

# *2020 Greater Philadelphia SeaPerch & SeaGlide Challenge Kick Off*

- Program goal is to sustain a long-term effort to address the need for college enrollments in engineering and technical programs
  - Increase student interest in STEM related studies through hands-on activities at the middle and high school level
  - Provides awareness of Naval Engineering and Naval Architecture as career fields
  - Helps students prepare for college level work
    - Interface with industry, academia, and government engineers
    - Work in collaborative environment
    - Participate in a realistic business
    - Experience a major university campus
    - Participate in a realistic technical scenario

Create a Fun, Challenging and Educational experience for students

- Share career experiences
  - their job as an engineer or scientist
  - math and science education
  - how science and math are used in engineering
- Provide help with kit construction
- Assist with the build & troubleshooting
- Provide guidance on competition requirements
- Assist students with troubleshooting
  - Teacher must be present whenever mentors are with teams
  - All communications with mentor must be via the teacher



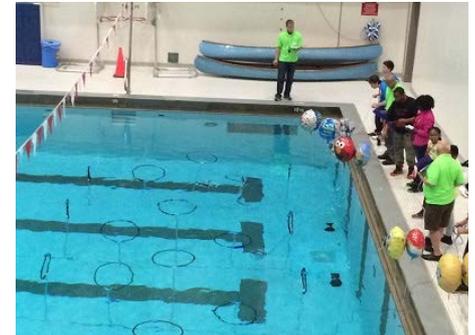
- The experience is about more than winning
- Teams sit together in bleachers
- Use flags, signs, mascots, cheers, etc. to show your team spirit
- NO INSTRUMENTS OR NOISE MAKERS (DRUMS, HORNS, SHAKERS, ETC.)



seaperch  
TEACH • BUILD • BECOME

# What is the Sea Perch Challenge?

- SeaPerch is a Remotely Operated Vehicle (ROV) educational program
  - Consists of an educational tool kit that allows middle and high school students to construct and compete a simple ROV
  - Includes a curriculum-designed program that teaches students about basic marine design skills
    - Naval Architecture
    - Marine Engineering
    - Ocean Engineering
  - Objective is to develop the next generation of naval architects, marine engineers, naval engineers, and ocean engineers



# What is provided?

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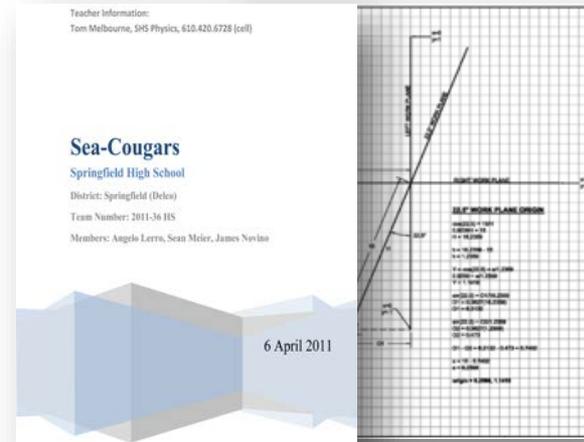
- Online construction manual, parts lists, lesson plans, and other resources via web and social media sites
- Access to Learning Modules and Videos
  - Hydrodynamics
  - Propulsion Systems
  - Control Systems
  - Stability
  - ROVs in the navy
- Construction training for new advisors and mentors
- A naval engineer mentor may be available to visit your team and provide support





# Challenge Overview

- **Two Competition Classes**
  - **Middle School** (Grades 5 – 8)
  - **High School** (Grades 9 – 12)
- **Two Skill Levels**
  - Captain
  - Admiral
- **Four Competition Categories**
  - **Technical Design Report**
  - **Ten Minute Oral Slide Presentation (+ Five Minute Q&A)**
  - **Vehicle Performance (2 Rounds)**
    - Round 1: Obstacle Course
    - Round 2: Mission
  - **Team Spirit and Sportsmanship**



# Teacher Training

- Temple University is hosting a one day training event
- Date: TBD
- Kits will be distributed to teams participating in the training



- Check [www.phillynavalstem.com](http://www.phillynavalstem.com) frequently for updates and information
- Familiarize yourself with all posted competition rules
- Design, Build and Test SeaPerch (November thru February)
- Competition Challenge practice (Critical for vehicle performance success)
- Technical Design Report – date for submission to be announced
- Oral Slide Presentation (competition day)
- Vehicle Performance round 1 – Obstacle Course
- Vehicle Performance round 2 – Mission
- Team Spirit and Sportsmanship
- Utilize engineering learning modules and other resources
- Other resources on national site [www.seaperch.org](http://www.seaperch.org)

Primary source for all Philadelphia Challenge Information and Questions.

**PhillyNavalSTEM.com**





- 3D printing of SeaPerch parts to replace or modify minor parts is permissible under the following guidelines:
  - Shall provide technical advantage or innovation
  - Rationale documented in Technical Design Report and Oral Presentation
  - Included in \$25 design improvement budget limit (Captain's Class Only)
  - Parts shall be costed out at \$0.05 per gram
  - Vehicle's primary structure shall be built using only PVC, CPVC, PEX pipe and fittings (Captain's Class Only)



# Competition – Presentation

- Teams must create and prepare a 10 minute Slide Presentation followed by a 5 minute Q&A
  - Team is a simulated company
  - Seeking navy contract award for their SeaPerch design
  - Focus on Naval Engineering
  - Highlight innovation and creative thinking
  - Time management will affect scoring
  - SeaPerch must be present at presentation
  - All team members must participate in the Slide presentation



