BunnyBots 2018 Rules

Box ‘Em Up

2.03 10/26/18

BunnyBots is an annual pre-season event designed by Catlin Gabel School FRC Team 1540, the Flaming Chickens. Its purpose is to give new FRC students and teams a chance to get familiar with robot construction before the build season starts while giving veterans the opportunity to try new things and lead. This game is more relaxed than the FRC competitions and all in good fun.

WHO’S INVITED

Team 1540 hosts a competition for PNW teams, Team 449 is hosting an inaugural event in the Chesapeake region. This is, however, designed to be an easy event to stage so teams in other regions are more than welcome to host one of their own. Let Dale Yocum (yocumd@catlin.edu) of Team 1540 know if you are interested in doing this so we can share logistical details.
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Revision History

This is a living document. The recent rule modifications or edits will be noted here

Version 1.0 - August 29, 2018
Initial release

Version 1.1 - 9/2/18
Ball setup rules changed. Balls are now randomly distributed across entire field by reset crew.

Version 1.2 - 9/3/18
Robots may not store a significant number of their opponent's balls within their robot. See #1 under Penalties and Red Cards.

Version 1.21 -9/4/18
Homemade bunnies may not contain fluids, hazardous materials, or be dangerous to handle.

Version 1.22 - 9/5/18
Clarification under setup that balls will be distributed roughly randomly and of equal color representation.

Version 1.23 - 9/6/18
Balls can be adjusted minimally during setup to make room for robot placement.

Version 2.0 - 9/14/18
Significant changes to autonomous. Robots who cross fully over the centerline during auto incur a 20 point penalty. If they come in contact with an opposing robot while fully on the opposing side the of the field during auto, they'll incur another 20 point penalty for each instance. The centerline will be marked with 4" wide white gaffers tape. This replaces the previous auto which rewarded crossing the centerline. This change allows robots to execute sophisticated autos without interference from opposing teams.

Also an update to Setup. Balls can be moved slightly to make space for a crate during setup but that new ball placement must not be strategic. The refs/field reset crew might readjust them if it appears that might be the case.

Version 2.01 - 9/17/18
Under the Starvation section of Penalties, robots may additionally not store a significant number of balls within a crate that is under its control for more than a short time.

Version 2.02 - 10/17/18
Under “Scoring” a clarification that balls need only be fully supported by a crate, not exclusively contained within it, to score. Previously that was stated both ways in that section.

Version 2.03 - 10/26/18
Just making it clear under #9 in Robot rules that robots must have .5” ground clearance AT ALL TIMES.

GAME SUMMARY

Bunnybots 2018, Box 'Em Up, is played on standard carpeted field with two alliances of 1-3 teams each depending on venue registration, Portland is 3 per side. On each half of the field are 15 plastic crates from FIRST's 2018 game "Power Up." The field is covered with 120 red racket balls and 120 blue racket balls placed randomly over the entire field. The goal is to "claim" as many crates as possible by having the obvious majority of the balls in the crates be of your alliance's color.

GAME DETAILS

The game is played on a 27' x 54' field covered with standard FRC carpet. Each alliance starts the game with 15 white plastic crates on their half of the field. These are the same crates as were used in the 2018 FRC game Power Up.
https://www.milkcratesdirect.com/set-of-6-square-milk-crates

Before a match each alliance arranges these crates on their half of the field (closest to their driver's station) as they see fit with the closed bottom parallel with the floor. They MAY NOT:

Be outside of the field boundaries.

Be in contact with the centerline.

Be in contact with a robot.

Contain a ball or bunny.

Matches are 2:30 minutes long with the first 15 seconds (max) being autonomous. At the end of the match 10 points are awarded to an alliance for a crate in contact with the carpet within the field boundaries judged by the referees as to obviously have the majority of their color balls fully supported within it.

Each alliance also starts the match with up to three stuffed bunnies. These bunnies have red or blue ribbons tied sportily around their necks. If, at the end of the match, one of these bunnies is fully supported by a crate (or its contents) the crate is claimed for the respective alliance, no matter the color of the balls held within it. If a crate supports a bunny from each alliance then the bunnies cancel each other out and the crate's ownership is determined by any balls it contains.

Balls (120 of each color) are regulation racquetballs in both red and blue (Penn Blue http://a.co/13y17Vc & Penn Red http://a.co/bopyiTp)

BUNNIES

Bunnies are stuffed animals of random sizes in the 8”-15” range. Teams can choose bunnies of their liking from a supply on their side of the field during setup. Teams can also bring bunnies of their own if they so choose (red and blue ribbon will be supplied.) Bunny bodies should be in the range of 8” - 15” exclusive of ears. Note there is no rule excluding modifying (or making your own) bunnies if you bring your own. If you make your own it must look like a bunny to the casual observer and have a body in the 8”-15” range. If you make your own bunny you must show it to the robot inspector. Bunnies must not contain fluids, hazardous materials, or be potentially dangerous when handled. There are no more than three bunnies for each alliance.

