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## Revision History

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<td>1</td>
<td>September 12, 2015</td>
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1.0 The Game

1.1 Introduction
This document describes FIRST® RES-QSM, the FIRST® Tech Challenge game for the 2015-2016 season. Teams must comply with all rules and requirements stated in this document and in Part 1 of the Game Manual. Clarifications to the game rules are issued on the Question & Answer section of the game forum at FTCFORUM.USFIRST.ORG. Forum rulings take precedence over information in the game manuals.

1.2 Game Description
Matches are played on a Playing Field initially set up as illustrated in the figure 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 climbing the Mountains, rescuing Climbers, alerting authorities with Rescue Beacons, and clearing Debris. The Scoring Elements for the game are 80 Alliance neutral Debris in the shape of cubes and spheres and 14 Climbers. The game is played in two distinct periods: Autonomous and Driver-Controlled.

The game starts with a 30-second Autonomous Period. Teams are challenged to design Robots that: 1) activate Rescue Beacons, 2) relocate Climbers to Shelters, 3) climb Mountains, and 4) Park In a Rescue Beacon Repair Zone or Floor Goal. Robots start the Match with up to two pre-loaded Climbers.

The two minute Driver-Controlled Period follows the Autonomous Period. Teams earn points for their Alliance by: 1) cleaning up the disaster Area by placing Debris Inside Alliance-specific Mountain Goals or Floor Goals, 2) releasing Climbers to ride a Zip Line to safety, and 3) relocating Climbers to Shelters.

The final 30 seconds of the Driver-Controlled Period is called the End Game. In addition to the previously listed Scoring activities, Robots may scale the challenging vertical section at the top of the Mountain and claim the All Clear Signal for their Alliance. Robots also earn points for their Alliance based on their height on the Mountain at the conclusion of the Match.

Figure 1.2-1 – FIRST® RES-QSM Playing Field.
1.3 Playing Field Illustrations
The following illustrations identify the Game Elements and give a general visual understanding of the game. Teams should refer to the official Playing Field documents available at http://www.firstinspires.org/node/4271 for the exact Game Element layout and dimensions.

Figure 1.3-1 – Overhead view of the Playing Field.
Figure 1.3-2 – Mountain, Zip Line, Rescue Beacon, and Shelter on the Blue Alliance side of the Playing Field.

Figure 1.3-3 – Mountain on the Blue Alliance side of the Playing Field.
1.4 Game Definitions
The following definitions and terms are used in FIRST® RES-Q™

All Clear Signal – Red and blue batons located at the top of each Mountain that Robots claim for their Alliance during the End Game.

Alliance – A pre-assigned grouping of two Teams that work together for a given Match. Alliances are designated as either “Red” or “Blue.”

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

Area – The space defined by the vertical projection of the outside edge of a region’s boundary (e.g. gaffers tape, Goal, Playing Field Wall). The boundary element (tape, wall, markings, etc.) is considered to be part of the Area for the purposes of determining Inside and Outside.

Autonomous Period – A thirty second 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.

Blocking Access – Preventing a Robot from accessing a Game Element or Area by obstructing ALL paths of travel to the object or Area.

Cliff / Cliff Zone – The vertical Climbing Area above/beyond the High Zone on the Mountain. A Pull-up Bar for Robots to hang from and the All Clear Signal are located at the top of the Cliff.

Cliff Low Bar – The closest horizontal bar below the Pull-up Bar in the Cliff Area.

Cliff Vertical Divider – The vertical dividing structure in the center of the Cliff Area connecting the top bar of the High Zone to the Pull-up Bar. The Cliff Vertical Divider separates the Red and Blue Alliance Climbing Areas in the Cliff.

Climber – A human-shaped, gold-colored Scoring Element. The maximum dimensions for the Climbers are 4.62 inches (11.73 cm) tall, 1.17 inches (2.97 cm) wide and 0.5 inches (1.27 cm) thick. Climbers weigh approximately 0.8 ounces (22.7 gm).

There are a total of fourteen Climbers as described below.

a. Three Climbers for each Alliance start the Match at the top of the corresponding Alliance’s Zip Line. Robots earn points by activating Triggers at three heights on the Mountain to set free their Alliance’s Climbers, one Climber per Trigger, to slide down the Zip Line to safety. The Climbers attached to a Zip Line may not be removed from the Zip Line. There are a total of six Climbers on the Zip Lines.

b. Each Robot may start the Match with up to two pre-loaded Climbers to place In a Shelter. There are a total of eight pre-loaded Climbers, four per Alliance.

Climbing Area – Mountains have separate, restricted Robot Climbing Areas for the two Alliances. The restricted Areas are designated by red and blue colored panels forming the underlying climbing surface In the Low and Mid Zone Climbing Areas. The restricted Climbing Areas include the corresponding High Zone and Cliff Zone of the Mountains. Three Alliance specific Goals for Scoring Debris are In an Alliance shared space between the two Climbing Areas. The Red Alliance Climbing Area is on the right side of the Mountain when it is viewed from the Playing Field floor entrance to the Mountain.

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**Coach** – A student Team member or adult mentor designated as the 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 considered to be Controlled by a Robot if the object is following the movement of the Robot. Examples are: pushing an object on the Playing Field floor, or holding or carrying an object. Objects that are Controlled by a Robot are considered to be part of the Robot. See Possess / Possessing to learn about a related term.

**Debris** – An Alliance-neutral Scoring Element for the game. The game is played with two types of Debris: fifty 2-inch (5.1 cm) gold-colored plastic cubes and thirty 2.8-inch (7.1 cm) diameter white plastic spheres. The cubes weigh approximately 1.9 ounces (54.4 gm) and the spheres weigh approximately 0.96 ounces (27.2 gm).

**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. If a referee Disables a Robot during a Match, he/she will ask the Team to drive their Robot to a neutral position on the Playing Field and to 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 Disqualified from a Match has its Robot Disabled and will not receive credit for the Match (i.e., no Qualifying or Ranking points).

**Drive Team** – Up to three representatives (two Drivers and one Coach) from the same Team.

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

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

**Driver Station** – Hardware and software used by Drive Teams to control their Robot during a Match. The Driver Station consists of an Android device, FTC-supplied Android App, adapter cable, optional unpowered USB Hub, and up to two Logitech F310 Gamepad Controllers.

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

**Floor Goal** – An approximately 3.9 square-foot (0.36 square-meter) Alliance-colored taped Area on the Playing Field floor along the Playing Field Wall, between the Rescue Beacon Repair Zone and the Mountain. There are two Floor Goals on the Playing Field floor, one per Alliance.

**Game Element** – Any item Robots interact with to play the game. Game Elements for this year’s game include: Mountains, Pull-up Bars, Triggers, Zip Lines, Rescue Beacons, Goals, Shelters, Debris, Climbers, and All Clear Signals.

**Goal** – An Area where Robots place Debris to earn points for their Alliance.

**In(side) / Completely In(side)** – An object that has crossed into the vertical (i.e. at a right angle to the Playing Field tile floor) extension of a defined Area’s boundary is Inside the Area. An object that is entirely within the vertical extension of a defined Area’s boundary is Completely Inside the Area.
**Inadvertent** – An outcome that is not a planned strategy and not the predictable result of persistent or repeated actions.

**Inconsequential** – An outcome that does not have an effect on Scoring or gameplay.

**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.

**Mountain** – An Area where Robots climb, Score Debris into Goals, release Climbers and claim the All Clear Signal. A Mountain consists of: 1) separate Red and Blue Alliance Climbing Areas with four levels of climbing difficulty, 2) three Alliance-specific Goals, 3) an Alliance-specific Zip Line with three Climbers, 4) three Alliance-specific Zip Line Climber-release Triggers, and 5) an All Clear Signal.

There are two Mountains with Alliance-specific differences on the Playing Field. The Mountain adjacent to the Red Alliance Station contains one Debris Goal for the Red Alliance, two Debris Goals for the Blue Alliance, and a Zip Line for the Red Alliance. The Mountain adjacent to the Blue Alliance Station contains one Debris Goal for the Blue Alliance, two Debris Goals for the Red Alliance, and a Zip Line for the Blue Alliance. Figures 1.3.2 and 1.3.3 identify the Game Elements for a Mountain located on the Blue Alliance side of the Playing Field.

**Mountain Goals** – Debris Scoring Areas located at different heights on the Mountain, in an Alliance-shared space between the two Climbing Areas. Each Mountain contains three Alliance-specific Goals, as specified in the table below.

