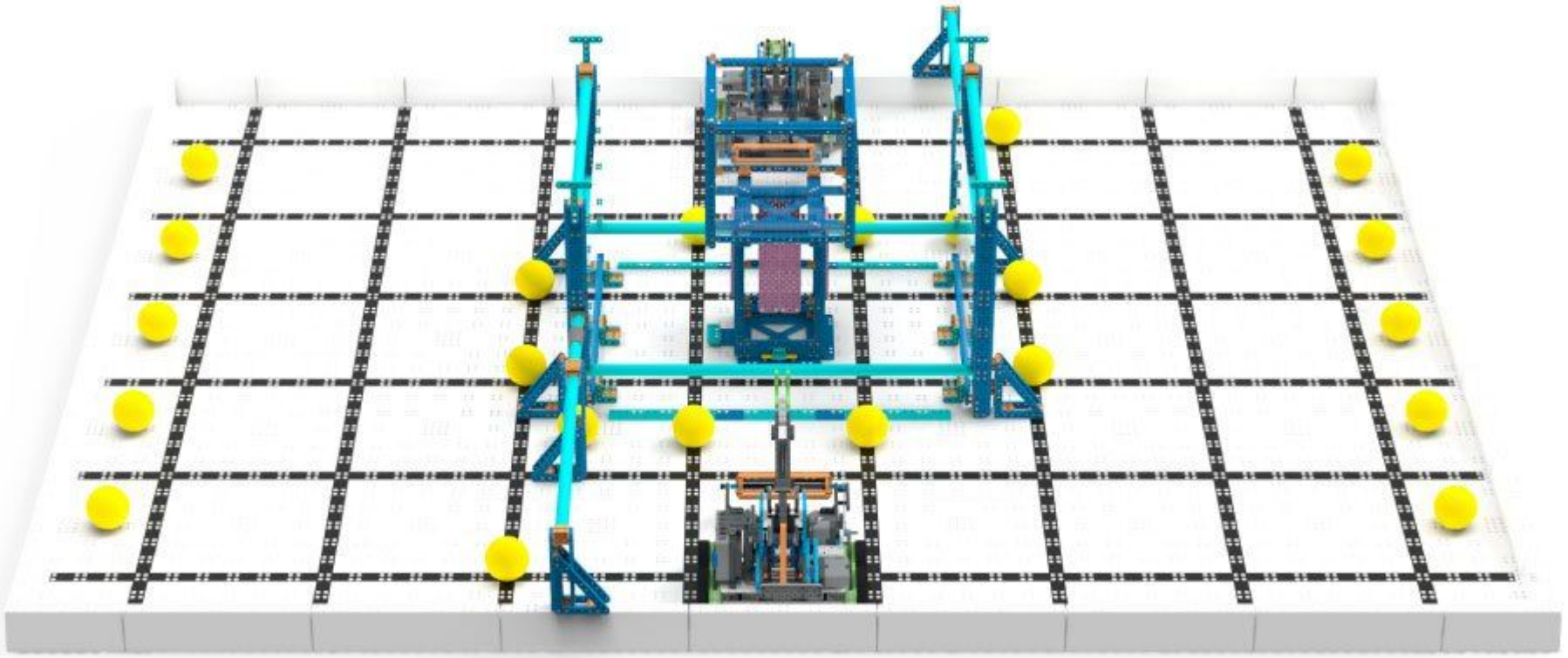
VIQC Pitching In - Game Overview

Grant Cox
Chairman of the VEX Game Design Committee

2021-22: VIQC Pitching In



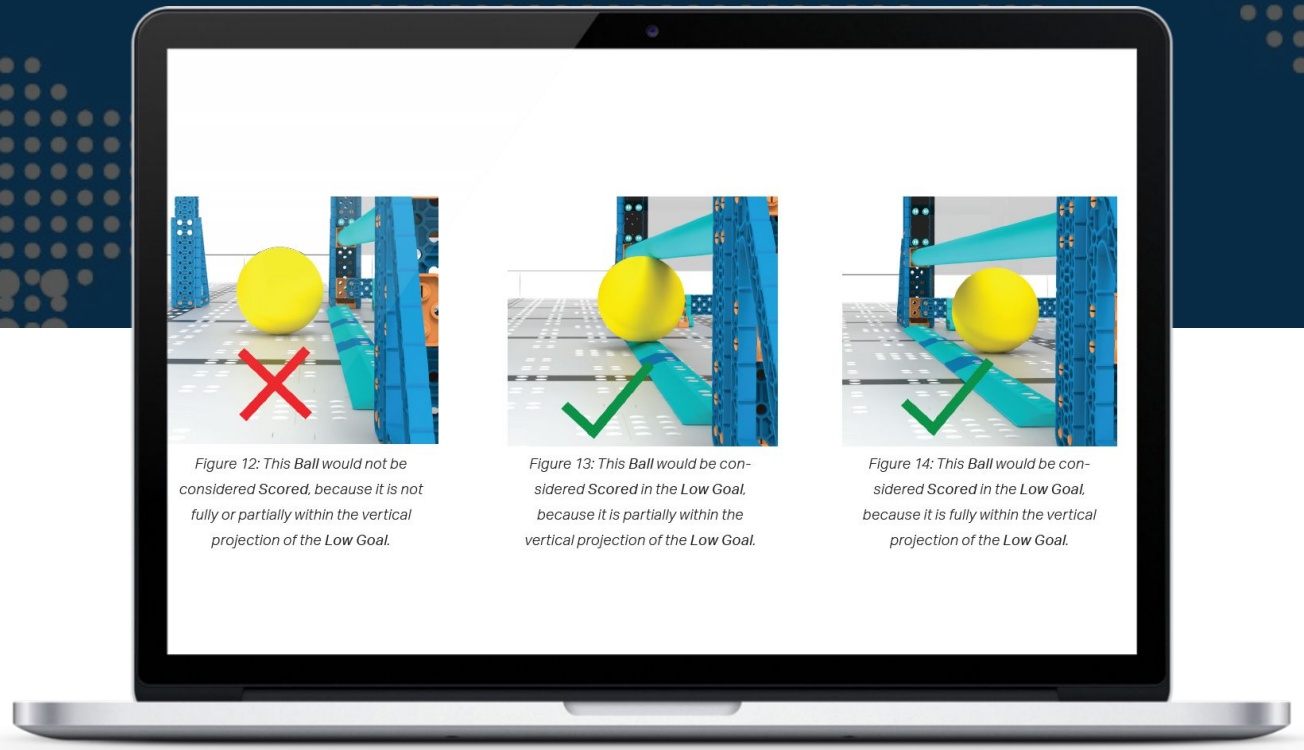


*Figure 12: This **Ball** would not be considered **Scored**, because it is not fully or partially within the vertical projection of the **Low Goal**.*

*Figure 13: This **Ball** would be considered **Scored** in the **Low Goal**, because it is partially within the vertical projection of the **Low Goal**.*

*Figure 14: This **Ball** would be considered **Scored** in the **Low Goal**, because it is fully within the vertical projection of the **Low Goal**.*

Scoring

Scoring - Starting Corral / Cleared

Starting Corral - One of two areas of the *Floor* on either end of the *Field*, each of which are bound by the *Field* perimeter and the outside of the solid black line closest to the 6' edge of the *Field*. The *Starting Corral* is defined as this portion of the *Floor*, not the three-dimensional volume above it.

Cleared - A *Starting Corral* status. A *Starting Corral* is considered *Cleared* at the end of a *Match* if no *Balls* are contacting the *Floor* inside of the *Starting Corral*. Referees can check any *Balls* in question by sliding a piece of paper between the *Ball* and the *Floor*.

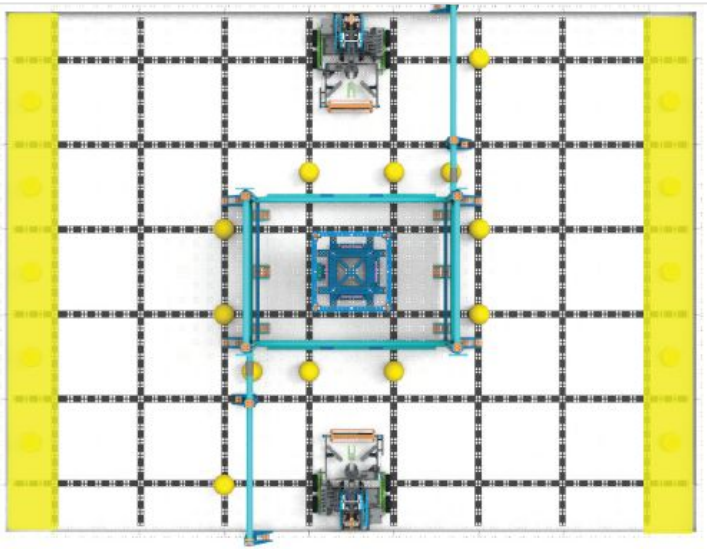


Figure 16: An overview of the Field. The Starting Corrals are highlighted.

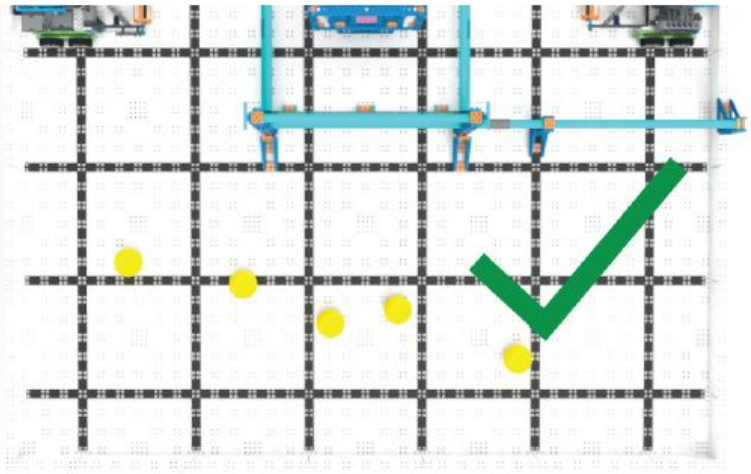


Figure 4: An example of a Cleared Starting Corral.

Scoring - Low Goal

Low Goal - The area in the center of the *Field* surrounding the *High Goal* structure. On two sides, the *Low Goal* is bound by clear plastic sheets. On the other two sides, the *Low Goal* is bounded by the outer edge of the teal PVC pipes, and the VEX IQ parts attached to the *Floor*. The plastic sheets, PVC pipes, and VEX IQ parts are considered part of the *Low Goal*.

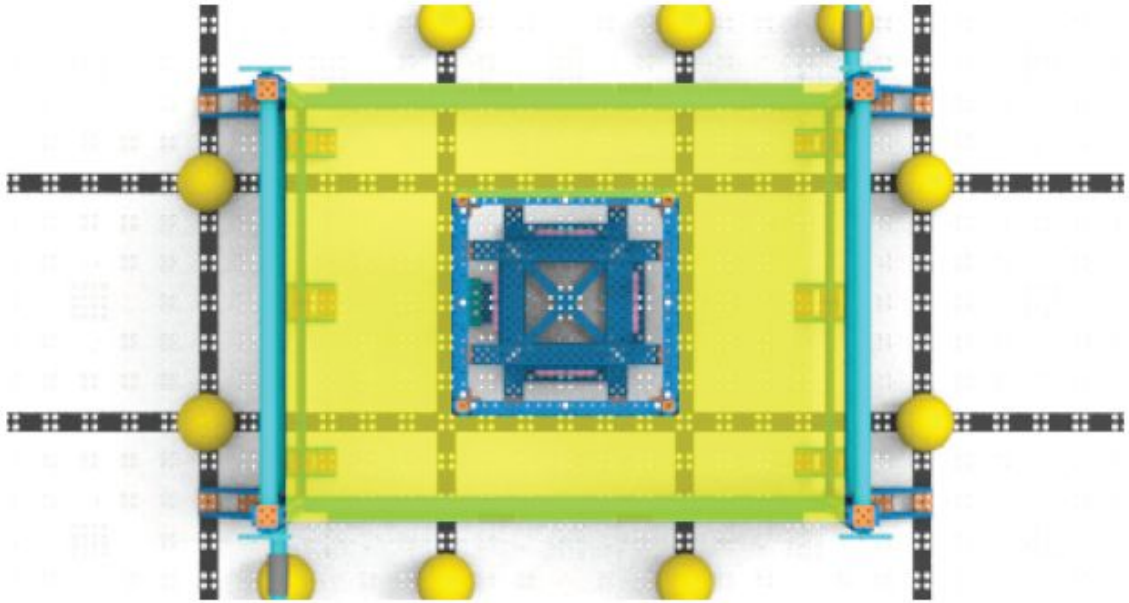


Figure 11: The Low Goal.

