

Battle Bots (fight to the death)



Event Description:

Battle Bots tournaments is separated into two weight classes, Lightweight and Heavyweight. The weight limit for the Lightweight is under 1000 grams and there is no weight limit for the Heavyweight. Teams of 2-4 students will create a robot, using the MindStorm kits provided and any other LEGO pieces, prior to the day of the tournament. A balloon will be taped to the back of the robot and TWO THUMB TACKS may be secured anywhere else on the robot for attacking. Your goal is to pop the other team's balloon before they pop yours, or push them out of bounds. A remote-control program may be used to move and control the robot on the course. On the day of competition teams will compete in one on one challenges and advance through a tournament bracket to the final rounds.

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.

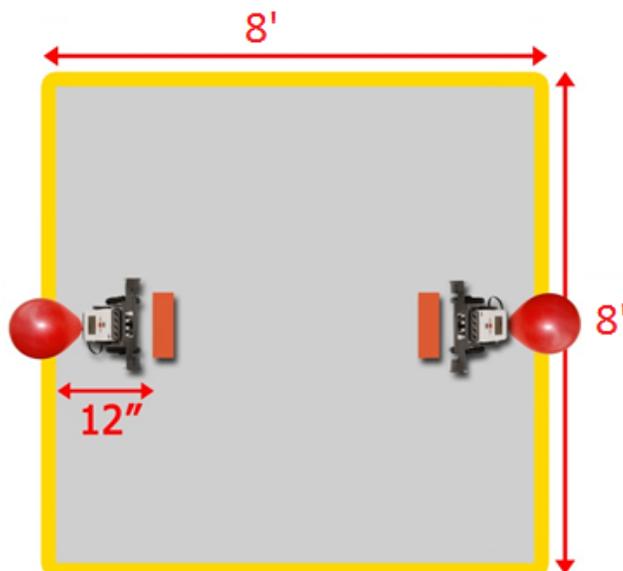
Designing and Programming your Robot:

Design Specifications:

Your robot will need to be able to drive around on a course and attempt to pop your opponents' balloon while also maneuvering to protect your own balloon. Each team will be allowed to connect TWO THUMB TACKS to your robot with either tape or glue, the rest of the design may only include Lego pieces (from the kit or otherwise). The balloon will be attached to the rearmost part of your robot (no other pieces may block/cover your balloon). We will be using standard 12" balloons.

Course Layout:

The course will consist of an 8'x8' square marked out on the floor. There will be two bricks on opposite sides of the course to mark the "starting line" of the two competing robots. Each brick will be positioned 12" from the edge and about 26" from each side. See image. The two bricks will remain on the course as obstacles during competition. There will also be two bricks placed towards the center of the ring that have thumbtacks attached to them. Beware of these obstacles.



Technical Requirements:

- Weight limit for Lightweight is under 1000 grams and there is no weight limit for Heavyweight.
- Vehicles must be constructed entirely with LEGO pieces (with the exception of the TWO THUMBSTICKS and tape/glue to attach them).
- Weights may be used if they are thoroughly encased in Lego pieces and attached by Lego pieces to the robot.
- The robots may be controlled with a remote-control program through Bluetooth such as the [NXT Remote Program](#) (download the folder and extract to your desktop).
- Students may not touch the robot at all during each round. If there is a problem with the robot, it may ONLY be fixed in between rounds.
- There will be 30 seconds between rounds to make adjustments and reset.
- ONLY registered students are allowed to touch the robot and computer that is used.
- The entire robot must fit inside a 12" x 12" x 12" box at the start of each round. Pieces may autonomously extend out during the round. (The balloon may extend out of the box).
- During a round, if ANY of a robot's wheels are out of bounds the other team wins the round.
- No firing projectiles or dropping pieces. The robot should attempt to remain in one piece.
- No more than 3 motors may be used.

Battle Bot Tournament Bracket:

This event will consist of multiple "matches" as teams advance through the tournament bracket. We will try to do a double elimination bracket, depending on the number of teams that register. The tournament bracket and schedule will be posted online and in the event room. Students MUST be ready when they are up. If a team is not ready to compete within 2 minutes of being called, they will forfeit the match and potentially be eliminated from the competition.

