Taking Stock of the Alphabet Soup … to Grow Environmental Literacy

CCSS … NGSS … ELP … OMG … LOL. We live in a world of acronyms. The alphabet soup of new education standards and guidelines can be overwhelming. What is expected of teachers? What is expected of students? How will our classroom activities change to meet these new requirements?

This newsletter does not have all the answers. What it does have is articles to help you begin to wade your way through some of the new requirements. Articles have been contributed by New Hampshire teachers and nationally recognized environmental educators. There is information for you about local and national resources, including reading resources for using informational texts with your students.

One thing is for sure: it is going to take patience and perseverance to decide the most appropriate path to take to implement all of the new requirements. By staying informed and having conversations with your colleagues, you will begin to make sense of the alphabet soup.

Environmental Literacy, Common Core Standards and the Next Generation Science Standards

by Bora Simmons, National Project for Excellence in Environmental Education

The ultimate goal of environmental education is now typically discussed in terms of the development of an environmentally literate citizenry. The breadth and depth of what it means to be environmentally literate is directly impacted by how environmental education is practiced in schools and how it connects to innovations such as the Common Core State Standards (CCSS) and the Next Generation Science Standards (NGSS).

Defining environmental literacy, especially within the U.S. school system, is an on-going effort. Ultimately, environmentally literate individuals – those who have become thoughtful, skillful and active citizens in a democracy – possess a sophisticated set of skills that allow them to solve novel environmental problems and determine the best set of actions.

Efforts to define environmental literacy or to establish frameworks that can be used in curriculum development or assessment are critical. They help those in the field articulate essential underpinnings of environmental education and guide the development of programs and materials that are comprehensive and more likely to lead to environmental literacy. This is environmental literacy can mean caring for wildlife in your own watershed, a theme explored by these 4th grade students studying trout.

Environmental continued on page 2
not, however, sufficient. We must provide direct links between the standards-based core curriculum and environmental education.

Through the National Project for Excellence in Environmental Education (NAAEE 2010, 4th edition), four key elements of environmental literacy have been further articulated to include:

**Strand 1: Questioning, Analysis and Interpretation Skills**
- The earth as a physical system
- The living environment
- Humans and their societies
- Environment and society

**Strand 2: Knowledge of Environmental Processes and Systems**
- The earth as a physical system
- The living environment
- Humans and their societies
- Environment and society

**Strand 3: Skills for Understanding and Addressing Environmental Issues**
- Skills for analyzing and investigating environmental issues
- Decision-making and citizenship skills

**Strand 4: Personal and Civic Responsibility**

### Common Core State Standards for English Language Arts and Mathematics

For the first time in the nation’s history, 46 states have adopted a common set of national standards. The CCSS for English Language Arts and Mathematics articulate the essential tools required for students to be functionally literate and numerate. They go beyond basic reading, writing and computational skills, however, to include critical thinking, analysis and synthesis. These standards are shaping education in the United States. Linking environmental literacy and the CCSS is essential.

Thankfully, the Kentucky Environmental Education Council has developed crosswalks or matrices that demonstrate essential connections between the CCSS and the North American Association for Environmental Education’s Excellence in Environmental Education: Guidelines for Learning (K-12). These crosswalks are designed for the very practical purpose of assisting teachers wishing to integrate environmental education into the curriculum through standards-based lessons. The crosswalks help educators identify natural opportunities for integration and a way of connecting the curriculum through a comprehensive vision. The crosswalks can also be used to make the argument that environmental education is a legitimate avenue for addressing standards.

### The Next Generation Science Standards (NGSS)

Similar to the CCSS efforts, the development of the NGSS has been state-led. These standards, in their final draft form at the time this newsletter is being published, are designed to engage students in three dimensions of science learning:

1. **Science and Engineering Practices:**
   - asking questions and defining problems, planning and carrying out investigations, engaging in argument from evidence, obtaining, evaluating and communicating information.
2. **Crosscutting Concepts:** patterns, cause and effect, systems and system models, energy and matter in systems, stability and change of systems.
3. **Disciplinary Core Ideas:** are divided into four major categories (i.e., life sciences, physical sciences, Earth and space sciences, and engineering, technology, and applications of science) and include topics such as interdependent relationships in ecosystems, Earth’s surface systems, energy, and human sustainability.

