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1.0 Introduction

1.1 What is FIRST® Tech Challenge?
FIRST® Tech Challenge is a student-centered program that focuses on giving students a unique and stimulating experience. Each year, teams engage in a new game where they design, build, test, and program autonomous and driver operated robots that must perform a series of tasks. To learn more about FIRST® Tech Challenge and other FIRST® Programs, visit www.firstinspires.org.

1.2 FIRST Core Values
We express the FIRST® philosophies of Gracious Professionalism® and Coopertition® through our 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!

2.0 Gracious Professionalism®

FIRST® uses this term to describe our programs’ intent.

Gracious Professionalism® is a way of doing things that encourages high-quality work, emphasizes the value of others, and respects individuals and the community.

Watch Dr. Woodie Flowers explain Gracious Professionalism in this short video.

3.0 How to Use This Document

The Game Manual Part 2 – Traditional Events is a resource for all FIRST® Tech Challenge Teams for information specific to the 2020-2021 season’s game.

The intent of this manual is that the text means exactly, and only, what it says. Please avoid interpreting the text based on assumptions about intent, implementation of past rules, or how a situation might be in “real life”. There are no hidden requirements or restrictions. If you have read everything, you know everything.

Key words that have a specific meaning within this document are defined in the Game Definitions section and are indicated with the first letter capitalized, and the entire word in *Italics*. 
4.0 The Game

4.1 Introduction
This document describes ULTIMATE GOAL™ presented by Qualcomm, the FIRST® Tech Challenge game for the 2020-2021 season. We recommend viewing the game animation prior to reading this manual to gain a general understanding of the game. The animation is not intended as a replacement for official game rules. The animation can be accessed on our website under “Videos and Promotional Materials”:
https://www.firstinspires.org/resource-library/ftc/game-and-season-info

Teams must comply with all rules and requirements stated in this document and in the Game Manual Part 1 - Traditional Events. Clarifications to the game rules are issued on the Question & Answer section of the forum at ftcforum.firstinspires.org. Forum rulings take precedence over information in the game manuals.

4.2 Game Description
Matches are played on a Playing Field initially set up as illustrated in Figure 4.3-1 below. Two Alliances – one “Red” and one “Blue”, composed of two Teams each – compete in each Match. The object of the game is to attain a higher Score than the opposing Alliance by Delivering Wobble Goals to a randomly selected Target Zone, placing or Launching Rings into the Tower Goal, and Launching Rings to knock over Power Shot Targets.

The Match starts with a 30-second Autonomous Period in which Robots operate using only pre-programmed instructions and sensor inputs. During the Autonomous Period, Alliances earn points by: Delivering Wobble Goals to a randomly selected Target Zone, Parking In the Launch Line, Launching or placing Rings into the Tower Goal, and Launching Rings to knock over Power Shot Targets.

The two-minute Driver-Controlled Period follows the Autonomous Period. During the Driver-Controlled Period, Alliances earn points by Launching or placing Rings into the Low, Medium, and High Goals on the Tower Goal.

The final 30 seconds of the Driver-Controlled Period is called the End Game. In addition to the previously listed Driver-Controlled Period Scoring activities, Alliances earn points by Delivering a Wobble Goal to the Start Line or to the Drop Zone, Placing Rings on the Wobble Goals, and Launching Rings to knock over Power Shot Targets.

4.2.1 Game Narrative
In every game we play, we set out to make ourselves a collaborative teammate, a respected competitor, and a stronger person. No expectations are greater than those we place on ourselves.

While we revel in the big plays and vital scores, the real lessons we learn are when we fail and work with our teammates to recover. And each time our team steps up to a new challenge, we establish bolder goals, fueling our ambitions to work together, enhance our skills, and transcend all boundaries.

It’s the passion that drives us forward. As game changers, we use our strengths to outscore the competition and legendary players that have come before us. Together we are teammates at the top of our game, competing in a thrilling sport – to score, to win and to leave a legacy that lasts.

No matter the outcome, we stand up in the face of competition, pushing each other to do better, work harder, and exceed our team and personal potentials.

It’s time to set the records straight by breaking them. Are you up to the challenge?
4.3 Playing Field Illustrations
The following illustrations identify the Game Elements and give a general visual understanding of the game. Teams should refer to andymark.com/FTC for the exact Game Element dimensions. The official Playing Field documents, including the official Field Setup Guide, are available at https://www.firstinspires.org/resource-library/ftc/game-and-season-info. Please note: Playing Field Wall heights are different depending on the manufacturer. Wall height measurements are in the official Field Setup Guide. Across the season, Teams may attend events that use Playing Field Walls from different manufacturers, please incorporate that into the design of your Robot.

Figure 4.3-1 – Isometric view of the Playing Field

Figure 4.3-2 – Top view of the Playing Field
4.4 Game Definitions
The following definitions and terms are used for ULTIMATE GOAL™ presented by Qualcomm:

Alliance – Each FIRST Tech Challenge Match consists of two, two-Team Alliances. These two Teams compete against an opposing Alliance (also made up of two Teams) to complete the game challenges and to earn the highest Score. For qualifying and championship tournaments with more than 20 Teams, the semi-final and final round Alliances consist of three Teams each. However, only two of those Teams compete during any one Match.

Alliance Neutral – Available to a Robot or Human Player from any Alliance.

Alliance Specific – Available only to a Robot or Human Player from a specific Alliance (i.e., Red or Blue Alliance).

Alliance Station – The designated “Red” or “Blue” Alliance Area adjacent to the Playing Field where the Drivers and Coach stand during a Match.

Area – The space defined by the vertical projection of the outside edge of a region’s boundary (for example, gaffer tape, goal, Playing Field Wall). The boundary element (tape, wall, markings, etc.) is part of the Area for the purposes of determining Inside and Outside.

Autonomous Period – A thirty-second Match period in which the Robots operate and react only to sensor inputs and to commands pre-programmed by the Team onto the onboard Robot control system. Human control of the Robot is not permitted during this time.

Block / Blocking – Preventing an opposing Alliance Robot from accessing an Area or Game Element for an extended period by obstructing ALL paths of travel to the object or Area. Active defense played by a Robot shadowing an opposing Alliance Robot that eliminates all paths of travel between the opposing Alliance Robot and an Area or Alliance Specific Game Element or all remaining Alliance-Neutral Game Elements is considered Blocking, even though at any frozen point in time there is an open path. See also Trap / Trapping (which may be considered the same except it is from a Game Element or Area of the Playing Field).

Coach – A student Team member or adult mentor designated as the Drive Team advisor during the Match and identified by wearing a “Coach” badge or identifying marker.

Competition Area – The Area where all the Playing Fields, Alliance Stations, scoring tables, on-deck queuing tables, event officials, and other tournament items relating to Match play are located. The Team Pit area and practice Playing Fields are not part of the Competition Area.

Control / Controlling – An object is Controlled by a Robot if the object is following the movement of the Robot. Objects that are Controlled by a Robot are part of the Robot. See Possess / Possessing to learn about a related term. Examples include, but are not limited to:

- Carrying – holding one or more Game Elements inside or outside of a Robot.
- Herding – pushing or impelling one or more Game Elements to a desired location or direction that gains a strategic advantage beyond moving the Robot around the Playing Field.
- Holding – Trapping one or more Scoring Elements against a Game Element, Playing Field Wall, or Robot to shield or guard them.
- Launching – see definition below.

Examples of interaction with Game Elements that are not Controlled include, but are not limited to:
• **Plowing** – Inadvertent contact with Game Elements while in the path of the Robot moving about the Playing Field.

• **Deflecting** – Inadvertent contact with a Launched Game Element as it bounces off the Playing Field or a Robot.

**Delivery** - A Scoring achievement where a Robot deposits a Wobble Goal.

**Disable / Disabled** – A Robot that is no longer active for the remainder of the Match due to a Robot failure or by the request of a referee. Drive Teams may not Disable a Robot without the permission of a Field Technical Advisor or referee. If a referee Disables a Robot during a Match, they may ask the Team to drive their Robot to a neutral position on the Playing Field, issue a stop command with the Driver Station, and place their Driver Station in a hands-off location on a tournament-provided structure or the Alliance Station floor.

**Disqualified / Disqualification / Disqualify** – A Team that is ineligible to compete in a Match. A Team that is Disqualified from a Match will not receive credit for the Match (that is, no Ranking and TieBreaker points).

**Drive Team** – Up to four representatives; two (2) Drivers, one (1) Coach, and one (1) Human Player from the same Team. Only one (1) Human Player represents an entire Alliance in a Match.

**Driver** – A pre-college student Team member responsible for operating and controlling the Robot and identified by wearing a tournament supplied “Driver” badge or identifying marker.

**Driver-Controlled Period** – The two-minute Match time period in which the Drivers operate the Robots.

**Driver Station** – Hardware and FIRST supplied software used by a Drive Team to control their Robot during a Match. A detailed description of Driver Station is listed in Game Manual Part 1 – Traditional Events.

**Drop Zone** – The Alliance Neutral Area Outside the Playing Field Perimeter, between the plane formed by the front Playing Field Wall and the audience, where Robots Deliver Wobble Goals during the End Game.

**End Game** – The last thirty seconds of the two-minute Driver-Controlled Period.

**End of the Period/Match** - The moment when the Match timer reaches 2:00 for the Autonomous Period or 0:00 for the Driver-Controlled Period and which coincides with the start of the sound that designates the End of the Period.

**Game Element** – Any item Robots or Human Players interact with to play the game. Game Elements for this year’s game include: Rings, Wobble Goals, Tower Goals, Power Shot Targets, and Return Racks.

