BunnyBots 2025

CARROT CHAOS

Version 1.0 - 9/1/2025

BunnyBots is an annual robotics pre-season event originally conceived by Catlin Gabel School FRC team 1540, the Flaming Chickens. Its purpose is to give new FRC students and teams a chance to familiarize 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 official FRC competitions and all in good fun.

WHO'S INVITED

Catlin Gabel hosts a competition in Portland, Oregon, and team 3218 hosts a competition in Bonney Lake, Washington. 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. Contact us at robotics@catlin.edu if you are interested in doing this so we can share logistical details.

EVENT INFORMATION

For registration and venue details, such as team capacity, maps, schedule, spectator information, webcasts, communicable disease protocols, and more, please refer to the event-specific sites below:

- Oregon BunnyBots (Portland, OR): team1540.org/bunnybots
- Washington BunnyBots (Bonney Lake, WA): frc3218.org/bunnybots

If you came here for Blair BunnyBots, the Chesapeake BunnyBots hosted by the Blair Robot Project FRC 449 in Maryland, you can find details here: https://robot.mbhs.edu/bunnybots

ACKNOWLEDGEMENT

The BunnyBots 2025 game was designed by the following committee:

- Dale Yocum, 1540 and 6665
- Jason and April Vander Hoek, 3218
- Kevin Forbes, 1540 and 1844
- Kobe Cong, 1540 and 1844
- Lissette Wilhelm, 4512 and 4911

Special thanks to 1540 alumni Jack Sturman and Ryan Turner for early development and editing.

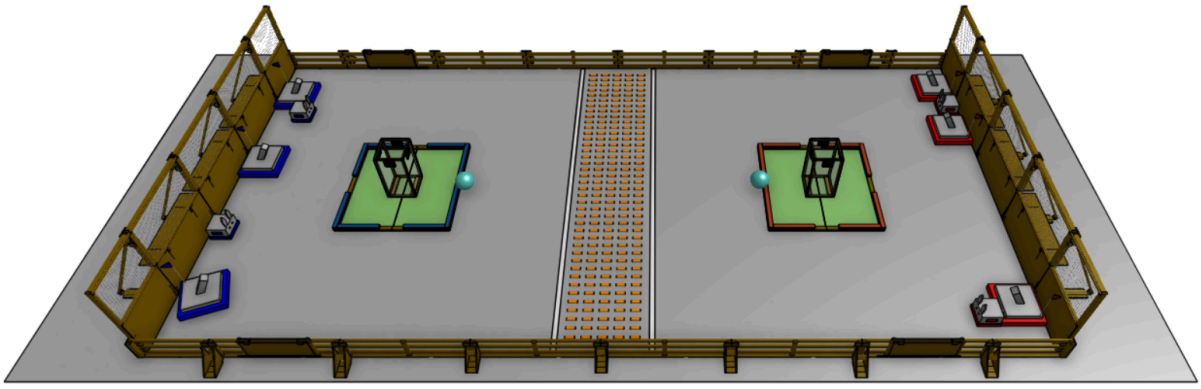
REVISION HISTORY

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

Ver	Date	Description
1.0	9/1/2025	Initial release.

GAME SUMMARY

Carrot Chaos is played by two alliances of 3 ROBOTS each on an indoor FRC-style carpeted field measuring roughly 27 ft. by 54 ft.



Matches consist of a 15-second Autonomous period followed by a 2-minute, 15-second Teleoperated period. Red and blue alliances, each consisting of 3 FRC-style ROBOTS and up to 2 BUNNIES (optionally FTC-sized robots), collect CARROTS and shoot them in the FEEDER STATION, the PETTING ZOO, or HIT opposing ROBOTS to score points. In the last seconds of the match, both alliances can earn a bonus by placing both CABBAGES in the CARROT PATCH.

