

2026-2027 *FIRST®* Tech Challenge

Competition Manual

BIOBUZZ™ Presented by RTX – Pre-Season V0

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1 Introduction

1.1 About FIRST®

FIRST® (For Inspiration and Recognition of Science and Technology) was founded to inspire young people’s interest in science and technology. Since its founding, FIRST has grown to be the world’s leading youth-serving nonprofit advancing STEM education and has become a worldwide movement: inspiring innovation, building confidence, and preparing young people for the future.

Our programs have a [proven and lasting impact](#) on learning, interest, and skill-building inside and outside of the classroom, and are only possible because of the FIRST volunteers, educators, mentors, and sponsors who tirelessly support our students as they build their future.

Each year participants experience firsthand the inspiration that comes from joining a global community of people with the same mission, and the bonding that comes from working to solve the same shared challenge. FIRST students will go on a journey of discovery that merges the rigor of STEM learning with the fun and excitement of traditional sports.

Please visit [the FIRST website](#) for more information about FIRST and its programs.

Purpose	Vision	Mission
FIRST exists to prepare the young people of today for the world of tomorrow.	To transform our culture by creating a world where science and technology are celebrated and where young people dream of becoming science and technology leaders.	The mission of FIRST is to provide life-changing robotics programs that give young people the skills, confidence, and resilience to build a better world.

1.2 FIRST® Tech Challenge

FIRST provides a wide spectrum of robotics experiences designed to meet students where they’re at: engaging and exciting students at every level, whatever their circumstances. What makes FIRST® Tech Challenge special among the family of exceptional FIRST programs?

Scale, Skill Level, Complexity, Flexibility, & Student Ownership

- **Scale.** With a classroom sized field and classroom safe robots - FIRST Tech Challenge can be implemented anywhere students want to gather. The ability to succeed with smaller teams provides a social structure in which students on a team can either excel in all roles or specialize in a single role.
- **Skill Level.** FIRST Tech Challenge provides challenges for students looking for championship play with advancement opportunities, and for those just now learning to play in their own classroom. It provides a scaffolded experience for growth that does not require experts to drive the experience, only caring adults to enable self-exploration.

- **Complexity.** Robots can be fully built from a basic Starter Kit, fully fabricated from custom designs, or built in a way that mixes both approaches. There are opportunities for advanced manufacturing, but non-classroom tools are optional, not required.
- **Flexibility.** With an extended season kicking off in September and running through March with capstone events held April through July, teams can adjust their season to incorporate intense peaks spread out between recovery periods or other school activities while still providing an improvement driven, iterative build experience.
- **Student Ownership.** Smaller teams competing in an extended season with classroom safe robots enable students to learn independently through self-exploration and feel ownership over more of their team's journey.

And of course, *FIRST* Tech Challenge provides all the opportunities for community, collaboration, outreach, and growth found across the *FIRST* programs.

Please visit the [FIRST Tech Challenge](https://firstinspires.org/robotics/ftc) webpages for more details.

1.3 *FIRST* Ethos and Core Values

1.3.1 *Gracious Professionalism*®

Gracious Professionalism® is part of the ethos of *FIRST*. It's a way of doing things that encourages high-quality work, emphasizes the value of others, and respects individuals and the community.

Through *Gracious Professionalism*, fierce competition and mutual gain coexist. Participants compete intensely while treating each other with respect and empathy. There is no trash talking, but there are also no disingenuous platitudes. Knowledge, competition, integrity, and empathy blend comfortably.

Ultimately, *Gracious Professionalism* is part of pursuing a meaningful life. When professionals use knowledge in a gracious manner and individuals act with integrity and sensitivity, everyone wins and society benefits.

The term was coined by Dr. Woodie Flowers, (1943 - 2019) executive advisory board chair emeritus, distinguished advisor to *FIRST*, and father of competition robotics.

Figure 1-1: Dr. Woodie Flowers, Father of Competition Robotics, *Gracious Professionalism* advocate and exemplar



"The FIRST spirit encourages doing high-quality, well-informed work in a manner that leaves everyone feeling valued. Gracious Professionalism seems to be a good descriptor for part of the ethos of FIRST. It is part of what makes FIRST different and wonderful."

- Dr. Woodie Flowers

Gracious Professionalism is a gift from Woodie, and all of us have now become its stewards. Woodie often said that it is not critical that we define *Gracious Professionalism*, but Woodie would continue to say it is very important to talk about *Gracious Professionalism*.

Gracious Professionalism can be difficult to understand because the pursuit of it should be different for everyone. When talking about *Gracious Professionalism*, it is quickly evident that it has come to symbolize all that is good inside all of us and all that is good when we interact with one another and our world.

It is an aspirational ideal to always strive towards, not a goal to be achieved, and not a method of measuring someone. For that reason, you can never say someone “is” or “is not” being Graciously Professional, but instead they might embody some of its aspects.

Whenever something is being discussed as “not GP,” it’s more appropriate to talk about specific behaviors that need improvement. Was the person disrespectful? Impolite? Dishonest?

Being Graciously Professional is more than any of its individual attributes.

Some possible meanings of *Gracious Professionalism* include:

- gracious attitudes and behaviors that are win-win,
- gracious folks respect others and let that respect show in their actions,
- professionals possess special knowledge and are trusted by society to use that knowledge responsibly, and
- gracious professionals make a valued contribution in a manner pleasing to others and to themselves.

In the context of *FIRST*, this means that all teams and participants should:

- learn to be strong competitors but also treat one another with respect and kindness in the process, and
- avoid leaving anyone feeling as if they are excluded or unappreciated.

Successful teams spend time going over this concept and reinforcing it regularly. Team members should work together to identify real-life examples of *Gracious Professionalism* in practice. Routinely highlight opportunities to display aspects of *Gracious Professionalism* to each other at events and encourage every team member to suggest ways in which they can embody aspects of this quality themselves.

Figure 1-2: Words which might apply to individuals embodying Gracious Professionalism.
 What words would you put in your word cloud?



1.3.2 **Coopertition®**

Coopertition® is displaying unqualified kindness and respect in the face of fierce competition. It is founded on the concept and philosophy that teams can cooperate and help one another even when they're directly competing against each other. The alliance structure of *FIRST* Tech Challenge inherently showcases *Coopertition®* - a team's opponent in one match may be their alliance partner in the next. In this sense, every team benefits when everyone plays their best.

1.3.3 **Core Values**

The *FIRST* Core Values are fundamental to *FIRST* and unique to our programs. They emphasize friendly sportsmanship, respect for the contributions of others, teamwork, learning, and community involvement. Our community expresses the *FIRST* philosophies of *Gracious Professionalism®* and *Coopertition®* through the *FIRST* Core Values.

- **Discovery:** We explore new skills and ideas.
- **Innovation:** We use creativity and persistence to solve problems.
- **Impact:** We apply what we learn to improve our world.
- **Inclusion:** We respect each other and embrace our differences.
- **Teamwork:** We are stronger when we work together.
- **Fun:** We enjoy and celebrate what we do!

1.3.4 **Why Embrace the *FIRST* Ethos and *Gracious Professionalism*?**

Some people new to *FIRST* and our values may think: *"This doesn't apply to me. I don't see this in the world around me. Why do I need to act this way?"*

To build a better world, pursue a more meaningful life, and celebrate all that makes us uniquely human.

Build a Better World

Our mission is to “give young people the skills, confidence, and resilience to build a better world.” What kind of world do we want that to be? What kind of culture do we want to be a part of?

We at *FIRST* believe that a world where everyone strives to embody the *FIRST* values and demonstrate *Gracious Professionalism* in their actions would be a pretty great world to live in.

Pursue a Meaningful Life

And, these actions make people feel good! We know, being an effective contributor is a huge part of feeling good about yourself. These behaviors will have a positive impact in all areas of your life.

Working hard can be fun and profoundly satisfying, and achieving this rational self-esteem is a big part of long-term happiness. You may start these behaviors because you’re trying to build a better world, but you’ll also find yourself building a more meaningful life.

Still skeptical? Try it in *FIRST*.

In many ways, *FIRST* is practice for the real world; we have the chance to shape the *FIRST* community however we want. We’re giving students the opportunity to make Graciously Professional choices when it’s easy - so they’ll see how it feels, learn how it works, and be prepared to do the same when it’s *not* as easy.

We get what we celebrate: so, let’s celebrate hard work, integrity, fair play, sportsmanship, empathy, and all the things which make us uniquely human.

1.4 The Spirit of the Competition

1.4.1 A Note from the *FIRST* Staff

Welcome to BIOBUZZ presented by RTX! We are excited to begin the 2026-2027 *FIRST* Tech Challenge Season. We'd like to describe some changes that are happening, some things we hope will never change, and some challenges we're facing due to the success and growth of the program. *FIRST* Tech Challenge serves participants with a wide variety of backgrounds, ages, and skill levels. Our program is both a capstone experience and a foundational experience. The highest skilled competitors in *FIRST* Tech Challenge are creating robots with technical achievements that impress even industry experts and perform tasks most people don't think are possible. At the same time, *FIRST* Tech Challenge provides an on-ramp for students and teams who are experiencing a robotics-sport for their first time. Our games are played at levels which would rival the excitement and spectacle of any sporting event, but they are also played in classrooms, garages, and in school libraries.

As veterans know and rookies will soon learn:

"There are no perfect solutions, only tradeoffs. Only compromise. We must choose the tradeoffs we believe provide the best balance of outcomes."

Our commitment is that students and teams from across this entire spectrum find a welcoming home in *FIRST* Tech Challenge. We will ensure every team can "play robots" in a way where they can meaningfully contribute to their alliance, iterate as they grow in experience, and feel the thrill that comes from competing in a true *sport of the mind™*.

Season Challenges: Championship Play vs. Learning to Play.

Whether you're the defending world champion or you're building your first StarterBot, we will provide engaging games with challenges that enable student learning and skill growth. These challenges will include familiar themes from the past to encourage building on the skills from prior seasons, while also including new dynamics which shift the 'meta,' encouraging the community to continuously learn and experiment.

FIRST Tech Challenge will always provide high-integrity Championship level experiences where our top teams can showcase their capabilities and find creative, exceptional solutions to the season's challenges. That is not changing. However, we also want more kids around the world to be able to participate in *FIRST* Tech Challenge, even if they don't have any prior STEM experience and don't have access to a Championship level event. To do that, we need to make the program more accessible to students, coaches, volunteers, and local leaders.

Competition Integrity at all Levels.

The *FIRST* Staff and all *FIRST* volunteers want every match of every competition to be perfect. Even if they can't be perfect, we want to protect the integrity of the competition and ensure fair play for all our teams. As our sport has matured, teams have made us very proud as they have *dramatically* improved in performance. With their success has come additional challenges, and now maintaining the integrity of the competition is becoming increasingly difficult. Recent years have placed more burden on our game design, our field designs, and our volunteers. Many of our efforts to enable the highest levels of

play only make it more difficult to enable introductory play experiences. We feel we need to change something to be successful at enabling both.

Changes for 2026-2027 (and beyond).

The 2026-2027 Season includes a deliberate change in how we designed BIOBUZZ and wrote its Competition Manual. This change is something we plan to continue for future games and future seasons. The manuals from prior seasons focused on covering exact circumstances and details, removing flexibility in favor of attempting to cover all scenarios.

The BIOBUZZ manual emphasizes the "spirit of the rule" and empowers event volunteers to make good-faith judgement calls. BIOBUZZ rules are written to emphasize "intended gameplay" and make it simpler for participants and volunteers to understand the spirit and intent of the rule. The rules are designed to allow volunteers to watch for larger behaviors and strategies that run counter to the spirit of the competition, rather than be required to watch for and record every action or incident that occurs (e.g., strategically blocking an opponent from access to their gate vs. going into an opponent's gate zone). This will make it easier to volunteer, allow volunteers to focus more on supporting teams in line with the spirit of *FIRST* Volunteering, and result in a more consistent competition experience for everyone.

This change can only be possible if we all commit ourselves to the ethical standards described by the *FIRST* Ethos and *FIRST* Core Values. We still want teams to compete to win. We want that to be done in a manner that is gracious and respectful to both their fellow competitors and the event volunteers enforcing the rules. To enable this culture, we're emphasizing a Framework of Behaviors all *FIRST* participants should follow, and a Competition Integrity Contract. When all our participants and volunteers are aligned with this framework it will allow us to simplify many of our regulations, remove some burden from everyone in the program, and make it easier for all of us to be successful!

Thank you, and we look forward to everything to come this season!

- ***FIRST* Tech Challenge Staff**

1.4.2 Framework of Behaviors

The culture of *FIRST* Tech Challenge is shaped by the habits and behaviors of our global community. To ensure our sport remains a positive space for our teams, we rely on all our participants, mentors, educators, supporters, alumni, and volunteers to follow a framework of ethical behaviors. These range from aspirational philosophies to firm rules and regulations.

- ***Gracious Professionalism & FIRST Core Values***
Gracious Professionalism remains the guiding star for all our behaviors, and we should always strive to act in a way that aligns with its philosophy. Celebrating the *FIRST* Core Values and ensuring they remain central to our behavior is how we embody *Gracious Professionalism* and preserve the unique *FIRST* culture.
- ***FIRST Code of Conduct***
Adults (and parents of minors) in *FIRST* each certify adherence to the [FIRST Code of Conduct](#) which provides behavior and youth protection requirements to ensure the safety of all *FIRST* participants.
- ***Competition Integrity Contract***
Every team in *FIRST* Tech Challenge must follow the Competition Integrity Contract (CIC) in Section [1.5 Competition Integrity Contract \(CIC\)](#) below. The CIC outlines team behaviors which protect the integrity of the competition and long-term health of The Sport.
- ***Competition Rules: The Competition Manual, Team Updates, and Q&A***
Each season's game is defined by the rules and regulations in its Competition Manual. While these rules change each year, they describe the criteria all teams must meet to be eligible for competition, and the specific behaviors all teams must follow while competing.

1.4.3 The Role of Mentors

The *FIRST* mission is to create programs that give young people skills, confidence, and resilience to build a better world, and mentors are a key component to that in *FIRST* Tech Challenge. Adult mentorship is [a proven part](#) of what makes *FIRST* so effective:

*Working with a mentor or coach is a critical part of the learning process.
FIRST programs provide mentoring of students which may lead to a better understanding of
STEM careers as well as increased confidence, self-esteem and satisfaction of the student.*

This naturally leads to the question: “How much involvement in building the robot should the mentors have?”

The answer continues to be: “However much is needed to inspire the youth on the team.”

Each team's robot should be representative of their journey and experience, and every team's journey is unique.

The level of involvement of mentors on a team will vary team-by-team and often season-by-season. For example, a team may have a student or group of students with enough CAD skills to largely create the CAD model of their robot with limited mentor guidance and oversight. The same mentor may need to take a more hands-on approach the next season if those students graduate, and no other students have those skills yet.

FIRST does not provide a prescriptive process for running a team; each team should be structured to meet students where they're at. Success should always be based on individual student outcomes. This is reinforced

through mentor training resources and the sharing of best practices, so all teams may continuously improve as they find what works best for their students.

1.4.4 The Sprit of *FIRST* Volunteer

FIRST volunteers are there to help every team succeed and should actively help the competitors avoid breaking rules whenever possible. One of the things which makes *FIRST* special is the culture in which volunteers have the opportunity to serve as mentors to all *FIRST* students.

It is easy for volunteers to default to a culture of enforcement and for teams to default to adversarial behaviors. *FIRST* teams and volunteers need to remember during all their interactions, they should be working together, not fighting each other.

It is often said:

"Through Gracious Professionalism, fierce competition and mutual gain coexist. Participants compete intensely while treating each other with respect and empathy."

In this way, fierce and intense competition can be a direct part of embodying *Gracious Professionalism*. Everyone should remember that *FIRST* teams, students, and mentors are deeply passionate about our sport. They will, as they should, compete very hard as they pursue excellence and "success on the field."

FIRST prepares volunteers to likewise respond with respect and empathy in the face of this competitive intensity. To be successful, volunteers must take advantage of the resources and training *FIRST* provides each season. This means they must fully understand not only the rules, but also the published guidelines on how *FIRST* intends them to be enforced. This will ensure that each competition is conducted as fairly and consistently as possible.

For many *FIRST* students, their competition experience will be defined by a few interactions with a handful of adult volunteers. This is why it is so important that all *FIRST* volunteers behave in a friendly, supportive, fair, and team-focused manner at all times. **This is another reason why *FIRST* volunteers are so special; they are charged with maintaining the integrity of the competition but doing so by reinforcing the *FIRST* Core Values and always doing their best to act with *Gracious Professionalism*.**

There are two phrases which drive and motivate the individuals that volunteer their time with *FIRST*: "Giving Back" and "Paying It Forward." Each year, you have the extraordinary opportunity to help create the best-ever experience for our students, mentors, and fellow volunteers by becoming a *FIRST* volunteer.

Please consider [volunteering](#) at local events near you, but know that not all applicants can be placed in all roles at any given event. Please work with your volunteer coordinator and [local Program Delivery Partner](#) (PDP) to help identify the most meaningful way you can help in your region. A complete set of all role-specific volunteer materials can be found on our [Volunteer Resources Page](#).

1.5 Competition Integrity Contract (CIC)

As an actionable part of the Framework of Behaviors described in Section [1.4.2 Framework of Behaviors](#), the Competition Integrity Contract (CIC) defines ways that every team in *FIRST* Tech Challenge should behave, both at and outside events.

The CIC is divided up into two categories: Sporting Ethics Code, which all teams must follow to protect the integrity of the competition, and Behavior Guidelines, which help teams act in a way that embodies *Gracious Professionalism* and ensures that every team can: Have Fun, Make Friends, and Chase Excellence.

1.5.1 Sporting Ethics Code

Our Team Certifies:

We Don't Cheat.

Our team will never intentionally violate the spirit of a rule. We won't circumvent the systems *FIRST* uses to keep the competitions running. We would be ashamed to win a student competition by cheating. The only true wins come when everyone is playing by the same rules: with honor, fair play, and integrity.

We Always Behave with Integrity.

We take pride in behaving with honor, even when "no one is watching." We appreciate the spirit of *FIRST* Volunteering, and we want the volunteers to focus on supporting teams rather than simply enforcing rules. We understand that teams need to abide by *all* the regulations, even the ones that are not checked. **Our actions are based on *what is right*, not *what we think we can get away with*.**

We Play the Game as Intended.

We understand The Sport is designed to be: "Red Alliance vs. Blue Alliance," it is not supposed to be "Teams vs. Volunteers." We understand the rules aren't designed to list every possible situation that can occur. Our team will not try to gain an advantage using any "loopholes" in the rules. If there is ever ambiguity in the specific wording of a rule, we will look to the intent of the rule and spirit of the competition to guide our behavior.

We Know Our Team Doesn't Enforce the Rules.

Our team values fair play and good sportsmanship. If we see something which we know is inappropriate, we will politely bring it to the attention of competition staff. We understand it is the responsibility of the event staff and *FIRST* Headquarters to handle any escalation and mitigation. We understand it is not appropriate for us to accuse, investigate, publicly call-out, or persecute *anyone* for a perceived infraction, especially in a disrespectful or confrontational manner.

1.5.2 Behavior Guidelines

Our Team Certifies:

We Focus on Journey, Before Destination.

Our team will try hard to win. We will chase excellence in everything we do. We will not define our success based on the competition results, but on the lessons we learn and friends we make. *FIRST* competitions are opportunities to measure our progress, and alongside other teams, celebrate the journey we've all taken together!

We Behave with Respect and Good Sportsmanship.

We will always strive to treat others with respect. Regardless of the outcomes, we will always strive to act professionally and behave in a way that we will be proud to remember (even when the competition gets intense and emotions are running high). Long after the competition is over, we know we won't remember if things didn't go exactly the way we wanted, but we will remember how we acted during those tough moments.

We support our teammates. We praise our partners. We celebrate our opponents.

We Help Each Other.

We do our best work when we're helping others and treating them with respect and kindness. We want to succeed, but we don't want it to happen because someone else failed. We want to help everyone to play at their best, even when we're playing against each other. Then, we're going to celebrate with each other regardless of the outcome. (...but we're hopefully going to win.)

We 'Take the High Road.'

We're all still growing, no one is perfect. Being respectful means being understanding, empathetic, and sometimes being forgiving when someone else's behavior doesn't meet our expectations. If someone acts in a way which doesn't seem right, we will try not to let it affect how we behave. Everyone is on their own journey; everyone is struggling in ways we don't always see. We will remain focused on our own growth. We will be respectful to everyone, even those who are disrespectful to us.