Scoring - Low Goal

Scored - A *Ball* status. A *Ball* is considered *Scored* at the end of a *Match* if it is not touching a *Robot*, and if it is "in" one of the Goals:

1. The *Ball* is partially or fully within the three-dimensional area defined by the infinite vertical projection of the *Low Goal*, or

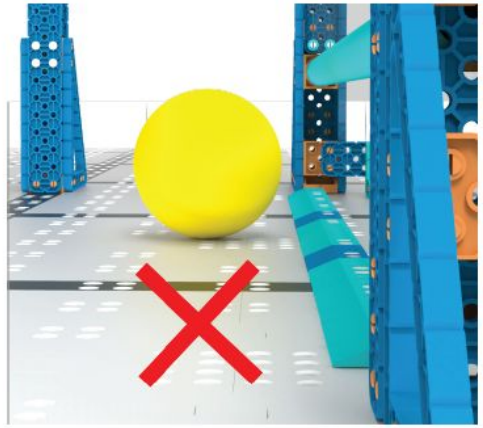


Figure 12: This Ball would not be considered Scored, because it is not fully or partially within the vertical projection of the Low Goal.

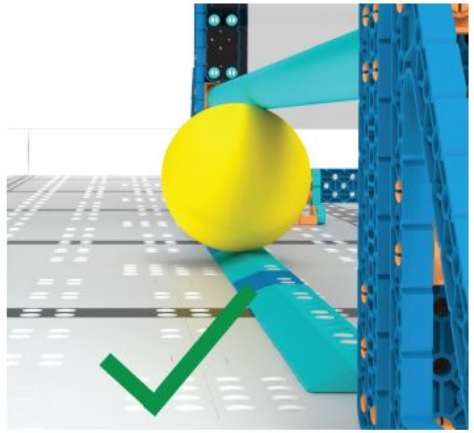


Figure 13: This Ball would be considered Scored in the Low Goal, because it is partially within the vertical projection of the Low Goal.

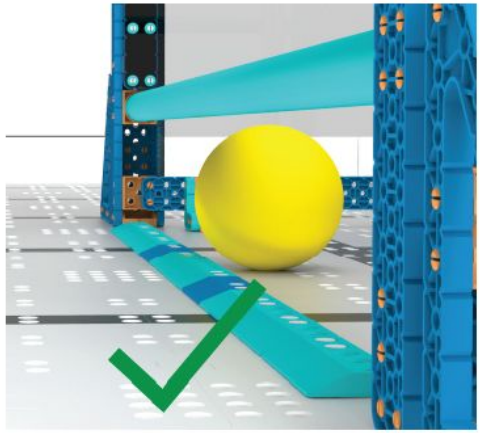


Figure 14: This Ball would be considered Scored in the Low Goal, because it is fully within the vertical projection of the Low Goal.

Scoring - High Goal

High Goal - The cube-shaped structure built out of VEX IQ parts and clear plastic sheets that is elevated in the center of the *Field*. The support structure underneath the clear cube, with green and pink VEX IQ parts on each side, is not considered part of the *High Goal*.

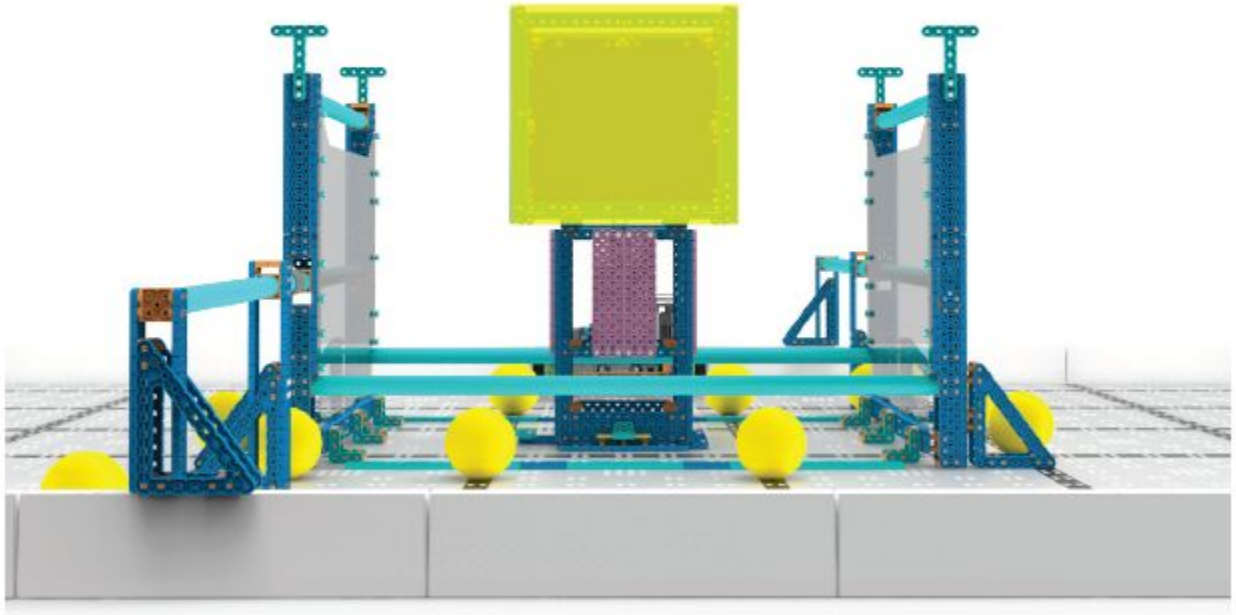


Figure 10: The High Goal.

Scoring - High Goal

Scored - A *Ball* status. A *Ball* is considered *Scored* at the end of a *Match* if it is not touching a *Robot*, and if it is "in" one of the Goals:

2. The *Ball* is above the bottom surface of the *High Goal*, and partially or fully within the three-dimensional area defined by the infinite vertical projection of the *High Goal*.

Note: Once a *Ball* is considered *Scored* in the *High Goal*, it is no longer considered *Scored* in the *Low Goal*.

Figure 15: All Balls would be considered Scored in the High Goal, because they are full or partially within the vertical projection of the High Goal.

Scoring - Hanging

Hanging - A *Robot* status at the end of a *Match*.

- **Low Hanging** – A *Robot* is *Low Hanging* if it is contacting one of the *Hanging Bars*, is not contacting the *Floor*, and is not supported by any *Balls*. Referees can check to see if a *Robot* is *Low Hanging* by sliding a piece of paper between the *Robot* and the *Floor*.
- **High Hanging** – A *Robot* is *High Hanging* if it is contacting one of the *Hanging Bars*, is not supported by any *Balls*, and is completely above a horizontal plane that is in line with the bottom edge of the lower *Hanging Bar*. Referees can check to see if a *Robot* is *High Hanging* by sliding a VEX IQ part which is 15 holes long (e.g. a 1x15 beam) underneath it.

Note 1: A *High Hanging Robot* does not also count as a *Low Hanging Robot*.

Note 2: Referees can check to see if a *Robot* is supported by any *Balls* by gently removing the *Ball* in question.

Scoring - Hanging

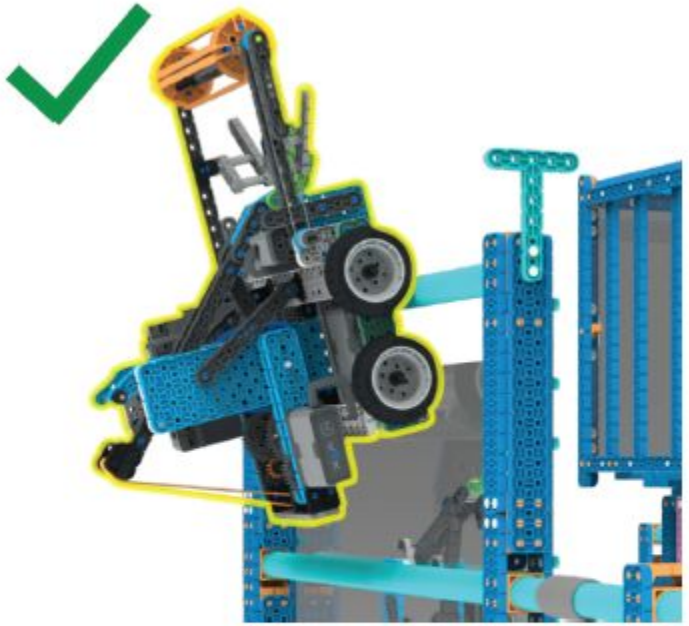


*Figure 6: This **Robot** would be considered **High Hanging**, because it is completely above the bottom edge of the lower **Hanging Bar**.*

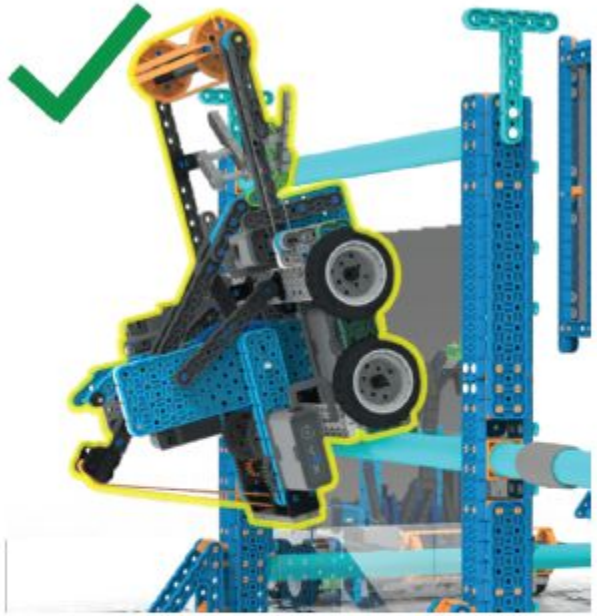


*Figure 7: This **Robot** would be considered **Low Hanging**, because it is not completely above the bottom edge of the lower **Hanging Bar**.*

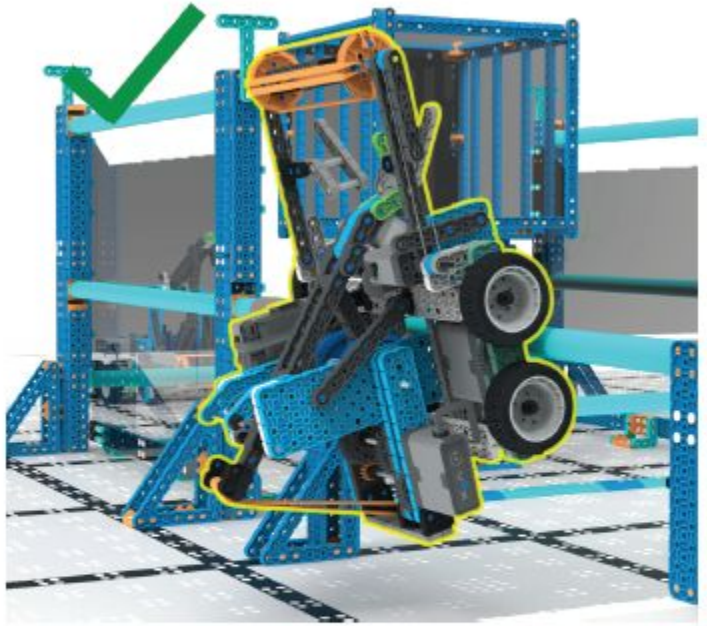
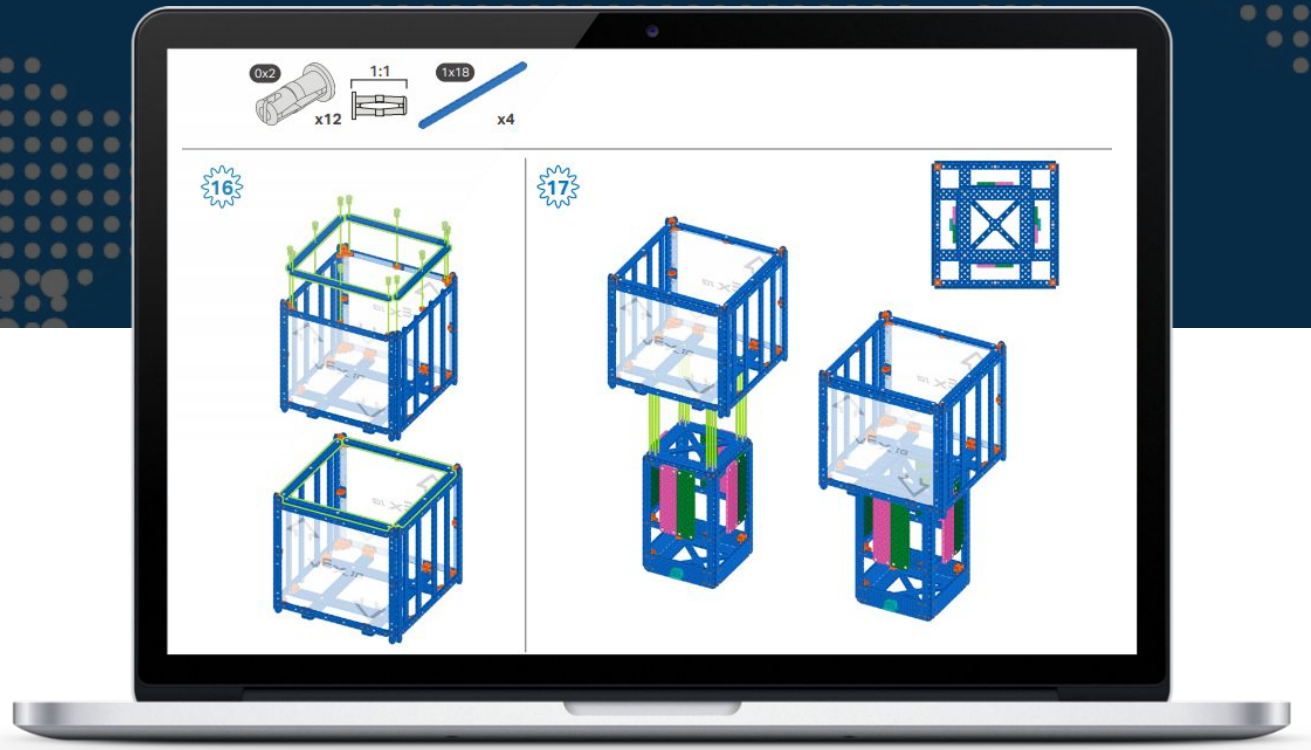


