

## 11 TOURNAMENTS

Each 2023 FIRST® Robotics Competition event is played in a tournament format. Each tournament consists of 3 types of MATCHES: Practice MATCHES (not necessarily played at all District Events), Qualification MATCHES, and Playoff MATCHES.

Practice MATCHES provide each team with an opportunity to operate its ROBOT on the FIELD prior to the start of the Qualification MATCHES.

Qualification MATCHES allow each team to earn Ranking Points which determine their seeding position and may qualify them for participation in the Playoff MATCHES.

Playoff MATCHES determine the event Champions.

### 11.1 MATCH Schedules

A MATCH schedule is used to coordinate MATCHES at an Event. Figure 11-1 details information shown on each schedule. SURROGATE MATCHES are described in [Section 11.6.2 MATCH Assignment](#).

Figure 11-1 Sample MATCH schedule

**Qualification Match Schedule**

Event Name								
Matches Per Team		10	ALLIANCE Red or Blue					
Time	Description	Match	Blue 1	Blue 2	Blue 3	Red 1	Red 2	Red 3
Thu 2:30	Qualification 1	1	1	2	3	4	5	6
Thu 2:37	Qualification 2	2	7	8	9	10	11*	12
Thu 2:44	Qualification 3	3	13	14	15*	16	17	18

DRIVER STATION number  
1, 2, or 3

MATCH Start Time      MATCH Type      MATCH Number      Asterisk (\*) indicates SURROGATE MATCH

### 11.2 Head REFEREE and FTA Interaction

The Head REFEREE has the ultimate authority in the ARENA during the event, but may receive input from additional sources, e.g. Game Designers, FIRST personnel, FTA, and other event staff. The Head REFEREE rulings are final. No event staff, including the Head REFEREE, will review video, photos, artistic renderings, etc. of any MATCH, from any source, under any circumstances.

#### 11.2.1 Question Box

Each ALLIANCE has a designated Question Box near the scoring table. If a DRIVE TEAM has a question about a MATCH, the FIELD, etc., they may send 1 DRIVE TEAM member to their corresponding Question Box. Depending on timing, the Head Referee or FTA may postpone any requested discussion until the end of the subsequent MATCH as necessary.

Technical questions regarding FIELD or ROBOT operation are addressed by the FTA, additional team members are invited to participate in these conversations if necessary. If a DRIVE TEAM needs clarification on a ruling or score, per H202, 1 STUDENT from that DRIVE TEAM should address the Head REFEREE after the ARENA Reset Signal (e.g. FIELD lights turn green).

While FMS tracks quantities of FOULS, *FIRST* instructs REFEREES to not self-track details about FOULS and TECH FOULS; as a result, we don't expect REFEREES to recall details about what FOULS and TECH FOULS were made, when they occurred, and against whom.

Any reasonable question is fair game in the Question Box, and Head REFEREES will make good faith efforts to provide helpful feedback (e.g. how/why certain FOULS are being called, why a particular ROBOT may be susceptible to certain FOULS based on its design or game play, how specific rules are being called or interpreted), but please know that they may not be able to supply specific details.

### 11.2.2 YELLOW and RED CARDS

In addition to rule violations explicitly listed throughout the *2023 Game Manual*, YELLOW CARDS and RED CARDS are used in *FIRST* Robotics Competition to address team and ROBOT behavior that does not align with the mission, values, and culture of *FIRST*.

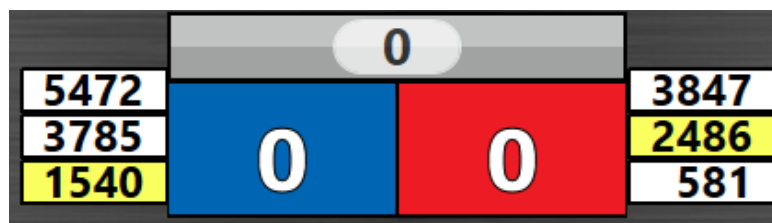
As noted in [Section 6.5 Rule Violations](#) and [H201](#), the Head REFEREE may assign a YELLOW CARD as a warning, or a RED CARD for DISQUALIFICATION in MATCH for egregious behavior inappropriate at a *FIRST* Robotics Competition event.

A YELLOW or RED CARD is indicated by the Head REFEREE holding a YELLOW and/or RED CARD in the air while the Game Announcer describes the violation.

Per [Section 6.5 Rule Violations](#) YELLOW CARDS are additive, meaning that a second YELLOW CARD is automatically converted to a RED CARD. A team is issued a RED CARD for any subsequent incident in which they receive an additional YELLOW CARD, including earning a second YELLOW CARD during a single MATCH. A second YELLOW CARD is indicated by the Head REFEREE holding a YELLOW CARD and RED CARD in the air simultaneously after the completion of the MATCH. A team that has received either a YELLOW CARD or a RED CARD carries a YELLOW CARD into subsequent MATCHES, except as noted below.

Once a team receives a YELLOW or RED CARD, its team number is presented with a yellow background on the audience screen at the beginning of all subsequent MATCHES, including any replays, as a reminder to the team, the REFEREES, and the audience that they carry a YELLOW CARD.

Figure 11-2 Example audience screen graphic showing YELLOW CARD indicators



All YELLOW CARDS are cleared in FMS at the conclusion of Practice, Qualification, and division Playoff MATCHES. Verbal warnings are cleared after Practice MATCHES and persist from Qualification MATCHES through subsequent tournament phases. The Head REFEREE may opt to perpetuate a verbal warning or YELLOW CARD earned during Practice MATCHES through to Qualification MATCHES for particularly egregious behavior.

### 11.2.3 YELLOW and RED CARD application

YELLOW and RED CARDS are applied based on the following:

Table 11-1 YELLOW and RED CARD application

Time YELLOW or RED CARDS earned:	MATCH to which CARD is applied:
prior to Practice MATCHES	Team's first Practice MATCH
during the Practice MATCHES	Team's current (or just-completed) MATCH.
between the end of PRACTICE MATCHES and the start of Qualification MATCHES	Team's first Qualification MATCH
during the Qualification MATCHES	Team's current (or just-completed) MATCH. In the case where the team participated as a SURROGATE in the current (or just completed) MATCH, the card is applied to the team's previous MATCH (i.e. the team's second Qualification MATCH)
between the end of Qualification MATCHES and the start of Playoff MATCHES	ALLIANCE'S first Playoff MATCH
during the Playoff MATCHES	ALLIANCE'S current (or just-completed) MATCH

Please see examples of the application of YELLOW and RED CARDS as shown in [Section 6.5.1 Violation Details](#).

#### 11.2.4 YELLOW and RED CARDS during Playoff MATCHES

During Playoff MATCHES, YELLOW and RED CARDS are assigned to the violating team's entire ALLIANCE instead of to only the violating team. If an ALLIANCE receives 2 YELLOW CARDS, the entire ALLIANCE is issued a RED CARD which results in DISQUALIFICATION for the associated MATCH. If both ALLIANCES receive a RED CARD, the ALLIANCE assessed the first RED CARD, chronologically, is DISQUALIFIED and loses the MATCH.