GAME-BREAKING STRATEGIES

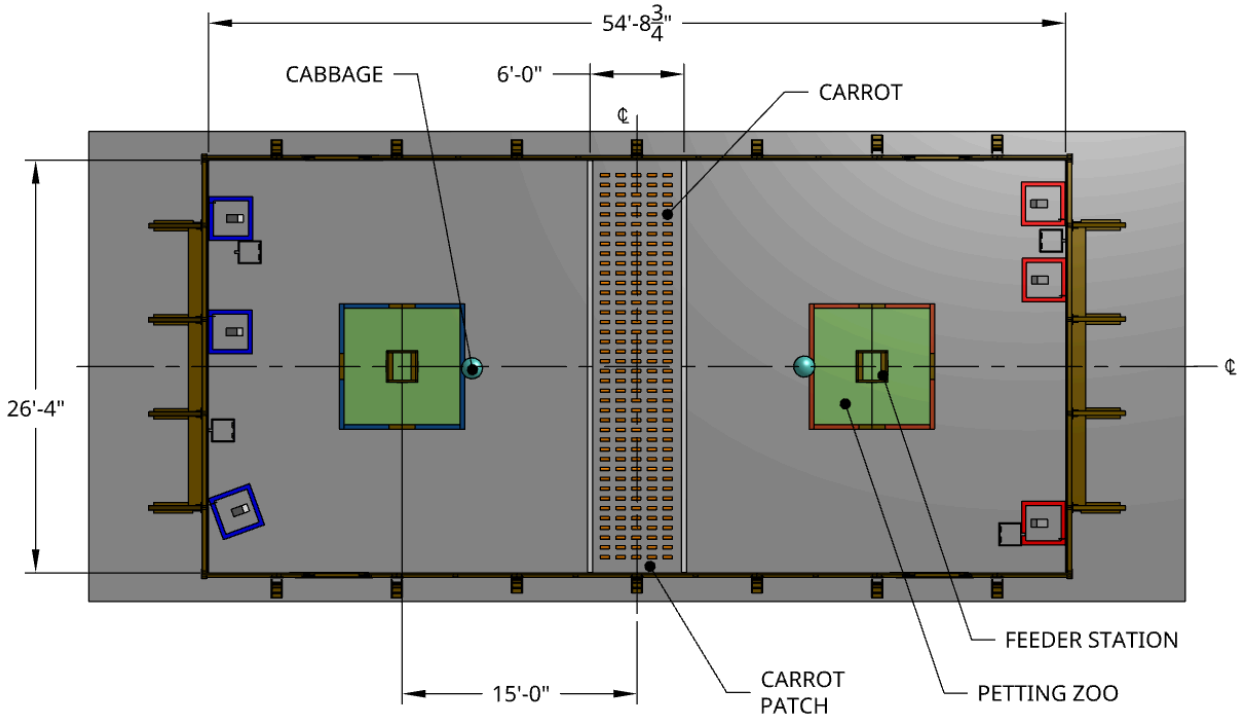
We've done our best with these rules to catch any game-breaking strategies, but if you think you've found one, please confidentially email robotics@catlin.edu for a ruling. We want this to be a fun event for everyone, not an event that celebrates the cleverness and lawyer instincts of one team. We reserve the right to plug any one of these holes in the game on game day as they develop… better to get a ruling in advance!

Q&A

If you want to ask your question in a place where everyone will see the clarification, do so on the official Chief Delphi Q&A thread here. If it needs to remain confidential, email robotics@catlin.edu.

GAME DETAILS

FIELD LAYOUT



Carrot Chaos is played on an FRC-style carpeted field measuring approximately 27ft by 54ft. The field is populated with:

- 2 PETTING ZOOS
- 2 FEEDING STATIONS
- 2 CABBAGES
- 150-200 CARROTS

A CARROT PATCH is marked by 2 white tape lines located mid-field. This zone is where all CARROTS, aside from preloaded ones, will start the game and where the CABBAGES must reside for the end bonus. Drive teams are located on the same side as their PETTING ZOO, with blue and red alliance zones flanking the central CARROT PATCH.

CAD/DRAWINGS

- OnShape model
- STEP model and field drawings

GAME ELEMENTS

CARROTS

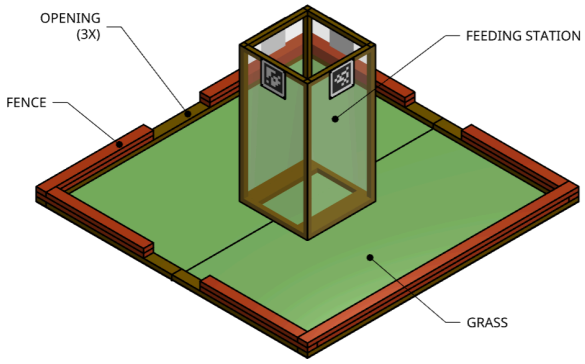
CARROTS are the main game element of *Carrot Chaos*. These are 7”-7.25” long, orange, hollow pool noodles with a nominal OD of 2.5” and ID of 1.0”. There are between 150 and 200 on the field at any time. ROBOTs may CONTROL no more than 5 CARROTS at a time.