*Figure 8: This **Robot** would be considered **Low Hanging**, because it is contacting a **Hanging Bar**, is not contacting the **Floor**, and is not supported by any **Balls**.*

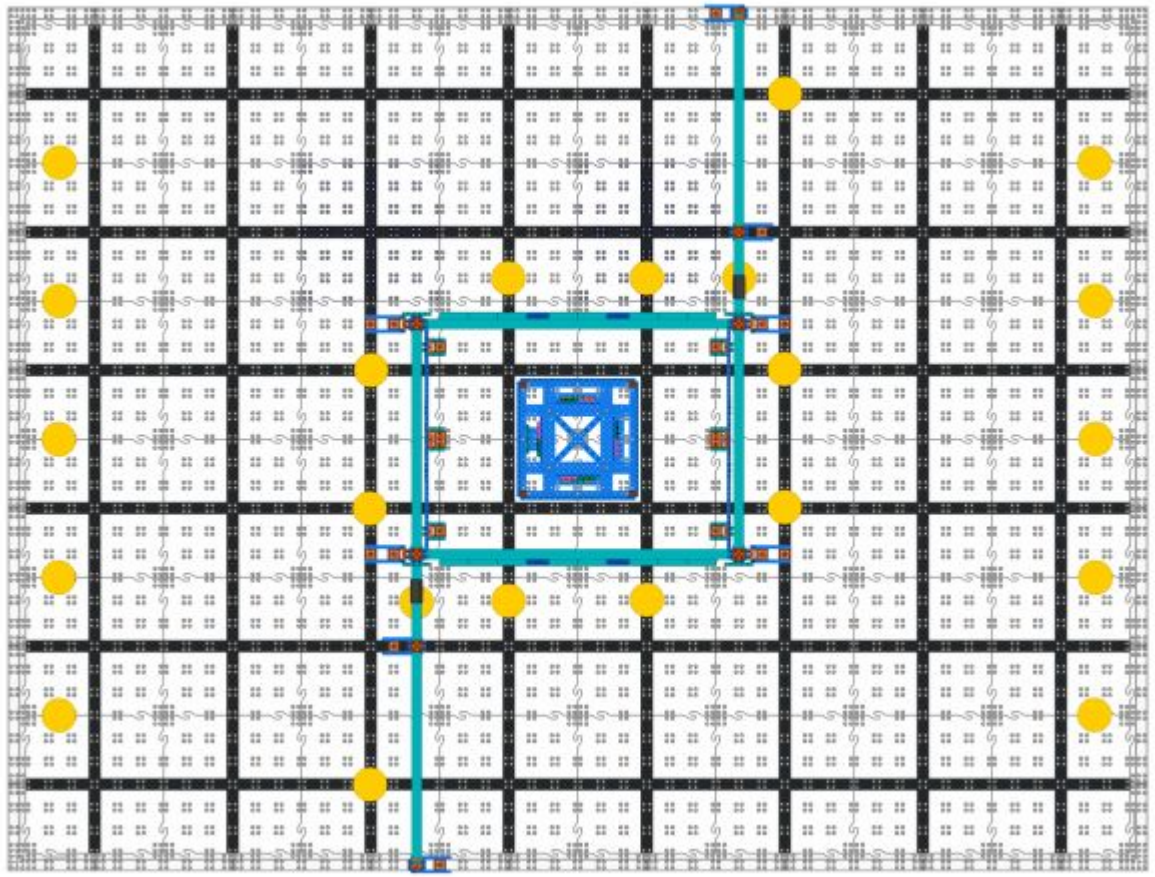
Scoring - “Benefit of the Doubt”

Teams may encounter other *Ball* / Goal states than the examples depicted in the figures above. In these edge cases, *Teams* will be given the "benefit of the doubt", and the *Ball* should generally be considered *Scored*. *Head Referees* will not be expected or required to define a perfectly rigid imaginary vertical projection or check imperceptibly small measurements.