SETUP

The setup period lasts one minute as indicated by a timer on the screen. The field reset crew is responsible for making sure there are 15 crates on each side of the field, bunnies are in a pile for each alliance under their driver’s station tables, and the balls are randomly distributed on the carpet. They will make a reasonable effort to ensure there are roughly the same number of red and blue balls on each side of the field and each side has roughly the same number overall. This won’t be exact and sometimes conditions may favor one side or another.

All crates must be placed open side up at the beginning of the match by the alliances with their bottoms parallel with the carpet. They can't be upside down or on their side. They must be within the borders of the field and not in contact with a robot. They can be stacked. Balls can be moved slightly to make space for a crate but that new ball placement must not be strategic. The refs/field reset crew might re-adjust them if that might be the case.

Team may not add any other material to crates or modify them in any way.

A single ball of either color can be preloaded into each alliance robot if desired.

Balls may not be in contact with a robot at the beginning of a match with the exception of the optional single preloaded ball.

During setup teams can not reposition balls except to make room for their robot against the back wall. (Field reset staff will adjust those moved balls if it appears they are repositioned in a strategic way.) Incidental contact will occur during setup but if the referees determine teams are intentionally adjusting the location of balls they will be scolded, reprimanded, penalized and embarrassed as the referees see fit.

Field setup can be done by team members beyond the drive team.

If the setup period takes more than a minute the referees and the field reset crew will take over and will place the crates in a way of their choosing. In other words, have a plan with your alliance partners that you can execute quickly!

On occasion the ball count may vary slightly as they escape the confines of the field or get taken away accidentally by teams. We won't recount the balls before each match, only when there is a break in play. Also ball distribution will vary from match to match.

The bunnies (three per alliance max) can start the match in contact with (or fully in the possession of) a robot or the carpet. They may not start the match in contact with a crate. They need not be placed at all if the alliance has no need for them.

SCORING

Each alliance's score is calculated at the end of the match.

10 points are awarded for every crate contacting the carpet and supporting an obvious majority of an alliance's color balls unless the crate is fully supporting a bunny in which case the ten points goes to the alliance associated with that bunny.

The referees won't take the time to count the balls in a crate so if a crate has too many balls of both colors to tell at a glance which alliance has the majority, they may skip it and it won't score for either side.

Some portion of a crate must be in contact with the carpet in order to count. Stacking doesn't score, in other words.

Balls must be fully supported by a crate in order to count.

Autonomous points (see Autonomous section below.)

Teams considering ball starvation strategies should carefully consider how qualification points are earned. Depriving your opponents of the ability to score drastically affects your score. Also note Penalty and Red card rule #1.

AUTONOMOUS PERIOD

Robots begin the 15 second autonomous period anywhere touching the edge of the field border closest to their drivers and not in contact with a crate.

Robots earn 20 points for each crate they are able to load with either color ball (or balls). The ball or balls must be fully supported by the crate at the end of autonomous for this score to be recorded. Note: the red alliance could, for example, earn 20 points by putting a blue ball in a crate during auto. At the end of the match, however, that blue ball is just like any other and could result in the crate scoring 10 points for the blue alliance if it's the majority in that crate. Note that a single ball can also be preloaded into each robot if desired at the beginning of the match.

The auto score is action-based and stands no matter the ultimate fate of the crate at the end of the match.

Robots who cross fully over the centerline during auto incur a 20 point penalty. If they come in contact with an opposing robot while fully on the opposing side the of the field during auto, they'll incur another 20 point penalty for each instance. The centerline will be marked with 4" wide white gaffers tape. This is the only white tape on the field.

Robots are also free to take any other legal action during the autonomous period.

No human interaction is allowed during autonomous. Systems assisted by humans using laptop cameras, IR remote controls, voice, Xbox Kinect, etc. are forbidden and punishable by a red card.

While the nominal length of autonomous is 15 seconds the referees may signal an early end to it if it's clear no robot is doing anything useful. This extra time then goes into teleop. Be sure to alert the referees if your autonomous might be slow to reveal its ultimate awesomeness.

ROBOT RULES

All FRC robot rules (that aren't game specific) from 2018 apply with the following modifications:

1. Since the whole point of BunnyBots is to get new team members up to speed, robots should be built from scratch for the event, just like FRC. You can't use last year's FRC robot or BunnyBot with a few tweaks.

2. Because the goal of BunnyBots is to increase the skills of students, mentors are encouraged to take an advisory (and not direct fabrication) role when it comes to the robot's fabrication. Mentors should also encourage students to do as much of the design as they can.

