



"4-H SET Updates" are sent out once a month to two email lists: one for 4-H Staff and a week later to our General News email list.

August 2009

The The 4-H Science, Engineering, and Technology (SET) Initiative combines non-formal education with hands-on, inquiry-based learning in a positive youth development context to engage youth in improving their SET knowledge, skills and abilities. 4-H SET combines the strengths of 4-H Youth Development non-formal experiential-based delivery modes and strong youth-adult partnerships to address SET content as defined by the National Science Education Standards (1996).

FEATURED NEWS

- **4-H Science, Engineering, and Technology Abilities** (also known as science processes) are one of the critical components of 4-H SET projects and activities. Learning science, engineering and technology is not about memorization. When youth are encouraged to use science processes to discover knowledge themselves, youth become engaged and motivated to learn SET content.



Both science content and abilities (processes) are critical to increase science literacy. The National Science Education Standards call for the learning of unifying abilities as these provide youth with powerful ideas to help them understand the natural world. Emphasis has shifted from being solely on "the content to be learned" to "how students learn the content" and "how the content is taught."

The 4-H SET program outlines **thirty important SET processes** and refers to them as 4-H SET Abilities. These thirty 4-H SET Abilities include distinct and measurable behaviors and are critical elements of experiential learning and inquiry. For example – A young person may *state a problem* about water quality (content), *plan an investigation*, *collect data*, *analyze the data*, *graph results*, *summarize*, *communicate to others*, and then work on implementing a solution. Through these steps, content is learned by engaging youth in the process of science, engineering and technology.

More information is available at <http://www.ca4h.org/SET/documents/CA4HSET-Abilities.pdf>

- The 4-H Science, Engineering and Technology (**SET**) Initiative was started in 2008 to help address America's critical need for more scientists and engineers by engaging new youth into 4-H SET activities and projects. In formal K-12 education, most administrators and teachers use the acronym **STEM** to denote similar content areas of science, technology, engineering and mathematics. **4-H SET content = STEM content** with one important difference - 4-H integrates mathematics into SET activities as 4-H has no purely mathematics projects.

However, 4-H SET education differs from formal K-12 STEM education in four important ways:

1. **4-H is a non-formal education program**, which is more structured than informal learning and more

flexible and adaptable than formal education.

2. **4-H utilizes experiential and inquiry-based learning** where youth engage in hands-on learning, sharing, discovering, and applying their learning.
3. **4-H activities are delivered in a context of positive youth development**, which promotes a sense of community, opportunities for independence and generosity, and allows youth to master new skills.
4. **4-H projects promote youth-adult partnerships** where learning experiences are led by trained, caring adult staff and volunteers acting as mentors, coaches, facilitators and co-learners.

UPCOMING TRAININGS

- In our amazing **Garden Classroom on the UC Santa Cruz campus**, or at your school or garden site, Life Lab Science Program's professional trainers bring inspiration to educators interested in science, nutrition, and garden-based learning. Upcoming workshops include: Discovering the Garden in Early Childhood Education - Aug 28, 2009, deadline, Aug 14. \$150; Plant It, Grow It, Eat It! - Sept 17, 2009, deadline, Sept 3. \$150; The Growing Classroom - Oct 8-9, 2009, deadline, Sept 24. \$300. More information is available at <http://www.lifelab.org/workshops.php>
- Mark your calendars for **Winter 2010 4-H SET Professional Development: February 6, 2010**, with five locations throughout the state to be determined. The day-long trainings will focus on the California 4-H SET Year 2 Plans:
 - **Morning:** Step-Up Incremental Model for Teens-as-Teachers - Providing a sequence of workshops that help educators grasp mastery of content and methodology. It also provides an opportunity for group reflection and feedback.
 - **Afternoon:** Introduction to 4-H SET curricula; 2-3 per each site (which may include water conservation, alternative energy, veterinary science, biosecurity, and others).

As the locations and curricula are identified, more information (including registration instructions) will be included in future 4-H SET Updates. 4-H staff willing to host a location or assist with facilitation should contact Steven Worker at smworker@ucdavis.edu

- The **Coalition for Science After School (CSAS)** has released a report titled "**Strengthening After-School STEM Staff Development**" (January 2009). High-quality out-of-school programs fit into three general areas: 1) Activities, Curricula, and Learning; 2) Staff Capacity, Training, and Relational Care; and 3) Programmatic Support Structures and Leadership. The report examines one of the three sides of this triangle — staff — as it relates to supporting the inclusion of high-quality STEM learning opportunities in after-school settings. http://www.scienceafterschool.org/pdfs/CSAS_Staff_Development_2009.pdf
- The last scheduled eight hour train-the-trainer workshop, **Tools of the Trade II – Inspiring Young Minds to be SET* Ready for Life! *Science, Engineering, & Technology** will take place on September 30. Through hands-on, inquiry-based activities the training will build the capacity of afterschool staff to incorporate science, engineering and technology experiences in afterschool settings. The last scheduled training will take place on September 30 (San Diego). For more information, please visit <http://www.ca4h.org/set/updates/ToolsoftheTradell.pdf>