**Human Player** – A pre-college student Team member who supplies Rings to the Playing Field, resets Power Shot Targets, and is identified by wearing a tournament supplied “Human Player” badge or identifying marker.

**Human Player Station** – The Area where the Human Player stands during a Match.

**In (Inside) / Completely In (Completely Inside)** – An object that has crossed into the upwards vertical (i.e., at a right angle to the Playing Field Floor) extension of a defined Area’s boundary is Inside the Area. An object that is entirely within the upwards vertical extension of a defined Area’s boundary is Completely Inside the Area. The boundary element (tape, wall, markings, etc.) is part of the Area for the purposes of determining Inside and Outside, unless otherwise specified.
**Inadvertent** – An outcome that is not a planned strategy and not the predictable result of persistent or repeated actions. Unforced or unexpected Robot actions based on software commands are not considered to be Inadvertent.

**Inconsequential** – An outcome that does not influence Scoring or gameplay.

**Interference** - Interaction between opposing Alliance Robots that amplifies the difficulty of a Scoring activity. Actions that constitute Interference should not be considered illegal except as specified by a game rule.

**Launching** – Propelling Game Elements with enough force such that they move independent of contact with the Robot or Human Player. Movement due to gravity is not Launching.

**Launch Line** - A two (2) inch wide, white gaffer tape line extending from the blue Alliance Wall to the red Alliance Wall that defines the Launch Zone Area. The Launch Line should be considered to be a continuous line even though there may be breaks in the tape at the Tile interfaces and at the Target Zone tape.

**Launch Zone** – The part of the Playing Field bounded by the Front Wall, Blue Alliance Wall, red Alliance Wall, and the Launch Line. The Launch Line is considered to be part of the Launch Zone.

**Match** – A head-to-head competition between two Alliances. A Match consists of a thirty-second Autonomous Period followed by a two-minute Driver-Controlled Period for a total time of two minutes and thirty seconds.

**Navigating** – An Autonomous Period Scoring task where a Robot is Parked In a specified Area.

**Navigation Image** - Five (5) unique images mounted on the Playing Field Walls that Robots can use to navigate around the Playing Field. One (1) image is placed below each Tower Goal and one (1) image is placed in the approximate center of each of the three remaining Playing Field Walls. Images are printed on standard letter size paper, 8 1/2 inches x 11 inches (216 mm x 279 mm) or A4 (210 mm x 297 mm) paper.

**Off** – Not physically in contact with or Supported by an object, surface, etc. Objects that are Off are also considered Completely Off.

**On / Completely On** – An object that is physically in contact with and at least partially Supported by an object, surface, etc. is considered On. An object that is entirely Supported by another object, surface, etc. is Completely On.

**Out / Outside** – An object that has not crossed into any part of a defined Area is Outside the Area.

**Park / Parked** – The condition where a Robot is motionless.

**Penalty** – The consequence imposed for a rule or procedure violation that is identified by a referee. When a Penalty occurs, points will be deducted from the Score of the Alliance that incurred the Penalty. Penalties are further defined into Minor Penalties (ten (10) points) and Major Penalties (thirty (30) points). Penalties may also include and/or escalate to issuing of a Yellow Card or Red Card as a result of a continued occurrence of a rule violation and upon discretion of the Referee.

**Yellow Cards and Red Cards** – In addition to rule violations explicitly listed in section 4.6, Yellow Cards and Red Cards are used in the FIRST Tech Challenge to manage Team and Robot behavior that does not align with the mission of FIRST. Yellow and Red Cards are not limited to just the Competition Area. Teams that display egregious behavior in the pit area, judging rooms, stands, or any other location of the tournament can be issued a Yellow or Red Card for egregious behavior.

Illegal behaviors that are repeated (3 or more times), or egregious behaviors by a Robot or Team member at the tournament can result in a Yellow and/or Red Card. 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, for example, earning a second Yellow Card during a single Match.

Yellow and Red Cards may be issued on or off the competition field. For details please make sure to read the Tournament Rules outlined in section 4.2 of the Game Manual Part 1 – Traditional Events.

**Pin / Pinning** – Preventing the movement in all directions of an opposing Alliance Robot while it is in contact with the Playing Field Wall, one or more Game Elements, or another Robot.

**Playing Field** – The part of the Competition Area that includes the 12 ft. x 12 ft. (3.66 m x 3.66 m) field and all the Game Elements described in the official field documents. From the audience viewpoint, the Red Alliance Station is on the right side of the Playing Field.

**Playing Field Damage** – A physical change to a Game Element or Playing Field that affects gameplay or an action that causes harm to the playability of a Game Element or Playing Field.

**Playing Field Floor** – The top surface of the Tiles that make up the base of the Playing Field.

**Playing Field Perimeter** – The outside face of the Playing Field Wall.

**Playing Field Wall** – An approximate 12 inches (30.5 cm) tall, 12 ft. (3.66 m) long by 12 ft. (3.66 m) wide wall surrounding the Playing Field Floor. The height of the Wall will vary depending on which Playing Field Wall is being used at the event. Robots should be built to interact with all legal Playing Field Walls.

**Possess / Possessing** – An object is in Possession by a Robot if, as the Robot moves or changes orientation (for example, moves forward, turns, backs up, spins in place), the object remains in approximately the same position relative to the Robot. Objects in Possession by a Robot are considered to be Controlled, and they are part of the Robot. See also Control/Controlling.

**Power Shot / Power Shot Target** – A Game Element containing six (6) Alliance Specific Targets, three (3) red and three (3) blue. The Targets have two states:

- **Forward** - The Targets are oriented towards the field.
- **Back** - The Targets are oriented away from the field.

**Pre-Load** - A Game Element that a Drive Team positions during pre-Match setup so that it touches a Robot or is Possessed by a Robot at the start of the Autonomous Period.

**Queuing Area** – The location in the Competition Area where Drive Teams, Robots, and optional Robot carts are staged until directed by competition personnel to setup their Robots on a Competition Playing Field.

**Return Rack** – A Game Element used by the Human Player to introduce a Ring into the Playing Field. There is one (1) Return Rack for each Alliance.

**Ring** – An approximate 5-inch diameter torus-shaped, orange colored, Alliance Neutral Scoring Element that Robots Launch or place into a goal. A Match is played with a total of twenty (20) Rings.

**Robot** – Any mechanism that has passed Robot inspection and a Drive Team places on the Playing Field prior to the start of a Match. A detailed definition of Robot is in the Robot rules section in the Game Manual Part 1 – Traditional Events.
**Scoring / Score** – Robots earn points for their **Alliance** by interacting with **Scoring Elements** and **Parking** in specific Areas of the **Playing Field**. **Scoring Elements** still in contact with Robots of the corresponding **Alliance** have zero **Score** value, unless stated otherwise in Sections 4.5 or 4.6.

Scoring determination is done by one of three methods: “**Scored Live**”, “**Scored at End of the Period**”, and “**Scored at Rest**.” The specific method for each Scoring achievement will be stated in the achievement’s description in Section 4.5.

**Scored Live**: The achievement is considered **Scored** the moment it is successfully completed, i.e. all criteria are met.

**Scored at End of the Period**: The achievement’s Scoring status is determined based on the Robot or Scoring Element’s position at the End of the Period.

**Scored at Rest**: The achievement is considered **Scored** based on the position of the Robot or Scoring Element when the entire field has come to rest after the Match Period ends.

**Scoring Elements** – Objects that Robots manipulate to earn points for their **Alliance**. The **Scoring Elements** for ULTImATE GOAL℠ are Rings and Wobble Goals.

**Start Line** – An approximate 22.75-inch (57.8 cm) long x 2 inch (5.1 cm) wide strip of Alliance Specific (red or blue) colored gaffer tape where Robots are setup to start a Match.

**Starter Stack Area** – The **Playing Field** location where zero (0), one (1), or four (4) Rings are placed during pre-Match setup.

**Starter Stack** – A pre-placed stack of Rings that corresponds to a selected Target Zone. Zero (0), one (1), or four (4) Rings correspond to Target Zone Goals A, B, or C respectively.

**Support / Supported / Completely Supported** – An object (i.e. Robot, Scoring Element, Game Element, etc.) is Supported by another object if the second object is bearing at least some of the weight of the first object. If the second object is bearing all the weight of the first object, it is Completely Supported by the second object.

**Target Zone Goal** – An approximate 22.75 inch (57.8 cm) by 22.75 inch (57.8 cm) Autonomous Period Scoring Area where Robots Deliver Wobble Goals. There are three Target Zone Goals for each Alliance. Each Zone is indicated by red or blue gaffer tape around the inside perimeter of a Tile.

**Team** – Mentors, supporters, and pre-college-aged students affiliated with an entity registered with FIRST and for the competition.

**Tile** – An approximate 24 inch x 24 inch (609.6 mm x 609.6 mm) foam rubber mat, 36 of which make up the Playing Field Floor.

**Tower Goal** – A **Playing Field** element containing three vertically stacked Alliance Specific goals named the Low, Mid, and High Goals. ULTImATE GOAL℠ is played with two (2) Tower Goals. Alliance goal ownership is shown in the table below:

<table>
<thead>
<tr>
<th>Tower Closest to the Blue Alliance Station</th>
<th>Tower Closest to the Red Alliance Station</th>
</tr>
</thead>
<tbody>
<tr>
<td>Low Goal – Blue Alliance</td>
<td>Low Goal – Red Alliance</td>
</tr>
<tr>
<td>Mid Goal – Red Alliance</td>
<td>Mid Goal – Blue Alliance</td>
</tr>
<tr>
<td>High Goal – Blue Alliance</td>
<td>High Goal – Red Alliance</td>
</tr>
</tbody>
</table>
Trap / Trapping – Preventing an opposing Alliance Robot from escaping a constrained Area of the Playing Field or from a Game Element for an extended period of time by obstructing all paths of travel from the object or Area. See also Block / Blocking (which may be considered the same except it is accessing a Game Element or Area of the Playing Field).

