

The Water Weeks experience



2016-2019 Report of Results



4 years & 72 teachers

Across 10 weeks, reaching 12,000 students in
61% high-needs schools

BAYWORK has been working with Ignited to sponsor Water Week Externships since 2016.

These externships are opportunities for teachers to:

- Learn about water and wastewater careers
- Tour water processing plants, reservoirs, and more
- Job shadow mechanics and other industry professionals
- Identify the connections between observed career tasks and classroom STEM learning standards
- Develop student-driven, hands-on learning curriculum relevant to their students' lives



Highlights

Teachers who participated in BAYWORK
Water Weeks from 2016-2018

58

Surveys

Teacher responses, 56% response rate
(Typical rate for most surveys is 10 to 15%)

32

Teachers use content from the water and wastewater industry into their classrooms

Content

60 % of teachers implemented lesson plans they developed during Water Weeks

80 % that incorporated examples and concepts from their experience into their classrooms

90 % that shared information about water and wastewater careers with their students

Students

A range of students in STEM classes gained knowledge about water and wastewater industries and careers

55% female. 60% low income. 60% under-represented groups

25% through biology and chemistry classes

30% in other STEM classes

Impressions of BAYWORK

100% of teachers left their externships with a more positive impression of BAYWORK and their local water and wastewater agencies

Most teachers would be enthusiastic about future opportunities

Teacher knowledge

Teachers gained knowledge through memorable experiences

An impactful part of the experience for teachers was the tours. Other themes: A deeper understanding of the water system and how much “unseen” work goes on to keep everything moving. Learning about freshwater processes, from source to testing to distribution, was a memorable experience, as well as learning about the treatment of wastewater.

Comments

“The onsite tour of the wastewater treatment plant was especially helpful in learning the connections between theory and practice”

“Wow, the experience definitely impacted my practice. Overall, the need to emphasize how essential basic math skills are for even entry level positions. Students were impressed by how much of the basic math skills are used to purify and bring water to homes.”

“The week was exceptional. It was extremely organized and one of the best workshops I have attended. I felt like a VIP who was given a grand tour of the City of San José.”

“I think every aspect related to the processing of water was exceptional. I learned pretty much continuously, no down time, so it would be really unfair to pick just one ‘best’.”

60%

Teachers who indicated the tours as a highlight

100%

Teachers left with a more positive impression of their local water and wastewater agency

60%

Teachers shared information from the externship with other teachers or school administrators

Student knowledge

Knowledge for students is relevant and real

When asked what their students took away from the lessons and examples, most teachers referred to the relevance - examples of “real” STEM like chemistry and math they could incorporate into their classrooms, and to the career opportunities.

Comments

“Students learned that they can, and that people do, apply theories from the classroom into practice right here in their ‘backyard’”

“The biggest thing the lesson plan does is introduce my students to opportunities with the water district. There are times where my students lose hope because they don’t have the grades for college, but when I let them know about opportunities open to them if they finish their GED, they become interested in working a little harder to pass the class!”

“A lot of students don't consider working for the city and I could see that the variety of options available peaked their interest.”

“Students learned the chemistry of how wastewater is treated. I shared how much math and science water treatment plant operators used in their jobs.”

“I had students calculate the volume of a cylinder - they were most amazed by the volume of water held in tanks that they see often in their own neighborhoods.”

“My students got to experiment with a major part of their lives that they didn't really think about a lot. It made them more aware of their resources.”

84%

Incorporated examples and concepts from their experience into their classrooms

94%

Teachers shared information about water and wastewater careers with their students

Lesson implementation

Some teachers were not able to implement lessons

60% of teachers implemented the lesson plans they developed during their Externship week. The most common reason for *not* implementing was that teachers hadn't finished developing the lesson over the course of the week. Teachers also commented on difficulties in aligning the real-world concepts they saw with the science standards they had to address in their classrooms.