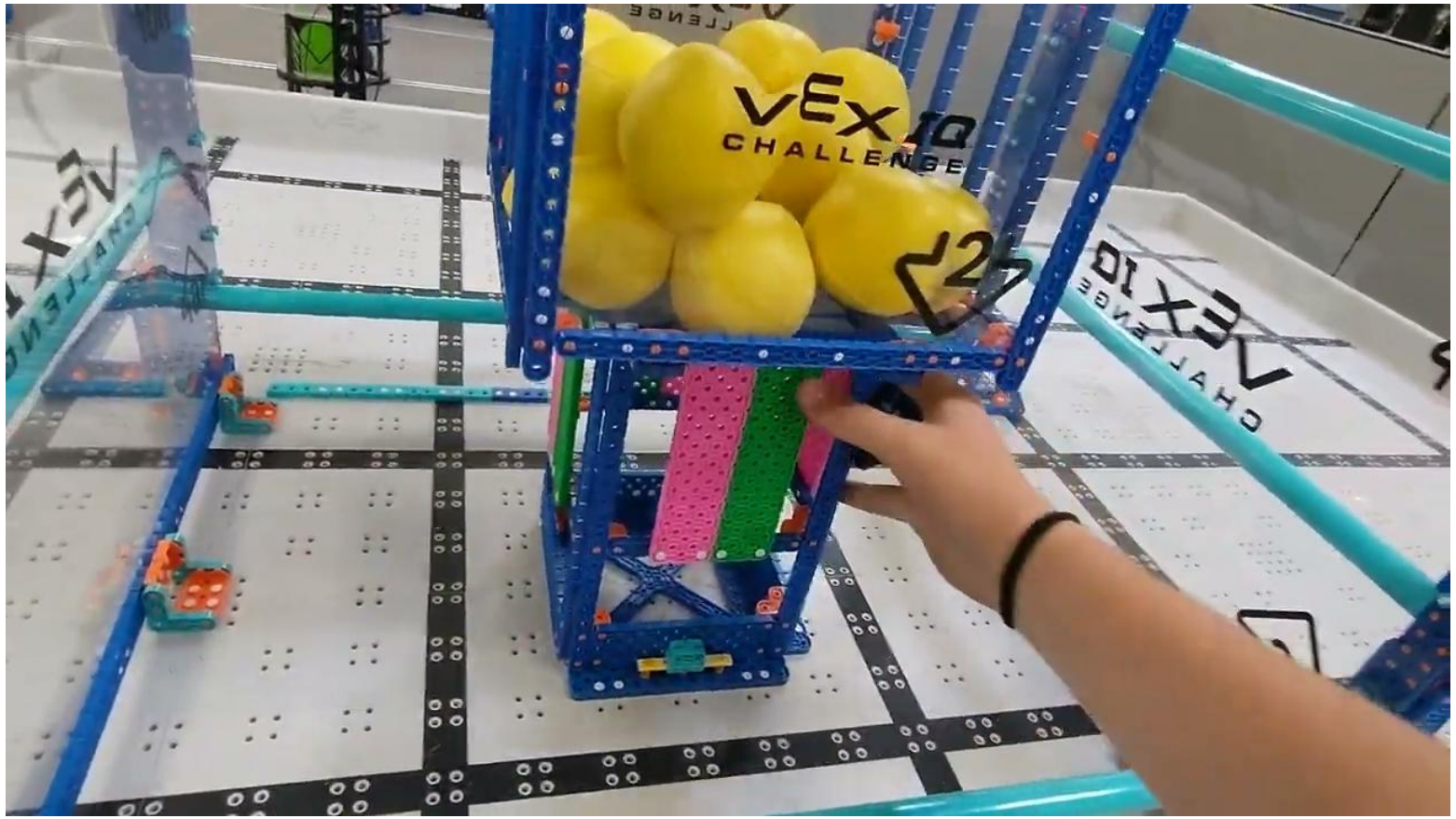


Field Tips / Notes

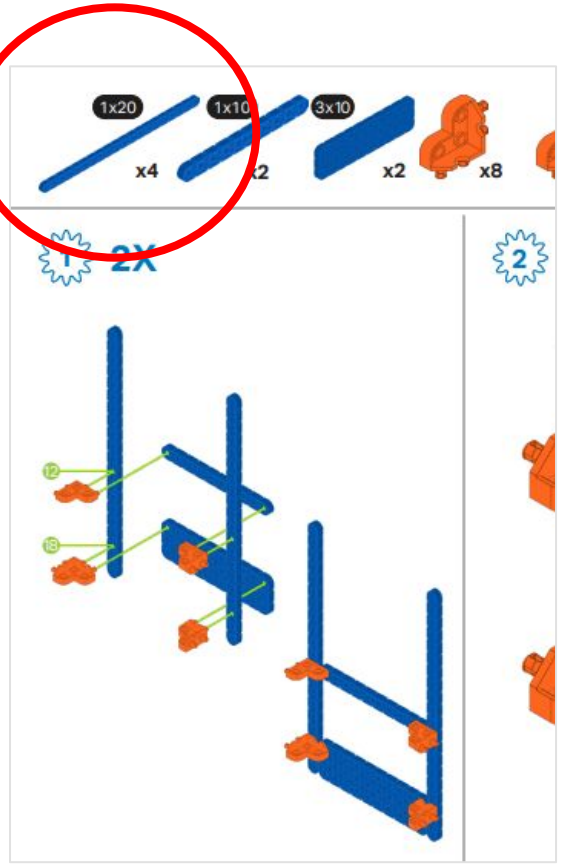
Field Setup - Ball Starting Locations

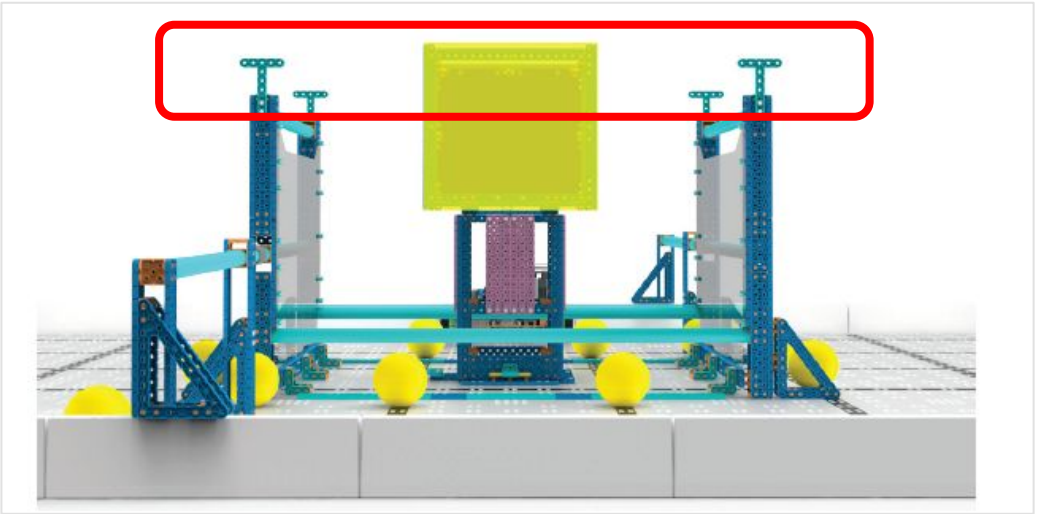


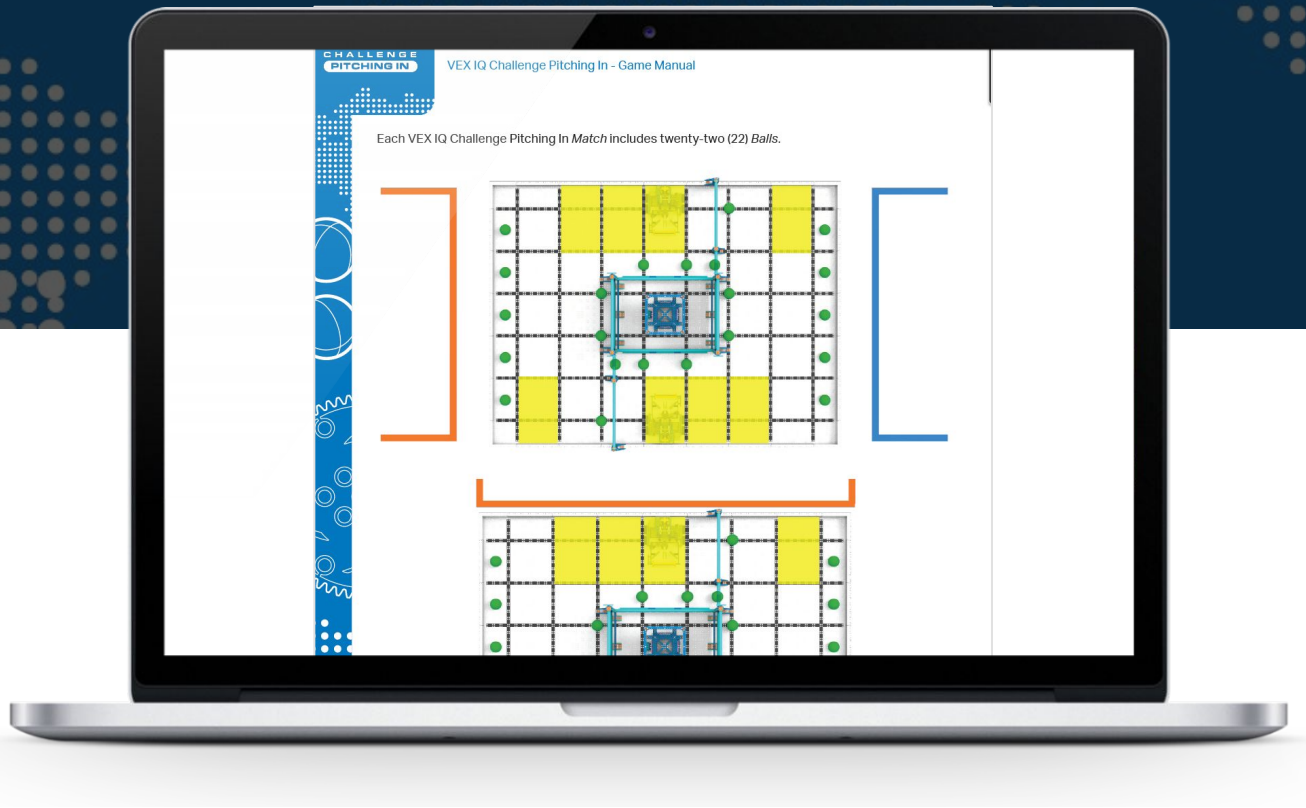
High Goal - Remove for Field Reset



Build Tips - High Goal Height

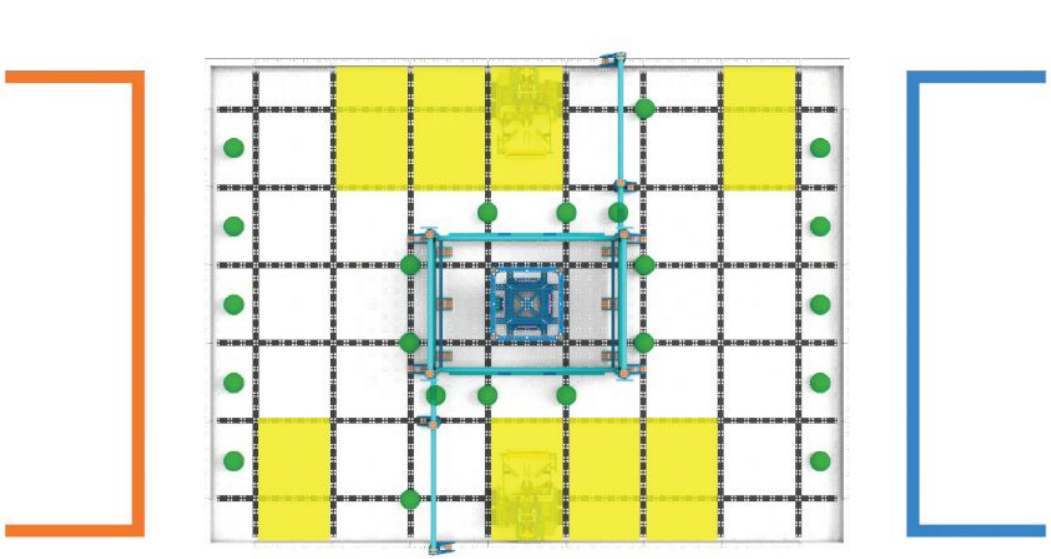


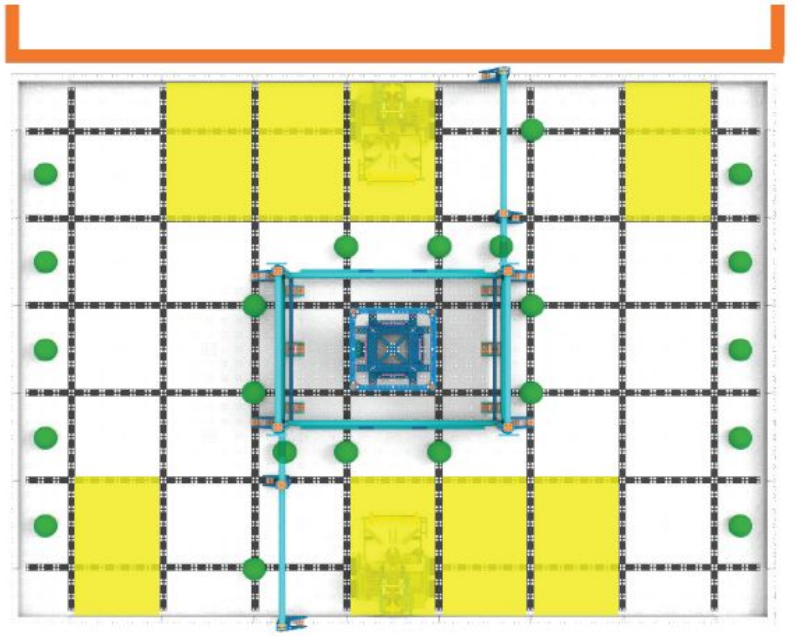




Noteworthy Rule Updates/Changes

<G9> - Driver Station & Starting Position Options





Note: Either *Driver Station* option, as shown in Figure 2, may be used.

<G19> - Game Manual Updates

May 29, 2021	**Version 0.1**	Initial game release
June 7, 2021	(N/A)	Official Q&A system opens
June 15, 2021	Version 0.2	Minor typographical errors or formatting issues found in the initial release. There will be very few rule changes, if any.
June 29, 2021	**Version 1.0**	May include critical gameplay or rule changes inspired by input from the official Q&A system and the VEX community.
July 27, 2021	Version 1.1	"Q&A clarification update" only
August 31, 2021	**Version 2.0**	May include gameplay or rule changes inspired by early-season events.
December 7, 2021	Version 2.1	"Q&A clarification update" only
February 1, 2022	Version 2.2	"Q&A clarification update" only
April 5, 2022	**Version 3.0**	May include gameplay or rule changes pertaining specifically to the VEX Robotics World championship

Note: Multi-week league events that "cross over" a major update, and encounter a rule change that impacts their event, should contact their REC Foundation Regional Support Manager. Cases will be reviewed individually depending on the context of the event and the rule that has changed. This is the only possible "grace period" exception.

<G5> & <R6> - Expansion Limits

<G5> Expansion is limited during a Match. During the *Match*, *Robots* may not expand beyond the following restrictions:

a. Horizontally, beyond an 11" x 19" (279.4mm x 482.6mm) area.
b. Vertically, beyond 19" (482.6mm) high. This is the same height as the top of the teal T-shaped VEX IQ parts in the center of the *Field*. See Figure 19.

This expansion limit does not require that the *Robot* stay in the same configuration as it was when it began the *Match*. It simply means that, at any given moment during the *Match*, it should be able to fit within an 11" x 19" x 19" (279.4mm x 482.6mm x 482.6mm) rectangular prism. *Robots* will be tested for compliance with this rule, alongside rule <R6>, during inspection.

<R6> The Match configuration will be inspected. The starting configuration of the *Robot* at the beginning of a *Match* must be the same as a *Robot* configuration inspected for compliance.

c. Once the *Match* begins, *Robots* must not be capable of violating the 19" height limit set forth by <G5>. *Teams* may be requested to demonstrate any extendable *Robot* mechanisms during inspection, to ensure compliance with this limit. Software limitations are acceptable, for the puposes of this rule.

<G5> & <R6> - Expansion Limits

The intent of testing compliance with this rule during inspection is to reduce the need for judgment calls during a *Match*. The 19" height restriction is not a "virtual ceiling"; for example, it is legal for a portion of the *Robot* to extend beyond the T-shaped VEX IQ markers while *Hanging*, so long as it never momentarily extends beyond 19" along the way. If a *Head Referee* is unsure of a *Robot's* compliance with this rule, they may request a field-side height check for the configuration that was seen momentarily during the *Match*.

Figure 19: Robots may not vertically expand beyond 19".

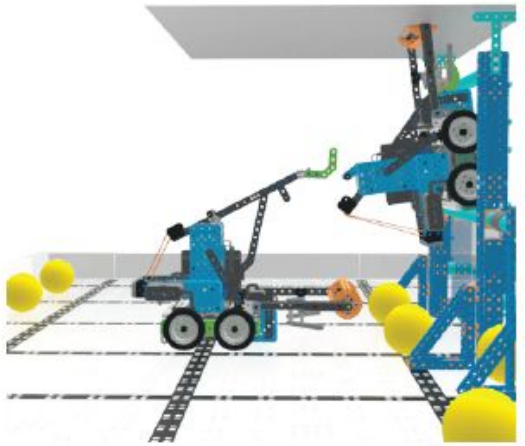


Figure 20: The same Robot from Figure 19 in a Hanging position.

<RSC1> & <RSC2> - Robot Skills Challenge

<RSC1> Standard rules apply in most cases. All rules and scoring from previous sections apply to *Skills Matches*, unless otherwise specified.

<RSC2> Skills Field Layout. For each *Skills Match*, the *Field* will be set up exactly the same as a standard VIQC Pitching In *Match*.

<LRT3> - Live Remote Tournament setup

<LRT3> In a *Live Remote Match*, each field is set up with twenty-two (22) *Balls*, as shown below in figure 22.

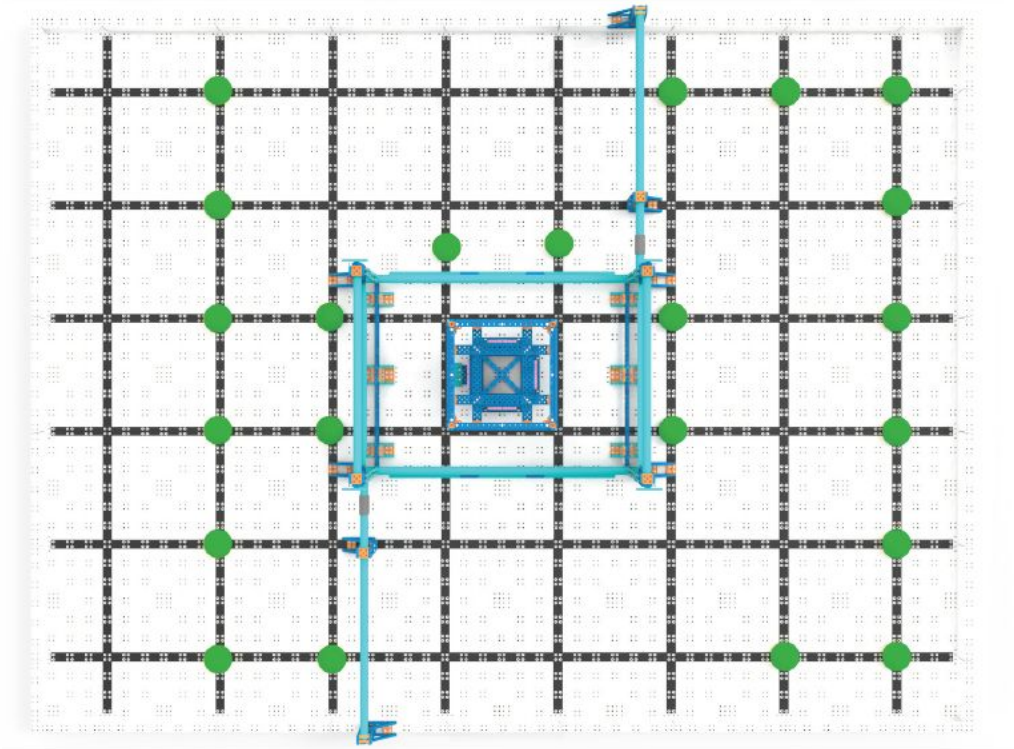


Figure 22: A Field in its starting configuration for a ***Live Remote Match****.Ball positions have been highlighted.*

<LRT4> - Live Remote Tournament setup

<LRT4> At the beginning of a *Live Remote Match*, the setup criteria listed in rule <G4> still applies. However, only one *Robot* from the *Alliance* may start in each pair of the *Starting Position* options depicted in Figure 22; one *Robot* must start on the "audience side", and one *Robot* must start on the "*Driver Station* side". See Figure 23.