Wobble Goal – A moveable Goal for Scoring Rings and a location-based Scoring Element. There are two (2) Red Alliance and two (2) Blue Alliance Wobble Goals.

4.5 Gameplay
Prior to the start of the Match, Drive Teams perform some basic Robot setup steps that are described in section 4.5.1. Matches are made up of several periods totaling two minutes and thirty seconds. There is a thirty-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. When the Match is over and referees signal, Drive Teams collect their Robots, return Possessed Game Elements to the Playing Field, and exit the Competition Area.

4.5.1 Pre-Match
Field personnel set up the Playing Field as depicted in Figure 4.3-1. The four Wobble Goals are placed adjacent to their corresponding Alliance Specific Start Lines and a stack of four (4) Rings is placed on the Playing Field Floor at each Alliance’s Starter Stack Area.

Prior to setting up on the Playing Field, the Alliance partner Teams decide which Team of their Alliance participating in the Match supplies the Human Player. Only one Human Player for an Alliance may come to the Playing Field from the Queuing Area.

Drive Teams set up their Robots on the Playing Field with the following required constraints:

1) Starting Location - Drive Teams, with the concurrence of their Alliance partner, select their Robots’ starting locations.
   a) Drive Teams must place their Robots, in any orientation, Completely Inside the Playing Field Perimeter.
   b) The Robot must touch the front facing (i.e. closest to the audience) Playing Field Wall.
   c) A Robot must be Parked In their Alliance Specific Start Line. Only one (1) Robot per Start Line.

2) Robot Contact - A Robot may not contact another Robot or anything Pre-Loaded onto another Robot.

3) Wobble Goal -
   a) A Robot is required to Pre-Load exactly one (1) of their respective Alliance Specific Wobble Goals. Drive Teams may move the Wobble Goals from their initial Field Set-up position.
   b) A Robot may not touch an opposing Alliance’s Wobble Goal.

4) Pre-Load Rings – A Robot may Pre-Load up to three (3) Rings. Rings that are not Pre-Loaded have no Score value for the Autonomous Period and they are placed into the Alliance’s Low Goal for the Human Player to use during the Driver-Controlled Period. Rings cannot be loaded onto the Wobble Goal.

5) Op Mode – Drive Teams use their Driver Station Android device to select an Op Mode. Pressing the Driver Station Init button is not required unless it is needed for the Robot to satisfy the Match start size constraint.
Drive Teams may position themselves anywhere in their Alliance Station. When the Robots and Drive Teams are in position, the Human Player must also be in their Human Player Station and stay there for the remainder of the Match.

Once the referees give the set-up complete signal:

1) Drive Teams may no longer touch their Robots until the conclusion of the Match.

2) Drive Teams may not touch their Driver Stations or Controllers until the Autonomous Period has ended, except to initialize and/or start their Autonomous program using the Driver Station Android device screen. Robots that require Autonomous program initialization to satisfy the Robot starting size constraint must be initialized before referees give the set-up complete signal.

After the Robot set-up process is complete, field personnel will randomize the field into one of the three (3) configurations. The pre-placed stacks of Rings will be adjusted to either zero (0), one (1), or four (4), corresponding to the selected Target Zone Goal (A, B, or C). Excess Rings will be dropped into the respective Alliance’s Low Goal.

4.5.2 Autonomous Period

The Match starts with a thirty-second Autonomous Period where Robots are operated via pre-programmed instructions only. Teams are not allowed to control Robot behavior with the Driver Station or any other actions during the Autonomous Period. The Driver Station is placed in a hands-off location during the Autonomous Period so that it is evident that there is no human control of Robots. The only exception is to allow Drive Teams to start their Robot with “init” and/or “start” commands issued on the Driver Station Android device. Teams must use the built-in thirty-second timer.

Following a countdown by field personnel, the Autonomous Period begins. Drive Teams may issue Robot start commands with their Driver Station Android device to run the Autonomous Op Mode selected during Pre-Match setup. Failure to adhere to this procedure may subject the Team and/or Alliance to a Penalty as specified in the game rules in section 4.6.2. Drive Teams are not required to start executing an Op Mode during the Autonomous Period.

Illegally Scored Rings and Power Shot Targets earn points for the Alliance but also earn an offsetting Penalty per rules <GS12> and <GS13>.

Autonomous points are awarded for the following achievements:

1) **Wobble Goal Delivery to a Target Zone** – At the End of the Period, every Wobble Goal that is Completely In its Alliance Target Zone (as identified by the size of the Starter Stack) for the corresponding Alliance earns fifteen (15) points.

2) **Robot Navigating** – Each Robot that is Parked at the End of the Period with any portion of the Robot In the Launch Line earns five (5) points.

3) **Tower Goal** – Each Ring that enters the Low, Mid, or High Goal earns points for the Alliance corresponding to the goal, regardless of which Alliance Robot Scores the Ring. Stuck Rings removed from Inside a Tower Goal by the Human Player or referee count as Scored. Rings in Tower Goals are Scored Live and recorded as Scored the moment the Rings are Completely In the Tower Goal, are not in contact with a Robot or Human Player, and do not exit back out through the front of the Goal. Rings Launched prior to the End of the Period are still eligible to be Scored.

   a) **Low Goal** - Each Ring that is placed or Launched by a Robot into the Low Goal earns three (3) points. The Scoring Robot’s location can be anywhere Inside the Playing Field.
b) **Mid Goal** – Each Ring Launched into the Mid Goal by a Robot earns six (6) points. The Scoring Robot must be Completely In the Launch Zone.

c) **High Goal** – Each Ring Launched into the High Goal by a Robot earns twelve (12) points. The Scoring Robot must be Completely In the Launch Zone.

4) **Power Shot** – A Power Shot Target that is changed from Forward to Back by a Launched Ring earns points for the Alliance corresponding to the Power Shot Target. The Scoring Robot must be Completely In the Launch Zone. Rings Launched prior to the End of the Period are still eligible to be Scored.

a) Each Scored Power Shot Target earns fifteen (15) points for the corresponding Alliance.

b) Power Shot Targets can be Scored in any sequence.

c) Power Shot Targets are Scored at Rest.

d) A Power Shot Target knocked Down by an Opposing Alliance Robot by any means counts as Scored. For example, if a Blue Alliance Robot knocks Down a Red Alliance Power Shot Target, the Red Power Shot Target counts as Scored for the Red Alliance.

The intent of the Mid Goal, High Goal and Power Shot Scoring achievements is for Robots to be Completely In the Launch Zone. Small, Inconsequential Robot extension Outside the Launch Zone while Launching a Ring is allowed.

### 4.5.3 Driver-Controlled Period

Directly following the end of the Autonomous Period, Drive Teams have five (5) seconds plus a "3-2-1-go" countdown to prepare their Driver Stations for the start of the Driver-Controlled Period. On the countdown word "go," the Driver-Controlled Period starts, and Drive Teams press their Driver Station start button to resume playing the Match.

During the Driver-Controlled Period, Human Players are expected to return Rings to the Playing Field via the Return Racks and reset Scored Power Shot Targets for their corresponding Alliance back to an un-Scored state (i.e., Forward). Power Shot Targets that start the End Game already in the Back position are not eligible to be counted as Scored during the End Game.

The Driver-Controlled Score is based on completing Tower Goal tasks as outlined below. Each Ring that enters the Low, Mid, or High Goal earns points for the Alliance corresponding to the goal regardless of which Alliance Robot Scores the Ring. Robots are allowed to Score Rings in any Tower Goal. Stuck Rings removed from Inside a Tower Goal by the Human Player or referee count as Scored. Rings in Tower Goals are Scored Live and recorded as Scored the moment the Rings are Completely In the Tower Goal, are not in contact with a Robot or Human Player, and do not exit back out through the front of the Goal. Rings Launched prior to the End of the Period are still eligible to be Scored.

Illegally Scored Rings and Power Shot Targets earn points for the Alliance but also earn an offsetting Penalty per rules <GS12> and <GS13>.

Points are awarded for the following achievements:

1) **Low Goal** - Each Ring that is placed or Launched by a Robot into the Low Goal earns two (2) points for the Alliance corresponding to the goal. The Scoring Robot’s location can be anywhere Inside the Playing Field.

2) **Mid Goal** - Each Ring Launched into the Mid Goal by a Robot into the Mid Goal earns four (4) points. The Scoring Robot must be Completely In the Launch Zone.
3) **High Goal** - Each Ring Launched into the High Goal by a Robot into the High Goal earns six (6) points. The Scoring Robot must be Completely In the Launch Zone.

The intent of the Tower Scoring achievements is for Robots to be Completely In the Launch Zone to Score in the Mid and High Goals. Small, Inconsequential Robot extension Outside the Launch Zone is allowed.

### 4.5.4 End Game
The last thirty seconds of the Driver-Controlled Period is called the End Game. Driver-Controlled Period Scoring can still take place during the End Game. End Game tasks started and/or completed prior to the start of the End Game will earn zero (0) points for those tasks.