<table>
<thead>
<tr>
<th>Goal</th>
<th>Mountain Adjacent to the Red Alliance Station</th>
<th>Mountain Adjacent to the Blue Alliance Station</th>
</tr>
</thead>
<tbody>
<tr>
<td>High Zone</td>
<td>Blue Alliance Goal</td>
<td>Red Alliance Goal</td>
</tr>
<tr>
<td>Mid Zone</td>
<td>Red Alliance Goal</td>
<td>Blue Alliance Goal</td>
</tr>
<tr>
<td>Low Zone</td>
<td>Blue Alliance Goal</td>
<td>Red Alliance Goal</td>
</tr>
</tbody>
</table>

**Mountain Zones** – A Mountain consists of four height zones: Low, Mid, High, and Cliff. The Mountain Zone locations are shown in Figure 1.3.3.

**Off / Completely Off** – Not physically in contact with or Supported by an object, surface, etc.

**On / Completely On** – Physically in contact with and Supported by an object, surface, etc. An object that is entirely Supported by another object, surface, etc. is defined as Completely On the object, surface, etc.

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

**Park / Parked** – A Robot that 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 awarded to the Alliance that did not incur the Penalty. Penalties are further defined into Minor Penalties (ten points) and Major Penalties (forty points).

**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 of the Game Elements described in the official field documents. The Playing Field is divided into two equal-sized Alliance Areas (Red and Blue) separated by red and blue gaffers tape as shown in the illustration of the Playing Field in section 1.3. From the audience viewpoint, the Red Alliance Area is on the right side of the Playing Field.

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**Playing Field Perimeter** – The outermost boundary of the *Playing Field* defined by the *Outside* face of the *Playing Field, Mountains, Rescue Beacons* and *Shelters*. The *Mountains, Rescue Beacons* and *Shelters* extend the outermost boundary beyond the *Outside* face of the *Playing Field Wall* at their respective locations on the *Playing Field*.

**Playing Field Wall** – An approximate 1 ft. (0.3m) tall, 12 ft. (3.66 m) long by 12 ft. wide (3.66 m) wall surrounding the soft foam tile floor of the *Playing Field*.

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

**Pull-up Bar** – The top-most horizontal bar located *In* the *Cliff Zone* of the *Mountain*.

**Rescue Beacon** – An object that *Robots* “reset/repair” during the *Autonomous Period* to earn points for their *Alliance*. *FIRST® RES-QSM* is played with two *Alliance* specific *Rescue Beacons* which are mounted on top of *Playing Field Walls* in the locations shown in Figure 1.3-1. Each *Rescue Beacon* has two buttons on its front face. Each of those buttons has LEDs above it that will be illuminated as either red or blue. Each *Rescue Beacon* also has a randomization button; when it is pressed, the *Rescue Beacon* will randomly choose to illuminate red LEDs above one button and blue LEDs above the other.

**Rescue Beacon Repair Zone** – An approximate 2 ft. by 2 ft. (0.6 m x 0.6 m) *Alliance*-specific *Area* on the *Playing Field* floor adjacent to a *Rescue Beacon*. *Rescue Beacon Repair Zones* are identified with red or blue gaffers tape on the *Playing Field* floor tiles.

**Robot** – Any mechanism that has passed inspection and a *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 Part 1 of the Game Manual.

**Scoring / Score** – *Teams* earn points for their *Alliance* by interacting with *All Clear Signals, Climbers, Debris, Floor Goals, Mountains, Mountain Goals, Pull-up Bars, Rescue Beacons, Rescue Beacon Repair Zones, Shelters*, and *Zip Line Triggers*. *Scoring Elements* are considered to be *Scored* when they are placed *In* the appropriate *Area* and are no longer in contact with a *Robot* from the corresponding *Alliance*. The *Scoring* achievements and their point values are described in section 1.5.

**Scoring Elements** – Objects that *Robots* place *In* specific *Areas* to earn points for their *Alliance*. The *Scoring Elements* for *FIRST® RES-QSM* are *Debris* and *Climbers*.

**Shelter** – An *Alliance*-specific basket attached to the corresponding *Alliance’s Rescue Beacon* where *Climbers* are placed by *Robots*. The *Shelters* are *Outside* the *Playing Field Wall*, but *Inside* the *Playing Field Perimeter*.

**Support / Supported / Completely Supported** – A *Robot* is *Supported* by an object if that object is bearing at least some of the weight of the *Robot*. If the object is bearing all of the *Robot’s* weight, the *Robot* is *Fully Supported* by the object.

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

**Trap / Trapping** – Preventing an opposing *Alliance Robot* from accessing or escaping from a *Game Element* or constrained *Area* of the *Playing Field* for an extended period of time.
**Trigger** – A lever on a *Mountain* that is used by *Robots* to release *Climbers* to slide down a *Zip Line* to safety. There are three *Alliance*-specific *Triggers* on each *Mountain*. Each *Trigger* releases one *Climber*. The *Trigger* located in the *Low Zone* releases the first/lowest *Climber* on the *Zip Line*. The *Trigger* locations are shown in Figure 1.3-3.

**Zip Line** – An inclined rope extending from the top of the *Mountain* to the floor beneath the closest *Rescue Beacon*. Each *Mountain* has one *Alliance*-specific *Zip Line*, for a total of two *Zip Lines* on the *Playing Field*. The *Zip Line* reserved for the Red *Alliance* is attached to the *Mountain* adjacent to the Red *Alliance Station*. The *Zip Line* reserved for the Blue *Alliance* is attached to the *Mountain* adjacent to the Blue *Alliance Station*. Three *Climbers* start the *Match* at the top of each *Zip Line*. *Triggers* for releasing the *Climbers* are located at three heights on the *Mountain*.

### 1.5 Game Play

Prior to the start of the *Match*, *Drive Teams* perform some basic *Robot* setup steps that are described in section 1.5.1. *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*.

#### 1.5.1 Pre-Match

*T eams* will receive an *Alliance*-colored *Robot*-identification flag from field personnel; this flag must be securely mounted on the *Robot* as defined in the *Robot* rules. *Drive Teams* place their *Robots* in any orientation on the *Playing Field* with the following constraints:

- a. *Robots* must be *Completely Inside* their *Alliance*’s *Area* of the *Playing Field*.
- b. *Robots* must be in contact with the *Playing Field Wall* that is along the boundary of their *Alliance Station*.
- c. *Robots* may not be in contact with a *Mountain*.
- d. *Robots* may not be in contact with another *Robot*.
- e. *Robots* may not extend beyond the *Outside* edge of the *Playing Field Wall*.
- f. *Teams* may pre-upload up to two *Climbers* per *Robot*. The pre-loaded *Climbers* must be in contact with a single *Robot* and they may touch the *Playing Field*. *Teams* may elect not to pre-upload some or all of their *Climbers*. *Climbers* that are not pre-loaded are placed by field personnel in a random location and orientation, lying flat, and *Completely Inside* the corresponding *Alliance Floor Goal*.

After placing their *Robot* on the *Playing Field*, the *Drive Team* pre-loads the *Climbers*, selects their *Autonomous Period* Operational Mode (Op Mode) on their *Driver Station* Android device and initializes their *Robot* by triggering the *Team*’s initialization event software. *Drive Teams* wait *Completely Inside* their assigned *Alliance Station* for the start of the *Match* with their *Driver Station* in a hands off location.

*Field personnel* will press the randomization button on the *Rescue Beacons*. Once the first *Rescue Beacon* has been randomized, *Teams* may no longer touch their *Robots* until the conclusion of the *Match*, and may not touch their *Driver Stations* until the *Autonomous Period* has ended. *Field personnel* will disperse the *Debris* onto the *Playing Field* by cascading the *Debris* down the corresponding *Alliance side* of the *Mountains*. For example, *Debris* will cascade down the Red *Alliance Climbing Area* for the *Mountain* located in the Red *Alliance* side of the *Playing Field*. Approximately half of the *Debris* will enter the *Playing Field* by way of each *Mountain*. *Debris In a Mountain Goal* or *Completely On the Mountain* will be removed from the Mountain and dispersed onto the *Playing Field* by field personnel before the *Match* starts. *Debris In a Floor Goal* will remain in place.

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1.5.2 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 a single start command issued on the Driver Station Android device using the built-in thirty second stop timer. The Autonomous Period begins following a start countdown (e.g. 3-2-1-go) by field personnel; signaling Drive Teams to issue a Robot start command with their Driver Station. Failure to adhere to this procedure may subject the Team and/or Alliance to a Penalty as specified in the game rules in Section 1.6.2.

The Autonomous Score is based on the state of the Rescue Beacons and the locations of the pre-loaded Climbers and Robots at the end of the Autonomous Period after all Game Elements and Robots have come to rest. Points are awarded for the following achievements:

1. **Rescue Beacons** – The Rescue Beacons are randomly set up at the start of a Match so that Robots must use onboard sensors to identify the correct button to trigger the Rescue Beacon in favor of their Alliance. Rescue Beacons are randomized independently of each other.

