

Soccer Bots Event Description

Soccer Bots Main Event:

Event Description:

Teams of 2-6 students will design and build two robots to compete together, using Lego OR VEX IQ robot sets. Students will drive robots with remote controls and attempt to score points on the course. On the day of competition, they will face off against other teams in 2 on 2 matches to advance through a tournament bracket to the final match.

Common Core Standards and 4C's:

Prepare for and participate effectively in a range of conversations and collaborations with diverse partners, building on others' ideas and expressing their own ideas clearly and persuasively. Creativity, Collaboration, Communication and Critical Thinking.

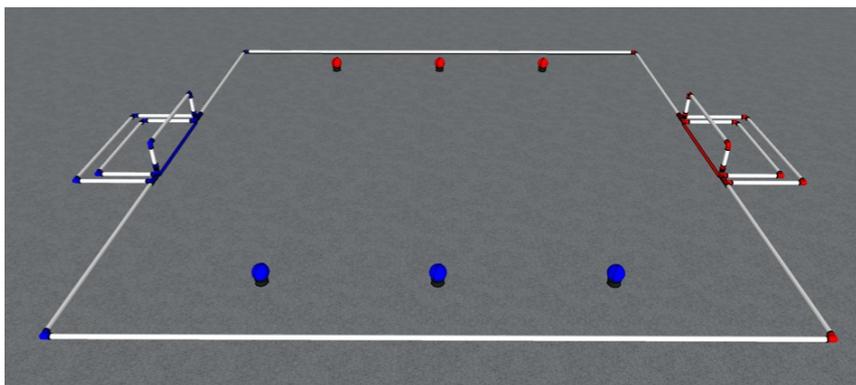
Designing and Programming your Robot:

Robots must be designed and built to collect balls from the course and place them in the goals. For this event, robots may be controlled with a remote-control program or phone app. Robots should be small enough to maneuver around the course and shorter than 7 $\frac{3}{4}$ " to fit into the goal area.

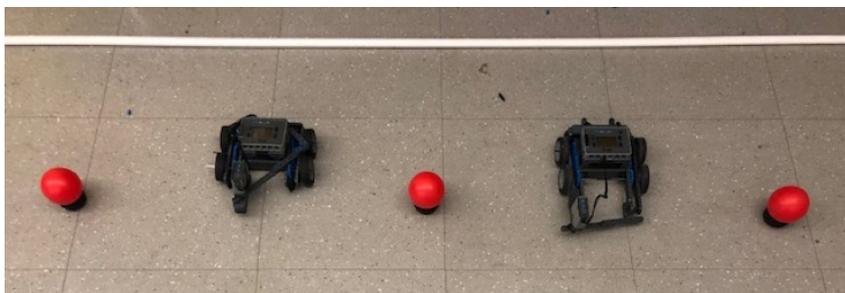
Course Layout:

The course will consist of a 10'x10' field as shown below constructed with $\frac{1}{2}$ " PVP pipe. There will be three 3" colored balls for each team to push into their goal to score points. The balls will be sitting on a medium size rough tread lego tire. Goals will be 24 $\frac{1}{2}$ " wide and will have 7 $\frac{3}{4}$ " clearance underneath the crossbar with a 2" wide section around them for containing the balls.

[LINK TO DETAILED MEASUREMENTS](#)



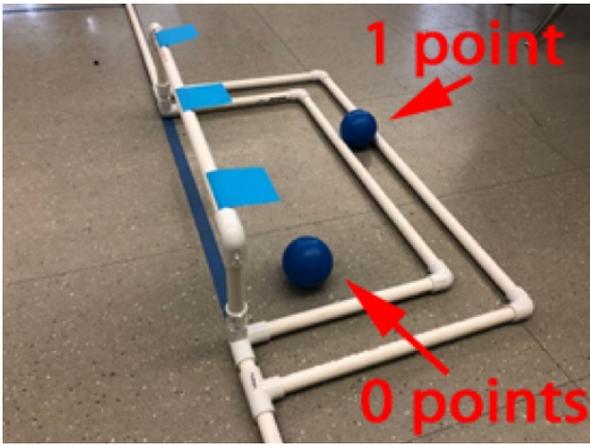
Robots will be positioned at the start of the match in the spaces between the three colored balls of the opposing team.



(Blue team at start)

Scoring:

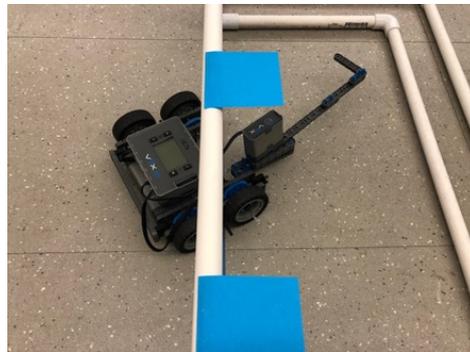
Teams will face off in 3-minute matches. The first team to place ALL 3 BALLS in the scoring section of the goal wins the round. If time runs out, the team with the highest score wins. If time runs out, AND both teams have the same score, next to score wins. Balls must remain in a scoring position to be counted. If a ball is bumped out, it will be tossed back into the middle of the field. Teams may attempt to remove balls from their opponents' goal but may not enter the goal area. If any wheel enters the goal area, the robot will be placed outside the course and must be driven back to their own goal. Then it may be placed back on the field next to their own goal. If a ball was bumped out while the robot was in the goal, it will be returned.



