After 50 issues and almost 25 years, we here at the FOSS Newsletter are hanging up our printers’ caps. This is the last issue of the FOSS Newsletter in its current physical form. When we published the first FOSS Newsletter in Spring of 1993, we set out with a clear mission in mind—to provide you, our loyal users, with up-to-date information about FOSS. Whether it’s articles on real-world implementation, theoretical pieces, or pieces designed to help you deepen your science teaching for all students, we’ve written, and will continue to write and seek out, articles designed to help you connect with us.

And so the print FOSS Newsletter is no more, but FOSSconnect is here to stay. We’ll still maintain our archive of past articles, and we’ll still publish sets of articles a minimum of twice a year, but we’ll also start pushing out articles on timely subjects more often, as well as giving you more of a platform to write pieces about how you use FOSS.

In this special edition issue 50, you’ll find: “A Look Back at the FOSS Newsletter,” by former editor Sue Kaschner Jagoda; “What’s Next for FOSS in 2018?”, by FOSS codirector Linda De Lucchi; the final print edition of “Observations . . . by Larry,” by FOSS codirector Larry Malone; and the beginning of a new series of in-depth looks at FOSS implementations around the country, beginning with Linden, New Jersey, and RESA 6 in West Virginia. “FOSS Next Generation Implementations throughout the United States” begins in this issue, but is continued at www.deltaeducation.com/FOSSconnect, where we’ll continue these two district’s stories more in-depth, as well as regularly add other stories.

While we can’t help but shed a tear over saying goodbye to the print form we all love, we’re very excited to connect with even more of you while saving some trees in the process. Rest assured, we’ll provide key articles in a print-ready format for those of you that need articles in hand for workshops and to share with colleagues.

The FOSS Newsletter Goes Digital: Introducing FOSSconnect
By David Lippman, FOSS Program Manager and Newsletter Editor

FOSS NEWSLETTER
FALL 2017
NO. 50

The FOSS Newsletter is now available online at www.deltaeducation.com/FOSSconnect. You can access articles from this issue and past issues, and submit your own articles. If you’re interested in contributing to FOSSconnect, please contact foss@berkeley.edu.

Keeping in touch with FOSSconnect
If you’re already subscribed to the digital newsletter, you don’t have to do a thing. However, if you’re subscribed only to the print newsletter, you will need to sign up to receive updates when new articles are released.

To receive notification when new articles are published, sign up at www.deltaeducation.com/FOSSnewsletter.

Check out www.deltaeducation.com/FOSSconnect for the most recent articles.

Send your questions, article ideas, and articles you’ve written to foss@berkeley.edu.
What’s Next for FOSS in 2018?
By Linda De Lucchi, FOSS codirector, the Lawrence Hall of Science

The FOSS Next Generation K–8 Program is almost complete. “Complete” is a relative term, as we always seek ways to enhance the program once it has been “finalized.” The FOSS Project is dedicated to providing high-quality support to FOSS educators throughout an implementation, and the goal of every enhancement is to better support teachers and districts. At this point in the cycle of curriculum development, we are often asked, “What’s next?” Here’s what the FOSS staff have created for the future.

We worked with educators in California and around the country to design professional development tools to facilitate continuous improvement of teaching with the focus on learning. We have now incorporated these professional development strategies and enhancements into the instructional materials that will be available as chapters in the © 2018 releases of Teacher Resources on FOSSweb. The program remains the same (same instructional design, same modules and courses, same investigations, equipment, student readings), but with improved strategies for sense-making, and improved assessments to support three-dimensional teaching and learning. These new tools will be introduced in the online Grade-Level Planning Guides and will be detailed in specific chapters on FOSSweb. These new chapters will be particularly useful for the experienced teacher who feels comfortable teaching a module or course. In essence, the tools provide extended content that normally would be accessible only if teachers engaged in higher-level professional development.

Focus on Three-Dimensional Teaching and Learning

One of our goals is to enhance learning beyond a single module (or course) to provide teachers with tools that weave together the several modules at a specific grade using a three-dimensional teaching and learning approach. Strategies for engaging students at the beginning of the year, the middle of the year, and the end of the year with science and engineering practices will be described in one chapter using examples from the three modules. Specific ways to bridge student learning using crosscutting concepts at different times in each module will be presented in another chapter. Another chapter, called Sense-Making Discussion for Three-Dimensional Learning, will provide a few examples of how to plan and conduct sense-making discussions in different parts of the three modules throughout the year. These suggestions will be flexible as it is not essential to use the grade-level modules in a specific order.