We Respect Property and Facilities.

Our team will always work to leave things in a better state than we find them. We will behave in a way that prevents foreseeable damage to equipment, facilities or the property of others. We will clean up any messes we make. Accidents happen, and we will report any accidental damage to the appropriate individuals.

We Build a Positive Culture of Safety.

We will never knowingly jeopardize our own safety, or the safety of those around us. Our team will enable the safety of everyone we meet. Instead of a culture of safety enforcement, we emphasize teaching safe decision making and understanding safety best practices. In doing so, we help our members learn how they can be safe even in unfamiliar situations.

We Make Healthy Choices.

The competition is exciting and sometimes there is a risk of it becoming all-consuming of our time and attention. We understand that to succeed in *FIRST* Tech Challenge, and in life, it's important to prioritize our mental and physical health. Even when things get "very busy," we will ensure everyone on our team is: staying hydrated, eating well, staying active, getting enough sleep, and taking regular breaks.

We also understand that in any creative process a measured (and sometimes relaxed) schedule which leaves time for recuperation will often result in a better outcome than “grinding” for long hours. We know our team is most successful when every member is at their best, both at competitions and outside them.

We're All on the Same Team.

This is a global community of great people with unique backgrounds who all have experiences to share. On the field, teams are supposed to compete fiercely against each other. Off the field, we're all on the same team. Students, Mentors, Volunteers, Event Organizers... Everyone is here for the same reasons. We're going to have fun, play robots, share stories, build something awesome, learn from everyone we meet, celebrate cool stuff, and more than anything: we'll be excellent to each other!

1.5.3 Infractions, Mitigations, & Escalation

Violations of the CIC may require escalation and/or mitigation depending on the circumstances of the infraction. These infractions may occur at an event and/or outside of events.

Escalations for violations related to specific competition regulations are outlined in the Escalation Guidelines (coming soon). Some situations may require escalation to competition volunteers such as a Lead Robot Inspector (LRI), Head Referee, or *FIRST* Technical Advisor (FTA) for mitigation.

More serious violations, especially violations of the Sporting Ethics Code, will be escalated to the Event Director, and/or to *FIRST* Headquarters. At the discretion of *FIRST* Headquarters, these violations may result in the team being sanctioned, and/or disqualified from current and/or future events. Following an investigation, at the discretion of *FIRST* Headquarters, serious violations could result in a team or individuals being suspended or permanently removed from the *FIRST* Tech Challenge program.

FIRST has an open door policy; concerns from an event may be brought to the attention of *FIRST* Headquarters by emailing customerservice@firstinspires.org or [contacting support](#).

1.6 Accessibility and Inclusion

FIRST is committed to *STEM for Everyone™* and as such, *FIRST* makes reasonable accommodations for persons with disabilities who need and request accommodations. If a participant needs accommodation for an event, please [contact your local leadership](#) before the event so they can help ensure the accommodation is provided. Local leadership may make exceptions to rules to allow for reasonable accommodation given the exceptions do not create an undue hardship or cause safety concerns.

1.7 Understanding & Using the Competition Manual

1.7.1 This Document & Its Conventions

The 2026-2027 Competition Manual is a resource for all *FIRST* Tech Challenge teams for information specific to the 2026-2027 season and the BIOBUZZ™ presented by RTX game. Its audience will find the following details:

- a general overview of the BIOBUZZ game,
- detail about the BIOBUZZ playing FIELD,
- a description of how to play the BIOBUZZ game,

- rules (related to safety, conduct, gameplay, inspection, event, etc.),
- ROBOT construction rules, and
- a description of how teams advance throughout the season.

The Competition Manual is intended to be the “source of truth” and while the intent is for supporting documents to be consistent with information some inconsistencies may exist. In cases of discrepancy, the Competition Manual takes precedence.

Specific methods are used throughout this manual to highlight warnings, cautions, key words, and phrases. These conventions are used to alert the reader to important information and are intended to help teams in constructing a ROBOT that complies with the rules in a safe manner.

Links to other section headings and rule references within this manual appear in [blue underlined text with a grey background](#). Links to external resources appear [blue underlined text](#).

For linked references not included in a preview release of this document, the links will appear with the section letter and ### for the rules number within square brackets. For example, a cross link to a game rule before a game rule is released will appear as [\[G###\]](#) and will be replaced with the current linked rule when that section of the manual is released.

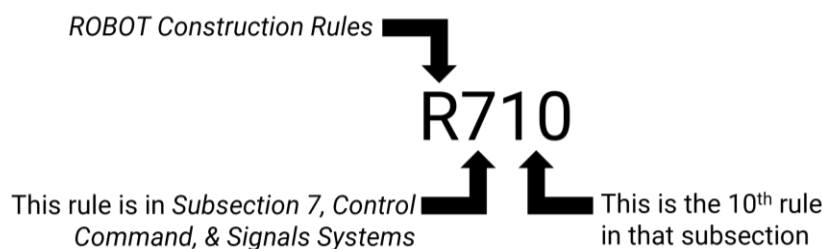
Key words that have a particular meaning within the context of FIRST Tech Challenge and BIOBUZZ are defined in section [16 Glossary](#) and indicated in ALL CAPS throughout this document.

The rule numbering method indicates the section, subsection, and position of the rule within that subsection. The letter indicates the section in which the rule is published.

- | | |
|-----------------|--|
| – I for Section | 3 Competition Eligibility and Inspection (I) |
| – E for Section | 5 Event Rules (E) |
| – A for Section | 6 Awards (A) |
| – G for Section | 11 Game Rules (G) |
| – R for Section | 12 ROBOT Construction Rules (R) |
| – T for Section | 13 Tournament (T) |
| – L for Section | 14 League Play Tournaments (L) |
| – C for Section | 15 FIRST Championship (C) |

The following digit(s) represents the subsection in which the rule can be found. The final digits indicate the rule’s position within that subsection.

Figure 1-3 Rule numbering method



Warnings, cautions, and notes appear in orange boxes. Pay close attention to their contents as they’re intended to provide insight into the reasoning behind a

rule, helpful information on understanding or interpreting a rule, and/or possible “best practices” for use when implementing systems affected by a rule.

While orange boxes are part of the manual, they do not carry the weight of the actual rule (if there is an inadvertent conflict between a rule and its orange box, the rule supersedes the language in the orange box).

Imperial dimensions are followed by comparable metric dimensions in parentheses to provide metric users with the approximate size, mass, etc. Metric conversions (e.g., dimensions) round to the nearest 0.05 cm, e.g., “17.5 in. (~44.45 cm).” The metric conversions are offered for convenient reference only and do not overrule or take the place of the imperial dimensions presented in this manual and the official drawings (i.e., dimensions and rules will always defer to measurements using imperial units).

Rules include colloquial language, also called headlines, in an effort to convey an abbreviated version of the rule or rule set. There are two versions of headline formatting. Evergreen rules, rules which are expected to be present each season with only their specific details changing from season to season, are indicated with their headline presented in ***bold green text** with a leading asterisk. This means that the overall subject and presence of the rule from season to season is constant, but game specific details and terms may be updated as needed (e.g., changing game specific terms, or changing the specific details around ROBOT expansion within an Evergreen rule about expansion limits, or changing the quantity of allowed motors within an Evergreen actuator rule). These rules also start their respective section, so their rule number is less likely to change from season to season. All other rule headlines use **bold orange text**.

Any disagreement between the specific language used in the rules and the colloquial language is an error, and the specific rule language is the ultimate authority. If you discover a disparity, please let us know at customerservice@firstinspires.org.

Team resources that are not generally season specific (for example, what to expect at an event, communication resources, team organization recommendations) can be found on the [FIRST Tech Challenge Resources Page](#).

1.7.2 Translations & Other Versions

The *FIRST* Tech Challenge Competition Manual is originally and officially written in English and is occasionally translated into other languages for the benefit of *FIRST* Tech Challenge teams whose native language may not be English. These assets are posted on the [Game and Season Materials](#) page.

A text-based English version can be provided only for use with assistive devices and not for redistribution. For more information, please contact *FIRST* Tech Challenge at customerservice@firstinspires.org.

Additional resources such as a *FIRST* Tech Challenge AI Chatbot (coming soon) are provided as a helpful tool, but the Competition Manual is the final authority. In the event that a rule or description is modified in an alternate version of this manual, the latest English PDF version as published on the [Game and Season Materials](#) page is the authoritative version.

1.7.3 Team Updates

Team Updates are used to notify the *FIRST* Tech Challenge community of revisions to the official season documentation (e.g., the manual, drawings) or important season news. Team Update posts are scheduled as follows on the [Game and Season Materials](#) page:

- Every Thursday beginning on Kickoff day and ending two weeks prior to *FIRST* Championship.

Team Updates are indicated using the following formatting:

- Additions are highlighted in yellow. **This is an example.**
- Deletions are indicated with a strikethrough. ~~This is an example.~~

Team Updates that are published after the driver's meeting at an event will not apply to that event.

1.7.4 Question & Answer System

The [Question and Answer System \(Q&A\)](#) is a resource for teams to ask questions about gameplay, competition rules, judging and advancement, ROBOT build rules, and FIELD setup. Teams can search for previously asked questions and responses or pose new questions. Questions can include examples for clarity or reference multiple rules to understand the relationships and differences between them.

The Q&A opens on September 28, 2026, 12:00p.m. ET. Access to the Game Q&A system is through the Lead Coach 1 or Lead Coach 2's account on the [FIRST dashboard](#).

The Q&A may result in revisions to the text in the official manuals (which are communicated using the process described in Section [1.7.3 Team Updates](#)).

Moderators will answer team questions beginning each Monday and close on Thursday at 5:00p.m. ET. The responses in the Q&A do not supersede the text in the manual, although every effort will be made to eliminate inconsistencies between the two. While responses provided in the Q&A may be used to aid discussion at each event, REFEREES and INSPECTORS are the ultimate authority on rules. If you have concerns about enforcement trends by volunteer authorities, please [notify FIRST](#).

The Q&A is not a resource for firm predictions on how a situation will play out at an event. Questions about the following may not be addressed:

- rulings on vague situations
- challenging decisions made at past events
- design reviews of a ROBOT system for legality
- questions that are overly broad, vague, and/or include no rule references
- questions about how a REFEREE should have ruled when specific gameplay happened at a past event
- duplicate questions
- questions clearly defined/addressed in this manual

Good questions ask generically about features of parts or designs, gameplay scenarios, or rules, and often reference one or more relevant rules within the question. Some examples of questions that will likely be answered in the Q&A are:

- A device we are considering using on the ROBOT comes with purple AWG 40 wire, does this comply with R?? and R??

-
- We're not sure how to interpret Rule G?? applies if blue ROBOT A does X and red ROBOT B does Y, can you please clarify?
 - If a ROBOT does this specific action, is it doing what this defined term is describing?

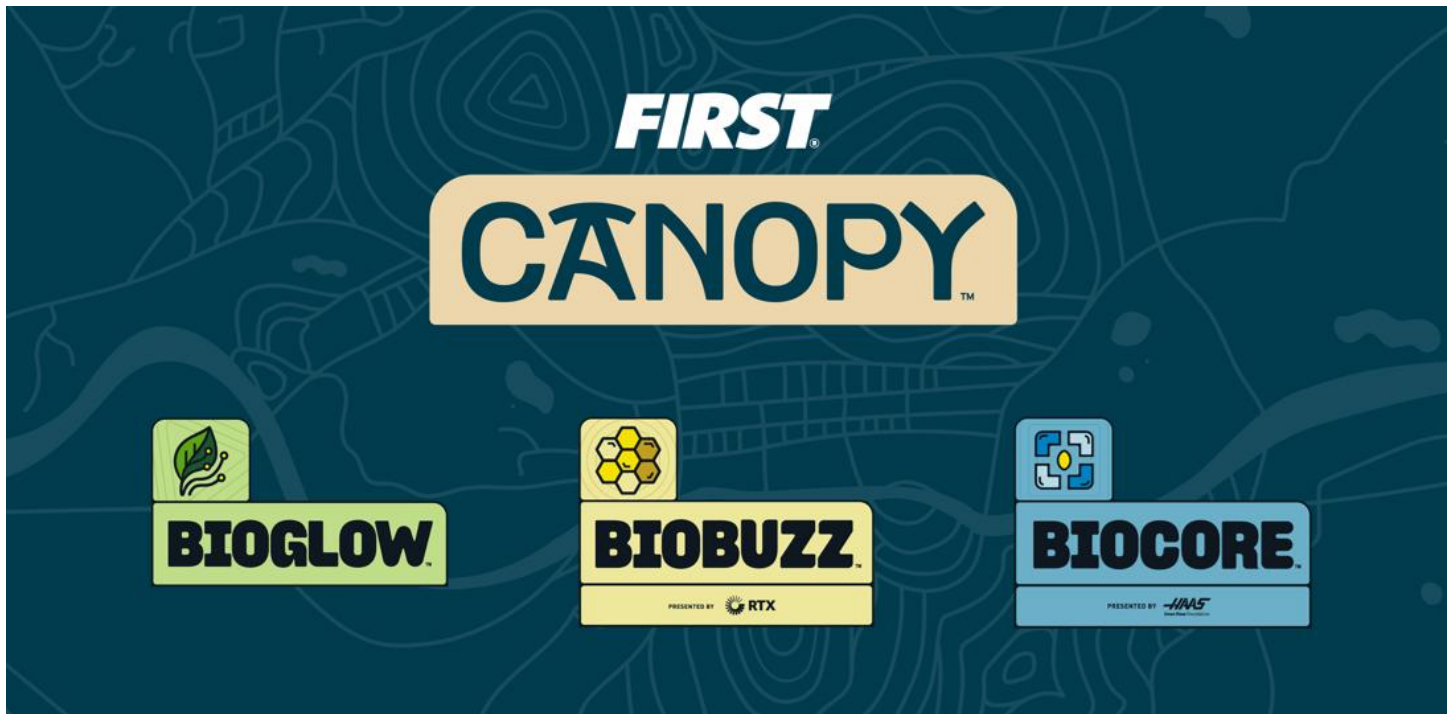
2 *FIRST* Season Overview

Engineer a Thriving Planet with *FIRST*

Nothing on Earth thrives alone. Every gene, species, and ecosystem is part of a rich web of biological diversity that powers clean air, fresh water, and food. With STEM as their tool and nature as inspiration, today's boldest innovators are finding new ways to strengthen the connections that protect our shared home.

Building. Problem solving. Growing stronger through teamwork.

Welcome to *FIRST*® CANOPY™, our 2026-2027 robotics season inspired by nature. Building. Problem solving. Growing stronger through teamwork.



LEARN MORE: <https://www.firstinspires.org/first-canopy>

3 Competition Eligibility and Inspection (I)

3.1 Team Eligibility Rules

I101 ***Teams must be registered with FIRST.** Teams must be “competition ready” in order to compete in FIRST Tech Challenge official events and earn MATCH points or be eligible for judged awards.

- A. North America - competition ready requirements:
 - i. complete annual registration process through the *FIRST* dashboard
 - ii. pay annual registration fee
 - iii. 2 adults must be assigned in the Lead Coach 1/Lead Coach 2 roles and have passed [Youth Protection Program \(YPP\) screening](#),
 - iv. complete any additional Youth Protection screening requirements (may vary from region to region), and
 - v. register all youth team members on the *FIRST* dashboard.
- B. outside North America - competition ready requirements:
 - i. complete annual registration process through the *FIRST* dashboard and
 - ii. complete any additional requirements by the local *FIRST* Program Delivery Partner with regards to program fees, registrations and youth protection screening.

The local Program Delivery Partner may, in rare cases, make exceptions for delayed payment on a case-by-case basis. Teams who have not paid annual registration fees will not earn any official season record and will not be allowed to advance.

I102 ***Check-in at the event on time.** An adult team member must check-in at the Pit Administration station, or designated check-in location, no later than 45 minutes before Qualification MATCHES are scheduled to start, unless otherwise specified or approved by the Event Director. Check-in must be completed by a team adult and at least one STUDENT must be present at the venue before check-in can be completed.

Additional check-in requirements will vary by region but may require one or more of the following items:

- A. A current, completed team roster from the team's [FIRST dashboard](#) as specified by the local Program Delivery Partner,
- B. local Program Delivery Partner team member registration or consent forms (varies by region),
- C. a ROBOT built to specifications in Section [12 ROBOT Construction Rules \(R\)](#), if they intend to participate in MATCHES, and
- D. a printed team PORTFOLIO (optional, see Section [6 Awards \(A\)](#)).

All teams, regardless of how “ready” they think they are, are encouraged to participate in gameplay and judging. Teams are encouraged to reach out to their Program Delivery Partner and other teams to request help getting their ROBOT ready to compete before attending an event.

I103 ***A responsible adult must be present for the whole event.** At least 1, preferably 2, adult(s) responsible for the STUDENT team members must be present at all times during the event. Responsible adult(s) are recommended to be listed on the team roster.

3.2 Awards Eligibility Rules

To be eligible for Team Judged Awards, a team must participate in an Initial Interview ([A203](#)). For some awards, submitting a PORTFOLIO ([A201](#)) is also required.

Teams competing in multiple Qualifying or League Tournaments, or at events outside of their HOME REGION, are subject to [A213](#) and [A214](#). Details on a HOME REGION can be found in Section [4 Advancement](#).

Complete details and rules about FIRST Tech Challenge awards can be found in Section [6 Awards \(A\)](#).

3.3 MATCH Eligibility Rules

Prior to participating in Qualification or Playoff MATCHES, teams are required to pass a ROBOT inspection facilitated by INSPECTOR volunteers. The goal of inspection is to ensure the team's ROBOT meets baseline safety and competition requirements before engaging in MATCH play.

Some events may offer scheduled Practice MATCHES. Teams are permitted to participate in scheduled Practice MATCHES before passing inspection, but they may not participate in unscheduled or "filler line" Practice MATCHES before passing inspection. Teams are responsible for ensuring their ROBOTS are safe and will not damage the playing field.

The FTA, LRI, or Head REFEREE may prohibit a team from participating in a Practice MATCH if they determine that their ROBOT is unsafe or likely to damage the playing field.

3.3.1 Inspection

Inspection is often one of the first activities a team experiences upon arrival at an event. Some events may assign specific inspection time slots for teams, and others may schedule a general span of time for teams to complete inspection. Teams are responsible for completing inspection within the scheduled time.

During inspection, student team members present their ROBOT, all COMPONENTS that will be used by that ROBOT, and their OPERATOR CONSOLE. INSPECTORS will review baseline safety and competition requirements with the team. If any requirements are not met, INSPECTORS will work with the team to find a resolution. The Lead ROBOT INSPECTOR (LRI) has the final authority on a team's eligibility to participate in Qualification and Playoff MATCHES on matters related to ROBOT construction.

Teams may power on and enable the ROBOT during inspection to demonstrate adherence to ROBOT construction rules. Team members should let INSPECTORS know if the ROBOT must be powered on and/or enabled to meet any inspection criteria. Team members should also inform INSPECTORS if the ROBOT, in its inspection configuration, has any stored energy (for example, springs stretched) and collaborate with each other to ensure a safe inspection experience.

Inspection is not comprehensive. Teams are expected to adhere to the spirit of the rules in Section [12 ROBOT Construction Rules \(R\)](#), even if INSPECTORS do not check every part of the ROBOT. Teams that strategically circumvent ROBOT construction rules to gain a competitive advantage are not adhering to the Competition Integrity Contract (CIC) and may be subject to mitigation.

An [Inspection Checklist](#) is available to help teams self-inspect their ROBOT. Teams are strongly encouraged to self-inspect before every event.

Inspection may not happen all at once if, for example, a team needs to take a break to resolve a ROBOT construction issue or participate in a scheduled Practice MATCH. The process may involve multiple inspection volunteers. Either the INSPECTOR or the team may request assistance from the LRI.

- I301 *Bring the complete ROBOT and supporting equipment to inspection.** Teams should present the ROBOT and OPERATOR CONSOLE with all COMPONENTS, including decorative parts, that will be used during MATCHES. Teams are not required to use all inspected COMPONENTS in every MATCH, but they should not add any un-inspected COMPONENTS to the ROBOT without re-inspection. Teams should demonstrate to INSPECTORS all ways the ROBOT will be configured for a MATCH.
- I302 *Certain limits apply to all configurations.** The total number of electronics (motors, servos, Android Devices, etc.) used to build all MECHANISMS and base ROBOT, whether they are used on the ROBOT at the same time or not, may not exceed the constraints specified in Section [12 ROBOT Construction Rules \(R\)](#).