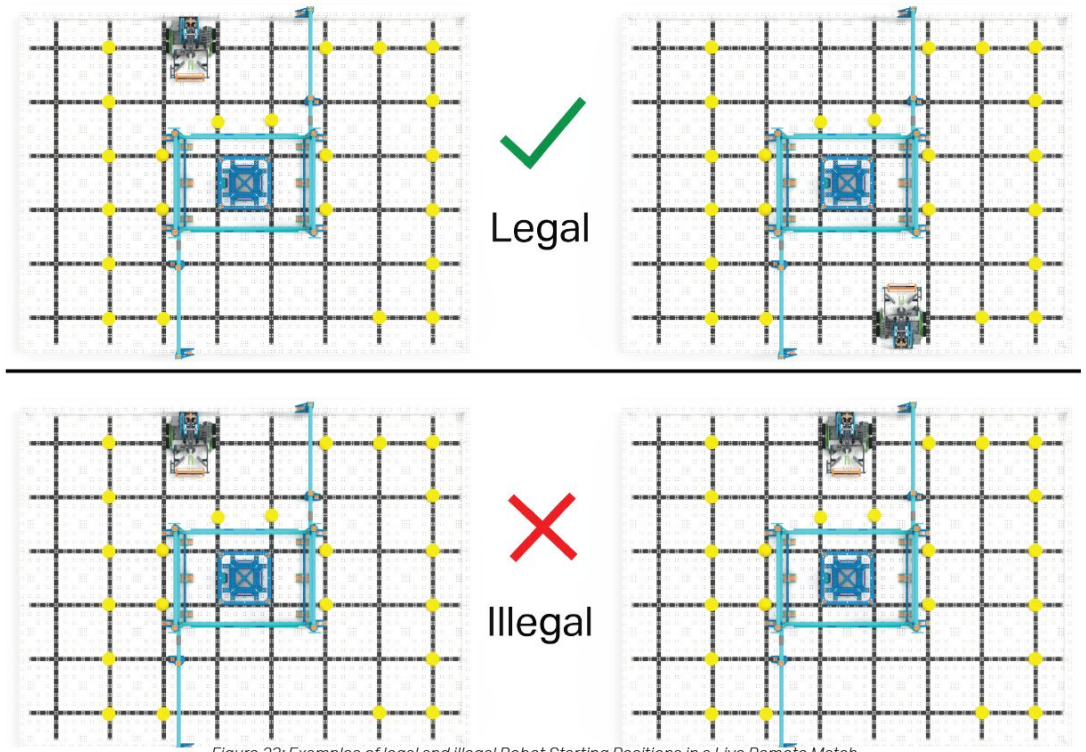


Figure 23: Examples of legal and illegal Robot Starting Positions in a Live Remote Match.

THANK YOU

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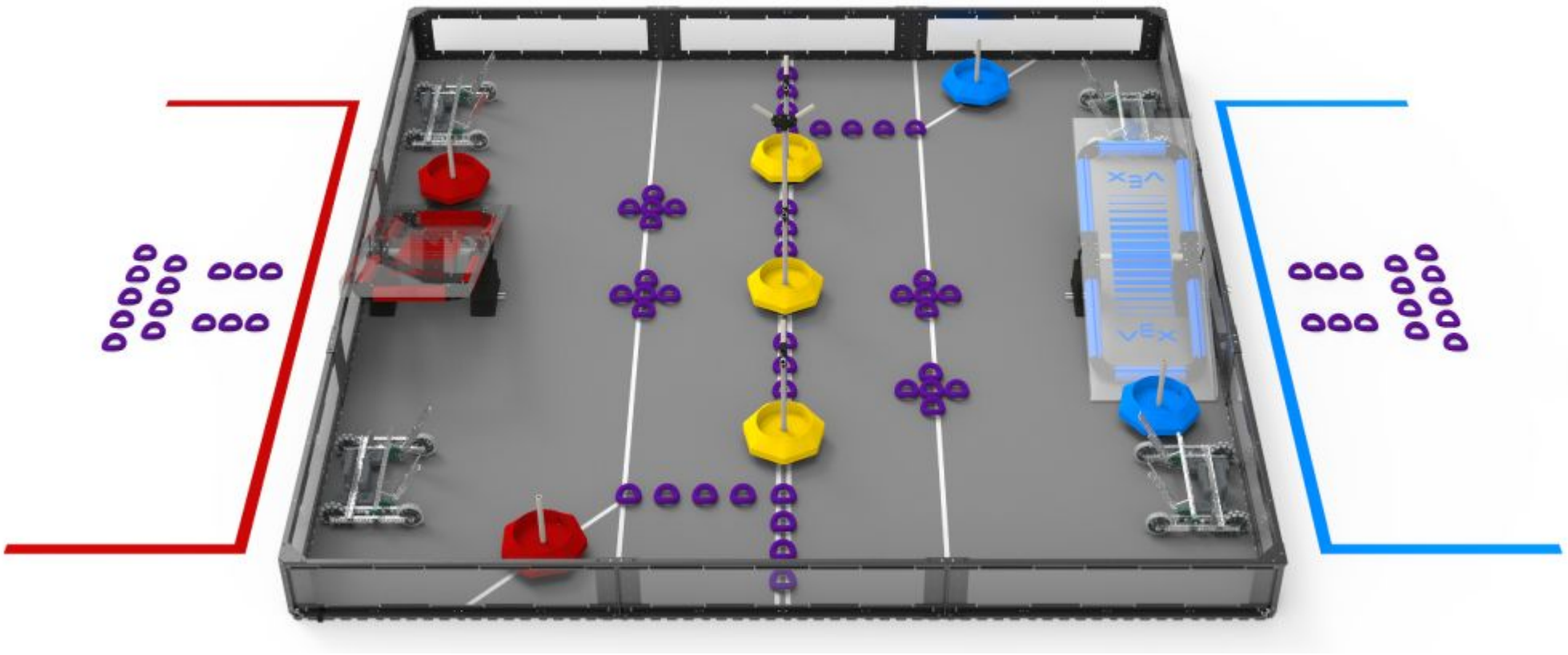
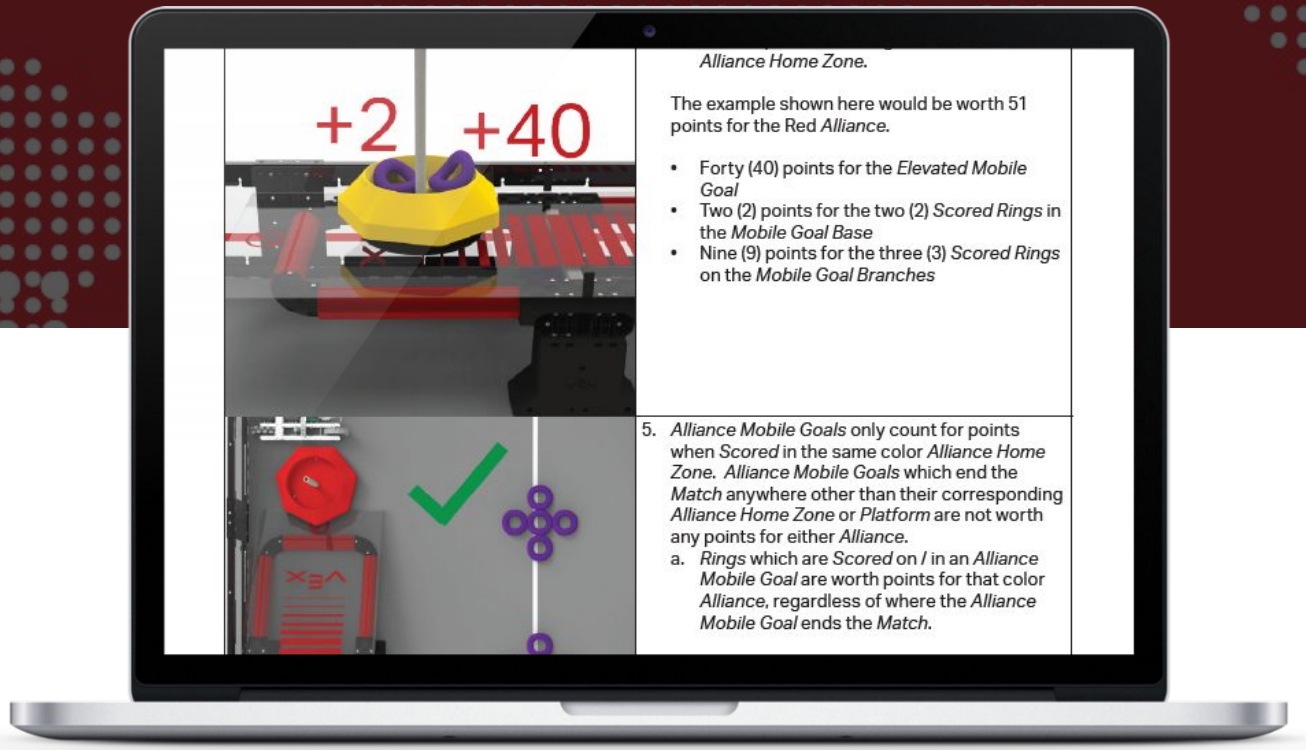
VRC Tipping Point - Game Overview

Grant Cox
Chairman of the VEX Game Design Committee

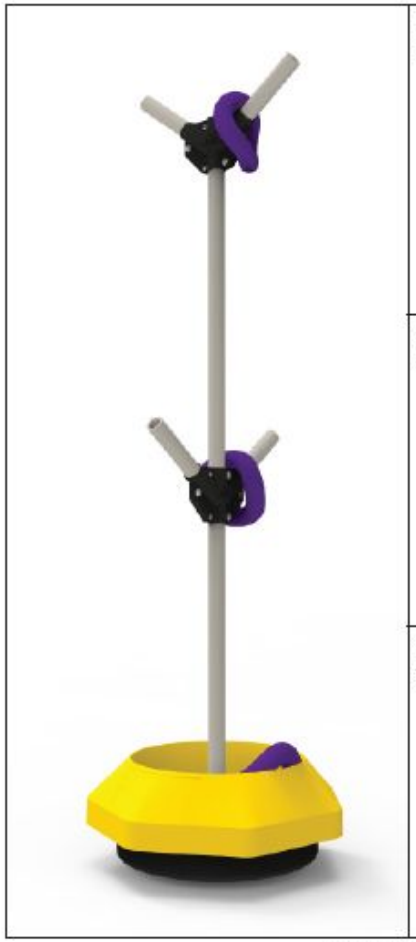
2021-22: VRC Tipping Point





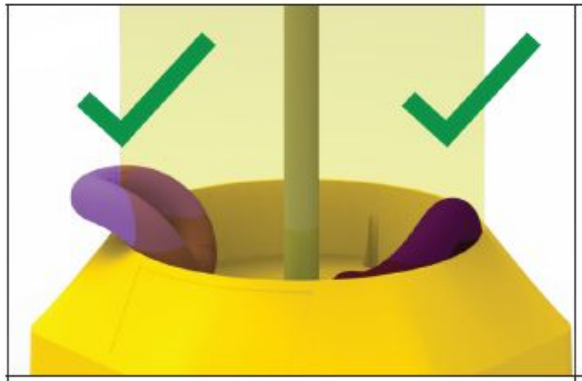
Scoring / Definitions

Scoring - Rings



	Each *Ring* which is *Scored* on a *Neutral Mobile Goal* High Branch is worth ten (10) points.
	Each *Ring* which is *Scored* on any other *Mobile Goal Branch* is worth three (3) points.
	Each *Ring* which is *Scored* in a *Mobile Goal Base* is worth one (1) point.

Table 1: *Point values for Scored Rings.*

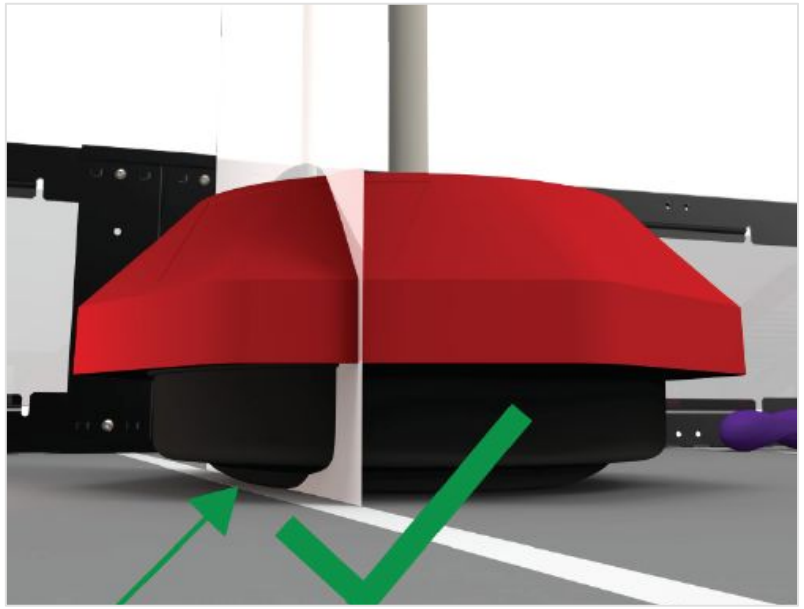


1. A *Ring* is considered *Scored* in a *Mobile Goal Base* if it is not contacting a *Robot* and is at least partially within the 3-dimensional vertical projection formed by the "bowl" of the *Mobile Goal Base*.

2. A *Ring* is considered *Scored* on a *Mobile Goal Branch* if it is not contacting a *Robot*, and any part of the Branch is within the volume defined by the outer edges of the *Ring* (i.e. part of the *Ring* is encircling or surrounding the Branch). A *Ring* supported by the *Mobile Goal Branch*, but not encircling it would still be considered *Scored* in the *Mobile Goal Base*, as it is within the 3D vertical projection.

a. *Rings* which are *Scored* on / in an *Alliance Mobile Goal* are worth points for that color *Alliance*, regardless of where the *Alliance Mobile Goal* ends the *Match*.

