SeaPerch Build Lesson: Student-Designed Modification of ROV

Legacy SeaPerch Resource www.seaperch.org

Grade Level: 7th – 12th grade

Length of Lesson: 1-2 periods for modification, 2 periods for business letter

Goals:

After completing the building of a submersible SeaPerch ROV, students will use their experience and ingenuity to create a beneficial modification through the standard design process. The project will culminate in a persuasive business letter that will motivate local merchants, corporations and others to support this design project to its completion as a prototype.

- Brainstorm ideas for various modifications.
- Identify and choose a "dream" modification (modification of choice) with stated objective in mind.
- Design and draw to scale a prototype of SeaPerch plus its modification to present to other students. Classmates will provide feedback to modification plan using a rubric.
- Web search for availability of appropriate parts and equipment needed, including cost.
- Incorporate ideas, design, costs, materials and equipment needed etc. into a formal business letter to look for project funding.
- Begin to think like the various marine engineers and scientists who make their careers through the use of ROVs like the SeaPerch.

National Science Standards:

- ETS1.A: Defining and Delimiting an Engineering Problem
- ETS1.B: Developing Possible Solutions
- ETS1.C: Optimizing the Design Solution

Materials:

- SeaPerch kits (conventional design)
- Lined and graph paper
- Various PVC parts
- Collection of extra materials from the classroom and student contributions

Background:

Imagine the following scenario: A company that constructs ROVs is looking for an underwater vehicle for the next field testing season. The company does not have a very large budget, and cannot afford to build a new ROV for this project. The company needs an engineer to alter the design of their existing SeaPerch ROV so it can be used in the upcoming field season.

Lesson: LAUNCH

1. Encourage students to brainstorm and recognize an existing problem/condition underwater that they would like to investigate.

2. Based on the identified problem/condition, give students time to identify what equipment would be needed to add to their existing SeaPerch in order to collect data or analyze the identified problem/condition.

Lesson: INVESTIGATE

1. Students will plan out – to scale – what the modification design will look like. What materials will be used? How expensive would the modification be? How long would it take to build and test the modification?

2. After students have planned their modifications, give them time to show/demonstrate their designs to other students and critique each other's designs.

3. Based on the critiques by their peers, students should make changes to their modifications.

Lesson: PRACTICE

1. Give students time to organize the information they have collected on their modification into a cohesive portfolio.

2. Using their modification portfolio, students will write a formal business letter detailing their proposed modification, how it would benefit their specific cause, and why a certain company of their choice should support them. If students need help with the format of a business letter, there are many online resources to help them.

3. Students may want to actually post their letters, in the event that a company might support a specific project!