Points are awarded for the following End Game achievements

1) **Wobble Goal Delivery** – At the start of the End Game, Wobble Goals In a Target Zone or not located in the Launch Zone are eligible for the following achievements:
   a) **Start Line** – A Wobble Goal In the Start Line for the corresponding Alliance at the End of the Match earns five (5) points for the Alliance corresponding to the Wobble Goal. To earn the points, the Wobble Goal must break the vertical plane of any side of the Start Line.
   b) **Drop Zone** - A Wobble Goal Supported by the Drop Zone at the End of the Match earns twenty (20) points for the Alliance corresponding to the goal. The Wobble Goal is not required to be Completely Supported by its domed base (i.e., a tipped over Wobble Goal counts as Scored).

   The intent of the Drop Zone achievement is that Robots Deliver a Wobble Goal without damaging the floor outside the Playing Field. Robot designs for Delivering a Wobble Goal to a Drop Zone should take into account that flooring may vary from competition to competition. Flooring could be robust (e.g., carpet, foam tile, etc.) or easily damaged (e.g., polished wood basketball floor).

2) **Wobble Goal Rings** – Each Ring Completely Supported by a Wobble Goal or another Ring Completely Supported by the Wobble Goal at the End of the Period earns five (5) points for the goal's Alliance. Any Wobble Goal location and orientation are allowed for this achievement.

3) **Power Shot** – A Power Shot Target that is changed from Forward to Back by a Ring Launched from a Robot located Completely In the Launch Zone is Scored for the Alliance corresponding to the Power Shot Target.
   a) Each Scored Power Shot Target earns fifteen (15) points for the corresponding Alliance.
   b) Power Shot Targets that start the End Game already Back are not eligible to be Scored. Human Players have a 10 second grace period following the start of End Game to reset the Targets.
   c) Power Shot Targets are allowed to be Scored in any sequence.
   d) Power Shot Targets are Scored at Rest.
   e) A Power Shot Target knocked Back by an Opposing Alliance Robot by any means counts as Scored. For example, if a Blue Alliance Robot knocks Back a Red Alliance Power Shot Target, the Red Power Shot Target counts as Scored for the Red Alliance.

### 4.5.5 Post Match
After the Match, field personnel will finalize the Score. Referees will signal for the Drive Teams to enter the Playing Field and retrieve their Robots. Drive Teams should return any Rings and/or Wobble Goals that are

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Possessed by the Robot to the Playing Field. The Playing Field reset crew will set up the Playing Field for the next Match.

4.5.6 Penalty Scoring
Penalty points are subtracted from the offending Alliance’s Score at the End of the Match. Minor Penalties subtract ten (10) points per occurrence. Major Penalties subtract thirty (30) points per occurrence.

4.5.7 Flowchart of Match Play
The following figure shows the flow of the Match and the actions taken on the Driver’s Station Android device.

4.6 Rules of Gameplay
Gameplay is restricted by the Safety rules (<S#>), the General rules (<G#>), and the Game-Specific rules (<GS#>). Other rules to pay close attention to are the Robot rules, the inspection rules, and the tournament rules defined in the Game Manual Part 1 – Traditional Events. Violation of rules may lead to Penalties, Yellow Cards and/or Red Cards, a Disabled Robot, Disqualification of the offending Team and/or Alliance from either a Match or the tournament. Rules apply to all periods of play unless specifically called out otherwise. If rules are in conflict, Safety rules take precedence over all rules and Game-Specific rules take precedence over General rules. The official FIRST Tech Challenge Question & Answer Forum rulings take precedence over all information in the game manuals.

4.6.1 Safety Rules
<S1> Unsafe Robot or Playing Field Damage – If at any time the Robot operation is deemed unsafe or has damaged the Playing Field or another Robot, by the determination of the referees, the offending Robot may be Disabled, and the Team may be issued a Yellow Card. Re-inspection of the Robot is required before it may play another Match. Damage that requires significant repair and/or delays subsequent Match play is likely to escalate to a Red Card.
<S2> **Robot Extension Outside the Playing Field Perimeter** – If any portion of the Robot contacts anything Outside the Playing Field Perimeter, the Team will be issued a Yellow Card and it may be Disabled immediately for the remainder of the Match, unless allowed by Game-Specific rule(s) listed in section 4.6.3. See the game definitions in section 4.4 for a complete description of the Playing Field Perimeter.

The intent of this rule is not to Penalize an Alliance for Inadvertent, safe Robot extension Outside the Playing Field Perimeter. Intentional Robot extension Outside the Playing Field is not permitted, except as allowed by Game-Specific rules listed in section 4.6.3.

<S3> **Safety Gear** – All members of the Drive Team are required to wear approved eye protection and shoes with closed-toes and a closed-back. If any member of the Drive Team is not wearing these safety items, the referee will issue a warning to the Team member(s) and if the situation is not remedied within thirty seconds, the offending member(s) of the Drive Team must leave the Competition Area for the remainder of the Match and may not be replaced by another Team member. Failure to comply with a request to leave the Competition Area violates rule <G3>. Repeated Team member violations during the tournament will escalate to a Team warning. Following the Team warning, subsequent violations by any member of the Team will result in a Minor Penalty for the Alliance.

4.6.2 General Game Rules

<G1> **Autonomous to Driver-Controlled Period Transition** – At the conclusion of the Autonomous Period, Robots will remain in a hands-off state. Field personnel will not enter the field and will not touch Robots on the field during the Autonomous to Driver-Controlled transition. The scoring system display will provide visual and audio cues for Drive Teams to pick up their Driver Stations. Drive Teams will have 5 seconds to pick up and prepare their Driver Station. After the 5 seconds, there will be a “3-2-1 go” countdown and the Driver-Controlled Period of the Match will begin.

<G2> **Certifying the Score at Match End** – Scores will be tracked by field personnel throughout the Autonomous and Driver-Controlled Periods of the Match. At the End of the Match, the final Score will be certified as quickly as possible. A change in state of a Game Element or Robot at the End of the Match after its final Score is recorded will not change an already-recorded Score. Scoring Elements will not be recounted at the End of the Match unless specified by a Game-Specific rule.

<G3> **Forcing an Opponent to Break a Rule** – The actions of an Alliance or their Robots shall not cause an opposing Alliance or Robot to break a rule and thus incur Penalties. Any forced rule violations committed by the affected Alliance shall be excused, and no Penalties will be assigned.

<G4> **Robot Manipulation of Scoring Elements** – Scoring Elements that are Controlled or Possessed by a Robot are part of the Robot except when determining the location of the Robot or otherwise specified by a Game-Specific rule.

For Example: If a Robot Possesses a Scoring Element, and only that Scoring Element breaks the plane of a Scoring Area, the Robot does not receive points for being In that Area.

<G5> **Robot or Scoring Elements In Two or More Scoring Areas** – Robots or Scoring Elements that are In two or more Scoring Areas earn points only for the highest value achievement. If the achievement values are equal, only one achievement counts as Scored. Exceptions to this general rule may be specified in the Gameplay section (4.5) or in the Game-Specific rules.

<G6> **Disabled Robot Eligibility** - If a referee Disables a Robot, it will not be eligible to Score or earn points for the remainder of the Match. A Disabled Robot (whether referee induced or failure) does not earn Penalties.
after becoming *Disabled*. Game-Specific rule(s) listed in section 4.6.3 take precedence over this general game rule.

**<G7> Playing Field Tolerances** – Tournament provided *Playing Field* and *Game Elements* will start each *Match* with tolerances that may vary by as much as +/- 1.0 inch (25.4 mm). *Teams* must design their *Robots* accordingly.

*Playing Field and Game Elements* are expected to be manufactured, assembled, and set up using a high standard for dimensional and location accuracy. The intent of the generous +/- 1.0 inch tolerance is to accommodate unintentional size and location variations that may occur. The tolerance is not an excuse for intentional or imprecise accuracy in construction or setup.

**<G8> Match Replay** – *Matches* are replayed at the discretion of the Head Referee only for a failure of a non-*Team* supplied *Game* or *Field Element*, or verified Wi-Fi interference that was likely to have impacted which *Alliance* won the *Match*.

Unexpected *Robot* behavior will not result in a *Match* replay. *Team*-induced failures, such as low battery conditions, processor sleep time-outs, *Robot* mechanical, electrical, software, or communication failures, etc. are NOT valid justifications for a replaying of a *Match*.

**<G9> Inadvertent and Inconsequential** - *Robot* actions that violate a rule may be ruled at the referee’s discretion to be *Inconsequential* and *Inadvertent*, and will not be *Penalized*.

**<G10> Scoring Elements in Contact with Robots** – *Scoring Elements* in a *Scoring Area* that are in contact with or *Controlled* by a *Robot* on the corresponding *Alliance* for the *Scoring Area* have zero *Score* value. Game-Specific rule(s) listed in section 4.6.3 that allow *Robot* contact with *Scoring Elements* take precedence over this general game rule.

**<G11> Drive Team** – Each *Drive Team* shall include up to two *Drivers*, one *Coach*, and one *Human Player* (however only one *Human Player* may represent an *Alliance*). Electronic communications (cell phone, two-way radio, Wi-Fi, Bluetooth, etc.) by *Drive Team* members after an *Alliance* has been called from the queue to the *Playing Field* for its *Match* are not allowed. The first instance of violating this rule will result in a warning, with any following instances during the tournament resulting in a *Minor Penalty*. Items that may be mistaken by a casual observer as being in violation should not be brought to the *Playing Field*. The *Driver Station* is exempt from this rule but must be used only for operating the *Robot*.

**<G12> Playing Field Access** - *Team* members cannot enter the *Playing Field* for any reason other than to place/retrieve their *Robots*. While placing or retrieving their *Robots*, *Teams* may not measure, test, adjust, or verify *Scoring of Game Elements*.