   During the Autonomous Period, each Robot may trigger the Rescue Beacon on its Alliance’s side of the Playing Field one time. The Rescue Beacon is triggered by pressing a button under either the red or blue LEDs; the Alliance matching that color will receive 20 points, even if it is the opposing Alliance, so Robots should choose carefully.

   The first time a Rescue Beacon is triggered, the LEDs above the selected button become brighter. The second time a Rescue Beacon is triggered; the LEDs on the second half are illuminated with the color above the just-pressed button. All of the LEDs will flash twice when the second button is pressed or thirty seconds after the first button is pressed, whichever occurs first. The Rescue Beacon then displays the LED pattern for the referees to record on the scoresheets. Each Rescue Beacon can be triggered up to two times during the Autonomous Period – once per Robot on the Alliance – for a total of up to forty points awarded.

   Once a Rescue Beacon has been triggered twice, the buttons no longer have an effect on the state of the Rescue Beacon’s LEDs and it can not be set to a different state. To help prevent accidental resetting of a Rescue Beacon twice by a single Robot, there is a five second delay after a button is released before the buttons become active and are able to trigger the Rescue Beacon a second time.

   If no buttons are pressed during the Autonomous Period, the LEDs will not brighten or change color, indicating that zero points are awarded for the Rescue Beacon. Rescue Beacons that have not been triggered by a Robot during the Autonomous Period or are triggered during the Driver-Controlled portion of the Match do not contribute to the Match Score.

2. **Climbers** – Climbers In an Alliance-specific Shelter earn ten points per Climber for the Alliance.
3. **Mountains** – Robots earn points based on where they are *On* the *Mountain* at the end of the *Autonomous Period*. Robots earn points for the lowest zone that they are *On*. For example, a Robot that is *On* both the Low- and Mid-Zones earns points for the *Low-Zone* achievement. At the end of the *Autonomous Period*, Robots may be in either Alliance’s Climbing Area to earn these points. Point levels are based on the *Area* of the *Mountain* that *Supports* the Robot. The *Score* is not dependent upon being *In* or *Completely In* an *Area*. Point values for *Parking* are listed below.

   a. *On* the *Playing Field* tile floor and the *Mountain*: five points
   b. *Low Zone*: ten points
   c. *Mid Zone*: twenty points
   d. *High Zone*: forty points

4. **Rescue Beacon Repair Zone** – Robots *Parked In* their Alliance’s *Rescue Beacon Repair Zone* earn five points.

5. **Floor Goal** – Robots *Parked In* their Alliance’s *Floor Goal* earn five points.

A *Robot* will receive only one *Score* based on its position. For example, a *Robot* that is *In* both the *Rescue Beacon Repair Zone* and the *Floor Goal* earns only five points.

### 1.5.3 Driver-Controlled Period

At the conclusion of the *Autonomous Period*, referees fill out scoresheets and *Drive Teams* pick up their *Driver Stations*. When the referees are ready, field personnel will instruct *Teams* to select their *Driver-Controlled Op Mode* and initialize their *Robots* by triggering the *Teams*’ initialization event software with their *Driver Station* Android device. A two minute *Driver-Controlled Period* begins following a start countdown (e.g. 3-2-1-go) by field personnel. *Teams* start their *Robots* by pressing the start button on their *Driver Station* Android device. Failure to adhere to this procedure may subject the *Team* and/or *Alliance* to a *Penalty* as specified in the game rules in Section 1.6.2.

The *Driver-Controlled Score* is based on the location of the *Scoring Elements*, *All Clear Signals*, and *Robots* at the end of the *Match* after all objects have come to rest. Points are awarded for the following achievements:

1. **Debris** Inside Alliance-specific *Goals* earn points based on the elevation of the *Goal*:

   a. *Floor Goal* – one point per *Debris*.
   b. *Low Zone Goal* – five points per *Debris*.
   c. *Mid Zone Goal* – ten points per *Debris*.
   d. *High Zone Goal* – fifteen points per *Debris*.

   *Debris In* a *Goal* earns points for an *Alliance* based on the color of the *Goal* regardless of which Alliance’s *Robot* placed *Debris In* the *Goal*.

2. **Zip Line Climbers** – *Climbers* that have slid down the Alliance’s *Zip Line* to safety earn twenty points each, regardless of which *Alliance* released the *Climbers*.

3. **Climbers** – *Climbers Inside* an Alliance-specific *Shelter* earn ten points per *Climber* for their Alliance. The *Zip Line Climbers* are not eligible for *Scoring In* a *Shelter* (i.e. do not remove *Climbers* from the *Zip Line*; their removal is considered a violation of rule <S1>).

   *Climbers* that were *Scored* into a *Shelter* during the *Autonomous Period* will be counted again at the end of the *Driver-Controlled Period* if they are still *In a Shelter*, contributing a total of twenty
points to the *Match Score* (ten points for the *Autonomous Period* plus ten points for the *Driver-Controlled Period*).

4. **Mountains** – Robots earn points based on where they are *Parked On the Mountain* at the end of the *Driver-Controlled Period*. Robots earn points for the lowest zone that they are *On*. For example, a Robot that is *On* both the *Low- and Mid-Zones* earns points for the *Low-Zone*. Robots receive points only if they are *In* their Alliance’s *Climbing Zone* (unless <GS12> applies). Point levels are based on the *Area* of the *Mountain* that *Supports* the *Robot*. The *Score* is not dependent upon being *In* or *Completely In* an *Area*. Point values for *Parking* are listed below.
   
   a. On the *Playing Field* tile floor and the *Mountain*: five points
   b. *Low Zone*: ten points
   c. *Mid Zone*: twenty points
   d. *High Zone*: forty points
   e. *Cliff Zone*: See *End Game* scoring

1.5.4 *End Game*

The last thirty seconds of the *Driver-Controlled Period* is called the *End Game*. During the *End Game* – and not before – Robots may climb the *Cliff* at the top of the *Mountain* and/or claim the *All Clear Signal* for their Alliance. Robots may continue to perform all of the *Driver-Controlled* scoring activities during the *End Game*. Points are awarded for the following *End Game* achievements:

1. **Cliff Pull-up Bar** – A Robot *Fully Supported* (i.e. hanging) by the *Cliff Pull-up Bar* earns eighty points for its Alliance. Robots may touch the *Cliff Vertical Divider*, rest against the *Cliff Low Bar*, and be in contact with an opposing Alliance *Robot* if the contact is *Inadvertent* and *Inconsequential*. The intent of this *Scoring* achievement is for the *Cliff Pull-up Bar* to support the Robot’s weight. If the *Cliff Vertical Divider*, *Cliff Low Bar* and the opposing Alliance *Robot* are removed from the *Mountain*, a *Robot* that is *Fully Supported* by the *Cliff Pull-up Bar* would not fall from the *Cliff*.

2. **All Clear Signal** – The first *Robot* to trigger the *All Clear Signal* on a *Mountain* by rotating the corresponding Alliance color baton upward into an approximate vertical orientation earns twenty points for the Alliance indicated by the color of the baton. Alliances may trigger up to two *All Clear Signals*, one per *Mountain*. However, only one Alliance earns *All Clear Signal* points per *Mountain*. The first claimed *All Clear Signal* will be recorded as *Scored* by the referees. *All Clear Signals* that change orientation from their first claimed state will not change which Alliance is credited for the *Score*. *All Clear Signals* that *Inadvertently* rotate into a *Scored* orientation prior to the start of the *End Game* do not count as *Scored* unless a *Robot* claims it during the *End Game* by touching the *All Clear Signal* baton in place or changing the orientation of the *All Clear Signal*.

1.5.5 *Post Match*

After the *Match* is over, referees record the locations of *Robots*, *Climbers*, *All Clear Signals*, and *Debris*. The *Rescue Beacons* do not contribute to the *Driver-Controlled Period Score*. After they are finished scoring the *Playing Field*, referees will signal for the *Drive Teams* to enter the *Playing Field* and retrieve their *Robots*. *Teams* should not step on or climb the *Mountains* when retrieving their *Robots*. The *Drive Teams* should return *Debris* and *Climbers* that are *Possessed* by the *Robot* to the *Playing Field* and return the *Alliance*-colored *Robot* identification flag to the field personnel. The *Playing Field* reset crew will set up the *Playing Field* for the next *Match*. 
1.5.6 Penalty Scoring

Penalty points are added to the non-offending Alliance’s Score at the end of the Match. Minor Penalties give the opposing (non-offending) Alliance ten points per occurrence. Major Penalties give the opposing (non-offending) Alliance forty points per occurrence.

1.6 Rules of Game Play

Game play 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 Part 1 of the Game Manual. Violation of rules may lead to Penalties, a Disabled Robot, or Disqualification of the offending Team and/or Alliance. Rules apply to all periods of play unless specifically called out as omitted. If rules are in conflict, Safety rules trump all rules and Game Specific rules take precedence over General rules. The official FTC Question & Answer Forum rulings take precedence over all information in the game manuals.

