

TEAM 3176
PURPLE PRECISION

2018-19 Rocket Rush Game Manual

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1.0 Introduction

Our Mission as Team 3176 is to inspire the youth of our community to be leaders in science and technology through engagement in FIRST's First Robotics Competition (FRC) that improves and fosters skills in Science, Technology, Engineering, and Mathematics (STEM). Through the acquisition of these skills, students become more adept in real life experiences and gain self-confidence, communication, and leadership experience. The team strives to ignite a passion in students to learn and engage in STEM activities. Students learn the importance of values established by FIRST and apply them as they continue their lives. Members of Team 3176 gain experience in the keys of teamwork and the success, when properly executed, it can achieve.

We strive to put our name, Team 3176 Purple Precision, into the community representing FIRST and its values. One of our primary goals as a team is impacting the community in a positive way; by doing this we spread an excitement for STEM. Because our community is where we derive our supporters and sponsors, we give back in a variety of innovative methods.

1.1 West Middle School Program

In correlation with Team 3176's mission statement, the team has helped to create a new robotics program at Brownsburg West Middle School. Here kids will experience FIRST programs in a local setting. This allows for interaction with the community, while still gaining skills vital to competing in FIRST programs. This document will outline the rules and regulations of the program's 2018-19 game, Rocket Rush, which purposely follows very closely to other FLL games.

2.0 Rocket Rush Overview

Rocket Rush, the 2018-19 Team 3176 game, challenges you and your team of engineers to escape the unknown planet you have just crashed on. Here you must build and design your own rover, collecting the lost pieces of the Stryker 10 rocket. After each piece is collected, your team can then assemble the rocket and liftoff to return home.

Pieces of the rocket can be collected in the following ways:

1. **Rocket Readings - 15 Points** - Four black boxes are positioned in random order on the field. Your rover must identify the box with the rocket part in it (further identified by the green label) and bring it back to the base. Points will only be awarded if the black box is brought back to base by your rover without moving the remaining 3 black boxes. If any of the empty black boxes are shifted from their initial position, the rocket part may still be returned to the base and it remains eligible to be used in the endgame, but no points will be awarded for this mission.
2. **Crater Challenge - 10 Points** - Your rover must retrieve the rocket piece from behind the barricade. Rovers are allowed to climb over the wall to retrieve the part, but be cautious. If your rover gets stuck it will be a touch penalty to retrieve it! The rocket part is held by a hooped platform to aid in the retrieval process. This platform does not have to be removed, to earn the points for this mission - only the rocket part.
3. **Combination Mixup - 10, 15, 20, or 25** - In order to retrieve this rocket part, your rover must first pull one of the four pins out of the top of the vault to unlock the door. Although there are four pins, your rover may only pull one. Each pin decreases in size as they get further away from the door. This being said, the smaller the pin the more points your team will receive. The closest pin to the door is worth ten points, the second is 15, the third is 20, and the last is 25. Pulling more than one pin will result in no points gained from the mission. As well, Opening the door before a pin is pulled will result in a 15 point penalty.
4. **Airlock Panic - 15 Points** - Rovers must rotate the red dial in either direction to release the rocket piece. Watch out, though. Falling rocket parts might damage parts of your rover if your team isn't careful!

5. **Command Center Confusion - 25 Points** - Rovers must press the red button to release the rocket piece down the ramp. Once the button is pushed, rovers are allowed to go retrieve the piece. Be careful, though. Rocket pieces might roll and land in unpredictable positions!
6. **Rough Terrain - 30 Points** - Your team's rover must retrieve a rocket part that is guarded by 3 patches of rough terrain. These patches are 2 inches deep and get taller and rougher the closer they are to the rocket part. Rovers must completely cross at least one of the terrains to be able to pick up the rocket part for that mission. Rovers may not reach over the barricade wall to retrieve the piece. For this mission only, rovers may be retrieved penalty free if they are stuck on or in between any of the rough terrains. If your rover is able to retrieve the part and return to base without getting stuck. Your team will receive a bonus 20 points for the mission in addition to the initial 30 points.
7. **Star Challenge** - Details can be found in Team Update 1

After all six pieces are collected, teams are able to complete a bonus endgame challenge:

1. **Liftoff - 25 Points** - Your team's task is to assemble the Stryker 10 Rocket and place it on the launchpad located in your team's base. Once all 6 rocket pieces are assembled and placed on the launchpad. ~~the rover can also press the red Liftoff button for 50 additional points located on the opposite side of the field.~~
Changed in Team Update 1

Each match is 2-minutes and 30-seconds, with only one robot on the field at a time. Robots will be made completely out of LEGO parts, and controlled autonomously. This means each mission will be completed by pre-programmed commands, without human interference. The only area in which robots can be handled is the base, which can be seen in Section 4.0.

3.0 Match Play

Each team will have the opportunity to play a number of times at a competition, rankings will then be decided based on the average amount of points per match.