The consequences for violating this rule are:

a) *Minor Penalty* for violation of this rule during *Match* setup or following the *End of the Match*.

b) *Major Penalty* for violations of this rule that delay the start of the *Match*.

c) Violations of this rule outside of normal *Match* play result in a *Yellow Card*.

If a *Team* feels the *Playing Field* is not set up correctly, *Teams* should notify a Referee or Field Technical Advisor prior to the start of the *Match*.
<G13> **Pre-Match Robot Placement** – At the beginning of a **Match**, each **Alliance Robot** must be set up on the **Playing Field** according to section 4.5.1 **Pre-Match**. After **Robots** are set up on the **Playing Field**, **Drive Teams** must stand **Inside** their respective **Alliance** or **Human Player Station**.

a) During the Qualification **Matches**, the blue **Alliance Robots** are set up on the **Playing Field** first, unless the red **Alliance** waives their right to set up on the **Playing Field** second.

b) During the **Elimination Matches**, the 3rd and 4th seeded **Alliance Robots** are set up on the **Playing Field** first, unless the higher seeded **Alliance** waives their right to set up on the **Playing Field** second. **Alliance** color doesn’t change the seeding of a **Team** during the Elimination **Matches**. If the 4th seed defeats the 1st seed in the Semi-Finals, they will still have to place their **Robot** on the field first in the finals because their seeding will be lower than the 2nd or 3rd seed.

c) During Elimination **Matches**, 3 **Team Alliances** may only place **Robots** that are intended to compete in that **Match**. Once two **Robots** are placed for the two **Teams** competing in a **Match**, the **Alliance** cannot swap in the 3rd **Alliance’s Robot** for a **Robot** already placed.

d) **Teams** may explicitly waive their right to place their **Robots** on the **Playing Field** last by placing their **Robots** on the **Playing Field** before or with the opposing **Alliance**. There is no need to tell the referees; **Teams** waive their right by the act of placing their **Robots** on the **Playing Field**.

e) **Teams** that unnecessarily delay the beginning of a **Match** and/or field reset will incur a **Minor Penalty** for each offense. Significant delays may escalate to a **Major Penalty** at the discretion of the head referee.

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Drive Teams are expected to stage their Robots for a Match, and remove it from the Playing Field afterwards, safely and swiftly. Drive Team efforts that either intentionally or unintentionally delay the start of a Match or the Playing Field reset are not allowed. Examples include, but are not limited to:

- Late arrival to the Playing Field.
- Robot maintenance once on the Playing Field.
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<G14> **Robot Starting Volume** – Before the start of a **Match**, each **Robot** in its starting location must not exceed a volume of 18 inches (457.2 mm) by 18 inches (457.2 mm) by 18 inches (457.2 mm) unless otherwise allowed or restricted by Game-Specific rules detailed in section 4.6.3. A **Pre-Loaded Scoring Element** may extend **Outside** the 18-inch (457.2 mm) cube volume constraint. In place of a delay of game **Penalty**, an offending **Robot** will be removed from the **Playing Field**. The **Team** remains eligible to earn **Ranking** and **TieBreaker Points** if a member of the **Drive Team** is in their **Alliance Station** during the **Match**.

After the start of a **Match**, the **Robot** may extend in any dimension unless restricted by the Game-Specific rules detailed in section 4.6.3.

<G15> **Robot Setup/Alignment** – **Teams** may align their **Robots** during Pre-Match setup if they do so with legal components that are part of the **Robot** and can be reset to be within the 18-inch (457.2 mm) cube starting volume constraint. A single member of the **Drive Team** may also align the **Robot** by sight if they are next to the **Robot** and their action does not delay the start of a **Match**. A **Minor Penalty** will be assessed to the **Team** for violation of this rule.

<G16> **Alliance and Human Player Stations** – During a **Match**, the **Drivers**, **Coaches**, and **Human Players** must remain **In** their **Stations**.
a) The first instance of leaving the Station will result in a warning, with any following instances during the Match resulting in a Minor Penalty. Leaving the Station for safety reasons will not result in a warning or Penalty.

b) Opposing Alliances’ Drive Team members on the same side of the Field cannot distract and/or Interfere with each other nor the off-field Scoring Elements. Violation of this rule will result in an immediate Major Penalty and a possible Yellow Card.

c) Drive Teams may be anywhere in their respective Alliance and Human Player Stations. Human Players should not obstruct the view of field personnel Scoring the Match.

The intent of this rule is to prevent Drive Team members from leaving their assigned Station during a Match to gain a competitive advantage. For example, moving to another part of the Field for better viewing, reaching into the Field, etc. Simply breaking the plane of the Station during normal Match play is not a Penalty.

<G17> Post-Match Removal of Robots – Robots must be designed to permit easy removal of Game Elements from the Robot after the Match. Robots should also be able to be removed from the Playing Field without damaging the Playing Field. A Minor Penalty will be assessed for violations of this rule.

The intent of this rule is to have timely removal of Robots from the Playing Field following a Match. Drive Teams are expected to stage their Robots for a Match, and remove them from the Playing Field afterwards, safely and swiftly. Drive Team efforts that either intentionally or unintentionally delay the start of a Match or the Playing Field reset are not allowed. Examples include, but are not limited to:

1) Failing to exit the Playing Field once instructed by a Referee.
2) Failing to remove Driver Stations in a timely manner.

<G18> Starting Gameplay Early – Robots that start playing the game (Autonomous or Driver-Controlled Period) prior to the start of a Match Period receive a Minor Penalty. Referees have the option of issuing a Major Penalty in place of the Minor Penalty if the early start results in a competitive advantage for the offending Alliance.

<G19> Late Start of the Autonomous Period – Teams participating in the Autonomous Period are expected to press the “start with 30-second” button on their Driver Station Android device and then place the Driver Station in a hands-off location without delay when field personnel signal the start of the Autonomous Period. A Minor Penalty is assessed for violating this rule. Referees have the option of issuing a Major Penalty in place of the Minor Penalty if the late start results in a competitive advantage for the offending Alliance.

<G20> Parked at End of the Period – Robots must Park at the End of the Autonomous and Driver-Controlled Periods. Drive Teams should make their best effort to stop gameplay immediately when the End of the Period game sound begins. Robots that are not Parked at the conclusion of the game sound receive a Minor Penalty and the actions of the Robot do not count towards their Alliance’s Score. Referees have the option of issuing a Major Penalty in place of the Minor Penalty if the late stop results in a competitive advantage (other than Scoring) for the offending Alliance.

Scoring Elements that were Launched (unless disallowed by Game-Specific rules) before the End of the Period are eligible to be counted as Scored. Other Robot Scoring achievements that occur after the announced end of the Autonomous Period and before the start of the Driver-Controlled Period do not count towards the Score for the Autonomous or Driver-Controlled Periods.
<G21> **Robot Control During Autonomous Period** - During the Autonomous Period, Drive Teams may not directly or indirectly control or interact with Robots or Driver Stations. Early stopping of the Robot while running its Autonomous code is not allowed, except in cases of personal or equipment safety. A Major Penalty will be assessed for violating this rule.

<G22> **Drive Team Contact with the Playing Field or Robot** – During a Match, the Drive Team is prohibited from making contact with the Playing Field, any Robot, or any Game Element (except for allowed Human Player activities). The first instance of contact will result in a warning, with any following instances during the tournament resulting in a Minor Penalty. Contact that affects Scoring and/or gameplay will result in issuance of a Yellow Card at the discretion of the referees. Contact with the Playing Field, a Game Element, or a Robot for safety reasons will not result in a warning or Penalty.

For example, a Game Element is Launched from a Robot on the Playing Field and it Inadvertently hits a Team member in the Alliance Station and is deflected back onto the field. The Team would not receive a Penalty because the Team member was protecting him/herself (safety). However, if that same Game Element is caught and/or directed to a specific location on the Playing Field, the Team may be issued a Penalty.

<G23> **Drive Team Coach Driver Station Control** – During the Driver-Controlled Period, Robots must be remotely operated only by the Drivers using the Gamepads connected to the Team’s Driver Station and/or by software running on the on-board Robot control system. The first instance of Coach controlling a Robot (for example, operating a Gamepad) will result in a warning, with any following instances during the tournament resulting in a Major Penalty. During the Driver-Controlled Period, Drive Team Coaches and/or Drivers are allowed to hold the Team’s Driver Station Android device and interact with it to select an Op Mode, view information displayed on the screen, and initialize, start, stop, and reset the Robot.

<G24> **Robots Deliberately Detaching Parts** – Robots may not deliberately detach parts during a Match or leave mechanisms on the Playing Field unless permitted by a Game-Specific rule. Possessed or Controlled Scoring Elements are not considered to be a part of the Robot for the purpose of this rule. The consequence of deliberately detaching a part is a Minor Penalty if it does not Block an opposing Alliance Robot, Alliance-specific Scoring Element or Scoring Area. If a deliberately detached component or mechanism affects gameplay by any Robot, the offending Robot will receive a Major Penalty and will be issued a Yellow Card. Robot parts that are released but remain connected by a tether are considered detached for the purposes of this rule.

Tethered components that move independently of the main Robot are considered a detached component and are illegal.

<G25> **Robots Grasping Game Elements** – Robots may not grab, grasp and/or attach to any Game Element, Robot, or structure other than Scoring Elements, unless specifically allowed by Game-Specific rule(s) listed in section 4.6.3. The first instance will result in a warning with any following violations during the tournament resulting in a Major Penalty.

