



How to Get California 4-H SET Ready!

1. What is 4-H SET?

The 4-H Science, Engineering, and Technology (SET) Initiative is the 4-H program's response to our nation's and state's concern for improving human capacity and workforce abilities in the areas of science, engineering, and technology (SET). It combines non-formal education with hands-on, inquiry-based learning in a youth development context to increase SET literacy and engage youth in improving their knowledge, skills and abilities in science, engineering and technology. 4-H SET combines the strengths of 4-H non-formal experiential-based delivery modes and strong youth-adult partnerships to address SET content and processes as defined by the National Science Education Standards.

Specifically, California 4-H SET will address this challenge by preparing 150,000 new young people to excel in science, engineering, and technology. CA 4-H SET will do this by focusing available resources, both public and private to:

- Support and develop new and existing 4-H clubs, camps, afterschool programs, and other youth program deliveries that provide high quality 4-H SET experiences.
- Create and disseminate innovative, research-based 4-H SET curricula that support the development of science literacy within the context of non-formal experiential education.
- Provide youth-adult partnerships which effectively engage youth in the learning through adult mentors, coaches, and facilitators.
- Develop and deliver multi-faceted professional and volunteer development training for 15,000 volunteers that will build capacity and assure program sustainability.

Anchored in the University of California, CA 4-H SET brings the cutting-edge research and resources of the land-grant university system to combine with nearly one hundred years of premiere youth development work to address these global competitiveness and leadership issues.

Through additional private and public funding, 4-H SET can focus resources and expertise in non-formal education to improve SET literacy and increase the number of young adults pursuing careers in science, engineering, and technology fields.

2. How 4-H SET is Unique

4-H SET experiences are framed in science, engineering, and technology concepts based on National Science Education Standards and intentionally target the development of SET knowledge, skills, and abilities. Additionally, 4-H SET integrates the core elements of youth development programming as identified by that National Research Council with inquiry-based learning allowing the youth participant to build a deep understanding from these learning experiences.

4-H SET is not a new activity or curriculum. 4-H SET is framed in SET concepts based on national SET standards and intentionally targets the development of SET abilities, including: identify and solve problems; observe, compare, categorize, order, classify, and interpret data; design and develop solutions; and others. Additionally, 4-H SET integrates the 4-H Essential Elements of Youth Development and engages participants in experiential and inquiry-based learning. 4-H SET



experiences operate from a perspective that youth are partners and resources in their own development. Very importantly, 4-H SET learning experiences rely on trained, caring adult volunteers who serve as mentors, coaches, and learning facilitators.

3. Why 4-H SET is Important

The U.S. is at pivotal point in its history. Despite our rich legacy of innovation and global contributions, as a nation we are facing declining proficiencies in science, engineering, and technology (SET) and a significant workforce shortage in these critical fields. Too many of our nation's young people do not have the science, engineering, and technology skills needed for careers in the 21st century. Nationwide, only 18% of high school seniors are considered proficient in science (NAEP, 2000), while a mere 5% of today's college undergraduates earn degrees in science and engineering (Rising above the Gathering Storm, 2006).

The United States is at a critical juncture relative to science literacy. National and international studies have revealed that science literacy among school-age children in the United States is among the lowest in the developed world and the problem is worsening (Hiraoka, 1998; National Center for Education Statistics, 2000; NSTA, 2005; Zinsmeister, 1998). Factors contributing to this problem include a lack of emphasis on science in schools, the use of traditional teaching methods, and the inadequate preparation of educators (Smith & Trexler, 2006).

Technology also plays a crucial role in today's economy and workforce requirements, and in order for people to participate in a meaningful way in the world around them, they must be technologically literate (Labov, 2003; Weber, 2005). Technological literacy, considered essential for the 21st century, requires not only the acquisition of technical skills, but also the ability to understand the nature of technological systems and apply the tools of technology to complex, real-world problems (NCREL, 2003).

Increasing the engineering literacy among the youth population in the United States is another critical concern among educators. Complex global problems such as food shortages and environmental concerns will require the development of new technologies by engineers. However, according to Robinson and Kenny (2003), most youth are "not knowledgeable about what engineers do" (p. 96). By improving their engineering literacy, more students will be prepared and motivated to pursue SET careers and help meet crucial needs of the 21st Century.

4. How 4-H SET is Supported and Organized

4-H SET is one of the three national mission mandates identified by CSREES/USDA in partnership with the National 4-H Council. 4-H SET is supported at the national level by the 4-H SET Leadership Task Force and Management Team comprised of Cooperative Extension/4-H and national youth science educators, researchers, and innovators with expertise in professional development, curriculum, program development, evaluation, marketing, and funding development. State appointed 4-H SET liaisons provide a conduit for information sharing and dissemination among the state and national leaders.