1.6.1 Safety Rules

<S1> Unsafe Robot and Playing Field Damage – If at any time the Robot operation is deemed unsafe or has damaged the Playing Field, another Robot, Game Element, Playing Field surface, or Playing Field Wall, by the determination of the referees the offending Robot may be Disabled and/or the Team may be Disqualified. Re-inspection of the Robot is required before it may play another Match.

The intent of this rule is to immediately stop unsafe Robot actions or Playing Field damage that is likely to persist with continued Robot operation. Robots that are able to continue safe operation without damaging the Playing Field will receive a warning and may continue to play the Match. Robots will be Disabled for unsafe operation or Playing Field damage that occurs after the first warning.

Referees will issue a warning before Disabling a Robot or Disqualifying a Team for violating this rule.

<S2> Robot Extension Outside the Playing Field Perimeter – If any portion of the Robot makes contact with anything Outside the Playing Field Perimeter, it will be Disabled for the remainder of the Match, unless specifically allowed by game-specific rule(s) listed in Section 1.6.3. See the game definitions in section 1.4 for a complete description of the Playing Field Perimeter. Repeated offenses of this rule may lead to Disqualification.

<S3> Safety Gear – All members of the Drive Team are required to wear safety glasses 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 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 <G25>.

1.6.2 General Game Rules

<G1> Drive Team – Each Drive Team shall include up to two Drivers and one Coach. 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. Repeated offenses may result in Disqualification for the Match. 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.

<G2> Pre-Match Robot Setup – At the beginning of a Match, each Alliance Robot must be set up on the Playing Field in accordance with section 1.5.1 Pre-Match. After Robots have been set up on the Playing Field,
Drive Teams are required to stand Completely Inside the Alliance Station at the location (Station one or Station two) specified by the Qualification Match schedule. Teams are not assigned Alliance Station positions (1 or 2) for the Elimination Matches.

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 lower seeded (e.g. 3rd seed is lower than 2nd seed) 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.

c. Teams may waive their right to place their Robots on the Playing Field last by placing their Robots on the Playing Field before or in conjunction with the opposing Alliance. There is no need to notify the referees; Teams waive their right by the act of placing their Robots on the Playing Field.

d. Teams that deliberately or repeatedly delay the start of the Match will incur a Minor Penalty for each offense. Repeated offenses may lead to Disqualification.

<G3> Robot Starting Volume – Before the start of a Match, each Robot In its starting location must not exceed a volume of 18 inches (45.7cm) wide by 18 inches (45.7cm) long by 18 inches (45.7cm) tall. The Alliance identification flag and pre-loaded Scoring Elements may extend Outside the 18-inch (45.7cm) cube volume constraint. An offending Robot will be Disabled and powered off for the Match at the Head Referee’s discretion and must remain on the Playing Field In its starting location for the length of the Match.

<G4> Robot Setup Alignment Devices – Alignment devices are allowed during pre-Match setup if they are constructed from legal components, they are part of the Robot, and they remain Completely Inside the 18-inch (45.7cm) cube starting volume constraint during the setup process. A Minor Penalty will be assessed for violation of this rule, and repeated offenses may lead to Disqualification.

The intent of this rule is to prohibit the use of devices external to the Robot and to prevent the extension of any object or tool Outside the 18-inch (45.7cm) cube starting volume.

<G5> Alliance Station – During a Match, the Drivers and Coach must remain Completely Inside their Alliance Station. The first instance of leaving the Alliance Station will result in a warning, with any following instances resulting in a Minor Penalty and/or Disqualification. Leaving the Alliance Station for safety reasons will not result in a warning or Penalty.

<G6> Starting Game Play Early – Robots that start to play the game (Autonomous or Driver-Controlled Period) prior to competition personnel announcing 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.

<G7> Late Start of the Autonomous Period – Teams participating in the Autonomous Period are expected to press the start 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.

<G8> Stopping Game Play Late – Robots that do not stop playing the game at the end of the Autonomous or Driver-Controlled Periods when competition personnel announce the end of a Match period receive a Minor Penalty and the actions of the Robot occurring after the end of a Match period 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.

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 and Driver-Controlled Periods. Referees may remove any Scoring Elements that are improperly Scored in this manner.

<G9> Drive Team Contact with the Playing Field or Robot – During a Match, the Drivers and Coaches are prohibited from making contact with the Playing Field, any Game Element, or any Robot. The first instance of contact will result in a warning, with any following instances resulting in a Minor Penalty and/or Disqualification. Contact that affects Scoring and/or game play will result in Disqualification 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.

<G10> Autonomous to Driver-Controlled Period Transition – At the conclusion of the Autonomous Period the Head Referee at his or her discretion will untangle Robots, place Robots on their drivetrains, make minor adjustments to Robot position, etc. so that the Robots can participate in the Driver-Controlled portion of the Match. The referees will do this after finding out from the Team where the best place is to touch their Robot. At this time, if a Robot has lost its Wi-Fi Direct connection to the Team’s Driver Station or if it is locked-up, power to the Robot may be reset under supervision of the Field Technical Advisor as long as the Match is not extraordinarily delayed. If the Robot is not controllable after attempts to get it working with the Team’s Driver Station, it will be Disabled and remain in place for the remainder of the Match.

When instructed by field personnel to do so, Drive Teams may use their Driver Station to select an Op Mode, initialize, start, and reset their Robot as appropriate.

<G11> Drive Team Coach Interference – During the Driver-Controlled Period, Robots must be remotely operated only by the Drivers using the Team’s Driver Station and/or by software running on the on-board Robot control system. The first instance of Coach interference (e.g. touching a Gamepad) will result in a warning, with any following instances resulting in a Major Penalty and/or Disqualification. 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.

<G12> Recording the Score After Objects Come to Rest – Referee scoresheets will be filled out at the end of the Autonomous and Driver-Controlled Periods when all objects on the Playing Field have come to rest. A change in the state of a Game Element or Robot that occurs before a referee records the Score on the scoresheet will affect the Match Score. A change in state of a Game Element or Robot after its Score is recorded on the scoresheet will not change an already-recorded Score.

<G13> Robots Deliberately Detaching Parts – Robots may not deliberately detach parts during a Match, or leave mechanisms on the Playing Field. If a deliberately-detached component or mechanism prevents additional Scoring by any Robot, the offending Robot will be Disabled and the Team will be Disqualified. Multiple infractions may result in tournament Disqualification.

<G14> Robots Grasping Game Elements – Robots may not grab, grasp or attach to any Game Element or structure other than Scoring Elements, unless specifically allowed by game-specific rule(s) listed in Section 1.6.3. The first instance will result in a warning with any following violations resulting in a Major Penalty and/or Disqualification.

<G15> Destruction, Damage, Tipping, etc. – Strategies and mechanisms aimed solely 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. However, FTC games are highly interactive and Robot-to-Robot contact and

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defensive game play should be expected. Some tipping, entanglement, and damage may occur as a part of normal game play. If the tipping, entanglement, or damage is ruled to be deliberate or chronic, the offending Team may receive a Major Penalty and/or a Disabled Robot and Team Disqualification for that Match. Repeated offenses may result in tournament Disqualification.

<G16> Pinning or Trapping – A Robot cannot cause an opposing Alliance Robot to become Pinned or Trapped for more than five seconds. 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, and the offending Robot may be Disabled for the Match. If a referee declares a Pinning or Trapping warning during the Match the offending Robot must move away at least 3 feet (0.9 m), approximately 1.5 floor tiles from the Pinned or Trapped Robot. A Robot cannot incur a Pinning or Trapping Penalty during the Autonomous Period. If a Pinning or Trapping occurrence 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 or Trapped Robot or a Minor Penalty will be assessed immediately and again for every five seconds that they are in violation, and the offending Robot may be Disabled for the Match.

<G17> 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 rule violations committed by the affected Alliance shall be excused, and no Penalties will be assigned.

<G18> Removing Game Elements from the Playing Field – Robots may not deliberately remove Game Elements from the Playing Field during a Match. Game Elements that incidentally fall Outside the Playing Field will be returned to the Playing Field by field personnel at the earliest safe and convenient opportunity. Teams deliberately removing Game Elements from the Playing Field will incur a Minor Penalty per Game Element removed from the Playing Field. Continued violation of this rule may lead to the Robot being Disabled and Disqualification of the Team. Game-specific rule(s) listed in Section 1.6.3 that allow the removal of Scoring Elements from the Playing Field take precedence over this general game rule.

<G19> Scoring Elements in Contact with Robots – Alliance-neutral Scoring Elements that are in contact with a Robot on the corresponding Alliance for the Goal or Shelter have zero Score value when referees record the Score at the end of the Autonomous and Driver-Controlled Periods. Game-specific rule(s) listed in Section 1.6.3 that allow Robot contact with Scoring Elements take precedence over this general game rule.