***THIS IS NOT A POSTER PRESENTATION.***

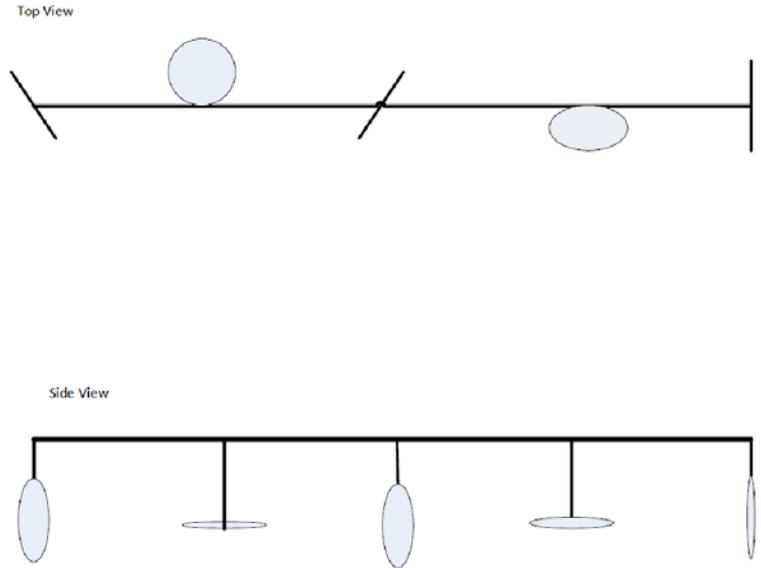
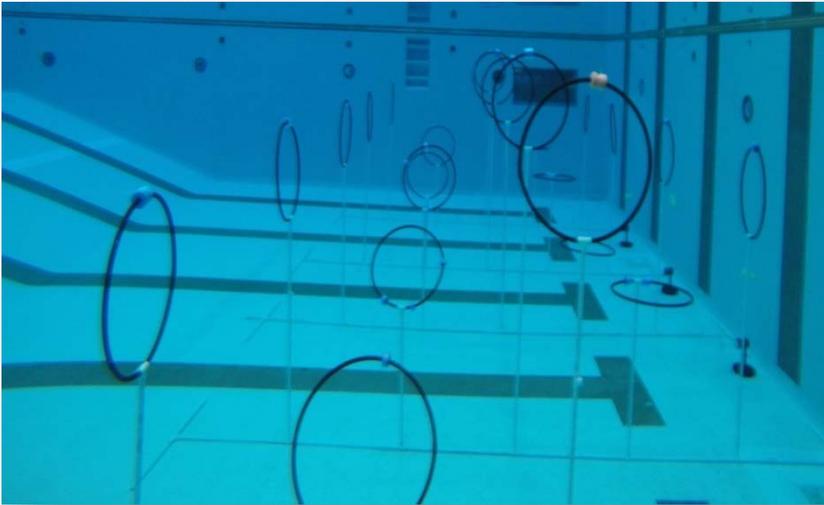
**30% to 50% of presentation score is based upon  
“Innovative Product Design”**

# Competition – Obstacle Course

- Craft Performance Round 1:

## Complete the Obstacle Course

- Maneuver through a submerged obstacle course of 5 pre-arranged hoops
- SeaPerch must surface after clearing the furthest ring before starting its return
- All rings at a depth of 4 feet



## Mission Components

1. An air cannon
2. One vertical tunnel
3. A beacon
4. A plastic bottle
5. A plastic bottle trap
6. A weighted rope ring
7. A vault gate
8. A flag raiser
9. A bubbler
10. A horizontal tunnel
11. An inclined challenge
12. A 2<sup>nd</sup> air cannon

## SeaPerch Ninja Warrior

The course features representative challenges from this year’s international mission, which has an **Ocean Cleanup** theme. The challenges in this course require all the SeaPerch features and pilot skills needed to compete in the international mission. The international challenges included in “SeaPerch Ninja Warrior” are:

- Marking the location of floating waste by lighting a beacon
- Move solid waste trapped in a gyre so it can be collected
- Lifting sunken solid waste to a collection “vault”

## **Ocean Clean Up**

An estimated 8 million metric tons of plastics enter the ocean every year adding to the approximately 150 million metric tons already in the ocean. Plastic waste has been ingested by many different types of aquatic life and can injure or kill them. Many different organizations around the world are involved in cleaning up the oceans and preventing trash from entering the oceans. In the ocean there are large circular currents called gyres. Gyres essentially will concentrate the floating trash. One such gyre in the north central Pacific Ocean is the size of Texas.

Prior to 1990 ships would dispose of their trash at sea. Regulations from the International Maritime Organization has prohibited ships from disposing of plastics at sea. Now most of the plastic trash comes from people who just throw their plastics anywhere. Rainwater will wash the plastic into rivers and the rivers will dump into the ocean.

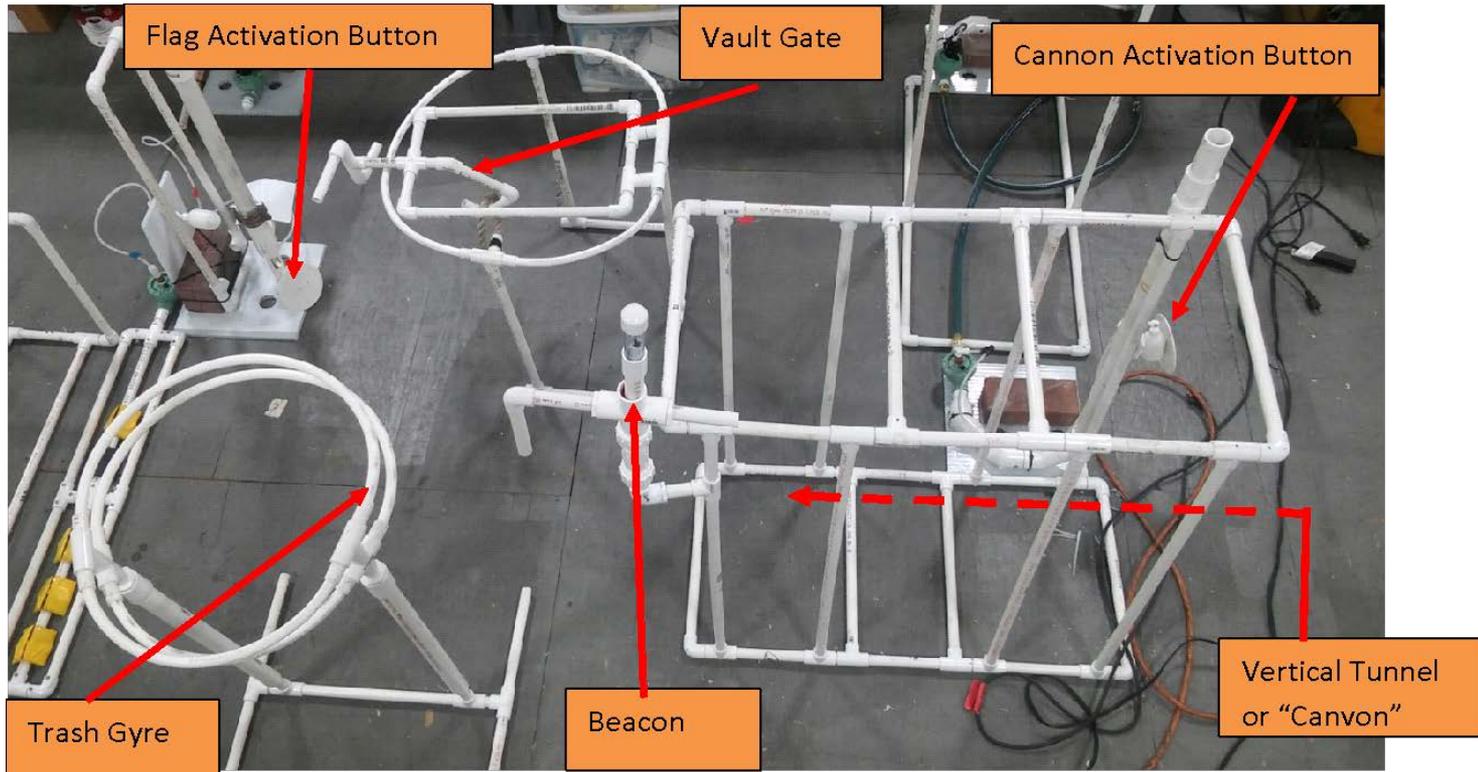
Whenever operations happen at sea, a ship that is using a remote operating vehicle has to be aware of the weather and ocean conditions. Weather will cause high sea states making ocean cleanup efforts impossible.