Science education, according to the draft standards, “should reflect the interconnected nature of science as it is practiced and experienced in the real world.” Although it is too early to map in detail the relationship between environmental literacy and the NGSS, it is easy to see that strong connections exist across all four environmental literacy strands and the three NGSS dimensions.

Environmental literacy is essential. It is not only compatible with, but supportive of the standards-based curriculum efforts detailed in the CCSS and the NGSS.

### Project Learning Tree Correlations to the Common Core

Activities in Project Learning Tree’s (PLT) PreK-8 Environmental Education Activity Guide will help you address many of the Common Core State Standards. The correlation document allows you to easily find a PLT activity that addresses a specific grade level standard. The correlations can be found at plt.org/common-core.

The PLT activity numbers in bold on the chart have a strong correlation to the particular standard. Activity numbers that are not bold address the standard, but are not sufficient to meet the standard. Please note that PLT activity numbers correspond to the chronological order of the activities in the guide, and not to the page number.

PLT’s activities are designed to be infused into your existing curriculum so they can reinforce language arts, math, science and social studies concepts; provide hands-on lessons; engage students to think critically; and carry out observations and experiments.

The correlations are based on the way the activity is written. They do not take into account the myriad ways a teacher could modify an activity to address a standard more directly or completely. In addition, if the content of the standard is referred to in the activity’s background information, but if the students do not act on the information in the written activity, it is not included in the correlations.

### Math Correlations

Approximately one third of the PLT activities include a math component, ranging in concepts covered from kindergarten to eighth grade. Students may often wonder why they should care about learning a certain math concept. The math components of PLT activities give such students a chance to see “real-world” applications of math.

Through activities, students count tree rings, discover shapes in nature, learn about the exponential growth of invasive species, measure and graph plant growth under various conditions, learn about volume as they investigate water conservation, and more.

### English Language Arts Correlations

Results for multiple grades have been aggregated on the correlation chart for English language arts in the following way: kindergarten through second grade, third through fifth grade, and sixth through eighth grade. At the beginning of each PLT activity, grade levels for various parts of the activity are indicated. Activities, however, can be geared up or down with slight modifications.
Spotlight on...

Elementary GLOBE

There is a little girl named Anita. She ALWAYS asks questions. She wants to know how things work and is noticing everything, all the time! Her friends groan when she raises her hand because they know this will not be a “yes” or “no” question, but will lead to even more questions. When the hummingbirds disappeared at her school, Anita wanted to know where they went and she wasn’t going to stop until she found out. When Scoop, a friend’s dog, ran off and dug holes all over town, Anita noticed that each hole had different types of soil. Anita is a scientist and uses science process skills.

I bet you know someone just like Anita. I bet you wish we could all be a little more like her when it came to science. Most of all, I bet you wished there was more time in the school day to be like her and her friends. By combining science, math and literacy, you just might be able to do that.

The five Elementary GLOBE storybooks, designed by the GLOBE® Program for K-4 students and starring Anita and her friends, model science process skills and introduce scientific concepts. Each book comes with three learning activities that build on the other books.

Learn about clouds (Do You Know the Clouds Have Names?), soil (The Scoop on Soils), migration and phenology (The Mystery of the Missing Hummingbirds), earth systems science (All about Earth, Our World on Stage), and streams and seasons (Discoveries at Willow Creek). The activities guide you and your students in singing a song about the Earth, to act out a play, investigate pond water and soil, and record the colors of the seasons.

Best of all, using Elementary GLOBE, you can meet the Common Core requirements and the Next Generation Science Standards while having fun. (Shhhhh! Don’t tell anyone about that last part!) It's all free, it's all online, and it's all here: http://globe.gov/web/elementary-globe.

Only the Anchor Standards are shown on the chart for English language arts; however, when the correlations were completed, each activity was correlated to the specific standards that apply to each grade. For the Standards for Literacy in History/Social Studies, Science, and Technical Subjects (grades 6–8), specific standards are included on the table. The Anchor Standards for Reading apply to both literature and informational texts. The correlation chart clearly indicates which PLT activities support each.

