Center is that of an assembly line with repetitive motions and fast-paced movement. Often it brings to mind fairy tale stories of elves at work in their workshop happily bantering yet keen on efficiency and completion of tasks.

Each summer, the interns refurbish 3,600 boxes from an inventory of over 925 items, benefitting over 50 elementary schools, 900 classrooms, and 26,000 students. After the kits have been refurbished, they are staged on the warehouse floor to be delivered to the schools before the first day of school in the fall. Two times during the year, the kits are rotated so that each teacher receives a Life Science, Physical Science, and Earth Science module for 11 weeks. This work is important because it ensures that every teacher in the district has the materials that she or he needs so her or his students can complete their science investigations, make observations, analyze data, and then make claims and evidence and draw conclusions just like real scientists. It helps students learn how to learn. It sparks their curiosity and passion and can catapult them on a pathway into a science career.

Learn more and watch a video showing the interns in action: [http://science.ousd.k12.ca.us/elementary.html](http://science.ousd.k12.ca.us/elementary.html)

**Staying Safe with FOSS: MSDS becoming SDS**

Here at FOSS we’re always making sure that our safety information stays relevant and up-to-date. We’re committed to helping ensure that all teachers and students stay safe.

On that note, due to OSHA requirements, Materials Safety Data Sheets (MSDS) will soon be called Safety Data Sheets (SDS). The information will be the same, and the format will be consistent and user-friendly. Watch for the name change in the near future, but know that the information you’ve relied on will still be right where you need it.
FOSS Institutes: Fall 2015

Delta Education will host two one-day FOSS Institutes before each of the three 2015 NSTA area conferences in Reno, Nevada (10/21/15); Philadelphia, Pennsylvania (11/11/15); and Kansas City, Missouri (12/2/15). These Institutes, one for K–5 and one for middle school, will be for educators from districts that have implemented FOSS or are interested in learning about FOSS. The Institutes will focus on newly developed FOSS materials—new FOSS Next Generation for K–5, and the newly revised Second Edition Middle School courses.

These Institutes are free, but you must register in advance to attend.
To secure your spot at an Institute, please contact:
Jenn Reid at Delta Education
800.258.1302 x3667
jenn.reid@schoolspecialty.com

NSTA NATIONAL CONFERENCE
CHICAGO, MARCH 12–15, 2015
K-8 Workshop Schedule
Thursday, March 12, 2015
8:00–9:30  Engineering Design in the FOSS Next Generation Program
10:00–11:30 Science Practices: What Does Argumentation Look Like in a FOSS Elementary Classroom?
12:00–1:30 Crosscutting Concepts: What Do They Look Like in a FOSS Elementary Classroom?
2:00–3:30 Asteroid! Will Earth Be Hit Again? FOSS Planetary Science for Middle School
4:00–5:30 Evidence for Plate Movement with FOSS Earth History for Middle School

Friday, March 13, 2015
8:00–9:30  Predicting Pollinators with FOSS Diversity of Life for Middle School
10:00–11:30 Floods, Heat Waves, and Hurricanes: Analyzing Evidence for a Changing Climate using FOSS
11:00–12:30 Special Pathway Session: Formative Assessment: Lessons Learned
12:00–1:30 Crosscutting Concepts: What Do They Look Like in a FOSS Elementary Classroom?
2:00–3:30 Assessment: The Bridge between Teaching and Learning
4:00–5:30 Science Practices: What Does Argumentation Look Like in a FOSS Elementary Classroom?

Sunday, March 15, 2015
11:00–12:00  The Reflective Assessment Practice: 15 Minutes to Improved Instruction and Learning

The Lawrence Hall of Science Institutes
Transitioning to Next Generation Science Standards in California (K–5)
July 6–7, 2015
FOSS California Two-Day Summer Institute

FOSS Next Generation Edition for K–5
July 8–10, 2015
The Next Generation of Active Learning

FOSS Middle School
July 14–17, 2015
Introducing Diversity of Life, Second Edition

FOSS Middle School
July 20–23, 2015
Introducing Weather and Water, Second Edition

Regional Institutes
Regional institutes for elementary and middle school programs are offered throughout the country. For a complete list of dates and locations, please visit the Professional Development calendar on FOSSweb, or contact Jenn Reid for more information.
jenn.reid@schoolspecialty.com
http://www.FOSSweb.com/pd-event-calendar

Sign Up to Receive the FOSS Newsletter
To receive the FOSS Newsletter electronically, sign-up at www.deltaeducation.com/FOSSnewsletter. You can also view both the recent and previous issues of the FOSS Newsletter, as well as archived articles, at http://www.FOSSweb.com/newsletter.

If you’d like to be added to the mailing list to receive this newsletter by mail, please send your name and address to:
Mariel Warnock, mariel.warnock@schoolspecialty.com

FOSS Summer Institutes: Register Now!
Register now for the FOSS Summer Institutes at the Lawrence Hall of Science! Visit the FOSS Professional Development calendar for more information and registration links.
http://www.FOSSweb.com/pd-event-calendar

http://www.facebook.com/FOSSscience
http://twitter.com/FOSSscience
Every FOSS Middle School Second Edition Course includes:

- Embedded science notebooking, including focus questions and data processing (sensemaking) practices.
- Updated FOSS Science Resources, used with literacy strategies that reflect Common Core State Standards for English Language Arts.
- New and improved multimedia features embedded in each investigation.
- Teaching strategies that support content, practices, and crosscutting concepts as described in the Next Generation Science Standards.

Contact your FOSS Regional Sales Manager for more information!