- A Technical Design Report (new this year) will consist of a written paper with the following six mandatory Sections and two mandatory Appendices describing the team's SeaPerch design
  - Abstract (½ page) - Short summary
  - Task Overview (½ page) - Tasks SeaPerch must complete & how it affected design
  - Design Approach (2 pages) - Strategy & approach to developing your design
  - Experimental Results (1 page) - Description of tests conducted & their results
  - Reflection & Next Steps (1 page) - What are the takeaways? What would be your next steps if you had more time?
  - Acknowledgements
  - References - Use APA style guide
  - Appendix A: Budget - Itemized costs (Captain's Class ≤ \$25, Admiral's Class > \$25)
  - Appendix B: Fact Sheet - 1 page Overview "Quad Chart"
  - Appendix C: Additional Info (Optional) - Results, Calculations, Figures, Tables, Engineering Design Notebook, etc.
- Additional sections may be included; however, the overall limit of 5 pages applies (excluding References, Acknowledgements, and Appendices)
- Teams are required to submit Design Notebooks electronically (16 MB limit)

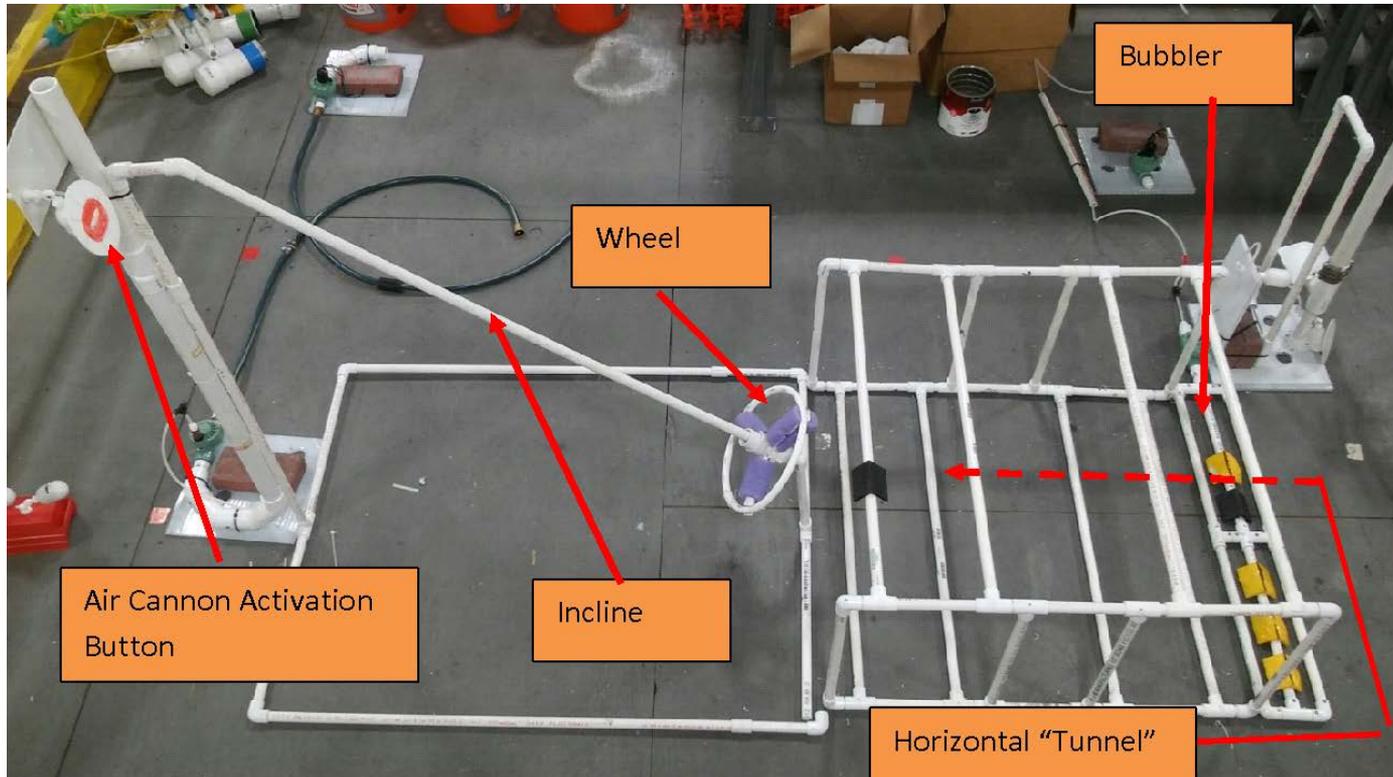
## • “SeaPerch Ninja Warrior” Mission Challenges