Matches:

Each "match" will be the best of three 90 second rounds. Each round will end as soon as a balloon is popped or a robot is pushed out of bounds. A point will be awarded to the first team to pop their opponent's balloon or push them out of bounds. At the end of three rounds the team with the most points (2-1, 2-0, or 1-0) will win the match and move on to the next bracket. If no team has scored a point after three rounds, or if there is a 1-1 tie, there will be one final 30 second break and then sudden death will begin where the first to pop their opponent's balloon OR push them out of bounds will win the match immediately.

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).

Battle Bots Scoring Breakdown		
Points from Rank	70	70 - 3(Your Rank -1)
Points from Design Document	30	See Design Document on next page
TOTAL POINTS	100	

Battle Bot 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 submitted and scored prior to the tournament and will be worth 30 points. Design Documents must be converted to a PDF file before uploading to the Battle Bot Design Document LW or HW Submission Portal on Teams no later than 11:59 pm on March 3, 2018.

Research:

In this section students will use the internet or other sources to search for facts and information about Robotics in the Military. They will need to provide specific examples of military robots 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 weight of their robot, the dimensions of their robot (length, width, height) as well as a list of the primary components they used (motors and sensors). They will also include pictures of their robot.

Programming:

Students will explain how they controlled their robot to complete the task. They should state what program they used and discuss specific settings. They will also include a screenshot of the program.

Testing:

In the final section, students will describe the testing of their robot and what modifications they made to improve its speed, maneuverability and attack. This should include physical changes to the robot such as changing the wheels or redesigning the robot. It should also include changing the setting of the remote-control program. Students should include a data table showing the results of different trials.

Sample Data Table:

Trial	Win/Loss?	Modifications
1	Win	Original battlebot design.
2	Win	Increased the speed of the motors to 90%
3	Loss	Used larger wheels on the robot, needed more friction.
4	Win	Reset the controls of the program to easier buttons for driving.
5	Loss	Redesigned the attack arm but it was too weak.

If a team does not have another team to scrimmage against, they may simply list their modifications and how they improved/hindered their robot.

Getting Help:

Visit the [Tournament of Technology Teams site](#) to see a sample Design Document and our new [YouTube Channel](#) to view tutorials to help prepare and practice.

Contact Philip Siechert at Philip.Siechert@fresnounified.org if you have any further questions regarding this event.

Battle Bot Design Document Scoring Rubric

Team: _____

Category	Exemplary	Proficient	Partially Proficient	Incomplete	Points
RESEARCH:	5 points	3 points	1 point	0 points	
There are specific examples provided.	3 or more very relevant examples are provided.	2-4 relevant examples are provided.	Only 1 somewhat relevant example is provided.	There were no examples provided.	
WORKS CITED:	5 points	3 points	1 point	0 points	
Multiple reliable sources have been referenced or cited in the research.	3 or more very reliable sources have been referenced or cited in the research.	2 reliable sources have been referenced or cited in the research.	Just 1 somewhat reliable source was referenced or cited in the research.	There were no sources referenced or cited in the research.	
SPECIFICATIONS:	5 points	3 points	1 point	0 points	
The dimensions and components of the robot are clearly listed with multiple pictures.	All dimensions/components are listed and there are 3 or more pictures of the robot.	Dimensions/components are listed and there are 2 pictures.	Missing dimensions or components and has just 1 picture.	Missing dimensions and components and there are no pictures.	
PROGRAMMING:	5 points	3 points	1 point	0 points	
It is very clear how the programming makes the robot complete the tasks.	It is very clear how the programming works.	It is somewhat clear how the programming works.	It is unclear how the programming works.	There is no explanation of the programming at all.	
TESTING:	5 points	3 points	1 point	0 points	
There was significant testing to improve the speed, maneuverability, and attack of the robot.	5 or more modifications were very clearly described in the testing.	3 modifications were clearly described in the testing.	Fewer than 3 modifications were somewhat described in the testing.	There were no adjustments or modifications described in the testing.	
DATA TABLE:	5 points	3 points	1 point	0 points	
A clear and detailed data table was included to show results of the testing.	The data table was very clear and easy to read with multiple entries and detailed results.	The data table was clear with but lacked specific detail.	The data table was confusing and lacked detail.	There was no data table in the design document.	
<i>Total Score (30 max)</i>					