Another enhancement is that we have identified the anchor, investigation, and everyday phenomena explicitly in each module and investigation, with a guiding question for each investigation that can be answered at the end of the investigation in the Wrap-Up discussion.

Educators often talk of three uses of phenomenon in instruction: An anchor phenomenon establishes the storyline for the module. An investigative phenomenon guides an active investigation part (expressed in the guiding question for the investigation and through the focus questions for each part). Related examples of everyday phenomena are exposed in the FOSS readings, videos, discussions, formative assessment, outdoor experiences, and extensions.

We also make use of an Image Gallery for each module on FOSSweb to provide access to images and short video clips to introduce the module anchor phenomenon or an investigative phenomenon. These images and videos are also suggested as ways to revisit the guiding question for the investigation during the review and wrap up before the I-Check. The images and video clips come from the FOSS Science Resources interactive eBook or the streaming videos. We will also add links to these images and video clips in the Resources by Investigation (RBI) section on FOSSweb.
Three-Dimensional Assessments

FOSS has a forward-looking assessment system with both formative and summative assessments and we are making them even more robust. For the 2018–19 school year, FOSSmap (our online assessment system) has a new user interface, and we have taken this opportunity to make revisions to the benchmark assessments (Survey/Posttest and I-Checks) so they are even more three-dimensional. As educational leaders across the country are working on the NGSS assessments, we have been learning how to develop better 3-D items.

We are also developing new interim assessment tasks for grades 3–5 to directly target specific NGSS performance expectations. They are not meant to be diagnostic for daily instruction using FOSS curriculum, rather they are generic tasks that students should be able to answer given any curriculum used to teach the NGSS. Interim assessments can be given after students complete an investigation focused on a particular performance expectation, or you can give them at the end of the year as a grade-level test, especially when a state or district test is not given at that grade level. These tasks will be updated as we learn more about the design of large-scale national assessments.

These tasks begin with a scenario to set the context for the assessment items that define the task. Teachers can opt in many cases to include a hands-on experience, and in a few cases a computer simulation. Each task then consists of a number of related items to which students respond. Most are constructed-response items, but a few may be multiple-choice, multiple-answer, or short answer.

Establishing a Classroom Culture—Access and Equity

In our professional development work, we found that most teachers need support in conducting sense-making discussions focusing on the three dimensions of NGSS. In the updated Teacher Resources, we help the teacher establish norms for discourse and introduce ways to establish a culture of productive discussion that supports engagement in the science and engineering practices. Students need to feel free to express their ideas and to provide and receive critique from others as they work toward understanding of the disciplinary core ideas of science and methods of engineering. Teachers need guidance in asking questions and encouraging collaborative communications in the service of better understanding of the disciplinary core ideas, science practices, and crosscutting concepts.

The FOSS Program has been designed to maximize the science learning opportunities for all students including those who have traditionally not had access to or have not benefited from equitable science experiences—children with special needs, ethnically and culturally diverse learners, English learners, children living in poverty, girls, and advanced and gifted learners. FOSS is rooted in a 30-year tradition of multisensory science education and informed by recent research on Universal Design for Learning (UDL) to be culturally and linguistically responsive to teaching and learning. Procedures found effective with students with special needs and students who are learning English are incorporated into the materials and strategies used with all students during the initial instruction phase. A new Access and Equity chapter in Teacher Resources will focus on these strategies and further suggestions will be provided for enhancing the science and engineering experiences for all students.

State-Specific Resources

FOSSweb provides the opportunity to share state-specific resources. An example of such a resource is the FOSS connections to the California Environmental Principles and Concepts. FOSS has a strong environmental component specifically enhanced for the California educator with direct connections to the CA Environmental Principles and Concepts. This is part of the California state-specific Teacher Resources and CA Planning Guide for each grade level.

Educators across the country will also be able to use a new feature of our Interdisciplinary Extensions: Environmental Literacy Extensions.

Developing Partnerships

These are some of the new tools we have available to educators for the coming year. We will announce these updates on FOSSweb and through emails to registered FOSSweb users. As always, we look forward to establishing partner relationships with districts to meet the specific needs of teachers and students in their community and help to integrate science seamlessly into the educational experiences of all students. Our mission is to help every school become a science-centered school. To contact us about partnerships, write to FOSS@berkeley.edu.