1. The first challenge is to sprint to a 5-inch diameter target, punch the target to release a 20-foot geyser. The first cannon to be released will be triggered by the team with the fastest start.
2. The second challenge is to traverse 3 feet through an 18-inch wide “canyon.” Colliding with the side posts will slow the SeaPerch. This is a test of the operator’s navigational skills.
3. The third challenge is to turn on a beacon. There is an arm attached to a PVC cross. The robot has to pivot at the “canyon” exit to rotate the cross, which will turn on the light. (Note: the beacon is the same that was used last year.)
4. The fourth challenge is to remove a small plastic bottle from the floating ring (gyre). The bottle must be pushed over the top of the rings or pulled below.
5. The fifth challenge is to close the gate on the vault. The robot will pick a weighted rope ring and place it on a hook on the vault gate.
6. The sixth challenge is to raise a flag. The robot will push and hold red button, which will raise a flag above the surface of the water. This action will require the robot to apply constant pressure to the button. The activation will also activate a bubbler.
7. The seventh challenge is to navigate through the bubbler. The bubbles will make it difficult to enter the horizontal “tunnel.” However, the robot operator may accept a time penalty and choose to wait until the flag descends. When the flag descends, it will shut off the bubbler.
8. The eighth challenge is to navigate the horizontal tunnel, challenging the operator’s navigational skills by maintaining a low horizontal course. Colliding with the posts above or below will slow the SeaPerch.
9. The ninth challenge is to slide the wheel up an inclined pipe past a set mark on the pipe. This requires carefully coordinated applications of forward and upward thrusts.
10. The tenth challenge is to maneuver away from the wheel and push the red course completion button. This will activate the second air cannon releasing a 20-foot geyser signaling time stop.

# Competition – Mission Overview



# Competition – Mission Overview



- Obstacle Course
  - All hoops at a depth of 4 feet from the surface
- New Themed Mission
  - SeaPerch Ninja Warrior
- Captain & Admiral Classes
  - Captain: \$25 Limit
  - Admiral: No \$ Limit
- Technical Design Report
  - Replaces Engineering Design Notebook requirement

- The Greater Philadelphia Regional High School and Middle School teams awarded 1st Place in Pool Performance will be invited to move onto the International SeaPerch Challenge
- Location: University of Maryland
- Dates: May 30-31, 2020
- Teams may only compete in ONE Regional qualifying competition
- Up to 100 teams will participate

For more info visit:  
[seaperch.org](http://seaperch.org)



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## FUN UNDERWATER ROBOTICS

SeaPerch is an innovative underwater robotics program that equips teachers and students with the resources they need to build an underwater Remotely Operated Vehicle (ROV) in an in-school or out-of-school setting.

[Order Kits and Parts](#) [Apply for Kit Grant](#)



Teach

Resources using SeaPerch to help you "TEACH" STEM



Build

Resources to help you "BUILD" SeaPerch



Become

Resources to show you what you can "BECOME" after SeaPerch

### 2018 International SeaPerch Challenge

The SeaPerch Challenge is going international! Starting in 2018, the event will be known as the International SeaPerch Challenge. In 2018, more than 1,500 students, teachers, coaches/coordinators, family, friends, volunteers, judges, invited guests, speakers, and committee members will gather at a venue in the New England area for a fun weekend of learning, sharing, competing, and team-pounding excitement. On the line will be the title of International SeaPerch Champion with additional trophies being awarded in all three competition events, as well as special awards in a variety of categories. This year's event will tentatively be a two-day event, held the weekend of June 1-3, so watch this space for more information.

[Learn More](#)

I have been an elementary and middle school teacher for 15 years. This is the most empowering program that demonstrates to girls that STEM isn't for boys only.

~ Patricia G.



# Technical and Teaching Resources

## SeaPerch Learning Modules



### What is Buoyancy?

Have you ever wondered why massive boats and ships weighing hundreds of tons float while small objects like rocks sink? Have you ever wondered why when you submerge a pool you float and when you submerge you sink to the bottom even though you weigh the same? This phenomenon can be explained by the scientific principle called **buoyancy**.

Buoyancy is the upward force that an object feels from the water and when compared to the weight of the object, it is what makes an object float, sink, or remain **neutrally buoyant** in the water.

When an object floats, the upward buoyant force exerted by the water is greater than the downward force of the weight of the object. You can also understand this concept with numbers. If an object's density is less than water's density (1 g/cm<sup>3</sup>), it will float.

When an object sinks, the weight of the object is greater than the upward buoyant force exerted by the water and its density is greater than 1 g/cm<sup>3</sup>. When an object is neutrally buoyant, meaning it neither sinks nor floats, then the weight of the object is equal to the upward buoyant force exerted by the water.

When neutrally buoyant in water, the object also has the same density as water. Neutral buoyancy is a very important principle in the sea-perch competition, but like a real submarine, you will want your sea-perch to be able to submerge below the surface of the water without just sinking to the floor.

### What is Buoyancy?

**Lab**

**Objectives**

In this laboratory activity, you will investigate what makes objects, such as ships and submarines, float or sink. You will learn how buoyancy affects objects in water.

**Introduction**

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When an object is neutrally buoyant, meaning it neither sinks nor floats, then the weight of the object is equal to the upward buoyant force exerted by the water. When neutrally buoyant in water, the object also has the same density as water. Neutral buoyancy is a very important principle in the sea-perch competition, but like a real submarine, you will want your sea-perch to be able to submerge below the surface of the water without just sinking to the floor.

When you start to build your sea-perch, you will want to consider this principle. You can calculate just how much buoyant force your sea-perch will need in order to be neutrally buoyant if we understand Archimedes' Principle.

Archimedes' says that the upward buoyant force is equal to the weight of the displaced volume of liquid. What this means is, by calculating the volume of water that must be pushed aside or displaced by your sea-perch when you place it in the water as well as measuring the mass of your sea-perch, we can use the equation Density = Mass/Volume to determine how much buoyancy is needed in order for it to equal the upward buoyant force exerted by the water. To calculate this, we will need to conduct an experiment!

Experiment in this experiment, you will need to submerge your sea-perch in water and then find the difference in the volume of water displaced by the sea-perch. You will then calculate how much buoyancy is needed in order to create a neutrally buoyant sea-perch in the water. By applying what

### What is Buoyancy?

Definitions and Equations

**Buoyancy:** The property of a body that enables it to float on the surface of a liquid or in a fluid. Buoyancy is the upward force acting on an immersed or floating body by the supporting fluid. This combination of forces counteracts the force that causes, alone, downward buoyancy and that the upward force exerted on the immersed or floating body equals the weight of the fluid which it displaces.

**Positive Buoyancy:** Occurs when the weight of the body is less than the weight of an equal volume of the displaced fluid.

**Neutral Buoyancy:** Occurs when the weight of the body is equal to the weight of an equal volume of the displaced fluid. A body in this state remains suspended, neither rising nor sinking, unless acted upon by an outside force.

**Negative Buoyancy:** Occurs when the weight of the body is greater than the weight of an equal volume of the displaced fluid and the body sinks.