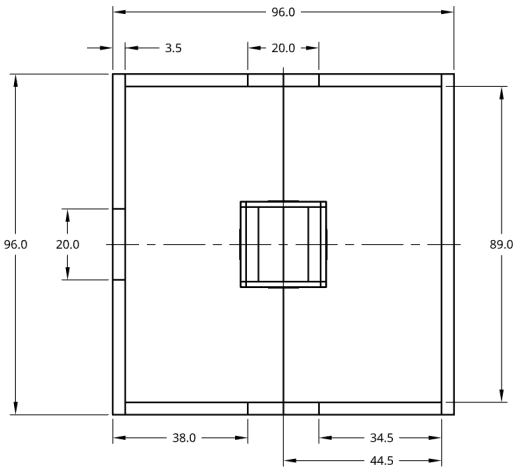
CABBAGES

The 2 CABBAGES are blue-green kickballs identical to Algae from the 2025 FRC game Reefscape (crosshatch edition). The CABBAGES will be inflated to a diameter of approximately 16”. Twenty points will be awarded to both alliances if both CABBAGES are placed in the CARROT PATCH at the end of the match.

PETTING ZOO

The PETTING ZOO is the primary scoring location in *Carrot Chaos*. Each PETTING ZOO consists of a FENCE (boundary), GRASS (painted floor), and a FEEDING STATION. The FENCE is constructed with three 2x4s stacked on top of each other, approximately 4.5” tall, to form an 8’ x 8’ boundary box around the GRASS and FEEDING STATION. Three sides of the FENCE have a 20” wide gap for BUNNIES to move in and out of the PETTING ZOO. This gap consists of a single, flat 2x4. The GRASS bottom is 0.125” hardboard painted green. There is no actual grass to be found here. The two halves of the PETTING ZOO are hinged to ease transportation and fit through doorways. See the field drawings for further detail.



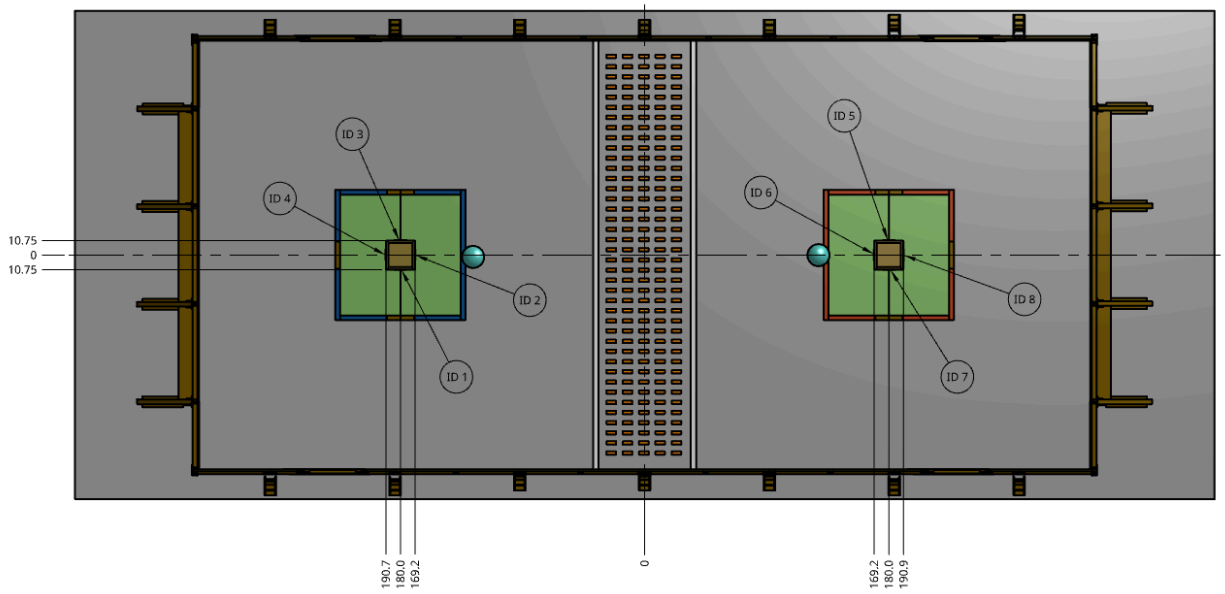


FEEDING STATION

The FEEDING STATION is a wooden and polycarbonate structure located in the center of the PETTING ZOO, firmly attached to the GRASS. The FEEDING STATION is a 24" W x 24" L x 48" H off the GRASS. CARROTS are scored through the open top. Four AprilTags are mounted to each face of the FEEDING STATION for alignment and targeting. See the APRILTAGS section below for specific ID locations.

