PREFACE

This division is to provide a fun, less completely destructive environment aimed at teaching the basics of building insect combat robots. Ideally these rules allow variation on design while restricting the components used to keep things simple. Veterans and Rookies will be competing at the same time unless there is enough interest to make separate Veteran and Rookie divisions viable. The division will be run mostly as a time filler in the later stages of a combat robotics event.

This document will include a set of rules, as well as recommendations. They will be highlighted in Teal.

There **will also soon be a link** to a spreadsheet with a complete list of recommended parts required to build a Balloon bot with the 3d print from the BotBrawl website. We will work hard to keep the links updated to the best of our ability.

Note: This ruleset may evolve, as this is a brand new class of robots There may be some **very slight** tweaks to the ruleset here or there to ensure everything stays balanced and we have not left out glaring loopholes.

Game Objective

Akin to ~~Mario Kart~~ A Popular GoKart themed video game Battle Mode, robots will have 3 small Balloons attached to their backs. To win, competitors must puncture the balloons on the opposing robots while avoiding having their balloons popped. Once all 3 Balloons are popped, that competitor is eliminated from the game. Last bot with at least one Inflated Balloon wins.

1. Match Rules

1.1 Playing The Game

1.1.1 Robots with no inflated Balloons are eliminated

1.1.2 Balloons that are no longer attached to a robot are counted as deflated

1.1.3 Balloons that become deflated due to the floor, the walls, or arena debris are counted as deflated

1.1.4 Balloons that are punctured are counted as deflated once they are smaller than 2" diameter.

1.1.5 Robots that cannot show controlled movement are eliminated after a 10 second countdown.

1.1.6 Robots that are eliminated, are, with their spike down, to drive towards and park near the door, if possible, and remain immobile for the remainder of the match.

1.1.7 Matches will end when all but one Robot are eliminated or after 3 minutes. If there is no winner after 3 minutes, the robot with the most balloons left intact wins. If there is a tie on balloon counts, the match will go to a Judge's decision.

1.1.8 Robots designed with the intent to flip, damage, or cause harm to other robots are not allowed.

1.1.9 Balloons will be inexpensive Water Balloons inflated with air. Inflated dimensions are approximately ~3" inches in diameter and ~5" long. Organizers will do their best to ensure consistency between balloons.

1.1.10 Robots are only allowed to Pin for a maximum of 10 seconds. Pinning is when a robot pins or traps another robot against the wall or other obstacle.

1.2 Championship

1.2.1 Similar to the scoring system for motorsports events, The competitors of every match of Balloon bots will recieve season championship points according to the following scale.

1. 25 points
2. 18 points
3. 15 points
4. 12 points
5. 10 points
6. 8 points
7. 6 points
8. 4 points
9. 2 points
10. 1 point.

1.2.2 To make the competition more even, The lowest 4 scoring matches for each competitor will be dropped from the championship season results. These may be a match in which the competitor did not compete.

1.2.3 All robots will accumulate points over all matches played in a calendar year. The seasonwide champion will be decided after the final match of the year by totalling up the points over the season.

2. Robot Build Rules

2.1 Drivetrain

2.1.1 Drive motors/gearbox combos (Referred to as Motors) will be functionally equivalent to these 16mm diameter gearmotors. Any off the shelf ratio is allowed, however custom gearbox setups are not allowed.
https://kozbots.com/store/qcjb1195wz8fvljyum7uncoj507alc.
https://www.fingertechrobotics.com/proddetail.php?prod=ft-Sspark16
https://www.botkits.com/collections/all-products/products/four-battle-hardened-motors?variant=31142859341926

2.1.2 All robots are allowed a maximum of 2 drive Motors. We recommend using direct 2 wheel drive

2.1.3 Drive wheels are Unrestricted. We recommend Hubs + foam wheels, off the shelf small robot wheels, toy wheels, or custom 3d printed wheels.

2.1.4 The drivetrains listed below are prohibited. All other drivetrains are 100% legal. If you have questions on drivetrain legality contact the event organizer.
       -Belt/chain driven 4+ wheel drive (4wd, 6wd etc)
       -Flight
       -Sharp or damaging drive wheels/hubs
       -Vibration drive

2.2 Weapon

2.2.1 Weapons shall have no more than 4" of weapon reach. The weapon arm may be longer than 4" providing the tip of the screw may extend no further from the perimeter of your robot than 4".

2.2.2 Weapons will be powered by a single servo motor. When rated at 6V, The servo motor will not turn faster than a maximum speed of 0.10 Sec/60°. When rated at 6V, The servo motor will not exceed a maximum torque of 45.0 Kg/cm.

2.2.3 Weapon arms may not rotate faster than a maximum speed of 0.10 Sec/60°, although they do not have to be directly driven.

