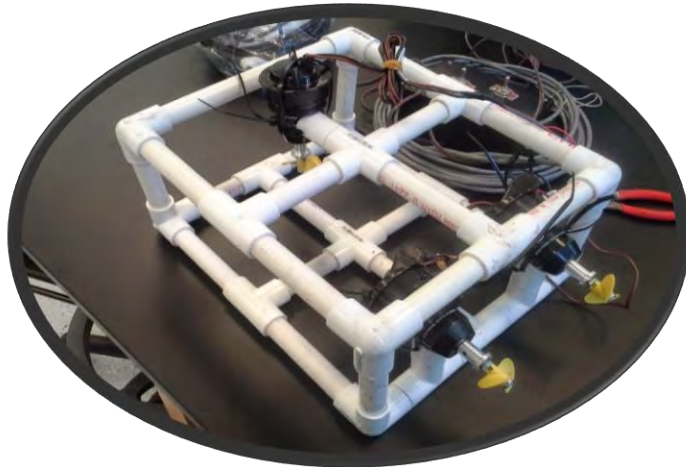


# GST BOCES 2018/2019 Spring Regional Underwater ROV Competition



**Date:**

**May 22, 2019**

9:00 AM – 2:00 PM

**Location:**

**Campbell-Savona Jr/Sr High School**

8455 County Route 125

Campbell, NY 14821

School Phone: (607) 527-9800

Spectators and media are welcome!

**Schedule for the day:**

9:00 – 9:30 AM	Arrival and set-up in the LGI.
9:30 – 10:00 AM	Science Fair (LGI)
10 AM – 1:00 PM	Competition (Pool Area)
11:30 – 1:00 PM	Lunch (staggered, in LGI)
1:15 – 1:30 PM	Awards and conclusion

**Bus drop-off / spectator parking:**

Please pull behind the school to the Flag Pole entrance- use the normal bus loop and follow all posted signs.

ROV teachers and student groups will enter and sign-in at the greeting table near the entrance. ROV teams will report directly to the LGI (Large Group Instruction room) to set up for the science fair portion of the competition.

Students, teachers, and spectators will all be required to sign in and follow typical Campbell-Savona district policies for school visitors. Please realize that C-S students are in class while the competition is taking place.

**Food:**

Teams will need to make their own arrangements for food; bring your own or have any deliveries made to the “flag pole entrance behind the school.” You **MUST** meet the delivery person; the main office will not accept delivery for you. We suggest requesting bagged lunches from your school if possible.

**Details about pool:**

12 ft deep end with six lanes. Plenty of room along sides for equipment setup and use. There is also a PA and bleacher seating.

**Competition Day organization:**

Please make sure your batteries are fully charged, your cables are organized and ready to go, and all your pieces/parts are securely attached. Please make a note of all materials and tools you bring so that they return home with you.

**Team Registration (Teachers):**

- Please make sure to RSVP your school to by April 1<sup>st</sup>.
- A registration form will be sent to teachers after that date to gather the number of teams, student names, etc. This information is required to be submitted no later than May 1<sup>st</sup>.

**Media Release Forms:**

The media release form has been updated for this year.

Please work with your district, students, and parents to make sure we get a complete list of your students who need to be excluded from video/photo/media. Please bring any media forms with you on competition day! It will be your district's responsibility to confirm that we get an accurate list of students for the competitions.

**Sample Competition Schedule:**

In order to keep teams on task, we will be asking them to make sure they have completed at least one challenge every hour. This will give teams time to adjust their ROVs and find time to eat yet still finish all challenges in a timely manner.

Teams will be allowed to move to the next challenge early, but the teams who are scheduled to be at an event will be allowed to finish first.

10:00 – 11:00:

Group A – Rise to the Top  
Group B – Artifact Retrieval  
Group C – Down & Back

11:00 – 12:00

Group B – Rise to the Top  
Group C – Artifact Retrieval  
Group A – Down & Back

12:00 – 1:00

Group C – Rise to the Top  
Group A – Artifact Retrieval  
Group B – Down & Back

\*this is a sample and may change prior to the competition.

