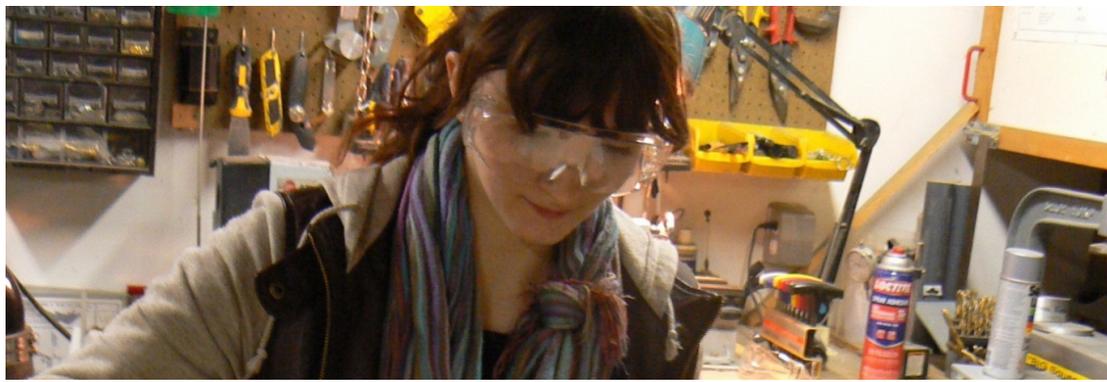




WASHINGTON STATE  
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## 4-H SEATECH

### Leaders in Washington 4-H STEM

#### BY THE NUMBERS

- More than 60% of SeaTech 4-H club members reported doing better in science and math at school as a result of joining SeaTech.
- 91% feel that being a member of SeaTech 4-H helped them have a better understanding of science.
- 71% said they were motivated to take more science classes after they joined SeaTech 4-H.
- 74% of survey respondents entered into, or planned to enter into, a science, engineering, or technology field in college.

## 2016

### ISSUE

The numbers of high school graduates, particularly females and minorities, enrolling in computer science have been low and declining (Salamon, Kupersmith, and Houston 2008; Barker and Ansorge, 2007; NAS, 2007; NCES, 2005). Twenty-nine percent of teens surveyed indicated *any* familiarity with career opportunities in engineering, and 63% reported never considering a career as an engineer (Intel, 2011). To this day, a review of almost any state's reported standardized test scores reflects that there is an ongoing critical need for enhancing science education, particularly for high school youth (NCES, 2005). Competence in science has a particularly noticeable decline between middle and high school, which might indicate a lack of rigor in earlier grades or a failure to consider the developmental needs of adolescents (Smith & Darflur, 2012). 4-H STEM activities can provide prolonged and in-depth exposure to experiential-based inquiry and design.

### RESPONSE

For more than a decade SeaTech has been a premiere robotics club in Washington State 4-H. Since its inception into 4-H in 2001, SeaTech 4-H Club has provided in-depth science mentoring to more than 115 youth. Most participants remain in the program for an average of two and a half years, receiving both intense and long duration exposure to science and engineering practices. The club's name is an acronym for Skagit Exploration And marine TECHnology. SeaTech creates elaborately custom-designed underwater remotely operated vehicles that compete in numerous national events.

The hands-on experience offered by the club provides students an opportunity to learn and apply basic engineering skills essential to solving complex problems. Inter-club competitions promote teamwork and opportunities for collaboration between members involved in the same design challenge. The 4-H approach of promoting teamwork, encouraging public speaking, and providing public educational opportunities is designed to help youth apply their content, build connections, effectively communicate, and contribute to their health and well-being, their futures, and their communities.



## QUOTES

“SeaTech encouraged me to get into the electrical engineering field and challenged me to understand electronic theory and apply it to building and troubleshooting circuit boards. I have used these skills in both school and work.”

“I learned teamwork and a dedication to putting your all into a project. Commitment goes beyond just doing your best – you dive in, study, ask questions, test, and do thorough research until you have made your best better and, most of all, you never give up.”

“I have learned leadership, teamwork, dedication, CAD design, painting, critical thinking, brainstorming, compensating, delegating, social skills and being trustworthy.”

## IMPACTS

The impacts of effective and engaging science opportunities for youth cannot be underestimated. Eighty-five percent of the youth in SeaTech reported that science and math became more interesting subjects in school as a result of their participation in club activities. Approximately 66% of those indicated that their math and science scores improved as a result of joining the club. Seventy-one percent were motivated to take more science classes in school as a result of participating in 4-H. 4-H club activities in the STEM fields can vastly improve youth engagement and success in school learning environments.

Survey participants reported a greater understanding of what scientists and engineers do, and a greater understanding of the processes that scientists and engineers utilize to produce results. The 4-H framework was reported as essential in helping these young club members build teamwork and communication skills that became cornerstones of their success. They did not hesitate to report that learning to deal with challenges was an important lesson. Of youth still in school, 76% of the survey respondents indicated that their career interests were now science-related. Of those out of school, 26% indicated they were in science-related careers.

Since 2009, the SeaTech teams have consistently earned first through third place awards in regional competitions, and they have attained international recognition at the Marine Advanced Technology Education Center competitions.



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