



## Creating Ripples with Underwater Robots

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This project took students from robotic ideas, engineering designs, structural, electrical and mechanical systems, to a final assembly of their Underwater Remotely Operated Vehicle (ROV) robot. Students used their ROV to understand buoyancy forces and density acting on a submerged object. Once the ROVs were complete and tested, the students entered the SeaPerch Tournament and competed against other Southern California schools in two separate missions: an underwater obstacle course challenge and a heist mission. In the heist mission their ROV slid an underwater gate open, went through the gate and recovered a block of wood on the pool floor at depth of six feet. Throughout the project, professionals from the United States Navy, SeaPerch, Exploring STEM Careers Initiative (ESCI) and SeaBotix served as resources for the students in their ROV assembly and troubleshooting. The project lived on after the competition at Living Coast Discovery Center (LCDC) to complete research for the coastal region, and add sensors to the ROVs.

### Teacher Reflection

This project encouraged students to think outside the box in how they viewed physics and robotics. My students could not believe they built their own controller from breadboard electronics. I saw my students' attitudes change and become excited as their robots took shape and came alive. I stood back and saw 54 excited, engaged students flagging down their friends to show and teach them about their ROV. I overheard students saying they never knew they could "do" robotics and now they want to study robotics and engineering.

### Student Reflections

The most memorable moment was when all the pieces of the robot came together. I am more excited to be an engineer.

—Jacob

I am more interested in robotics now than before and realize I can build a working robot! Imagine what you can do when you have more parts than just what was in the high school. —Rosy

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