

# NAVAL NUCLEAR LABORATORY

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## SEAPERCH COMPETITION INSPIRES POTENTIAL FUTURE ENGINEERS AT LOCAL SCHOOLS

Teams of students at five local schools and two YMCAs have built and operated underwater remote-controlled vehicles, with some help from personnel who have a similar everyday mission.

SeaPerch competition on Saturday, April 8th will conclude weeks of inspiration, learning, and vision for students at Ballston Spa, Niskayuna, and Schenectady City School Districts and the Guilderland and Duanesburg YMCAs.

SeaPerch is an MIT developed curriculum designed to generate awareness, interest, and eventual pursuit of science, technology, engineering, and math (STEM) careers, sponsored by the Office of Naval Research (ONR). Coaches from Bechtel Marine Propulsion Corporation's Naval Nuclear Laboratory – Knolls Laboratory in Niskayuna and Kesselring Site in West Milton assisted teachers from these schools in leading teams of two to four students during the building of an underwater remotely operated vehicle (ROV).

James Kokernak is a Naval Nuclear Laboratory engineer and first year volunteer with the SeaPerch Program. "One of my students noted that our ROV was having trouble diving under the water. Her solution was to remove some of the flotation material to help it submerge. After a few iterations she was controlling a perfectly balanced, neutrally buoyant ROV around the pool. This simple solution was based only on her knowledge of physics gained from her everyday experiences. SeaPerch nurtures the engineering thought process in a way that doesn't depend on the student's math or science background. It is rewarding as a mentor to see them realize that engineering is really the process of generating and testing ideas to solve problems."



For three months, the coaches guided the students' afterschool sessions on marine propulsion, buoyancy, electronics, and soldering, which were then reinforced with hands-on experience. The teams of students built the ROV from a kit comprised of low-cost, easily accessible parts following a curriculum that teaches basic engineering and science concepts with a marine-engineering theme.

Doug Baldrey, a Naval Nuclear Laboratory engineer and the Technical Lead for the Oneida Middle School in the Schenectady School District, said, "SeaPerch is an opportunity for me to work with kids

to try to get them interested in STEM. This is a fun program that gets the kids thinking about how to design something and things like how motors work and what is buoyancy. I've found this program very rewarding and enjoy watching the kids when they figure out something and accomplish one of the tasks. The kids really seem to enjoy building the kits and competing against the other teams."

The SeaPerch program provides students with the opportunity to learn about robotics, engineering, science, and mathematics while building an underwater ROV as part of a science and engineering technology curriculum. Students learn engineering concepts, problem solving, teamwork, and technical applications throughout the project.

Chris Maercklein is a Naval Nuclear Laboratory Technical Lead and the Technical Lead for the Central Park Middle School in the Schenectady School District. "SeaPerch is a great STEM activity that exposes students to many different hands on facets of a design/build/operate process. Measuring and cutting, soldering, wiring, waterproofing, and assembly are just some of the activities that the students experience. It is a very rewarding experience to help the students through this process and to see their development, both on an instantaneous basis when they suddenly grasp a concept that had been alluding them, and on a long-term basis as they progress through the entire process. Watching students conquer each challenge and realizing how much they are learning through the process is really what mentoring is all about."

More than 130 students from the seven programs built their vehicles from January through April, with the help of over 45 Naval Nuclear Laboratory – Knolls Laboratory employees, retirees, and teachers who volunteered their time. Naval Nuclear Laboratory corporate funds covered the kits, additional supplies, and other administrative costs.

"I was involved in several STEM activities while I was in school, and it was through these that I realized I wanted to go into an engineering field" said Jason Thompson, a Naval Nuclear Laboratory engineer and the Niskayuna School District Technical Lead. "I know the programs I did back then would not have been successful without the support of local professionals who donated their time and skills, and I'll always be grateful to them for this. This is why I enjoy giving back to the local community by supporting middle and high school STEM activities like SeaPerch."

Once the students build and test their SeaPerch ROV, they participate in a one-day competition against all of the teams at their school. The participating teams deploy their ROVs on missions, including quickly navigating through an obstacle course and manipulating levers to release balls from an underwater device before retrieving the balls and depositing them into specific locations. Students also prepared an oral presentation about their design and how they integrated their new skills into a successful ROV.

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For 70 years, the Naval Nuclear Laboratory has developed advanced naval nuclear propulsion technology, provided technical support, and trained world-class nuclear operators to ensure the safe and reliable operation of our nation's submarine and aircraft carrier Fleets. The Naval Nuclear Laboratory is solely dedicated to the Naval Nuclear Propulsion Program. We rely on the dedication and innovation of our 7,000 engineers, scientists, technicians, and support personnel.