APRILTAGS

AprilTags are square targets located on the FEEDER STATIONS, which aid in ROBOT localization (determining where you are) or targeting.

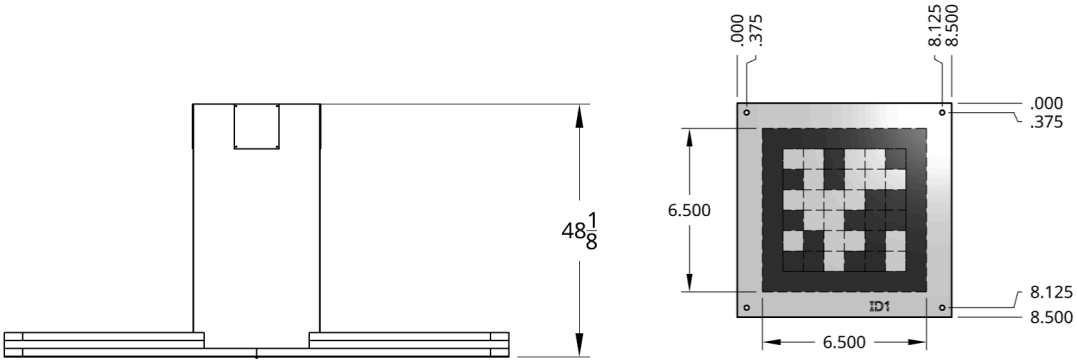


All markers are from the 36h11 tag family, IDs 1-8. The outer dimension of the black square measures 6.5in per side. Tags are placed in the following locations:

- 1 through 4 are affixed to the blue FEEDER STATION
- 5 through 8 are affixed to the red FEEDER STATION

Tags are mounted at the top of the PETTING ZOO, with the top of the tag measuring 48” from the surface of the GRASS. See the CAD/DRAWINGS for further detail. A PDF containing all 8 tags can be found here. Be sure to print on Letter at 100% Scale (or Actual Size) and verify the black outline of the tag measures 6.5” across.

> **NOTE:** 2025 FRC teams can receive a free vinyl sticker pack here using virtual KOP voucher code.



BUNNIES (MINIBOTS)

BUNNIES *may* be auxiliary teleoperated robots similar to a FTC robot in size. Two BUNNIES may be fielded by an alliance and are operated separately during the match. If you choose to field a BUNNY (minibot), it must have the vague appearance of a bunny. You may opt instead to field a classic, non-mechanical stuffed BUNNY, and we will have a selection of those to choose from at the event.

BUNNIES start the match in contact with one of their alliance’s ROBOTS or the back wall. They may be teleoperated during the autonomous portion of the match and they are free to manipulate CARROTS and CABBAGES as they like. Autonomous period scoring on the part of BUNNIES counts the same as autonomous scoring by ROBOTS.

See BUNNY RULES below for specific construction rules regarding BUNNIES.

FIELD SETUP

All ROBOTS must be touching the back border of their alliance zone at the start of the match. BUNNIES must be in contact with one of the ROBOTS of their alliance or the back wall. 150-200 CARROTS are distributed randomly within the CARROT PATCH while the CABBAGES are placed just outside of the PETTING ZOO centered on the side wall closest to the CARROT PATCH.

ROBOTs may start pre-loaded with up to 3 CARROTS. BUNNIES may start with 1 pre-loaded CARROT.

AUTO PERIOD

The first 15-seconds of the match is the AUTO period. ROBOTS attempt to place CARROTS in their PETTING ZOO, either in the FEEDER STATION or on the GRASS, without human control using pre-programmed instructions. During AUTO, CARROTS in the FEEDER STATION are worth 15 points each and CARROTS in the PETTING ZOO are worth 2 points each. While ROBOTS must be autonomous during AUTO, BUNNIES may be teleoperated. ROBOTs and BUNNIES can enter the CARROT PATCH, but no part of them (including bumpers) may cross the CARROT PATCH line on the opposite side of the field. Contact within the CARROT PATCH is allowed. ROBOTS partially within the CARROT PATCH at the end of AUTO earn an additional 5 points.

TELEOP PERIOD

During the teleoperated period, humans control ROBOTS and BUNNIES (as needed) in order to place CARROTS in the FEEDER STATION or PETTING ZOO.