3.1 Scoring Guide

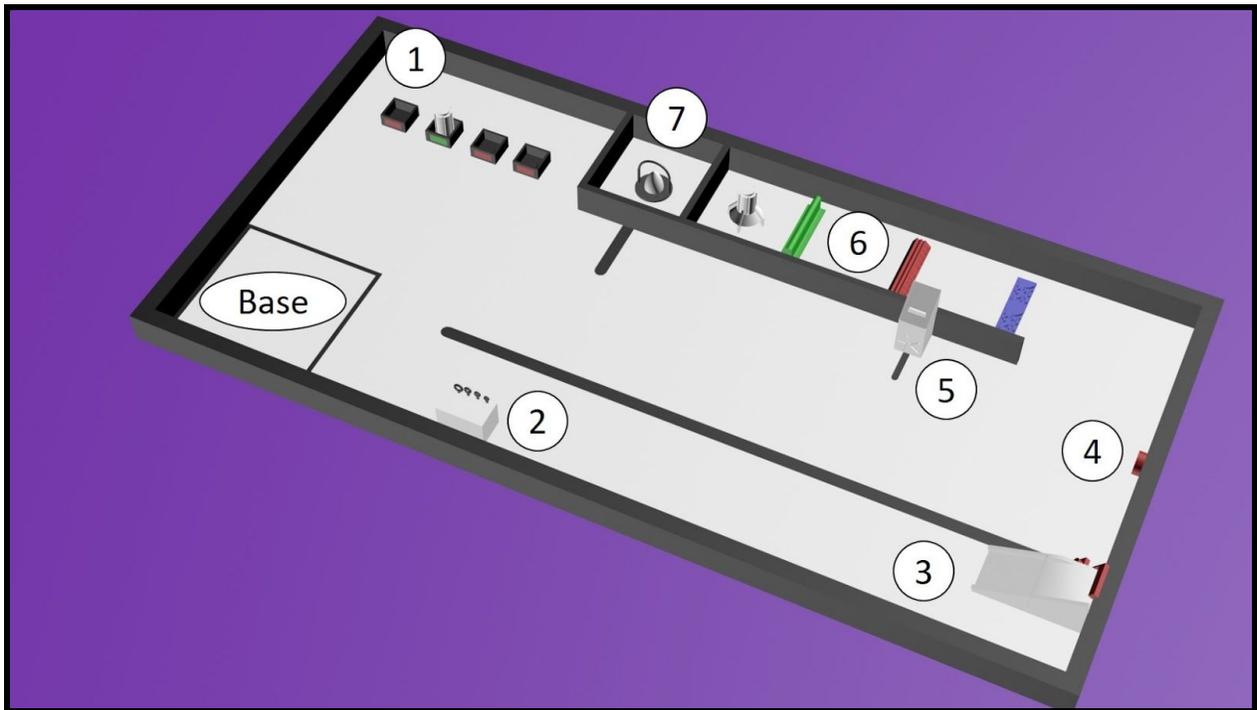
The following table outlines the points gained by each mission:

NAME (BONUS CHALLENGE)	MAP REF.	POINT VALUE (BONUS)
Rocket Readings	1	15
Crater Challenge	7	10
Combination Mixup	2	10, 15, 20, or 25 - pin based
Airlock Panic	5	15
Command Center Confusion	3	25
Rough Terrain (W/O Getting Stuck)	6	30 (+20)
Liftoff (Red Button Pressed)	4	75
Star Challenge	NA	3/Star

3.2 Awards

Based on the the outcome of the scoring shown above, one group will be awarded the 'Competition Winner'. This is not the only award however, additional awards will be given to teams who show exceptional creativity, teamwork, professionalism, and more. These awards will be nominated by a team judges, who evaluate the efforts of each team and interact with them throughout the season. More information on the release of these awards, and the selection process, will come in a 'competition overview'.

4.0 The Field



5.0 Rules and Regulations

The following table outlines all the potential fouls/penalties:

Foul	Penalty Points
Rover handled outside of base	15 per infraction
Combination Mixup - Opening door before pin is pulled	15
Rover retrieves a rocket part without attempting the mission (see below)*	15 per infraction

*This penalty will be up to referee discretion. The purpose of this rule is not to encourage teams to not think outside of the box. Instead, this rule is designed as a way to eliminate “cheating” or “work-around” strategies. An example of a time in which this penalty would be enacted would be if a rover purposely removed the rocket piece from on top of the Airlock Panic mission without rotating the dial. An example of a time in which this penalty would not be enacted would be a wire accidentally bumping a rocket piece out of place.

5.1 Referee Interaction

There will be one referee per table at competitions. The job of the referee is to fairly calculate the score and to assign any needed penalties. The referee will not interact with your rover in any ways except for in the following circumstances...