3.3.2 Re-Inspection

Teams may make changes to their ROBOT during an event after they complete their initial inspection. With some exceptions, all changes to the ROBOT must be re-inspected before the team can participate in further Qualification or Playoff MATCHES. During re-inspection, teams demonstrate the changes to INSPECTORS and make any additional changes necessary to meet baseline safety and competition guidelines. Re-inspection may also be requested by the Head REFEREE or FIRST Technical Advisor (FTA) if they observe potentially unsafe or disallowed ROBOT construction.

Teams are encouraged to seek the advice and assistance of Team Support volunteers when making a change to their ROBOT. Attempting to participate in a MATCH with a ROBOT that does not meet the rules in [Section 12 ROBOT Construction Rules \(R\)](#) may cause unnecessary delays and stress for teams. Deliberately making changes to a ROBOT after inspection to gain a competitive advantage without re-inspection is against the spirit of the competition.

I303 *Request re-inspection for most changes to the ROBOT. A team should request re-inspection when it makes changes to a ROBOT that may cause it to not comply with safety and competition guidelines or when requested by the Head REFEREE or FTA.

Re-inspection is generally **not** necessary for the scenarios listed below (unless they result in a significant change to the ROBOT'S size, legality, or safety):

- A. addition, relocation, or removal of fasteners (e.g., cable ties, tape, and rivets),
- B. addition, relocation, or removal of labeling or marking,
- C. addition, relocation, or replacement of the team SIGN,
- D. revision of ROBOT code,
- E. replacement of a COMPONENT with an identical COMPONENT,
- F. replacement of a MECHANISM with an identical MECHANISM (size, weight, material), and
- G. additions, removals, or reconfiguration of ROBOT with a subset of MECHANISMS already inspected.

All teams should make a good faith effort to comply with ROBOT construction rules if they make changes to their ROBOT during an event.

If a team is unclear if reinspection is required, they should confirm with the LRI or FIELD STAFF. For example, if a team is unsure if reassembling a part changes their ROBOT'S size, they should have it checked.

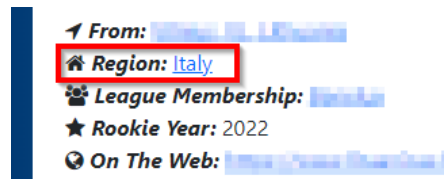
I304 *Do not exploit re-inspection. Teams may not use the re-inspection process to circumvent any other rules.

4 Advancement

Teams are only eligible to advance from events within their HOME REGION. Teams may be invited to compete at tournaments outside of their HOME REGION; however, they are not advancement eligible from these out-of-region events.

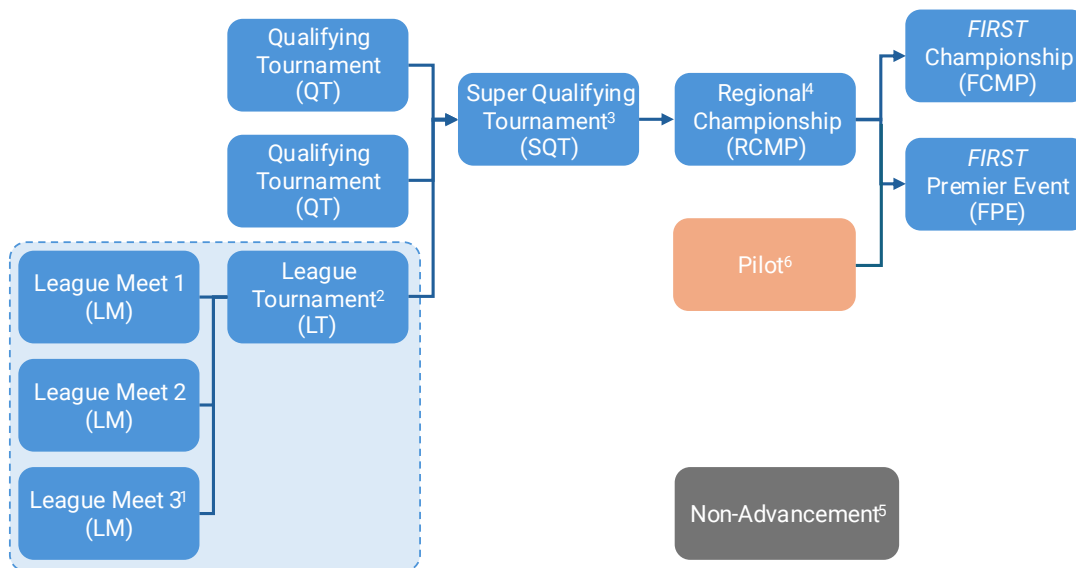
Teams can check what HOME REGION they are assigned to on the [FTC-Events](#) page by looking up their team number. Teams in regions that do not have a local Program Delivery Partner, or who are geographically isolated within their HOME REGION can work with FIRST by emailing customerservice@firstinspires.org to get reassigned to another more accessible region once per season for advancement.

Figure 4-1: Region assignment display on FTC-Events page



FIRST Tech Challenge tournament progression is shown in Figure 4-2. Teams can advance from any of their first three entry-level events: Qualifying Tournaments (QT) and League Tournaments (LT). Teams may only participate in one League per season. See Section [14 League Play Tournaments \(L\)](#) for more details on League Tournaments. Teams may participate in more than three entry-level events but are eligible to advance from the first three chronological events.

Figure 4-2: Tournament Advancement Structure



1,3,5 – Optional event, not offered in all regions.

2 – All teams within a League play in the League Tournament.

4 – Can also be called State, Region, or Country Championship.

6 – Only in select new or emerging regions.

Teams may advance from their region's Qualifying Tournaments or League Tournament to either a Super Qualifying Tournament (SQT) or directly to a Regional Championship (RCMP). Super Qualifying Tournaments (SQT) are an optional advancement level often used in large regions which need more levels of competition. A team may only participate in one Super Qualifying Tournament (SQT).

Teams in a few specific geographical regions may advance from a Pilot event - the highest tier of competition within a new or emerging region - to FIRST Championship and/or a FIRST Premier Event.

The local Program Delivery Partner determines the advancement numbers from each tournament in their region, up to a Regional Championship. FIRST Staff determine the advancement from each Regional Championship to FIRST Championship and FIRST Premier Events.

4.1 Advancement Points Calculation

For each advancing event, teams will be ranked based on the advancement points they earn through their overall performance at that individual event. The top ranked teams not already advanced will qualify for the next level of play, up to the total allocated advancement spots for that event. Advancement points are awarded to teams based on Table 4-1 below.

Table 4-1: Advancement Point Assignment

Category	Advancement Points Earned
Qualification Phase Performance	Normal distribution of points from 16 to 2 across the highest ranked team to the lowest based on the equation in Section 4.1.1 Qualification Phase Performance . (This will result in a minimum of 2 points and a maximum of 16 points being awarded for Qualification phase performance.)
ALLIANCE lead	Equal to 21 minus the ALLIANCE lead number (e.g., 18 points for ALLIANCE #3 lead)
Draft Order Acceptance	Equal to 21 minus the Draft Order Acceptance number (e.g., 18 points for the team which accepts the third draft position)
Playoff Advancement	40 points for 1 st Place (Winners) 20 points for 2 nd Place (Finalists) 10 points for 3 rd Place 5 points for 4 th Place (See Section 13.8 Dual Division Events for modifications to this section)
Team Judged Awards	60 points for Inspire Award 1 st Place 30 points for Inspire Award 2 nd Place 15 points for Inspire Award 3 rd Place 12 points for all other 1 st Place Awards 6 points for all other 2 nd Place Awards 3 points for all other 3 rd Place Awards (See A211 for a list of points-eligible awards)

If there is a tie in the point totals between teams, the higher ranked team will be determined using the following additional sorting criteria in Table 4-2.

Table 4-2 Advancement Sorting Criteria Including Tiebreakers

Order Sort	Criteria
1 st	Total Advancement Points (as calculated in Table 4-1)
2 nd	Judged Team Award Points
3 rd	Playoff Advancement Points
4 th	ALLIANCE Selection Results Points (ALLIANCE Lead or Draft Order Acceptance)
5 th	Qualification Phase Performance Points
6 th	Average Qualification MATCH Points (excluding FOULS)
7 th	Average Qualification AUTO Points
8 th	Highest individual Qualification MATCH Points (excluding FOULS)
9 th	Second Highest individual Qualification MATCH Points (excluding FOULS)
10 th	Random Selection by Event Management System

4.1.1 Qualification Phase Performance

The calculation of Qualification Phase Performance points is done using the equation below. This equation is an inverse error function which utilizes the following variables:

- **R** – the qualification rank of the team at the event at the conclusion of Qualification MATCHES (as reported by the Event Management Software and defined in Section [13.6.3 Qualification Ranking](#))
- **N** – the number of FIRST Tech Challenge teams participating in the Qualification rounds at the event
- **Alpha (α)** – a static value (1.07) used to standardize the distribution of points at events

$$QualificationPoints(R, N, \alpha) = \left[InvERF\left(\frac{N - 2R + 2}{\alpha N}\right) \left(\frac{7}{InvERF\left(\frac{1}{\alpha}\right)} \right) + 9 \right]$$

This formula generates an approximately normal distribution of Qualification Phase Performance points at an event, based on rank, with most teams getting a moderate number of points, and fewer teams getting the highest or lowest numbers of points available.

Table 4-3 displays sample Qualification Phase Performance points for variously ranked teams at a 28-team event. The system will automatically generate the appropriate points for each team based on their rank and the number of teams at the event.

Table 4-3 Sample Qualification Round Point Assignments

Rank	1	2	3	4	...	12	13	14	...	25	26	27	28
Points	16	15	14	14	...	10	10	10	...	6	5	5	4

4.1.2 ALLIANCE Selection Results

This attribute measures both individual team Qualification round seeding performance and recognition by peers.

ALLIANCE Leads are recognized based on their Qualification phase seeding rank. This rank is a result of the rules of the game, which typically incorporate several team performance attributes. ALLIANCE partners are rewarded based on peer recognition. To be invited to join an ALLIANCE, a team's peers have decided that the team has attributes that are desirable.

Note also that ALLIANCE leads are given the same number of points as the team drafted in the same sequence. For example, the team who accepts the pick from the 3rd ALLIANCE lead receives the same number of points as the 3rd ALLIANCE lead. Numerical analysis supports the idea that ALLIANCE leads are about as strong in ROBOT performance as equivalently drafted teams.

4.1.3 Playoff Performance

This attribute measures team performance as part of an ALLIANCE.

Teams earn points based on how far they progress into the Playoffs. Points are given to all teams within the ALLIANCE as described in Table 4-1.

See Section [13.7.2 Playoff MATCH Bracket](#) for more details on the number of ALLIANCES that are formed for the Playoffs and an example of the Playoff MATCH bracket.

4.1.4 Team Judged Awards

This attribute measures team performance with respect to team awards judged at the event.

The points earned for team awards in this system are not intended to capture the full value of the award to the team winning the award or to represent the full value of the award to FIRST.

Points are being assigned to awards in this system only to help teams recognize that *FIRST* continues to be "More than Robots®," and to assist in elevating award-winning teams above non-award-winning teams in the ranking system.

Teams only get points for team awards judged at the event. If an award is not judged, is not for a team (e.g., the *FIRST* Leadership Award), or is not judged at the event (e.g., Safety Animation Award), no points are earned. Points for awards not given at the event are not assigned to any team. See [A211](#) for the list of points-eligible awards.

4.2 Advancement Distribution by Region

Advancement within a region is determined by the Program Delivery Partner and minimum advancement numbers should be made publicly accessible to participating teams as early as possible before the event, and no later than when ALLIANCE selection begins. Advancement information may be published on the [FTC-Events](https://firstinspires.org/robotics/ftc) page as shown in Figure 4-3.

Figure 4-3 Event Advancement Information as shown on the ftc-events.firstinspires.org/page

Event Information	
Basic information about the NYC QUALIFIER 1 can be found in the chart below. All times and dates displayed here and on the event's individual result pages are local to the event.	
Event Code	USNYYNYQ
Dates	 Event Complete (Week 11 since kickoff) Sunday, November 17 to Sunday, 17 November 2024
Venue	East Harlem Tutorial Scholars Academy 2017 FIRST Avenue New York, NY USA
Region	New York - NYC
Advancement	8 teams advance to NYC SUPER QUALIFIER 2
Website	https://www.eastharlemscholars.org/high-school

Advancement to *FIRST* Championship and *FIRST* Premier Events is determined by *FIRST* Headquarters based on a number of factors including:

- Global and regional representation
- New developing regions with a Program Delivery Partner
- Number of teams registered within the region before the cutoff date (November 17th, 2026 for the BIOBUZZ season)
 - Regions who meet minimum registration requirements
 - Total number of teams within the region

Regional allocations of advancement slots information will be published on the [FTC-Events](https://firstinspires.org/robotics/ftc) page starting in early December. Regionally allocated slots which are not secured by the event deadline will be returned to *FIRST* HQ or Premier Event Host for reallocation which may include reallocation to a new region or waitlist team invitation.

5 Event Rules (E)

This section includes general rules which apply from the beginning of the public schedule when teams arrive through the end of the event with departure from the venue.

Universal Violation Note: A violation of any [Event Rules \(E\)](#) will result in a VERBAL WARNING.

Egregious or subsequent violations of an Event Rule may result in escalation to FIRST Headquarters and/or disqualification for the team from MATCHES and awards. Criminal behavior will not be tolerated and will result in removal of individual(s) involved and/or disqualification for the team from the event.

Any items that are deemed unsafe or outside specifications by FIRST personnel and/or the Event Director must be removed.

Additional rule specific violations, if applicable, are listed with their corresponding rule.

FIRST is committed to [STEM for Everyone™](#) and as such, FIRST strives to make reasonable accommodations for persons with disabilities that request accommodation. Please see Section [1.6 Accessibility and Inclusion](#) for more information.

Rules around safety and security within this Section are minimum requirements, and Program Delivery Partners are able to implement increased restrictions due to local or venue requirements (e.g., requiring badging for all attendees, reserving seating for accessibility). Partners should communicate additional local requirements early enough to allow teams to plan.

5.1 General Rules

E101 ***Personal safety comes first.** All team members must observe the following safety practices throughout the event:

- A. wear safety glasses or safety rated glasses with side shields (ANSI-approved, UL Listed, CE EN166 rated, AS/NZS certified, or CSA rated) in specified areas. There is a 10-minute grace period when the venue opens each day of the event for teams to find and distribute safety glasses.

Clear or lightly tinted safety glasses are preferred. Shaded glasses are allowed for those who need them and do not require a specific accommodation request.

- B. wear closed toed/heeled shoes,
- C. control entanglement risks by tying back long hair and removing other dangling decorations including lanyards, spirit wear, and rings as needed while working on or around a ROBOT or ROBOT related materials or tools,
- D. wear appropriate clothing,
- E. walk in the venue, and
- F. comply with government and venue-specific health and safety requirements in place for that event (i.e., mask wearing).

Teams are responsible for bringing their own personal protective equipment.

For more information about safety at *FIRST* events, please reference the [FIRST Safety Manual](#).

- E102** ***Be Respectful.** All participants should follow the framework of behaviors listed in [Section 1.4 The Spirit of the Competition](#) while attending a *FIRST* Tech Challenge event. Uncivil behavior toward any participants is not tolerated.

Examples of inappropriate behavior include, but are not limited to:

- A. use of offensive language or other uncivil conduct towards someone,
- B. “weaponizing *Gracious Professionalism*” by accusing another person or team of being “not GP”,
- C. intentionally blocking the view of other participants or spectators for an extended period (Team members momentarily holding up team signs while directly supporting their team is not considered a violation of this rule.), and
- D. anything that interferes with a ROBOT or the ARENA operations.

Examples of particularly contemptible behavior that may result in ejection from the event include, but are not limited to, the following:

- E. assault, e.g., throwing something that hits another person (even if unintended),
- F. threat, e.g., saying something like “if you don’t reverse that call, I’ll make you regret it,”
- G. harassment, e.g., badgering someone with no new information after a decision has been made or a question has been answered,
- H. bullying, e.g., using body or verbal language to cause another person to feel inadequate or unsafe,
- I. insulting, e.g., telling someone they do not deserve to be on a team,
- J. swearing at another person (versus swearing under one’s breath or at oneself), and
- K. yelling at another person(s) in anger or frustration.

- E103** ***Children with adults, please.** Children under 12 must be accompanied in the pits by an adult at all times.
- E104** ***Respect the venue.** Teams may not damage the venue, including but not limited to bleachers, floors, walls, and railings, in any way. This includes littering with team giveaways including candies, flyers, and stickers or items thrown from the stands.
- E105** ***Event resources are for competing teams only.** Only teams registered for an event may use that event’s competition FIELD, practice FIELD, and inspection unless pre-approved by the Event Director or the Program Delivery Partner. Host teams supplying practice FIELD elements and/or machine shop resources may use them; however, teams registered for that event must be granted priority.
- E106** ***Practice only when/where permitted.** Teams may only practice with their ROBOT in their pit space, in the designated event practice areas, or while in a Practice MATCH.

Teams may not set up their own practice equipment outside their pit in other areas of the event venue. If the Event Director determines a pit practice setup is unsafe or interferes with activity in adjacent pits or aisles, the team must discontinue the activity.

Demonstrating robot functionality to guests or JUDGES is not considered practice.

- E107 *Work in designated areas only.** At the event venue, teams may only produce FABRICATED ITEMS as follows:
- A. in their pit area,
 - B. in another team's pit area with permission from that team,
 - C. while queued for a MATCH or practice FIELD (given space constraints, extra scrutiny regarding safety is required),
 - D. any area designated by event staff (e.g., playoff pit area), or
 - E. as permitted at provided machine shops that are available to all teams.
- E108 *Some things do not belong at events.** Do not bring or use the following:
- A. Skateboards,
 - B. 'hoverboards,'
 - C. drones,
 - D. bottled gas tanks (e.g., helium),
 - E. noisy devices or noisemakers, such as floor stompers, whistles and/or air horns,
 - F. scooters, except for those used for accommodations.
 - G. any item with bright lights which flash faster than approximately 5 times per second
- E109 *Do not arrange for additional services or utilities.** Do not arrange for power, internet access, or phone lines from venue service providers or attempt to use venue internet connections reserved for event purposes (e.g., *FIRST* event management software or webcasting).
- E110 *Do not sell stuff.** Teams may not conduct sales at an event. This includes, but is not limited to, raffle tickets, food, hats, shirts, candy, water, soft drinks, fruit, or any promotional products unless specifically allowed by the Event Director.
- E111 *No Loud Music.** Do not invite or bring live bands to play in the audience. Do not play loud music.
- E112 *Hang banners with care.** Be respectful when hanging your banners.
- A. Do not cover or move other team or sponsor signs already in place.
 - B. Share the available space fairly with other teams.
 - C. Do not obstruct the view of spectators.
 - D. Get permission from the Event Director before hanging banners outside of your pit.
 - E. Hang signs and banners in a safe manner.
 - F. Banners hung outside team pits must not be larger than 25 ft.² (~2.3 m²).

We encourage teams to bring team flags and/or signs for display in their pits and/or the ARENA.

Respect venue-specific rules regarding sign location and hanging methods. At the end of the event, safely remove all signs and anything used to hang the signs (tape, string, etc.).

- E113 *Limit flag and flagpole size if used in the ARENA.** Flags and flagpoles may not be of unreasonable size and weight if they are going to be used around the FIELD.

As a guideline, reasonable flags are less than 3 ft. by 5 ft. (~91 cm by 152 cm) in size and weigh less than 2 lbs. (~907g). Reasonable flagpoles may not be more than 8 ft. (~243 cm) long and must weigh less than 3 lbs. (~1360g).

- E114 *No firearms or other weapons.** Firearms or other weapons are prohibited at all *FIRST* events for all *FIRST* programs, including without limitation, [all official FIRST Events posted here](#). This rule includes prop or simulated weapons which appear to be real. This policy does not apply to law enforcement or venue security personnel.