If a ROBOT is HIT with an airborne CARROT, the opposing alliance receives 5 points. Hitting ROBOTs is rate-limited to one HIT every 2 seconds, and a HIT only counts if 1) the impacted ROBOT is the first object the CARROT touches after leaving the firing ROBOT or BUNNY, and 2) the CARROT initially touches the ROBOT, not its bumper. As launched CARROTS lodging themselves on ROBOTS may be common, CARROTS that appear to the refs to be stuck to a ROBOT will not count toward their CONTROL limit.

At the end of the match, any BUNNY within the alliance's PETTING ZOO is worth 10 points.

SCORING SUMMARY

<u>Autonomous Period</u>

- **15 pts** for each CARROT inside or fully supported by their alliance's FEEDER STATION
- **2 pts** for each CARROT fully contained within the vertical projection of their alliance's GRASS
- **5 pts** for each ROBOT partially inside the CARROT PATCH at the end of AUTO.

<u>Teleop Period</u>

- **10 pts** for each CARROT inside or fully supported by their alliance's FEEDER STATION
- **5 pts** for each CARROT HIT on an opposing ROBOT
- **1 pt** for each CARROT fully contained within the vertical projection of their alliance's GRASS
- **10 pts** for each BUNNY (regardless of alliance) in alliance's PETTING ZOO at the end of the match
- **20 pts** if both CABBAGES are fully inside the CARROT PATCH and not contacting a ROBOT or BUNNY 5 seconds after the match

ROBOT RULES

*Evergreen FRC rules from 2025 generally apply (those have **bold green** titles in the manual) with the following additions/exceptions:*

R1. The maximum weight of the ROBOT excluding batteries and bumpers is 115 lbs.

R2. ROBOTS, excluding bumpers, must not exceed 120" in frame perimeter at the beginning of the match. After the match has begun, they may expand outside their perimeter a maximum of 12" on all sides.
NOTE: this is measured with a fabric tape measure around the widest point of the frame, usually where the bumpers attach.

R3. 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.

R4. ROBOT height, as measured when resting upright on a flat floor, may not exceed 36" tall at any point in the match. The flag is excluded from this limit.

R5. Due to the nature of the game pieces this year, bumpers are **required**!

R5.1. Bumpers must be constructed generally along FRC techniques and 2025 rules. Avoid blue or red bumpers as teams may confuse that for your alliance color. Alliances are indicated by flags, not bumpers.

R5.2. The bottom of the bumpers must be between 0.5" and 1" off the ground to discourage CARROTS from getting lodged under your ROBOT.

R5.3. Bumpers may have cutouts, but must adhere to the 6" minimum corner coverage rule from the 2023 FRC manual (R401, page 83).

R6. ROBOTS must have at least 0.5" of ground clearance at all times to avoid damaging the carpet seams. This includes bolt heads, chains, etc. It also includes intakes in their lowered position.

R7. No vision trickery! ROBOTS will not be fielded if they have anything resembling AprilTags or game pieces externally visible.

R8. There is no cost accounting for BunnyBots, but common sense would say you don't want to spend too much money on BunnyBots parts you can't use again.

R9. Any part that was legal for any previous FRC competition may be used.

R10. 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.

R11. The ROBOT power source for BunnyBots is a single FRC-legal 18Ah sealed lead-acid (SLA) 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.
Pro tip: Don't assume your batteries from previous years are still good. Our batteries don't appreciate being allowed to sit fully discharged for months. Test them under heavy load first!

R12. 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 a given FRC team has more than one ROBOT, 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 team or 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.

R13. No limits on types of motors, but they must be driven by no more than the 12v battery through a single 40a breaker.

R14. No limits on pneumatics aside from the 120psi and 60psi limits, relief valve, and digital/analog switch.

R15. No manipulation of CARROTS using blown air. That means no leaf blowers or similar technology are allowed on ROBOTS. Suction/vacuum devices are fine.

BUNNY (MINIBOT) RULES

BUNNIES generally follow the same rules and are subject to the same penalties as their larger counterparts, with the following exceptions:

B1. Schools may not provide BUNNIES to other schools unless they are inoperable (classic stuffed BUNNY, or a disabled mechanical BUNNY). If your school has multiple teams and BUNNIES, they may be used interchangeably.

B2. While only 2 BUNNIES may be fielded by an alliance in a given match, they may be provided by any team on the alliance, including the fourth back-up team not playing during the elimination portion of the tournament.