<G20> Post-Match Removal of Game Elements from Robots – Robots must be designed to permit easy removal of Game Elements from any grasping, containing, or holding mechanism 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, and repeated offenses may lead to Disqualification.

The intent of this rule is to have timely removal of Robots from the Playing Field following a Match.

<G21> Robot Manipulation of Scoring Elements – Scoring Elements that are Possessed or Controlled by a Robot are considered to be part of the Robot.

<G22> Robot or Scoring Element 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 Game Play section or in the game-specific rules.

<G23> Playing Field Tolerances – Playing Field and Game Elements will start each Match with tolerances that may vary by as much as +/-1.0 inch (2.5cm). Teams must design their Robots accordingly.
<G24> Match Replay – Matches are replayed at the discretion of the Head Referee only for a failure of a Game Element or verified Wi-Fi interference that was likely to have impacted which Alliance won the Match.

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

<G25> Egregious Behavior – Egregious Robot or Team member behavior at the Playing Field, as determined by the referees, will result in a Major Penalty and possible Match Disqualification. 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 Drivers, Coaches, competition personnel, or event attendees.

1.6.3 Game-Specific Rules
<G41> Drive Teams Touching Robots or Driver Stations After Rescue Beacon Randomization – Drive Teams are not allowed to touch or interact with their Robots or Driver Stations once field personnel have randomized the first Rescue Beacon. If this occurs, a Minor Penalty will be assessed per Robot and the affected Robot is not eligible to trigger a Rescue Beacon. This Penalty only affects the offending Team. The non-offending Alliance Partner Robot remains eligible for the Rescue Beacon Scoring achievement. Drive Teams are allowed to start their Robot with a single start command issued on the Team’s Driver Station Android device when they are instructed to do so by field personnel.

<G42> Drive Team or Robot Pressing the Rescue Beacon Randomization Button – Drive Teams and Robots are not allowed to press the randomization button on the Rescue Beacon. A Major Penalty will be assessed for violating this rule.

<G43> Triggering Rescue Beacons – A Robot may trigger its Alliance’s Rescue Beacon no more than one time per Match. Violation of this rule results in zero Score awarded to the offending Alliance for the Alliance’s Rescue Beacon. The opposing Alliance remains eligible to receive points from the affected Rescue Beacon if the Rescue Beacon is triggered in their favor. The offending Alliance remains eligible to receive points from the opposing Alliance’s Rescue Beacon.

The intent of this rule is to require both Robots on an Alliance to trigger their Alliance’s Rescue Beacon in order to earn the maximum forty points.

<G44> Opposing Alliance’s Rescue Beacon – Robots are not allowed to press the buttons on the opposing Alliance’s Rescue Beacon. A Major Penalty will be assessed for violating this rule and the Rescue Beacon has zero Score value for both Alliances.

<G45> Autonomous Period Robot Keep Out Area – Robots may not go Inside the opposing Alliance’s Area of the Playing Field during the first ten seconds of the Autonomous Period. A Major Penalty will be assessed for violating this rule. The red and blue gaffers tape on the Playing Field floor bisects the Playing Field into equal-sized Alliance Areas.

The intent of the Game Design Committee is to delay the start of defensive strategies by requiring Robots to stay Completely Inside their Alliance’s Area during the first ten seconds of the Autonomous Period. The unpredictability of events during the Autonomous Period may result in unintentional entry into the opposing Alliance Area. For example, Robot collisions may result in an Inadvertent ingress into the opposing Alliance Area. Inadvertent and Inconsequential ingress into the opposing Alliance Area will not be Penalized. Entering into the opposing Alliance Area during the first 10-seconds of the Autonomous Period that results in an Alliance gaining an advantage is not Inconsequential and it will be Penalized.

<G46> Robots Grabbing Game Elements – Robots may grab, grasp, and attach to the All Clear Signal, Mountains, Zip Line Climber-release Triggers, Mountain Pull-up Bars, Debris, and Climbers. Robots may not

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grab, grasp, etc. the Mountain Goals, Rescue Beacons, Shelters, Zip Line, or any Climber that is attached to a Zip Line. A Major Penalty will be assessed per occurrence for violating this rule. Grasping one, two, or three Zip Line Climbers in the same occurrence counts as a single violation of the rule, resulting in one Major Penalty for the action. Inadvertent and Inconsequential contact with restricted Game Elements will not result in a Penalty.

<GS7> Debris Possession/Control Constraint – Robots may not Possess or Control more than five Debris (cubes or balls) in any combination. If a Robot is Possessing or Controlling more than five Debris, the Alliance will incur an immediate Minor Penalty for each Debris above the limit plus an additional Minor Penalty per extra Debris for each five second interval that this situation continues.

Debris placed In Goals while a Robot Possesses or Controls more than five Debris will cause the Alliance to receive a Minor Penalty for each Debris placed In a Goal until the Robot Possesses/Controls five or fewer Debris.

For example, a Robot Possesses six Debris for seven seconds before placing all six Debris Into a Goal. The Penalty assigned to the Alliance is two Minor Penalties for Possessing one Debris over the limit during two five-second intervals, plus an additional Minor Penalty for placing one Debris Into a Goal while Possessing one Debris over the five Debris Possession constraint. For a total of three Minor Penalties. All six Debris will count as Scored by Referees at the end of the Driver-Controlled Period if they remain In the Goal.

The intent of this rule is to disallow the deliberate Possession or Controlled movement of a mass quantity of Debris. Plowing (bumping, moving, touching, etc.) Debris located on the Playing Field floor is allowed and does not count towards the five Debris Possession/Control constraint if the movement of the Debris is not purposeful. Debris will be scattered around the Playing Field and some interaction between Robots and Debris is expected and should not be Penalized, provided that the Robot is not deliberately Controlling the Debris. Robot designs or game strategies that attempt to circumvent this rule are not allowed and may be Penalized at the discretion of the referees. For example, Robot designs or intentional actions that use the floor or Mountain ramp to Possess or Control more than five Debris violates the intent of this rule.

<GS8> Debris Score Value During the Autonomous Period – At the conclusion of the Autonomous Period, Debris has zero Score value. Debris contributes to the Alliance Score only at the end of the Driver-Controlled Period. Robots are allowed to collect Debris subject to the limitations of rule <GS7> and place Debris In Scoring Areas during the Autonomous Period. Field personnel will not remove Debris from Scoring Areas at the end of the Autonomous Period.

<GS9> Blocking Access – During the Driver-Controlled Period, a Robot may not obstruct ALL access, prevent a Robot from escaping, or interfere with the opposing Alliance’s Mountain Area when an opposing Alliance Robot is actively attempting to access or escape from that Area. The offending Alliance will incur a Major Penalty. Additional Major Penalties will be assessed for every five seconds that the condition persists. This rule does not apply during the Autonomous Period.

The intent of this rule is to allow reasonable Robot ingress and egress to an Alliance’s Low Zone (entrance ramp) of the Mountain Climbing Area and to prevent interference with the opposing Alliance’s Mountain Climbing Area. A Robot In an opposing Alliance Climbing Area during the Driver-Controlled Period that isn’t Inconsequential and Inadvertent is Blocking Access and it will be Penalized.

<GS10> Ingress into an opposing Alliance Climbing Area – Robots may not enter or extend Inside an opposing Alliance’s Mountain Climbing Area during the Driver-Controlled Period. The close proximity of the Red and Blue Alliance Climbing Areas will likely lead to some Inadvertent and Inconsequential Robot ingress into the opposing Alliance’s Area, which is allowed without incurring a Penalty at the discretion of the referees.
A *Minor Penalty* will be assessed for violating this rule in the *Low, Mid, and High Zones*. Two *Major Penalties* for a total of eighty points will be assessed for violating this rule in the *Cliff Zone*.

The three *Alliance*-specific *Goals* for *Scoring Debris* on the *Mountain* are *In an Alliance*-shared space between the two *Climbing Areas*. Ingress into this shared *Area* is allowed.

Robots may enter an opposing *Alliance Climbing Area during the Autonomous Period* without receiving a warning or *Penalty*. The intent of the Game Design Committee is for *Robots* to stay within their *Alliance’s reserved Climbing Areas*. However, the unpredictability of events during the *Autonomous Period* may result in *Robots* entering and/or *Parking Inside* the opposing *Alliance Climbing Area*. No warnings are issued and no *Penalty* is assessed for a *Robot Inside or Completely Inside* an opposing *Alliance Climbing Area* during the *Autonomous Period*. The required first action of a *Robot* that is *Inside or Completely Inside* an opposing *Alliance Climbing Area* at the start of the *Driver-Controlled Period* is to immediately move *Out* of the opposing *Alliance Climbing Area*. A *Robot* that does not leave the opposing *Alliance Climbing Area* in a reasonable length of time incurs <GS10> *Penalties*. A guideline for referees is to allow five seconds for each zone the *Robot* needs to travel *In* to exit the *Climbing Area*. For example, a *Robot* *In* the *Mid Zone* is expected to exit the opposing *Alliance Climbing Area* within ten seconds. Since the Game Design Committee can not predict all circumstances, referees may allow additional time to exit the *Climbing Area* at their discretion.