2.2.4 Weapon arms may not exceed a rotation angle of 100°

2.2.5 The only allowed weapon tip will be a single, unmodified #6 1-¼ drywall screw. See links at the end of the rules for examples. These screws will be provided at the event, and event

provided screws will be required to be used while competing. We recommend competitors purchase their own screws to ensure they work with their robot.

2.4.6 The weapon screw can be mounted at any angle.

2.2.7 Weapons require both a weapon lockout and sharp edge covers for safety.

2.2.8 Weapons may only extend from the front of the robot.

2.3 Chassis

2.3.1 All chassis materials will be allowed. This allows builders to use whatever material is most easy for them to build the robot out of, whether it be cardboard, 3d printing, wood or machined metal. If builders are stuck for designs, there is a 3d print available on the bot brawl website that you can use/modify.

2.3.2 When measured with the robot sitting flat on its drivetrain, Robots will not exceed 10" Wide by 10" Long x 10" Tall at any time, in any configuration or possible position.

2.3.3 The outer faces of the robot will be within 15° of vertical for the first 1/2" up from the floor. No Wedges!

2.3.4 Balloon bots will have attachment points for balloons mounted on the back or top, behind the weapon of their robot. The balloons do not have to fit inside the robot dimensions defined in rule 2.3.2. This can be anything from a binder clip, a zip tie, some tape, a clothes pin or a slot that the knot sealing the balloon goes through. Just remember, if the balloon falls off it counts as deflated.

2.3.5 No part of the balloon may exceed a maximum height of 7" measured from the floor with the robot not moving.

2.3.6 The balloons must be exposed from the top, back, and sides. Don't wall in your Balloon!

2.3.7 The Completed robot must weigh no more than 3 lbs. We recommend designing with the intent to weigh less than 1lb, as a heavier robot will have reduced performance.

2.3.8 The chassis is not a weapon. Decorations or other structures must not have sharp edges/points. Designs seeking to exploit the popping of other balloons with sharps not on the weapon are not allowed.

2.4 Electronics

2.4.1 The only battery chemistry permitted are standard hobby grade Lithium Polymer batteries. These are commonly used on drones/quadcopters and hobby RC planes/vehicles.

2.4.2 Combined Batteries should not be rated less than 350 mAh, or any more than 2s (7.4V Nominal) voltage. High voltage lipo batteries that supply above standard 2s (7.4V Nominal) voltages are not allowed. Multiple batteries are allowed. We recommend a 2s 350-500mAh Battery.

2.4.3 Batteries must be protected from puncture by other robots from all sides. We recommend having the batteries under some sort of cover. Can be as simple as a sturdy 3d print or a small piece of durable plastic that can withstand the attack of another robot.

2.4.4 Any Radio/RX/Custom Control System may be used as long as it meets the failsafe requirements. We recommend something similar to the links at the end of the rules.

2.4.5 Any ESC (DC motor controller) can be used. We recommend something similar to the list at the end of the rules.

2.4.6 All robots must have some sort of battery monitor or battery voltage indicator built in. We recommend something similar to the links at the end of the rules.

2.4.7 All robots must have some sort of indicator that shows they are on. This can be a light, a LED or the necessary battery voltage indicator.

2.4.8 All robots must have an easily accessible power switch. We recommend a switch that requires no tools, like a toggle switch, or a turn switch.

2.4.9 All robots must failsafe. If the control signal is lost (or transmitter turned off) the robot must stop DEAD and remain inactive.

2.4.10 No additional motors or servos may be used on the robot aside from purely decorative purposes.

3 Inspections/Penalties

3.1.1 Inspections will not be performed on all robots. The honour system will be used, however, should a robot appear to or be found to be breaking a rule, that robot may be inspected to the full extent of the rules

3.1.2 Should a robot be found to be breaking any rules, that robot may be substituted for a stock balloon bot provided by the event organizers.

3.1.3 Robots who break game rules may be subject to having one or more balloons removed before the start of the next match.

3.1.4 Should a robot be found to be against the spirit of the division, that robot may be substituted for a stock balloon bot provided by the event organizers.

Related Links
2.2.3 Screw Links
[Home Depot Link](#)
[Rona link](#)
[Canadian Tire Link](#)
[Lowes Link](#)

2.4.4 Radio/Receiver links
[Stock Balloon Bot Controller -usb chargeable](#)
[Smaller Controller RC Car Type-2xAA Batteries](#)
[Fully featured RX, includes mixing](#)

2.4.5 ESC links
[Fingertech TinyESC](#)
[Endbots DESC, two esc's in one, with built in mixing.](#)
[Vex 29- inexpensive option if you don't mind modding it](#)

2.4.6 Battery Monitor links
[Amazon.ca DIY 2 wire voltmeter](#)
[Hobbyking voltmeter, no alarm](#)

Switch
[switches used in stock Balloon Bot. Ask Andrea nicely and she may give you one because she doesn't need 20.](#)