**Stability:** Stability is that property of a body that causes it, when disturbed from a condition of equilibrium, to develop forces, or moments, that tend to restore the body to its original condition.

**Equilibrium:** Equilibrium is a state of balance between opposing forces.

**Archimedes Principle:** Archimedes Principle states that the buoyant force on a submerged object is equal to the weight of the fluid that it displaced by the object.

**Mass:** A measure of how much matter is in an object.

**Weight:** The downward force caused by gravity on an object. Weight = mass \* gravity

**Volume:** The amount of space occupied by a shape or object. How much 3 dimensional space (length, width, and height) it occupies. For a volume of water in a cylindrical bucket, Volume= Area\*Height of water, or πr<sup>2</sup>h, or πr<sup>2</sup>.

**Area:** The amount of space inside the boundary of a flat (2-dimensional) object such as a triangle or circle. For a circle, Area=πr<sup>2</sup>.

**Radius:** The distance from the center to the edge of a circle. It is half of the circle's diameter.

**PI:** π = 3.14159...

**Source:** <http://www.marine-technology.com>  
<http://www.ck12.org/physics/Archimedes-Principle-Definition-Formula-Examples-Video-Questions-Answers-1>  
<http://www.ck12.org/physics/Archimedes-Principle-Definition-Formula-Examples-Video-Questions-Answers-2>

### What is Buoyancy?

**Lab**

- When an object sinks:
  - The weight of the object is greater than the upward buoyant force
  - The weight of the object is less than the upward buoyant force
  - The density of the object is less than 1 g/cm<sup>3</sup>.
  - The density of the object is equal to 1 g/cm<sup>3</sup>.
- Archimedes said that:
  - The buoyant force is equal to gravity
  - The weight of the object is equal to the buoyant force
  - The weight of the displaced liquid is equal to the buoyant force
  - The buoyant force is equal to the density of the object
- An object is neutrally buoyant when:
  - It neither sinks nor floats
  - The weight of the object is equal to the upward buoyant force
  - The density of the object is equal to the liquid it is submerged in
  - All of the above
- What is:
  - A measurement of matter
  - Weight
  - Gravity
  - None of the above
- Weight is:
  - Mass
  - Mass\*gravity
  - Gravity
  - A measurement of matter
- Buoyancy:
  - A material's mass per unit volume
  - A material's volume per unit mass
  - A material's thickness
  - A material's ability to float
- If the object's weight is greater than the upward buoyant force:
  - The object will sink
  - Additional buoyant force is needed to be neutrally buoyant
  - Additional weight is needed to be neutrally buoyant
  - A and B are correct
- If the object's weight is equal to the buoyant force:
  - The object will remain at rest
  - The object will neither sink nor float
  - The object is neutrally buoyant
  - All of the above

### In this Section....you are taught...

- What is a Soldering?
- SEAPerch Soldering
- Soldering Equipment
- Soldering: What to Know
- How to Solder
- Lead Free Soldering

### Types of Batteries - Primary Cell

#### Zinc Carbon

- Zinc carbon represents the oldest technology in the primary dry battery systems "Zinc carbon section".
- The cathode is a mixture of carbon conductor and electrolyte.
  - The zinc can serves as the anode and forms the metal shell of the battery. The electrolyte is a complex mixture of ammonium chloride & manganese.
- Zinc carbon chemistry is used in all inexpensive AA, C, and D dry cell batteries.

<http://www.dunked.com/adding/batteries/wire-gauge-batteries.asp>

### How to Strip Wire

#### Step 3: Strip the Wire

- Using wire strippers, first insert the wire into the matching slot, or set the adjustment screw for the gauge of wire. Holding the wire firmly in one hand with your thumb extended toward the end of the wire, position the strippers on the wire at an angle with your other hand and press the handles together.
- Rock the strippers back and forth until the insulation is severed and can be pulled off the wire in one quick motion. Once you get the hang of it, wire stripping is easy.



# Technical and Teaching Resources

seaperch.org



Unclassified

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Resources > Teacher Tools

## Teacher Tools

### Manuals & Instructions

- SeaPerch ROV Build Manual - 2011-02S (PDF 3.3 MB)
- SeaPerch Official Certificate of Participation (PDF 625k)
- SeaPerch Start-up Manual (405 KB)
- Bring SeaPerch To Your School\*

### Labs & Lesson Plans\*

- Attenuation of Light in Water (PDF 462 KB)
- Biological Sampling Device Using a SeaPerch (PDF 87.8 KB)
- Buoyancy/Density Pertaining to Submersibles
- Exploring Underwater Habitats and Environments
- Hunt for Red Octopus
- Measurement of the Depth of the Ocean
- Student-Designed Modification of SeaPerch

### How Everything Works

- PVC
- Relays
- Microcontrollers
- Switches
- Electric Motors

### How Everything Works - Advanced\*

- Buoyancy
- Electricity
- Sensors



My SeaPerch Account

TEACH

BUILD

BECOME

SeaPerch Kit Orders

SeaPerch Event Calendar

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## Online Training Videos

### Constructing a SeaPerch

Below are a series of instructional videos that provide hands-on demonstrations of how to construct a SeaPerch.

Instructor: Chris Hansen, SeaPerch Technical Director

Resources Needed:

SeaPerch Kit

SeaPerch Construction Manual - 2011-02S (PDF 3.3 MB)



### SeaPerch Basics

**Description:** Chris Hansen, SeaPerch Technical Director, walks you through the tools utilized in building a SeaPerch.

**TIP:** These videos are helpful to anyone who has never used power tools and soldering irons. If you have some knowledge and skills in this area, you can move on to Unit 1.

SeaPerch Basic Modules 1 Intro	00:25	MOV (62.8 MB)	MP4 (9.1 MB)
Measuring PVC Pipe	01:05	MOV (26.3 MB)	MP4 (24.2 MB)
Drilling PVC Pipe	03:59	MOV (94.9 MB)	MP4 (94.1 MB)
Cutting the PVC	01:03	MOV (25 MB)	MP4 (24.4 MB)
Cutting the Wire	01:01	MOV (24.8 MB)	MP4 (24 MB)
Soldering	03:48	MOV (90.5 MB)	MP4 (87.7 MB)

### Unit 1: Assembly of the Vehicle Frame

**Description:** Chris Hansen, SeaPerch Technical Director, with Fiona Redman and Gwen Gray will walk you through the entire process of how to build a SeaPerch frame.