## **New this year: Two different classes for competition!**

Because 3d printers, microcontrollers, lithium batteries, and specific ROV hardware have become more readily available in the last few years we have decided to enhance our competition format to allow for more creativity and engineering.

**Stock Class:** these ROVs are designed and built using the pieces and parts that come in the ROV kit. Pieces can be modified, but no extra materials may be used in the construction of your ROV.

**Open Class:** these ROVs can be designed using almost any materials or resources available. The following rules must be adhered to:

- All pieces, parts, and the entire ROV system needs to be safe. This includes any electrical systems, pneumatic/hydraulic systems, propulsion parts, etc. Anything deemed unsafe will not be allowed to be used.
- No parts can be completely transparent (Plexiglas, etc.) This is in case pieces or parts fall off we can find them in the pool. If you need to use clear plastic please put some colorful (not blue or black) tape or waterproof paint on it for this reason.
- No glass or other easily breakable items unless they are inside a sealed container.
- Tethers should be no longer than 30' yet long enough to participate in all challenges.
- Systems should stay together once in the pool. Please make sure all pieces and parts are attached well.
- Please be prepared to openly share any innovative design, engineering, or programming that you used with spectators, teachers, and other students.

ROVs in both classes will attempt the same challenges, however both classes will receive awards separately. Any ROV that uses non-provided materials at any point in the competition will be classified as "Open Class".

If there are any questions about materials, processes, or your class designation please ask!

## Challenge: Rise to the Top

This challenge tests the team's ability to make their ROV as close to neutrally buoyant as possible.

Drivers will power their robots to sit on the bottom of the pool (in the deep end). A judge will tell you to turn all motors off and will then start their stopwatch.

The ROVs should begin to rise. The task is to make them come to the surface as slowly as possible (but staying within a 2-minute time limit). You will receive one point per second that it takes your robot to rise, 120 points maximum. Time stops when your robot breaks the surface of the water.

- If an ROV surfaces within 10 seconds after that time limit they will be scored as follows:
  - $120 - (2 \times (\text{Recorded Time} - 120)) = \text{score}$
- Any ROV that does not surface in 130 seconds or less will be scored with a zero.

Students may not use the tether, a motor, or any other method to help move the ROV to the surface.

Teams will be given three attempts at this challenge, if needed.

### Excel Scoresheet example:

	A	B	C	D	E
1	Test Team				
2					
3		Attempt 1	Attempt 2	Attempt 3	Best
4	Time (s)	102	128	131	
5	Points	102	104	0	<b>104</b>
6					

Formula for  
cell B5 >> =IF(B4<120, B4, IF(B4<131, 120-(2\*(B4-120)), 0))

## Challenge: Down & Back

*(formerly called "Drag Race")*

This challenge will test the team's ability to build something well-balanced and fairly hydrodynamic.

ROVs will race from the edge of the pool to a location approximately 20' out and then back to the pool edge. The turn-around location will be noted with some sort of marker (a pool noodle, a laser line, or some other device still under construction).

ROVs must be touching the edge of the pool when the timer begins.

No student may help propel the robot in any way. This includes pulling on the tether or pushing it to start.

ROVs can travel at any depth during this challenge.

ROVs can move in any direction (forward/backward/sideways) while attempting this challenge.

There is a 5-minute (300-second) time limit for this race.

Scoring is based on the 300 minus the measured time (s). The quicker you are, the higher your score will be.

Drivers may not look toward the pool while the challenge is happening. Teammates can watch the ROV and communicate with the driver if necessary.

Teams may try this challenge twice, if needed.