Scoring - Mobile Goals in Zones

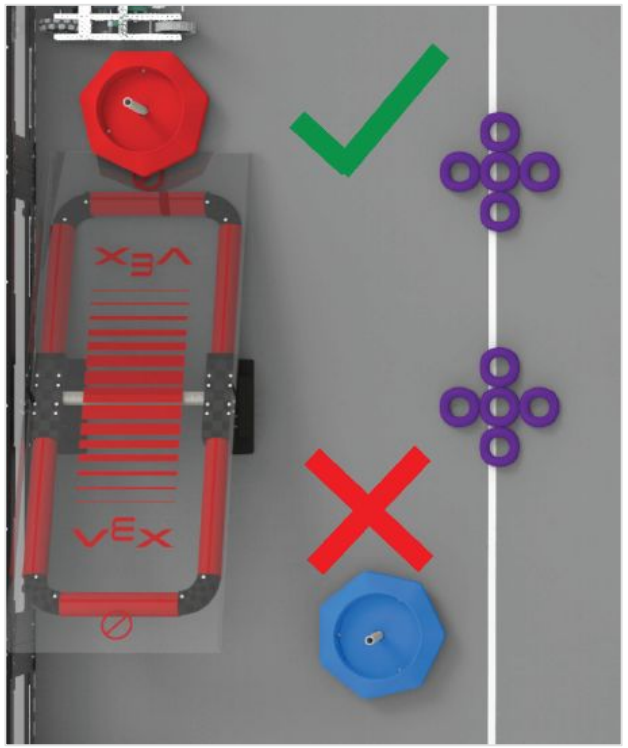


A *Mobile Goal* is considered *Scored* in an *Alliance Home Zone* if, at the end of the *Match*, any part of the *Mobile Goal Base* is contacting the *Alliance Home Zone*.

Each *Mobile Goal* that is *Scored* in an *Alliance Home Zone* is worth twenty (20) points for that *Alliance*.

That *Alliance* also receives the points for any *Rings* which are *Scored* on or in that *Mobile Goal*.

Alliance Mobile Goals only count for points when *Scored* in the same color *Alliance Home Zone*. *Alliance Mobile Goals* which end the *Match* anywhere other than their corresponding *Alliance Home Zone* or *Platform* are not worth any points for either *Alliance*.



*Note - July 27th update to definition of "Alliance Home Zone"

Scoring - Platforms

Balanced - A *Platform* state. A *Platform* is considered *Balanced* if all of the following criteria are met at the end of a *Match*:

1. The *Platform* is roughly parallel to the field.
2. Both flat surfaces of the *Platform* hinges are contacting the *Platform* base, as shown in Figure 7.
3. *Robots* and / or *Scoring Objects* contacting the *Platform* in their *Alliance Home Zone* are not also contacting any other *Field Elements*, such as foam field tiles or the field perimeter.
   a. For the purposes of this definition, contact is considered "transitive" through other *Robots* and *Scoring Objects*. For example, as shown in Figure 9, contact with a *Mobile Goal* that is resting on top of the field perimeter would not satisfy the definition of *Balanced*.

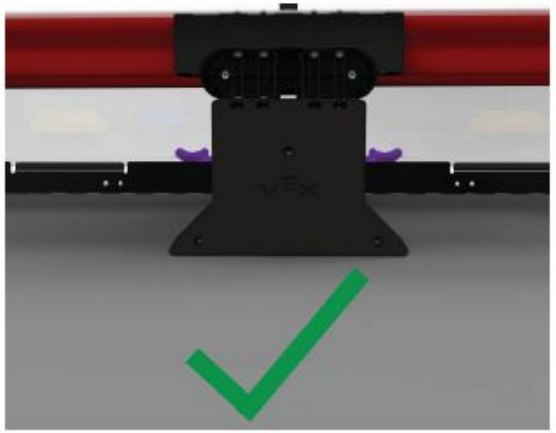
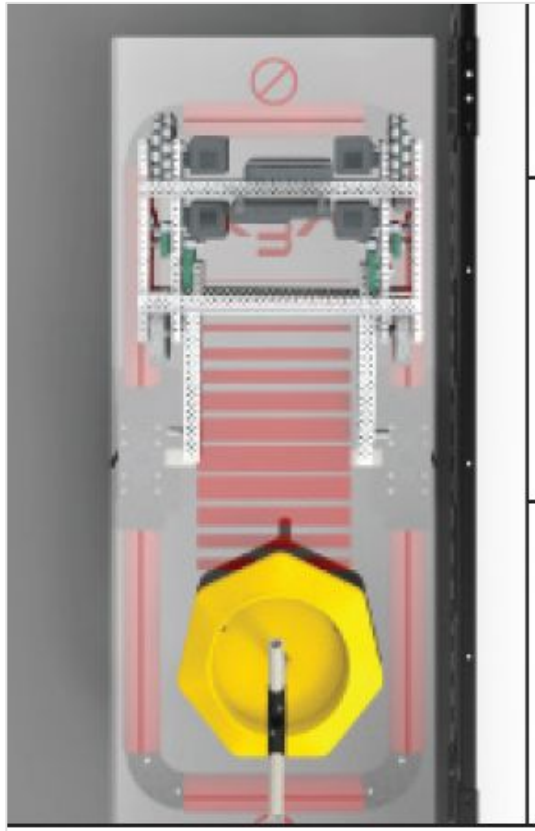


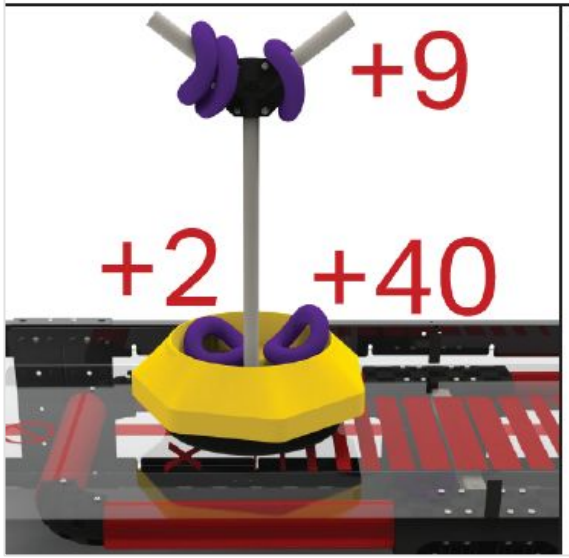
Figure 7: A Balanced Platform.

Scoring - Platforms



Each *Robot* which is *Elevated* on an *Alliance's Balanced Platform* is worth thirty (30) points for that *Alliance*.

Each *Mobile Goal* which is *Elevated* on an *Alliance's Balanced Platform* is worth forty (40) points for that *Alliance*.



4. *Rings* which are *Scored* on or in an *Elevated Mobile Goal* count for points for the *Alliance* who is *Elevating* the *Mobile Goal*.
   a. An *Elevated Mobile Goal* does not also receive points for being *Scored* in an *Alliance Home Zone*.

The example shown here would be worth 51 points for the Red *Alliance*.

- Forty (40) points for the *Elevated Mobile Goal*
- Two (2) points for the two (2) *Scored Rings* in the *Mobile Goal Base*
- Nine (9) points for the three (3) *Scored Rings* on the *Mobile Goal Branches*

Scoring - Autonomous Win Point

An *Autonomous Win Point* is awarded to any *Alliance* that has *Cleared* their *AWP Line*, and *Scored* at least one *Ring* on each *Alliance Mobile Goal*, at the end of the *Autonomous Period*.
The winner of the *Autonomous Bonus* receives a twenty (20) point bonus. In the case of a tie, both *Alliances* receive a ten (10) point bonus.

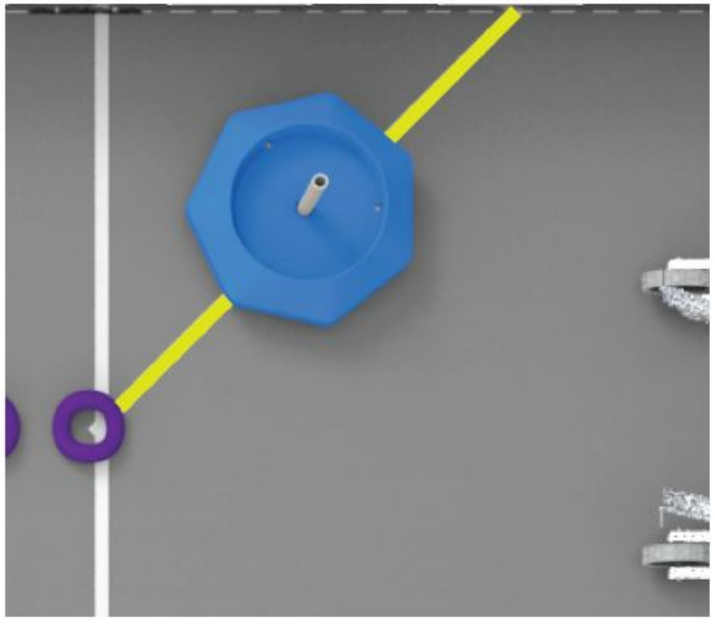
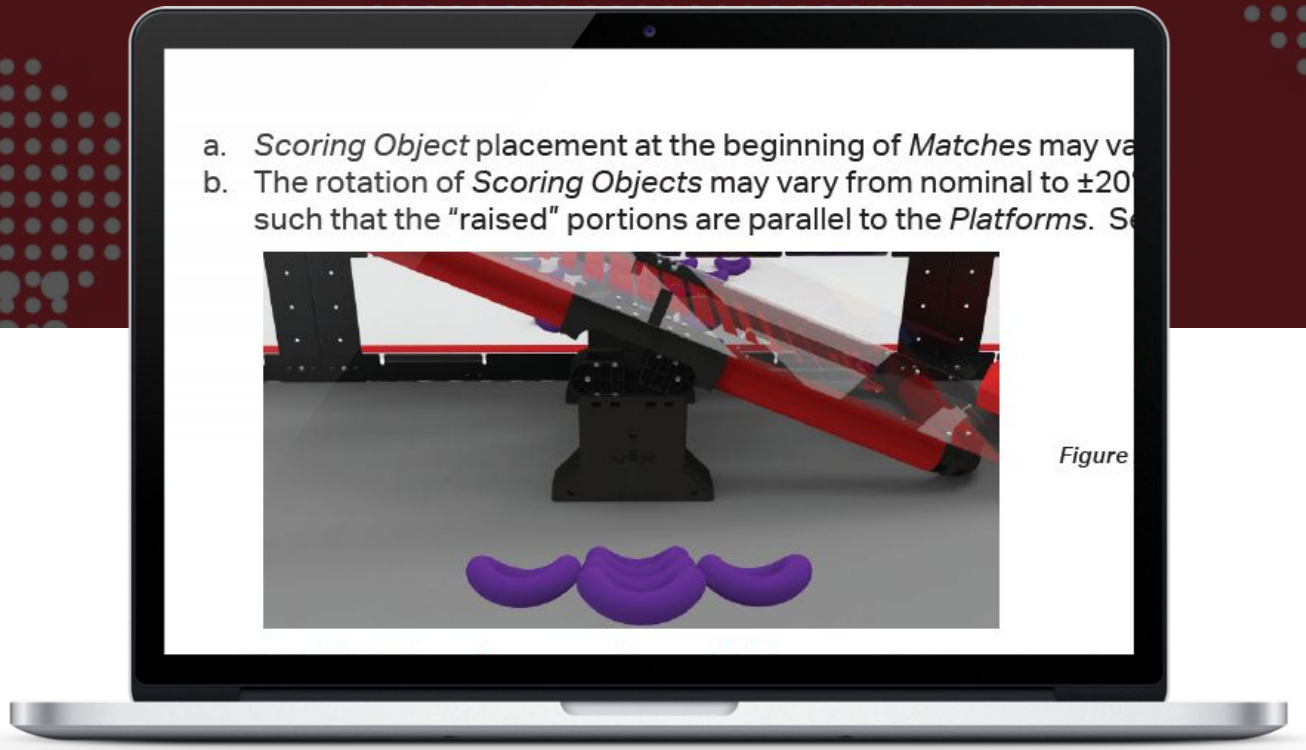