### 11.3 MATCH Replays

Over the course of the tournament, it may be necessary for a MATCH to be replayed. Typical causes for replays are MATCHES that end in a tie during the Playoffs, MATCHES that are stopped because FIELD STAFF anticipated FIELD damage or personal injury, or if there is an ARENA FAULT. An ARENA FAULT is an error in ARENA operation that includes, but is not limited to:

- A. broken FIELD elements due to
  - a. normal, expected game play or
  - b. ROBOT abuse of FIELD elements that affects the outcome of the MATCH for their opponents,

A broken FIELD element caused by ROBOT abuse that affects the outcome of the MATCH for their ALLIANCE is not an ARENA FAULT.

- B. power failure to a portion of the FIELD (tripping the circuit breaker in the DRIVER STATION is not considered a power failure),
- C. improper activation by the FMS, and
- D. errors by FIELD STAFF (except those listed in Other Logistics).

If, in the judgment of the Head REFEREE, an ARENA FAULT occurs that affects the outcome of the MATCH and any team on the affected ALLIANCE desires a replay, the MATCH will be replayed. *FIRST* Headquarters reserves the right to, with consultation of the Head REFEREE and the FTA, replay a MATCH in which an ARENA FAULT impacts the outcome of an event.

The outcome of the MATCH is affected if an error occurs that, in the judgement of the Head REFEREE, changes which ALLIANCE would have won the MATCH and/or the assignment of Ranking Points.

The outcome of an event is affected if an error occurs that, in the judgement of *FIRST* Headquarters, changes the assignment of Ranking Points or has a dramatic effect on points used for ranking criteria.

Note that an ARENA FAULT that does not affect MATCH outcome, in the judgement of the Head REFEREE, does not lead to a MATCH replay. Examples include, but are not limited to:

- a. a piece of FIELD plastic falls into the FIELD, far away from any human or ROBOT activity, and in such a way that it does not affect MATCH outcome,
- b. delay in the playing of an ARENA sound,
- c. mismatch between the timer on the audience screen and the ARENA timer, and
- d. any adjustment or delay in assignment of a penalty (including those made after the MATCH).

**T301** **\*Replays will be the same.** All reasonable effort is made to create the same conditions when replaying a MATCH caused by an ARENA FAULT or FIELD damage. This means, for example, that a team that was BYPASSED prior to the start of the MATCH which is to be replayed is BYPASSED for the replay MATCH. ROBOT and DRIVE TEAM starting locations do not need to be replicated when replaying a MATCH.

*Violation: MATCH with not start until the situation is corrected*

## 11.4 Measurement

At each event, the ARENA will be open for at least 30 minutes prior to the start of Qualification MATCHES, during which time teams may survey and/or measure the ARENA and bring ROBOTS on the FIELD to perform sensor calibration. The specific time that the FIELD is open will be communicated to teams at the event. Teams may bring specific questions or comments to the FTA.

**T401** **\*Freeze, ROBOT.** During the period when the ARENA is open for measurement, ROBOTS can be enabled, but may neither drive, extend outside their FRAME PERIMETER, nor interact with (e.g. score, push, pickup, etc.) GAME PIECES, the CHARGE STATION, GRIDS, or other FIELD elements.

*Violation: Verbal warning. If subsequent violations at any point during the event or egregious YELLOW CARD.*

## 11.5 Practice MATCHES

Practice MATCHES are played before Qualification MATCHES. The Practice MATCH schedule is available as soon as possible, but no later than the start of Practice MATCHES. For Regional events, it will also be published and available online at the [FIRST Robotics Event Results site](#), except during exceptional circumstances. Practice MATCHES are randomly assigned, and teams may not switch scheduled Practice MATCHES. Each team is assigned an equal number of Practice MATCHES unless the number of

teams multiplied by number of Practice MATCHES is not divisible by 6. In this case, the FMS randomly selects some teams to play an extra Practice MATCH.

Practice MATCHES are not guaranteed at District Events due to event schedule constraints.

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### 11.5.1 Filler Line

A Filler Line is used to fill open slots at events that employ scheduled Practice MATCHES or all slots at events with an open Practice MATCH schedule. Teams from the Filler Line are used on a first come, first served basis to fill empty spots in Practice MATCHES left by other teams that do not report to Queueing. The number of teams in the Filler Line is dependent upon space at venues.

Only teams that meet all criteria below qualify for the Filler Line:

- A. ROBOTS in the Filler Line must have passed inspection (this requirement may be waived for events with open Practice MATCH schedules),
- B. DRIVE TEAMS must join the Filler Line with their ROBOT,
- C. teams may not work on their ROBOT while in the Filler Line,
- D. teams may not occupy more than 1 spot in the Filler Line, and
- E. if a team is queued for their Practice MATCH, they may not also join the Filler Line.

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## 11.6 Qualification MATCHES

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### 11.6.1 Schedule

The Qualification MATCH schedule is made available as soon as possible, but no later than 30 minutes before Qualification MATCHES are scheduled to begin. Teams receive 1 hard copy and it is also available at the [FIRST Robotics Competition Event Results site](#), except during exceptional circumstances. Each Qualification schedule consists of a series of rounds in which each team plays 1 MATCH per round.

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### 11.6.2 MATCH Assignment

FMS assigns each team 2 ALLIANCE partners for each Qualification MATCH using a predefined algorithm, and teams may not switch Qualification MATCH assignments. The algorithm employs the following criteria, listed in order of priority:

1. maximize time between each MATCH played for all teams
2. minimize the number of times a team is allied with any team
3. minimize the number of times a team plays opposite any team
4. minimize the use of SURROGATES (teams randomly assigned by the FMS to play an extra Qualification MATCH)
5. provide even distribution of MATCHES played on blue and red ALLIANCE
6. provide even distribution of MATCHES played in each DRIVER STATION number

For more information about the MATCH scheduling algorithm, please see [Idle Loop software's website](#).

At events with fewer than 24 participating teams, the criteria are similar, however criterion 5 is changed to minimize the number of times a team swaps between the blue and red ALLIANCE rather than an even distribution.

All teams are assigned the same number of Qualification MATCHES, equal to the number of rounds, unless the number of teams multiplied by number of MATCHES is not divisible by 6. In this case, the FMS

randomly selects some teams to play an extra MATCH. For the purpose of seeding calculations, those teams are designated as SURROGATES for the extra MATCH. If a team plays a MATCH as a SURROGATE, it is indicated on the MATCH schedule, it is always their third Qualification MATCH, and the outcome of the MATCH has no effect on the team's ranking. YELLOW and RED CARDS assigned to SURROGATES, however, do carry forward to subsequent MATCHES.

### 11.6.3 Qualification Ranking

Ranking Points are units credited to a team based on their ALLIANCE'S performance in Qualification MATCHES. Ranking Points are awarded to each eligible team at the completion of each Qualification MATCH per Table 6-2.

Exceptions to Ranking Point assignment are as follows:

- A. A SURROGATE receives 0 Ranking Points.
- B. A DISQUALIFIED team, as determined by the Head REFEREE, receives 0 Ranking Points in a Qualification MATCH or causes their ALLIANCE to receive 0 MATCH points in a Playoff MATCH.
- C. A "no-show" team is either DISQUALIFIED from or issued a RED CARD for that MATCH (see [H305](#)). A team is declared a no-show if no member of the DRIVE TEAM is in the ALLIANCE AREA at the start of the MATCH.

