

**University of California**

Agriculture and Natural Resources

4-H Youth Development Program

Workforce Development utilizing Teens as Teachers: Sacramento 4-H Science Education Programs

(Final Report for 2015-16 State Street gift)

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From its earliest days, 4-H has focused on workforce development. Now more than ever, the need to prepare young people with the skills and attitudes to assume a productive role in the workplace and in their communities is critical. This is especially true of youth from economically disadvantaged circumstances.

Eighteen years ago, the Sacramento County 4-H Youth Development Program launched the 4-H Youth Experiences in Science Project (YES), a National Science Foundation funded program developed at UC Davis to engage and enthuse elementary school-aged students in science. The YES curriculum is designed for teenagers to deliver in after school settings. 4-H On the Wild Side (OTWS), a teen-planned and led environmental education experience, followed the next year. While these two projects advance science interest and competency in elementary school children, they exhibit especially powerful impacts on the teenagers who plan and lead the programs, increasing public speaking and leadership skills, building confidence and responsibility, and encouraging community involvement.



We are grateful for the critical support State Street, our largest funder for these programs, has provided 4-H since 2012. We continue to report successes for both projects: teen leaders describe skill growth and increased confidence; elementary school-aged children demonstrate significant knowledge gain in, and enthusiasm for, science; and programs engage youth from communities where, for economic reasons, opportunities are often lacking. Our partnership has made a difference.

Project Overview

4-H YES and 4-H On the Wild Side present both service-learning opportunities for teenagers and science-learning opportunities for elementary school students. Teens work in teams with two to four peers and an adult coach, receive training in curricula and how to teach inquiry-based science, then plan and deliver either weekly science projects (in YES) or weekend camp programs (in OTWS) to students attending schools in low-income neighborhoods.



"I feel like I have done my job in getting the kids to understand nature."

--OTWS Teen Staff

In the 4-H YES Project, 1st-3rd graders participate in the semester-long program where snails, bubbles and worms provide the basis for observation, comparison, and organization—all components of the science process. YES training is 10 hours,

after which YES teams are assigned to an after school program site. Team members leave training with curriculum, an understanding of their job and how to perform it, and greater confidence in their role. Periodic meetings bring teams together for discussion and shared learning as they process their experiences.

Students in 4th-6th grade attend 4-H On the Wild Side—held at Camp Gold Hollow in Nevada City—where they rotate through teen-led activities to learn about the natural world and systems within it. Teen and adult volunteer recruitment happens in January. They meet monthly to plan, attend a day-long training at Sacramento State University, and practice their sessions with peers at a weekend retreat at the camp. They staff one of two camp weekends, which this year took place May 27-28 and June 3-4.

Population Served

Programs reside in Sacramento's lowest-income communities at schools where at least 50% of students qualify for free or reduced lunches. Programs served 15 different elementary schools in North Sacramento, Del Paso Heights, South Sacramento, Rosemont, Rio Linda, Elk Grove and Rancho Cordova, and 89% of youth were non-white. We are pleased to report expansion in both programs this year as 51 teenagers served as teen teachers (up from 37) and 450 elementary school students participated in the projects (up from 388).



Table 1: Participant demographics for 2015-16 4-H YES and 4-H On the Wild Side Projects

Ethnicity	Elementary Students (n=450)		Teen Teachers (n=51)		Adult Support (n=34)		Total	Percent
	Wild Side	YES	Wild Side	YES	Wild Side	YES		
Caucasian	33	49	9	3	16	1	111	21%
African American	31	72	0	4	1	2	110	21%
American Indian	3	7	0	0	0	0	10	1%
Asian	17	34	7	8	2	2	70	13%
Pacific Islander	6	10	0	0	0	0	16	3%
Hispanic	46	102	6	6	3	3	166	31%
Other	11	29	5	3	2	2	52	10%
Total	147	303	27	24	24	10	535	100%
Gender								
Female	97	165	21	20	15	8	326	61%
Male	50	138	6	4	9	2	209	39%

Evaluation Results

The evaluation measured knowledge gain, leadership skills and confidence in teen teachers, and enjoyment and satisfaction with the experience. It also measured knowledge gain and attitudes about science and the environment in elementary school-aged children. It included teen surveys (at the conclusion of training sessions and the projects), as well as student pre- and post-tests and an end-of-camp survey for elementary school students attending 4-H On the Wild Side. Data was compiled and analyzed in SPSS.

Building Workforce Readiness in Teens

A strong workforce depends on confident, competent employees who can communicate effectively, work as part of a team, know how to learn, and solve problems. In 4-H YES and 4-H OTWS, teens assume authentic leadership roles that develop these skills. They feel a sense of responsibility and empowerment in their jobs, and their sense of contribution to community grows.

Understanding the work world: The experience models the work place in many regards. Adolescents filled out an application, worked under a job description, attended training for their role, and concluded with an evaluation of their program. They partnered with adult coaches who helped them reflect on their work.



"(Today I learned) to multitask and work as a team. Planning is key. Encourage questions and introduce some."

--YES Teen Teacher

Developing leadership and workplace skills: The project-based work in 4-H naturally leads to developing important skills for life. Surveys given to teens after YES training sessions and at the conclusion of the YES and OTWS programs ask teens to assess their growth in a number of areas: public speaking and presentation making, sharing their ideas with adults or other teens, and organizational skills. Sixty-nine percent of YES teens indicated an increase in comfort in making presentations, 81% better understood how to teach science to children, and 94% expressed confidence going into their role as a teen teacher as a result of training. Teens in OTWS reported increased confidence in making presentations (43%). This percentage was lower than in past years in part because many teens reported high presentation skills prior to participating in the program, therefore did not perceive growth. All teens (100%) involved in both programs strongly agreed that the project gave them the chance to work with people of different backgrounds, cultures and abilities. Teens are seen as resources in all aspects of program development and played key roles in developing a grant proposal, approving the budget, recruiting program staff, and presenting at project meetings and training sessions.