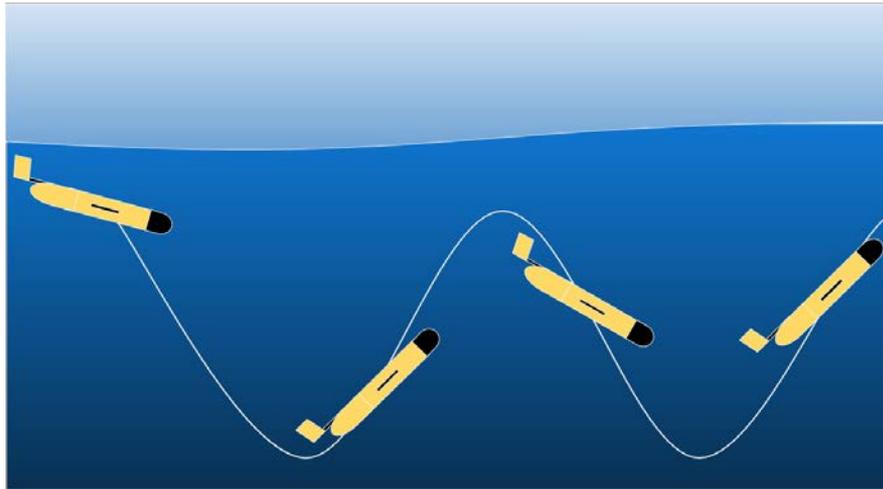


# seaglide

## What is a SeaGlide?

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- A SeaGlide is an autonomous, miniature underwater glider which moves by variable-buoyancy propulsion. A buoyancy engine takes in or expels water, causing it to dive or rise. At the same time it shifts its center of gravity, changing its pitch. This causes the wings to provide lift, and thus propulsion.
- SeaGlide is inspired by full scale underwater gliders which require very little energy and can be fully or partially autonomous, allowing them to deploy for months at a time to collect valuable data about the world's oceans.



["SeagliderPic1-1"](#) is licensed under CC BY 4.0



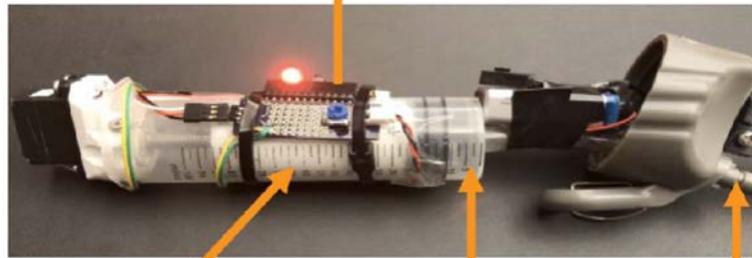
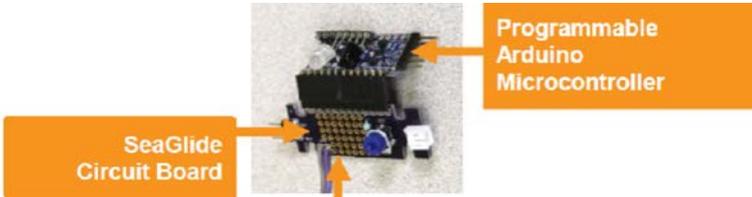
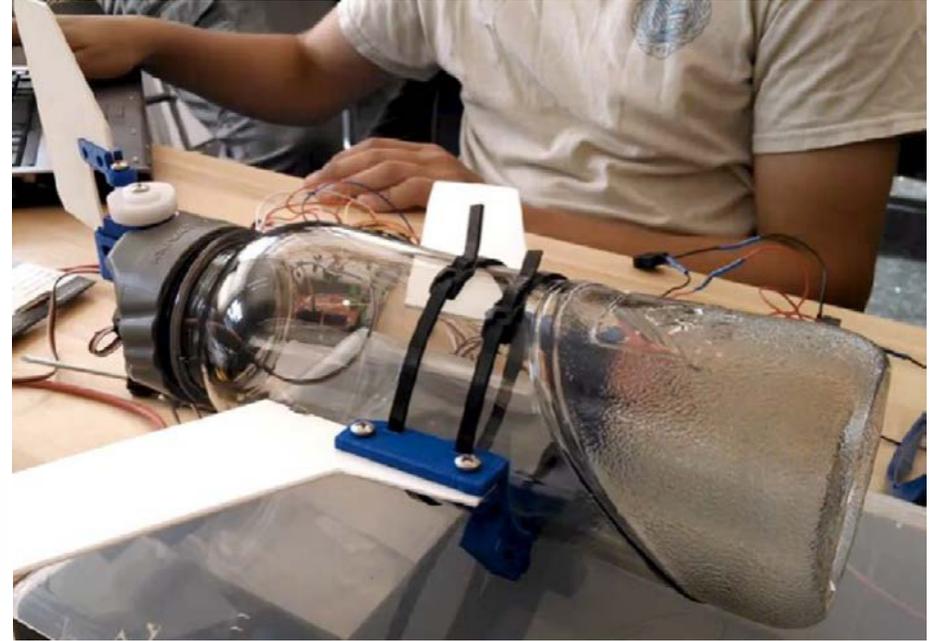


## What is the SeaGlide Competition?

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- The SeaGlide Competition is the culmination of months of research, building and testing. It involves writing a white paper, giving a presentation, and demonstrating the vehicle's performance.
- SeaGlide consists of an educational tool kit that centers on a curriculum-designed program that teaches students about the basics of
  - Naval architecture
  - Marine engineering
  - Computer programming
  - Electrical circuits and microcontrollers
- SeaGlide is an open platform that allows design modifications to incorporate sensor readings, increased maneuverability, and more. *Incorporating modifications beyond what is required, along with research and testing, should be the goal of every team and is key to doing well in the competition.*





Moving Mass      Water Reservoir      Water Intake



```
Arduino IDE - AnalogInput (Arduino 1.0)
File Edit Sketch Tools Help
AnalogInput $
Analog Input
//
Analog Input
int sensorPin = A0; // select the input pin for the potentiometer
int ledPin = 13; // select the pin for the LED
int sensorValue = 0; // variable to store the value coming from the sensor

void setup() {
  // declare the ledPin as an OUTPUT
  pinMode(ledPin, OUTPUT);
}

void loop() {
  // read the value from the sensor:
  sensorValue = analogRead(sensorPin);
  // turn the ledPin on
  digitalWrite(ledPin, HIGH);
  // stop the program for  $<sensorValue>$  milliseconds:
  delay(sensorValue);
  // turn the ledPin off:
  digitalWrite(ledPin, LOW);
  // stop the program for  $<sensorValue>$  milliseconds:
  delay(sensorValue);
}
```



