



**University of California**

Agriculture and Natural Resources | 4-H Youth Development Program

## Program Outcomes for 2023-24 4-H Science Education Programs In Elk Grove Unified School District

Marianne Bird, Beryl Johnson and Aarti Subramaniam  
University of California Cooperative Extension  
([mbird@ucanr.edu](mailto:mbird@ucanr.edu))



**4-H Water Wizards**  
**4-H On the Wild Side**  
**Youth Experiences in Science Project**  
**Cooking Academy**  
**Teens as Teachers programming**



## Sites Served

Twelve elementary schools in Elk Grove Unified School District participated in 4-H Science Education Projects in 2023-24 (see Table 1). 4-H offered four programs including Youth Experiences in Science (YES), 4-H Water Wizards, Cooking Academy, and 4-H On the Wild Side. Most programs were conducted in concert with the District’s Expanded Learning Programs (ExL). Union House attended 4-H On the Wild Side environmental education camp in conjunction with their regular school day program. We served a total of 848 elementary students in the four program offerings. Additionally, we recruited and trained a total of 54 teenagers—predominately from Florin, Monterey Trail, and Valley High schools—to deliver Cooking Academy and YES projects weekly in ExL programs.

**Table 1: Participant numbers by site and program for 2023-24 EGUSD Science Education Projects**

School Sites	Youth Experiences in Science	4-H Water Wizards	Cooking Academy	4-H On the Wild Side	Total
	Youth	Youth	Youth	Youth	
Mary Tsukomoto	(Fall + Spring) 71	24	26		<b>121</b>
John Reith	(Fall + Spring) 52	22	29		<b>103</b>
Sierra Enterprise	30	21	19		<b>70</b>
Isabelle Jackson	(Fall + Spring) 74		(Fall + Spring) 36		<b>110</b>
Charles Mack	(Fall + Spring) 67	25			<b>92</b>
Prairie	22	22	16	13	<b>73</b>
John Leimbach	(Fall + Spring) 77				<b>77</b>
Irene B. West	39		20		<b>59</b>
James McKee	25				<b>25</b>
Union House				31	<b>31</b>
Anna Kirchgater			52		<b>52</b>
Barbara C. Morse			(Fall + Spring) 35		<b>35</b>
<b>Total</b>	<b>457</b>	<b>114</b>	<b>233</b>	<b>44</b>	<b>848</b>



Teen teachers work to engineer a “recycle-saur-us” at YES training.



Elementary school students become scientists themselves as they investigate what lives in the lake.

## Evaluation Results

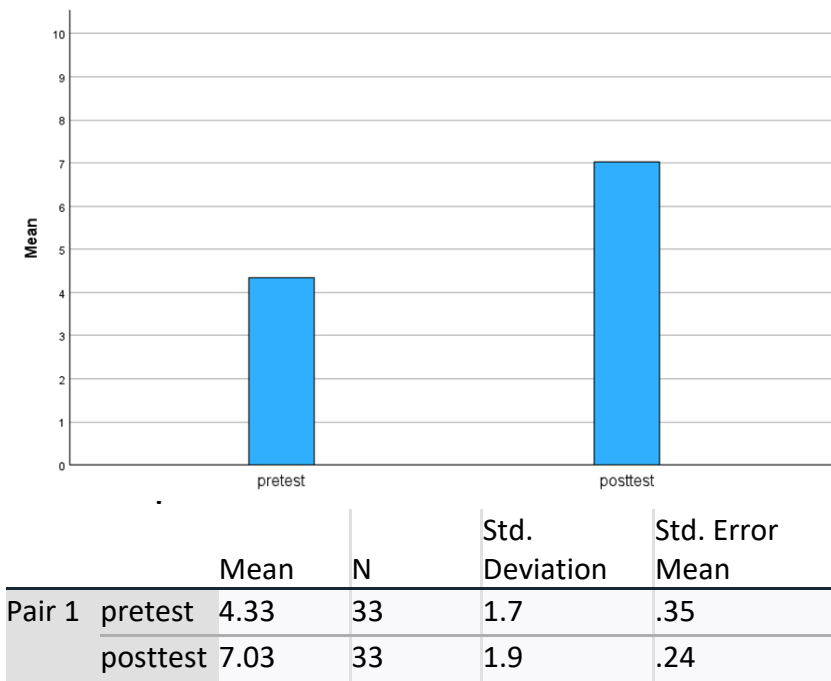
We conducted formal evaluations to assess knowledge gain and/or behavior changes for elementary school students participating in 4-H Water Wizards, 4-H On the Wild Side and Cooking Academy. We also measured the impact programs had on teen teachers including their perceived growth in public speaking, their ability to work as part of a team, their confidence working with younger youth, and their sense of contribution to their community. Results are summarized below.