- E115 *Inspection required for practice FIELD access.** A team may only use a practice FIELD with a ROBOT that has passed an initial, complete inspection. This rule only applies to events not using scheduled inspection times.

- E116 *Do not record anyone at the event without their consent.** Do not record interactions with anyone at an event, without the person's consent. *FIRST* event staff and volunteers are empowered to excuse themselves from an interaction in which they are being recorded after declining consent.

Please note that many *FIRST* events are livestreamed and *FIRST* participants have given permission to appear in footage from *FIRST*. This does not mean that people can record specific interactions without additional consent.

Laws regarding recording of conversations vary state-to-state and country-to-country, and, in some cases, recording without consent may be criminal. Introducing the idea of recording a conversation with an implied reason of proving someone's error can escalate a discussion and is likely to increase its adversarial nature.

- E117 *Enter only 1 ROBOT in the tournament.** At a given *FIRST* Tech Challenge event, each team may only inspect and play MATCHES with 1 ROBOT. *FIRST* Tech Challenge teams may only participate in 1 concurrent event at a time.

The intent of this rule is to use tournament resources responsibly by not requiring volunteers to inspect multiple ROBOTS and to prevent loopholes around having multiple inspected ROBOTS that can be switched out between MATCHES.

This rule does not prohibit teams from bringing other ROBOTS or robot-like assemblies into the venue for other purposes such as awards presentations or pit displays.

It is expected that teams will update, make changes and even build multiple ROBOTS during a season; this rule only applies to bringing multiple different ROBOTS to a single event to play MATCHES.

E118 *No saving seats. Teams are not permitted to save or designate seats for team members that are not actively using them.

Teams may not hang banners or ribbons or otherwise designate seating. (Event staff will remove and discard any banners, roping, etc., used to designate seating.) Please take turns sitting in the bleachers/stands if seating is limited. If there is a crowding problem, we ask that you kindly leave after your team's MATCH and return later, if possible.

The Event Director may reserve seats for attendees who require accessible seating, for certain volunteers, or to ensure teams in the Playoffs have seats to watch their teams play.

5.2 Machine Shops and Host Team Build Spaces

Rarely, some events host a machine shop or open their team's build space, during specific hours (see the event public agenda), to help teams with repair and fabrication of their ROBOT. Machine shops are typically sponsored by the local host organization. In most cases, the machine shop is on site and readily accessible to all teams. All competing teams should have access to the same resources.

5.3 Wireless Rules

E301 *No wireless communication. Teams may not set up their own Wi-Fi (802.11a/b/g/n/ac/ax/be) wireless communication (e.g., access points or ad-hoc networks), Bluetooth, or any other communications systems using 2.4GHz or 5GHz wireless in the venue.

A wireless hot spot created by a cellular device, camera, smart TV, etc. is considered an access point.

Some smart TVs have access points enabled by factory default. Please make sure that functionality is disabled for any TVs brought to the event.

Bluetooth uses 2.4GHz frequencies to communicate which can interfere with venue and ROBOT systems.

Many R/C toys (including drones, wireless vehicles, FPV systems) use 2.4GHz and 5GHz communications. Do not operate these in the venue.

E302 *Don't interfere with wireless networks. Participants may not interfere, attempt to interfere, or attempt to connect with any other team or *FIRST* wireless network without expressed permission.

Teams are encouraged to report suspected wireless security vulnerabilities to the *FIRST* Technical Advisor (FTA) or Event Director if at the event or to *FIRST* via customerservice@firstinspires.org to report a suspected issue after the event.

5.4 Load-In

Some large events (often multi-day events) may set specific time frames, published on the event public schedule, in which teams are invited to load their ROBOT and equipment into their pit areas before pits officially open.

Load-in can be stressful for teams and volunteers, which can be mitigated by preparation and planning. Unanticipated factors, like traffic or weather, can change a team's scheduled arrival time, making the process difficult. The most important things a team should remember are to be safe, gracious, and professional.

5.5 Pits

A team pit is the designated space, typically a 10 ft. by 10 ft. by 10 ft. (~3 m x 3 m x 3 m) area, where a team may work on their ROBOT. Each team is assigned a pit space typically marked with their team number. This helps team members, JUDGES, and visitors find teams easily. Pit spaces may vary based on competition venue size limits.

The pit area refers to the general area where team pits are located which encompasses the aisles between the pits, pit admin, ROBOT inspection, practice FIELD, or other areas where ROBOTS may be active or worked on. All pit rules apply to the full pit area.

Additional limitations beyond those listed below may be imposed by the Event Director but they should be clearly communicated at least 48 hours before the event start time and applied to all teams fairly.

Team pits may or may not have a table and power outlet. If individual team outlets are not provided, the venue must provide access to team-usable outlets in the pit area for charging batteries. Power may not be available overnight for a multi-day event.

E501 *Pits are unavailable if closed. Teams may not access their pit area outside the designated hours.

E502 *Pit set ups should be self-contained within the space assigned by the Event Organizers. Teams should set up their allowed equipment fully within their assigned pit space. Teams may not:

- A. run power or internet lines from their team pit to any other area except as instructed or allowed by the Event Director,
- B. swap team pits with other teams if pits have assigned team numbers, or
- C. move themselves to empty team pits without Event Director approval.

E503 *Keep aisles and exit pathways clear. Teams may not block aisles and pathways.

E504 *Open flames and spark emitting devices must be limited and carefully controlled. Tools that throw sparks or produce open flames are generally prohibited, except in limited and safely controlled instances. The Event Director may impose additional restrictions on open flames or sparks.

Examples which are generally acceptable: limited use of a lighter to melt strings or strap to prevent fraying, using a sander to shorten a bolt as long as the sparks are directed safely and is limited in duration.

Examples of tools that violate this rule include, but are not limited to: welders, bench and angle grinders, and gas torches.

- E505** ***Only small benchtop machinery is permitted in team pits.** Small machinery is allowed but floor standing power tools are prohibited. The Event Director may impose additional limitations.

'Small' machinery is machinery that can be easily lifted by one person and examples include, but are not limited to: 3D printers, small band saws, small drill presses, desktop CNC mills, and sanders.

Examples of prohibited machinery include, but are not limited to: full-size free standing drill presses, and band saws.

- E506** ***No brazing or welding.** Brazing/welding is prohibited.

- E507** ***Solder with specific tools only.** Soldering may be done using an electric iron/gun only.

- E508** ***Pit structures must be safe.** Teams may not build any structure that supports the weight of people or stores items overhead. Structures may not block or inhibit fire sprinkler systems or otherwise be unsafe. The Event Director may impose additional restrictions.

Popup tents may be used assuming they comply with E502, but the coverings may violate this rule if they interfere with fire suppression systems.

- E509** ***Only use aerosol or other chemicals with noxious fumes in approved areas.** Any aerosol or chemical that produces noxious fumes or sprays particulates should only be used in approved areas. Not all venues will allow the use of these products anywhere on site.

- E510** ***Don't heat or cool ROBOT components to gain an advantage.** Teams may not attempt to gain a competitive advantage by heating or cooling ROBOT parts above or below the ambient temperature of the venue.

The intent of this rule is that ROBOTS should compete as if they were left alone for an extended period of time in the competition venue at ambient temperature. Behaviors that are against the spirit of this rule include, but are not limited to:

- Cooling fuses so they take longer to trip than normal,
- Heating batteries to increase their performance, and
- Freezing heatsinks so they are more effective at cooling other components.

Examples of behaviors that would not violate this rule include, but are not limited to:

- Heating or cooling components for reasons unrelated to ROBOT performance (e.g., warming up heat shrink tubing during installation)
- Using a battery that is slightly above ambient temperature as a result of its regular charging cycle, and
- Using a ROBOT with components that are warm as a result of prior use.

E511 *Charge batteries in a safe and fair manner. When charging batteries teams must:

- A. Charge batteries at a safe rate, following all manufacturer recommendations,
- B. Never charge batteries on a battery charger that exceeds a 3-amp average channel current, and
- C. Charge batteries using safe connectors.

Safe connectors are those with a polarized connector corresponding to the connector on the battery itself. Batteries must never be charged using alligator clips or similar.

5.6 ROBOT Carts

E601 *Carts must not be a nuisance. Teams may use carts to transport their ROBOT throughout an event. Carts must:

- A. be easy to control and maneuver,
- B. pose no risk to bystanders,
- C. fit through a standard 30-inch (762mm) door,
- D. remain in the team pit when not in use,
- E. not be equipped with music or other sound generating device, and
- F. not use powered propulsion.

5.7 Ceremonies

At most events, there are opening and closing ceremonies to show honor and respect for represented countries, sponsors, teams, mentors, volunteers, and award winners. Ceremonies provide everyone with the opportunity to collectively applaud the successes of all participants. They also give teams a chance to "meet" the volunteers, sponsors, and supporters involved with the event. Closing ceremony elements are at the end of most events and are integrated into and presented between Playoff MATCHES.

At the awards ceremony, *FIRST* presents trophies and medallions to outstanding teams. All team members are encouraged to attend the ceremonies, be punctual, and show appreciation to volunteers that staffed the event, and celebrate their fellow teams.

E701 *Quiet in the pits during ceremonies. During ceremonies outside of Playoff MATCHES, team members may not:

- A. use power tools,
- B. use loud hand tools (hammers, saws, etc.), or
- C. shout, yell, or use loud voices in a way that's disruptive to the ceremony.

E702 *Pit person limit during ceremonies is 5. No more than 5 team members may be in the pits during ceremonies outside of Playoff MATCHES. Each team must have at least 1 representative observing ceremonies to be responsible for relaying important information to the entire team.

All teams are encouraged to have as many people in the stands for ceremonies as possible. This is important both to celebrate all who are recognized during ceremonies, but also to listen for important day-of information from event organizers which might be critical for your team.

E703 *Be respectful during anthems. Team members, including any remaining in the pits, should exhibit peaceful behavior during the presentation of all national anthems. If team members wish to abstain from traditional anthem observance behaviors, they have a right to do so, as long as they remain silent and non-disruptive.

6 Awards (A)

This section includes a high-level description of each of the components of judging and ROBOT game specific awards in *FIRST* Tech Challenge.

FIRST Tech Challenge celebrates the excitement of competition both on and off the field. Through the following awards, we celebrate the *FIRST* Core Values which makes us so much “*More than Robots®*”. Please note that different event types (e.g., League Tournaments, Regional Championship, *FIRST* Championship) or event sizes may offer different sets of awards. Not every award is presented at every *FIRST* Tech Challenge event. No awards are presented at League Meets - see Section [14 League Play Tournaments \(L\)](#); additional details by event type are available in the sections below.

Team judged awards are determined by volunteers from the community who prepare for the event with thorough training and certification. There are two key judging volunteer roles:

- **JUDGES** – meet with teams to learn about and celebrate the unique journey and accomplishments of each team and evaluate these against award requirements. JUDGES interact with STUDENTS in the pits and sometimes in dedicated judging spaces. As a group, JUDGES determine the teams that receive awards at events with the guidance of the JUDGE Advisor.
- **JUDGE Advisor (JA)** – trains, directs, and supervises JUDGES throughout the event. JUDGE Advisors oversee the judging processes and procedures to make sure they are in accordance with *FIRST* Tech Challenge judging guidelines but they do not select who wins the awards.

FIRST Tech Challenge judging is delivered in one of two ways. Most events will have in-person (“traditional”) judging along with the standard in-person gameplay. The second option is hybrid format which has in-person gameplay, but judging is done remotely before in-person gameplay. This manual will primarily describe the traditional in-person judging process. The remote judging process follows the same overall judging standards and requirements, but interviews are conducted online, and in-person meetings may not occur.

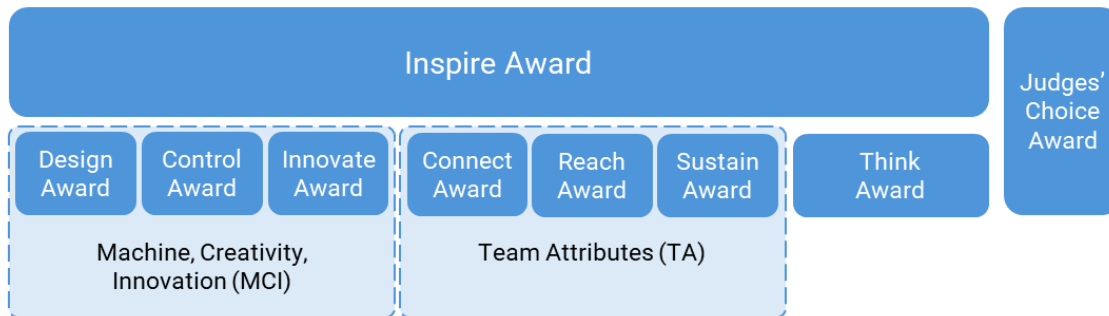
Teams may also read the [Judge and Judge Advisor Manuals](#) (*coming soon*) to gain more insight into the complete judging process. Teams are also encouraged to review the [Outreach Terms and Definitions Document](#) to ensure all teams can clearly communicate with JUDGES and our community the great things they do to grow *FIRST*.

6.1 Team Judged Awards Overview and Schedule

FIRST Tech Challenge team judged awards fall into three categories, which have one or more awards each: Machine, Creativity, and Innovation (MCI), Team Attributes (TA), and Documentation. In addition, the Judges’ Choice Award is given to a stand-out team which was not recognized in one of the other categories. The most prestigious, all-around award is Inspire Award (Figure 6-1).

The local Program Delivery Partner may elect to give additional awards to celebrate local sponsors or initiatives, but these awards are not considered Team Judged Awards for the purposes of advancement calculations as described in Section [4 Advancement](#).

Figure 6-1: Award hierarchy



- The **Inspire Award** recognizes teams who excel in MCI, TA, and Documentation accomplishments. This team is an all-around inspiration for others.
- **MCI awards** recognize the technical accomplishments of teams in the brainstorming, design, construction, operation, and control of their ROBOTS.
- **TA awards** recognize teams who have expanded their skillset, created a plan to sustain their program and team, and spread the message of *FIRST* throughout their outreach.
- The **Think Award** recognizes teams who masterfully document their team’s process and ROBOT using their PORTFOLIO.
- **Judges’ Choice Award** recognizes a team whose unique efforts, performance, or dynamics merit recognition, but does not fit into any of the other award categories.

The JUDGES will gather information from the teams through several different pathways (Figure 6-2). All teams will have the opportunity to submit a team PORTFOLIO which should document aspects of their team which directly support the team judged award criteria or information which they would like the JUDGES to consider.

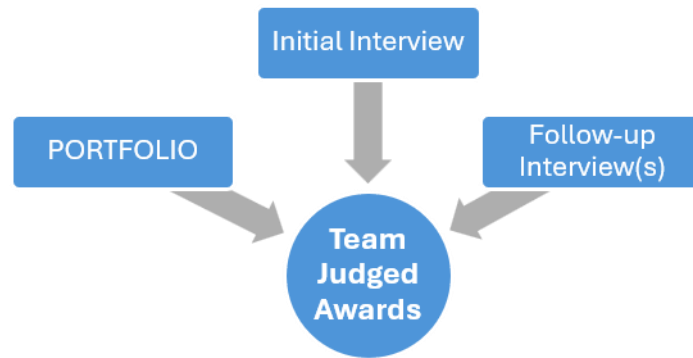
All award winners chosen by the JUDGES are recognized as being positive examples of the award criteria, not necessarily the “best” team. JUDGES will only consider the published award criteria in Section [6.3 Team Judged Award Descriptions](#).

Teams may participate in judging regardless of the inspection status of their ROBOT and are eligible for awards even if they are attending the event without a ROBOT.

6.1.1 Sources of Information Considered for Awards

JUDGES will use the Initial Interview, any follow-up interview, and the PORTFOLIO (where applicable) as sources of information for each award consideration.

Figure 6-2: Sources of Information for Team Judged Awards.



In addition to the specific information sources JUDGES use to evaluate teams, there are also sources of information which are specifically disallowed. JUDGES are strictly instructed to only consider information from the current event and the current season.

For the purposes of judging, the current season begins on January 1, 2026. JUDGES cannot consider information from outside of what they have seen or heard at the current event.

Per [A201.E](#), progress, challenges, and accomplishments which have taken place since January 1, 2026 can be documented in the team PORTFOLIO and will be considered as part of the current season.

Examples of information that cannot be considered during the judging process include, but are not limited to:

- Past performance (good or bad) of a team,
- Personal knowledge of a team,
- External sources such as websites and/or social media,
- A ROBOT's performance (e.g., how many points scored in a MATCH) unless it is specifically listed as an award criteria,
- ROBOT penalties during gameplay, or
- A team's ranking in the tournament.

The awards are a method *FIRST* uses to inspire STUDENTS and open their eyes to building a better future together. The judging process should foster a positive STUDENT interaction with JUDGES who are independent caring adults and can recognize their achievements and encourage them to continue learning.

6.1.2 Initial Interview

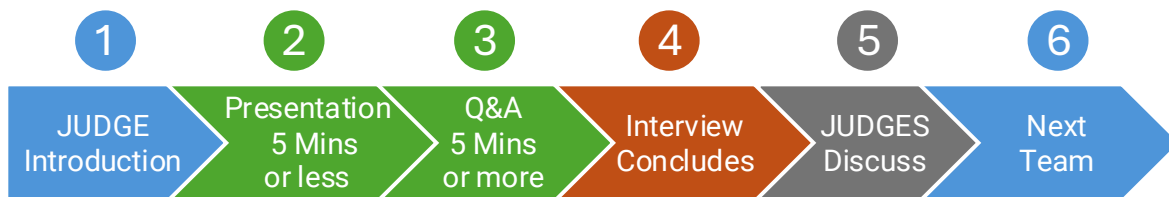
All teams are encouraged to prepare for an Initial Interview session where the team may present a prepared oral presentation to a small panel of JUDGES, followed by an open Q&A session.

The Initial Interview may be conducted in one of three formats:

- **Scheduled in-person:** A planned meeting with JUDGES, at a specific time, in a dedicated judging space.
- **Unscheduled in-person:** The interview is not scheduled for a specific time. JUDGES meet teams in their pit area at the event or in a dedicated judging space.
- **Remote:** A meeting with the JUDGES held online on a video conferencing platform.

All three types of Initial Interviews have the same rules and allow teams to share information with the JUDGES.

Figure 6-3: Initial Interview Timeline



1. JUDGES introduce themselves to the team and ask if the team has a prepared presentation they would like to start with.
2. Teams may present to the JUDGES uninterrupted for up to about 5 minutes, per [A205](#).
3. JUDGES will ask open ended questions and interact with the team for the remaining interview time.
4. The interview is concluded by the JUDGES.
5. JUDGES privately discuss the details of the interview and complete the feedback form (coming soon).
6. JUDGES identify the next team to be interviewed and repeat the process.

The Event Director, in coordination with the JUDGE Advisor and the regional planning committee, is responsible for determining the format for the Initial Interview and communicating this information to the teams prior to the event. All teams, regardless of the option chosen, are expected to be interviewed using the same format at their event.

Teams participating at events where the Initial Interview is conducted in the pits should be mindful that the pit area is an active and often noisy environment. While JUDGES will provide teams with an uninterrupted opportunity to present information and answer questions, external distractions (such as pit announcements and general background noise) may occur during the interview and could create communication challenges.

For interviews that take place in the pits, JUDGES will work with MATCH queuers and technical volunteers to ensure teams are able to attend MATCHES and work on their ROBOTS.

Teams are encouraged to review the [Judge Interview Question Bank](#) (coming soon) prior to their judging interviews to understand the type of questions that may be asked by the JUDGES. At each event, the JUDGE

Advisor will select two questions from the question bank that all teams will be asked at the start of the Initial Interview's question and answer session. One question will be focused on the MCI award category, and one question will be focused on the TA award category. After the first two questions are asked and answered, JUDGES may ask additional questions to help evaluate the team's performance against the award criteria.

Additional questions asked during interviews may come from the question bank but teams should be prepared to answer questions that are not listed within the document.

6.1.3 Pit Interview(s)

After all the judging panels have finished the Initial Interviews, the JUDGES compare notes and may elect to follow up with the teams in the pit area during the competition and conduct informal pit interviews. During this round of pit interviews, teams have the opportunity to expand upon materials presented in the Initial Interview and share additional content with the JUDGES (e.g., ROBOT prototypes, design artifacts, and photos or letters from outreach events). A team does not need to prepare another presentation for this pit interview but should be ready to answer questions from the JUDGES.