The California 4-H SET Steering Committee comprised of internal and external partners, researchers, practitioners, and youth and adult volunteers with cross disciplinary interests in SET provides leadership and guidance to California's statewide 4-H SET efforts. A similar structure will be replicated at the county-level to identify SET needs, implement local programs evaluate success,



and sustain program outcomes. Using a train-the-trainer model, 4-H SET teams will attend state professional development opportunities and events and replicate the training locally.

5. California 4-H SET Goals

California 4-H SET has established goals around three critically important areas: *Program Development and Design*, *Professional Development*, and *Curriculum Development* to accomplish its objectives.

Specifically, 4-H SET will develop, design, and deliver programs to youth in diverse settings and locations that have current, accurate content and are contextually valid. Through this program development and design strategy, the 4-H SET program will provide opportunities for youth to increase knowledge, skills, and competencies and improve their attitudes about science, engineering, and technology.

Secondly, a well-coordinated system of professional development opportunities will be provided to prepare 4-H youth, adult volunteers and staff to incorporate science, engineering, and technology into 4-H. These professional development experiences will assist in increasing the knowledge, skills, competencies, and comfort levels of youth, adult volunteers and staff to provide hands-on, experientially-based 4-H SET learning experiences.

Furthermore, a wide variety of 4-H SET curricula that meet the National Science Education Standards (NSES) and the curricula review process will be identified, adapted/developed, and implemented. By working with 4-H volunteers and staff, land-grant college and university faculty, 4-H SET content experts, and other partners (e.g., museums, 4-H SET organizations, 4-H SET associations, industries, foundations) the 4-H program will be infused with new, exciting and innovative materials to reach new audiences and enhance the 4-H experience.

6. Why Get Involved in 4-H SET?

The 4-H Science, Engineering, and Technology (SET) Initiative has as its overarching goal to engage more youth, at least one million youth nationally and over 150,000 young people in California, in 4-H SET projects and programs over the next five years. How will this be possible? With its history as a leader in youth development and non-formal education programming, as well as its direct connection to the cutting-edge research and resources of the nation's 106 land grant universities and colleges through the National Cooperative Extension (CE) system, 4-H is strategically positioned to contribute to improved youth SET literacy through its national network of county-based programs.

In close collaboration with National 4-H, each state 4-H program involved in the SET Initiative has its own specific goals and objectives. The California SET Initiative has developed an integrated plan that focuses on SET curricula, programming, and volunteer development opportunities. Central to the State 4-H SET Plan is building the system's capacity to deliver 4-H SET programming through a continuum of delivery modes. California 4-H will forge new SET programming through a systematic plan that will emphasize a different delivery mode or audience each year: 4-H clubs and residential camps in the first year, followed by teen-led training in day camps, afterschool programming for diverse audiences, classroom teachers and school enrichment, and finally master volunteers to focus on all delivery modes in subsequent years.



Over the course of this five-year plan, county 4-H SET teams will receive concentrated and strategic training on how to develop and design 4-H SET programs focused on the above delivery modes. Particular emphasis and support will be given to strategies to identify, reach, and train new and diverse audiences, both youth and adult.

7. How will 4-H SET be Funded?

Significant funding is needed to support an initiative of this magnitude. It is essential that county and state 4-H SET Teams work collaboratively and in tandem to increase the capacity of our 4-H YDP in fund development through strategic planning and positioning of our 4-H SET efforts. This will require solicitation of public and private funds at the local, county, and state levels.

The CA 4-H SET Steering Committee, working with the CA 4-H Foundation and National 4-H Council, is developing a comprehensive fund development plan that will require the engagement of 4-H alumni, business and industry leaders, local and state agencies, as well as youth and volunteers.

8. What can 4-H SET do for Funders and Partners?

4-H SET offers funders and partners the opportunity to join forces with one of the largest and most recognized youth development organizations in the world in an effort to address a critical national need – improving the next generation’s capacities and workforce abilities in the areas of science, engineering, and technology. Additionally, it provides exposure for new products and processes associated with 4-H SET through the development and implementation of new 4-H curricula and programs, as well as opportunities for youth to develop professional skills and explore career opportunities through potential authentic applications.

9. How to get involved in 4-H SET

4-H SET involvement can be at many levels based on interest, availability, and opportunity. Each participating county is asked to complete a 4-H SET interest and inventory of county programs. From this interest survey and inventory, counties identify the areas of interest they have in 4-H SET. Now is the time to start recruiting leaders, teens, and other adults new to 4-H to be part of your county 4-H SET Team.

Statewide 4-H SET trainings will support each county’s capacity to build its own resources in 4-H SET. 4-H SET can be used in many settings and the five-year 4-H SET Plan will provide in-depth training on a different delivery mode each year.

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