Project WET
Correlations to the Common Core

The Project WET Foundation proudly released its Curriculum and Activity Guide 2.0 in September 2011. Printed in full color, the guide contains updated activities from the original guide, a collection of the “Best of the Best” from other Project WET publications, and a series of new field-tested activities. The addition of the Reading Corner and Teacher Resources to each activity allows teachers and students to further their knowledge of the subject matter in the activity. A companion online portal simultaneously went live in September 2011.

Immediately after the release of the Guide 2.0 and Portal, work began on correlating each activity to several national education standards. A team of educators led by the Project WET Foundation staff in Bozeman, Montana, painstakingly went through each activity and correlated them to the “Common Core State Standards for English Language Arts & Literacy in History/Social Studies, Science, and Technical Subjects,” “Common Core State Standards for Mathematics,” “A Framework for K-12 Science Education: Practices, Crosscutting Concepts, and Core Ideas” and “Ocean Literacy: The Essential Principles for Ocean Science K-12.” These correlations were completed and uploaded to the Project WET Portal in November 2012.

Although the Portal is free to all users, only those who have taken a Project WET 2.0 workshop can access the correlations content on the Portal. A 2.0 online refresher course for those who have previously taken a Project WET 6-hour workshop will be available in April. It will enable educators to obtain the Guide 2.0 and access the correlations on the Portal.

Plans are underway to correlate the activities to the “Excellence in Environmental Education: Guidelines for Learning (K-12)” and the “Next Generation Science Standards” once they have been finalized.

Find out more at projectwet.org.
Making Use of Informational Texts in Your Science Classroom

by Lori Bresnahan

The “Common Core State Standards for English Language Arts & Literacy in History/Social Studies, Science, and Technical Subjects” include the expectation that literacy skills will be taught and applied across a range of content areas. Students will be “reading to learn.” This has always been true to some extent, but to accomplish this goal of meaningful application, with an increased emphasis on informational text, there needs to be intentional instruction in literacy skills and strategies within the content area classes. The standards themselves offer some direction, but here are basic suggestions:

Establish a clear purpose for reading. Most content area reading has a specific purpose – to build background knowledge, gather information on a given topic, answer a question, etc. Help students understand how the purpose affects how you focus your reading. For example, you often don’t need to start at the front cover and read through to the end of the text, but rather, look to find and focus on the pertinent section.

Call attention to text features and how to use them. Informational materials contain a variety of text features, each of which serves a specific purpose: table of contents, headings and subheadings, charts and graphics, fonts (and features such as bold, italic), glossary, index and appendix. How does each help us to access information? Demonstrate for students how to use these features to meet the specific purpose of their reading. Thinking aloud as you model their use is often very helpful.

Clarify content-specific vocabulary. Don’t assume that students know key vocabulary. Review and clarify meanings. Are there clues in the surrounding context? Are there glossaries or other resources that may be helpful? Instill a “need to know” attitude in your students, so they will seek to clarify meaning for themselves as they read along.

Familiarize students with common text structures in nonfiction materials. An understanding of how informational text is structured can help us find information more easily. It can also help us determine which information is most important. These structures include description, cause and effect, question and answer, comparison and contrast, problem and solution, and sequence (chronological or other). Use of graphic organizers can support students’ understanding of these structures.

Don’t ignore electronic resources. Students may spend a lot of time exploring online, but they still may need guidance in how to navigate and use these resources in meaningful ways. Knowledge of text features and structures will still apply, but with audio, animation, hot links and video elements added in, it is critical to maintain a focus on the purpose for reading, to avoid confusion and distraction.

Support critical reading. It is important for us to help students to develop a critical eye as they approach informational text (both print materials and electronic resources). Both good information and bad abound. We need to help students to tell the difference. They should look to determine the source. Is it reliable? How current is the information? Is there supporting evidence in multiple reliable resources?

It is up to us to lead the way for our students, so they can discover the excitement of the world of information that surrounds us!

Understanding how informational text is structured helps students determine what is important.