To see a sample table of contents for a new FOSSweb module detail page Teacher Resources for grade 2, view the online edition of this article.
FOSS Next Generation Implementations throughout the United States

By Erica Beck Spencer, FOSS Curriculum Specialist

Over the next few years, we will be reporting on FOSS Next Generation implementations of various shapes and sizes from around the country. The reports will feature a wide range of transitions, from single-school purchasers to major urban center adoptions. The reports will be about transitions from textbooks, or having no science program at all, or transitions from the Second or Third Editions of FOSS to the Next Generation Edition. Some will be about purchasing the whole scope and sequence in one large purchase order, while others will be about the acquisition of a few modules at a time to manage limited resources. The goal of these brief reports will be to provide models describing how things are done in various areas around the country. They may be used as a tool to compare implementations, to think outside of your district’s box to find solutions, and may even serve as a critical competitor for various ways to get the job done. It is possible that these reports will provide a way to tap into others’ excitement and ruminations about how to adopt the FOSS Next Generation Edition in a manner that best works for your school or district. Ultimately, the goal is to share ways to positively affect the lives of as many teachers and students as possible. If you have already begun using the FOSS Next Generation Edition, these reports may suggest other ways to support, maintain, and improve the effectiveness of your adoption.

To kick this project off let’s focus on two adoptions: Linden, New Jersey, and RESA 6 in West Virginia. These two adoptions share some similarities. Both are long-time FOSS users, both have passionate leadership, and both are about strengthening their implementation by bringing together their communities. You can get a taste for these adoptions here in print, but can read a more comprehensive overview of these adoptions on our new site for articles (www.deltaeducation.com/FOSSconnect).

Strong FOSS implementations in Linden, New Jersey, and RESA 6 in West Virginia.

Linden, New Jersey
Linden is a working-class town in northern New Jersey. They serve 6,080 students in their eight elementary schools, two middle schools, and one high school. The demographics of the community:

- 54% students receive free or reduced lunch
- 1,329 students speak 34 various languages
- Black 34%
- Hispanic 35.72%
- White 21.79%
- Multi-racial 4.91%
- Asian 2.53%
- Other 42%

Linden Public School District’s FOSS Implementation is one of the country’s longest running FOSS implementations; they have been proud FOSS users since 1993. Linden has a refurbishment center, a supervisor of science, and an elementary science specialist. Their strong district science leadership is further supported by their participation in an informal partnership with four other nearby towns: Elizabeth, Hillside, Rahway, and Newark. Science leadership from the five districts meet several times a year to discuss future programs and to bounce ideas off of each other, and four of them have made the decision to use the FOSS Next Generation Edition after an in-depth review of eight different programs. During the summer of 2017, the five-district collaborative hosted peer-led module and course trainings, primarily in life science, and implementation will occur K–8 in the 2017–18 school year. The five districts will decide if the next trainings will be in the Earth Science Strand or Physical Science Strand.

Rose Goldstein, the district supervisor of science shared,

We were looking for a program and a partnership with a vision, who shares our values, who is going to be there when we need support—we were not just buying a product with an NG sticker on it. If we have a problem and a question—we know we can reach out to all on the FOSS team, to those with a shared passion for educating children to the best of our ability. The five towns wanted to work with a program who is loyal, loyal to our districts, loyal to our teachers, and ultimately loyal to our students. FOSS, the sales rep, and the consultants are part of our team and each of them treats our district, our teachers, our students as if they are their own.

For more information about Linden, New Jersey’s history with FOSS PD and refurbishment plans, and lessons learned from 20+ years of using active science visit www.deltaeducation.com/FOSSconnect.

RESA 6
To understand the magic happening in parts of West Virginia you first have to understand how the state is organized. In this largely rural state counties are the school districts and counties are grouped and supported by Regional Education Service Agencies (RESA), a resource sharing and money saving organization that works in conjunction with the superintendents of each county. Hancock, Brooke, Ohio, Marshall, and Wetzel counties are served by RESA 6, led until recently
by now retired Executive Director, Nick Zervos. RESA 6 provides a wide range of professional services including everything from lining athletic fields to providing professional development to over 10,000 people in all subject areas each year (those served are mostly educators, but they also provide adult education, training for firefighters, and many other types of trainings). RESA 6 is unique in that its science program is largely supported by the WV-Handle on Science Project founded in 1997 and led to this day by Libby Strong. The WV-Handle on Science Project provides most of the science PD offered to the RESA 6 educators, but more importantly, it provides the inspiration and support for teachers throughout the five districts to teach with fidelity with very limited resources. They coordinated the adoption and managed the transition to the FOSS Next Generation Edition. The program saves thousands of dollars for the counties and reduces potential barriers by providing most of the teacher-supplied items for teachers through the refurbishment center which manages the circulation of all the kits sent out to over 400 teachers. They manage three rotations per year from their 3,780-foot warehouse with one full-time materials manager, Vincent Loreto, who has been with the project for over 15 years. A sixth-grade teacher from Ohio County said about the refurbishment center, “Having the resources readily available is wonderful. The refurbished kits save so much time and effort, which in turn enhances my science teaching.”