"I feel like I'm more comfortable around children and public speaking now. Thanks, 4-H!"

--OTWS Teen Staff

Discovering a bigger future: Teens from the 4-H YES project traveled to Humboldt State University where they presented two YES workshops at the California 4-H State Leadership Conference in July. They also co-presented with adult partners at the Region 4 After-School Conference in August. OTWS teens spent a day training at Sacramento State. These are opportunities for teens to assume adult roles and present workshops in the community, explore college campuses, and see higher education as a possibility for their future.

Developing a sense of service: Helping young people understand issues in their community—and their responsibility to contribute to solutions—is central to 4-H's mission. Almost all teens (98%) felt they made an important contribution to their community through their 4-H project. As teens realized responsibility and empowerment in their jobs, their sense of contribution to others grew.

"Thank you for allowing this opportunity to exist in our community."

--YES Teen Teacher

"The aspect of the program that meant the most to me was bonding with everyone—the kids, other teens, the adults...everyone I met here is so special."

--OTWS Teen Staff



Meaningful relationships with caring adults:

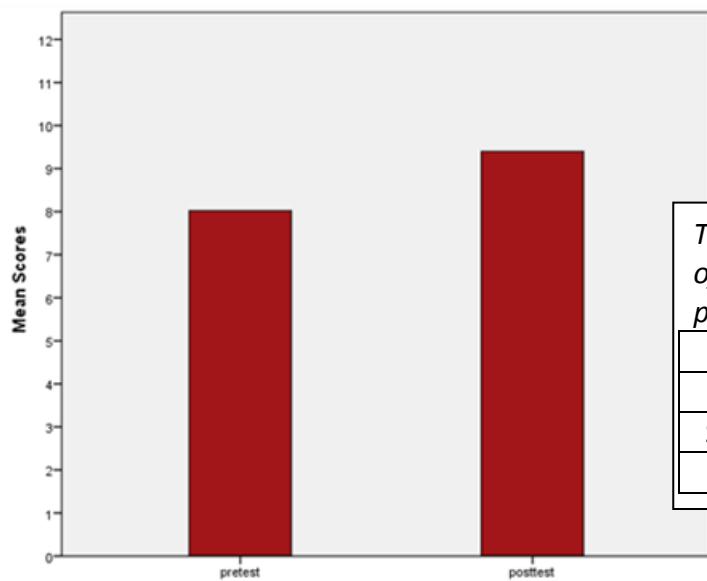
Research tells us that relationships with trusted adults are central to healthy youth development. Adult coaches play important roles in supporting teen teams as they cultivate their lessons, and cross-age friendships form. In addition to planning and delivering their lessons for camp, 4-H On the Wild Side teens work in partnership with adults on the Program Development Committee to meet the funding, training, and recruitment needs of the program.

Enhancing Education to Address Science Disparities

The United States lags behind other developed nations in science education, both in our ability to produce the scientists industry needs and a science-literate citizenry. The disparity in science is especially evident in Latino and African-American youth. 4-H YES and On the Wild Side address these issues by bringing hands-on, inquiry-based science learning opportunities to elementary school-aged children on a regular basis.

Learning about the natural world: Elementary students attending 4-H OTWS take a test prior to, and at the end of camp, to measure how much they learned as a result of their experience. Consistent with previous years, data show significant increase ($p=.05$) between pre- and post-test scores (pre-test = 8.02; post-test = 9.40) indicating that students learned information about the natural world, and that

Graph 1: Mean pre-test and post-test scores for 2016 4-H On the Wild Side participants



teenagers can be very effective teachers. Graph 1 illustrates the average test scores before and after attending 4-H OTWS camp. Comments from student journals support this finding as well.

Table 2: Means, standard deviation, and number of students for 2016 4-H On the Wild Side pre- and post-test scores

	Pretest	Posttest
Means	8.02	9.40
Std. Deviations	1.84	1.72
N	141	141

Creating positive feelings about science and the environment:

Enjoying nature and science are goals in our science literacy efforts, and both 4-H OTWS and YES are popular programs with youth. Almost all campers attending 4-H OTWS rated the program as good or excellent. Likewise, after school program staff confirm that the 4-H YES Project is popular with elementary school students who ask when the teens will arrive to teach. Every YES teen teacher (100%) indicated they enjoyed YES training, and a high return rate for teens in both programs gives evidence of how much they enjoy and value their experience in the programs.

Community Partnerships

Strong community partners fortify our 4-H science literacy and youth development efforts. These partnerships provide people-power, community resources, and connection to students. The teams that organize our programs include our partners in shared-leadership roles. Partnerships

include five after school programs: Sacramento START, Folsom-Cordova Stars, Target Excellence, Sacramento Chinese-the Center, and Elk Grove ASES (which provide students to receive, and adult program leaders to coach, the 4-H YES Project); California State University, Sacramento (program leadership; student volunteers and mentors; facilities); Sacramento City and Twin Rivers school districts (students and teachers who attend environmental camp program). Financial partners include State Street, Arata Brothers Trust and the Sacramento



Community Regional Foundation's Grants Advisory Board for Youth (GABY).

"The more I do OTWS, the better I get around kids and the more comfortable I am in leadership positions."

--OTWS Teen Staff

Graph 2: Student ratings of the 2016 4-H On the Wild Side program.