The intent of the Game Design Committee is for *Robots* to perform a pull-up *Completely Inside* their *Alliance’s Climbing Area*. However, ingress into the opposing *Alliance’s Cliff Zone* and contact with an opposing *Alliance Robot* during the *End Game* that is *Inadvertent* and *Inconsequential* is allowed.

<GS11> **Interfering with Climbing Robots** – During the *Driver-Controlled Period*, a *Robot* may not make contact with an opposing *Alliance Robot* that is *Completely In* its *Alliance’s Mountain Climbing Area*. For example, a Red *Alliance Robot* may not make contact with a Blue *Alliance Robot* that is *Completely In* the Blue *Alliance Mountain Climbing Area*. Violations will result in a *Major Penalty* per occurrence. Two *Major Penalties* totaling eighty points will be assessed for violations occurring in the *Cliff Zone*. The close proximity of the *Robots* on opposing *Alliances* will likely lead to some *Inadvertent* and *Inconsequential* contact that is allowed without incurring a *Penalty* at the discretion of the referees.

Climbing the *Mountain* and performing a pull-up *In* the *Cliff Zone* may place *Robots* in precarious situations. The intent of this rule is to prevent outside forces from: disrupting the stability of a *Robot*, preventing a *Robot* from placing *Debris* into a *Mountain Goal*, or interfering with a *Robot* that is *Supported* by the *Pull-up Bar*.

<GS12> **Disabled Robot Blocking Access to or In the opposing Alliance Climbing Area** – If a *Disabled Robot* is *Blocking Access* to the opposing *Alliance’s Mountain Climbing Area*, one *Robot* from the affected *Alliance* may enter an opposing *Alliance Mountain Climbing Area* (on either *Mountain*) that is not occupied by another *Robot* to *Score In Goals, Park*, hang from the *Cliff Zone Pull-up Bar*, and claim its *Alliance’s All Clear Signal*. Further, this *Robot* is not subject to rule <GS9> while it is *In* this *Area*. If access to both of an *Alliance’s Climbing Areas* are blocked by *Disabled* opposing *Alliance Robots*, both of the affected *Alliance’s Robots* may enter opposing *Alliance Climbing Areas*.

The intent of rules <GS9>, <GS10>, <GS11> and <GS12> is to assure free access to the *Mountain* and unimpeded opportunities to complete the *Scoring* tasks on the *Mountain*.

<GS13> **Mountain Scoring Constraints** – *Robots* may *Score Debris* into the *Low Zone Goal* and engage the *Low Zone Zip Line Trigger* from any location on the *Playing Field*. *Robots* are required to be *Completely On the Mountain* and the *Robot’s drivetrain* (e.g. wheels, tread) must only be in contact with the portions of the *Mountain* above the two inch tall buffer *Area* that is defined by white gaffers tape located at the bottom/entrance to the *Mountain* ramp to perform the following actions:

a. Attach to or be Supported by the *Cliff Pull-up Bar*

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b. Score Debris In the Mid Zone and High Zone Goals

c. Claim the All Clear Signal

d. Release Zip Line Climbers with the Mid and High Zone Triggers

The 2-inch buffer Area is considered to be part of the Low Zone. Robot actions performed while violating this rule do not contribute to the Alliance’s Score.

The intent of this rule is for Robots to climb onto the Mountain in order to earn points for all of the Mountain’s Scoring achievements except for placing Debris into the Low Zone Goal, partially Parking On the Mountain, and engaging the Low Zone Zip Line Trigger.

<GS14> Releasing Climbers – Triggers on the Mountain are the only valid way to release the Zip Line Climbers. Zero points are Scored for Climbers that are released to slide down the Zip Line by any other method. Zip Line Climbers have a Score value only at the end of the Driver-Controlled Period; however, Robots may release them during the Autonomous and Driver-Controlled Periods.

The intent of this rule is for the Mountain Triggers to release the Zip Line Climbers. Robot interaction with the Mountain and/or Playing Field Walls may cause an Inadvertent release of Zip Line Climbers without a Robot engaging the Triggers. Referees will credit an Alliance for releasing Climbers if the Triggers are engaged after Climbers have been released by other means. Referees will also award credit for releasing a Climber under the following circumstances:

a. A Trigger appears to be engaged and the corresponding Climber does not release and travel the entire length of the Zip Line.

b. A Trigger rotates from an engaged/Scored orientation back to its pre-Match starting orientation after the corresponding Climber has been released by a valid method.

<GS15> De-Scoring Debris – Robots may not de-Score Debris from the Mountain Goals, however Debris may be de-Scored from any Floor Goal. If Debris is de-Scored illegally, the offending Alliance will incur a Major Penalty for each de-Scored Debris. In other words, once a Debris is Scored In a Mountain Goal, it may not be removed by any Robot, even one of the same Alliance’s color. De-Scored Debris do not count towards an Alliance’s Match Score.

The intent of this rule is to prevent intentional de-Scoring. Debris that fall out of a Mountain Goal due to Robots climbing the Mountain, bumping into a Mountain Goal or Mountain, placing Debris into a Mountain Goal, engaging Triggers, etc. will not be Penalized.

<GS16> De-Scoring Climbers – Robots may not de-Score a Climber from a Shelter. If Climbers are de-Scored illegally, the offending Alliance will incur a Major Penalty for each de-Scored Climber. Climbers that are Inadvertently de-Scored while attempting to Score Climbers will not be Penalized. De-Scored Climbers do not count towards an Alliance’s Match Score.

<GS17> Removing a Climber from the Playing Field – A Robot may remove a Climber from the Playing Field without incurring a Penalty if it is a consequence of an attempt to Score the Climber In a Shelter. Field personnel will return the Climber to the Playing Field at the earliest safe and convenient opportunity.

<GS18> Robot Contact with the All Clear Signal or Mountain Cliff Zone Before the End Game – Robots that contact, engage, grasp, grab, etc. an All Clear Signal, the Pull-up Bar, or the Cliff Low Bar prior to the start of the End Game cause their Alliance to receive zero Score for both of the End Game Scoring
achievements on the corresponding Mountain. The offending Robot remains eligible for the Low, Mid and High Zone Parking achievements on the same Mountain. The All Clear Signal and Pull-up Bar on the other Mountain remain in play for both Robots on the offending Alliance. Inadvertent and Inconsequential contact made with the All Clear Signal, the Pull-up Bar, or the Cliff Low Bar will not result in a Penalty of loss of Score.

<GS19> **Robot Contact with the All Clear Signal at the End of the Match** – Robots are allowed to be in contact with the All Clear Signal at the end of the Match and earn the All Clear Signal and pull-up Scores for their Alliance. Robots are not required to be in contact with the All Clear Signal to earn points for their Alliance.

<GS20> **Robot Extension Outside the Playing Field Perimeter** – Robots will not be Penalized for extending beyond the Mountain’s Cliff Zone or the Shelter. The Drive Team and field personnel in these Areas should be situationally aware to avoid contact with Robots.

<GS21> **Number of Robots Supported by a single Pull-up Bar** – Up to one Robot from each Alliance is allowed to be Supported by the same Cliff Zone Pull-up Bar (i.e. no double Robot hangs by an Alliance on the same Pull-up Bar). Two Major Penalties totaling eighty points will be assessed for violating this rule. Robots protected by rule <GS12> are eligible to earn Cliff pull-up and All Clear Signal Points along with their Alliance Partner Robot on the same Mountain.