Figure 5: *Top view of the field with an AWP Line highlighted.*



Field Tips / Notes

Field Setup - Alliance Stations

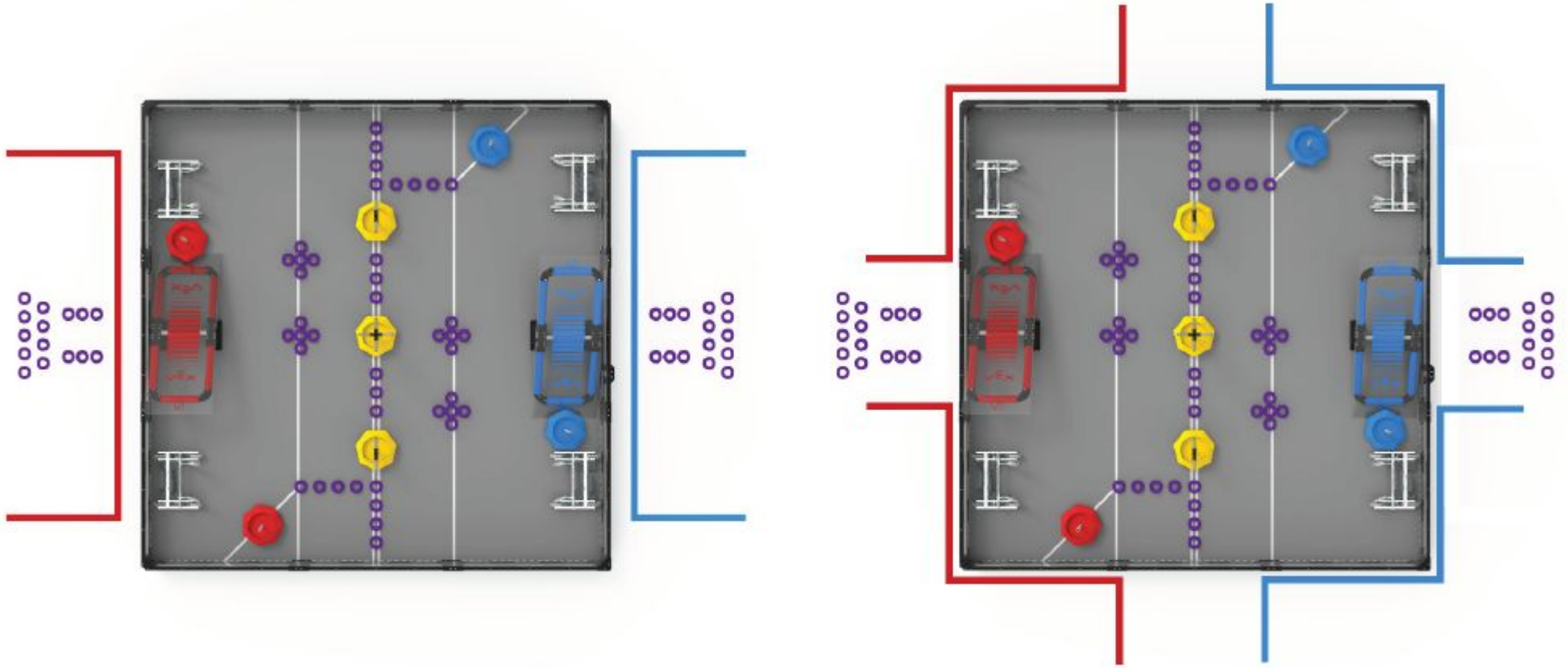
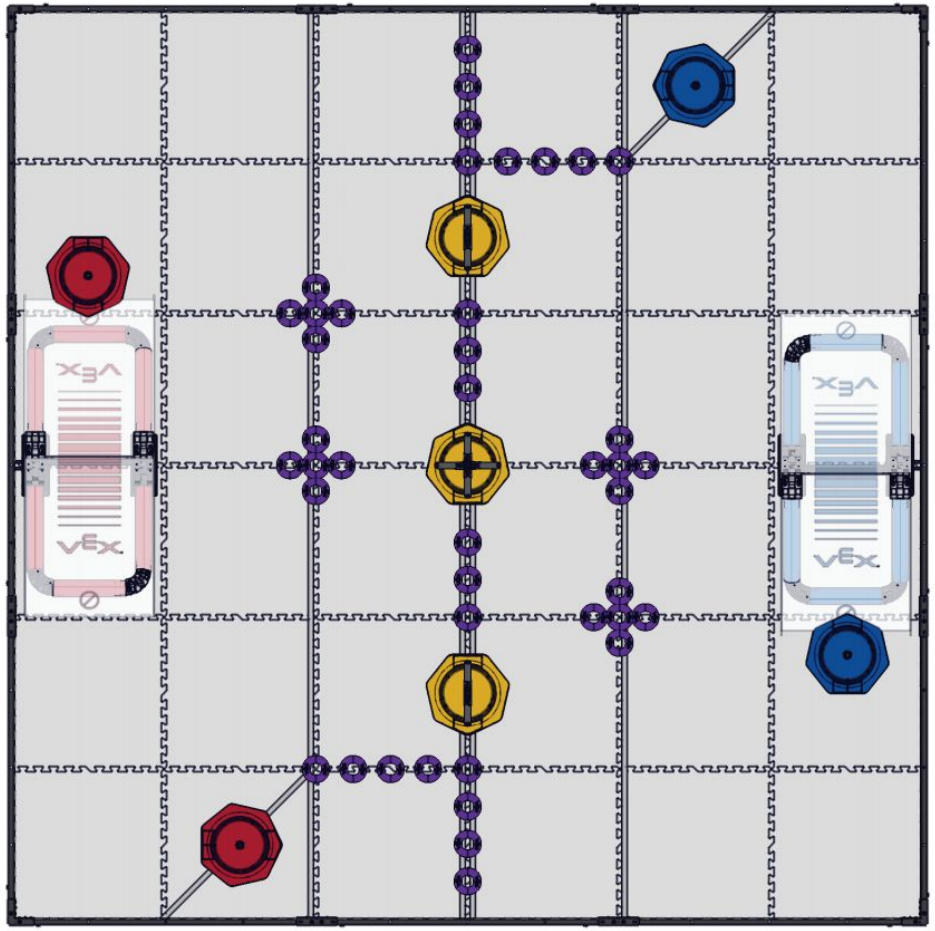


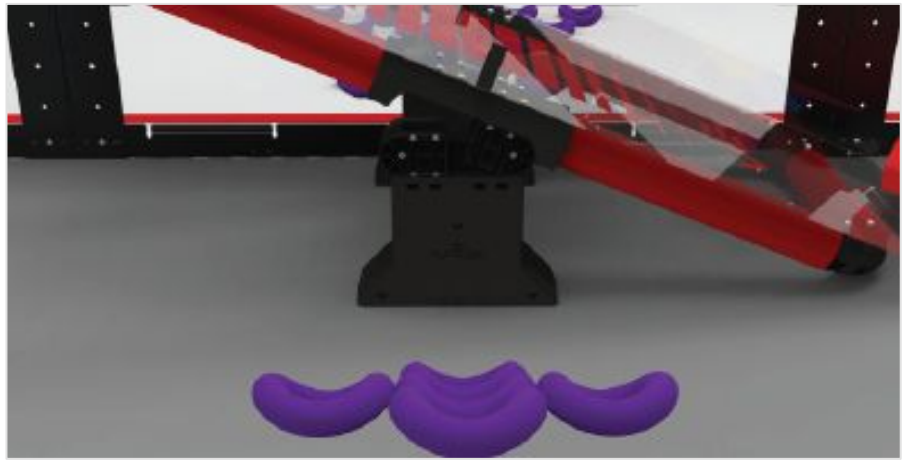
Figure 4: *The two permissible Alliance Station configurations for VRC Tipping Point.*

Field Setup - Scoring Object Orientation

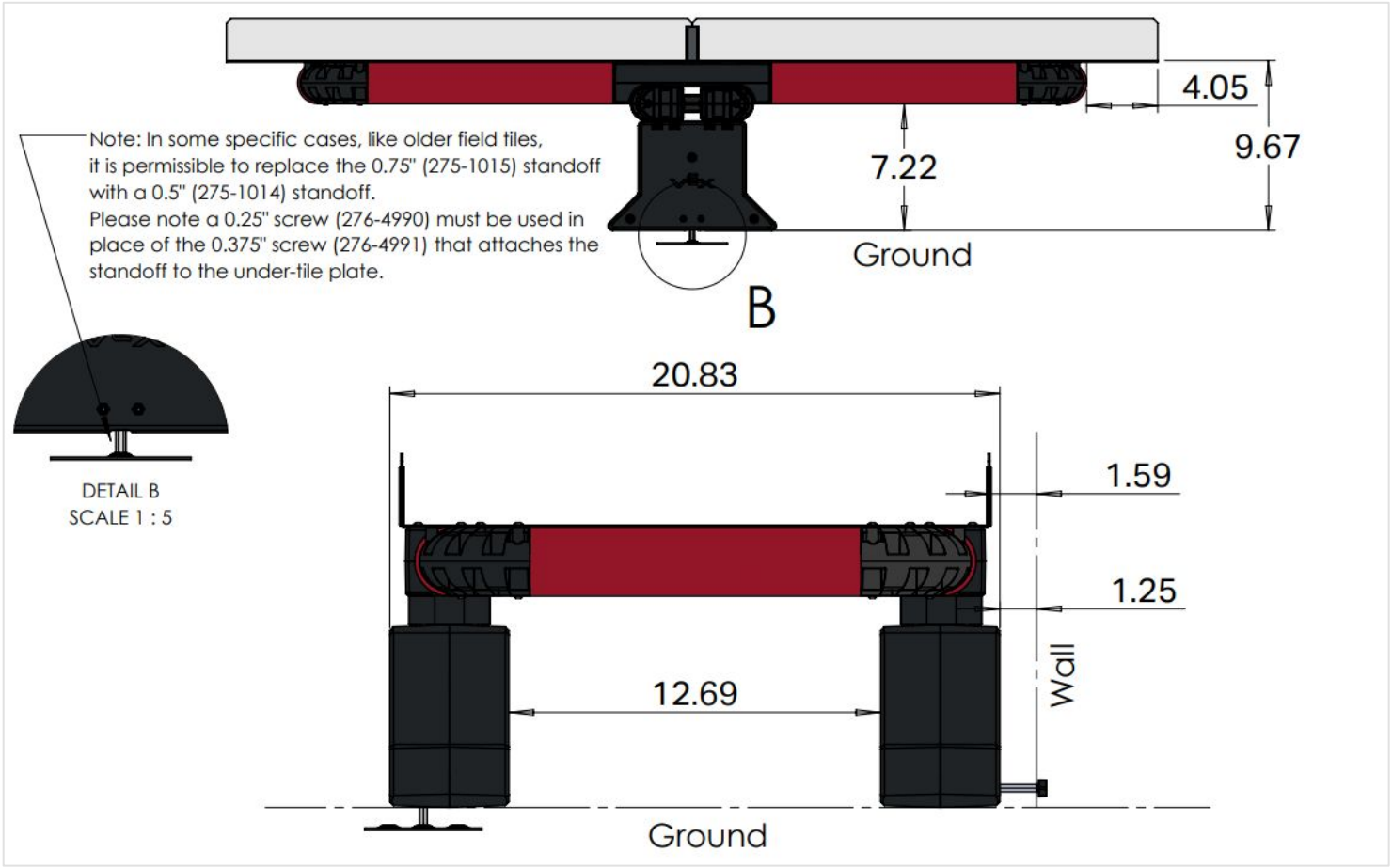


<G19> **Be prepared for minor field variance.** *Field Element* tolerances may vary from nominal by ±1.0", unless otherwise specified. *Ring* weights may vary from nominal to ±5 grams. *Mobile Goal* weights may vary from nominal to ±65 grams respectively. *Teams* are encouraged to design their *Robots* accordingly. Please make sure to check Appendix A for more specific nominal dimensions and tolerances.

a. *Scoring Object* placement at the beginning of *Matches* may vary from nominal to ±1.5".
b. The rotation of *Scoring Objects* may vary from nominal to ±20°. *Rings* should always be oriented such that the "raised" portions are parallel to the *Platforms*. See Figure 22.



Field Setup - Platform Stability



Programming Skills - Code Strip & VEX GPS

In *Programming Skills Matches*, the VEX GPS code strip must be installed on the field. This field modification will be recommended for all events beginning August 1, and required for all events beginning October 1.