The total number of Ranking Points earned by a team throughout their Qualification MATCHES divided by the number of MATCHES they've been scheduled to play (minus any SURROGATE MATCH), then truncated to 2 decimal places, is their Ranking Score (RS).

All teams participating in Qualification MATCHES are ranked by Ranking Score. If the number of teams in attendance is 'n', they are ranked '1' through 'n', with '1' being the team with the highest Ranking Score and 'n' being the team with the lowest Ranking Score.

Teams are ranked in order, using the sorting criteria defined in Table 11-2.

*Table 11-2 Qualification MATCH ranking criteria*

Order Sort	Criteria
1 <sup>st</sup>	Ranking Score
2 <sup>nd</sup>	Average ALLIANCE MATCH points, not including FOULS
3 <sup>rd</sup>	Average ALLIANCE CHARGE STATION points
4 <sup>th</sup>	Average ALLIANCE AUTO points
5 <sup>th</sup>	Random sorting by the FMS

## 11.7 Playoff MATCHES

Playoff MATCHES follow the qualification MATCHES. In the Playoffs, teams play on set ALLIANCES, chosen during ALLIANCE selection, and advance through a double elimination bracket. Teams do not earn Ranking Points; they advance based on winning, losing, or tying a MATCH.



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### 11.7.1 ALLIANCE Selection Process

At the end of the Qualification MATCHES, the top 8 ranked teams become the ALLIANCE Leads. The ranked ALLIANCES are designated, in order, ALLIANCE 1, ALLIANCE 2, etc., down to ALLIANCE 8. Using the ALLIANCE selection process described in this section, each ALLIANCE Lead chooses 2 other teams to join their ALLIANCE.

**T701 \*Send a STUDENT representative.** Each team must choose and send a STUDENT team representative to the ARENA at the designated ALLIANCE Selection time (typically before the lunch break on the final day of the event) to represent their team. The designated STUDENT representative from each ALLIANCE Lead is called the ALLIANCE CAPTAIN. This representative may change between ALLIANCE selection and PLAYOFF MATCHES.

*Violation: Team is ineligible for the Playoff Tournament*

If an absent team would have been an ALLIANCE Lead, all lower ranked ALLIANCE Leads are promoted 1 spot. The next highest-ranked team moves up to become the ALLIANCE 8 Lead.

The ALLIANCE selection process consists of 2 rounds during which each ALLIANCE CAPTAIN invites a team ranked below them in the standings to join their ALLIANCE.

Round 1: In descending order (ALLIANCE 1 to ALLIANCE 8), each ALLIANCE CAPTAIN invites a single team to join their ALLIANCE. The invited team's representative steps forward and either accepts or declines the invitation.

If the team accepts, it becomes a member of that ALLIANCE. If an invitation from a top 8 ALLIANCE to another ALLIANCE Lead is accepted, all lower ALLIANCE Leads are promoted 1 spot. The highest-ranked, unselected team becomes the ALLIANCE 8 Lead.

Round 2: The same method is used for each ALLIANCE CAPTAIN'S second choice except the selection order is reversed, with ALLIANCE 8 picking first and ALLIANCE 1 picking last. This process results in 8 ALLIANCES of 3 teams.

**T702 \*Declining teams can't be picked.** An ALLIANCE CAPTAIN may not invite a team that has declined another ALLIANCE'S invitation to participate in the Playoff tournament. Declining teams are ineligible to be a BACKUP TEAM.

*Violation: The ALLIANCE CAPTAIN must make another selection*

An ALLIANCE Lead that declines an invitation from another ALLIANCE is able to invite teams to join their ALLIANCE but may not be invited to join another ALLIANCE.

At the conclusion of ALLIANCE selection, the highest ranked unselected teams are eligible to become a BACKUP TEAM, as defined in [Section 11.7.3 BACKUP TEAMS](#).

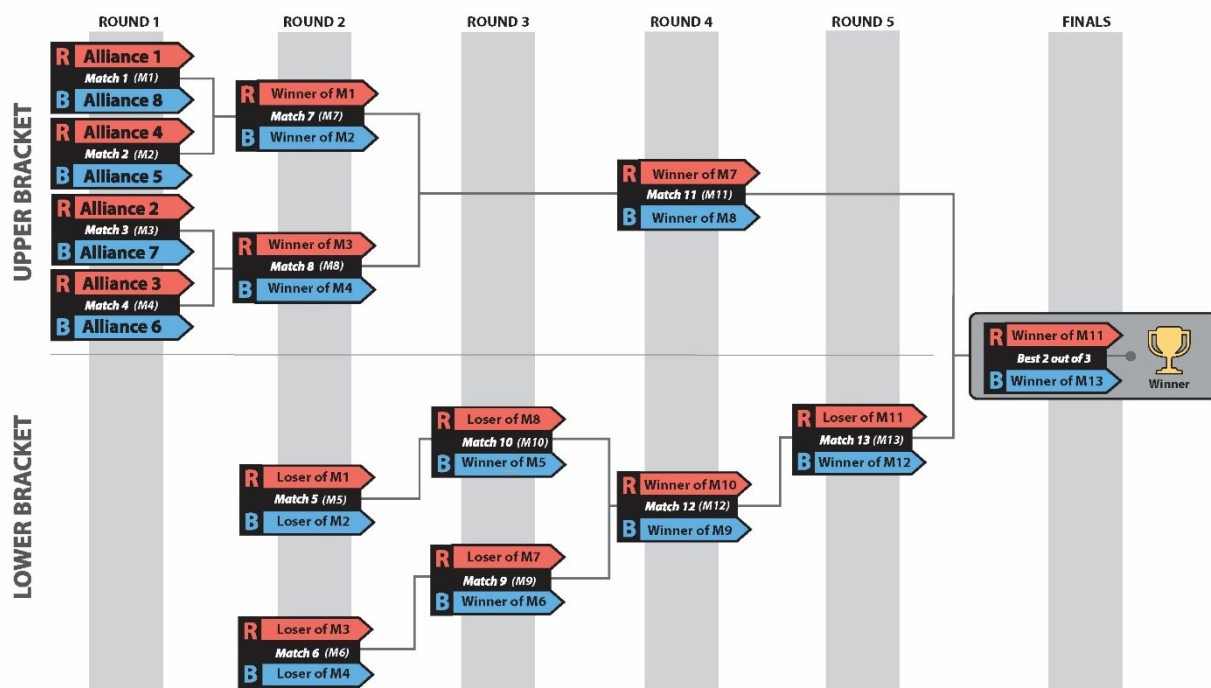
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### 11.7.2 Playoff MATCH Bracket

The double elimination tournament consists of an Upper and Lower bracket as shown in Figure 11-3. Each ALLIANCE begins with a slot in the Upper bracket. If an ALLIANCE wins a MATCH in the Upper bracket, they remain in the Upper bracket. If an ALLIANCE loses a MATCH in the Upper bracket, they transition to the Lower bracket. ALLIANCES in the Lower bracket must win any subsequent MATCHES (except for finals) to remain in the tournament, i.e. once they lose a MATCH, they're out of the tournament.

In Round 1, the higher ranked ALLIANCE is assigned to the red ALLIANCE. For subsequent rounds, ALLIANCE color is assigned as shown in Figure 11-3, regardless of ALLIANCE rank at the start of the Playoff tournament.