JUDGES may read additional information during pit interviews but will not bring back additional content to be referenced as part of the JUDGE deliberations.

6.1.4 Sustained Outreach and Demonstrating Impact by Numbers

In general, JUDGES will consider ongoing, sustained outreach to be of higher quality than occasional or one-off outreach. JUDGES will seek to understand what is the impact of the outreach to the individuals being reached by the activity.

Teams are encouraged to review the [Outreach Terms and Definitions Document](#) to understand the requirements behind specific terms (starting a *FIRST* team, running an event, reaching x number of people). JUDGES may ask specific questions when a specific term listed in this document is mentioned in a team's PORTFOLIO or during an interview.

6.2 Team Judged Award Rules

A201 *Team PORTFOLIOS have limits. Teams have the opportunity to submit a team PORTFOLIO to be used as part of the judging process. Other printed or digital content outside this document will not be collected by the JUDGES for consideration during deliberations. Team PORTFOLIOS must meet the following requirements:

- A. must consist of 1 cover page including the team number and optionally: team name, PORTFOLIO table of contents, team organizations, sponsors, logo, motto, and picture of the ROBOT and/or team,
- B. no more than 15 pages of content,
- C. use only US Letter (8.5" x 11") or A4 (210 x 297 mm) size pages,
- D. if submitted digitally, the complete submission must be less than 15MB in size, and
- E. must only include progress, challenges, and accomplishments which have taken place since January 1, 2026.

None of the content of the cover page will be used by JUDGES to evaluate any awards criteria. Any content beyond the allowed 15 pages will not be reviewed by the JUDGES.

Teams must strictly minimize Personally Identifying Information (PII) in the PORTFOLIO. For student privacy, use only first names and last initials. While student photographs are permitted, full names must not be disclosed.

The JUDGES use the cover page to identify the team associated with the PORTFOLIO. Teams who forget to include a cover page may be disqualified from judging if the JUDGES cannot determine what team the PORTFOLIO is associated with.

Design your PORTFOLIO for readability. Avoid fonts under 10 pt and low-contrast text on images—JUDGES cannot evaluate what they cannot read. Use free tools like the [WebAIM Contrast Checker](#) to ensure your font size, color, and design choices are clear.

JUDGES will not click on links, websites, or videos in a PORTFOLIO. They also cannot take extra printed papers from an interview back to their judging room. Teams should put everything they want JUDGES to see directly in their PORTFOLIO.

Teams may use AI and research aids to compose their portfolios, provided they respect intellectual property rights and include a footnote or endnote credit. Example Credit: "Portfolio created by Team XXXXX and ChatGPT"

A team may reference previous seasons (for example, in a team or organizational plan) to demonstrate growth, but the emphasis must be on the current season.

A202 *PORTFOLIOS must be submitted on time and as requested. Teams must submit their PORTFOLIO as instructed by the Event Director and by the stated deadline if they wish to have it considered during the judging process. If no other instructions are provided, teams should submit 1 printed copy of their PORTFOLIO during the Initial Interview.

Instructions about when and how teams should submit their PORTFOLIOS should be communicated by the Event Director before the event.

If circumstances prevent a team from following the PORTFOLIO submission instructions, the Event Director should work with the JUDGE Advisor to make reasonable accommodations to accept all team PORTFOLIOS unless doing so poses an undue burden to the judging process.

Teams are encouraged to have an additional copy (digital or physical) of their PORTFOLIO available in their pit to assist with interviews they have with the JUDGES.

A203 *Teams must participate in an interview session. To be considered for any judged awards the team must participate in an Initial Interview session.

If scheduled, teams should be informed of their assigned time by the Event Director or local Program Delivery Partner in advance of the event.

If there is a schedule conflict or the team misses their Initial Interview slot due to unforeseen circumstances the team should work with the Event Director or local Program Delivery Partner to make reasonable alternate accommodations for an Initial Interview at the event if possible.

A204 * Have the right resources available for your Initial Interview. Teams should be prepared for their Initial Interview by having:

- A. no fewer than 2 STUDENT representatives for teams of 2 STUDENTS and larger,
- B. a copy of their team PORTFOLIO for reference during the interview,
- C. “show and tell” demonstration items which may include the team’s ROBOT (encouraged, but optional),
- D. 1 silent observer per [A208](#) (optional), and
- E. 1 support person to fill accommodation needs per [A209](#) (optional, as needed).

Teams are encouraged to have as many STUDENTS as possible involved in the Initial Interview process.

A team does not have to have a ROBOT to participate in judging or be eligible for judged awards.

Teams may power on and demonstrate their ROBOT functions during the initial interview but may not cause significant delays during the interview.

A205 *Everyone gets equal Initial Interview time. All teams will be scheduled for the same length Initial Interview of at least 10 minutes.

- A206 *The Initial Interview timer starts when the team starts.** The timer starts after the JUDGES have introduced themselves and either, the team begins their presentation, or the Q&A portion of the interview begins. Teams who take an extended amount of time to begin will be warned by the JUDGES to begin promptly and then the Initial Interview timer will be started regardless of the readiness of the presenting team.
- A207 *Prepared initial presentation time should not be interrupted.** The first 5 minutes of the Initial Interview are reserved for the team to present a prepared oral presentation uninterrupted, if they choose. The uninterrupted presentation time may be ended early by the team. Any remaining time should be a question and answer conversation with the STUDENTS and led by the JUDGES.
- A208 *One adult silent observer is welcome.** One adult may attend the judging session and be present for any interaction between the JUDGES and the STUDENT team members. Adult coach(es) may be present for any interactions between the JUDGES and the STUDENT team members outside of the Initial Interview. The adult observer and coach(es) may not interact or actively coach during any interaction between the JUDGES and the STUDENT team members.

The purpose of the adult silent observer is to provide silent confidence to the STUDENT team members presenting in an unknown environment with new people.

- A209 *Translator and/or Sign Language Interpreter accommodations will be made for teams who need it.** Teams who need to use a translator to communicate with the JUDGES may provide one if the team's native language does not match that of the JUDGES. This includes sign language or other adaptive technology. Teams who intend to interview with the assistance of a translator must work with the Event Director in advance to request additional interview time of between 2 and 5 minutes, if needed. The translator may be an adult and can be in addition to the silent observer in [A208](#).

In most cases the translator will need to be provided by the team. If other accommodation is needed, the team should [contact your local leadership](#) to discuss options.

- A210 *No Photos, Video or Audio recording during Initial Interview.** In addition to the restrictions of [E116](#), no recording of video or audio, or photos may be taken during the Initial Interview.

A211 *The number of awards given scales with event size. The total number of awards given is based on the number of teams checked in at the event. Not all awards are given at every competition. Only the awards specified in Table 6-1 based on the event size are points-eligible for advancement.

Table 6-1: Total judged awards available based on all event participating teams

Total Event Participating Teams					
Award		4-10 Teams	11-20 Teams	21-40 Teams	41-64 Teams
Inspire Award		1 st Place	1 st Place 2 nd Place	1 st Place 2 nd Place 3 rd Place	1 st Place 2 nd Place 3 rd Place
Think Award		1 st Place	1 st Place	1 st Place 2 nd Place	1 st Place 2 nd Place (3 rd Place*)
TA Awards	Connect Award	1 st Place (Only one of Connect, Reach, or Sustain will be given)	1 st Place	1 st Place (2 nd Place*)	1 st Place 2 nd Place (3 rd Place*)
	Reach Award		1 st Place	1 st Place (2 nd Place*)	1 st Place 2 nd Place (3 rd Place*)
	Sustain Award		1 st Place	1 st Place (2 nd Place*)	1 st Place 2 nd Place (3 rd Place*)
MCI Awards	Design Award	1 st Place (Only one of Innovate, Control, or Design will be given)	1 st Place	1 st Place (2 nd Place*)	1 st Place 2 nd Place (3 rd Place*)
	Innovate Award		1 st Place	1 st Place (2 nd Place*)	1 st Place 2 nd Place (3 rd Place*)
	Control Award		1 st Place	1 st Place (2 nd Place*)	1 st Place 2 nd Place (3 rd Place*)
Judges' Choice Award		Optional*	Optional*	Optional*	Optional*

*Discretionary awards

See Section [13.8 Dual Division Events](#) for the modified dual division version of this rule.

- A212 *Judging feedback is provided to all teams.** All teams will receive feedback from their Initial Interview session. The JUDGES complete a form immediately following the Initial Interview based on their initial impression of the team. This feedback form is not used during deliberations and does not include any updated feedback based on later interactions by the JUDGES with the team.

The feedback form will either be returned with the PORTFOLIO for in-person judging near the end of the event, or the Lead Coach 1 will receive access to a digital version in [FTC-Scoring](#) following the event.

- A213 *Teams are only eligible to win the Inspire Award in their own region.** Teams are only eligible to be considered for the Inspire Award (1st, 2nd, or 3rd place) when competing at a tournament within their HOME REGION.

FIRST Championship and FIRST Premier Events are an exception to this rule. At these events, all teams may be considered for the Inspire Award.

- A214 *Teams cannot win the Inspire Award at multiple Qualifying or League Tournaments.** Teams are only eligible to win 1st place Inspire Award once per season from any Qualifying or League Tournament.

Teams who have won 1st Place Inspire are eligible to win 2nd or 3rd place Inspire Award at subsequent Qualifying or League Tournaments.

Teams who have won 1st Place Inspire at a Qualifying or League Tournament are eligible to win it at their Regional Championship.

- A215 *Teams can only get one judged award.** Teams are only eligible to win or be a runner-up for a single team judged award at the event.

This rule does not prevent a team from winning additional awards listed in Section [6.4 Tournament ALLIANCE Awards](#) and Section [6.5 Individual Awards](#).

6.3 Team Judged Award Descriptions

6.3.1 Inspire Award

The Inspire Award recognizes a team that is a strong role model for all *FIRST* programs. This team is a top contender for many judged awards and competes with a positive, respectful attitude.

The Inspire Award winner inspires other teams both on and off the playing field. Their actions reflect the *FIRST* Core Values and embody *Gracious Professionalism*. They regularly share their experiences, enthusiasm, and knowledge with other teams, sponsors, their community, and the JUDGES. Working as a unit, this team will have shown success in performing the task of designing and building a ROBOT.

Table 6-2: Inspire Award Criteria

Inspire Award Criteria		
Required	1	Team must submit a PORTFOLIO.
Required	2	The Inspire Award celebrates the strongest qualities of all the judged awards. A team must be a strong contender for at least one award in each of the following judged award categories: A. Machine, Creativity, and Innovation Awards, B. Team Attributes Awards, and C. Think Award.
Required	3	Team must be positive and inclusive, and each team member contribute to the success of the team.
Required	4	Team is able to share their experiences and knowledge to the JUDGES.

6.3.2 Think Award

The Think Award recognizes a team for their excellent PORTFOLIO. The PORTFOLIO is a clear and organized record of the team's engineering journey and growth this season. JUDGES look at this document to find the most deserving recipient. Teams may also share extra details about their building, design, or programming process in their PORTFOLIO to help JUDGES understand their choices.

Table 6-3: Think Award Criteria

Think Award Criteria		
Required	1	Team must submit a PORTFOLIO. The PORTFOLIO must include at least one of these engineering topics: A. evidence of use of the engineering process, B. lessons learned and applied relating to the design of their ROBOT, C. comparing choices: Show how you looked at different ideas and explain why you chose one over the other, and/or D. math choices: Show how you used math to make decisions about your ROBOT or programming design.
Encouraged	2	Information in the PORTFOLIO should be easy to read and easy to find.

6.3.3 Connect Award

The Connect Award recognizes a team that builds meaningful partnerships with members of the science, technology, engineering, and mathematics (STEM) community. Through these partnerships, the team develops new knowledge, skills, and resources that support its long-term growth. The team has a clear plan with defined actions to achieve its goals. A PORTFOLIO is not required for this award.

Table 6-4: Connect Award Criteria

Connect Award Criteria		
Required	1	Team demonstrates professional development competency by explaining its plan for developing team member skills, including both: A. the team's goals for learning, and B. the steps the team has taken or will take to reach those goals.
Encouraged	2	Team demonstrates networking competency by building and maintaining meaningful in-person or virtual relationships with professionals in STEM.
Encouraged	3	Team demonstrates collaboration competency by actively working with members of the engineering community through mentoring, knowledge sharing, technical guidance, or collaborative activities.

6.3.4 Reach Award

The Reach Award recognizes a team that has introduced and recruited new people into *FIRST*. Through their outreach efforts, they have inspired and motivated others to join the *FIRST* community and actively participate in its programs. A PORTFOLIO is not required for this award.

Table 6-5 Reach Award Criteria

Reach Award Criteria		
Required	1	Team demonstrates outreach planning competency by clearly explaining all of the following: A. its outreach objectives, B. the strategy behind its outreach activities, and C. how these activities support the growth of the <i>FIRST</i> community.
Required	2	Team demonstrates successful recruitment of new teams, coaches, mentors, or volunteers who have not previously participated in the <i>FIRST</i> community
Encouraged	3	Team demonstrates strong communication competencies by serving as an ambassador for <i>FIRST</i> and increasing public awareness of <i>FIRST</i> programs through effective outreach and communication.
Encouraged	4	Demonstrates media and promotion competencies by developing creative, continuously improving outreach materials that effectively introduce both the team and <i>FIRST</i> to the public.

6.3.5 Sustain Award

The Sustain Award recognizes a team that has established the leadership, resources, and organizational practices needed to ensure that its team or program can continue and grow in future seasons. A PORTFOLIO is not required for this award.

Table 6-6 Sustain Award Criteria

Sustain Award Criteria		
Required	1	Team demonstrates organizational sustainability competency by explaining its plans for long-term success, including one or more of the following: A. financial sustainability, B. season planning, and/or C. long-term team sustainability objectives.
Required	2	Team demonstrates project management competency by explaining how it measures, reviews, and tracks progress toward its sustainability plans and objectives.
Encouraged	3	Team demonstrates leadership development competency through clearly defined team roles and an intentional process for preparing future student leaders.
Encouraged	4	Team demonstrates risk management competency by identifying organizational constraints, implementing mitigation strategies, and adapting plans when challenges arise.

6.3.6 Innovate Award sponsored by RTX

The Innovate Award recognizes a team that designs creative solutions to game challenges. JUDGES give this award to a team with a creative and original design for one or more parts of their ROBOT. JUDGES look at the design itself, how well it works, and the creative thinking behind it. The award can recognize the design of the whole ROBOT or one MECHANISM on the ROBOT. The design should work well during most MATCHES, but it does not need to work every time. A PORTFOLIO is not required for this award.

Table 6-7: Innovate Award Criteria

Innovate Award Criteria		
Required	1	The team demonstrates their engineering competency by showing examples of their engineering work that explain how the team developed their design.
Required	2	The design of the ROBOT or ROBOT MECHANISM is creative, unique, or both.
Required	3	The creative design must be stable and reliable. It must help the team reach its game goals most of the time.
Encouraged	4	Designs often involve risks. The team should explain how they reduced those risks.

6.3.7 Control Award

The Control Award recognizes a team that uses sensors and software to solve game challenges in a creative way. Examples include autonomous operation, smarter mechanical systems, or sensors that improve results. The solution should work well during most MATCHES, but it does not need to work every time. Teams may use their solution during the AUTO period, the TELEOP period, or both. The team's PORTFOLIO must include a summary of the software, sensors, and mechanical control system. The PORTFOLIO does not need to include the full code itself.

Table 6-8: Control Award Criteria

Control Award Criteria		
Required	1	Team must submit a PORTFOLIO. The PORTFOLIO must include all of the following: A. hardware or software control COMPONENTS on the ROBOT, B. the challenges each COMPONENT or system solves, and C. the function of each COMPONENT or system.
Required	2	The team must use one or more hardware or software solutions that use external feedback to control the ROBOT and improve how it performs.
Encouraged	3	The control solution(s) should work consistently during most MATCHES.
Encouraged	4	The team can explain how reliable their solution is. They can show this by demonstrating that it works, or by explaining how it could be improved.
Encouraged	5	The team should describe what they learned while using the engineering process to develop their control solutions (sensors, hardware, algorithms, or a combination).

6.3.8 Design Award

The Design Award recognizes a team that understands the principles of industrial design. This means balancing form, function, and appearance while meeting the needs of this season's game. The team's design process should result in a ROBOT that is efficient and that solves the game's challenges well. A PORTFOLIO is not required for this award.

Table 6-9: Design Award Criteria

Design Award Criteria		
Required	1	Team must describe or demonstrate that their ROBOT is elegant, efficient (simple to build and operate), and/or practical to maintain.
Required	2	The design of the entire ROBOT, or the detailed process used to create it, must be considered – not just one COMPONENT.
Encouraged	3	The ROBOT stands out from other ROBOTS because of its appearance and how well it functions.
Encouraged	4	The team has clearly thought through the reasons behind their design choices, such as inspiration or function.
Encouraged	5	The design works consistently and aligns with the team's game plan or strategy.

6.3.9 Judges' Choice Award

The Judges' Choice Award is optional and not given at all FIRST Tech Challenge events.

During the competition, the judging panel may meet a team whose unique efforts, performance, or dynamics merit recognition, but does not fit into any of the other award categories. To recognize these unique teams, FIRST offers a Judges' Choice Award.

6.4 Tournament ALLIANCE Awards

6.4.1 Winning Alliance Award

This award will be given to the winning ALLIANCE represented in the final MATCH of the Playoffs of a single-division Tournament or Championship event. If the event is a dual-division or multi-division event, there will be Winning Alliance Awards awarded to both the division playoff winners and the event finals playoff winners.

6.4.2 Finalist Alliance Award

This award will be given to the finalist ALLIANCE represented in the final MATCH of the Playoffs of a single-division Tournament or Championship event. If the event is a dual-division or multi-division event this will be awarded to the division playoff finalists and the event finals playoff finalists.

6.5 Individual Awards

6.5.1 FIRST Leadership Award

FIRST Leadership Award semi-finalists, finalists, and winners exemplify student leadership. These individuals actively promote the FIRST mission, champion Core Values like Inclusion, Teamwork, and Impact, and embody *Gracious Professionalism*. FIRST aims to support these students as they continue to serve as lifelong leaders, [alumni](#), and advocates.

Please visit the [FIRST Leadership Award webpage](#) to see complete award submission details and to see past FIRST Tech Challenge winners.

6.5.2 Compass Award

This is an optional award offered at the Regional Championship tournament level of competition. All teams attending FIRST Championship will have an opportunity to submit for this award at FIRST Championship.

The Compass Award recognizes an adult coach or mentor who has given outstanding guidance and support to a team throughout the year and demonstrates to the team what it means to be a Gracious Professional. The winner of the Compass Award will be chosen from candidates nominated by FIRST Tech Challenge STUDENT team members, via a 40-60 second video submission. The video must highlight how their mentor has helped them become an inspirational team. The video should emphasize what sets the mentor apart.

Table 6-10: Compass Award Criteria

Compass Award Criteria		
Required	1	Team must be able to clearly articulate this mentor's contribution to the team and explain what sets this mentor apart.
Required	2	Submission must be in video format and meet the following requirements: A. submitted by the deadline established by the Event Director or local Program Delivery Partner, B. be in one of the following formats: .mp4, .mov, .avi, or .wmv (no links to streaming services will be accepted), C. one video submission per team per event (videos can be updated or changed between events), D. all music must be used with permission from the copyright owners and be indicated in the video credits, and E. videos cannot be longer than 60 seconds, including credits.

Teams are encouraged to review the [FIRST Branding and Style Guidelines](#) before creating their video.

6.6 Project-Based Global Awards

Project-based global awards are awards that are only judged and awarded once per season and are open to all registered FIRST Tech Challenge teams. Each award has its own independent requirements and deadlines. These awards do not contribute towards team advancement.

More information about Project-Based Global Awards coming soon!

7 Game Sponsor Recognition

Thank you to the 2026-2027 *FIRST®* Tech Challenge season presenting sponsor, [RTX](https://www.rtx.com).



8 Game Overview

This section will be updated with the Kickoff Competition Manual release on September 12, 2026

9 ARENA

This section will be updated with the Kickoff Competition Manual release on September 12, 2026

10 Game Details

This section will be updated with the Kickoff Competition Manual release on September 12, 2026

11 Game Rules (G)

This section will be updated with the Kickoff Competition Manual release on September 12, 2026

12 ROBOT Construction Rules (R)

The rules listed below explicitly address legal parts and materials and how those parts and materials may be used on a ROBOT. A ROBOT is an electromechanical assembly built by a *FIRST* Tech Challenge team to play the current season's game and includes all the basic systems required to be an active participant in the game –power, communications, control, and movement about the FIELD.