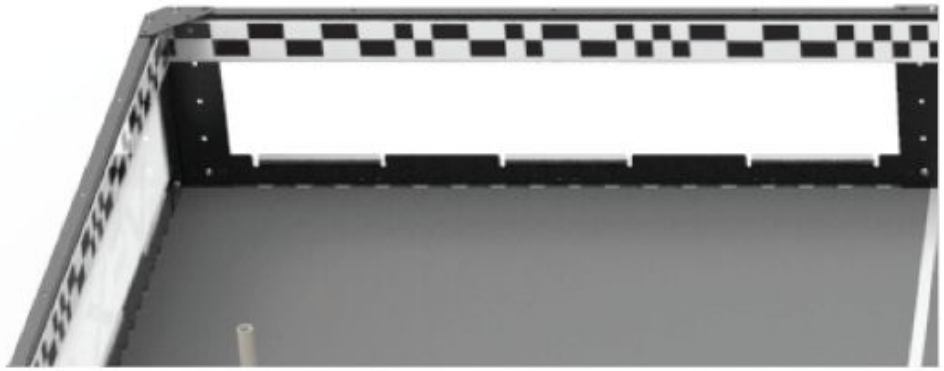
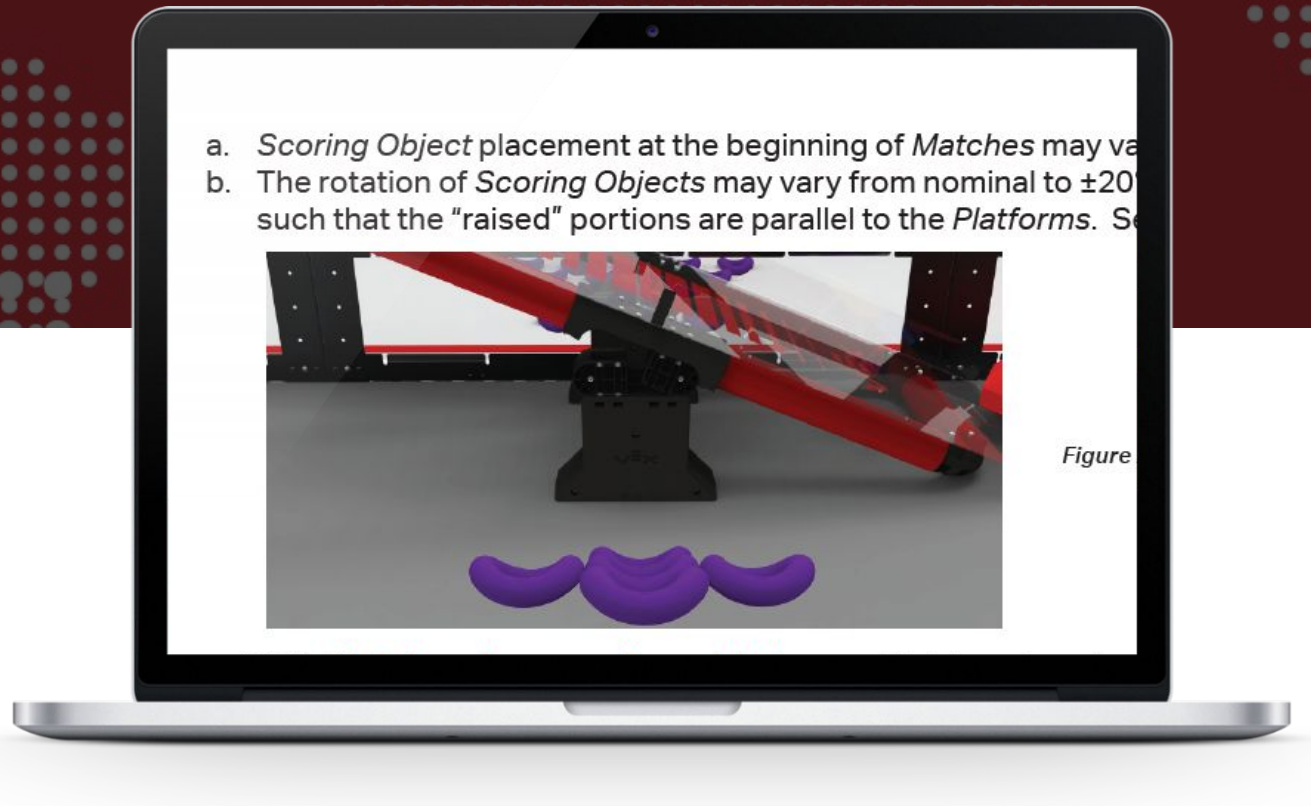


Figure 2: GPS Field Code strips must be installed on the field for Programming Skills Matches.



Notable Gameplay & Robot Rules

<SG2> - Expansion Limits

<SG2> Robot expansion is limited once the Match begins. Per <G3>, at the beginning of a *Match*, each *Robot* must be smaller than a volume of 18" (457.2 mm) long by 18" (457.2 mm) wide by 18" (457.2 mm) tall. Once the *Match* begins, *Robots* may expand, but no horizontal dimension can exceed 36" (914.4 mm) at any point during the *Match*. See Figure 24.

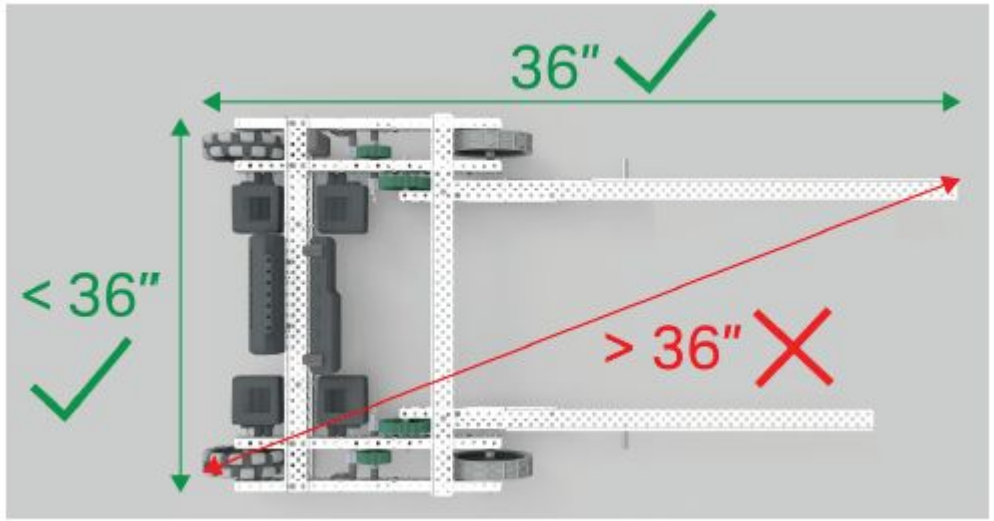


Figure 24: Examples of Legal and Illegal "point-to-point" expansions.

<SG3> - Platforms are “safe” during endgame

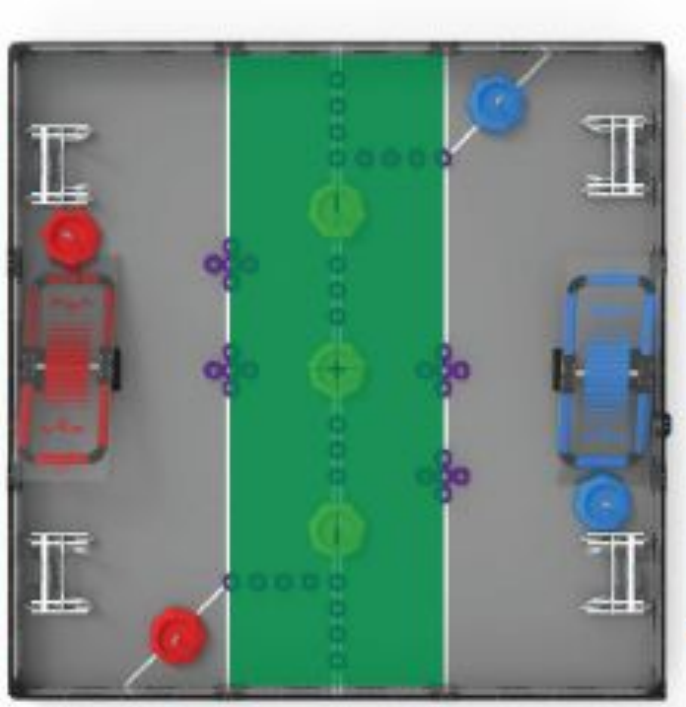
<SG3> Platforms are “safe” during the endgame. During the last thirty (30) seconds, *Robots* may not contact the opposing *Alliance’s Platform*.

a. For the purposes of this rule, contact is considered “transitive” through other *Robots* and *Scoring Objects*. For example, contacting an opposing *Robot* who is contacting their own *Platform* would be considered a violation of this rule.
b. For the purposes of this rule, <G13> supersedes rule <G14>. Any *Robot* which is contacting its own *Platform* during the last thirty (30) seconds, provided that no other rules are being violated, will automatically receive the “benefit of the doubt”. Therefore, any contact with this *Robot* will be considered a violation, regardless of intent.
c. Per <SG10>, using a *Scoring Object* to cause interference with the opposing *Alliance’s Platform* during the last thirty (30) seconds would be considered a violation of this rule.

A *Robot* which interferes with gameplay as a result of violating this rule, such as preventing a *Platform* from becoming *Balanced*, will result in a *Disqualification*, whether the interference was *Match Affecting* or not.

*Note - “Interference” Q&A’s & July 27th update

<SG5> - Neutral Zone Interactions



<SG5> **Enter the Neutral Zone during Autonomous at your own risk.** Any *Robot* who engages with the *Neutral Zone* during the *Autonomous Period* should be aware that opponent *Robots* may also choose to do the same. Per <G11> and <G12>, *Teams* are responsible for the actions of their *Robots* at all times.

a. For the purposes of this rule, "engages with" means any combination of:
   i. Contacting foam tiles within the *Neutral Zone*
   ii. Contacting *Neutral Mobile Goals*
   iii. Contacting *Rings* that begin the *Match* on the double white tape line in the center of the *Neutral Zone*
b. If opposing *Robots* contact one another while both engaging with the *Neutral Zone*, and a possible <G12> violation results (i.e. damage, *Entanglement*, or tipping over), then a judgment call will be made by the *Head Referee* within the context of <G12> just as it would if the interaction had occurred during the *Driver Controlled Period*.
c. If opposing *Robots* contact one another while both engaging with the *Neutral Zone*, and an incidental violation of <SG4> occurs, no penalty will be assessed on either *Alliance*.

The overarching intent of <SG5> is for the vast majority of these interactions to result in **no rule violations and / or penalties** for either *Alliance*, just as no rules violations occur in 99% of Driver Controlled interactions.

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With that being said, this is a *Neutral Zone*, not a "free-for-all" zone. The intent of point "e" is to provide *Head Referees* with the leeway to still make a judgment call, if needed, when a *Team* has chosen to exploit this rule beyond its intent. Reckless or unsafe strategies aimed solely at the destruction, damage, tipping over, *Entanglement*, *Trapping*, or forcing of an opponent into a penalty are still prohibit-

damage, tipping over, *Entanglement*, *Trapping*, or forcing of an opponent into a penalty are still prohibited in the VEX Robotics Competition.

<SG8> - Match Load Rings

<SG8> Each Alliance may introduce their Match Load Rings at any point during the Match. This action must follow the following criteria:

a. *Match Load Rings* must be gently placed onto one of the gray foam tiles directly in front of the *Alliance Station*, i.e. the tiles coincident with the field perimeter wall. See Figure 24.
b. *Match Load Rings* may not be placed into a *Scored* position on a *Mobile Goal*.
c. *Match Load Rings* may not be placed such that they are contacting a *Robot* (from either *Alliance*) while still in contact with a *Drive Team Member*.
d. *Match* wise ir other
e. *Match* *Period*, i.e. they may not be introduced during the pause between the two periods, or prior to the *Match*.
f. It is expected that *Drive Team Members* may momentarily break the plane of the field perimeter while legally introducing *Match Load Rings*. This action should be kept as brief as possible, and *Teams* from both *Alliances* should be very mindful of <S1> when *Match Load Rings* are being entered into the field.
    i. Any human contact with *Robots* from either *Alliance* during this interaction may be considered a violation of <G9> and / or <S1> at the *Head Referee's* discretion.

Note: There is no requirement for *Alliances* to introduce their *Match Load Rings*, if they do not wish to do so.

Minor violations of this rule that do not affect the *Match* will result in a warning. *Match Affecting* offenses, or violations of <S1>, will result in a *Disqualification* as applicable. *Teams* that receive multiple warnings may also receive a *Disqualification* at the *Head Referee's* discretion.

The intent of this rule is to keep *Drive Team Member* hands away from any *Robots* during this interaction. There is no explicit requirement for an amount of time before a *Robot* may contact the *Ring*, or minimum distance away from other *Robots*; *Teams* are advised to bear <G3> in mind when introducing

<G12> & <G13> - Intended to be a (Heavily) Interactive Game

Note: Incidental damage that occurs due to interaction with a *Robot* in *Possession* of a *Neutral Mobile Goal* will, in most cases, not be considered a violation of <G12>. Intentional damage, tipping, or dangerous mechanisms may still be considered a violation of <R3>, <S1>, or <G1> at the *Head Referee's* discretion.

VRC Tipping Point is intended to be an offensive, interactive game. *Robots* interacting with *Neutral Mobile Goals* should expect vigorous interactions from opponent *Robots*, especially if attempting to interact with multiple *Mobile Goals* at once.

The following "rules of thumb" apply when determining offensive / defensive roles in the context of rule <G13>:

- A *Robot* in *Possession* of its own *Alliance Mobile Goal* is generally playing an offensive role.
- A *Robot* in *Possession* of an opponent's *Alliance Mobile Goal* is generally playing a defensive role.
- A *Robot* in *Possession* of a *Neutral Mobile Goal* is generally neither playing a defensive or offensive role. In the case of a destructive interaction between two *Robots* competing for the same *Neutral Mobile Goal*, the Note from <G12> will apply.

<G21> - Game Manual Updates

May 29, 2021	**Version 0.1**	Initial game release
June 7, 2021	(N/A)	Official Q&A system opens
June 15, 2021	Version 0.2	Minor typographical errors or formatting issues found in the initial release. There will be very few rule changes, if any.
June 29, 2021	**Version 1.0**	May include critical gameplay or rule changes inspired by input from the official Q&A system and the VEX community.
July 27, 2021	Version 1.1	"Q&A clarification update" only
August 31, 2021	**Version 2.0**	May include gameplay or rule changes inspired by early-season events.
December 7, 2021	Version 2.1	"Q&A clarification update" only
February 1, 2022	Version 2.2	"Q&A clarification update" only
April 5, 2022	**Version 3.0**	May include gameplay or rule changes pertaining specifically to the VEX Robotics World championship

Note: Multi-week league events that "cross over" a major update, and encounter a rule change that impacts their event, should contact their REC Foundation Regional Support Manager. Cases will be reviewed individually depending on the context of the event and the rule that has changed. This is the only possible "grace period" exception.