



# Vermont State Championship

Saturday, February 11, 2023

Champlain Valley Union High School | Hinesburg, VT

Livestream: <https://go.uvm.edu/ftcf2023>

Compete in an energy-driven game and test the limits of performance, efficiency, and endurance to power innovations forward.



# POWER PLAY<sup>SM</sup>

PRESENTED BY  **Raytheon**  
Technologies

# FIRST<sup>®</sup> ENERGIZE<sup>SM</sup>

PRESENTED BY **Qualcomm**

# About *FIRST*



**FIRST**  
**LEGO**  
**LEAGUE**

GRADES  
PreK-8  
AGES  
4-14

**FIRST**  
**TECH**  
**CHALLENGE**

GRADES  
7-12  
AGES  
12-18

**FIRST**  
**ROBOTICS**  
**COMPETITION**

GRADES  
9-12  
AGES  
14-18

*FIRST*® (For Inspiration and Recognition of Science and Technology) was founded in 1989 to inspire young people's interest and participation in science and technology. Based in Manchester, NH, the 501(c)(3) not-for-profit public charity designs accessible, innovative programs that motivate young people to pursue education and career opportunities in science, technology, engineering, and math, while building self-confidence, knowledge, and life skills.

*FIRST* is More Than Robots.™ *FIRST* participation is proven to encourage students to pursue education and careers in STEM-related fields, inspire them to become leaders and innovators, and enhance their 21<sup>st</sup> century work-life skills.

# About *FIRST* Tech Challenge

**FIRST® Tech Challenge** is an exciting, fun, global robotics program for students in grades 7-12. Teams are responsible for designing, building, and programming their robot to compete in an alliance format with and against other teams. The standard robot kit is reusable and can be programmed using a variety of java-based programming languages. Teams compete on and off the playing field for awards that celebrate robot design and performance, community outreach, *Gracious Professionalism*®, and sharing and spreading *FIRST* in their communities. Being on a *FIRST* team empowers students to:

- Think, explore, and project plan like scientists and engineers
- Have a fun, creative, and hands on STEAM experience
- Experiment, iterate, and overcome obstacles
- Apply real life math and science skills
- Build self-esteem and confidence
- 90% of participating students report learning how STEM can solve real world problems



# Tournament Schedule

## Teams Schedule

7:00 AM	Team registration and pits open
7:30 AM	Robot inspection begins
7:30 AM	Scheduled judging sessions begin (see judging schedule)
9:00 AM	Coaches meeting with Field Manager (at playing fields)
9:30 AM	Drivers meeting with Referee team (at playing fields)
9:45 AM	Teams queue up for first matches
10:00 AM	Opening ceremony
10:30 AM	Qualification matches begin
11:55 AM	Group picture (bleachers next to playing fields)
12:05 PM	Lunch break
12:30 PM	Qualification matches resume
3:00 PM	Qualification matches complete
3:15 PM	Alliance selection begins
3:45 PM	Semi Final matches begin
4:00 PM	Final matches begin
4:30 PM	Awards ceremony
4:45 PM	Competition complete
5:15 PM	Pits close; cleanup and departure

NOTE: Times are approximate and may change.  
Check the latest event schedule throughout the day.

\* Please note that the tournament schedule might have changed after this program book went to print. All times are subject to change. For any changes to the event's schedule, check in with Pit Admin.

# Match Play and Elimination Rounds

## During the Qualifying Matches

After all teams have gone through the robot and field inspections, they are randomly assigned into alliances of two teams. A team's alliance partner in one match may be their opponent in another match.