<G26> **Destruction, Damage, Tipping, etc.** – Robot actions aimed at the destruction, damage, tipping over, or entanglement of Robots or Game Elements are not in the spirit of the FIRST Tech Challenge and are not allowed unless permitted by Game-Specific rules. However, FIRST Tech Challenge games are highly interactive. Robot-to-Robot contact and defensive gameplay should be expected. Some tipping, entanglement, and damage may occur as a part of normal gameplay. If the tipping, entanglement, or damage is ruled to be deliberate or chronic, the offending Team will receive a Major Penalty and a Yellow Card.

<G27> **Removing Game Elements from the Playing Field** – Robots may not deliberately remove Game Elements from the Playing Field during a Match. Game Elements that Inadvertently fall Outside the Playing
Field will be returned to the Playing Field by field personnel at the earliest safe and convenient opportunity at a non-Scoring location approximately where it left the field. Game Elements removed from the Playing Field in an attempt to Score are also not subject to this Penalty. Teams deliberately removing Game Elements from the Playing Field will incur a Minor Penalty per Game Element removed from the Playing Field. Game-Specific rules listed in section 4.6.3 that address the removal of specified Scoring Elements from the Playing Field take precedence over this general game rule.

<G28> Pinning, Trapping, or Blocking Robots – A Robot may not cause an opposing Alliance Robot to become Pinned, Trapped, or Blocked. If a referee determines this rule is violated, the offending Alliance will receive a Minor Penalty for every five seconds that they are in violation. If a referee declares a Pinning, Trapping, or Blocking violation during the Match, the offending Robot must immediately move away at least 3 feet (0.9 m), approximately 1.5 floor Tiles, from the Pinned, Trapped, or Blocked Robot.

A Robot cannot incur this type of Penalty during the Autonomous Period unless it is determined by the Referee to be part of a deliberate strategy and will be penalized as described above. If the violation happens during the Autonomous Period, the first action done by the offending Robot during the Driver-Controlled Period must be to move away from the Pinned, Trapped, or Blocked Robot or a Minor Penalty will be assessed immediately and again for every five-seconds that they are in violation. Game-Specific rule(s) listed in section 4.6.3 that further define Pinning, Trapping, or Blocking take precedence over this general game rule.

The intent of this rule is that Drive Teams begin to immediately move their Robots away and have a five second grace period to move the required distance. The grace period is not permission to intentionally Block for up to five seconds.

<G29> Illegal Usage of Game Elements - Robots may not deliberately use Game Elements to ease or amplify the difficulty of any Scoring or game activity. A Major Penalty will be assessed for violations of this rule. Continued violations of this rule will escalate to Yellow Cards quickly.

<G30> Egregious Behavior – Egregious Robot or Team member behavior at the Playing Field, as determined by the referees, will result in a Major Penalty and issuance of a Yellow Card and/or Red Card. Subsequent violations will result in Team Disqualification from the tournament. Egregious behavior includes, but is not limited to, repeated and/or flagrant violation of game rules, unsafe behavior or actions, and uncivil behavior towards Drive Team, competition personnel, or event attendees.

4.6.3 Game-Specific Rules

<GS1> Robot extension outside the Playing Field Perimeter – Robots may safely extend outside the Playing Field Perimeter for Scoring Rings in the Low Tower Goal (back wall) and during the End Game for Scoring a Wobble Goal in the Drop Zone (front wall). All other extensions outside the Playing Field Perimeter will be handled per rule <S2>.

<GS2> Human Player Station – The Human Player may change position Inside the Human Player Station while actively collecting Rings, placing Rings into the Alliance’s Return Rack, and resetting Power Shot Targets.

<GS3> Grasping Scoring Elements – Robots may grasp Rings and Wobble Goals.

<GS4> Human Player Ring Handling – The Human Player may introduce Rings Onto the Playing Field Floor with the constraints listed below. After a referee issued warning, subsequent violations of these constraints within the tournament result in a Minor Penalty per occurrence.

a) A Human Player may not introduce Rings into the Playing Field before the start of the Driver-Controlled Period.
b) **Human Players** may only introduce **Rings** into the **Playing Field** using their corresponding **Alliance’s Return Rack**. **Drive Teams** may not bring tools or devices to the **Playing Field** for handling **Rings**. Accommodations and exceptions for **Human Players** with disabilities or extenuating circumstances will be made at the discretion of the event coordinator.

c) Storing a supply of **Rings** by a **Human Player** is not allowed during the **Driver-Controlled Period**. **Rings** should be returned to the **Playing Field** as quickly as practical to prevent **Alliances** from gaining a strategic advantage. **Penalties** will be assessed per **Ring** with additional **Penalties** per **Ring** for every five seconds the violation continues.

d) The **Human Player** may not extend **Inside** the **Playing Field Perimeter**.

e) The **Human Player** is allowed to reach into the **Tower Goal** to retrieve stuck **Rings** when all **Robots** are at least one (1) Tile away from the affected **Tower Goal**. A **Disabled Robot** in the vicinity does not prevent **Human Player** retrieval of a stuck **Ring**.

f) The **Human Player** may hold more than one **Ring** at a time.

g) The **Human Player** may use a tournament provided tool to remove **Rings** that are stuck in the **Return Rack**.

<GS5> **Drive Teams Touching Robots or Driver Stations after Starter Stack Randomization** – **Drive Teams** are not allowed to touch or interact with their **Robots** or **Driver Station** once field personnel have begun the randomization process. If this occurs, a **Minor Penalty** will be assessed, and the offending **Robot** is not eligible to earn the **Wobble Goal Delivery Score** in the **Autonomous Period**. This **Penalty** only affects the offending **Team**. The non-offending **Alliance** partner **Robot** remains eligible for the **Wobble Goal Delivery Scoring** achievement.

<GS6> **Control/Possession Limits of Scoring Elements** –

1) **Rings** – A **Robot** may **Control** or **Possess** a maximum of three (3) **Rings**. A **Launched Ring** is considered **Controlled** until it makes contact with something else (e.g. **Playing Field Floor**, net, **Tower Goal**).

   a) **Plowing** through any quantity of **Rings** is allowed but **Herding** or directing **Rings** above the allowed limit to gain a strategic advantage (i.e., **Scoring**, accessibility, defense) is not allowed. The **Penalty** for **Controlling** or **Possessing** more than the allowed quantity is an immediate **Minor Penalty** for each **Ring** above the limit plus an additional **Minor Penalty per Ring** in excess of the limit for each 5-second interval that this situation continues. An additional **Minor Penalty** will be assessed for each **Ring** that is **Scored** while a **Robot Controls** or **Possesses** more than the allowed quantity. Continued violation of this rule will escalate to **Yellow Cards** quickly.

   b) **Controlling** or **Possessing** a **Ring** by a **Robot** before the **Ring** has been **Supported** by the **Playing Field Floor** will earn a **Minor Penalty** for each occurrence. Strategies for **Controlling Rings** that deny all access by other **Robots** are not allowed. Violation of this **Rule** will escalate to a **Major Penalty** and potential **Yellow Card** on reoccurrence during the competition.

   c) **Rings Supported** by a **Wobble Goal** are exempt from the **Control/Possession Limit**.

**Rings** that may become **Possessed Inadvertently** still earn a **Penalty**. **Teams** should design their **Robots** to minimize the possibility of accidently **Possessing** a stray **Ring**.
2) **Wobble Goals** - A Robot may *Control* or *Possess* a maximum of one (1) *Wobble Goal*. *Inconsequential Control* of *Wobble Goals* above the limit is allowed. The *Penalty* for *Controlling* or *Possessing* more than the allowed quantity is an immediate *Minor Penalty* for each *Wobble Goal* above the limit plus an additional *Minor Penalty* per *Wobble Goal* for each five second interval that this situation continues. A *Major Penalty* will be assessed for each *Wobble Goal* in excess of the limit that is *Scored* while a *Robot Controls* or *Possesses* more than the allowed quantity. Continued violation of this rule will escalate to *Yellow Cards* quickly.

<GS7> **Launching of Game Elements** –

1) **Rings** – Robots may *Launch Rings* during any *Match Period*. Any *Ring* *Launched* over a *Playing Field Wall* that is not the *Tower Goal Playing Field Wall* will receive a *Minor Penalty* per *Ring*.

The intent of this rule is not to *Penalize Inadvertent Launching of Rings* over the *Tower* while attempting to *Score*.

2) **Wobble Goals** – *Launching Wobble Goals* is not allowed. A *Major Penalty* will be assessed for violating this rule and the *Wobble Goal* will not earn points for the period (*Autonomous* or *Driver-Controlled*) when the violation occurred.

<GS8> **Autonomous Interference** - Robots may not *Interfere* with the opposing Alliance’s *Scoring* attempts or with the opposing Alliance’s *Starter Stack Area* during the *Autonomous Period*. A *Major Penalty* will be assessed for each occurrence.

<GS9> **Wobble Goal Constraints** -
A *Major Penalty* will be assessed for each of the following circumstances:

a) Robots may not *Interfere* with or *Control* an opposing Alliance’s *Wobble Goal* that is *Completely In* any of its corresponding Alliance’s *Target Zones*.

b) Robots are not allowed to *De-score* an opposing Alliance’s *Wobble Goal* during the *End Game*.

c) Robots are not allowed to *Block* access to an opposing Alliance’s *Wobble Goal* during the *End Game*.

d) Robots may not *Interfere* with an opposing Alliance’s attempt to place a *Wobble Goal* in the *Drop Zone* when the opposing Alliance’s *Robot* is within one (1) *Tile* of the *Front Wall* during the *End Game*.

A *Minor Penalty* will be assessed for each of the following circumstances:

e) Robots are not allowed to *De-score Rings* from an opposing Alliance’s *Wobble Goal* during the *End Game*. A *Penalty* will be applied for each *Ring* that is *De-scored*.

f) Robots may not *place Rings* onto *Wobble Goals* except during the *End Game*. A *Penalty* will be assessed for each *Ring*. Strategies aimed at hoarding *Rings* prior to *End Game* will be addressed per Rule <G30>.