3. There are no limits to the number of motors on a robot, but they must have been legal in FRC at some point. In addition you may use any 300, 500, or 700 series motor and any motor sold by AndyMark, VEXPro, Rev, or Banebots.

4. Bumpers are optional. If used, bumpers must be constructed generally along FRC techniques. Bumpers are not counted as part of your frame perimeter or weight. The bottom of the bumpers must be at least .5" off the ground and the top no more than 8.5" off the ground. Avoid blue or red bumpers if possible as teams may confuse that for your alliance color. Alliances are indicated by flags in BunnyBots, not bumpers.

5. Robots, excluding their bumpers, must not exceed 28" W x 38" L at the beginning of the match. There is no height limitation. After the match has begun they may extend outside of their initial perimeter as much as 24" total in any direction or directions. So, for example, a robot might extend a single 24" arm out one side but that would mean they couldn't be outside of their initial perimeter on any other side while that arm is deployed. Alternatively they might extend 12" out one side and 12" out another. That's also perfectly fine but no other extensions would be permitted while those appendages are deployed.

6. Robot designers should assume there will be small terrified bunnies laying around on the field plus hundreds of racket balls and should take care to shield wheels, chains, and gears in drive trains so as not to mutilate them or suck them up into their innards.

7. Robots may not intentionally detach pieces of themselves. Accidentally having parts fall off is fine.

8. The maximum weight of a robot, without its battery, is 120 lbs (excluding bumpers if used.)

9. **Robots must have at least .5" ground clearance at all times** to clear field irregularities, taped seams, as well as random robot parts. Fasteners count towards the .5". No, intakes can't momentarily go lower.

10. FIRST electrical rules don't apply. This allows you to use any control system you like, such as the cRIO controller, VEX controllers, RC controllers, infrared, roboRIO, etc. Use common sense and follow FIRST wiring guidelines when possible. Make sure your radio system doesn't interfere with 5Ghz FRC radios if you are using something different.

11. Robots using the FRC control system should include a robot signal light so the referees and teams will know when it is safe to approach.

12. Do not use anything that relies on normal 2.4 GHz WiFi 802.11b/g to control your robot as experience has shown that to be unreliable due to congestion. If you are using the FRC control system, be sure you are using the 5GHz WiFi band. Note: the Classmate laptop does NOT support the 5GHz band. Either use a laptop that has dual band N wireless or a separate dual band N network adapter. Note that all of this must be battery powered. While there will be AC power at the driver's stations, you'll want to be connected to your robot before arriving at the field. This is so teams can connect their robots and laptops while in queue, which dramatically speeds up matches. In the interest of time, we will not hold the match for you.

13. There is no limit to the equipment used in the driver station though it must all be battery powered and quick to set up.

14. There is no cost accounting for BunnyBots, but common sense would say you don't want to spend too much money for BunnyBot parts you can't use again.

15. Any part that was legal for any previous FRC competition may be used.

16. There is no requirement that parts used on your BunnyBot be available off the shelf. This allows you to use random parts you might have lying around the shop or that have been removed from other devices. The idea is for people to not spend too much money on this.

17. The power source for BunnyBots is a single FRC-legal 18Ah battery. Power sources integral to other electronic devices, such as cameras and co-processors, are allowed. That power source just can't be involved in driving motors.

18. Each robot must have a place to insert a flag that identifies their alliance color. The shaft for these flags (provided at the competition) is 5/16" in diameter with flag shafts about 3' high.

19. Each robot must display its team number in 4” or higher characters of a contrasting color on at least two opposing sides; more sides are preferable. Numbers don’t have to be on bumpers, but it’s an option. The robot will be announced in the form “Team 1234” by the announcer. If the robot has a name, it may be announced if it’s on the robot. If a given FRC team has more than one BunnyBot, they should be labeled 1234 followed by a single letter. 1234B, for example, could be announced as 1234 "Bravo" or 1234 "Bogus". It's up to you. Including your school’s name and sponsors on the robot would be good marketing and helps the emcee but is not required. The scoring system will be expecting the single letter suffix for teams with multiple robots, so don’t get creative with the numbering.

PENALTIES AND RED CARDS

1. STARVATION. Robots may not store or control a significant number of their opponents balls within their robot (or crate controlled by it) for more than a short time. “Significant” and “Short time” is in the eyes of the refs but essentially it means storing so many balls as to deprive your opponents of game pieces isn’t allowed. Yellow card or red card. This is not meant to exclude a robot quickly grasping a crate filled with an opponent's balls and dumping them out assuming it’s done promptly. It also doesn’t preclude accidently picking up a few of your opponents balls.

2. CENTERLINE CROSSING. Robots who cross fully over the centerline during auto incur a 20 point penalty. If they come in contact with an opposing robot while on the opposing side the of the field during auto, they’ll incur another 20 point penalty for each instance. The centerline will be marked with 4” wide white gaffers tape.