B3. BUNNIES may not exceed 18"W x 18"L x 18"H at any time in the match. This includes optional bumpers!

B4. BUNNIES must have the vague appearance of a rabbit this year. That is, to the casual observer, they must have distinguishable, rabbit features clearly visible from 20 feet away. Any portion of these features outside the 18" size limit must be non-functional. *Function* in this case might include blocking access to field elements, so excessively large decorations may not pass inspection.

- Those required elements are ears, eyes, and a tail.
- These elements may extend beyond the size limit: decorative elements may extend up no more than 24" above the ground, and cannot extend more than 4" from the ROBOT perimeter.
- Decorations cannot pose an entanglement hazard.
- Fur is not required but can be included if desired.
- Decorations need not be three dimensional. Creative bunnyesque artwork on the sides is allowed.

B5. BUNNIES must have a 2.5in x 4.5in red or blue panel on two opposing sides with their team number clearly visible from 20 feet away, similar in size to VRC license plates. The panel must be changeable to the given alliance color, and their team number must match a corresponding ROBOT of the alliance. Velcro, zip ties, tape, or magnets would be a natural attachment choice here but the technology is up to you.

B6. BUNNIES must be powered by no more than a nominal 12v power source. A FRC battery is allowed but is really too big for a BUNNY, consider using a smaller SLA or 12v power tool battery with an adapter. This is an example for the Milwaukee series.

B7. BUNNIES may not fly under their own power. RC helicopters would be fun, but.. No!

B8. BUNNIES cannot be simple RC cars - they must be primarily constructed by teams.

B9. There are no material limitations for BUNNIES. Consider that they likely will be subject to more impact forces than an FTC ROBOT.

B10. While there are no material restrictions, BUNNIES must still be safe to bystanders, the gym floor, and other ROBOTS in the opinions of the inspectors and referees. Be conservative here!

B11. Any motor can be used on a BUNNY so long as it is powered by 12v and is breakered at 40a or less.

B12. Be warned that the radio interference in the gym is heavy, especially in the 2.4GHz WiFi band. Also do NOT design anything to run in the 5GHz or 6GHz bands where our ROBOTs are! We recommend finding something either in the sub-GHz range or at 2.4GHz with a spread-spectrum technique such as frequency hopping.
NOTE: We are aiming to test RadioLink controllers/receivers at an off-season FRC event. Look for results in the official Q&A.

B13. Minibots do not *require* bumpers, but inspectors will be looking for sharp edges.

B14. No manipulation of CARROTS using blown air. That means no leaf blowers or similar technology are allowed on BUNNIES. Suction/vacuum devices are fine.

GAME RULES

Unless otherwise noted, penalties are added to the score of the opposing alliance.
Yellow cards are warnings. Two yellow cards result in a red card.
Red cards result in no points awarded to the offending team during qualifications. In an elimination tournament, a red card reduces the offending alliance's score to 0.

G1. Any ROBOT or BUNNY that goes out of bounds or becomes high-centered on the field perimeter must be E-stopped (permanently disabled) for the remainder of the match.
G2. ROBOTS and BUNNIES may not intentionally damage game pieces! 10 pt penalty.
G3. ROBOTS and BUNNIES may not intentionally cause game pieces to exit the field. 10 pt penalty.
G4. ROBOTS and BUNNIES may not descore CARROTS from the opposing alliance's FEEDING STATION. 10 pt penalty per game piece.
G5. ROBOTS and BUNNIES may not cross the far CARROT PATCH line during AUTO, even partially. 10 pt penalty, red card if it impacts an opposing ROBOT.
G6. ROBOTS may not grapple on, climb, or otherwise extend beyond the vertical projection of the FENCE of either alliance's PETTING ZOO. Penalty for consequential incursions determined by the referees. Red card for intentional or repeated violations.
G7. While BUNNIES may enter the PETTING ZOO, they may not grapple or attach to the FEEDING STATION or the FENCE.
G8. ROBOTS may not CONTROL more than 5 CARROTS. 10 pt penalty per CARROT over 5. **NOTE**: CARROTS that appear to the refs to be stuck to a ROBOT will not count toward their CONTROL limit.
G9. ROBOTS only! Humans may not score game pieces. 10 pt penalty per instance, more at the referees discretion. There are no human players in this game.
G10. Incidental frame incursion is not penalized. Drive train vertically projected frame incursion which affects the ability of the impaled ROBOT to play the game through damage, entanglement, or significant delay will result in a penalty or red card for the team responsible. The referees determine the penalty on a case-by-case basis.
G11. ROBOTS and minibots may not intentionally detach pieces of themselves. Accidentally having parts fall off is fine. Red card.
G12. BunnyBots is a contact sport, and as such, there is no penalty for high-speed ramming. ROBOTs and minibots should be designed robustly with this in mind.
G13. Ungracious behavior will not be tolerated. Penalties are up to the referees and can range from a warning to 10 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.
G14. Teams must take extreme care not to grind away at the carpet and into the expensive gym floor beneath it, especially during pushing activities. Red card and, if the floor itself is damaged, disqualification from the remainder of the event.
G15. Teams should keep in mind that spectators will be standing close to the field. ROBOTS or BUNNIES employing strategies that might harm people will be disqualified.