Figure 11-3 Playoff MATCH bracket (Red ALLIANCE tops each pairing)



As shown in Figure 11-3 and Table 11-3, Playoff MATCHES consist of 6 rounds with breaks between rounds and between the Finals MATCHES. Breaks begin after the FIELD has been cleared from the previous MATCH. The Blue and Red Gap columns indicate the approximate time between each ALLIANCE'S MATCHES. The expected start time of the scheduled MATCH is the time indicated on the MATCH schedule or 15 minutes from the end of either ALLIANCE'S previous MATCH, whichever is later.

If a Playoff MATCH needs to be replayed as described in [Section 11.3 MATCH Replays](#), teams are notified of when the replay will occur. A minimum 10-minute delay is provided for teams to reset their ROBOTS prior to the replay unless all teams are ready sooner. The affected MATCH must be replayed before the next round begins.

Table 11-3 Typical Playoff MATCH Schedule

MATCH	Blue	Red	Blue Gap (minutes)	Red Gap (minutes)	Winner moves to	Loser moves to
Upper Bracket – Round 1 – MATCH 1	ALLIANCE 8	ALLIANCE 1			Red – MATCH 7	Red – MATCH 5
Upper Bracket – Round 1 – MATCH 2	ALLIANCE 5	ALLIANCE 4			Blue – MATCH 7	Blue – MATCH 5
Upper Bracket – Round 1 – MATCH 3	ALLIANCE 7	ALLIANCE 2			Red – MATCH 8	Red – MATCH 6
Upper Bracket – Round 1 – MATCH 4	ALLIANCE 6	ALLIANCE 3			Blue – MATCH 8	Blue – MATCH 6



### 8-minute Break

Lower Bracket – Round 2 – MATCH 5	Loser of MATCH 2	Loser of MATCH 1	24m	31m	Blue – MATCH 10	
Lower Bracket – Round 2 - MATCH 6	Loser of MATCH 4	Loser of MATCH 3	17m	24m	Blue – MATCH 9	
Upper Bracket – Round 2 - MATCH 7	Winner of MATCH 2	Winner of MATCH 1	38m	45m	Red – MATCH 11	Red – MATCH 9
Upper Bracket – Round 2 - MATCH 8	Winner of MATCH 4	Winner of MATCH 3	31m	38m	Blue – MATCH 11	Red – MATCH 10

### 8-minute Break

Lower Bracket – Round 3 - MATCH 9	Winner of MATCH 6	Loser of MATCH 7	24m	17m	Blue – MATCH 12	
Lower Bracket – Round 3 - MATCH 10	Winner of MATCH 5	Loser of MATCH 8	38m	17m	Red – MATCH 12	

### 8-minute Break

Upper Bracket – Round 4 - MATCH 11	Winner of MATCH 8	Winner of MATCH 7	30m	37m	Red – MATCH 14	Red – MATCH 13
Lower Bracket – Round 4 - MATCH 12	Winner of MATCH 9	Winner of MATCH 10	24m	17m	Blue – MATCH 13	

### 15-minute Awards Break

Lower Bracket – Round 5 - MATCH 13	Winner of MATCH 12	Loser of MATCH 11	17m	24m	Blue – MATCH 14	
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### 15-minute Awards Break

Finals – Match 14	Winner of MATCH 13	Winner of MATCH 11	17m	44m	MATCH 15	MATCH 15
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### 15-minute Awards Break

Finals – Match 15	Winner of MATCH 13	Winner of MATCH 11	17m	17m	MATCH 16*	MATCH 16*
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### 15-minute Awards Break \*

Finals – Match 16 *	Winner of MATCH 13	Winner of MATCH 11	17m	17m		
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\* if required

#### 11.7.2.1 Playoff MATCH ties

If final MATCH scores for both ALLIANCES are equal, the win is awarded to the ALLIANCE per criteria listed in Table 11-4.

Table 11-4 Playoff MATCH Tiebreaker Criteria

Order Sort	Criteria
1 <sup>st</sup>	Cumulative TECH FOUL points due to opponent rule violations
2 <sup>nd</sup>	ALLIANCE CHARGE STATION points
3 <sup>rd</sup>	ALLIANCE AUTO points
4 <sup>th</sup>	MATCH is replayed

### 11.7.2.2 Playoff Finals

Once a single ALLIANCE remains in each Upper and Lower bracket, those ALLIANCES proceed to the Finals round. The first ALLIANCE to win 2 MATCHES in the Finals becomes the event's Champions.

If a Finals MATCH ends in a tie score, the tie is not broken using the criteria in Table 11-4, the MATCH remains a tie. In the case where an ALLIANCE hasn't won 2 MATCHES after 3 MATCHES have been played (because of tied MATCHES), the Playoffs proceed with up to 3 additional Finals MATCHES, called Overtime MATCHES, until an ALLIANCE has won 2 Finals MATCHES. In the case where the Overtime MATCH scores for both ALLIANCES are equal, the win for that Overtime MATCH is awarded based on the criteria listed in Table 11-4.

## 11.7.3 BACKUP TEAMS

During the Playoff MATCHES an ALLIANCE may elect to replace one of its ROBOTS due to a mechanical or software issue that prevents that ROBOT from competing effectively. The team whose ROBOT and DRIVE TEAM replaces another ROBOT and DRIVE TEAM on an ALLIANCE during the Playoff MATCHES is called the BACKUP TEAM.

In this situation, the ALLIANCE CAPTAIN has the option to bring in the highest ranked team from the pool of available teams to join its ALLIANCE for the following MATCH. The resulting ALLIANCE is then composed of 4 teams.

ALLIANCES submit LINEUPS (as described in [Section 11.7.4 LINEUPS](#)) for each Playoff MATCH. After the BACKUP TEAM'S first Playoff MATCH, the ALLIANCE'S LINEUP may consist of any 3 of the ALLIANCE'S 4 teams.

### 11.7.3.1 BACKUP TEAM Coupons

Each ALLIANCE is allotted 1 BACKUP TEAM coupon during the Playoff MATCHES. If a second ROBOT from the ALLIANCE becomes inoperable, then the ALLIANCE must play the following MATCHES with only 2 (or even 1) ROBOTS.

Example: 3 teams, A, B and C, form an ALLIANCE going into the Playoff MATCHES. The highest ranked team not on 1 of the 8 ALLIANCES is Team D. During 1 of the Playoff MATCHES, Team C's ROBOT suffers damage to its mechanical arm. The ALLIANCE CAPTAIN decides to bring in Team D to replace Team C in the next MATCH. The new ALLIANCE of Teams A, B, C, and D are successful in advancing to the Finals and win the event. Teams A, B, C, and D are all recognized as members of the Winning ALLIANCE and receive awards.

The Head REFEREE will not accept the BACKUP TEAM coupon unless it lists the number of the team whose ROBOT is being replaced and is initialed by the ALLIANCE CAPTAIN. Once a BACKUP TEAM coupon is submitted and accepted by the Head REFEREE, the BACKUP TEAM coupon may not be withdrawn by the ALLIANCE.

**T703 \*No BACKUP TEAM for replayed MATCHES.** An ALLIANCE may not request a BACKUP TEAM for a replayed MATCH. The sole exception is if, in the judgment of the Head REFEREE, the replay is due to an ARENA FAULT that rendered an ALLIANCE'S ROBOT inoperable.