CURRICULUM

- **For 4-H Academic Staff:** As you develop new 4-H curricula and adapt existing curricula, these resources are available to aid in ensuring 4-H Curricula are "SET-Ready":
 - **Reviewing curriculum with the California 4-H SET Curriculum Rubric**
<http://www.ca4h.org/wrp/set/curriculum/4HSET-Curriculum-Rubric.doc>
 - **Using the framework by Wiggins and McTighe, "Understanding by Design" 2005.**
<http://www.ubdexchange.org/>
Understanding by Design poses the core, essential questions of understanding and design, and provides readers with practical solutions for the teacher-designer. The book proposes a multifaceted approach,

with the six “facets” of understanding. The facets combine with backward design to provide a powerful, expanded array of practical tools and strategies for designing curriculum, instruction, and assessments that lead students at all grade levels to genuine understanding.

- **Ensuring content is linked to appropriate standards:**
 - National Science Education Standards
http://www.nap.edu/openbook.php?record_id=4962
 - Standards for Technological Literacy
<http://www.iteaconnect.org/TAA/PDFs/xstnd.pdf>
 - Science Content Standards for California Public Schools, K-12
<http://www.cde.ca.gov/be/st/ss/documents/sciencstnd.pdf>
- **Following Experiential and Inquiry Learning Models**
 - Experiential Learning 5-Step Model: Experience, Sharing, Processing, Generalizing, Applying.
<http://www.experientiallearning.ucdavis.edu/>
 - Inquiry Learning: <http://www.experientiallearning.ucdavis.edu/module2/el2-60-primer.pdf>
 - Effective Questioning Strategies:
<http://www.experientiallearning.ucdavis.edu/toolbox/questioning.pdf>

RESOURCES

- **For those in the Greater Sacramento area:** Program Youth Education & Stewardship (YES) offers day hikes and overnight backpacking trips for Sacramento region youth groups and schools. Through a series of outings, youth learn about the environment they live in, around, and how they can be better stewards of their environment. For more information about this program and how your group can get involved contact Gina Silvernale at outreach@sacramentovalleyconservancy.org
- **Year of Science 2009:** April showers bring May flowers, but what about August? It could be pretty hot! Hotter than normal? Are we talking weather or climate? NASA suggests an easy way to remember: "climate is what you expect, like a very hot summer, and weather is what you get, like a hot day with pop-up thunderstorms." August celebrates weather and climate at http://www.yearofscience2009.org/themes_weather_climate/celebrate/
- A new survey, conducted by the **Pew Research Center**, shows a growing gap between scientists and public belief on a number of issues. While overwhelming majorities say that science has had a positive effect on society and that science has made life easier for most people, just 17% of the public thinks that U.S. scientific achievements rate as the best in the world. These differences in scientific knowledge and public belief illustrate a need for engaging our future leaders in science, engineering and technology education. Survey data is available at <http://people-press.org/report/528/>

EVENTS & ACTIVITIES

- 4-H Clubs, Camps, and After School programs are preparing to engage 4-H and other youth in the **2009 4-H National Youth Science Day on October 7, 2009!**

You can now pre-order your “Biofuel Blast” National Science Experiment kits! The price of the kits are \$20 each, but – thanks to in-kind donations from Fleischmann's Yeast and Karo Corn Syrup - we are pleased to offer the first 500 kits at \$15! https://www.4-h.org/NYSD/the_experiment_mall_kit.php

Test your science skills in the 2009 4-H national Youth Science Experiment - "Biofuel Blast" - where youth can engage in the important environmental issues our global community faces together and the opportunity available for a greener tomorrow.



As our nation grapples with important environmental issues such as global warming, sustainability and energy independence, "biofuels" -sources of energy obtained from recently harvested plant materials- are at the forefront of the discussion of alternative energy sources. At 4-H, we encourage the youth of today to become our nation's future leaders. And, as such, it's vital for youth to understand and engage in the important environmental issues our global community faces together, and the opportunities available for a greener tomorrow.

More information is available at <http://www.ca4h.org/SET/>

- National 4-H Council has created a partnership with **FIRST (For Inspiration and Recognition of Science and Technology)** to reach new youth across the nation and expand existing 4-H robotics programs. FIRST organizes several competitions inspiring K-12 youth into STEM education and career exploration: [FIRST Robotics Competition](#) (FRC) and [FIRST Tech Challenge](#) (FTC) for high-school students, [FIRST LEGO® League](#) (FLL) for children 9-14 years old, and [Junior FIRST LEGO® League](#) (JFLL) for 6 to 9 year-olds. Read more about the 4-H and FIRST partnership at http://www.ca4h.org/SET/documents/FIRST_4-H_Partnership_release_FINAL.pdf

Teams typically begin work in August and September with events held in Winter and Spring.

For Northern California 4-H Clubs interested in participating, contact Playing At Learning, <http://www.playingatlearning.org/> or (510) 656-8664 or info@playingatlearning.org. See [county map](#).