### Excel Scoresheet example:

	F	G	H	I
1	Test Team			
2				
3		Attempt 1	Attempt 2	Best
4	Time (s)	243	277	
5	Points	57	23	<b>57</b>
6				

Formula for  
cell G5      =if(G4>299,0,300-G4)

## Challenge: Artifact Retrieval

Teams will be given three (3) minutes to pick up as many rings or tees as possible from the bottom of the pool.

Tees are worth 2 points

Rings are worth 1 point

Scoring is done as soon as the main body of the ROV breaks the surface of the water with the artifact. The ROV can drop the artifact or a teammate can remove it and toss it back in to the pool.

ROVs must be completely out of contact with artifacts after dropping them and before trying to pick them back up.

Drivers may not look toward the pool while the challenge is happening. Teammates can watch the ROV and communicate with the driver if necessary.

Teams can only do this challenge one time.

### Excel Scoresheet example:

	J	K	L	M
1	Test Team			
2				
3		# Rings	# Tees	Total
4	Time (s)	3	2	
5	Points	3	4	<b>7</b>
6				

### Overall Scoring:

All scores are normalized against a base score that represents our estimate for the max possible score for each challenge. This will make each challenge worth approximately the same amount.

Overall Scores
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	Rise to the Top	Down and Back	Artifact Retrieval	Science Fair	Total Score
base score	120	260	15	100	
raw score	104	57	7	82	
adjusted score	86.67	21.92	46.67	82	<b>237.26</b>

**Science Fair Communication Rubric (each team will be judged twice)**

**Underwater ROV  
Communication Rubric**

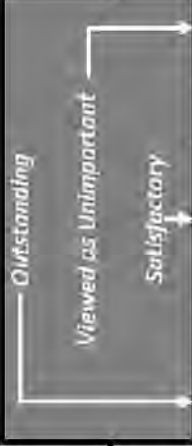
**Team:**

**PRESENTATION**

When speaking, team members are:

- using appropriate vocabulary, scientific concepts, and facts to support ideas
- organizing the discussion in a logical sequence that the audience can follow by maintaining a proper volume, rate, and level of enthusiasm
- use of visuals (photographs, charts, graphs, design drawings, engineering notebooks, slideshows, posters, etc) to help explain the learning that took place

5	4	3	2	1	0
5	4	3	2	1	0
5	4	3	2	1	0



**QUESTIONING**

When questioned, team members are:

- providing the audience with the information needed to fully understand the task
- answering all questions with clear explanations and further elaborations
- enthusiastic and confident about answering questions.

5	4	3	2	1	0
5	4	3	2	1	0
5	4	3	2	1	0

**DEMONSTRATING EXPERIENCE**

Students have discussed the following points about their experiences of designing, building, testing, and operating their ROV:

- first hand experiences about the robot build and any modifications used
- details about what they learned to successfully operate their robot
- details about what types of problems they experienced and how they solved them when writing their code to solve the challenges
- *How do they answer:* What could an ROV be used for around your community or the area in which we live?

5	4	3	2	1	0
5	4	3	2	1	0
5	4	3	2	1	0
5	4	3	2	1	0

**Total Points:**

( 50 )



**MEDIA, WEB PAGE, AND SOCIAL MEDIA RELEASE**

Student's Name \_\_\_\_\_

School District: \_\_\_\_\_

The school district website and social media accounts include photographs of students, often without names. In addition, local newspaper and occasionally TV stations attend school events outside the school day and have interviewed students about important issues. Please read the following two sections.

***If you deny permission for your child to be included in media coverage of our schools, please check the appropriate boxes and submit back to your child's administrator.***

***If nothing is returned, the school district will assume permission is granted under each of the sections identified below.***

I DO NOT give permission for school officials to photograph or record my child for school (for example yearbook and ID badges), school district, and/or BOCES publications (including web sites and district social media).

I DO NOT give permission for my child to be photographed, recorded, or interviewed by the media during the regular school day.

Parent/guardian signature: \_\_\_\_\_ Date: \_\_\_\_\_