*Violation: The request is denied.*

**T704 \*No BACKUP TEAMS for 1st match.** An ALLIANCE may not request a BACKUP TEAM until after their first Playoff MATCH.

*Violation: The request is denied.*

**T705 \*BACKUP TEAMS play when called.** A BACKUP TEAM must be included in the LINEUP for the ALLIANCE'S next MATCH following their recruitment.

*Violation: The LINEUP is denied.*

If the Head REFEREE is busy, and there is no designee, the ALLIANCE CAPTAIN remains in the Question Box to report the LINEUP.

**T706 \*BACKUP TEAMS due 2 minutes before the MATCH start time.** The BACKUP TEAM Coupon must be submitted to the Head REFEREE (or their designee) 2 minutes before the expected MATCH start time in which the BACKUP TEAM is to play.

*Violation: The request is denied*

If the Head REFEREE is busy, and there is no designee, the ALLIANCE CAPTAIN remains in the Question Box to submit the BACKUP TEAM coupon.

#### 11.7.3.2 BACKUP POOL

After the top ranked ALLIANCE has made their final pick during ALLIANCE Selection, REFEREES poll the remaining eligible teams. In rank order, REFEREES invite remaining teams to accept or decline a position in the BACKUP POOL, i.e. the group of teams willing and able to join an ALLIANCE during the Playoff MATCHES, if needed, until up to 8 teams accept.

**T707 \*Be there to be a BACKUP TEAM.** A team must be present after ALLIANCE Selection to accept the REFEREE'S invitation to join the BACKUP POOL.

*Violation: Team is ineligible to be a BACKUP TEAM.*

**T708 \*Send a BACKUP TEAM Representative.** The top 2 ranked BACKUP TEAMS must send at least 1 STUDENT representative (and optionally 1 additional STUDENT or mentor) to a designated area near the FIELD for the duration of the Playoff MATCHES.

These 2 representatives are available to answer questions and accept invitations to be a BACKUP TEAM from ALLIANCE CAPTAINS. If 1 of these 2 teams joins an ALLIANCE or excuses themselves from the BACKUP POOL, the next highest ranked team in the BACKUP POOL must provide their representative. Once a BACKUP TEAM has declined an invitation to join an ALLIANCE, it is no longer a member of the BACKUP POOL and ineligible to join another ALLIANCE.

*Violation: Verbal warning. If situation cannot be corrected within a reasonable amount of time, the team is removed from BACKUP POOL.*

Some events may offer an area near the FIELD where the top 1 or 2 teams in the BACKUP POOL may choose to stage their ROBOT for quick and easy access to the FIELD if recruited.

#### 11.7.4 LINEUPS

Each ALLIANCE competing in a Playoff MATCH has the option to submit a LINEUP, which lists the 3 teams participating in the MATCH and their selected DRIVER STATIONS.

The LINEUP is kept confidential until the FIELD is set for the MATCH at which point each ALLIANCE'S LINEUP appears on the Team Signs.

##### 11.7.4.1 LINEUPS for 4-team ALLIANCES

If an ALLIANCE has 4 members (either because a 3-team ALLIANCE has called a BACKUP TEAM or the event is the FIRST Championship), a single representative from the team not on the LINEUP is allowed as a sixteenth ALLIANCE member but must be a member of that team's DRIVE TEAM. This additional representative may only serve as a COACH.

#### 11.7.4.2 Default LINEUP

**T709 \*LINEUPS due 2 minutes before the MATCH.** The ALLIANCE CAPTAIN must submit their LINEUP in writing to the Head REFEREE (or their designee) 2 minutes before their expected MATCH start time.

*Violation: Late LINEUPS are denied, and the ALLIANCE'S most recent LINEUP is applied.*

If the Head REFEREE is busy, and there is no designee, the ALLIANCE CAPTAIN remains in the Question Box to report the LINEUP.

If no previous LINEUP exists, the ALLIANCE Lead is assigned DRIVER STATION 2, 1<sup>st</sup> team selected is assigned DRIVER STATION 1, and the 2<sup>nd</sup> team selected is assigned DRIVER STATION 3. If any of these 3 ROBOTS are unable to play, the ALLIANCE must play the MATCH with only 2 (or even 1) ROBOT(s).

**Example:** 3 teams, A, B, and C form an ALLIANCE going into the Playoff MATCHES. During one of the Playoff MATCHES, Team C's ROBOT becomes inoperable. The ALLIANCE decides to bring in Team D to replace Team C. Team C repairs their ROBOT and may play in any subsequent Playoff MATCHES replacing Team A, B, or D

If a BACKUP TEAM Coupon is accepted and the LINEUP for the next MATCH is not submitted or it omits the BACKUP TEAM, then the ALLIANCE'S most recent LINEUP is used with the BACKUP team in the position populated by the team for whom they're substituting.

**T710 \*For replays, no changing LINEUPS (mostly).** If a MATCH must be replayed due to an ARENA FAULT, the LINEUP for the replayed MATCH is the same as the original MATCH. The sole exception is if the ARENA FAULT rendered a ROBOT inoperable, in which case the LINEUP can be changed.

*Violation: The new LINEUP is denied.*

### 11.7.5 Pit Crews

During the Playoff MATCHES and because of the distance between the FIELD and the pit area, extra team members may be needed to maintain the ROBOT between MATCHES. Each team is permitted to have up to 3 additional pit crew members to help with needed ROBOT repairs/maintenance.

### 11.7.6 Small Event Exceptions

The scheduling algorithm described in [Section 11.6.2 MATCH Assignment](#) works to minimize teams playing in back-to-back MATCHES. However, at events with fewer than 24 teams, back-to-back plays may occur.

Multi-day events with 24 teams or fewer employ a modified Playoff MATCH format. Instead of 8 ALLIANCES, these events proceed through ALLIANCE SELECTION and the Playoff Tournament with the maximum number of complete 3-team ALLIANCES that can be formed while leaving at least 1 BACKUP TEAM (e.g. a 24-team event creates 7 ALLIANCES, a 20-team event creates 6 ALLIANCES).

$$ALLIANCE\ Count = \frac{Team\ count - 1\ BACKUP\ TEAM}{3}, rounded\ down$$

The Playoff Bracket remains as shown in Figure 11-3, with any matchup against a non-existent ALLIANCE resulting in a bye (i.e. automatic advancement to the next round). An ALLIANCE assigned a bye-MATCH is invited, though not required, to practice together in a null MATCH (i.e. it has no bearing on the Playoff tournament) during the designated time in the Playoff schedule.

District points for Draft Order Acceptance (per [Section 11.8.1.2 ALLIANCE Selection Results](#)) are awarded as if a full set of ALLIANCES was selected (i.e. the second selection of the 3-seed ALLIANCE still receive 3 points regardless of how many ALLIANCES are formed).

## 11.8 Advancement Through the District Model

Teams advance through the season depending on the events at which they compete: Regional or District. This section details how District teams advance from District qualifying events, to their District Championship.

