United States Naval Academy
STEM Center for Education and Outreach

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On May 16th, 2016, as part of their Severe Weather Infield Training internship, the SWIFT team made their way to Roy Clark Elementary School in Tulsa, OK to meet with 92 fourth graders and engage them in hands-on STEM activities. Six midshipmen led three different groups in sessions on rockets, catapults, helicopters, water tension, and circuits. The fourth graders were given the opportunity to build their own catapults, design and launch their own rockets, make a human circuit, and see who could fly the best ‘whirly-gig.”

“It was really exciting to see the kids’ reactions change once we actually started the projects. They went from blank stares during the introduction to bright eyed and eager to make the best model rocket out of the class. I think the kids really got a lot out of the project in just the small amount of time they had, being little engineers.”

-MIDN 2/C Jessie Sharp
In preparation for our final year of high school, we have spent our summer working in the USNA STEM Center. The various USNA STEM outreach programs have opened our eyes not only to the necessity of STEM awareness, but also the rewarding benefits of it. For us, as an example, after mastering the technicalities of the SeaPerch, an underwater remotely operated vehicle (ROV), we had the opportunity to assist teachers from around the globe in understanding and building them. This was special to us in that we knew this knowledge would be transferred to their students all across the world.

Given a wide variety of resources, we were able to explore our common interest in the engineering disciplinary fields. One of our many tasks was to create our own engineering design projects in which we incorporated our creativity and prior knowledge into developing a useful product. Being interested in biomedical engineering, Kalee Rozylowicz designed an exoskeleton modelled after those used in the military. As a potential mechanical engineering major, Jordan Barton created a conveyor belt to transport the STEM mascot from one place to another. Being intrigued in alternative energy forms, I created a water wheel which has the potential to transform mechanical energy into electrical energy. Overall, this internship has reinforced our desire to pursue engineering and provided a new outlook on the impact of STEM Outreach.
In June 2016, the U.S. Naval Academy Office of Diversity and STEM Center presented the Summer Heroes Youth Program (SHYP), a pilot program held on the USNA campus in Annapolis, MD, for 45 rising 7th and 8th grade students from Baltimore City. Three middle schools participated in the two-week program: Afya Public Charter School, Baltimore IT Academy, and Booker T. Washington Middle School.

The aim of the program was to promote positive attributes of leadership, self-esteem, confidence and teambuilding through various academic and athletic activities. Curriculum was STEM-based, using a sports theme to make learning science, math, engineering, literature, and life skills dynamic and engaging to the students.

Thirty midshipmen STEM majors planned, staged, facilitated and mentored the students through all activities, providing an opportunity for them to put into practice various leadership lessons learned during their training at USNA. SHYP encourages retention of existing midshipmen STEM majors by engaging them in their own studies through project based learning and educational outreach to others.

“I was very excited to take part in this new program and be able to work with young people to help them become as interested in science as I am. This is a great leadership opportunity for me and my fellow midshipmen, and I am happy to be part of the first year of this program.”
- Midn 3/C Tajhay Marshall

“I will say that this program is amazing and thank you to the midshipmen for letting me have the time of my life.”
- SHYP camper
Summer STEM Program

Summer 2016 included the annual Summer STEM Program at the U.S. Naval Academy, presented by the Office of Admissions and the STEM Center for Education and Outreach. Six hundred and fifty rising 9th to 11th graders attended the week-long overnight program, held over the course of 3 weeks in June. Campers explored 12 different STEM modules plus additional electives, ranging from engineering aquatic habitats to understanding the corrosive effects of electrochemistry. Students were also introduced to STEM career fields and real world applications, while developing their technical and problem-solving skills. Each of the modules and activities were designed and led by USNA faculty and staff with support from midshipmen who facilitated the academic sessions and supervised students.

The Summer STEM Program “impacted my interest in this field of study by opening my eyes and teaching more about science, technology, engineering, and math.”
-Camp Attendee

MODULES

- Corrosion
- Making Waves
- Autonomous Aid
- Weather and Climate
- Cyber Attack
- Build Your Own
- Sinking the Titanic
- Aquaculture Engineering
- Spinning Wings
- Bioloids
- Bioengineering
- Extreme Engineering
The USNA STEM Center hosted their annual Girls Tech Camp at the U.S. Naval Academy during the last week of June, with the theme ‘Color Me STEM’, symbolizing the way science, technology, engineering, and math touch every aspect of our lives. Forty-five rising 7th, 8th, and 9th graders attended the week-long day camp, led by Naval Academy female faculty along with nine high school age counselors. Students were able to participate in design challenges and competitions, team building, hands-on activities, tours of labs and research areas, and networking with professional female scientists and engineers. The week ended with a Tech Fair that allowed the students to showcase what they had learned throughout the week to their friends and family. This camp provides an outstanding opportunity for girls to explore the various opportunities available to them through STEM.