G16. 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.

G17. An alliance may not pin an opposing ROBOT that is in contact with a field border, field element, 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: 5 points initially and 5 points for every five seconds thereafter.

G18. Referees can modify penalties on a case-by-case basis as needed.

G19. Humans can not reach or step over the field boundary during the match.

G20. Unlike stuffed BUNNIES, mechanical BUNNIES cannot be launched! Red card.

G21. There are no restrictions on how a ROBOT can interact with a BUNNY (besides not being launched per above). BUNNIES can not intentionally damage ROBOTs or other BUNNIES. Penalties are up to the referees depending on the circumstance.

G22. CABBAGE scores are assessed 5 seconds after the match ends.

TOURNAMENT RULES

NO WIFI

To avoid interfering with remote controlled BUNNIES, the WiFi will be shut off in the venue. You may not set up WiFi hotspots for the same reason. You are welcome to tether to cell phones and the like over a wire. RF congestion has been a big problem in prior years, sorry for the inconvenience.

QUALIFICATION

Teams earn points from each qualification match according to the formulas below:

Winning Alliance Qualification Points = W + L/2
Loser Qualification Points = L
Tie Qualification Points = T + T/4

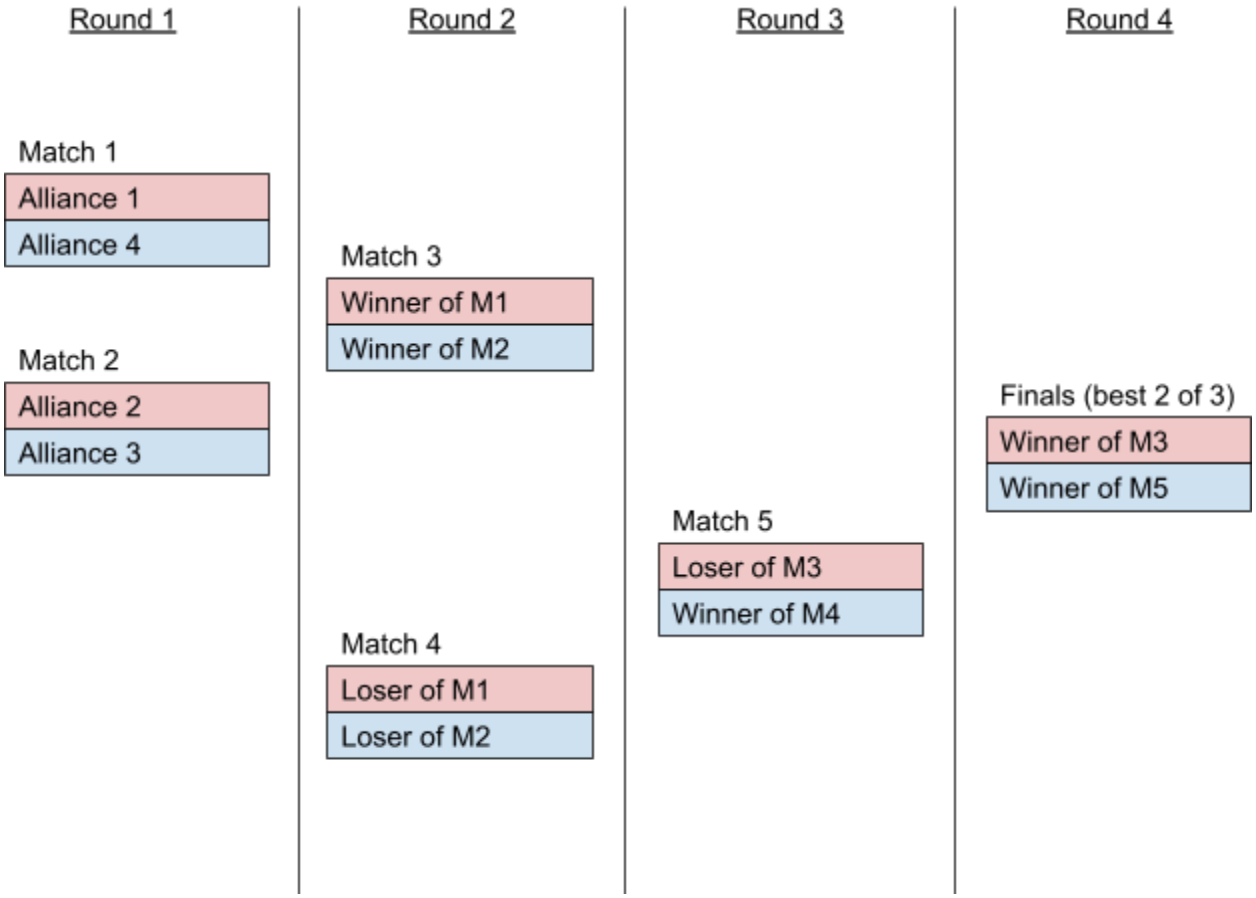
Where W is the winner's score, L is the loser's score, and T is either team's score in the event of a tie.