## Team Rank

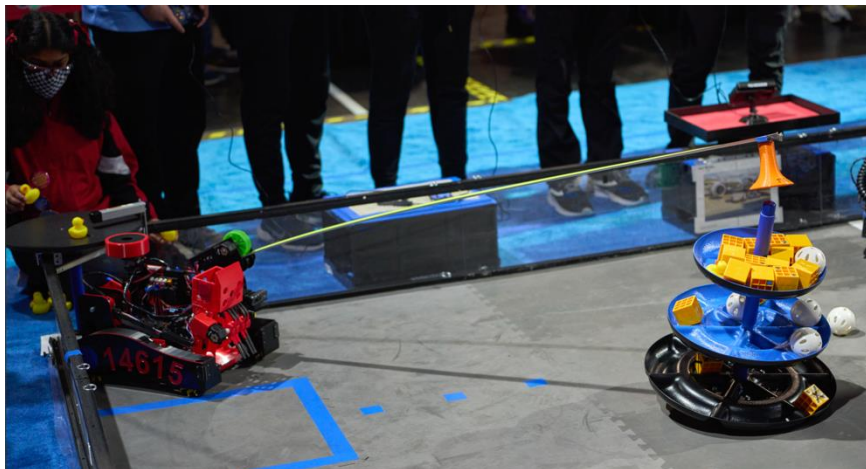
After all qualifying matches, all teams will be ranked from first through last based on their averaged Ranking Points (RPs). If multiple teams have the same number of ranking points, then the teams will be ranked based on their averaged tiebreaker points (TBP). There are two types of Tiebreaker points; TBP1 and TBP2. TBP1 is their alliances autonomous period score. TBP2 is the alliances end game score. If multiple teams have the same tiebreaker points as well, the teams will be ranked based on their highest match score. If this comparison still results in a tie, the next highest match score will be used until the tie is broken.

## Alliance Selection

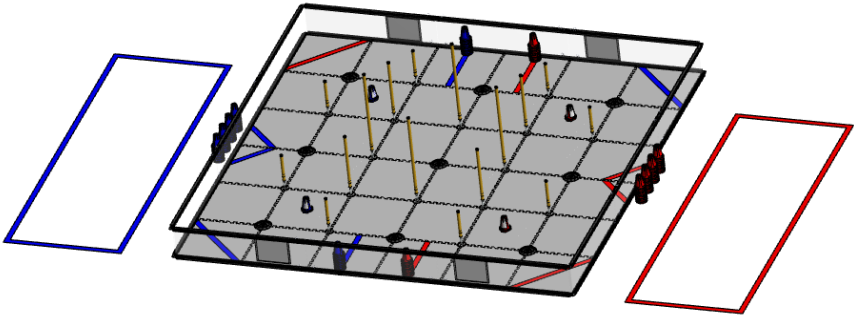
After all the qualifying matches are held, the Alliance Section begins. Four alliance captains are selected based on team rank. These captains then pick one or two additional teams (based on event size) to be their alliance partners for the Elimination Matches.

## Elimination Matches

Alliances get a win, loss, or tie. The advancing alliance is the first one to win two matches.



# Game Description



## The Game:

**POWERPLAY<sup>SM</sup>** presented by Raytheon Technologies is played on a 12 ft. x 12 ft. (3.7m x 3.7m) square field with approximately 1 ft. (0.3 m) high walls and a soft foam mat floor. There are two Alliances – “red” and “blue” – made up of two Robots each. Cones are the Alliance-specific scoring elements. There are 60 Cones, 30 red and 30 blue. There are also four Cone-shaped Signals that are used as indicators for the Autonomous Period to direct the Robots to specific scoring areas. At opposite corners of the field are two Alliance-specific Terminals. On the sides of the field are Alliance-specific Substations. In the middle of the field are twenty-five Junctions of various heights.

Robots must traverse around the field to access Cones located against the front or back field wall. Cones may also be placed by the Human Player into the Substation for Robots to access and score on the Junctions. Cones are placed on Ground, Low, Medium, and High Junctions to score different amounts of points based on the height of the Junction.

Prior to the start of the Match, Robots must be touching the wall closest to their alliance station at specified locations and may possess one Pre-Load Cone. Teams may place their own designed Signal Sleeve over the Signal located directly in front of their Robot. Teams may also manufacture an Alliance-colored Beacon and place it in their Substation Storage area for use during the End Game.

Matches have two distinct periods of play: a 30-second Autonomous period followed by a two-minute Driver-Controlled period. The last thirty seconds of the Driver-Controlled period is called the End Game which adds new scoring opportunities for the Robots to achieve.