2017 had the lowest implementation. During that summer, Ignited heard complaints from teachers about a lack of time provided during the week to finish lessons, and updated this to provide more time the following year. Furthermore, the summer of 2017 also marks the change when many schools started implementing the new science standards - NGSS (Next Generation Science Standards). This meant that we were asking teachers who had never before taught NGSS to develop lessons aligned to those standards, a much higher bar of difficulty. Both issues have been adequately addressed in the current model of Externship, and the follow up with 2019 Externs will help confirm this.

Implementation

40% 2017

70% 2016

70% 2018

Comments

“I didn't have enough time to develop the lesson plan I created during the externship, and my school also has since moved to the new NGSS science standards.”

“I wasn't able to implement the lesson mainly because I was in the midst of the district's NGSS implementation.”

“I have not forgotten any of the concepts and still plan to incorporate the information into my curriculum. I just had to prioritize moving to the NGSS standards first.”

Teacher relationships

BAYWORK can deepen relationships with teachers

90% of teachers indicated that they would be interested in future opportunities with BAYWORK or their local water and wastewater agencies. Meaningful interactions included field trips and guest speakers, especially if there was a contact list of willing speakers or sign-up available during the Externship Week itself. Other suggestions included an email newsletter from BAYWORK with educator resources.

Comments

“Our students took a field trip to BAYWORK South Bay Career Fair in 2018. Some of my students felt compelled to engage the presenters at various booths at the career fair. The students had authentic questions after hearing the presenters speak about the places where they worked and helped collect, treat, and or conserve water at various stages of the water cycle.”

“I had an employee come to my classroom to do a water lab lesson. Students learned about careers with water district and appreciated being able to see the water treatment process up close and meet someone in a job that they had learned about.”

“It would have been helpful to have example curriculum materials like student handouts or supplies (e.g. lab consumables) to make the process of fitting the concepts into curriculum easier.”

50%

Teachers who continued to connect with their local water or wastewater agency

30%

Teachers mentioned communicating with an employee they met during the week

20%

Teachers mentioned a visit (e.g. field trip)

Summary + recommendations

Showcase careers in water and wastewater industries to teachers and their students

- Teachers experience first-hand the real-world relevance of the subjects they need to teach.
- When teachers are given enough time and a Coach to guide development, they fully develop a lesson to meaningfully engage their own students.
- When teachers develop a complete lesson, they implement it with their students, who are shown good local careers.

Recommendations

Water Week Externships are a great way to increase visibility and deepen relationships between local water and wastewater agencies and schools. Some recommendations for next steps are:

- Have a sign-up sheet of upcoming tour or career-day dates or speakers available during the Externship week.
- Create a monthly email to teachers with, for example, featured lessons from the BAYWORK [educator tab](#) or upcoming engagement opportunities.
- Develop additional resources for educators to connect real-world water and wastewater work to classroom concepts, for example common NGSS connections or sample hands-on activity handouts.
- Invite Extern cohorts to talks from employees at rotating agency locations throughout the year to continue teachers' connections with each other in addition to with BAYWORK.

Respondents

Ignited has been a respected source of paid professional development for 34 years, and, in partnership with BAYWORK, we have expanded our reach to include helping teachers use connections with water and wastewater careers to inspire their students. Scale is embedded in our model, since each teacher often reaches more than 4,000 students over their career.

By incorporating this type of workplace learning into their classroom, educators are driving significant and critical change in their schools while inspiring students to engage more deeply within STEM. Together, we are transforming teaching and preparing the next generation of innovators.

Respondents

- 60% of 2016 and 2017 Externs (3 of 5 and 12 of 20 respectively)
- 50% of 2018 Externs (16 of 32)

Externship hosts

- 80% of EBMUD Externs (4 of 5)
- 50% of San Jose, SFPUC and Santa Clara Externs (5 of 10, 13 of 25 and 9 of 17 respectively)

Grade levels

- One 8th grade teacher, 3 community college teachers, rest high school

Subjects taught

- Bio: 7 teachers
- Chem: 7 teachers
- Math: 4 teachers
- Physics: 2 teachers
- Other Sciences: 6 teachers
- Other Subjects (e.g. career day, AVID): 5 teachers



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