### 4-H Water Wizards

4-H Water Wizards is a 12-week science education project teaching 4th-6th grade students about water and its importance to the planet. Students participate in hands-on learning experiences that encourage inquiry, teach basic information about water, and develop awareness about water issues. As part of the curricula, youth take a field trip to the American River Water Education Center. Youth also take action on a water issue in their community. A total of 114 students participated in the project from EGUSD, all in 4<sup>th</sup> grade.

To assess student learning, students participated in a pre- and post-survey to assess their knowledge about water and water issues in their communities. Participants responded to nine questions in the survey. Total pre-survey and total post-survey scores for all sites were tallied and then compared using a paired samples t-test. As graph 1 shows, post-test scores were higher, with a statistical significance of  $p=.000$ .

**Graph 1: Mean pre-survey and post-survey scores for sample of Water Wizards participants.**



Overall, 79% of students improved their scores. Two sites performed exceptionally well: At Charles Mack Elementary, all but one of the 17 participants improved their scores, and all six students with pre/post survey data at John Reith improved.

In the pre-survey 49% of the students named one water issue in their community and 6% named two issues. In the post-test, 85% were able to name at least one issue and 49% were able to name two issues, suggesting an increase in knowledge in this area.

## 4-H On the Wild Side

4-H On The Wild Side (OTWS) brings environmental education and an outdoor living experience to 4th-6th grade youth who have a limited opportunity to explore wild places or sleep under the stars. Young participants are expected to grow their knowledge and understanding of the natural world, expand their appreciation for conservation and environmental stewardship, and develop an enthusiasm for nature and outdoor experiences. The weekend program take place at a camp facility in Nevada City where children participate in a variety of outdoor education activities drawn primarily from Project Wild, Project Aquatic Wild, and Project Learning Tree curricula.



**Union House students circle around with teens.**

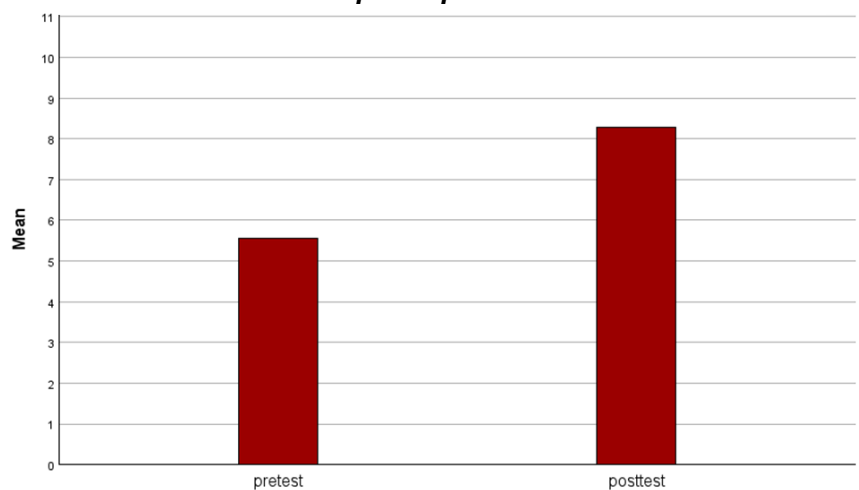
Through training and empowering teenagers as program leaders, the project also increases feelings of service and environmental stewardship in youth who deliver the program. Teens work alongside adult volunteers and attend monthly staff meetings, a day-long training session, and a weekend retreat all while working in teams to plan and deliver program components. High school students and

adults seeking a meaningful way to connect with and serve are invited to apply for a staff position.

A total of 44 elementary school students attended the program from two sites: Prairie and Union House Elementary. Of those, 97% rated camp as good or excellent. Forty-one percent said it was their first time at camp, and 39% said it was their first time to sleep outside.

As with 4-H Water Wizards, students attending 4-H On the Wild Side took a pre-survey before coming to camp, then completed a post-survey before they left. The survey was tailored to the material the teens covered in their sessions with students. In 2024, 11 questions included topics in fire science, water quality, decomposition, limiting factors and basic boating. A total of 39 participants completed the pre- and post-surveys. A paired sample t-test showed that participants scored significantly higher on the post-survey (see Graph 2). Both schools showed significant increases in post-survey scores, however sample size, especially for Prairie Elementary, was small (n=10).