The intent of this rule is for each Mountain Pull-up Bar to Support no more than two Robots, one from each Alliance.
### 1.7 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>
</tr>
</thead>
<tbody>
<tr>
<td>Rescue Beacon Triggered</td>
<td></td>
<td></td>
<td></td>
<td>1.5.2.1</td>
</tr>
<tr>
<td>- First time</td>
<td>20</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>- Second time</td>
<td>20</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Robot Parked</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>- Floor Goal</td>
<td>5</td>
<td></td>
<td></td>
<td>1.5.2.5</td>
</tr>
<tr>
<td>- Rescue Beacon Repair Zone</td>
<td>5</td>
<td></td>
<td></td>
<td>1.5.2.4</td>
</tr>
<tr>
<td>- Tile Floor and Mountain</td>
<td>5</td>
<td></td>
<td></td>
<td>1.5.2.3a</td>
</tr>
<tr>
<td>- Mountain Low Zone</td>
<td>10</td>
<td></td>
<td></td>
<td>1.5.2.3b</td>
</tr>
<tr>
<td>- Mountain Mid Zone</td>
<td>20</td>
<td></td>
<td></td>
<td>1.5.2.3c</td>
</tr>
<tr>
<td>- Mountain High Zone</td>
<td>40</td>
<td></td>
<td></td>
<td>1.5.2.3d</td>
</tr>
<tr>
<td>Climber in Shelter</td>
<td>10</td>
<td>10</td>
<td></td>
<td>1.5.2.2 &amp; 1.5.3.3</td>
</tr>
<tr>
<td>Debris</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>- Floor Goal</td>
<td></td>
<td>1</td>
<td></td>
<td>1.5.3.1a</td>
</tr>
<tr>
<td>- Low Zone Goal</td>
<td></td>
<td>5</td>
<td></td>
<td>1.5.3.1b</td>
</tr>
<tr>
<td>- Mid Zone Goal</td>
<td></td>
<td>10</td>
<td></td>
<td>1.5.3.1c</td>
</tr>
<tr>
<td>- High Zone Goal</td>
<td></td>
<td>15</td>
<td></td>
<td>1.5.3.1d</td>
</tr>
<tr>
<td>Zip Line Climber</td>
<td></td>
<td>20</td>
<td></td>
<td>1.5.3.2</td>
</tr>
<tr>
<td>Robot Parked</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>- Tile Floor and Mountain</td>
<td></td>
<td>5</td>
<td></td>
<td>1.5.3.4a</td>
</tr>
<tr>
<td>- Mountain Low Zone</td>
<td></td>
<td>10</td>
<td></td>
<td>1.5.3.4b</td>
</tr>
<tr>
<td>- Mountain Mid Zone</td>
<td></td>
<td>20</td>
<td></td>
<td>1.5.3.4c</td>
</tr>
<tr>
<td>- Mountain High Zone</td>
<td></td>
<td>40</td>
<td></td>
<td>1.5.3.4d</td>
</tr>
<tr>
<td>Cliff Pull-up Bar</td>
<td></td>
<td></td>
<td>80</td>
<td>1.5.4.1</td>
</tr>
<tr>
<td>All Clear Signal</td>
<td></td>
<td></td>
<td>20</td>
<td>1.5.4.2</td>
</tr>
</tbody>
</table>
### 1.8 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 1.6.

<table>
<thead>
<tr>
<th>Rule #</th>
<th>Rule</th>
<th>Consequence</th>
<th>Warning</th>
<th>Minor Penalty</th>
<th>Major Penalty</th>
<th>Disable</th>
<th>Disqualification</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Safety Rules</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>&lt;S1&gt;</td>
<td>Unsafe Robot or damage to the Playing Field.</td>
<td>Immediate <em>Disable</em> if unsafe operation or damage is likely to persist. Otherwise, warning escalating to <em>Disable</em> or <em>Disqualification</em>.</td>
<td>W</td>
<td></td>
<td>D</td>
<td>DQ</td>
<td></td>
</tr>
<tr>
<td>&lt;S2&gt;</td>
<td>Illegal Robot extension Outside the Playing Field and contacting anything Outside the Playing Field.</td>
<td>Robot will be <em>Disabled</em> and repeated offenses may lead to <em>Disqualification</em>.</td>
<td></td>
<td></td>
<td>D</td>
<td>DQ</td>
<td></td>
</tr>
<tr>
<td>&lt;S3&gt;</td>
<td>Drive Team missing safety gear.</td>
<td>Warning and if the situation is not remedied within thirty seconds, the offending member(s) of the <em>Drive Team</em> must leave the <em>Competition Area</em> for the remainder of the <em>Match</em> and may not be replaced.</td>
<td>W</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>General Rules</strong></td>
<td></td>
<td></td>
<td></td>
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<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>&lt;G1&gt;</td>
<td>Drive Team using disallowed electronic communication.</td>
<td>Warning with any following instances during the tournament resulting in a <em>Minor Penalty</em>. Repeated offenses may result in <em>Disqualification</em>.</td>
<td>W</td>
<td>1x</td>
<td></td>
<td>DQ</td>
<td></td>
</tr>
<tr>
<td>&lt;G2&gt;</td>
<td>Pre-Match Robot setup – Deliberately delaying the start of the <em>Match</em>.</td>
<td><em>Minor Penalty</em> for each offense. Repeated offenses may lead to <em>Disqualification</em>.</td>
<td></td>
<td>1x</td>
<td></td>
<td>DQ</td>
<td></td>
</tr>
<tr>
<td>&lt;G3&gt;</td>
<td>Robot starting volume.</td>
<td>Robot is <em>Disabled</em> and powered off in a valid starting Area on the <em>Playing Field</em>.</td>
<td></td>
<td></td>
<td></td>
<td>D</td>
<td></td>
</tr>
<tr>
<td>&lt;G4&gt;</td>
<td>Robot setup alignment devices.</td>
<td><em>Minor Penalty</em> and repeated offenses may lead to <em>Disqualification</em>.</td>
<td></td>
<td>1x</td>
<td></td>
<td>DQ</td>
<td></td>
</tr>
<tr>
<td>&lt;G5&gt;</td>
<td>Drive Team member(s) leaving the Alliance Station.</td>
<td>Warning for the first instance with any following instances resulting in a <em>Minor Penalty</em> and/or <em>Disqualification</em>.</td>
<td>W</td>
<td>1x</td>
<td></td>
<td>DQ</td>
<td></td>
</tr>
<tr>
<td>&lt;G6&gt;</td>
<td>Starting Game Play Early.</td>
<td><em>Minor Penalty</em> with the option of a <em>Major Penalty</em> in place of the <em>Minor Penalty</em> if the early start results in a competitive advantage for the offending <em>Alliance</em>.</td>
<td></td>
<td>1x</td>
<td>1x</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

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<table>
<thead>
<tr>
<th>Rule #</th>
<th>Rule</th>
<th>Consequence</th>
<th>Warning</th>
<th>Minor Penalty</th>
<th>Major Penalty</th>
<th>Disable</th>
<th>Disqualify</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt;G7&gt;</td>
<td>Late Start of the Autonomous Period</td>
<td>Minor Penalty with the option of a Major Penalty in place of the Minor Penalty if the late start results in a competitive advantage for the offending Alliance.</td>
<td></td>
<td>1x</td>
<td>1x</td>
<td></td>
<td></td>
</tr>
<tr>
<td>&lt;G8&gt;</td>
<td>Stopping Game Play Late.</td>
<td>Minor Penalty and the actions of the Robot that occur after the announced end of game play for the Match period 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 for the offending Alliance.</td>
<td></td>
<td>1x</td>
<td>1x</td>
<td></td>
<td></td>
</tr>
<tr>
<td>&lt;G9&gt;</td>
<td>Drive Team contact with the Playing Field or Robot.</td>
<td>Warning for the first instance with any following instances resulting in a Minor Penalty and/or Disqualification. Contact for safety reasons will not result in a warning or Penalty.</td>
<td>W</td>
<td>1x</td>
<td></td>
<td></td>
<td>DQ</td>
</tr>
<tr>
<td>&lt;G10&gt;</td>
<td>Autonomous to Driver-Controlled Period transition – Robot failure.</td>
<td>A Robot that can not be controlled by the Drive Team will be Disabled and remain in place for the remainder of the Match.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>D</td>
</tr>
<tr>
<td>&lt;G11&gt;</td>
<td>Drive Team Coach interference.</td>
<td>Warning for the first instance with any following instances resulting in a Major Penalty and/or Disqualification.</td>
<td>W</td>
<td>1x</td>
<td></td>
<td></td>
<td>DQ</td>
</tr>
<tr>
<td>&lt;G12&gt;</td>
<td>Referees record the Score after all objects come to rest.</td>
<td>Accurate completion of the Match scoresheets.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>&lt;G13&gt;</td>
<td>Robots deliberately detaching parts.</td>
<td>Robots will be Disabled and the Team Disqualified for deliberately detached parts that prevent additional Scoring by any Robot. Multiple infractions may result in tournament Disqualification.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>D</td>
</tr>
<tr>
<td>&lt;G14&gt;</td>
<td>Robots illegally grasping Game Elements.</td>
<td>Warning for the first instance with any following instances resulting in a Major Penalty and/or Disqualification.</td>
<td>W</td>
<td>1x</td>
<td></td>
<td></td>
<td>DQ</td>
</tr>
<tr>
<td>&lt;G15&gt;</td>
<td>Destruction, damage, tipping, etc.</td>
<td>Deliberate or chronic violations of this rule may result in a Major Penalty and/or Disabling the Robot and Team Disqualification for that Match. Repeated offenses may result in tournament Disqualification.</td>
<td></td>
<td></td>
<td>1x</td>
<td>D</td>
<td>DQ</td>
</tr>
<tr>
<td>Rule #</td>
<td>Rule</td>
<td>Consequence</td>
<td>Warning</td>
<td>Minor Penalty</td>
<td>Major Penalty</td>
<td>Disable</td>
<td>Disqualify</td>
</tr>
<tr>
<td>-------</td>
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</tr>
<tr>
<td>&lt;G16&gt;</td>
<td>Pinning or Trapping for more than 5-seconds in the Driver-Controlled Period.</td>
<td>Minor Penalty for every five seconds the Robot violates this rule and the offending Robot may be Disabled for the Match. The offending Robot must move away 3 ft. (0.9 m) from the Pinned or Trapped Robot. The Pinning or Trapping rule does not apply during the Autonomous Period. If a Pinning or Trapping occurrence happens during the Autonomous Period, the first action by the offending Robot during the Driver-Controlled Period must be to move away or a Minor Penalty will be assessed.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>1x D</td>
</tr>
<tr>
<td>&lt;G17&gt;</td>
<td>Forced by an opponent to violate a rule.</td>
<td>No Penalty is assessed to either Alliance.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>&lt;G18&gt;</td>
<td>Removing Game Elements from the Playing Field.</td>
<td>Minor Penalty per Game Element removed from the Playing Field unless the Robot is protected by rule &lt;GS17&gt;. Continued violation of this rule may lead to Disable and Disqualification.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>1x D DQ</td>
</tr>
</tbody>
</table>
| <G19> | Scoring Elements in contact with Robots.                           | - Alliance neutral Scoring Elements that are in contact with a Robot of the corresponding Alliance Goal have zero Score value.  
- Alliance-specific Scoring Elements in contact with a corresponding Alliance Robot have zero Score value.  
- The All Clear Signal is exempt from this rule per <GS19>. |         |               |              |         |            |
| <G20> | Delay caused by difficult Post-Match removal of Robots from the Playing Field and Game Elements from Robots. | A Minor Penalty will be assessed and repeated offenses may lead to Disqualification.                                                          |         |               |              |         | 1x DQ      |
| <G21> | Robot manipulation of Scoring Elements.                            | Not applicable.                                                                                                                             |         |               |              |         |            |
| <G22> | Robot or Scoring Element in two or more Scoring Areas.             | Points are earned only for the highest value achievement. If the achievement values are equal, only one achievement counts as Scored. |         |               |              |         |            |