*Inconsequential* contact with an opposing Alliance’s *Wobble Goal* will not be *Penalized*.

<GS10> **Ring Interference** - A *Robot* may not interfere with an opposing Alliance’s *Launched Ring* that is at least 18 inches (45.7 cm) above the *Playing Field Floor* and was *Launched* with the intent of *Scoring*. A *Major Penalty* will be assessed for each occurrence. Continued violations will escalate to *Yellow Cards* quickly.
<GS11> Tower Goal Interference - A Robot may not prevent access to an opposing Alliance’s Tower Low Goal. An immediate Major Penalty will be assessed for each occurrence. Continued violations will escalate to a Yellow Card quickly.

The intent of this rule is to prevent goaltending in front of the Low Goal

<GS12> Illegal Tower Goal Scoring – A Robot Outside the Launch Zone that places or Launches a Ring into a Mid or High Tower Goal receives a Major Penalty per Ring.

<G13> Illegal Power Shot Scoring – A Robot Outside the Launch Zone that Scores a Power Shot Target by its actions (e.g. Launching a Ring, contact with the Power Shot assembly, etc.) is assessed a Major Penalty per Scored Power Shot Target.

4.7 Scoring Summary
The following table shows the possible Scoring achievements and their point values. The table is a quick reference guide and not a substitute for a thorough understanding of the game manual.

<table>
<thead>
<tr>
<th>Scoring Achievement</th>
<th>Autonomous Points</th>
<th>Driver-Controlled Points</th>
<th>End Game Points</th>
<th>Reference</th>
<th>When Scored</th>
</tr>
</thead>
<tbody>
<tr>
<td>Wobble Goals Delivered (each)</td>
<td>15</td>
<td>-</td>
<td>-</td>
<td>4.5.2.1</td>
<td>End of Period</td>
</tr>
<tr>
<td>• Target Zone</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>• Start Line</td>
<td>-</td>
<td>-</td>
<td>5</td>
<td>4.5.4.1</td>
<td></td>
</tr>
<tr>
<td>• Drop Zone</td>
<td>-</td>
<td>-</td>
<td>20</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Robot Navigating (each)</td>
<td>5</td>
<td>-</td>
<td>-</td>
<td>4.5.2.2</td>
<td>End of Period</td>
</tr>
<tr>
<td>Rings Scored in Tower Goal (each)</td>
<td></td>
<td></td>
<td></td>
<td>4.5.2.3</td>
<td>Scored Live</td>
</tr>
<tr>
<td>• Low</td>
<td>3</td>
<td>2</td>
<td></td>
<td>4.5.3</td>
<td></td>
</tr>
<tr>
<td>• Mid</td>
<td>6</td>
<td>4</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>• High</td>
<td>12</td>
<td>6</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Power Shot</td>
<td></td>
<td></td>
<td></td>
<td>4.5.2.4</td>
<td>Scored at Rest</td>
</tr>
<tr>
<td>• Target moved from Forward to Back (each)</td>
<td>15</td>
<td>-</td>
<td>15</td>
<td>4.5.4.3</td>
<td></td>
</tr>
<tr>
<td>Wobble Goal Rings (each)</td>
<td>-</td>
<td>-</td>
<td>5</td>
<td>4.5.4.2</td>
<td>End of Period</td>
</tr>
</tbody>
</table>
### 4.8 Rule Summary

The following table shows the possible rule violations and their consequences. The table is a quick reference guide and not a substitute for a thorough understanding of the complete rule descriptions in section 4.6.

<table>
<thead>
<tr>
<th>Rule #</th>
<th>Rule</th>
<th>Consequence</th>
<th>Warning</th>
<th>Minor Penalty</th>
<th>Major Penalty</th>
<th>Card Issued</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td>Disable</td>
<td></td>
<td></td>
<td>YC*</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Disable</td>
<td></td>
<td></td>
<td>RC*</td>
</tr>
<tr>
<td>&lt;S1&gt;</td>
<td>Unsafe Robot or Damage to the Playing Field.</td>
<td>Disable if unsafe operation is likely to persist. Optional Yellow Card. Significant damage and/or delays may escalate to Red Card.</td>
<td>D*</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>&lt;S2&gt;</td>
<td>Contact Outside the Playing Field.</td>
<td>Immediate Yellow Card and Optional Disable unless allowed by rule.</td>
<td>D*</td>
<td></td>
<td></td>
<td>YC</td>
</tr>
<tr>
<td>&lt;S3&gt;</td>
<td>Drive Team missing safety gear.</td>
<td>Warning and if not resolved within 30 seconds, the offending member(s) of the Drive Team must leave the Competition Area and may not be replaced.</td>
<td>W(T^+)</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

#### General Rules – Further definitions, no Penalties earned

- **<G1>** Autonomous to Driver-Controlled Period transition
- **<G2>** Certifying the Score at End of Match
- **<G3>** Forcing an opponent to break a rule
- **<G4>** Scoring Elements that are part of the Robot
- **<G5>** Scoring Elements in two or more areas
- **<G6>** Disabled Robot eligibility
- **<G7>** Playing Field Tolerances
- **<G8>** Match Replay
- **<G9>** Inadvertent and Inconsequential
- **<G10>** Scoring Elements in contact with Robots. Points are not earned for any Scoring Elements in a Scoring Area in contact with Robots of the corresponding Alliance.
### General Rules – Pre-match Penalties

<table>
<thead>
<tr>
<th>Rule #</th>
<th>Rule</th>
<th>Consequence</th>
<th>Warning Disable</th>
<th>Minor Penalty</th>
<th>Major Penalty</th>
<th>Card Issued</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt;G11&gt;</td>
<td>Drive Team using disallowed electronic communication</td>
<td>Warning followed by a Minor Penalty.</td>
<td>W*</td>
<td>1x</td>
<td></td>
<td></td>
</tr>
<tr>
<td>&lt;G12&gt;</td>
<td>Measure, test, or adjust Game Elements. Playing Field inspection to determine Score</td>
<td>Minor Penalty for pre-Match or post-Match violations. Major Penalty if delay start of Match. Yellow Card if outside of normal Match play.</td>
<td></td>
<td></td>
<td></td>
<td>YC</td>
</tr>
<tr>
<td>&lt;G13&gt;</td>
<td>Pre-Match Robot placement.</td>
<td>Minor Penalty if Teams delay the start of a Match.</td>
<td>1x</td>
<td>1x*</td>
<td></td>
<td></td>
</tr>
<tr>
<td>&lt;G14&gt;</td>
<td>Robot starting volume.</td>
<td>Robot is removed from the Playing Field.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>&lt;G15&gt;</td>
<td>Robot setup alignment devices/Match Delay.</td>
<td>Minor Penalty for each offense.</td>
<td></td>
<td>1x</td>
<td></td>
<td></td>
</tr>
<tr>
<td>&lt;G16&gt;a</td>
<td>Drive Team member(s) leaving the Alliance Station.</td>
<td>Warning for the first instance with any following instances resulting in a Minor Penalty.</td>
<td>W</td>
<td>1x</td>
<td></td>
<td></td>
</tr>
<tr>
<td>&lt;G16&gt;b</td>
<td>Drive Teams distracting and/or interfering with each other or the off-Field Scoring Elements.</td>
<td>Immediate Major Penalty and a possible Yellow Card.</td>
<td></td>
<td></td>
<td></td>
<td>YC*</td>
</tr>
<tr>
<td>&lt;G17&gt;</td>
<td>Delay caused by the removal of Robots from the Playing Field and Game Elements from Robots.</td>
<td>A Minor Penalty will be assessed.</td>
<td></td>
<td></td>
<td>1x</td>
<td></td>
</tr>
</tbody>
</table>

