

Welcome SPECTATORS!

FIRST® Progression of Programs *FIRST®* is the world's leading child-serving nonprofit advancing science, technology, engineering, and math (STEM). For 30 years, *FIRST* has evolved into a global movement by engaging millions of people with a proven game-changer for preparing kids to solve the world's greatest problems. *FIRST* programs inspire innovation and leadership through engaging, hands-on robotics challenges developed to ignite curiosity and passion in students in grades K-12. *FIRST* builds powerful mentorship relationships between young people and STEM professionals, helping kids gain confidence to explore the innovation process while they learn valuable science, engineering, technology, teamwork, and problem-solving skills. *FIRST* creates the people who will change the world – today and tomorrow.



FIRST LEGO LEAGUE JR.

FIRST® LEGO® League Jr. teams build and program a model that moves using LEGO® Education WeDo 2.0 and present their research journey on a Show Me poster.

Children, Ages 6-10 (Grades K-4), get to:

- Learn about a real-world theme
- Explore challenges facing today's scientists
- Discover real-world math and science
- Begin developing teamwork skills
- Practice presentation skills
- Celebrate at noncompetitive events
- Engage in team activities guided by *FIRST®* Core Values



FIRST LEGO LEAGUE

FIRST® LEGO® League teams build robots using LEGO® MINDSTORMS® technology and develop research projects based on a real-world Challenge that changes annually.

Students, Ages 9-16* (Grades 4-8), get to:

- Create innovative solutions to challenges facing today's scientists
- Strategize, design, build, program, and test an autonomous robot
- Apply real-world math and science concepts
- Develop career and life skills, including critical thinking, time management, collaboration, confidence, and communication
- Participate in official tournaments and local events
- Engage in team activities guided by *FIRST* Core Values

*Ages vary by country



FIRST TECH CHALLENGE

FIRST® Tech Challenge students learn to think like engineers. Teams build robots from a reusable kit of parts, develop strategies, document their progress, and compete head to head.

Students, Ages 12-18 (Grades 7-12), get to:

- Design, build, and program robots
- Model a real-world engineering process
- Apply math and science concepts
- Develop strategic problem-solving, organizational, and team-building skills
- Build life skills while building robots and work towards participating in tournaments and *FIRST* Championship
- Compete and cooperate in Alliances at tournaments
- Access exclusive scholarships from hundreds of colleges/universities



FIRST ROBOTICS COMPETITION

FIRST® Robotics Competition teams compete with 120-pound robots of their own design, combining the excitement of sport with the rigors of science and technology.

Students, Ages 14-18 (Grades 9-12), get to:

- Work alongside professional engineers
- Build and compete with a robot of their own design
- Learn and use sophisticated hardware and software
- Develop design, project management, programming, teamwork, strategic thinking, and *Coopertition®* skills
- Earn a place in the *FIRST* Championship
- Access exclusive scholarships from hundreds of colleges/universities

At the heart of *FIRST* are its Core Values, which emphasize the contributions of others, friendly sportsmanship, teamwork, learning, and community involvement. These include: **Gracious Professionalism®** – Respect for others, being a good sport, and sharing what you learn. **Coopertition®** – Competing hard, but also helping the other teams.



FOR INSPIRATION & RECOGNITION OF SCIENCE & TECHNOLOGY

For information about *FIRST®* in your area: www.firstinspires.org/contactus

FIRST® Tech Challenge Game

ROVER RUCKUS



Presented By **Qualcomm**

The object of the game is to attain a higher score than the opposing alliance by descending from the Lander, collecting Minerals from the Crater, sorting and scoring Minerals into the Cargo Hold of the Lander, performing Autonomous tasks, and navigating to specific parts of the Playing Field. The Scoring Elements for the game are 60 Silver Minerals and 90 Gold Minerals, and a Team supplied Team Marker.

There are two alliances of two robots each – “red” and “blue”. Two alliance-neutral Craters sit in opposite corners of the Playing Field and two alliance-specific Depots are in the other two corners. Unique navigation targets are placed in the center of each field wall. In front of each corner is a Mineral Sampling Field with 2 Silver Minerals

and 1 Gold Mineral, randomly lined up. The remaining Minerals are divided approximately equally and placed in each Crater.

The Lander sits in the center of the field with alliance-specific Landing Zones marked by red and blue tape. Prior to the start of a match, robots may be latched onto the Lander. Robots that cannot be latched must start in the alliance’s Landing Zone. Robots may also preload a Team Marker. Teams can be very creative with their Team Marker designs. Field personnel will randomize the Minerals in the Sampling Field prior to the start of the match.

AUTONOMOUS PERIOD (0:30)

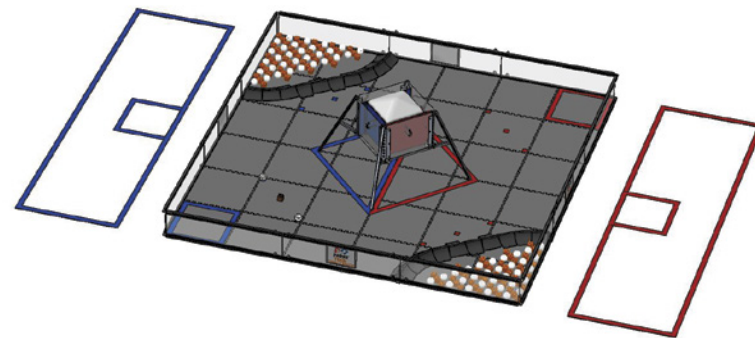
Robots operate using only pre-programmed instructions and sensor inputs. Alliances earn points by: Landing – robots lower themselves from the Lander onto the Playing Field; Sampling – robots identify the single Gold Mineral in each Sample Field; Claiming – robots place the Team Marker in their corresponding Depot; and Parking – robots that end the Autonomous Period in a Crater earn points.

DRIVER-CONTROLLED PERIOD (2:00)

Alliances earn points by placing Minerals into their alliance’s Cargo Holds and Depot. Gold Minerals must be placed in the Gold Cargo Hold and Silver Minerals into the Silver Cargo Hold to score. Any Mineral in the Depot may score for the alliance.

END GAME (0:30)

In addition to the Driver-Controlled period tasks, during the last 30 seconds of the game, alliances earn points by latching onto the Lander or by Parking on or completely in any Crater.



Autonomous Period Scoring	Points
Landing	30 points
Sampling	25 points
Claiming	15 points
Parking	10 points

Driver-Controlled Period Scoring	Points
Gold Mineral in Gold Cargo Hold	5 points/Mineral
Silver Mineral in Silver Cargo Hold	5 points/Mineral
Any Mineral in Depot	2 points/Mineral
Incorrect Mineral in either Cargo Hold	0 points/Mineral

End Game Scoring	Points
Robots Latched	50 points/Robot
Robots Parked In Crater	15 points
Robots Parked Completely In Crater	25 points

The alliance with the highest final score is the winner of the match.



FIRST®, the FIRST® logo, FIRST® Robotics Competition, FIRST® Tech Challenge, Coopertition®, and Gracious Professionalism® are trademarks of For Inspiration and Recognition of Science and Technology (FIRST). LEGO® and MINDSTORMS® are registered trademarks of the LEGO Group. FIRST® LEGO® League, and FIRST® LEGO® League Jr. are jointly held trademarks of FIRST and the LEGO Group. ©2018-19 FIRST. All rights reserved. FT031