“I was able to learn more about different STEM careers and participate in hands-on activities that have inspired me in areas of STEM!”
– Camp Attendee

“Girls Tech Camp strengthened my interest in engineering and made me 100% sure that was what I want to pursue in life.”
– Camp Attendee
The USNA STEM Center completed two week-long sessions of "SET Sail" STEM Educator Training held in July for K-12 educators. This year 91 teachers were able to take advantage of this opportunity, focusing on using Project Based Learning (PBL) in the classroom. Teachers from throughout the United States as well as nine foreign countries shared their own best practices and applications for the classroom. Many of the teachers were from Department of Defense (DoDEA) schools.

The week-long workshop provided teachers with intense training in PBL and the opportunity to discover, explore, and test ideas. They also learned how science and technology impact real-world research and challenges. They investigated diverse topics in all areas of STEM including engineering, math, chemistry, biology, materials science, helicopters, hydraulics, thermodynamics, corrosion, fluids, physics, cybersecurity, programming and more.

“My goals for this training were to gain activities for the classroom and network. I was able to do both. But having the training at the academy with experts in the field of studies has helped reinforce and inspire the teaching.”
- Teacher attendee

“This training gave me a plethora of STEM tools and techniques to use with students and to share with other educators.”
- Teacher attendee
Best Practices in STEM Outreach Workshop

Promoting science and engineering is part of the mission for many scientists and engineers at Naval commands around the nation. Many of these dedicated individuals came together at the Best Practices for STEM Outreach Workshop, held at Naval Surface Warfare Center, Port Hueneme, CA on August 9-10, 2016. The workshop, presented by the USNA STEM Center and sponsored by the Office of Naval Research, provided a forum to explore hands-on curriculum ideas for STEM outreach across a range of Navy relevant topic areas. The fifth in a series of workshops for scientists and engineers involved in Naval STEM outreach, this training focused on presenting at Fleet Weeks and festivals.

Topics explored during the two-day workshop included engineering design, aerodynamics & flight, cyber & coding, corrosion & electrochemistry, waves & ocean engineering, and biomedical & biochemical applications. Attendees also worked on developing their own modules in relevant topic areas.

After a day of training, workshop attendees put into practice the lessons they learned about STEM outreach facilitation. Attendees planned and presented a STEM outreach event for 60 military children at the Youth Center in Port Hueneme. The event was a success for both the youth and the facilitators.

These workshops provide a forum for sharing outreach experience, methods to promote engagement in Naval STEM topics, and an opportunity to strengthen the Naval STEM outreach community and the Naval workforce.

The workshop “helped me build confidence in my ability to facilitate and perform as an informal educator of STEM events.”
- Workshop attendee
Upcoming Events: Fall 2016

Sept

- USNA SeaPerch/NOAA “Engineering to Explore the Ocean” Educator Workshop, Talbot County, Sept 15-16
- USNA SeaPerch/NOAA “Engineering to Explore the Ocean” Educator Workshop, Baltimore County, Sept 20-21
- “SET Sail” STEM Educator Workshop, USNA, Sept 24
- Mini-STEM Event, USNA, Sept 30
- STEM Educator Workshop, Albuquerque, NM, Sept 30-Oct 1

Oct

- STEM Educator Workshop, Pearl Harbor, HI, Oct 3-4
- Girls Only STEM Day, USNA, Oct 15
- STEM Educator Workshop, Quantico, Oct 17
- Naval STEM Outreach Workshop, NRL DC, Oct 18
- Family STEM Day, USNA, Oct 22

Nov

- Hackathon, USNA, Nov 5
- MDSTA/DACTM Educator Workshop, Nov 5
- MESA STEM Day, Laurel, MD, Nov 7
- Naval STEM Cyber Workshop, USNA, Nov 14
- MESA STEM Day, Laurel, MD, Nov 18

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