4-H Clubs in other areas should check out the FIRST website for more information at <http://www.usfirst.org>



- The **Coalition for Science After School (CSAS)** is requesting your **photos** for use in materials promoting science, engineering and technology learning to be used in a national campaign. Before submitting photographs, please ensure all 4-H members and volunteers have a signed 4-H Photograph and Information Release (and have not opted-out). 4-H will receive credit anytime the photograph is used by CSAS. Minimum resolution is 300 DPI. If you have photos that you are willing to share, please submit the photos and the preferred text for a credit by email at csas_photos@yahoo.com or by tagging your photo on Flickr as "csasphotos". More information for CSAS available at <http://www.ScienceAfterSchool.org>
- **Pennies for the Planet**, part of the **National Audubon Society's TogetherGreen initiative**, motivates kids ages 7 to 12 to get involved in conservation locally, to learn more about threatened species and habitat, and to raise money to support three critical national conservation programs 1) Project Puffin and the Seabird Restoration Project off the Maine coast, 2) Four Holes Swamp/Francis Beidler Forest in South Carolina, and 3) Wyoming's sagebrush "sea". More information is available at <http://www.togethergreen.org/p4p/>
- The North Carolina Museum of Natural Sciences is encouraging a new program called **"Take a Child Outside Week" from September 24-30, 2009**. Take A Child Outside Week is a program designed to help break down obstacles that keep children from discovering the natural world. By arming parents, teachers and other caregivers with resources on outdoor activities, our goal is to help children across the country develop a better understanding and appreciation of the environment in which they live, and a burgeoning enthusiasm for its exploration. <http://takeachildoutside.org/>

INCENTIVES AND RECOGNITION

- Congratulations to the **2009 4-H Golden Clover Award Recipients in the**

Robert Brownlee Science Category!

- **4-H Member: Amelia Ciyatt, Siskiyou County** - Amelia is an active member in the 4-H SET initiative. She helped organize projects and experiments to be presented for the Siskiyou County Hi 4-H SET After School Program. She also is one of the team members that will be introducing SET at the Siskiyou County 4-H Camp. There, Amelia will help plan different science workshops.
- **4-H Volunteer: Michael Fynan, Sonoma County** - In 2006, Michael created a project centered on geology that captured the interest of many youth and adults. In this project, members and parents travel to the Santa Rosa Mineral & Gem Society to study Lapidary, or rock polishing, how to properly display and mount finished rocks and their uses.



- In its 51 years, **NASA** has recorded a long history of achievements in space exploration and now celebrates the 40th anniversary of the moon landing! **Discoveries in the first 50 years of the space age have led to an explosion of scientific and engineering knowledge and practical applications of space technology.** Surviving astronauts from NASA's Apollo missions made a public statement indicating that they'd like the agency to work on taking humans to Mars, instead of focusing on a return to the moon. Read more at <http://www.nationalacademies.org/headlines/20090731.html>



FUNDING OPPORTUNITIES

- **For 4-H Staff:** National 4-H Council is requesting proposals from county 4-H staff for the urban communities pilot "**SET in Our Community – A Digital Storytelling Project**". This project engages teams of youth from 4-H Afterschool, clubs, and summer programs in the creation of short films that explore SET (Science, Engineering and Technology) in their urban community. DUE AUGUST 21, 2009. More information is available at <http://www.ca4h.org/set/updates/SETUrbanCommunitiesPilotProjectRFPFinal072709.pdf>

AROUND THE STATE

- **Based in San Mateo County:** The **4-H Million Trees Project** continues to make excellent progress with 68,561 trees planted by 23,959 youth from 42 states! The project was featured at www.theclimatecommunity.com, a grass-roots effort to impact global climate change. This summer, senior 4-H youth in 20 states are giving speeches at their state 4-H conferences on leadership, community service, and SET using 4HMT as an example. Please continue to plant trees as part of this project, and then remember to update your database records. To update, just click on the Participants tab on the website, filter by state, click on your club/unit name, and enter the 'Adult Leader Name' and 'Adult Leader E-mail', enter the new data, and click update. <http://www.4hmilliontrees.org/>
- **In Humboldt County:** The 4-H Science, Engineering, and Technology Expo (SET Expo) was held on April 25 at Redwood Acres Fairgrounds. The event included booths with hands on activities all day as well as presentations, kitchen science, tree planting, computer classes, and a competition. Five hundred kids and adults shared in this great learning experience. The photograph slideshow is now available at <http://cehumboldt.ucdavis.edu/files/66863.pdf>
- **In Placer County:** Youth from across the county can register for two Rocketry Summer Camps: 1) Basics of Rocketry where youth will learn about aerodynamics, designing and building a rocket; and 2) Team America Rocketry Challenge where youth will use computer software to design and then build a rocket to use in the America Rocketry Challenge. More information is available at http://groups.ucanr.org/ceplacer4h/Rocket_Camp/
- **In San Diego County:** Starting in June 2009, and going through 09-10 program year, the county newsletter will

feature a 4-H SET topic each month. In June 2009, the topic was "Inquiry" with a sample activity.
<http://cesandiego.ucdavis.edu/newsletterfiles/newsletter545.htm>



Science, Engineering & Technology

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