# TEACHER & STUDENT TRAINING

## 2 Day Training at Temple University



Date: Nov 22-23, 2019

Participation Limit: 2 Teachers and 2 Students

Kits will be distributed to teams participating in the training



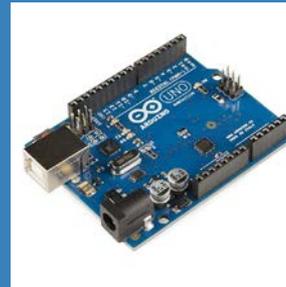
### 2 Day Build Training

- Construct and test a glider



### 2 Day Programming Training

- Learn introductory to advanced coding



```
File Edit Sketch Tools Help
AnalogInput$
Analog Input

int sensorPin = A0; // select the input pin for the potentiometer
int ledPin = A2; // select the pin for the LED
int sensorValue = 0; // variable to store the value coming from the sensor

void setup() {
  // declare the ledPin as an OUTPUT:
  pinMode(ledPin, OUTPUT);
}

void loop() {
  // read the value from the sensor:
  sensorValue = analogRead(sensorPin);
  // turn the ledPin on
  digitalWrite(ledPin, HIGH);
  // stop the program for <sensorValue> milliseconds:
  delay(sensorValue);
  // turn the ledPin off:
  digitalWrite(ledPin, LOW);
  // stop the program for 100 <sensorValue> milliseconds:
  delay(sensorValue);
}
```

- **Phase I: Program Kickoff**
  - Registration
  - Delivery of Overview and Rules document.
  - Teachers and students attend a 2-day training for building SeaGlide and Arduino coding. Participation limited to 2 teachers and 2 students per team. Kits will be distributed to teams participating in the training.
- **Phase II: Design – Build – Test**
  - Time between the program kickoff and competition to research, brainstorm, experiment, design, build, test, and practice.
- **Phase III: Competition**
  - The White Paper will be submitted prior to the competition day.
  - The Commercial and Slide Presentation are presented together, followed by a Q&A.
  - The Vehicle Performance will take place in a pool.

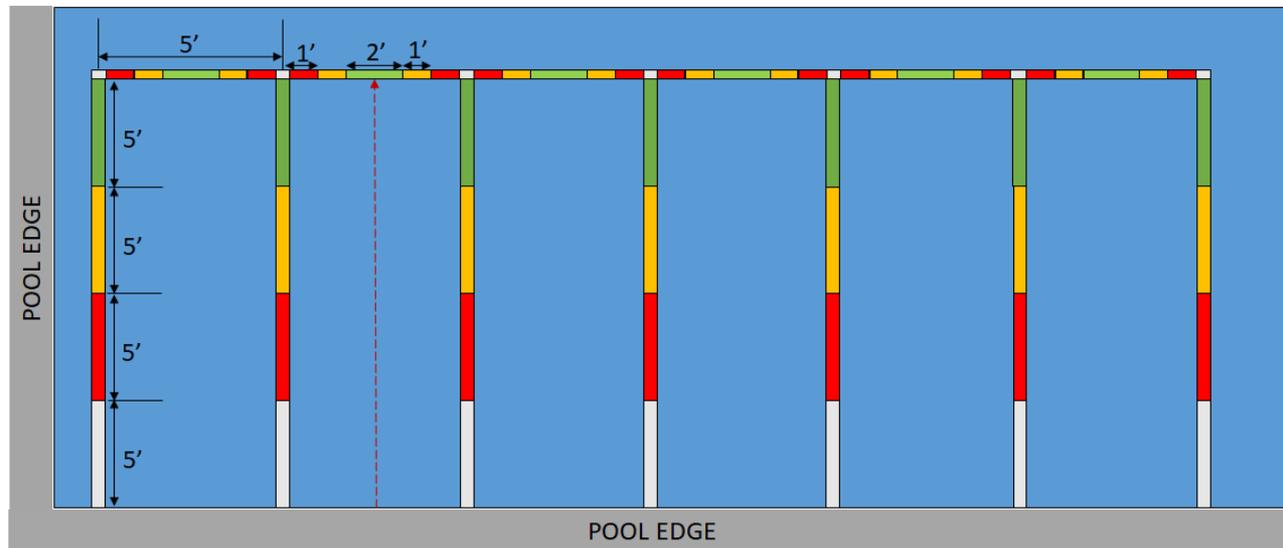


- Three sections: White Paper, Presentation, and Vehicle Performance
- White Paper
  - Provide historical and scientific background of problems and solutions
  - Describe the design process, including research, calculations and testing
  - Describe future plans
- Presentation
  - Produce a commercial
  - Produce and present a slide presentation
- Vehicle Performance
  - Tier 1: Straight-line race (basic SeaGlide kit)
    - \$50 modification limit
  - Tier 2: Two-turn race (SeaGlide kit modified with moving rudder)
    - \$100 modification limit



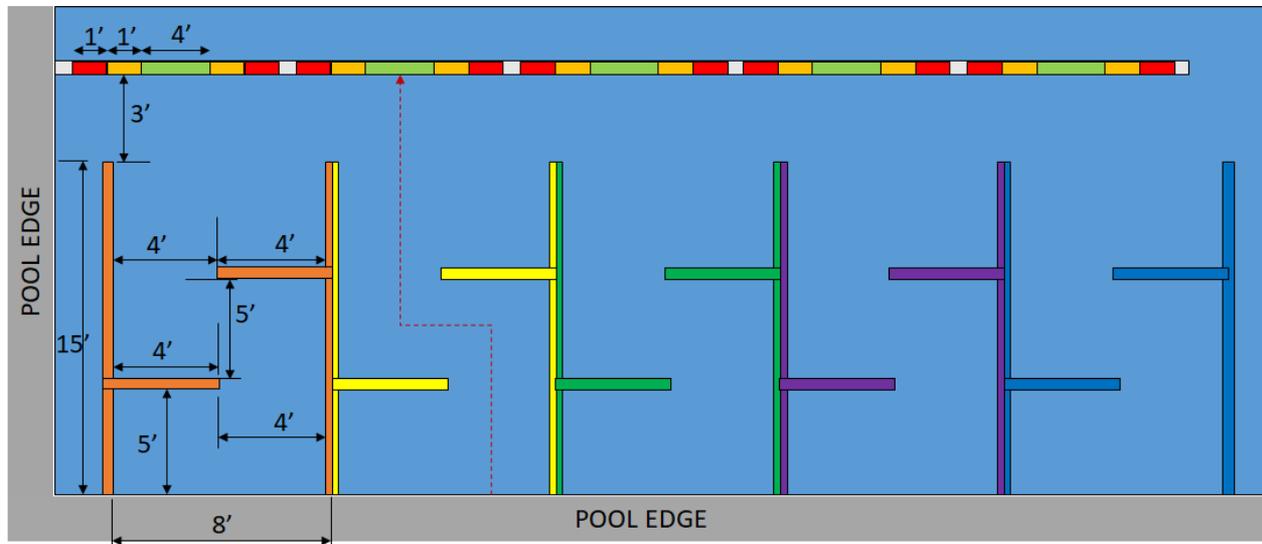
# What's New for 2020?