Unlike an FRC event, BunnyBots does not run a qualification match schedule. Teams enter a queue and play, more or less, on a first-come first-served basis. Creating a ROBOT that is reliable and can play frequently will be highly beneficial for this game.

At the conclusion of qualification matches (see event schedule, approx. 3:00pm), the four ROBOTS with the highest accumulated qualification points become the alliance captains for the semifinals. They choose three teams each to play with them in the final

double-elimination playoff matches. Each alliance therefore has their own backup ROBOT. Since there is one more ROBOT per alliance than can be fielded, one ROBOT will sit out each match. The mix is up to the alliance captain and can change from match to match. Any two bunnies from the four team alliance can play in any match. Because there are backups for each alliance, there are no timeouts. If we don't have enough operational ROBOTS at alliance selection for each alliance to have four, we will have three team alliances with the remaining ROBOTs on standby identical to how FRC works.

The team with the most qualification points picks first. The top four teams cannot pick one another nor can a team captain from a school pick another ROBOT from the same school in the first round. The pick order is 1-4, 4-1, 1-4. The alliances then play in a double-elimination tournament (bracket shown below). In the finals, the first alliance to win 2 matches is declared the event winner.



Double-elimination tournament bracket.

GLOSSARY

AUTO The first 15 seconds of a match wherein ROBOTS are driving under pre-programmed instructions without human control. BUNNIES are allowed to drive teleoperated during this time.

BUNNY Either an electromechanical device that is no larger than 18”x18”x18” *or* a stuffed bunny provided by the teams or the venue.

CABBAGE Approximately 16” playground ball identical to the 2025 algae.

CARROT 7”-7.25” orange hollow 2.5” pool noodle segment. 150-200 of these are on the field at the beginning of the match.

CARROT PATCH Central area of the field 6’ wide where CARROTS start and where CABBAGES aspire to end for additional points.

CONTROL If a game piece moves forward, backwards, left and right with the ROBOT as it moves it is in CONTROL of the piece. Clever mechanical or software systems that attempt to get around this rule are not allowed.

FEEDING STATION Scoring structure in the middle of the PETTING ZOO, 48” tall x 24” x 24”. CARROTS can be scored here for points.

FENCE Border around the PETTING ZOO built with 2x4s.

FRC FIRST Robotics Competition

FTC FIRST Tech Challenge

GRASS The flat surface within the PETTING ZOO. It’s painted green but is otherwise smooth and requires no mowing.

HIT ROBOTS and BUNNIES can optionally earn points by shooting CARROTS at other ROBOTS. If the airborne CARROT hits a ROBOT above the bumper line without hitting anything else first the opposing alliance earns points.

PETTING ZOO The entire 8’ x 8’ scoring area in the middle of each alliance's side of the field. The FENCE, GRASS and the FEEDING STATION are all within the PETTING ZOO.

ROBOT A FRC class electromechanical device under 115lbs excluding bumpers and battery, less than 120” in perimeter, and less than 36” tall.

TELEOP The last 2-minute 15-second period of a match wherein human drivers take control of ROBOTS and minibot BUNNIES.