**Graph 2: Mean pre-test and post-test scores overall for 4-H On the Wild Side participants.**



	Mean	N	Std. Deviation	Std. Error Mean
Pre-test	5.56	39	2.3	.37
Post-test	8.28	39	1.7	.27

## Cooking Academy

The 4-H Cooking Academy Project is a six-week cooking-based nutrition education program that teaches youth basic nutrition and cooking skills. The 4-H Cooking Academy aims to improve youth attitudes, knowledge and skills in food choices and preparation. Youth prepare, cook, and try new foods in each session. Each cooking lesson also includes a nutrition component. Teen teachers lead



Teens at Cooking Academy training.

sessions with the support of an adult coach who is typically an ExL site staff. 4-H and Cal Fresh staff partner to administer the project. Eight sites participated in the project (Mary Tsukomoto, John Reith, Sierra Enterprise, Isabelle Jackson, Charles Mack, James McKee, Anna Kirchgater, and Barbara C. Morse), two of which elected to conduct the project both semesters. The number of teen volunteers grew from 12 to 31 this year. Teens received a job description and a copy of the Cooking Academy curriculum, and attended a 10-hour training session. They worked in teams and delivered the program contently weekly.

Data from the Cal Fresh Healthy Living survey revealed elementary school students participating in Cooking Academy:

- Increased their intake of fruits and vegetables from 5.02 to 6.10 servings daily.
- 64% tasted foods they had not previously tried.
- 64% or more would eat the featured food again, and 50% were willing to ask that the food be cooked at home.

For teenagers delivering Cooking Academy, a retrospective pre-post survey indicated teens:

- Grew in their ability to plan programs (34% agree or strongly agree pre; 80% agree or strongly agree post)
- Grew in public speaking skills (53% agree or strongly agree pre; 94% agree or strongly agree post)
- Grew in their ability to teach others (60% agree or strongly agree pre; 80% agree or strongly agree post).
- 100% of teens said they learned how to make healthy food choices in the program.
- 77% of teens plan to eat the recommended amount of fruits and vegetables.
- 82% of teens know how to follow a recipe to make something to eat.
- 59 % plan to prepare healthy foods or snacks with their family and 32% indicated that maybe they would do so.
- 100% of teens agreed or strongly agreed that they had made a difference in their community, and 86% indicated they are definitely encouraged to volunteer more as a result of the program.

*"I've been able to become more social and become a more active problem-solver OUTSIDE of school."  
--Cooking Academy Teen Teacher*

*"I feel more confident in myself and prepared to tackle public speaking situations."*

*--Cooking Academy Teen Teacher*

## Youth Experiences in Science (YES)

4-H Youth Experiences in Science (YES) is a UC ANR curriculum designed to foster inquiry and engage children ages 5 to 8 in the process of exploration. Young children are introduced to the formal scientific process by performing a variety of scientific tasks including observing, organizing, comparing, and communicating. A cross-age teaching model engages teenage volunteers as teachers in program delivery. After attending a 10-hour training session, and equipped with the YES curriculum and adult support, the teens work in teams to prepare and deliver the weekly science activities. Teens make a semester-long commitment to the project, and many serve a full year. The YES Project ran at capacity with nine sites participating (Mary Tsukomoto, John Reith, Sierra Enterprise, Isabelle Jackson, Charles Mack, Prairie, John Leimbach, Irene B. West, James McKee), five of which opted to run both fall and spring semesters. Twenty-four teens volunteered as teachers. We do not formally assess youth receiving the YES project because this is challenging with younger children (K-3<sup>rd</sup> graders).

## Impact on Teen Teachers

In 2023-24 a total of 54 teenagers from EGUSD volunteered as teen teachers for the 4-H YES and Cooking Academy projects. The teen teacher role promotes workforce readiness in a variety of ways. Teens receive a job description and apply for the position. They attend training for their role, receive their own copy of the curriculum, and are expected to come to lessons prepared to teach. They reflect as a team with their coach after each session and evaluate their entire experience at the end of the semester.