- SeaGlide Overview and Rules document contains clarifications and rubrics.
- Tier 1 Course
  - Shorter course, with improved set-up and stability
  - Unlimited position resets (elapsed time does not reset)
  - New point award system
    - Time to reach each checkpoint, relative to best competition time
    - Accuracy when reaching last checkpoint



## What's New for 2020?

- SeaGlide Overview and Rules document contains clarifications and rubrics.
- Tier 2 Course
  - Shorter course, with improved set-up and stability
  - Unlimited position reset (elapsed time does not reset)
  - New point award system
    - Time to reach each checkpoint, relative to best competition time
    - Demonstration of autonomous turns
    - Accuracy when reaching last checkpoint





TEACH. BUILD. BECOME.

HOME ABOUT SEAPERCH RESOURCES SEAGLIDE RESOURCES EVENT INFO

## Greater Philadelphia SeaPerch & SeaGlide Challenge

### Upcoming Events

#### 2018 Training Event

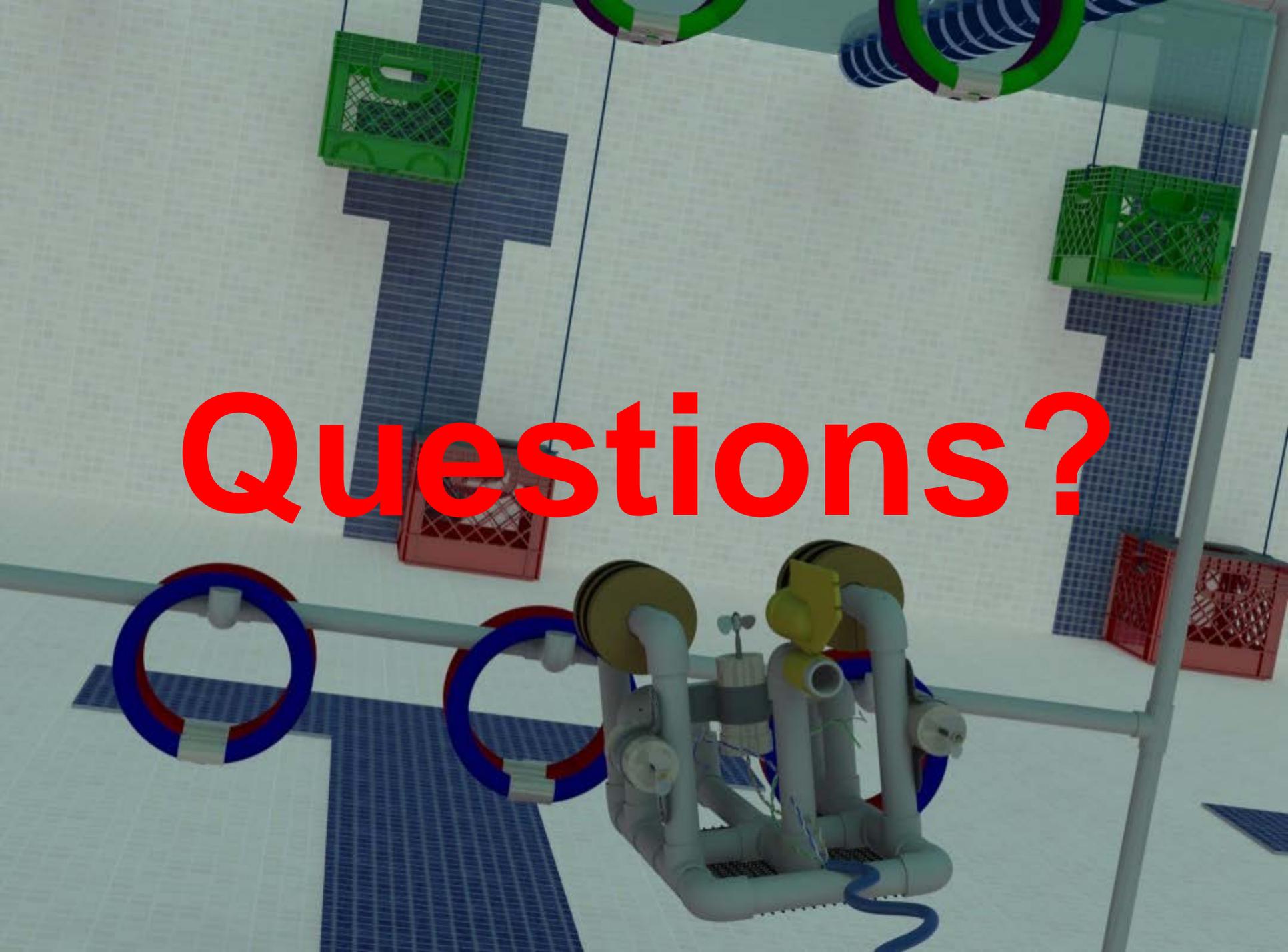
- Date: November 17th & 18th, 2017
- Time: 9:00 am - 4:00 pm
- Location: Temple University
- Receive ACT 48 credit!

### News & Updates

\*\*\*UPDATE\*\*\*

The SeaPerch professional development scheduled for Saturday, November 18th is canceled due to lack of response. We will hold the build and test training on Friday, November 17th and kits will be available for those in attendance on Friday. Please feel free to contact



A 3D rendered scene of a robotic assembly line. In the center, a white robotic arm with a yellow gripper is positioned on a blue grid floor. To its left, a horizontal white pipe has two blue and red rings. Above the robot, a red basket is suspended. To the right, a green basket is suspended. In the background, another green basket is suspended. The scene is set against a white wall with blue grid patterns. The text "Questions?" is overlaid in the center in a large, bold, red font.

**Questions?**