- Rover is at risk of falling off of the game table
- Rover is causing damage to the field
- Rover has flipped and is in an unreachable position
- Team asks referee to remove rover from the game table

Referees may at any point interact with field elements or mission models in an attempt to create a fair competition. Examples of referee interaction with field elements include but are not limited to...

- Mission model piece falls into the middle of the field
- Rocket piece is released by something other than a rover
- Mission Model is moved from its initial position
- Field tape is pulling up or is removed.
-

5.2 Rover Interaction

Rovers may only be touched by human players in the base zone. Any infraction of this rule will result in a 15 point touch penalty. A rover may be considered inside of the base zone if any part of the robot is crossing the base zone border. The same rule goes for rocket parts. Rocket parts may only be touched by human players if any part of the rocket piece has crossed the base zone border.

6.0 Presentation/Awards

In addition to creating a rover, your team must work together to create a 3–5 minute presentation. This presentation will answer the following questions: What kinds of tests would you have performed on the unknown planet? Why would you perform these tests? And finally, what would the data from these tests prove? Teams are encouraged to be as descriptive, yet as creative as they want in these presentations! These presentations will be given in front of a panel of 3–5 judges. These judges will be trying to determine who's team planned the most thoughtful and all-encompassing experiment. Teams are allowed to create posters, powerpoints, handouts, flyers, etc... A computer with internet access and Microsoft Office applications will be available for teams to use in their presentation, as well as a projector and screen. Teams will have 2 minutes to set up before their presentation and 2 minutes to tear down after their presentation.

Check Team Update for Presentation/Award Details

Team Update 1

Elements Being Removed

- The Planet Exploration presentation portion of competition will be removed and replaced. This element will be replaced by a two-step process. These two steps are...
 - A Technical Presentation:
 - Students will present the technical aspects (design, construction, code, etc...) to a panel of experts. These experts will listen to your presentation and ask questions regarding these technical aspects.
 - Walking Judges
 - In addition to the panel of experts, judges will be walking around the competition and observing robot performance during matches and practice time in between matches.
- The Launch Button will be removed from the gameplay. Instead, teams who complete an entire rocket will be awarded a flat bonus of 50 points.
- The Airlock Panic Mission will also be eliminated. The space on the board that the mission previously occupied will remain empty. The rocket piece earned from this mission will now sit in the base however no points will be earned from its positioning.

Elements Being Added

- A new mission is being added to the game. This mission is to encourage teams to focus on their driving and programming capability. The new mission is titled “Star Catching”. The rules are as follows.
 - STAR CATCHING
 - 5 colored stars are placed around the field. The robot’s mission is to drive over the colored stars.

- Every time any portion of a team’s robot crosses over the top of a colored star, that star is considered “caught”.
- 2 points will be awarded for every caught star.
- Stars may be caught up to 3 times per game period.
- Robots must return to the base before catching another star of the same color.

Awards

- The judges of the competition will be awarding a limited number of awards to deserving teams. This judging panel will include members of FIRST Robotics Team 3176, adult volunteers, and other mentors with engineering and technical experience. These awards will be presented in an Award Ceremony that will be held at the end of the competition. A list of the awards and their criteria is listed below.
 - MECHANICAL DESIGN
 - This award recognizes a team that designs and develops a mechanically sound robot that is durable, efficient and highly capable of performing Rocket Rush missions.
 - PROGRAMMING AWARD
 - This award recognizes a team that designs and develops programs that operate efficiently and are highly capable of performing Rocket Rush missions.
 - STRATEGY AND INNOVATION
 - This award recognizes a team that uses solid engineering practices and a well-developed strategy to design and build a nonnative, high performing robot.
 - RESEARCH AWARD
 - This award recognizes a team that utilizes diverse resources to formulate an in-depth and comprehensive understanding of the problem they have identified.
 - INNOVATIVE SOLUTION AWARD

- This award recognizes a team's solution that is exceptionally well-considered and creative, with good potential to solve the problem researched.
- PRESENTATION AWARD
 - This award recognizes a team that effectively communicates the problem they have identified and their proposed solution to both the judges and other potential supporters.
- INSPIRATION AWARD
 - This award celebrates a team that is empowered by their robotics team experience and displays extraordinary enthusiasm and spirit. This team's attitude should be a model to others and inspire others to pursue STEM as a future career or hobby.
- TEAMWORK AWARD
 - This award recognizes a team that is able to accomplish more together than they could as individuals through shared goals, strong communication, effective problem solving and excellent time management.
- GRACIOUS PROFESSIONALISM AWARD
 - This award recognizes a team whose members show each other and other teams respect at all times. They recognize that both friendly competition and mutual gain are possible, on and off the playing field.
- JUDGES AWARD
 - This award goes to the team that improvises and overcomes a difficult situation while still making a respectable showing leading the judges to believe great things to come in the future.
- PERFORMANCE AWARD

- This award recognizes a team that scores the most points during the competition. This team's robot, strategy, and operation all came together to achieve greatness in competitive success.

7.0 Contact Information

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