Libby’s 20-year commitment to improving science education in the five counties is inspiring. Half of her salary is currently funded by the five districts, although she works tirelessly (although only half time) to do all that the districts need her to do; her many other science-education related projects fill the rest of her time. She is exceptionally dedicated and performs tasks that aren’t necessarily on her job description, but she does them to support teachers and impact many children. For example, she will hand deliver live goldfish to teachers, she connects new teachers with experienced teachers so that they can receive some local support, and she has cultivated an enthusiastic team of teacher leaders. A cornerstone of most successful adoptions is a leader or, better yet, a leadership team, in the district to attend to the small stuff and to push the initiative along. Libby’s dedication has transformed teachers’ practice enormously. A Brooke County fourth-grade teacher said about her work, This is a program that has changed my teaching. When I began teaching, my least favorite subject was science. After I was introduced to the pedagogy and materials of the WV-Handle on Science Project, I understood the joy of learning science. My enthusiasm was transferred to my students. I have continued to refine my teaching skills each year and have added science notebooks in my science teaching.

The rural districts Libby works with have a free and reduced lunch percentage rate ranging from 35.7% to 51%. The student body is made up largely of white students ranging from 87% to 97.9%. The majority of the minority students are African-American, with a much lower percentage of Hispanic and Asian students. The five counties include 30 elementary schools and 10 middle schools. About 400 teachers are involved in the WVHOS project and attended the WVHSP PD for FOSS. For some of the titles, schools were able to purchase conversion kits, but in other instances, new titles needed to be purchased. All schools have upgraded from a curriculum consisting of FOSS Second Edition and a mixture of other hands-on science programs to a curriculum consisting entirely of FOSS Next Generation Edition.

And this, dear reader, is the spot, the place where you will now have to travel online to read more about the endeavors of these two districts. Please visit www.deltaeducation.com/FOSSconnect to read the enhanced version of this article.

FOSSweb Updates

We’ve recently updated the entire look and feel of FOSSweb. Visit soon and take a look around!

Check out the Waves Course on FOSSweb for Spanish resources that will be available soon for all middle school courses.
I’ve heard it a time or two: We’ve been doing FOSS for six years—been there, done that! There’s a rumor going around that FOSS is old and out of date. Now with NGSS looming, isn’t it time to try something new and different?

I’m here to tell you that none of these statements represents clear thinking. First of all, if you have been doing FOSS for a generation (one cycle of K–5 education) you have probably felt the rhythm of the program and developed some basic technical and strategic moves. Imagine, if you were on a journey of developing a musical career, it might take six years to develop facility with the mechanics of your instrument. Consider, for a moment, Yo-Yo Ma. Do you think that, after six years, he pondered, “Now that I have got the basics of managing this cello, OK, done that, maybe it’s time to turn my attention to another instrument . . . perhaps a banjo or an electric guitar?” No, he concentrated on the expression of music he was now able to execute. He focused on his musical phrasing and nuance of presentation. Yo-Yo Ma, clearly a man with a growth mindset, stuck with his cello adopting a personal dedication to continual improvement.

The same is true of your FOSS practice; you can always improve your FOSS instructional practice. It takes a few years to hone your basic moves to an intuitive edge. You don’t want to put down your FOSS at this point in your science teaching development, effectively squandering your investment of time and intellectual energy.

The rumor that FOSS is out of date is incorrect. True, FOSS has been around for a quarter of a century, but during that time it has been reinvented several times to stay abreast of the ever-changing science education currents. This has been possible because the founders and key staff of the FOSS project have stayed with the program and maintained a continuous growth mindset through its many iterations. The fact that the FOSS Next Generation Edition reflects significant similarity to the legacy editions of the program stems from the fact that national standards (NGSS) have finally caught up with the core philosophy and principles (now called three-dimensional teaching and learning) that have guided the FOSS project since its introduction in the 1990s. Out of date? I don’t think so!