3. OUT OF BOUNDS. A 20 point penalty is assessed for a robot that goes out of bounds (over the 4x4s). You are considered out of bounds if any portion of your robot touches the floor beyond the 4x4s. Once a robot is out of bounds, it must be disabled, manually returned to the playing field, and re-enabled. Wise robot designers will make sure some portion of the robot or bumper contacts the 4x4s before its wheels do.

4. REMOVAL Robots may not intentionally remove balls or crates from the field. A 20 point penalty will be assessed for each incident. More if it seems warranted.

5. INCURSIONS. Intentional incursions into an opposing alliance’s robot’s initial frame perimeter will incur a 20 point penalty per incident. Intentional frame incursion with the obvious intent to cause harm to opposing robots will incur a red card.

6. PINNING. An alliance may not pin an opposing robot that is in contact with a field border, or another robot for more than 5 seconds. A robot will be considered pinned until the robots have separated by at least 6 feet. The pinning robots must then wait for at least 3 seconds before attempting to pin the same robot again. Violation: 20 points initially and 20 points for every five seconds thereafter.

7. UNGRACIOUS BEHAVIOR will not be tolerated. Penalties are up to the referees and can range from a warning to 20 point penalties to red cards. Aggressive game play isn't ungracious as long as it's within the spirit of the rules. Being a jerk...that's ungracious.

8. This BunnyBot game is a contact sport, and as such, there is no penalty for high-speed ramming. Robots should be designed robustly with this in mind. This is also why bumpers might be a good idea (though they aren't required.)

9. Teams should keep in mind that spectators will be standing close to the field. Robots employing strategies that might harm people will be disqualified.

10. If the opposing alliance performs an action that causes a team to violate the rules, no penalty will be assessed. This is up to the referees and is judged on a case-by-case basis.

11. Electronic communication with the drive team or those in the general area is not allowed when the match is underway. Warning followed by red card.

12. Red cards zero the score for the entire alliance.

RULE CHANGES

BunnyBots is intended as a fun way for teams to gain experience building robots before build season. The rules can't be as carefully tested as an official FIRST game. We don't always know how the game will play until we start to play it. The game design committee and referees reserve the right to tweak the rules as the fall season progresses as well as the day of the competition as we see how the matches play.

Teams that discover what they suspect is a game breaking strategy should bounce that off Dale Yocum (yocumd@catlin.edu) before devoting too much time to it. Those kind of oversights on the part of the game design committee could easily be plugged on the day of the competition. The goal is to maximize the enjoyment of everyone not reward the cleverness of one team.

QUEUES

When a team is ready to play, they get in the queue. Teams are on their honor that when they are in the queue, their robot is functional. Teams may not do more than trivial repairs to their robots while they are in the queue and can't use power tools. Of course, the more matches you play, the higher your qualification score (see qualification points below). Building a reliable robot is critical.

Teams will draw a colored Lego block from a box once they enter the queue. Red or blue blocks mean you are on that alliance next. Yellow means you sit out a round but will be guaranteed of playing in the next match. This is done to mix up the matches and not have the same teams playing one another over and over. There are three red, three blue and two yellow blocks in the box.

A robot is not in queue unless the robot, the driver's station, and at least two team members are present. You can’t save a space in line.

Each team will have a pit area near the arena. This is where robots go for most repairs. They are not in the queue while in the pit area nor will queue staff go looking for them there. It's the responsibility of the team to get in queue every time they are ready to play a match.

QUALIFICATION POINTS AND FINAL MATCHES

After playing a match teams earn qualifications points using the formulas below:

Winning Alliance Qualification Points = W + L/2
Loser Qualification Points = L
Tie Qualification Points= W

Where W is the winner’s score (or either robot’s score in a tie), L is the loser’s score. If L or W is negative, it will be rounded up to zero when determining qualification scores.

At 3:00pm or as soon as the closest match is concluded, the four robots with the highest accumulated qualification points become the alliance captains for the semifinals. If there’s a tie among the top four they will draw straws for their rank. They choose 1-3 teams each to play with them in the final matches depending on the venue (three in Portland.) In the four robot version, each alliance therefore has their own backup robot. Since there are four robots per alliance, one robot will sit out each match. The mix is up

to the alliance captain. Because there are backups on each alliance, there are no timeouts. Smaller venues will have different rules.

The team with the most qualification points picks first. The top four teams cannot pick one another nor can a n alliance captain from a school pick another robot from the same school. The pick order is 1-4, 4-1, 1-4. The alliances then play in typical FRC fashion; the number 1 alliance plays the number 4 alliance, 2 plays 3. The winners of each of those matchups play for the winner and finalist trophies.