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OK



Not OK

Rules and Technical Requirements:

- Robots must be constructed entirely with LEGO or VEX iQpieces.
- There will be a 3-minute time limit on each match.
- Robots may be controlled with any type of remote-control program or phone app.
- Robots are allowed to grab/hold a ball of their own color and drive it into the goal.
- Robots are allowed to hit/push/block a ball from the other team but may NOT "hold" it.
- If a ball is pushed out of bounds it will be tossed back into the middle of the field.
- A ball must remain in the scoring section of the goal to be counted. If bumped out (by either team) it will be tossed back into the middle of the field.
- If a ball goes into the opposing team's goal, it will be tossed back into the middle of the field.
- If a robot breaks or loses connection, teams may pull it out to repair outside the field at that spot and must be driven back to its own goal before being placed back on the field.
- No team member may interfere with or touch the opposing team's robots.

Reward Points:

Teams will advance through the tournament bracket in an attempt to make it to the championship round and win the final match. 1st place will receive 70pts and each subsequent rank will receive 3 fewer points than the prior rank: (2nd = 67pts, 3rd = 64pts, 4th = 61pts and so on).

Points from Rank	70	70 – 3 (Your Rank -1)
Points from Design Document	30	See Design Document below.
TOTAL POINTS	100	

Soccer Bots Design Document:

Overview:

Students will create a document outlining the process of designing and testing their robot. There will be four main sections: Research, Specifications, Programming and Testing. The document will be worth 30 points. Design Documents must be converted to a PDF file before uploading to the [TOT App Submission Portal](#) no later than 10:00 pm on March 6th, 2020.

Research:

In this section students will use the internet or other sources to search for facts and information about robotic space exploration. They should provide specific examples of robots in space and cite the sources they used for their research. Finally, they should describe how this research relates to their own project.

Specifications:

In this section students will list the dimensions of their robot (length, width, height). They will also include labeled pictures of their robot to showcase different components and design.

Programming:

Students will explain how they controlled their robot to complete the task. They should include a diagram of their controller to show how they mapped their motors/ports as well as any other configuration settings.

Testing:

In the final section, students will describe the testing of their robot and what modifications they made to improve its performance on the course. This should include physical changes to the robot such as changing the wheels, modifications to the arm/claw or even redesigning the robot. It could also include changes to the programming. Students should include a data table showing the results of different trials.

Sample Data Table:

Trial	Result	Adjustments
1	Win	Had poor ball control so we modified the arm to grab the ball better.
2	Loss	Increased the power on the motors to 100% to be faster
3	Win	Used the larger wheels on the robot for even more speed

Getting Help:

Visit the [Soccer Bots Documents Page](#) to see a sample Design Document and Event support files and our new [YouTube Channel](#) to view tutorials to help prepare and practice.

Contact Chris Fuge at Chris.Fuge@fresnounified.org or Greg West at Greg.west@fresnounified.org if you have any further questions regarding this event.

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Points from Design Document	30	See Design document
Total Points	100	

Scoring Breakdown		Description / Formula	Max Points
Online	Design Document		30

Live Event Scoring Breakdown	Rank	$70 - 3(\text{Your Rank} - 1)$ Description / Formula	70 Max Points
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Design Document Scoring Rubric

Category	Exemplary	Proficient	Partially Proficient	Incomplete
Research There are specific examples provided.	5 Points 3 or more relevant examples are provided.	3 Points 2 relevant examples are provided.	1 Point Only 1 relevant example is provided.	0 Points There were no examples provided.
Works Cited Multiple reliable sources have been referenced or cited in the research.	5 Points 3 or more reliable sources have been referenced or cited in the research.	3 Points 2 sources have been referenced or cited in the research.	1 Point Just 1 source was referenced or cited in the research.	0 Points There were no sources referenced or cited in the research.
Specifications The dimensions and components of the robot are clearly listed with multiple pictures.	5 Points All 3 dimensions (L, W, H) are listed and there are a minimum of 3 labeled pictures of the robot.	3 Points 1-3 items are missing, could be missing a dimension, picture, or both.	1 Point 4-5 items are missing, could be missing dimensions, pictures, or both.	0 Points There are no dimensions or pictures.
Programming It is very clear how the programming makes the robot complete the tasks.	5 Points It is very clear how the programming works.	3 Points It is somewhat clear how the programming works.	1 Point It is unclear how the programming works.	0 Points There is no explanation of the programming at all.
Testing There was significant testing to improve the speed, maneuverability, and attack of the robot.	5 Points 5 or more modifications were clearly described in the testing.	3 Points 3 modifications were clearly described in the testing.	1 Point Fewer than 3 modifications were somewhat described in the testing.	0 Points There were no adjustments or modifications described in the testing.
Data Table A clear and detailed data table was included to show results of the testing.	5 Points The data table was very clear and easy to read with multiple entries and detailed results.	3 Points The data table was clear but lacked specific detail.	1 Point The data table was confusing and lacked detail.	0 Points There was no data table in the design document.

Rank Scoring Rubric

Category
Ranking Ranking after conclusion of battles.