Sea Perch Project
8th Grade
South Meadow School
Peterborough, NH

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Overview of South Meadow School

Our school is part of the Contoocook Valley Regional School System which serves 9 towns in the Monadnock region of New Hampshire.

We are a middle school, grades 5-8 (serve 5 of the 9 towns).

Our student population hovers around 550.
Our 8th Grade Classroom

- My 8th graders are in a self-contained, multidisciplinary classroom. Students go to “specials”; World Language, Physical Education, Art
- My students are heterogeneously grouped, large range in ability levels
Why the Sea Perch Project?
Why Sea Perch? Because..

• Our district’s 8th grade science curriculum consists of studying Basic Chemistry and Biology-the 6 Kingdoms of Living Organisms

• We spend much of the year studying water chemistry, watershed ecology, aquatic vertebrates and invertebrates, and aquatic ecosystems (fresh and salt water)

• We practice Aquaculture all year in our classroom, raising Tilapia in a 750 gallon tank
And because during the school year we visit:

- The New England Aquarium
- The Harvard Museum for a marine invertebrate lab
- A state trout hatchery and a federal Atlantic Salmon hatchery
- A working fish ladder on the Merrimack River
- A floating lab on Squam Lake to collect data
- Our local river (several times)
- The UNH marine research vessel to explore off the coast of NH
So naturally, building a Sea Perch to explore underwater is a perfect fit for us!
Integrating Sea Perch into Required Curriculum

- Where there is a will, there is a way!
- This project can be used to integrate Language Arts, Science, History, Math, Industrial Technology, Computers, and Art.
In the beginning we ask, “What is an ROV anyway?”

- Students begin the project by reading as much as they can about ROV’s
- They take notes on the history of ROV’s, the different types of robots, and their uses around the world
- Each student uses their collected information to make a poster to educate people in the building
“Oceans Around the World” Project

• Students choose an ocean somewhere in the world to “explore”

• Using the library and internet, they must research “their” ocean and take notes on size, depth, salinity, relative location, temperature

• Students also must figure out a purpose to bring an ROV to their ocean. Is there an interesting marine animal to hunt for? A shipwreck to discover? A new mining area? A volcano or trench?
Researching for the posters
Computer Generated Posters

• Students produce recruitment posters on the computer to entice the world’s top scientists to join their ROV mission. Skills include layering graphics, designing a logo, making a table, producing a seal, and writing descriptively and persuasively.
“Oceans Around the World” Recruitment Posters
In Order to Build Sea Perch

- We use directions printed from the MIT website. We read through the directions together once, and then kids are on their own.
- Also, we pull up the MIT website on classroom computer so students can see step by step directions in color.
Prototype available to look at
Building Sea Perch

• Students are assigned a partner
• All work, decisions, reading directions, problem solving, etc. are done together
• Lesson in working collaboratively
Building Continued

- Students are so engaged in this project, they work on these every chance they get. (some class time is allotted, study hall, advisory)
- Tools are shared
- Share ideas and hints on the blackboard
- Help each other
Building Continued

- Construction takes place in our room. Except, we go to the IAT room to use a vise for installing propellers, and to use the band saw to cut PVC pipes.
Building Continued
Wiring the Control Box

• Most students have never soldered before, but I tell them, “if I can do it, you can do it!”
• Wiring is hard, but very rewarding when it works!
• Some students have a real knack for wiring.
Wiring Continued
Testing the Motors

- We constantly test the motors as we go along; before wiring, after wiring, before soldering, after soldering, after potting, and one more time before the water test.
The First Water Test

- Our first water test is conducted in a 50 gallon aquarium in our classroom.
- Students work on buoyancy issues-How much weight must be added to the robot to allow it to submerge and resurface?
The Second Water Test

- Students take turns testing their Sea Perches in the 750 gallon aquaculture tank.
- Again, they adjust buoyancy
- They drive their ROV’s a little bit and adjust the position of the motors
ROV Adventure Story

• Once the recruiting poster project is done, but while the students are still building the Sea Perch in class, they individually write a fiction story at home. The story is about the ROV mission taking place in “their” ocean with the scientists they have hired.
Highlights of Fiction Story

• Great to see the students using real knowledge about “their” ocean in the story, along with using their imagination.

• The students themselves have to be characters in the story, so it’s fun to see “who” they are. Often, the students write themselves in as being the captains, engineers, lead scientists, or ROV experts on board the ship.
It’s “Launch Day”

- We take a trip to the town swimming pool to enjoy all our hard work, parents drive
- The students make minor adjustments, then they’re off!
- It is very exciting to see the robots scoot around the pool
Sea Perches Invade Town Pool
Sea Perch 500

- After warming up for an hour or so, we hold Sea Perch races
- Contestants must submerge, race across the pool (driving as straight as they can)
- We have elimination races until we can determine a winner
Sea Perch 500 Winners

- Our 2005 Sea Perch champs (much to their surprise!)
Upgrading The Sea Perch

• After our outing to the pool, students are then asked to “upgrade” their robots
• First, they sketch ideas on paper. What equipment can they add to their robot so they can collect data and/or take samples at a local lake?
Adding Testing Devices

- Students must create and attach their “scientific equipment” to their robots.
- They present their drawings, intended investigation, and remodeled Sea Perch to the rest of the class.
Ready for Water
Off to the Pond
Sea Perches at Work in Local Pond
Collecting Data
Recording Data
Creativity Works
To Whom It May Concern

• Students are asked to write a letter about their Sea Perch experience: what was easy, hard, fun, frustrating, etc. and whether or not they recommend this project to other 8th graders
• It must be typed
Student Quotes

- “I would recommend this project for people my age because it really makes you work your brain”
- “This project was hard enough to be challenging, but fun at the same time.”
- “This project was very fun, even though it got frustrating at times”
- “Having a partner for this project is really important I think, because it gives you an extra set of hands and if you are having a hard time working on a certain part they can pick up on what you can’t do”
More Student Quotes

• “..we got to test them in the water. It was so cool to think that you built this, and it actually worked!”

• “When we hooked it up to the tractor battery, it was so rewarding when the motors buzzed and spun.”

• “I recommend this project because, it made you use your mind as well as your hands.”

• “It taught us about robotics, mechanics, and electricity in ways we couldn’t learn from a textbook.”
A Teacher’s Perspective

• This is a great project! It is a lot of work to gather the Sea Perch building materials together and to implement the project, but it is well worth it.