There are many reasons for the structure of the rules, including safety, reliability, parity, creation of a reasonable design challenge, adherence to professional standards, and impact on the competition.

Another intent of these rules is to have all energy sources and active actuation systems on the ROBOT (e.g., batteries, motors, servos, and their controllers) drawn from a well-defined set of options. This is to ensure that all teams have access to the same actuation resources and that the INSPECTORS can accurately and efficiently assess the legality of a given part.

ROBOT construction rules in this section only apply to the construction of your ROBOT as it might be inspected. MATCH play rules and consequences for violating rules during MATCH play are outlined in Section [11 Game Rules \(G\)](#).

ROBOTS are made up of COMPONENTS and MECHANISMS.

- A COMPONENT is any part in its most basic configuration, which cannot be disassembled without damaging or destroying the part or altering its fundamental function.
- A MECHANISM is an assembly of COMPONENTS that provide specific functionality on the ROBOT. A MECHANISM can be disassembled (and then reassembled) into individual COMPONENTS without damage to the parts.

Many rules in this section reference Commercial-Off-The-Shelf (COTS) items. A COTS item must be a standard (i.e., not custom order) part commonly available from a VENDOR for all teams for purchase. To be a COTS item, the COMPONENT or MECHANISM must be in an unaltered, unmodified state (with the exception of installation or modification of any software). Items that are no longer commercially available but are functionally equivalent to the original condition as delivered from the VENDOR are considered COTS.

Example 1: A team orders 2 ROBOT panels from RoboPanels Corp. and receives both items. They put 1 in their storeroom and plan to use it later. Into the other, they drill “lightening holes” to reduce weight. The first panel is still classified as a COTS item, but the second panel is now a FABRICATED ITEM, as it has been modified.

Example 2: A team obtains openly available blueprints of a drive module commonly available from Wheels-R-Us Inc. and has local machine shop “We-Make-It, Inc.” manufacture a copy of the part for them. The produced part is not a COTS item, because it is not commonly carried as part of the standard stock of We-Make-It, Inc.

Example 3: A team obtains openly available design drawings from a professional publication and uses them to fabricate a gearbox for their ROBOT. The design

drawings are considered a COTS item and may be used as “raw material” to fabricate the gearbox. The finished gearbox itself would be a FABRICATED ITEM, and not a COTS item.

Example 4: A COTS part that has non-functional label markings added would still be considered a COTS part, but a COTS part that has device-specific mounting holes added is a FABRICATED ITEM.

Example 5: A team has a COTS gearbox which has been discontinued. If the COTS gearbox is functionally equivalent to its original condition, it may be used.

A **VENDOR** is a legitimate business source for COTS items that satisfies all the following criteria:

- A. has a Federal Tax Identification number. In cases where the **VENDOR** is outside of the United States, they must possess an equivalent form of registration or license with the government of their home nation that establishes and validates their status as a legitimate business licensed to operate within that country.
- B. is not a “wholly owned subsidiary” of a *FIRST* team or collection of teams. While there may be some individuals affiliated with both a team and the **VENDOR**, the business and activities of the team and **VENDOR** must be completely separable.
- C. should maintain sufficient stock or production capability so they are able to ship any general (i.e., non-*FIRST* unique) product within a timely manner. It is recognized that certain unusual circumstances (such as a global supply chain disruption and/or 1,000 *FIRST* teams all ordering the same part at once from the same **VENDOR**) may cause atypical delays in shipping due to backorders for even the largest **VENDORS**. Such delays due to higher-than-normal order rates are excused. This criterion may not apply to custom-built items from a source that is both a **VENDOR** and a fabricator.

For example, a **VENDOR** may sell flexible belting that the team wishes to procure to use as treads on their drive system. The **VENDOR** cuts the belting to a custom length from standard shelf stock that is typically available, welds it into a loop to make a tread, and ships it to a team. The fabrication of the tread takes the **VENDOR** 2 weeks. This would be considered a FABRICATED ITEM, and the 2-week ship time is acceptable. Alternately, the team may decide to fabricate the treads themselves. To satisfy this criterion, the **VENDOR** would just have to ship a length of belting from shelf stock (i.e., a COTS item) to the team within 5 business days and leave the welding of the cuts to the team.

- D. makes their products available to all *FIRST* Tech Challenge teams. A **VENDOR** must not limit supply or make a product available to just a limited number of *FIRST* Tech Challenge teams.

The intent of this definition is to be as inclusive as possible to permit access to all legitimate sources, while preventing ad hoc organizations from providing special-purpose products to a limited subset of teams in an attempt to circumvent any applicable cost accounting rules.

FIRST desires to permit teams to have the broadest choice of legitimate sources possible, and to obtain COTS items from the sources that provide them with the

best prices and level of service available. Teams also need to protect against long delays in availability of parts that will impact their ability to complete their ROBOT. The build season is brief, so the VENDOR must be able to get their product, particularly *FIRST* unique items, to a team in a timely manner.

Ideally, chosen VENDORS should have effective distribution channels. Remember, *FIRST* Tech Challenge events are not always near home – when parts fail, local access to replacement materials is often critical.

A FABRICATED ITEM is any COMPONENT or MECHANISM that has been altered, built, cast, constructed, concocted, created, cut, heat treated, machined, manufactured, modified, painted, produced, surface coated, or conjured partially or completely into the final form in which it will be used on the ROBOT.

Note that it is possible for an item (typically raw materials) to be neither COTS nor a FABRICATED ITEM. For example, a 20 ft. (~610 cm) length of aluminum which has been cut into 5 ft. (~152 cm) pieces by the team for storage or transport is neither COTS (it is not in the state received from the VENDOR), nor a FABRICATED ITEM (the cuts were not made to advance the part towards its final form on the ROBOT).

Teams may be asked to provide documentation (i.e., reference the relevant rule in this manual) proving the legality of items during inspection where a rule specifies limits for a legal part (e.g., motors, servos, current limits, COTS electronics).

If your team has a question about a part's legality, please e-mail your question to customerservice@firstinspires.org for an official ruling. This process should also be employed to seek approval for alternate parts/devices for inclusion in future *FIRST* Tech Challenge seasons.

12.1 General ROBOT Design

FIRST Tech Challenge can be a high-contact competition and may include rigorous gameplay. While the rules aim to limit intentional damage to ROBOTS, interaction between ROBOTS is allowed and expected. Teams should design their ROBOTS to be robust.

R101 ***It is your team's ROBOT.** The ROBOT and its MAJOR MECHANISMS must be built by the *FIRST* Tech Challenge team that has registered for the event and intends to use the ROBOT to participate in MATCHES or as part of judged awards.

A MAJOR MECHANISM is a group of COMPONENTS and/or MECHANISMS assembled together to address at least 1 game challenge: ROBOT movement, SCORING ELEMENT manipulation, FIELD element manipulation, or performance of a scorable task without the assistance of another ROBOT.

This rule requires that the ROBOT and its MAJOR MECHANISMS were built by its team but is not intended to prohibit or discourage assistance from other teams (e.g., fabricating elements, supporting construction, writing software, developing game strategy, contributing COMPONENTS, and/or MECHANISMS).

Examples that would generally not be considered MAJOR MECHANISMS, and thus are not subject to this rule include, but are not limited to:

- A. a gearbox assembly,
- B. a COMPONENT or MECHANISM that is part of a MAJOR MECHANISM, or
- C. COTS items.

The intent of this rule is that a team's ROBOT is a product that's representative of the current team members' experience and is intended to discourage complete solutions which are provided wholly by outside organizations or companies. Also see [R301](#) and [R303](#).

R102 *STARTING CONFIGURATION is limited to an 18-inch Cube. In the STARTING CONFIGURATION (the physical configuration in which a ROBOT starts a MATCH), all parts of the ROBOT must be fully stationary, and the ROBOT must be fully self-contained within an 18 in. (45.70 cm) wide, by 18 in. (45.70 cm) long, by 18 in. (45.70 cm) high volume.

If a ROBOT uses interchangeable MECHANISMS per [3.3 MATCH Eligibility Rules](#), teams should be prepared to show compliance with this rule and [R105](#) in all configurations.

Any pre-loaded SCORING ELEMENTS may extend outside the starting size constraint.

R103 *ROBOTS may assist in holding the STARTING CONFIGURATION. In the STARTING CONFIGURATION, ROBOTS must be fully self-supported (i.e., does not exert force on the sides or top of a sizing tool). ROBOTS may accomplish this using any combination of:

- A. mechanical means while powered-off, and/or
- B. initializing an OpMode that pre-positions servos and motors to a desired stationary position. OpMode may control motors and servos to hold their position to maintain the STARTING CONFIGURATION.

ROBOTS holding STARTING CONFIGURATION during inspection or waiting for a MATCH to start may have to do so for several minutes and should limit the possibility of thermal failure (e.g., not having motors stalled against a hard stop). Teams should be especially cautious when operating a running ROBOT during inspection, please notify the INSPECTOR that the ROBOT is live.

R104 *There is no ROBOT weight limit. There is no explicit weight limit for FIRST Tech Challenge ROBOTS playing BIOBUZZ.

While there is no official weight limit, teams should still consider the impact of a ROBOT'S weight on various factors including, but not limited to:

- FIELD TILE damage
- battery consumption
- ROBOT transportation
- overall ROBOT performance

- R105** **ROBOTS must stay as one assembly, and there are limits to how much it can expand.** ROBOTS may not be designed to intentionally detach COMPONENTS. After the MATCH has started, ROBOTS may expand beyond the STARTING CONFIGURATION but are still subject to sizing constraints relative to the ROBOT, based on the initial STARTING CONFIGURATION.

Sizing Constraints and more details will be released at Kickoff

12.2 Fair Play & Damage Prevention

- R201** ***ROBOTS should be designed so they don't damage anything or make a mess in the ARENA.** The ROBOT must not pose a risk of making a mess or pose a hazard to anything in the ARENA.

The intent of this rule is that teams should design their ROBOTS in a way that will avoid damage to the ARENA and minimize the risk of ROBOTS releasing materials that would require cleanup and may result in damage and/or MATCH delays.

SCORING ELEMENTS are expected to undergo a reasonable amount of wear and tear as they are handled by ROBOTS, such as scratching or marking. Gouging, tearing off pieces, or routinely and repeatedly marking SCORING ELEMENTS are violations of this rule and [GXXX](#).

Examples of "damage risk" ROBOT features include, but are not limited to:

- traction devices with features that are known to damage the TILE floor,
- components with exposed sharp edges or sharp protrusions, and
- features with abrasive surfaces that scratch objects that rub across them.

Examples of ROBOT features "at risk of making a mess" include, but are not limited to:

- excessive use of lubricants that may spin off or drip during ROBOT operation,
- any component not secured sufficiently, including loose ballast such as sand, coffee beans, kitty litter, glitter, or ball bearings, such that it may be released on the FIELD during a MATCH,
- liquid or gel materials,
- tire sealant, and
- other lubricants including graphite powder.

- R202** ***Design ROBOTS and OPERATOR CONSOLES for safety and fair play.** ROBOT and OPERATOR CONSOLE parts shall not be made from hazardous materials, be unsafe, cause an unsafe condition, or interfere with the operations of other ROBOTS or FIELD STAFF.

Examples of items that may violate this rule include, but are not limited to:

- A. shields, curtains, or any other devices solely designed or used to limit the vision of any DRIVE TEAM members,
- B. audio devices that generate sound at a level sufficient to be a distraction or mimic match sounds,

- C. any devices or decorations specifically intended to interfere with the remote sensing capabilities of another ROBOT, including vision systems, acoustic range finders, sonars, infrared proximity detectors, etc. This includes imagery on your ROBOT that utilizes or closely mimics 36h11 AprilTags,
- D. flammable gasses or any device intended to produce flames or pyrotechnics,
- E. hazardous materials like liquid mercury or lead,
- F. high intensity light sources used on the ROBOT should only be illuminated for a brief time while targeting and may invite additional scrutiny, and teams may be asked to disable or modify their lighting at the discretion of the Head REFEREE and/or LRI,
- G. animal based materials,
- H. any device designed to damage or flip competing ROBOTS,
- I. devices or conditions that pose an unnecessary risk of entanglement,
- J. decorative or functional lighting which flashes at greater than 5Hz will invite additional scrutiny and teams may be asked to disable or modify their lighting at the discretion of the Head REFEREE and/or LRI, and
- K. other items not listed which violate the spirit of the rule regarding safe and fair play.

R203 ***ROBOTS must be designed to be quickly removed from the FIELD without requiring power.** ROBOTS must allow removal of SCORING ELEMENTS from the ROBOT and the ROBOT from FIELD elements while powered off.

Some events may allow teams to use ROBOT power during FIELD reset (e.g., driving a ROBOT to the edge of the FIELD) but ROBOTS should be designed such that this is not required.

R204 ***No grabbing the floor.** ROBOTS may not use any mechanism which is designed to increase downforce by either grabbing FIELD surfaces or by using some form of generated airflow to provide downward suction.

12.3 Fabrication

R301 ***COTS MECHANISMS are legal but have limits.** COTS MAJOR MECHANISMS purposefully designed to complete a game task are prohibited. Allowed exceptions to this rule are:

- A. COTS drive CHASSIS, provided none of the individual parts violate any other rules, and
- B. COTS MAJOR MECHANISMS created as part of the official [FIRST Tech Challenge StarterBots](#).

COTS parts are intended to help teams design and build ROBOT MECHANISMS to complete game tasks and solve challenges but are not intended to be purpose-built solutions to complete game objectives.

A vendor selling “build to print” manufacturing of publicly available, purpose-built solutions is against the spirit of this rule.

R302 ***Legal COTS parts and raw materials can be modified.** Allowed raw materials and legal COTS parts can be modified (drilled, cut, painted, etc.) as long as no other rules are violated.

Raw materials refers to unfinished building stock including, but not limited to:

- A. sheet stock,
- B. extruded shapes,
- C. metals, plastic, rubber, and wood, and
- D. magnets.

R303 ***COTS must be single DoF.** COTS COMPONENTS and MECHANISMS must not exceed a single degree of mechanical freedom (DoF). Examples of allowed COTS single degree of freedom MECHANISMS and COMPONENTS are as follows:

- A. linear slide kit,
- B. linear actuator kit,
- C. single speed (non-shifting) gearboxes,
- D. pulley,
- E. turntable,
- F. lead screw, and
- G. single DoF gripper.

Allowed exceptions to this rule are:

- H. ratcheting devices (wrenches, bearings, etc.),
- I. holonomic wheels (omni or mecanum),
- J. dead-wheel odometry kits,
- K. items that transfer motion between misaligned COMPONENTS (such as universal joints, flexible shaft couplers, and similar items), and
- L. items that connect structures at variable angles (such as ball joint linkages, rod ends, and similar items).

The intent of this rule also extends to disallow highly specialized individual COMPONENTS only designed to assemble into a multiple DoF COTS COMPONENT.

The general test for a single degree of freedom MECHANISM is whether the orientation and position of each COMPONENT in the MECHANISM can be generally predicted based on the orientation and position of a single COMPONENT (such as the input) of the system.

Example 1: A mecanum drivetrain is made up of 4 independent drive modules, each with a single DoF (ignoring the DoF of the mecanum wheels as allowed by this rule), attached to a common structure (e.g., CHASSIS). The overall MECHANISM is still a single DoF.

Example 2: Dead wheel odometry modules, allowed by this rule, are typically composed of a 1 DoF wheel (ignoring the effect of the holonomic wheel)

providing forward/backwards motion and a spring force providing an additional unique rotational or vertical motion, creating a 2 DoF system.

Example 3: Simple gripper claws, comprised of a single actuator moving 2 gripper jaws simultaneously or double actuators each controlling an independent gripper jaw, are by and large a single DoF. However, grippers that incorporate additional actuators providing additional twisting and/or bending actions (like a wrist) add degrees of freedom that are prohibited in COTS MECHANISMS.

R304 *Custom software, designs, and parts can be reused year-to-year. ROBOT software, designs, and FABRICATED ITEMS created before Kickoff are permitted.

R305 *SCORING ELEMENTS are not allowed for ROBOT construction. Current season SCORING ELEMENTS or replicas of SCORING ELEMENTS are not allowed to be used as part of ROBOT construction.

12.4 ROBOT SIGN Rules

A ROBOT SIGN is a required assembly which attaches to the ROBOT. A ROBOT SIGN simultaneously identifies a ROBOT'S team number as well as its ALLIANCE affiliation for FIELD STAFF. Criteria used in writing these rules include the following:

- Maximize FIELD STAFF'S ability to determine team number and ALLIANCE of a ROBOT,
- Minimize the amount of design challenge in creating ROBOT SIGNS, and
- Increase consistency in displaying ROBOT identification.

A template ROBOT SIGN is available for download in [US Letter](#) and [A4](#) size.

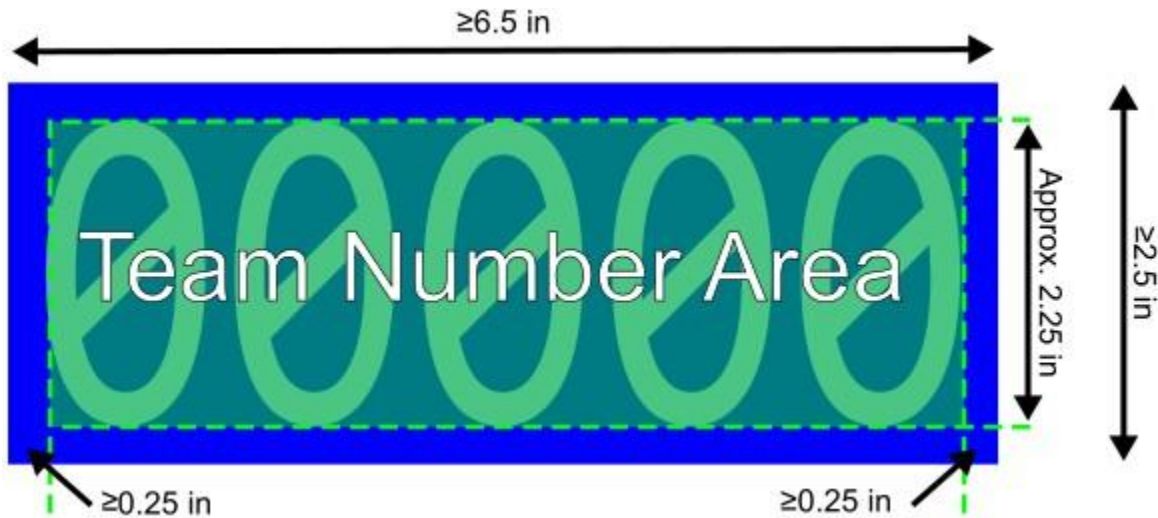
R401 *Minimum of two ROBOT SIGNS per ROBOT. ROBOT SIGNS must be placed in at least 2 separate locations on the ROBOT. These locations must be on opposite or adjacent surfaces of the ROBOT, ≥90 degrees apart. All ROBOT surfaces visible to FIELD STAFF can be used for placing ROBOT SIGNS including the top of the ROBOT. ROBOT SIGNS must meet the following criteria:

- A. be made of a robust material,
- B. minimally be 6.5 inches (16.5 cm) wide,
- C. minimally be 2.5 inches (6.4 cm) tall (Figure 12-1), and
- D. be supported by the structure/frame of the ROBOT.

The intent of this rule is for FIELD STAFF to easily view ROBOT SIGNS from at least 12 feet (3.65 meters) away before, during, and after the MATCH.

ROBOT SIGNS should be robust enough to withstand the rigors of MATCH play, but there is no specific guidance on what is robust enough. Teams should make a good faith effort with whatever they have available.