Many state and federal agencies and organizations publish nonfiction science-based literature for youth, much of which is available for free or can be purchased at a minimal cost. Here are just a few examples:
- Elementary GLOBE’s Storybook Set (K-4): http://globe.gov/web/elementary-globe
- Project WET’s Kids in Discovery series (3-5): http://store.projectwet.org
- N.H. Fish and Game’s WILD Times for Kids (3-5); Wildlife and Aquatic Wildlife pamphlets (3-6); wildlife fact sheets (middle and high school): wildnh.com/kidskids.htm
- Explore Wild New England (4-7): wildnewengland.org
- USDA Forest Service’s Investigator (5): scienceinvestigator.org
- USDA Forest Service’s Natural Inquirer (middle school): naturalinquirer.org
- N.H. Dept. of Environmental Services’ fact sheets (middle and high school): des.nh.gov/organization/commis-sioner/pip/factsheets/index.htm
- UNH Cooperative Extension’s Habitat Stewardship Series (high school): extension.unh.edu/FWT/HabBrochures.htm

Lori Bresnahan is a Reading Specialist in the Shaker Regional School District in Belmont, New Hampshire.
Focus on Doing Science, Not Knowing Science Facts

By Alicia Carlson, Project WET Coordinator, DES

Perhaps the writers of the Next Generation Science Standards can take a cue from Douglas Adams’s well-known science fiction book *The Hitchhiker’s Guide to the Galaxy.* In order to calm the nerves of teachers across the United States, they should print in large, friendly letters on the cover “Don’t Panic.”

The Next Generation Science Standards (NGSS) certainly illustrate a shift in thinking about how science should be taught, particularly in elementary grades. The focus now is on practicing science skills in conjunction with science ideas over time in order to develop students’ scientific understanding. This has been true in other subjects for years – finally, science teaching has moved from the memorization of discrete, disconnected facts to an understanding of how science is done. Students who practice their science and engineering skills throughout the K-12 continuum will build a structure that will help them understand how scientific ideas are related to each other.

The new emphasis on science and engineering practices first took root in *A Framework for K-12 Science Education: Practices, cross-cutting concepts and core ideas.* On page 11 of the framework, the writers stated: “…learning about science and engineering involves integration of the knowledge of scientific explanations (i.e., content knowledge) and the practices needed to engage in scientific inquiry and engineering design. Thus the framework seeks to illustrate how knowledge and practice must be intertwined in designing learning experiences in K–12 science education.”

With this shift in focus to the science and engineering practices, what may keep teachers from panicking is recognizing that their students will now be doing science, with less emphasis on knowing science. Sure, science ideas are still included in these new standards, but the focus has narrowed to a smaller set of ideas and learning progressions from grade to grade to more complex material. By combining the practices with the core ideas, students will become more like scientists by building deeper levels of knowledge.

Chances are, your students are already using at least some of the eight science practices in your classroom. They are:

1. Asking questions (for science) and defining problems (for engineering); continued on next page

### Activities Related to Articles in this Issue

**Project WILD suggests:**
- Middle school students describe aquatic animals in WILD Aquatic’s *Mermaids and Manatees* using a narrative style of writing that in turn is the basis for a drawing or painting done by other students.
- Elementary students in WILD Aquatic’s *Aqua Words* brainstorm water words, make word trees with those words and write poetic statements about water.
- In *Philosophical Differences*, high school students select a wildlife or environmental issue of concern to members of their community to research. They then correspond with representatives of a range of interest groups about their positions concerning their selected issues.

**Project WET suggests:**
- In the new activity* Invaders!,* students can read informational texts about invasive species before participating in a game that simulates competition for habitat and resources. Students also create graphs.
- Middle and high school students research water-related natural disasters and write newspaper stories about the area’s past, present and future in *Nature Rules.*
- Elementary students demonstrate how much of their bodies are composed of water and where water is found within their bodies through *Aqua Bodies.*
- New activities can be found in the 2011 edition of the Project WET Curriculum and Activity Guide. Don’t have a copy? Contact Alicia Carlson at alicia.carlson@des.nh.gov.

**Project Learning Tree suggests:**
- In *Poet-Tree* students are encouraged to express their viewpoints and attitudes about the environment while using various forms of poetry.
- Students monitor water use and determine how much is wasted in *Every Drop Counts.*
- Fifth grade students analyze informational text while determining if a story builds a case for conservation in *Trees for Many Reasons.*
2. Developing and using models;
3. Planning and carrying out investigations;
4. Analyzing and interpreting data;
5. Using mathematics and computational thinking;
6. Constructing explanations (for science) and designing solutions (for engineering);
7. Engaging in argument from evidence;
8. Obtaining, evaluating, and communicating information.