### General Rules – Gameplay Penalties

<table>
<thead>
<tr>
<th>Rule #</th>
<th>Rule</th>
<th>Consequence</th>
<th>Warning Disable</th>
<th>Minor Penalty</th>
<th>Major Penalty</th>
<th>Card Issued</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt;G18&gt;</td>
<td>Starting Gameplay Early.</td>
<td>Minor Penalty with the option of a Major Penalty if the early start results in a competitive advantage for the offending Alliance.</td>
<td></td>
<td>1x</td>
<td>1x*</td>
<td></td>
</tr>
<tr>
<td>Rule #</td>
<td>Rule</td>
<td>Consequence</td>
<td>Warning Disable</td>
<td>Minor Penalty</td>
<td>Major Penalty</td>
<td>Card Issued</td>
</tr>
<tr>
<td>--------</td>
<td>------</td>
<td>-------------</td>
<td>-----------------</td>
<td>---------------</td>
<td>--------------</td>
<td>-------------</td>
</tr>
<tr>
<td>&lt;G19&gt;</td>
<td>Late Start of the Autonomous Period.</td>
<td>Minor Penalty with the option of a Major Penalty if the late start results in a competitive advantage for the offending Alliance.</td>
<td>1x</td>
<td>1x*</td>
<td></td>
<td></td>
</tr>
<tr>
<td>&lt;G20&gt;</td>
<td>Robot is not Parked at the end of period.</td>
<td>Minor Penalty and the actions of the Robot that occur after the end of gameplay do not count towards their Alliance’s Score. Major Penalty if the late stop results in a competitive advantage for the offending Alliance.</td>
<td>1x</td>
<td>1x*</td>
<td></td>
<td></td>
</tr>
<tr>
<td>&lt;G21&gt;</td>
<td>Robot control during Autonomous Period / Early stopping of the Autonomous code.</td>
<td>Major Penalty.</td>
<td>1x</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>&lt;G22&gt;</td>
<td>Drive Team contact with the Playing Field, Game Element, or Robot.</td>
<td>Warning for the first instance with any following instances resulting in a Minor Penalty. Optional Yellow Card if contact affects Scoring and/or gameplay.</td>
<td>W†</td>
<td>1x</td>
<td>YC*</td>
<td></td>
</tr>
<tr>
<td>&lt;G23&gt;</td>
<td>Drive Team Coach Driver Station control.</td>
<td>Warning for the first instance with any following instances resulting in a Major Penalty.</td>
<td>W†</td>
<td>1x</td>
<td></td>
<td></td>
</tr>
<tr>
<td>&lt;G24&gt;</td>
<td>Robots deliberately detaching parts.</td>
<td>Minor Penalty. Major Penalty and a Yellow Card if it affects gameplay.</td>
<td>1x</td>
<td>1x</td>
<td>YC</td>
<td></td>
</tr>
<tr>
<td>&lt;G25&gt;</td>
<td>Robots illegally grasping Game Elements.</td>
<td>Warning for the first instance with any following instances resulting in a Major Penalty.</td>
<td>W†</td>
<td>1x</td>
<td></td>
<td></td>
</tr>
<tr>
<td>&lt;G26&gt;</td>
<td>Destruction, damage, tipping, etc.</td>
<td>Deliberate or chronic violations of this rule will receive a Major Penalty and a Yellow Card.</td>
<td>1x</td>
<td></td>
<td>YC</td>
<td></td>
</tr>
<tr>
<td>&lt;G27&gt;</td>
<td>Deliberately removing Game Elements from the Playing Field.</td>
<td>Minor Penalty per Game Element deliberately removed from the Playing Field.</td>
<td>1x</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Rule #</td>
<td>Rule</td>
<td>Consequence</td>
<td>Warning Disable</td>
<td>Minor Penalty</td>
<td>Major Penalty</td>
<td>Card Issued</td>
</tr>
<tr>
<td>-------</td>
<td>------</td>
<td>-------------</td>
<td>----------------</td>
<td>---------------</td>
<td>---------------</td>
<td>-------------</td>
</tr>
<tr>
<td>&lt;G28&gt;</td>
<td>Pinning, Trapping, or Blocking for more than 5-seconds in the Driver-Controlled Period.</td>
<td>Minor Penalty for every five seconds the Robot violates this rule.</td>
<td></td>
<td></td>
<td>1x+</td>
<td></td>
</tr>
<tr>
<td>&lt;G29&gt;</td>
<td>Illegal Use of Game Elements to ease or amplify Scoring.</td>
<td>Major Penalty will be assessed with any following instances resulting in a Yellow Card.</td>
<td></td>
<td></td>
<td></td>
<td>1x YC</td>
</tr>
<tr>
<td>&lt;G30&gt;</td>
<td>Egregious behavior.</td>
<td>Major Penalty plus a Yellow and/or Red Card. Possible Match Disqualification. Subsequent violations result in Team Disqualification for the tournament.</td>
<td></td>
<td></td>
<td></td>
<td>1x YC RC DQ</td>
</tr>
</tbody>
</table>

**Game-Specific Rules – Further definitions, no Penalties earned**

| GS1 | Robot extension outside Playing Field. |  |  |  |  |  |
| GS2 | Human Player Station movement. |  |  |  |  |  |
| GS3 | Grasping Scoring Elements. |  |  |  |  |  |

**Game-Specific Rules – Gameplay Penalties**

<p>| GS4 | Human Player Ring Handling. | Warning followed by a Minor Penalty per occurrence for violating constraints. | W | 1x |  |  |
| GS5 | Drive Teams touching Robots or Driver Stations after Randomization. | A Minor Penalty will be assessed, and the affected Robot is not eligible to earn the Wobble Goal Delivery Score. |  |  |  | 1x |</p>
<table>
<thead>
<tr>
<th>Rule #</th>
<th>Rule</th>
<th>Consequence</th>
<th>Warning Disable</th>
<th>Minor Penalty</th>
<th>Major Penalty</th>
<th>Card Issued</th>
</tr>
</thead>
</table>
| <GS6>1 | Control/Possession Limits for Rings. | a) Immediate Minor Penalty per excess Ring plus a Minor Penalty for each excess Ring every five seconds. Additional Minor Penalty for each Ring Scored while in violation. Escalates to a Yellow Card quickly.  
   b) Minor Penalty for Controlling or Possessing a Ring before it has been Supported by the Playing Field Floor. Escalates to a Major Penalty and potential Yellow Card on reoccurrence during the competition. | ✓ | 1x+ | 1x | YC* |
| <GS6>2 | Control/Possession Limits for Wobble Goals. | a) Minor Penalty per excess Wobble Goal plus a Minor Penalty for each excess Wobble Goal every five seconds.  
   b) Major Penalty for each Wobble Goal Scored while in violation. Escalates to a Yellow Card quickly. | ✓ | 1x+ | 1x | YC* |
| <GS7> | Launching Game Elements | 1) Launching Ring over front or side Playing Field Wall.  
   2) Launching Wobble Goal. | ✓ | 1x per Ring | 1x plus no Score per Wobble Goal for that period | |
| <GS8> | Autonomous Period Interference | A Major Penalty will be assessed for each occurrence. | ✓ | | 1x | |
| <GS9> | Wobble Goal Constraints | a) – d) A Major Penalty will be assessed for each occurrence.  
   e) - f) A Minor Penalty will be assessed for each occurrence. | ✓ | 1x | 1x | |
<p>| &lt;GS10&gt; | Ring Interference | A Major Penalty for each interfered Ring, escalating to Yellow Cards quickly. | ✓ | | 1x | YC |</p>
<table>
<thead>
<tr>
<th>Rule #</th>
<th>Rule</th>
<th>Consequence</th>
<th>Warning Disable</th>
<th>Minor Penalty</th>
<th>Major Penalty</th>
<th>Card Issued</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt;GS11&gt;</td>
<td>Tower Goal Interference</td>
<td>Immediate Major Penalty, escalating to a Yellow Card quickly.</td>
<td></td>
<td></td>
<td></td>
<td>1x</td>
</tr>
<tr>
<td>&lt;GS12&gt;</td>
<td>Illegal Tower Goal Scoring</td>
<td>Major Penalty per Ring.</td>
<td></td>
<td></td>
<td></td>
<td>1x</td>
</tr>
<tr>
<td>&lt;GS13&gt;</td>
<td>Illegal Power Shot Scoring</td>
<td>Major Penalty per Power Shot Target</td>
<td></td>
<td></td>
<td></td>
<td>1x</td>
</tr>
</tbody>
</table>

**Table Key**

<table>
<thead>
<tr>
<th>W: Warning</th>
<th>W¹: Tournament Warning</th>
</tr>
</thead>
<tbody>
<tr>
<td>D: Robot Disabled</td>
<td>1x: Penalty at single cost</td>
</tr>
<tr>
<td>YC: Yellow Card issued</td>
<td>1x+: Penalty at single cost every 5 seconds</td>
</tr>
<tr>
<td>RC: Red Card issued</td>
<td>2x: Penalty at double cost</td>
</tr>
<tr>
<td>DQ: Disqualification</td>
<td>* indicates optional</td>
</tr>
</tbody>
</table>
Appendix A – Resources

Game Forum Q&A
https://ftcforum.firstinspires.org/
Anyone may view questions and answers within the FIRST® Tech Challenge game Q&A forum without a password. To submit a new question, you must have a unique Q&A system username and password for your team.

FIRST Tech Challenge Game Manuals

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FIRST Tech Challenge Blog – Weekly articles for the FIRST Tech Challenge community, including outstanding volunteer recognition!
FIRST Tech Challenge Team Email Blasts – contain the most recent FIRST Tech Challenge news for teams.

Feedback
We strive to create support materials that are the best they can be. If you have feedback about this manual, please email firsttechchallenge@firstinspires.org. Thank you!
Appendix B – Playing Field Details

B-1 Tower Goals

B-2 Tower Goal Dimensions
Note: These dimensions are approximate. Refer to the Set-up Guide for exact placement. In general, the tape runs along the tabs of the Tile and the tape square is centered along one side of the Tile.
Appendix B – Playing Field Details

B-5 Target Zone Goal Dimensions
Appendix C – Scoring Elements

C-1 Wobble Goal

C-2 Ring
Appendix D – **Starter Stack** Randomization

D-1 **Starter Stack Setup**

Note: During setup, the *Rings* are centered on the tape squares
Appendix E – Wobble Goal Ring Scoring Examples

<table>
<thead>
<tr>
<th>Ring</th>
<th>Points</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>5</td>
</tr>
<tr>
<td>B</td>
<td>5</td>
</tr>
<tr>
<td>C</td>
<td>5</td>
</tr>
<tr>
<td>D</td>
<td>5</td>
</tr>
<tr>
<td>E</td>
<td>0 Not Completely Supported</td>
</tr>
<tr>
<td>F</td>
<td>5</td>
</tr>
<tr>
<td>G</td>
<td>0 In contact with Robot</td>
</tr>
</tbody>
</table>

E-1 Wobble Goal Ring Scoring Examples
Appendix F – Navigation Images

Image 1
Front Wall (audience)

Image 2
Blue Alliance Wall

Image 3
Red Alliance Wall

Image 4
Back Wall
Blue Side Tower

Image 5
Back Wall
Red Side Tower

F-1 Navigation Image Locations