Figure 12-1: Team Number ROBOT SIGN Sizing

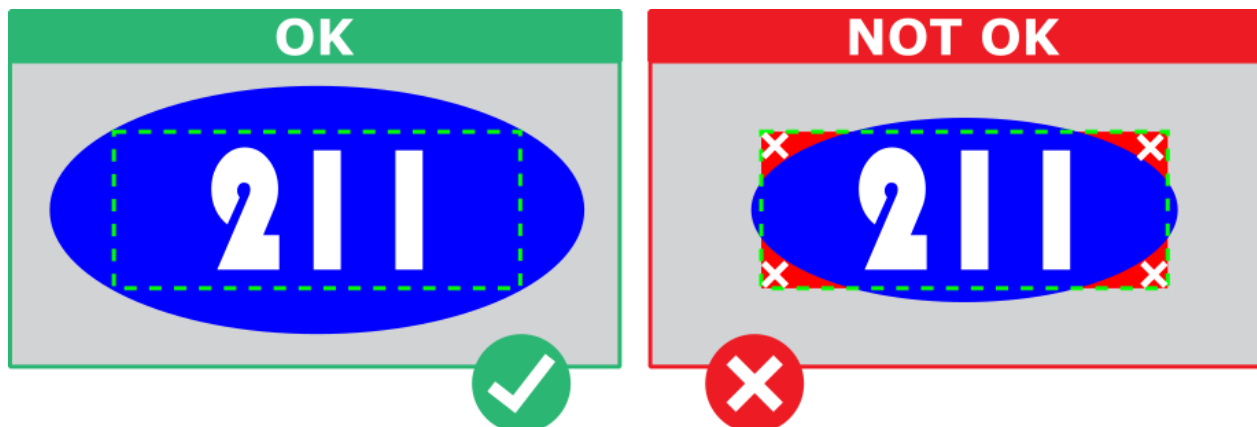


R402 ***ROBOT SIGNS indicate your ALLIANCE.** Each ROBOT SIGN must contain a rectangle with a solid red or blue opaque background at least 6.5 in. by 2.5 in. (16.50 cm by 6.35 cm) in size to indicate their ALLIANCE color (Figure 12-1), as assigned in the MATCH schedule at the event. Visible markings on ROBOT SIGNS when installed on the ROBOT, other than the following, are prohibited:

- A. those required per [R403](#),
- B. small amounts of hook-and-loop tape, hard fasteners, or functional equivalents,
- C. narrow areas of differing colors exposed at corners, folds, or cutouts,
- D. narrow markings on background solely for template purposes, and
- E. cannot be powered or rely on power from any sources to illuminate/reveal ALLIANCE color.

ROBOT SIGNS that are reversible or configurable must not allow the opposite ALLIANCE color to be visible to FIELD STAFF, except where permitted by this rule.

Figure 12-2: Minimum sized ALLIANCE rectangle

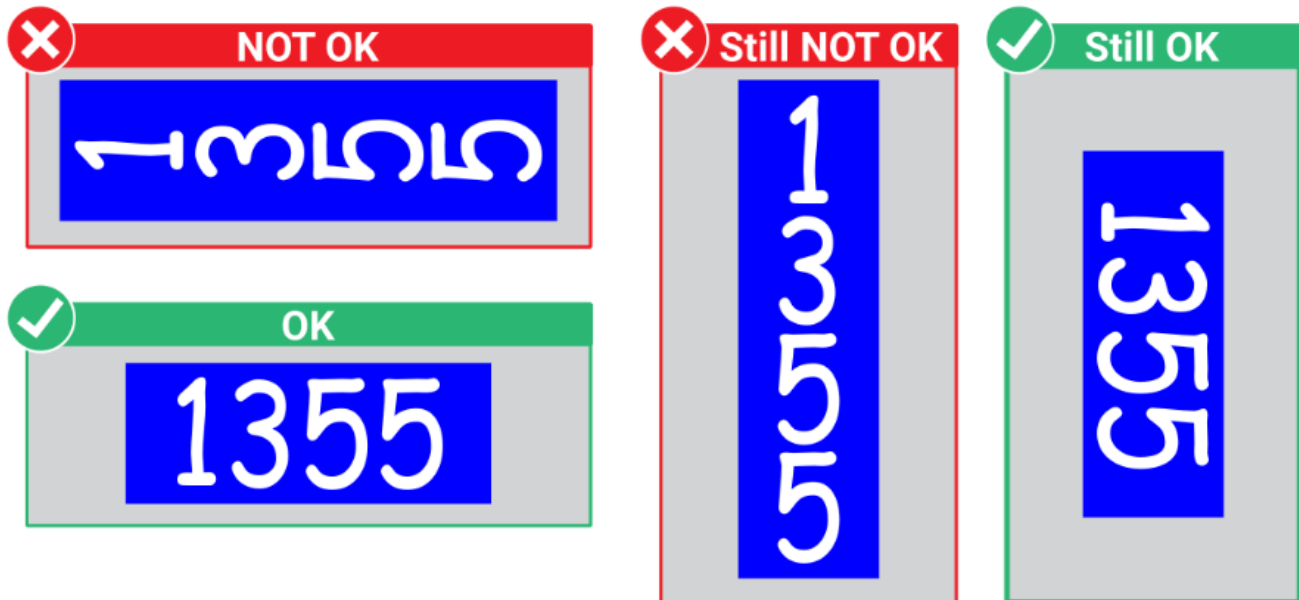


- R403 *Team number on ROBOT SIGNS.** Team numbers must be displayed and positioned on the ROBOT SIGN as shown in Figure 12-1, Figure 12-3, and Figure 12-4 and meet the following additional criteria:
- A. consist of solid opaque white Arabic numbers (e.g., 1,2,3,4) which are approximately 2.25 in. (5.70 cm) tall,
 - B. there must be a minimum of approximately 0.25 in. (0.60 cm) of background surrounding the numbers,
 - C. numbers may not be vertically stacked (Figure 12-4),
 - D. be made of robust materials, and
 - E. cannot be powered or rely on power from any sources to illuminate/reveal numbers.

Figure 12-3: Legal number for team 21001 playing on the blue ALLIANCE



Figure 12-4: Team number orientation examples for team 1355 playing on the blue ALLIANCE



If a team at an event does not have completely legal ROBOT SIGNS, and there is no color printer or other means available at the event to create a legal ROBOT SIGN, the Head REFEREE may approve an alternate substitute for use at the event.

Team numbers should be robust enough to withstand the rigors of MATCH play, but there is no specific guidance on what is robust enough. Teams should make

a good faith effort with whatever they have available. If there are limited materials available at an event, substitute ROBOT SIGNS may be simply handwritten on plain paper.

Examples of prohibited team numbers on ROBOT SIGNS include, but not limited to:

- team numbers only visible by edge lit engraved plastic
- LED Display numbers

12.5 Motors & Actuators

R501 *Only specific motors are allowed. The only allowed motor actuators are:

Table 12-1: Motor allowances

Motor Name	Part Numbers Available	Notes
AndyMark NeveRest 12V DC	am-3104, am-3104b	
AndyMark NeveRest Hex 12V DC	am-3104c	
goBILDA Yellow Jacket 520x Series 12V DC	5201-0002-0026, etc.	5201, 5202, 5203, and 5204 series
goBILDA 5000 Series 12V DC	5000-0002-4008, etc.	
Modern Robotics / MATRIX 12V DC	5000-0002-0001	Discontinued
NFR Products Yuksel 12V DC	NFR-600-100-000	
REV Robotics HD Hex 12V DC	REV-41-1291	
REV Robotics Core Hex 12V DC	REV-41-1300	
Studica Robotics Maverick 12V DC	75001	
SWYFT Robotics SWYFT Spike Motor	SR-MOTOR-DC-01	
TETRIX MAX 12V DC	739530, 39530	Discontinued
TETRIX MAX TorqueNADO 12V DC	W44260	
WATTOS Stingray 12V DC	WDM12	
Factory installed vibration and autofocus motors resident in COTS computing devices (e.g., rumble motor in a smartphone); can only be used as part of the device and cannot be removed and/or repurposed. These motors do not count toward the limit in R503.		
Motors integral to a COTS sensor (e.g., LIDAR, scanning sonar), provided the device is not modified except to facilitate mounting. These motors do not count toward the limit in R503.		

Additional motors may be added to the legal motor list in future competition manual updates.

Many legal gearmotors are sold with labeling based on the entire assembly. These motors may be used with or without the provided gearbox, and/or with any other compatible gearbox.

R502 ***Servo usage is restricted.** Servo actuators must meet the requirements below. Servos must be compatible with the power regulation devices they are ultimately used with (per [R505](#)) and may include additional servo position output interfaces (e.g., 4th Wire Position Feedback).

Table 12-2: Servo Requirements at 6V

Actuator Class	Mechanical Output Power	Stall Current	Example Servos (including, but not limited to)
Servo	≤ 8 watts @6V	≤ 4 amps @6V	AndyMark High-Torque Servos (am-4954)
			Axon MAX+ Servo (Axon MAX+)
			DSSERVO 35KG Coreless (DS3235MG)
			FEETECH Digital Servo (FT5335M-FB)
			goBILDA Dual Mode Servo (2000-0025-0003)
			REV Robotics Smart Servo (REV-41-1097)
			Studica Multi-Mode Smart Servo (75002)
Linear Servo	N/A	≤ 1 amp @6V	Actuonix Micro Linear Servo (P8-100-252-12-R)
			Hitec Linear Servo (HLS12-3050-6V)
			Studica Linear Servo RC Actuator (75014)
Servo mechanical output power is approximated by the following formula (using 6V data reported by manufacturer): Mechanical Output Power = 0.25 x (Stall Torque in N-m) x (No Load Speed in rad/s)			

Servos must meet both requirements to be legal for use. Refer to the [Inspection Quick Reference](#) document for a list of servos that are pre-approved, otherwise teams must be able to provide documentation verifying servo specifications. Use the [online calculator](#) to verify output power compliance.

If a manufacturer does not provide 6V specs, any specs for voltages that exceed 6V are allowed to be used.

Stall current is the maximum stall current possible for the device at the specified voltage, regardless of any user or VENDOR adjustable software limits that may be available within the servo.

It is important to ensure the voltage provided by the intended power regulation device is within the operating voltage range of the desired servo. The REV Control Hub and REV Expansion Hub provide 5V to servos, and the goBILDA Servo Power Injector, REV Servo Power Module, Studica Servo Power Block, and REV Servo Hub provide 6V to servos. While virtually all servos are compatible with 6V, servos with an operating voltage range of 6-8.4 DCV, for example, may not work properly when only provided 5V.

R503 ***ROBOTS are limited to a total of 8 motors and 8 servos.** A ROBOT may not have more than 8 motors and 8 servos from the allowable actuator lists per [R501](#) and [R502](#) for all MECHANISMS used in all configurations.

If a ROBOT has multiple configurations used at a single event which use different MECHANISMS, the sum total of all motors and servos must be less than or equal to the limit set in this rule.

R504 ***Do not modify actuators unless explicitly allowed.** The integral mechanical and electrical system of any motor or servo must not be modified. Motors and servos used on the ROBOT shall not be modified in any way, except as follows:

- A. the mounting brackets and/or output shaft/interface (including pinion gears) may be modified to facilitate the physical connection of the motor to the ROBOT and actuated part,
- B. the electrical leads may be trimmed to length as necessary and connectors or splices to additional wiring may be added (per [R609](#)), and purely electrical enclosures can be substituted with functionally equivalent replacements,
- C. servos may be modified as specified by the manufacturer (e.g., setting soft limits or modification for continuous rotation),
- D. labeling may be applied to indicate device purpose, connectivity, functional performance, etc. as long as the team applied label does not obstruct the markings used to identify the device,
- E. insulation may be applied to electrical terminals,
- F. repairs, provided the original performance and specifications are unchanged, and
- G. maintenance recommended by the manufacturer.

R505 ***All actuators must be controlled and powered through approved devices.** With the exception of servos, fans, or motors integral to sensors of COTS computing devices permitted in [R501](#), all actuator control signals must originate from a power regulating device. The only power regulating devices for actuators permitted on the ROBOT are:

Table 12-3: Power Regulators and Limits

Power Regulating Device	Part Number	Load Limit per Device
goBILDA 6V Servo Power Injector	3125-0001-0001	2 Servos per Port
REV Control Hub or Expansion Hub Motor Ports	REV-31-1153 / REV-31-1595	2 Motors per Port
REV Control Hub or Expansion Hub Servo Ports	REV-31-1153 / REV-31-1595	2 Servos per Port
REV Servo Power Module	REV-11-1144	2 Servos per Port
REV Robotics Servo Hub	REV-11-1855	2 Servos per Port
REV SPARKmini	REV-31-1230	2 Motors per Device
Studica Servo Power Block	75005	2 Servos per Port

R506 *The use of relays, electromagnets, and electrical solenoid actuators is prohibited. The application of electromechanical actuation through the use of additional relays, electromagnets, electrical solenoid actuators, or related systems is prohibited. In addition, the use of relays and electromagnets is also prohibited.

12.6 Power Distribution

R601 *ROBOTS can contain only 1 main battery. ROBOTS must contain 1 and only 1 approved 12V NiMH main battery. This battery is only legal source of electrical energy for the ROBOT control system and actuation during the competition and must be unaltered from the battery manufacturer state except as follows:

- A. the fuse may be replaced with a COTS equivalent in-line 20A ATM mini blade fuse installed per [R610](#), and
- B. installed connectors may be replaced with other popular connectors such as Anderson Powerpole, XT30, or any connector with a comparable power rating.

The only allowed ROBOT main power battery packs are:

Table 12-4: Legal ROBOT Main Power Battery Packs

Battery Pack	Part Number	Notes
AndyMark Flat Pack Battery DC 12V	am-5290	
goBILDA 12V NiMH Nested Battery	3100-0012-0020	
Matrix 12V 3000mAh NiMH	14-0014	May be labeled as "Modern Robotics"
REV 12V Slim Battery	REV-31-1302	
Studica 12V 3000mAh NiMH	70025	
TETRIX MAX 12V 3000mAh NiMH	W39057	Formerly 739023
WATTOS 12V Battery	WT-NMH1230	

There are many other similar style batteries available from multiple VENDORS, but only the listed manufactures and part numbers are legal for use at FIRST Tech Challenge Events.

Other batteries may be used for self-contained devices as listed in R602.

R602 *Other batteries are only allowed for self-contained peripheral devices and LEDs only. COTS USB battery packs with a capacity of 100Wh or less (27,000mAh at 3.7V), with 5V/5A max output or 12V/5A max output using USB-PD per port, and batteries integral to a self-contained devices such as camera (e.g., GoPro-style camera) may be used provided they are:

- A. not supplying power to any of the ROBOT actuators, and

- B. not used by any devices receiving control signals from the ROBOT control system (i.e., COTS USB battery packs must remain electrically isolated from the ROBOT power systems.).

Exceptions to part B of this rule are:

- i. powered USB Hubs, and
- ii. ROBOT CONTROLLER smartphones.

Any device receiving signals from a REV Control or Expansion Hub must be powered by the main ROBOT battery.

R603 ***Connect the ROBOT battery though the Main Power Switch.** Exactly one main power switch must control all power provided by the ROBOT battery pack to all power regulating devices on the ROBOT (except as specified by [R602](#)) such that all the following conditions are met:

- A. must be one of the following approved power switches:

Table 12-5: Legal Power Switches

Power Switch	Part Number
AndyMark FTC Power Switch w/ Bracket	am-4969
goBILDA Floodgate Power Switch	3103-0005-0001
REV Switch Cable and Bracket	REV-31-1387
Studica On/Off Power Switch Kit	70182
TETRIX R/C Switch Kit	W39129
WATTOS Power Switch Kit	WTS-SW1220

- B. must be mounted or located where it is accessible to the team, away from high-speed moving parts and pinch hazards, and
- C. secondary power switches can be used on the 12V line downstream of the main power switch.

There are no specific location requirements for the main power switch, but it should be located clear of any high-speed moving parts and pinch hazards. Teams are permitted to mount the main power switch behind removable panels.

The main power switch should be mounted on the ROBOT such that it is protected from ROBOT-to-ROBOT contact to avoid inadvertent actuation or damage.

R604 ***Fuses must be used as directed and must not be modified.** The intent of this rule is that teams utilize fuses as directed by a device manufacturer, and do not attempt to gain a competitive advantage by modifying the fuses, replacing the fuses with ones that have a higher trip point, or replacing them with fuses that are self-resetting.

R605 ***The ROBOT frame cannot be used as a current path.** All wiring and electrical devices shall be electrically isolated from the ROBOT frame. The ROBOT frame must not be used to carry electrical

current. Electrically grounding the control system electronics to the frame of the ROBOT is only permitted such that all of the following conditions are met:

- A. straps/cables used must be from the following approved parts:

Table 12-6: Legal ROBOT Grounding Straps

Grounding Strap	Part Number
AndyMark Resistive Grounding Strap	am-4648a
REV Resistive Grounding Strap	REV-31-1269
Swyft Grounding Cable	SR-Ground-01

- B. the strap/cable must directly connect to a fully COTS COMPONENT with an XT30 connector, and also must connect directly to the frame of the ROBOT (via the resistive terminal), and
- C. no ROBOT COMPONENTS or MECHANISMS are designed to electrically ground the ROBOT frame to the FIELD.

For additional details on installation of the grounding strap, please see the [ROBOT Wiring Guide](#).

R606 ***ROBOT CONTROLLER and the ROBOT electrical system must be inspectable.** ROBOT electrical components must be mounted with accessibility in mind, as follows:

- A. all power regulating devices (per [R505](#)), associated wiring, and all fuses must be able to be made visible for inspection, and
- B. the ROBOT CONTROLLER device must be mounted on the ROBOT such that the diagnostic lights, or device screen if applicable, can be visible for inspection.

“Visible for inspection” does not require that the items be visible when the ROBOT is in STARTING CONFIGURATION or normally during a MATCH, provided the team can make the items viewable during the inspection process if necessary.

Teams are strongly encouraged to make the diagnostic lights visible in all ROBOT configurations used during normal MATCH play. If diagnostic LEDs are not visible during a MATCH, FIELD STAFF may not be able to provide comprehensive support to the team.

R607 ***Custom Circuits must not provide regulated power above 5V unless they are only powering LEDs.**

Any active electrical item that is not an actuator (specified in [R501](#)) or power regulation device (specified in [R505](#)) is considered a CUSTOM CIRCUIT. CUSTOM CIRCUITS shall not provide regulated output voltages exceeding 5V, except if solely used for powering LEDs. CUSTOM CIRCUITS may pass through unregulated battery voltage.

R608 ***All Power regulating devices must be connected and powered through approved ports.** All power regulating devices ([R505](#)) must be powered per the manufacturer’s instructions and the following table must be true:

Table 12-7: Power Regulation Device Power Requirements

Power Regulating Device	Part Number	Method of Powering
goBILDA 6V Servo Power Injector	3125-0001-0001	Only powered using the XT30 connectors on the device by the ROBOT main battery
REV Control Hub / REV Expansion Hub	REV-31-1153 / REV-31-1595	Only powered using the XT30 connectors on the device by the ROBOT main battery
REV Servo Power Module	REV-11-1144	Only powered using the screw terminals and must only be powered by the ROBOT main battery
REV Robotics Servo Hub	REV-11-1855	Only powered using the power terminals and must only be powered by the ROBOT main battery
REV SPARKmini	REV-31-1230	Only powered by the Power input and must only be powered by the ROBOT main battery
Studica Servo Power Block	75005	Only powered by JST-VH power connector, and must only be powered by the ROBOT main battery

R609 *Use appropriately sized wire. All circuits shall be wired with appropriately sized insulated wire:

Table 12-8: Wire sizing requirements

Application	Minimum Wire Size
12V Main Battery Power	18 AWG (19 SWG or 1 mm ²)
Motor Power (unless otherwise listed)	
11-20A fuse protected circuit	
Motor Power - TETRIX MAX 12V DC Motors, REV Robotics Core Hex (REV-14-1300)	22 AWG (22 SWG or 0.5 mm ²)
PWM / Servo	
LEDs (5V / 12V)	
≤10A fuse protected circuit	
Signal level circuits (i.e., circuits which draw ≤1A continuous and have a source incapable of delivering >1A, including but not limited to: I2C, DIO, Analog, encoder and RS485 connections)	28 AWG (29 SWG or .08 mm ²)

Integrated wires originally attached to legal COTS devices or wires included/sold by the manufacturer are considered part of the device and by default legal. Such wires are exempt from this rule.

In order to show compliance with these rules, teams should use wire with clearly labeled sizes if possible. If unlabeled wiring is used, teams should be prepared to demonstrate that the wire used meets the requirements of this rule (e.g., wire samples and evidence that they are the required size).

Combining multiple smaller wires in parallel cannot be used to create an equivalent larger wire which meets minimum wire cross section requirements.