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<table>
<thead>
<tr>
<th>Rule #</th>
<th>Rule</th>
<th>Consequence</th>
<th>Warning</th>
<th>Minor Penalty</th>
<th>Major Penalty</th>
<th>Disable</th>
<th>Disqualify</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt;G23&gt;</td>
<td>Playing Field tolerances.</td>
<td>The <em>Playing Field</em> and <em>Game Elements</em> will start each <em>Match</em> within the specified tolerance.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>&lt;G24&gt;</td>
<td>Match replay.</td>
<td>A <em>Match</em> is replayed under the specified circumstances.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>&lt;G25&gt;</td>
<td>Egregious behavior.</td>
<td><em>Major Penalty</em> and possible <em>Match Disqualification</em>. Subsequent violations result in <em>Team Disqualification</em>.</td>
<td>1x</td>
<td></td>
<td></td>
<td></td>
<td>DQ</td>
</tr>
</tbody>
</table>

**Game Specific Rules**

<p>| GS1 | Drive Teams touching Robots or Driver Stations after Rescue Beacon randomization. | <em>Minor Penalty</em> and the affected Team’s Robot is not eligible to reset a Rescue Beacon. | 1x |  |  |  |  |
| GS2 | Drive Team or Robot pressing the Rescue Beacon randomization button. | <em>Major Penalty</em>. | 1x |  |  |  |  |
| GS3 | Robot triggers a Rescue Beacon more than once. | Zero Score for the Alliance’s Rescue Beacon. The opposing Alliance is eligible to receive points from the affected Rescue Beacon. |  |  |  |  |  |
| GS4 | Robot presses a button on the opposing Alliance Rescue Beacon. | <em>Major Penalty</em> and the Rescue Beacon has zero Score value for both Alliances. | 1x |  |  |  |  |
| GS5 | Robot enters the Autonomous Period Robot keep Out Area during the first 10-seconds of a Match. | <em>Major Penalty</em>. | 1x |  |  |  |  |
| GS6 | Robot grasping a Climber that is on a Zip Line or a Mountain Goal. | <em>Major Penalty</em> per occurrence. | 1x |  |  |  |  |
| GS7 | Exceeding the 5-Debris Possession/Control constraint. | <em>Minor Penalty</em> for each Debris above the limit plus an additional <em>Minor Penalty</em> per extra Debris for each five second interval that the situation continues. Additional <em>Minor Penalty</em> for each Debris placed in a Goal while the Robot Possesses/Controls more than five Debris. | 1x |  |  |  |  |</p>
<table>
<thead>
<tr>
<th>Rule #</th>
<th>Rule</th>
<th>Consequence</th>
<th>Warning</th>
<th>Minor Penalty</th>
<th>Major Penalty</th>
<th>Disable</th>
<th>Disqualify</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt;GS8&gt;</td>
<td>Debris Score value for the Autonomous Period.</td>
<td>Debris has zero Score value for the Autonomous Period. Debris is not removed from Scoring Areas by field personnel at the end of the Autonomous Period.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>&lt;GS9&gt;</td>
<td>Blocking Robot Access to or preventing a Robot from escaping an Alliance’s Mountain Climbing Area.</td>
<td>Major Penalty and additional Major Penalties assessed for every 5-seconds that the condition persists.</td>
<td></td>
<td>1x</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
| <GS10> | Ingress into an opposing Alliance’s Mountain Climbing Area.          | - Minor Penalty in the Low, Mid and High Zones.  
- Two Major Penalties in the Cliff Zone. |         | 1x            | 2x           |         |            |
<p>| &lt;GS11&gt; | Interfering with a climbing Robot.                                   | Major Penalty in the Low, Mid and High Zones. Double Major Penalty in the Cliff Zone.         |         | 1x,2x         |              |         |            |
| &lt;GS12&gt; | Disabled Robot Blocking Access to or In the opposing Alliance Climbing Area. | No Penalty is assessed and one opposing Alliance Robot is allowed to enter the Disabled Robot’s available Alliance Climbing Area subject to the restrictions listed in the rule. |         |               |              |         |            |
| &lt;GS13&gt; | Mountain Scoring constraints.                                        | Zero Score for the achievement(s) accomplished while violating this rule. See the rule for complete details. |         |               |              |         |            |
| &lt;GS14&gt; | Releasing Zip Line Climbers.                                         | Zero Score value for Zip Line Climbers that are released without using the Triggers. See the rule for complete details. |         |               |              |         |            |
| &lt;GS15&gt; | De-Scoring Debris from a Mountain Goal.                             | Major Penalty per de-Scored Debris.                                                          |         | 1x            |              |         |            |
| &lt;GS16&gt; | De-Scoring a Climber from a Shelter.                                | Major Penalty per de-Scored Climber.                                                         |         | 1x            |              |         |            |
| &lt;GS17&gt; | Removing a Climber from the Playing Field while attempting to Score In a Shelter. | No Penalty is assessed.                                                                     |         |               |              |         |            |
| &lt;GS18&gt; | Contact with the All Clear Signal or Mountain Cliff Zone before the End Game. | Zero Score for both of the End Game achievements. The offending Robot remains eligible for the Low, Mid and High Zone Parking achievements on the same Mountain. The offending Alliance’s Scoring eligibility for both Robots on the other Mountain is not affected. |         |               |              |         |            |</p>
<table>
<thead>
<tr>
<th>Rule #</th>
<th>Rule</th>
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<th>Disable</th>
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</tr>
</thead>
<tbody>
<tr>
<td>&lt;GS19&gt;</td>
<td>Contact with the <em>All Clear Signal</em> at the end of the Match.</td>
<td>No <em>Penalty</em> is assessed and <em>Scoring</em> of the <em>All Clear Signal</em> and <em>Pull-up Bar</em> is allowed.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>&lt;GS20&gt;</td>
<td>Robot extension <em>Outside the Playing Field Perimeter</em>.</td>
<td>No <em>Penalty</em> for extending beyond the Mountain’s Cliff Zone and Climber Shelter.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>&lt;GS21&gt;</td>
<td>More than one <em>Robot per Alliance Supported by a single Pull-up Bar</em>.</td>
<td>Two <em>Major Penalties</em> except for Robots protected by rule &lt;GS12&gt;.</td>
<td></td>
<td></td>
<td></td>
<td>2x</td>
<td></td>
</tr>
</tbody>
</table>

**Column Key**

| W: Warning | 1x: *Penalty* at normal (single) cost |
| D: Disabled | 2x: *Penalty* at double cost |
| DQ: Disqualify | |