### 11.8.1 District Events

District teams are ranked throughout the season based on the points they earn at their first 2 home District events they attend, as well as at their District Championship. Points are awarded to teams as follows:

Table 11-5 District Point Assignment

Category	Points
<b>Qualification Round Performance</b>	$QualificationPoints(R, N, \alpha) = \left\lceil InvERF\left(\frac{N - 2R + 2}{\alpha N}\right) \left(\frac{10}{InvERF\left(\frac{1}{\alpha}\right)}\right) + 12 \right\rceil$ <p>(For a typically sized District event, this will result in a minimum of 4 points being awarded for Qualification round performance. For events of all sizes, a maximum of 22 points will be awarded.)</p>
<b>ALLIANCE CAPTAINS</b>	Equal to 17 minus the ALLIANCE CAPTAIN number (e.g. 14 points for ALLIANCE #3 Captain)
<b>Draft Order Acceptance</b>	Equal to 17 minus the Draft Order Acceptance Number (e.g. 12 points for the team that is fifth to accept an invitation)
<b>Playoff Advancement</b>	Points awarded based on team participation in individual playoff rounds, and whether or not the ALLIANCE advances. See <a href="#">Section 11.8.1.3 Playoff Performance</a> for details.
<b>Judged Team Awards</b>	10 points for FIRST Impact Award (formerly the Chairman's Award) 8 points each for Engineering Inspiration and Rookie All Star Awards 5 points each for all other judged team awards

## Team Age

10 points for 2023 rookie teams  
5 points for 2021 and 2022 rookie teams

Points earned at District Championships are multiplied by 3 and then added to points earned at District events, to determine the final season point total for the team.

If there is a tie in the season point total between teams, those items are broken using the following sorting criteria:

Table 11-6 District team sort criteria

Order Sort	Criteria
1 <sup>st</sup>	Total Playoff Performance Points
2 <sup>nd</sup>	Best Playoff Round Finish at a single event
3 <sup>rd</sup>	Total ALLIANCE Selection Results Points
4 <sup>th</sup>	Highest Qualification Round Seed or Draft Order Acceptance (i.e. Highest ALLIANCE Selection points at a single event)
5 <sup>th</sup>	Total Qualification Round Performance Points
6 <sup>th</sup>	Highest Individual MATCH Score, regardless of whether that score occurred in a Qualification or Playoff MATCH
7 <sup>th</sup>	Second highest Individual MATCH Score, regardless of whether that score occurred in a Qualification or Playoff MATCH
8 <sup>th</sup>	Third highest Individual MATCH Score, regardless of whether that score occurred in a Qualification or Playoff MATCH
9 <sup>th</sup>	Random Selection

### 11.8.1.1 Qualification Round Performance

The calculation of Qualification performance points is done using the equation (an inverse error function) in Table 11-5. The equation utilizes the following variables:

- R – the qualification rank of the team at the event at the conclusion of Qualification MATCHES (as reported by FMS)
- N – the number of FIRST Robotics Competition teams participating in the Qualification rounds at the event
- Alpha ( $\alpha$ ) – a static value (1.07) used to standardize the distribution of points at events

This formula generates an approximately normal distribution of Qualification Round 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 11-7 displays sample Qualification Round Performance points for variously ranked teams at a 40-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 11-7 Sample Qualification Round point assignments

Rank	1	2	3	4	...	19	20	21	...	37	38	39	40
Points	22	21	20	19	...	13	13	12	...	6	6	5	4

#### 11.8.1.2 ALLIANCE Selection Results

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

ALLIANCE CAPTAINS are recognized based on their qualification round seeding rank. This rank is a result of the rules of the game, which typically incorporate several team performance attributes, and are designed to eliminate ties in rank. Non-ALLIANCE CAPTAINS 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. Giving points for ALLIANCE selection also supports come-from-behind teams. A team taking several MATCHES to optimize their performance may be recognized as a late bloomer by a top seeded team, even if that performance isn't reflected in the rankings because of poor performance in early MATCHES. These points also have the potential to recognize teams employing a minority strategy with their ROBOT. Teams with unique or divergent ROBOT capabilities that complement the strengths of other ALLIANCE members may be selected to fill a strategic niche.

Note also that ALLIANCE CAPTAINS are given the same number of points as the team drafted in the same sequence. For example, the third ALLIANCE CAPTAIN gets the same number of points as the third draft. Numerical analysis supports the idea that ALLIANCE CAPTAINS are about as strong in ROBOT performance as equivalently drafted teams. As an additional minor benefit, awarding the same points for ALLIANCE CAPTAINS and equivalent drafts lubricates the acceptance of draft offers between ALLIANCE CAPTAINS, which gives teams out of the top 8 the chance to experience being ALLIANCE CAPTAINS themselves.

#### 11.8.1.3 Playoff Performance

This attribute measures team performance as part of an ALLIANCE.

Teams earn points based on how far their ALLIANCE advances in the Playoff MATCHES and the percentage of MATCH wins in which the team participated. The ALLIANCE Advancement points are shown in Table 11-8.

Table 11-8 District Playoff Performance

ALLIANCE Finish	ALLIANCE Advancement Points
Winner	30
Finalist	20
3 <sup>rd</sup> Place (loser of MATCH 13)	13
4 <sup>th</sup> Place (loser of MATCH 12)	7

In most cases, unless a BACKUP is recruited, a team plays in 100% of the Playoff MATCHES won by their ALLIANCE, thus their Playoff Performance points simply equals their ALLIANCE Advancement points. If a

team does not play 100% of the Playoff MATCHES won by their ALLIANCE, their Playoff Performance points equals their ALLIANCE Advancement points multiplied by the percentage of Playoff MATCHES won by their ALLIANCE in which that team was a participant. For example, if Team X's ALLIANCE wins the event, but Team X only played in 4 of the 5 Playoff MATCHES won by their ALLIANCE, Team X's Playoff Performance points are  $30 \times (4/5) = 24$  points. If the result is not a whole number, the value is rounded up to the nearest integer.

#### 11.8.1.4 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*. In many ways, the team's experience in being selected for awards, especially the *FIRST* Impact Award, the Engineering Inspiration Award, and the Rookie All Star Award (which is optional for District Championship events), is beyond measure, and could not be fully captured in its entirety by any points-based system. Points are being assigned to awards in this system only to help teams recognize that *FIRST* continues to be "More than Robots<sup>SM</sup>," with the emphasis on our cultural awards, 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 (e.g. Rookie Highest Seed), is not for a team (e.g. the Dean's List Award) or is not judged at the event (e.g. Safety Animation Award, sponsored by UL), no points are earned.

#### 11.8.1.5 Team Age

This attribute recognizes the difficulty in being a rookie or relatively new team.

Points are awarded to 2021, 2022, and 2023 rookie teams in recognition of the unique challenges teams face in those early years, and to increase the chance that they will make it to the District Championship to compete with their ROBOTS. Like our dedicated Rookie awards, these additional points are intended to recognize and motivate newer participants in *FIRST* Robotics Competition. These points are awarded once at the beginning of the season. Rookie year is calculated based on the year in which *FIRST* recognizes the team as a rookie.

#### 11.8.1.6 Regional Participation

District teams neither earn points for their actions at any Regionals, nor are eligible for any *FIRST* Championship qualifying benefits at that Regional (awards, Wild Cards, etc.). If a District team is on the winning ALLIANCE, a Wild Card is awarded to the next qualifying team. If they are on the finalist ALLIANCE and would be awarded a Wild Card, they are skipped.