# Game Description, continued

## Autonomous Period:

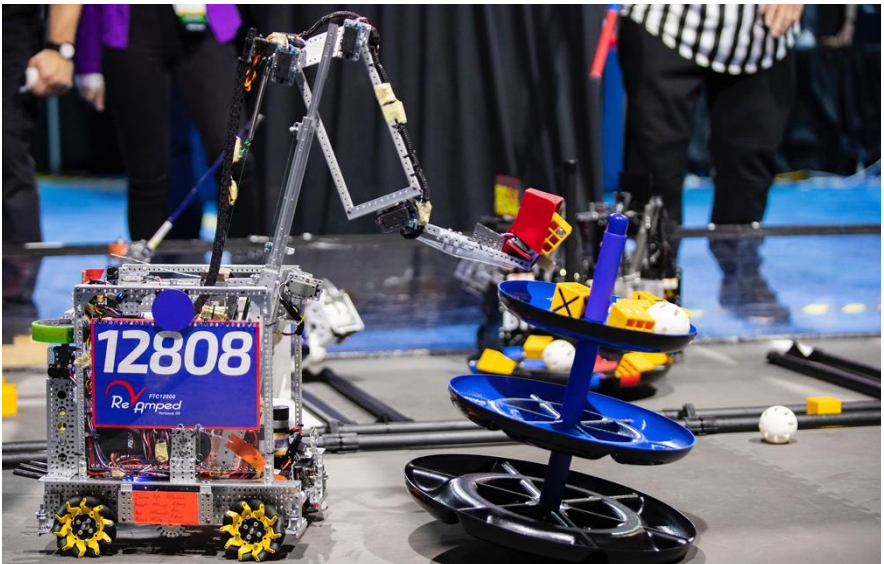
Robots may place Cones in their corresponding Terminal closest to their Alliance Station or on any of the Junctions. They can park in several locations at the end of the period for different points. They can also use their Signal Sleeve to help them determine in what Signal Zone to park.

## Driver-Controlled Period:

Alliances earn points by having their Robots place Cones in Terminals and on Junctions of different heights.

## End Game:

Alliances may continue to score Cones on Junctions. They may also use their Beacon to Cap a Junction and convey ownership of that Junction. Ownership is also conveyed by having the topmost Cone on a Junction at the end of the Match. Alliances that complete a Circuit (a connected string of owned Junctions and Terminals) will earn Bonus points. Additional points are scored if a Robot is parked in a Terminal at the end of the Match.



# Scoring

## Autonomous Period Scoring:

### Navigating:

- Parked In Alliance Substation: .....2 points
- Parked In closest Alliance Terminal: .....2 points

### Cones:

- Placed In closest Terminal: ..... 1 point
- Secured on Ground Junction: .....2 points
- Secured on Low Junction: .....3 points
- Secured on Medium Junction: .....4 points
- Secured on High Junction: .....5 points

### Signal Bonus – Parked Completely In Signal Zone:

- Using Playing Field-supplied Signal: .....10 points
- Using Team-supplied Signal Sleeve: ..... 20 points

## Driver-Controlled Period Scoring:

### Cones:

- Placed In matching color Terminal: ..... 1 point
- Secured on Ground Junction: .....2 points
- Secured on Low Junction: .....3 points
- Secured on Medium Junction: .....4 points
- Secured on High Junction: .....5 points

## End Game Scoring:

### Junction Ownership:

- Conveyed by top Scored Cone: .....3 points
- Conveyed by capped Beacon:.....10 points

**Completed Circuit:** .....20 points

**Parked In a Terminal:** .....2 points



## Participating Teams

<b>Team Number</b>	<b>Team Name</b>	<b>Vermont Town</b>
3397	HiveMind Robotics	Essex Junction
4946	Robo Raiders	Montpelier
5741	CVU RoboHawks	Hinesburg
6731	Ringers	St. Albans
7418	Batteries Not Included	South Burlington
8304	Wired Cats	Saxtons River
9622	RMS Robotics	Rutland
9721	Green Mountain Gears	South Burlington
10899	Mansfield Mechanics United	Jericho
14251	Capital Robotics	Montpelier
15081	Milton Robotics	Milton
16221	Manchester Machine Makers	Manchester Center
16295	Green Mountain Girls	South Burlington
18351	Bubbert Innovations	Montpelier
18616	River Valley RAD's	Springfield
18649	Lancer Robotics	Hyde Park
18650	Cookie Clickers	Bennington
21577	Bulldog Robotics	Burlington
22683	JV RoboRedHawks	Hinesburg

# FIRST Alumni and Scholarships

Participants and alumni of *FIRST* programs gain access to education and career discovery opportunities, connections to exclusive scholarships and employers, and a place in the *FIRST* community for life.



Learn more about scholarships, internships, and alumni opportunities at [www.firstinspires.org/alumni](http://www.firstinspires.org/alumni). If you're a graduating senior, make sure to register in our dashboard so we can stay in touch!