According to Heidi Schweingruber in the National Science Teachers Association (NSTA) webinar “Using the NGSS Practices in the Elementary Grades,” the practices help students leverage learning by providing time for reflection and consolidating understanding. Teachers who create a scientific community where students participate in “science talk” – using scientific language and sharing their ideas – will help their students collectively build their scientific knowledge.

Although students are naturally curious and come to school with a variety of experiences and an open mind to exploration, using all the science practices will not be intuitive. Students need intentional support by teachers to be successful science learners. In addition, teachers may find that integrating some new practices is challenging.

Not all of the practices are written in a way that can be used in an elementary classroom. Teachers will need to find appropriate levels of each practice for use in their classrooms. The process will take much discussion and coordination with fellow teachers to work through what they are asking of their students.

Fear not! There are resources available to help teachers better understand the science and engineering practices that are found in the NGSS. One especially useful resource is the NSTA website. NSTA presented a series of web seminars in the fall of 2012 to highlight each of the eight scientific and engineering practices. The webinars have been archived and are available for free, including the audio versions and presentation slides, at http://learningcenter.nsta.org.

In addition, as of the printing of this newsletter, the website for the NGSS included posted appendices to support the draft standards. Appendix F provides information about each of the practices, including tables showing progressions throughout the grade bands of what students should be able to do in science. To read the appendix, go to http://www.nextgenscience.org/next-generation-science-standards and click on “Appendix F” in the left side navigation box.

Yes, the draft NGSS are different than what you are used to. Yes, it will take some deep thought to consider how you may need to adjust your teaching practices to reflect the changes. Through the process, it will be helpful to keep in mind how much your students will benefit from doing science, rather than merely reciting facts.

ANNOUNCEMENTS

“Like” NHEET on Facebook

Keep in touch with the N.H. Education and Environment Team (NHEET), a collaboration between N.H. Project Learning Tree, N.H. Fish and Game’s Projects WILD and HOME, N.H. Department of Environmental Services (Project WET), the U.S. Forest Service and the GLOBE Program at facebook.com/BringingNHEETtoEducators.

Archery in the Schools

Let N.H. Fish and Game help your school get involved with the National Archery in the Schools Program (NASP), designed to teach target archery to students in grades 4-12. Through an eight-hour certification course, teachers are trained by NASP-certified instructors to implement the archery curriculum. For more information on NASP in New Hampshire, contact Eric Geib at 603-536-1290 or eric.geib@wildlife.nh.gov.

Watershed Ecology Institute (WEI)

July 19 at Odiene and July 22-26 at Hopkinton Middle and High School. Explore a variety of aquatic ecosystems, experience inquiry-based field investigations and learn how to use GIS to locate, map and analyze community data at the significantly revised institute. Participants get free GIS software, aquatic study tutorials and ideas for integrating GIS technology and data collection in the classroom. Three graduate credits available. To register, contact Judy Tumosa at judy.tumosa@wildlife.nh.gov or visit wildnh.gov/education/professional_development.html.

Institute for Nature-Based Learning: Learn to build science and social studies research skills across disciplines

August 4-9 (residential), October 25-26, and a winter Friday-Saturday (iba) (residential). This year-long professional development series for middle and high school educators focuses on enhancing the understanding of ecological concepts, forest management, products and issues. Sessions designed to provide inspiration, knowledge and investigation skills needed to transform classroom teaching into effective, project-based education about natural resources using public and community-based lands. Cost, including residential components, is $400. Classroom grants and graduate credit available. Register by June 7 at nhpli.org.
If a child is to keep alive his inborn sense of wonder,...he needs the companionship of at least one adult who can share it, rediscovering with him the joy, excitement, and mystery of the world we live in... (Rachel Carson, 1965)

Given the busy day of elementary school educators, how can they find time to get their students connected to the world around them? The Peter Woodbury School (PWS) is helping teachers in their district and surrounding area schools build environmental literacy by taking learning outdoors. This opportunity for early childhood and elementary educators builds on the success of the PWS outdoor classroom renovation, and uses nonfiction reading as the foundation to weave environmental literacy through the existing curricula in a variety of subject areas. The result will be a model for other districts to adopt and apply.