Now is the time to channel your inner Yo-Yo. You’ve put in your time learning to handle the instrument, now it’s time to make the music. NGSS places emphasis on three dimensions of teaching and learning science. The primary dimension is the disciplinary core ideas (DCIs) of science. This is what we for years called content. The FOSS science background discussion for the teacher associated with each investigation has been updated to reflect the latest understanding of modern scientific principles to ensure an NGSS-ready representation of current science and engineering. Dimension 2 is the science and engineering practices (SEPs). This is new, at least in a descriptive sense. The SEPs are a coherent description of the teaching/learning strategy we for years called inquiry science. The third dimension, the crosscutting concepts (CCs), is the conceptual connective tissue that integrates all science knowledge into a unified understanding of all things natural and human created. In a nutshell, the DCIs are the science content we expect students to learn, and, refreshingly, the SEPs are the intellectual rules of engagement for how to teach and learn the DCIs, and the CCs bind everything together to create a coherent understanding of the natural world—scientific literacy. Incorporating the SEPs and CCs seamlessly into your practice will be this generation’s big challenge. Teaching with a sensitive, textured approach to science learning will require a particular attention to the learning culture in your classroom. Teachers will develop skill for guidance without being overly directive. Teachers will have to become learning-space engineers; this will involve developing a community where students assume a new level of responsibility for both their own learning and the learning of their classmates. Sound like magic? Yes and no; performance at the pinnacle of excellence has the aura of magic (think Yo-Yo), but in fact they are simply first-rate human performance.

The FOSS Next Generation Edition is a new program adapted to thrive in the NGSS environment. The ancestral FOSS DNA is clearly apparent, but the new program sports a new research-based assessment program, fresh digital resources, new informational text materials, and a robust menu of teacher resources to inform instructional practice. FOSS Next Generation Edition ventures into the outdoor environment, and seamlessly integrates a bounty of language arts enhancements. And you will find strategies and instructional moves to embrace equity and diversity. So, stay with your FOSS, strive for mastery, and advance forward confidently in the NGSS era.

Observations . . . by Larry Staying the Course

By Larry Malone, FOSS codirector, The Lawrence Hall of Science
A Look Back at the FOSS Newsletter
By Susan Kaschner Jagoda

You are holding the last good-old-fashioned paper edition of the FOSS Newsletter in your hand as you read this article (unless you’ve already gone digital). In honor of our tree-saving measures we want to take a stroll down memory lane and share a bit of history and trivia of the FOSS Newsletter.

- The first FOSS Newsletter was published in 1993. It was originally published four times a year; the schedule soon changed to twice a year. (It’s a lot of work gathering articles, editing, and designing a newsletter, and we had curriculum to develop!)

- The goal of the FOSS Newsletter was to connect FOSS developers and users in a network across the country and beyond.

- Larry Malone was the first editor. A few years later he passed the baton to me (Spring 1998 was my first issue), and it became one of my favorite tasks as a FOSS Developer. David Lippman expertly took over as editor when I retired in 2012.

- One of my aims was to encourage teachers and students to contribute their FOSS experiences to the newsletters. They were thrilled to get published! (A couple of examples are “Crayfish in Arizona” and “Earth History Field Experiences.”)

- FOSS staff have shared their travel experiences in the newsletter. Check out “In the Land of the Rising Sun” and “Postcards from the Rim” in the newsletter archive.

- Part of the newsletter production team is based in Chicago. Phyllis Tamada-Brown has been the graphic designer for the newsletter since the beginning. Dawn McHugh has edited and supervised production of the newsletter. It was a cross-country team effort!

- Dr. Larry Lowery (1932–2016) was a frequent contributor to the newsletter providing insights into the cognitive science and learning theory on which the FOSS program is based.

Just like the FOSS program has evolved, so has the newsletter over more than 20 years. But even though the title is changing, FOSSconnect will still always be your source for updates, the latest research, and interesting stories from your colleagues.

To receive notification when new articles are published, sign up at www.deltaeducation.com/FOSSnewsletter.

http://www.facebook.com/FOSSscience
http://twitter.com/FOSSscience

FOSS Newsletter, Fall 2017, No. 50
FOSS Next Generation Conversion Options Are Here!

Delta Education now offers new ways to convert your previous editions of FOSS to FOSS Next Generation to help meet your logistical and budget needs!

- Program-level conversion plans: Collaborate with Delta to move your existing equipment around to create the Next Generation kits and order the specific equipment and print you need to make them complete.
- Going digital! Delta can help you convert your teacher and student print materials to FOSS Next Generation digital.

Reach out to your sales rep for more information!

Read more about converting to FOSS Next Generation here: deltaeducation.com/NGupgrade

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