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### 11.8.2 District Championship Eligibility

A team competing in a District qualifies for their District Championship by meeting 1 of the following criteria:

- A. District *FIRST* Impact Award Winner,
- B. District Ranking (based on total points earned at their first 2 home District events as detailed in [Section 11.8.1 District Events](#)),

Teams do not earn points at third or subsequent District events, nor at any inter-district or Regional events at which they compete during the season.

If a team declines an invitation to the District Championship, the next highest uninvited team on the list is invited, and so on, until the event capacity is filled.

- C. District Engineering Inspiration winner (qualifies to compete for the award only), and
- D. District Rookie All Star winner (qualifies to compete for the award only).

The capacity of each District Championship is shown in Table 11-9. Each District determines the number of teams that qualify for their District Championship. These limits are based on factors including but not limited to the total number of teams in the District, available venue capacity, etc.

*Table 11-9 2023 District Championship Capacities*

District Championship	Capacity	Divisions
<b>FIRST Chesapeake District Championship</b>	60	1
<b>FIRST Israel District Championship</b>	40	1
<b>FIRST Mid-Atlantic District Championship</b>	60	1
<b>FIRST North Carolina State Championship</b>	40	1
<b>FIRST Ontario Provincial Championship</b>	80	2
<b>FIRST in Texas District Championship</b>	80	2
<b>Indiana State Championship</b>	32	1
<b>Michigan State Championship</b>	160	4
<b>New England District Championship</b>	90	2
<b>Pacific Northwest District Championship</b>	50	1
<b>Peachtree District State Championship</b>	50	1

### 11.8.3 District Championships with Multiple Divisions

If a District Championship has too many teams to allow all teams 12 Qualification MATCHES, then the event hosts multiple divisions. These events have 2 or 4 divisions (based on the number of teams participating, see Table 11-9) with approximately 40–60 teams in each division. Teams are assigned divisions by *FIRST* using a process developed by *FIRST* in Michigan.

The process employs a “brute force iterative randomizer” and is executed as follows:

1. The district team list is sorted in order of cumulative district points earned as described in [Section 11.8.1 District Events](#).
2. The list is divided into quartiles based on rank (e.g. the first quartile has the top 25% ranked teams).
3. Division assignments are randomly generated using equal contribution from each quartile.
4. 3 criteria are calculated for each division:
  - a. average strength: the arithmetic mean of the district point values of teams in a division
  - b. distribution of strength: the Signal to Noise Ratio (SNR) of the district point values of teams in a division. SNR is calculated as follows:

$$SNR = 10 \left( \log \frac{\bar{x}^2}{\sigma^2} \right)$$

$\bar{x}$  = arithmetic mean of the district points in a division

$\sigma$  = standard deviation of the district points in a division

- c. distribution of strength for “top” teams: The SNR of the district point values of teams in the first quartile of a division
5. The 3 criteria for each division are compared to the other division(s). If the difference between the division’s value and any other division’s value exceeds the limits in Table 11-10, the criteria is not met.

*Table 11-10 District Championship division Evaluation Limits*

	2 divisions	4 divisions
<b>Average strength</b>	1	2
<b>Distribution of strength</b>	1	2.5
<b>Distribution of strength for “top” teams</b>	1.5	2

6. If all 3 criteria met, event organizers publish the assignments. If any of the 3 criteria are not met, assignments are rejected, and the process returns to Step 3.

#### 11.8.3.1 District Championship Playoffs

In these cases:

- Division winning ALLIANCES play each other in District Championship Playoffs, employing the brackets shown in Figure 11-4 and Figure 11-5 (and detailed in Table 11-11) that corresponds to their District, until a winning ALLIANCE for the event is determined.

*Figure 11-4 4 division District Championship Playoff Bracket*

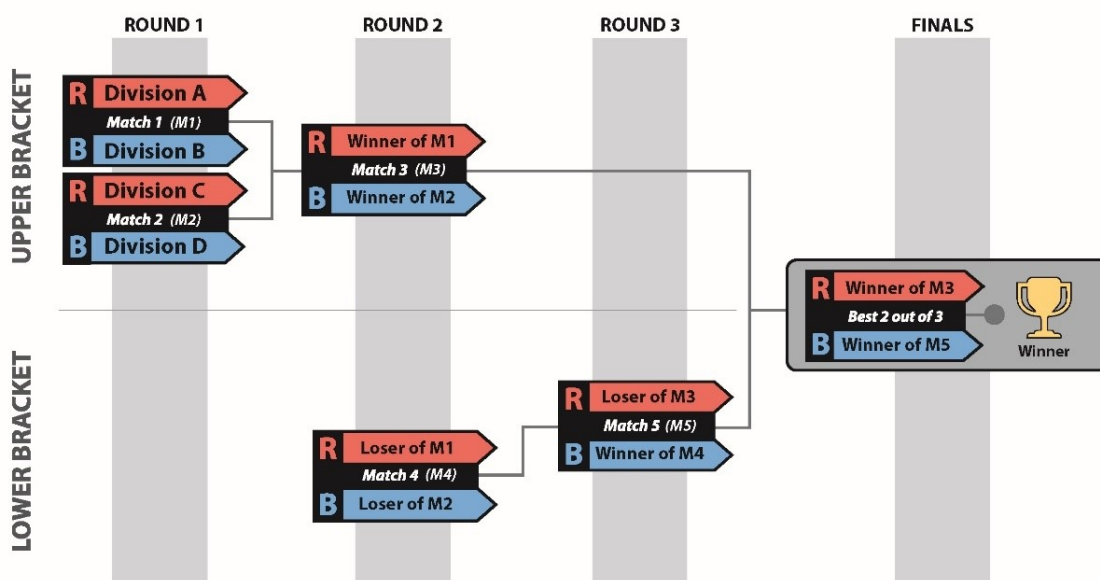


Figure 11-5 2 division District Championship Playoff Bracket

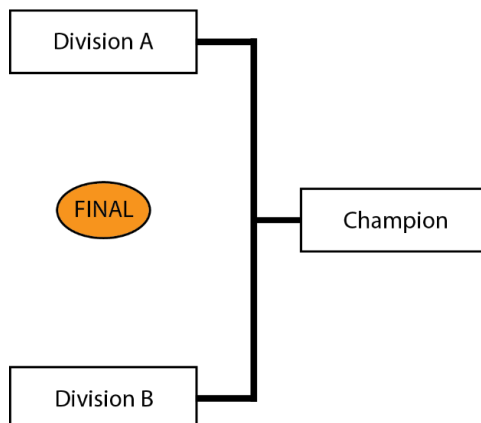


Table 11-11 District Championship 4-ALLIANCE Playoff MATCH schedule

MATCH	Blue	Red	Blue Gap (minutes)	Red Gap (minutes)	Winner moves to	Loser moves to
Upper Bracket – Round 1 – MATCH 1	B	A	-	-	Red – MATCH 3	Red – MATCH 4
Upper Bracket – Round 1 – MATCH 2	D	C	-	-	Blue – MATCH 3	Blue – MATCH 4
<b>15-minute Break</b>						
Upper Bracket – Round 2 – MATCH 3	W2	W1	17m	24m	Red – MATCH 6	Red – MATCH 5
Lower Bracket – Round 2 – MATCH 4	L2	L1	24m	31m	Blue – MATCH 5	
<b>15-minute Break</b>						
Lower Bracket – Round 3 – MATCH 5	W4	L3	17m	24m	6	
<b>15-minute Break</b>						
Finals - MATCH 6	W5	W3	17m	44m		
<b>15-minute Break</b>						
Finals - MATCH 7	W5	W3	17m	17m		
<b>15-minute Break</b>						
Finals - MATCH 8*	W5	W3	17m	17m		

\* if required

- Each team on a Champion ALLIANCE of a 2-Division District Championship Playoff tournament earns 10 points.
- For a 4-Division District Championship Playoff tournament, each team on a Champion ALLIANCE earns 20 points and each team on a Finalist ALLIANCE receives 10 points.
- If any of these alliances has recruited a BACKUP TEAM, these points are divided amongst the teams as described in [Section 11.8.1.3 Playoff Performance](#).