A team from PWS was awarded a grant from the Environmental Protection Agency through the New England Environmental Education Alliance, to support implementation of the Environmental Literacy Plan here in New Hampshire. As Mindy Beltramo, educator and staff librarian, writes, “Children are our greatest resource. Providing an integrated curriculum as a foundation in early childhood ensures sustainability of an environmentally literate citizenry in the future that will again offer the wonder of the world we live in to children of tomorrow.”

PWS is one of three PreK-4 public elementary schools in the Bedford School District. Three years ago, they initiated a cultural shift by designing and implementing an outdoor learning environment that encompasses the full school grounds, turning a barren bark mulch playground into a nurturing oasis full of opportunities for place-based learning. The area provides habitat for wildlife and many opportunities for students to make meaningful connections to the world around them. Including an array of native plants along with natural seating areas has created a park-like setting for the community to enjoy. And it’s serving as an inspirational and practical model environment for other schools.

This initiative responds to a need and desire in the district, the community, early childhood centers, and neighboring districts to use the natural world as a context for learning. Designed for early learners, the grant program’s purpose is to provide a foundation and building blocks for a lifetime of learning. The goal is to make environmental literacy relevant and tangible for young children, every day, to help them connect to the world around them, recognize their place in it, and grow into global citizens.

To accomplish this, Peter Woodbury School will host a series of professional development opportunities that focus on integrating environmental literacy into existing curricula for teachers of pre-K through grade 3. The grant will fund this staff development and collaboration with various community entities to cultivate adult guides who can effectively help children rediscover what Rachel Carson called “the joy, excitement, and mystery of the world we live in.”

The PWS team describes this effort as a vital and viable response to Richard Louv’s ongoing call to action that began with his book Last Child in the Woods: Saving Our Children from Nature Deficit Disorder, and resonated in New Hampshire in 2007 with the initiation of the NH Children in Nature Coalition. Through education of the adults who teach early learners, to promote young children’s continuous inquiry and wonderment of the natural world, this program aligns with the philosophies of the N.H. Science Teachers Association, N.H. Environmental Educators, and N.H. Children in Nature Coalition.

It will also build a relationship with...
environmental education content through professional development providers using nationally recognized program materials such as Project WILD, Project Learning Tree, Project WET, and Project HOME. Teachers who currently integrate environmental literacy into their daily routines will be able to share their expertise with others through a monthly seminar format, modeling their practice, sharing student work, and mentoring their peers. In this way, they will build a network of educators with a common understanding and practice.

The proposal builds capacity by teaching teachers who impact the lives of young children daily, yearly, even generationally. It promotes an integrated foundation of environmental literacy during the most formative years: early childhood.

The N.H. Environmental Literacy Plan provides the foundation for this program, along with the Common Core State Standards and Next Generation Science Standards. Professional development will cover topics that range from assessing school grounds for potential improvement of outdoor learning areas, to partnering with local agencies such as conservation commissions and recreational departments to increase the frequency of meaningful outdoor learning experiences, to weaving environmental literacy through the existing curricula. PWS intends to do this “without adding one more thing” to teachers’ full schedules.

Thirty participants, including educators, agency staff, and community members who work with children pre-K through grade three, will participate in approximately 40 hours of professional development and network building. The focus impact of the grant is intended to extend well beyond the immediate professional development, so the grant provides for ongoing support, using various online tools to share ideas, strategies and experiences. Participants will be encouraged to present their experiences and samples of their integrated curriculum models at regional and local conferences. District participants will continue to improve the integration of environmental literacy through the district’s Summer Curriculum Institute which is comprised of members from each school working in teams to develop and revise the district’s curriculum.

The program is underway. They will lay the groundwork to build capacity beginning this spring, conduct a three-day workshop in June, and begin monthly seminars in September. With staff development, sustainable support and collaboration with other community entities provided for through the grant, as Ms. Beltramo writes, “we can ensure that we ARE the adults, the companions, who help children rediscover ‘the joy, excitement, and mystery of the world we live in.’”

For information about the professional development opportunity with the Peter Woodbury School, contact Mindy Beltramo at beltramom@sau25.net.

Children use math and design skills to create a schoolyard habitat full of outdoor learning opportunities.