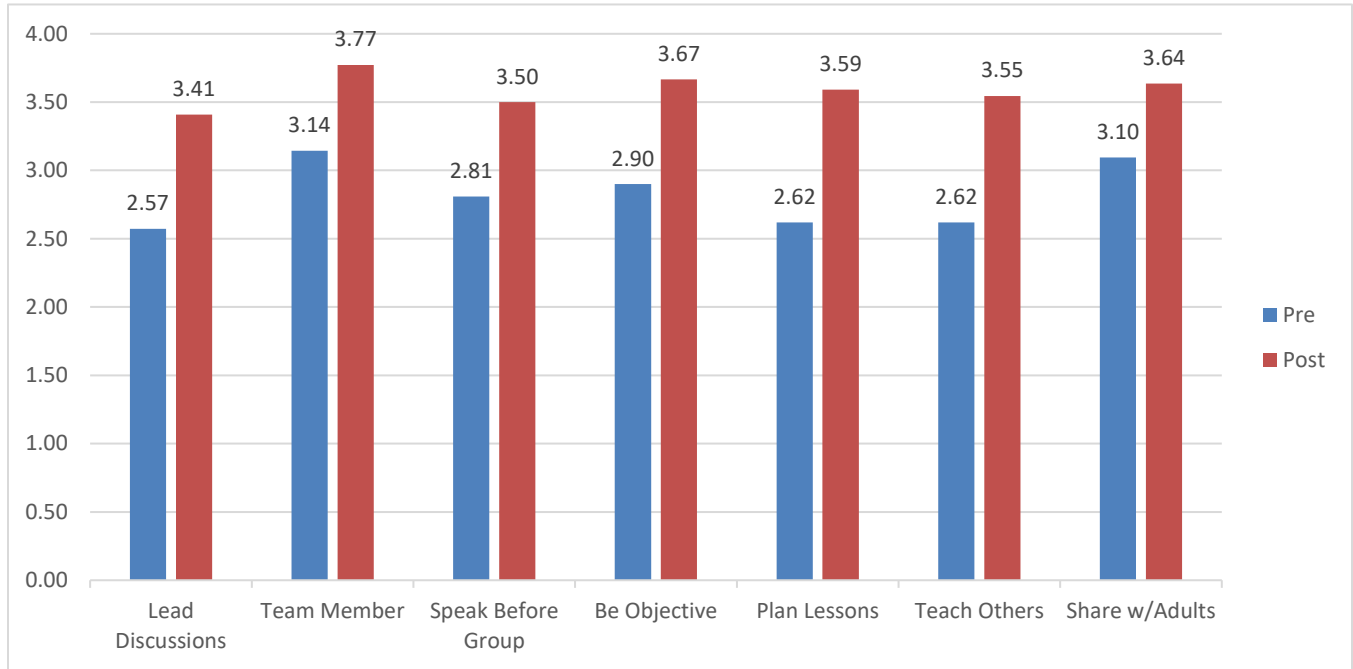


**EGUSD students deliver workshops at UC Davis.**

Some teens avail themselves to other opportunities beyond the training and weekly session delivery they commit to. Nine EGUSD teens attended the 4-H State Leadership Conference (SLC) for three days at UC Davis. They experienced college life living in the dorms, attending workshops, and touring parts of campus. Four delivered a Cooking Academy workshop to adults and peers at SLC this year. Additionally, two teens applied and served as Sacramento 4-H County Ambassadors, a group that develops and delivers countywide programming for younger members and represents 4-H at various community events. Two teens from Elk Grove's YES and Cooking Academy attended the National 4-H Ignite Conference in Washington DC.

A retrospective pre-post survey given at the end of the YES and Cooking Academy programs measured teens' perceptions about their experience in several areas including leading discussions, teamwork, public speaking, objectivity in problem solving, lesson planning, and sharing ideas with adults (see Graph 3). Results indicated that teen volunteers grew significantly in their teaching and leadership skills. Examining averages on a 5-point Likert scale, teens reported growth in speaking before a group (2.81 to 3.50), understanding the science process for young children (3.06 to 4.63), how to teach children (2.81 to 4.31), being part of a team (3.1 to 3.8), and teaching others (2.6 to 3.5).

**Graph 3: Teen Teacher retrospective assessment ratings of workforce related skills.**



Teens also reported a positive youth development experience. On a 4-point Likert scale, they reported there were dedicated adults to support them (3.59), received good training (3.50), experienced successful youth-adult partnership (3.67) and felt they could work successfully with younger youth (3.67).

*“My relationship with the adults slowly became stronger. The more I started working together with them, I got very comfortable and that made delivering the lessons easier because I knew that all the adults in the program were there to support us.”*

-- YES Teen Teacher

*“I think I have changed, I've practiced my youth voice during this YES project which helped my build a connection with the kids but as well improve my talking and presentation skills.”*

-- YES Teen Teacher



**EGUSD students attended the National 4-H Ignite Conference in Washington DC where they worked on and presented service plans to better their local communities.**