# FIRST Tech Challenge Awards

## INSPIRE

**The highest award that a team can be given.** This judged award is given to the team that truly embodied the “challenge” of the program. The team that receives this award is a strong ambassador for *FIRST* programs and a role model team. This team is a top contender for many other judged awards and is a gracious competitor. The Inspire Award winner is an inspiration to other teams, acting with *Gracious Professionalism*<sup>®</sup> both on and off the Playing Field.

## THINK

**Removing engineering obstacles through creative thinking.** This judged award is given to the team that best reflects the journey the team took as they experienced the engineering design process during the build season.

## CONNECT

**Connecting the dots between community, *FIRST*, and the diversity of the engineering world.** This judged award is given to the team that most connects with their local science, technology, engineering, and math (STEM) community.

## INNOVATE Award sponsored by Raytheon Technologies

**Bringing great ideas from concept to reality.** This judged award celebrates a team that not only thinks outside the box, but also has the ingenuity and inventiveness to make its designs come to life. This judged award is given to the team that has the most innovative and creative robot design solution to any or all specific field elements or components in the game.

## CONTROL Award sponsored by Arm

**Mastering robot intelligence.** This judged award celebrates a team that uses sensors and software to enhance the robot’s functionality on the field.

## MOTIVATE

**Sparking others to embrace the culture of *FIRST*!** This team embraces the culture of *FIRST* and clearly demonstrates what it means to be a team. This is a team who makes a collective effort to make *FIRST* known throughout their school and community, and sparks others to embrace the culture of *FIRST*.

# FIRST Tech Challenge Awards, continued

## DESIGN

**Industrial design at its best.** This judged award recognizes design elements of the robot that are both functional and aesthetic. All successful robots have innovative design aspects; however, the Design Award is presented to teams that incorporate industrial design elements into their solution.

## PROMOTE (Optional Award)

**“How I learned about FIRST”** - This judged award is given to the team that is most successful in creating a compelling video message designed to change our culture and celebrate STEM.

## COMPASS (Optional Award)

**A beacon and leader in the journey of the team.** This judged award recognizes an adult Coach or Mentor who has provided outstanding guidance and support for a Team throughout the year and demonstrates to the Team what it means to be a *Gracious Professional*.

## ELIMINATION TOURNAMENT AWARDS

The winning alliance and finalist alliance are both recognized for their achievement in robot game performance.

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**Thank You FIRST Tech Challenge  
Season Sponsors!**



# FIRST Values

**Gracious Professionalism®** — Dr. Woodie Flowers, *FIRST* Distinguished Advisor and Pappalardo Professor Emeritus of Mechanical Engineering, Massachusetts Institute of Technology, coined the term *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.

With *Gracious Professionalism*, fierce competition and mutual gain are not separate notions. Gracious professionals learn and compete like crazy but treat one another with respect and kindness in the process. They avoid treating anyone like losers. No chest thumping tough talk, but no sticky-sweet platitudes either. Knowledge, competition, and empathy are comfortably blended.

In the long run, *Gracious Professionalism* is part of pursuing a meaningful life. One can add to society and enjoy the satisfaction of knowing one has acted with integrity and sensitivity.

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**Coopertition®** — *Coopertition* produces innovation. At *FIRST*, *Coopertition* is displaying unqualified kindness and respect in the face of fierce competition. *Coopertition* is founded on the concept and a philosophy that teams can and should help and cooperate with each other even as they compete.

*Coopertition* involves learning from teammates. It is teaching teammates. It is learning from mentors. And it is managing and being managed. *Coopertition* means competing always and assisting and enabling others when you can.

# FIRST Core Values

*FIRST* is committed to fostering, cultivating, and preserving a culture of equity, diversity, and inclusion that opens STEM opportunities for all. The *FIRST* community thrives under the set of *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!





# Thank You, Tournament Volunteers and Supporting Organizations!

**Thank you to all who help make  
this program possible for our youth.**

*FIRST* could not exist without the support of the army of mentors, parents, teachers, and volunteers who step up to provide their time and expertise to inspire our young people to get excited about science, technology, engineering, and math.



THE UNIVERSITY OF VERMONT  
COLLEGE OF ENGINEERING &  
MATHEMATICAL SCIENCES



**Agilent**

Trusted Answers