- If an ALLIANCE in a District Championship Playoff has not yet recruited a BACKUP TEAM per [Section 11.7.3 BACKUP TEAMS](#), the ALLIANCE CAPTAIN may bring in only the highest ranked team from their division's BACKUP POOL to join its ALLIANCE.

## 11.9 FIRST Championship: Additions and Exceptions

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At the 2023 FIRST Championship, teams are split into 8 divisions. The process used to assign teams to their division is as follows:

1. Rookies are assigned randomly, team by team, sequentially to divisions (i.e. a team in Division 1, a team in Division 2, a team in Division 3, a team in Division 4, a team in Division 5, a team in Division 6, a team in Division 7, a team in Division 8, then back to Division 1 again, until Rookies are all assigned to a division).
2. Step 1 is repeated with veteran teams.

Each division plays a standard tournament as described in [Section 11.6 Qualification MATCHES](#) and [Section 11.7 Playoff MATCHES](#) to produce the division Champions. Those 8 division Champions proceed to the Championship Playoffs, on the Einstein FIELDS, to determine the 2023 FIRST Robotics Competition Championship Winners, per [Section 11.9.4 FIRST Championship Playoffs](#).

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### 11.9.1 Advancement to the FIRST Championship

Details on how teams earn eligibility to attend the FIRST Championship are posted on the [FIRST Championship eligibility webpage](#).

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### 11.9.2 4 ROBOT ALLIANCES

There is no provision for BACKUP TEAMS at the FIRST Championship.

Instead, before each division Playoff Tournament, ALLIANCES are selected per the process as described in [Section 11.7.1 ALLIANCE Selection Process](#), however the process continues with a third round of selection as follows.

**Round 3:** The same method is used for each ALLIANCE CAPTAIN'S third choice except the selection order is reversed again, with ALLIANCE 1 picking first and ALLIANCE 8 picking last. This process results in 8 ALLIANCES of 4 teams each.

ALLIANCES may start with any 3 of the 4 ROBOTS on their ALLIANCE during division Playoff MATCHES and during the Championship Playoffs. ALLIANCES submit LINEUPS for their MATCHES as described in [Section 11.7.4 LINEUPS](#).

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### 11.9.3 FIRST Championship Pit Crews

FIRST distributes buttons to the ALLIANCE CAPTAINS during the ALLIANCE CAPTAIN meeting, which takes place on the division FIELDS. These buttons provide the necessary access to the ARENA for pit crew members.

**T901 \*Wear your buttons.** Only team members wearing proper buttons are allowed on the ARENA floor during division and Playoff MATCHES.

*Violation: MATCH won't start until the situation is corrected. Those not displaying identification must leave the ARENA.*

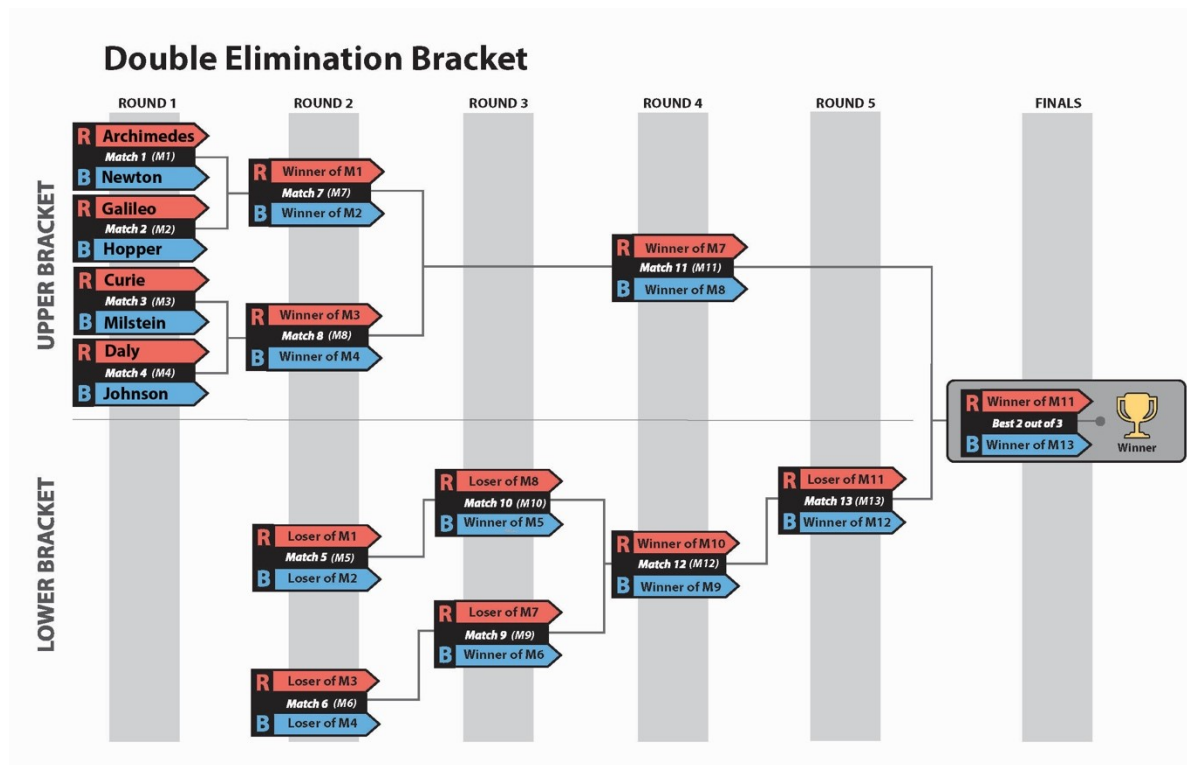


Teams should assume they may be chosen for an ALLIANCE and think about the logistics of button distribution and set a plan prior to the ALLIANCE selection process. It is each ALLIANCE CAPTAIN'S responsibility to distribute buttons to their pit crew members.

#### 11.9.4 *FIRST* Championship Playoffs

The 8 division Champions play a Double Elimination style tournament as described in [Section 11.7 Playoff MATCHES](#) to determine the 2023 *FIRST* Robotics Competition Champions. Exact MATCH timing is provided to *FIRST* Championship Playoff teams. ALLIANCES are paired as shown in Figure 11-6.

Figure 11-6 Championship Playoff Bracket



During the Einstein Finals, if the MATCH score of each ALLIANCE is equal, the MATCH is replayed. In this circumstance, the LINEUP may be changed.