R610 *Use specified wire colors for specific buses. The 12V main power bus and +5V auxiliary bus wires must be color-coded along their entire length. The following colors must be used:

- A. positive (e.g., +12VDC / +5V Aux): red, yellow, white, brown, or black-with-stripe, and
- B. negative (e.g., common/GND): black or blue.

Note: this rule does not apply to other types of wires including, but not limited to: motor wiring, signal level wiring (e.g., encoder and sensor wires), servo cables, and extensions, or wires originally attached to legal devices by their manufacturer.

R611 *Powered USB hubs must draw energy from approved sources. Powered USB hubs used on the ROBOT can only be powered through one of the following ways:

- A. an approved COTS USB battery Pack per [R602](#), or
- B. the 5V auxiliary power port on the REV Expansion Hub or REV Control Hub.

R612 *Do not modify critical power paths. CUSTOM CIRCUITS must not directly alter the power or control pathways between:

- A. the ROBOT battery and main power switch,
- B. the main power switch and a power regulating device (per [R603](#)),
- C. any two power regulating devices (per [R607](#)), or
- D. power regulating devices and actuators.

Custom high impedance voltage monitoring or low impedance current monitoring circuitry connected to the ROBOT'S electrical system is acceptable if the effect on power pathways is inconsequential.

Altering a power pathway includes, but is not limited to, altering the voltage of the power pathway using a boost (DC voltage step-up) or buck (DC voltage step-down) converter or otherwise altering the natural variable DC voltage provided by the ROBOT battery to create a constant DC voltage.

Devices that modify actuator control signals or power (except those allowed by [R505](#)) are prohibited, such as the goBILDA Servo Travel Tuner.

R613 *Do not mix and match power on or between power regulation devices. The following rules must be adhered to when using power on any power regulation device (per [R505](#)):

- A. sensors, encoders, and other devices must be powered solely by the power regulation device they are connected to. Do not use outside power sources (e.g., custom circuits or a second hub) to power them,
- B. power from a specific port may only power devices plugged into that exact port. Do not cross-wire power to other ports, and do not combine power from multiple ports into a single power bus/line,

- C. 6V power from approved Servo Power modules/injectors may only be used to power servos, and
- D. the +5V Aux port on a REV hub may be used to power devices not connected to other power regulation devices except via USB.

12.7 Control, Command & Signals System

R701 *Control the ROBOT with a single ROBOT CONTROLLER. ROBOTS must be controlled via 1 programmable ROBOT CONTROLLER. The ROBOT CONTROLLER is the only source of control for the ROBOT actuators and must be comprised of:

- A. a REV Control Hub (REV-31-1595), or
- B. a smartphone Android device connected to a REV Expansion Hub (REV-31-1153).

In addition to A or B, a ROBOT may also contain:

- C. no more than one additional REV Expansion Hub (REV-31-1153).

We recommend teams always keep all control system device software up to date. Check the *FIRST* Tech Challenge Firmware Update Page (Coming Soon) for release announcements and most recent software versions.

Due to unpredictable variations in Android software across different manufacturers and updates, the REV Control Hub is the only officially supported ROBOT CONTROLLER device. Teams choosing to use any other unsupported device (e.g., smartphones) are responsible for testing and verifying its compatibility, functionality, and performance.

R702 *Teams may not alter coprocessor software. Modifying software on coprocessors, unless explicitly permitted in this rule, is not allowed by teams. Firmware updates in binary form provided by the manufacturer may be applied as directed by the manufacturer. Programmable vision coprocessors natively supported by the FTC SDK are an exception to this rule, and reprogramming them is permitted. A list of programmable vision coprocessors is found in Table 12-9.

Table 12-9: Supported programmable vision coprocessors

Device	Part Number
Limelight Vision Limelight 3A	LL_3A

The following are examples of allowed and disallowed devices:

Example 1: The Adafruit BNO055 Absolute Orientation Sensor is an IMU package with an onboard ARM Cortex-M0 based coprocessor to crunch sensor data and produce composite output. Its coprocessor contains software that is not intended by the manufacturer to be modified by users. This device is allowed.

Example 2: The SparkFun Optical Tracking Odometry Sensor is a laser and IMU tracking device that uses an onboard microcontroller to perform complex calculations and produce simplified results. SparkFun does provide the source

code and toolchain for advanced users to modify/update the software, which is not permitted by this rule. Firmware updates provided by SparkFun are allowed to be applied to the device. This device is allowed.

Example 3: The Digital Chicken Labs OctoQuad FTC Edition is an 8-channel encoder/PWM interface, utilizing a Raspberry Pi Pico coprocessor. Teams are not permitted to modify software running on the device, including replacing the software with their own. Updates provided in binary form by the manufacturer (Digital Chicken Labs) may be applied to the device. This device is allowed.

Example 4: Optical Flow sensors are an example of a sensor that utilizes a vision coprocessor that is treated no differently than other coprocessors per [R702](#). These devices are allowed.

Example 5: The DFRobot HuskyLens and the Charmed Labs Pixy2 are examples of vision coprocessors that are configurable but not programmable and are treated no differently than other coprocessors per [R702](#). These devices are allowed.

Example 6: The OpenMV Cam, Luxonis OAK-1, and LimeLight Vision Limelight 3G are examples of programmable vision coprocessors that are prohibited.

- R703 *Smartphone Android devices used as a ROBOT CONTROLLER must connect to the REV Expansion Hub using USB.** If used as a ROBOT CONTROLLER, the smartphone Android device must be connected via its integrated USB port to a REV Expansion Hub with any combination of USB cables (including USB OTG cables) and/or USB hubs (powered or unpowered, with or without OTG integrated into the hub).
- R704 * Use networks and bandwidth as directed.** Teams and ROBOTS must use Wi-Fi networks and bandwidth in a way that enables fair play and does not interfere with other teams or ARENA operations. Teams must abide by the following guidelines:
- A. Teams may not use any other form of wireless communication, except those offered by the provided official tools, to communicate to, from, or within the ROBOT.
 - B. Teams may not interfere with the ROBOT networks. All communication signals must originate from only the ROBOT CONTROLLER device or the DRIVER STATION device using the ROBOT CONTROLLER Wi-Fi network. No other devices may attempt to connect to, interfere with, or alter the ROBOT CONTROLLER Wi-Fi network.
 - C. Ensure all programming laptops and other devices (other than the DRIVER STATION device) are disconnected from the ROBOT CONTROLLER Wi-Fi network during MATCH play.
 - D. Software with access to the ROBOT CONTROLLER Wi-Fi network must limit the amount of data being streamed (i.e., continuous transmission of data) over Wi-Fi. Software may only stream robot control data, debugging data, and telemetry to and from the ROBOT using the FTC Driver Station Application. Additional logging/streaming services, such as those hosted by third party plugins and tools such as FTC Dashboard, FTControl Panels, and others are prohibited. No continuous video stream is allowed.
 - E. Some events may assign Wi-Fi bands and/or channels to teams. If requested by event staff, teams must use the specific frequency band or channel on the day of the competition.

R705 *Configure devices for your team number. The ROBOT CONTROLLER, DRIVER STATION, and any spares used must be configured/named to correspond to the correct team number as follows:

- A. ROBOT CONTROLLER should be named <team number>-RC (e.g., 12345-RC),
- B. DRIVER STATION should be named <team number>-DS (e.g., 12345-DS), and
- C. If a spare ROBOT CONTROLLER or DRIVER STATION is configured, a letter designator may be added <team number>-<letter>-RC/DS (e.g., 12345-A-DS, 12345-B-DS)

See the [DRIVER STATION Instructions](#) and [ROBOT CONTROLLER Instructions](#) for a detailed procedure for updating DRIVER STATION and ROBOT CONTROLLER "names."

R706 *Only specified modifications to core control system devices are permitted. The DRIVER STATION device and software, Android-based ROBOT CONTROLLER device, main and secondary power switch(es), power regulation devices, fuses, and batteries shall not be tampered with, modified, or adjusted in any way (tampering includes drilling, cutting, machining, rewiring, disassembling, painting, removing enclosures and replacing with custom enclosures, etc.), with the following exceptions:

- A. wires, cables, and signal lines may be connected via the standard connection points provided on the devices,
- B. fasteners (including adhesives) may be used to attach devices to the OPERATOR CONSOLE or ROBOT or to secure cables to the device,
- C. thermal interface material may be used to improve heat conduction,
- D. labeling may be applied to indicate device identification, purpose, connectivity, functional performance, etc. as long as they do not cover labels or markings used to identify the product,
- E. jumpers or switches may be moved to configure devices per the manufacturer's manual,
- F. device firmware may be updated with manufacturer supplied firmware,
- G. integral wires on motor controllers and batteries may be cut, stripped, and/or connectorized,
- H. devices except batteries may be repaired, provided the performance and specifications of the device after the repair are identical to those before the repair,
- I. insulating material may be added to exposed conductors,
- J. tape may be applied for debris protection, and
- K. power switch mounting brackets can be modified or replaced.

Please note that while repairs are permitted, the allowance is independent of any manufacturer's warranty. Teams make repairs at their own risk and should assume that any warranty or return options are forfeited. Repairs must be functionally equivalent to original device condition.

Be aware that diagnosing and repairing COMPONENTS such as these can be difficult.

For example, "repairs" that change connector types, include device footprint modifications, or provide mechanical enhancements, are prohibited.

R707 *USB is for vision. Only the following devices may be connected to the ROBOT control system using USB:

- A. webcams and optical vision sensors per [R708](#),
- B. USB hub or USB switch, and
- C. a REV Expansion Hub.

R708 *Use only supported USB vision. Only single image sensor vision devices that are natively supported by the ROBOT CONTROLLER app are allowed to connect to USB (stereoscopic cameras are not allowed). This includes the following:

- A. all UVC compatible USB webcams (Logitech C270, and related), and
- B. Vision coprocessors allowed per [R702](#).

UVC compatible USB webcams may only use the UVC provided stream / data. No other interfaces or data provided by the webcam may be used.

To request support (or to provide sample drivers) for alternate USB vision devices for inclusion in future *FIRST* Tech Challenge seasons, please send an email to customerservice@firstinspires.org with the following details:

- Subject of email should be: “USB Vision Future Support Request”
- Contact details for providing feedback or clarifications
- Details on the device requesting support

R709 *Recording devices are okay. Self-contained video recording devices (GoPro or similar) are allowed providing they are used only for non-functional post-MATCH viewing and the wireless capability is turned off.

R710 *Lasers are only allowed if they’re part of a sensor, low-energy, and non-visible. Lasers are not allowed unless they meet all of the following criteria:

- A. must be part of a sensor,
- B. must be rated as IEC/EN 60825-1 “Class I” or IEC/EN 62471 “Exempt,” and
- C. must use non-visible spectrum.

R711 *Configure Android devices appropriately. ROBOT CONTROLLER and DRIVER STATION Android devices (smartphones, REV Control Hub, REV Driver Hub) must additionally be configured in the following ways:

- A. REV Control Hub users must [change the Wi-Fi password](#) to a non-default password,
- B. smartphone users must enable Airplane Mode,
- C. on ROBOT CONTROLLER and DRIVER STATION Android devices, Wi-Fi must be enabled and Bluetooth must be disabled, and
- D. on DRIVER STATION Android devices, remove all remembered Wi-Fi Direct Groups and Wi-Fi connections, leaving only the ROBOT CONTROLLER Wi-Fi connection.

12.8 Pneumatic Systems & Airflow Devices

R801 ***No Pneumatic Actuators, High-Speed Blowers, or Vacuums.** ROBOTS are restricted in their use of air in the following ways:

- A. ROBOTS may only use sealed, COTS closed-air systems which are pre-charged by the manufacturer (such as gas shocks),
- B. ROBOTS may not use any stored pressure components that are actuated by a device like a solenoid and/or are able to change their stable state,
- C. ROBOTS may not generate pressure or vacuum,
- D. ROBOTS may not use any user-adjustable gas storage vessels, except air-filled (pneumatic) COTS wheels, and
- E. ROBOTS may not use any device which creates high-speed airflow, except cooling fans integrated into COTS computing devices.

The intent of this rule is that robots may not use pneumatic actuators, pressure or vacuum storage devices, compressors, vacuum generators, or air blowers, but they may use “closed air” systems which were sealed by their manufacturer. This includes items such as gas springs, and dampers.

Examples of a “device which creates high-speed airflow” include but are not limited to a fan designed to move SCORING ELEMENTS on the FIELD.

High-speed flywheels or rollers used for manipulating SCORING ELEMENTS would not on their own be considered a high-speed airflow device.

12.9 OPERATOR CONSOLE

R901 ***Use only a specified DRIVER STATION device.** The OPERATOR CONSOLE may only have one approved Android-based DRIVER STATION device connected and powered on. The OPERATOR CONSOLE must have at least one of the following:

- A. REV Driver Hub (REV-31-1596), or
- B. Any Android Device with or without any combination of USB cables (including USB OTG cables) and/or USB hubs (powered or unpowered, with or without OTG integrated into the hub) for connecting one or more gamepads.

Due to unpredictable variations in Android software across different manufacturers and updates, the REV Driver Hub is the only officially supported DRIVER STATION device. Teams choosing to use any other unsupported device (e.g., smartphones) are responsible for testing and verifying its compatibility, functionality, and performance.

Teams who wish to have a spare DRIVER STATION device as part of their OPERATOR CONSOLE may do so as long as only one DRIVER STATION device is connected and powered on at a time.

- R902** ***The OPERATOR CONSOLE must make the touch screen accessible.** The OPERATOR CONSOLE, the set of COMPONENTS and MECHANISMS used by the DRIVE TEAM to relay commands to the ROBOT, must make the touch screen of the DRIVER STATION device accessible. The DRIVER STATION device must be positioned within the OPERATOR CONSOLE so that the screen display can be clearly seen during inspection and in a MATCH. The DRIVER STATION device touch screen must be functional without the requirement of additional aides (e.g., mouse) in order to be used.
- R903** ***OPERATOR CONSOLE physical requirements.** The OPERATOR CONSOLE, including all power sources (e.g., power banks), must not exceed a volume of 3ft wide, 1ft 6in deep and 2 ft tall (91.4 cm by 45.7 cm by 61.0 cm), excluding any items that are held or worn by the DRIVERS during the MATCH.

Also refer to [R203](#) for restrictions on designing OPERATOR CONSOLES for fair play and ARENA safety.

Please note that while there is no hard weight limit, OPERATOR CONSOLES that weigh more than 20 lbs. (~9 kg.) will invite extra scrutiny as they are likely to disrupt normal ARENA operations.

Teams who wish to have a spare external USB hub as part of the OPERATOR CONSOLE may do so as long as only one USB hub is connected at any time.

The intent of this rule is to allow teams to use a container to store, organize, and transport the DRIVER STATION device and support electronics. The OPERATOR CONSOLE rules are not intended to allow systems that function as a ROBOT cart or replace a competition-provided OPERATOR CONSOLE stand, table, etc.

- R904** ***ROBOT application wireless communication only.** Other than the connection controlled by the ROBOT CONTROLLER app running on the ROBOT and the DRIVER STATION app running on the DRIVER STATION device, no other form of wireless communications shall be used to communicate to, from, or within the OPERATOR CONSOLE during a MATCH.

Examples of prohibited wireless systems include, but are not limited to, active wireless network cards and Bluetooth devices

13 Tournament (T)

This section will be updated with the Kickoff Competition Manual release on September 12, 2026

14 League Play Tournaments (L)

Not all regions offer participation in League play. Leagues are closed groups of teams which play in multiple different League Meet events typically spread over several weeks or months. All the teams in the same League should have the opportunity to play in a roughly equal number of MATCHES. A minimum of 10 League Meet MATCHES should be played by all teams in the League.

League Meet events each play between 5 and 6 Qualification MATCHES per team as described in Section [13.6 Qualification MATCHES](#) but do not include Playoff MATCHES or judging for awards.

In addition, the behavior described in Section [10.6.1 YELLOW and RED CARDS](#), VERBAL WARNINGS, and CARDS also clear at the end of each League Meet event.

Teams may belong to only 1 League per season and can participate in only 1 League Tournament per season. A team can participate in a League outside their region, provided that is the only league they participate in. A team may not advance from a League Tournament to a Regional Championship that is outside of their region unless the Program Delivery Partners in both regions have agreed to move a team to a new region for the entire season.

League Tournaments function the same as a Qualifying Tournament including judging and advancement except that qualification rankings as described in Section [13.6 Qualification MATCHES](#), used for both ALLIANCE Selection and Qualification Round Performance Points, are calculated with the addition of each team's top 10 MATCHES played at any League Meet and the matches played at the League Tournament. Top MATCHES are defined by the sort order in Table 13 1.

Teams that played fewer than 10 MATCHES at League Meets will have RANKING POINTS, MATCH Points, and all scoring criteria, that are effectively 0 for the missing MATCHES.

League Tournament advancement (Table 4-1) is calculated only using team performance at the League Tournament except for the Qualification Round Performance which is based on the League Tournament Ranking which include the top 10 League Meet MATCHES as described above

15 *FIRST* Championship (C)

This section will be updated with the Kickoff Competition Manual release on September 12, 2026

16 Glossary

The following definitions and terms are used for the *FIRST* Tech Challenge game BIOBUZZ. Defined terms are in ALL CAPITAL LETTERS throughout the manual (for example, ALLIANCE). Competition rules mean what they plainly say. If a word is not given a game definition, then you should use its common conversational meaning.

Term	Definition
ALLIANCE	a cooperative of 2 <i>FIRST</i> Tech Challenge teams
ARENA	includes all elements of the game infrastructure that are required to play this season's FTC game including: the FIELD, SCORING ELEMENTS, queue area, team media area, and all equipment needed for FIELD control, ROBOT control, and scorekeeping
CHASSIS	ROBOT'S MAJOR MECHANISM that enables it to move around a FIELD
COMPONENT	any part in its most basic configuration, which cannot be disassembled without damaging or destroying the part or altering its fundamental function
COTS	a standard (i.e., not custom order) part commonly available from a VENDOR for all teams for purchase
HOME REGION	The region in which a team is assigned and in which they are only eligible to advance from events within.
INSPECTOR	a person determined by <i>FIRST</i> to accurately and efficiently assess the legality of a given part or the whole of a ROBOT, an event volunteer role
JUDGE	JUDGES meet with teams to learn about and celebrate the unique journey and accomplishments of each team and evaluate these against award requirements. JUDGES interact with STUDENTS in the pits and sometimes in dedicated judging spaces. As a group, JUDGES determine the teams that receive awards at events
LRI	Lead ROBOT INSPECTOR
MAJOR MECHANISM	a group of COMPONENTS and/or MECHANISMS assembled together to address at least 1 game challenge: ROBOT movement, SCORING ELEMENT manipulation, FIELD element manipulation, or performance of a scorable task without the assistance of another ROBOT
MECHANISM	an assembly of COMPONENTS that provide specific functionality on the ROBOT. A MECHANISM can be disassembled (and then reassembled) into individual COMPONENTS without damage to the parts.
OPERATOR CONSOLE	the set of COMPONENTS and MECHANISMS used by the DRIVE TEAM to relay commands to the ROBOT

PORTFOLIO	A document used as part of the judging process with requirements outlined in A201
REFEREE	an official who is certified by <i>FIRST</i> to enforce the rules of the current season's game, an event volunteer role
ROBOT	an electromechanical assembly built by a <i>FIRST</i> Tech Challenge team to play the current season's game and includes all the basic systems required to be an active participant in the game –power, communications, control, and movement about the FIELD
ROBOT CONTROLLER	Android device (a REV Control Hub (REV-31-1595) or a smartphone Android device connected to a REV Expansion Hub (REV-31-1153)) that runs the ROBOT CONTROLLER app to control the ROBOT as defined in R701
ROBOT SIGN	A ROBOT SIGN simultaneously identifies a ROBOT'S team number as well as its ALLIANCE affiliation for FIELD STAFF.
STARTING CONFIGURATION	the physical configuration in which a ROBOT starts a MATCH
STUDENT	a person who has not completed high-school, secondary school, or the comparable level in their HOME REGION as of September 1st
TILE	flooring surface of the FIELD is made of 36 interlocking soft foam TILES
VENDOR	a legitimate business source for COTS items that satisfies criteria defined in Section 12 ROBOT Construction Rules (R)
VERBAL WARNING	a warning issued by event staff or the Head REFEREE