

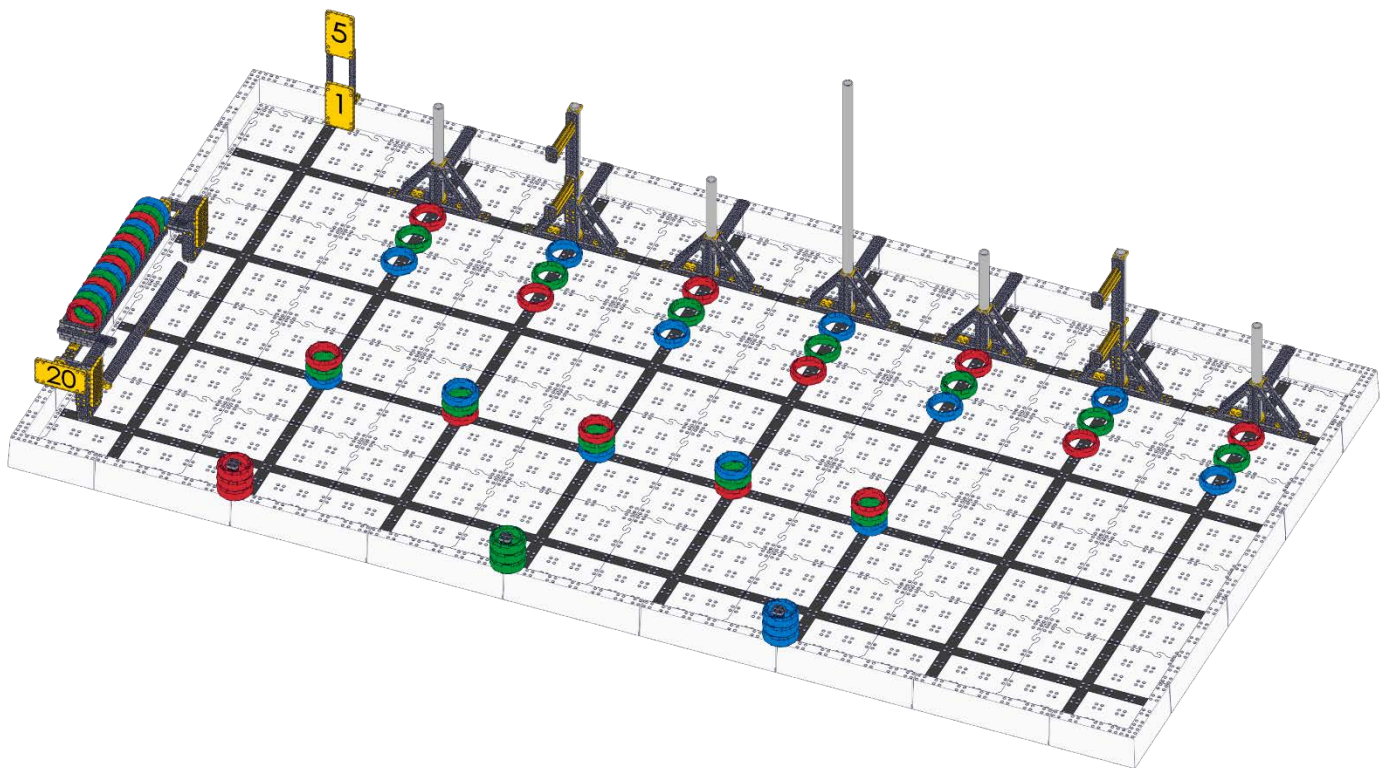


VEX IQ

CHALLENGE

RINGMASTER

Game Manual





VEX IQ Challenge Ringmaster – Game Manual

TABLE OF CONTENTS

THE GAME	3
ROBOT INSPECTION	11
THE EVENT	16
TEAMWORK CHALLENGE	16
ROBOT SKILLS CHALLENGE	18

VEX IQ Challenge Ringmaster – Game Manual

The Game

Game Description

Matches are played on a field set up as illustrated in the figures throughout. The **Robot Skills Challenge** and the **Teamwork Challenge** use the exact same field and set up.

In the Teamwork Challenge, an *Alliance* of two (2) *Robots*, operating under driver control, work together in each *Match*.

In the Robot Skills Challenge, one (1) *Robot* attempts to score as many points as possible. These matches consist of *Driving Skills Matches*, which will be entirely driver controlled, and *Programming Skills Matches*, which will be autonomous with limited human interaction.

The object of the game is to attain the highest score by *Scoring Rings* on the *Floor Goal* and on *Posts*, by having *Uniform Posts*, by *Emptying Starting Pegs*, and by *Releasing the Bonus Tray*.

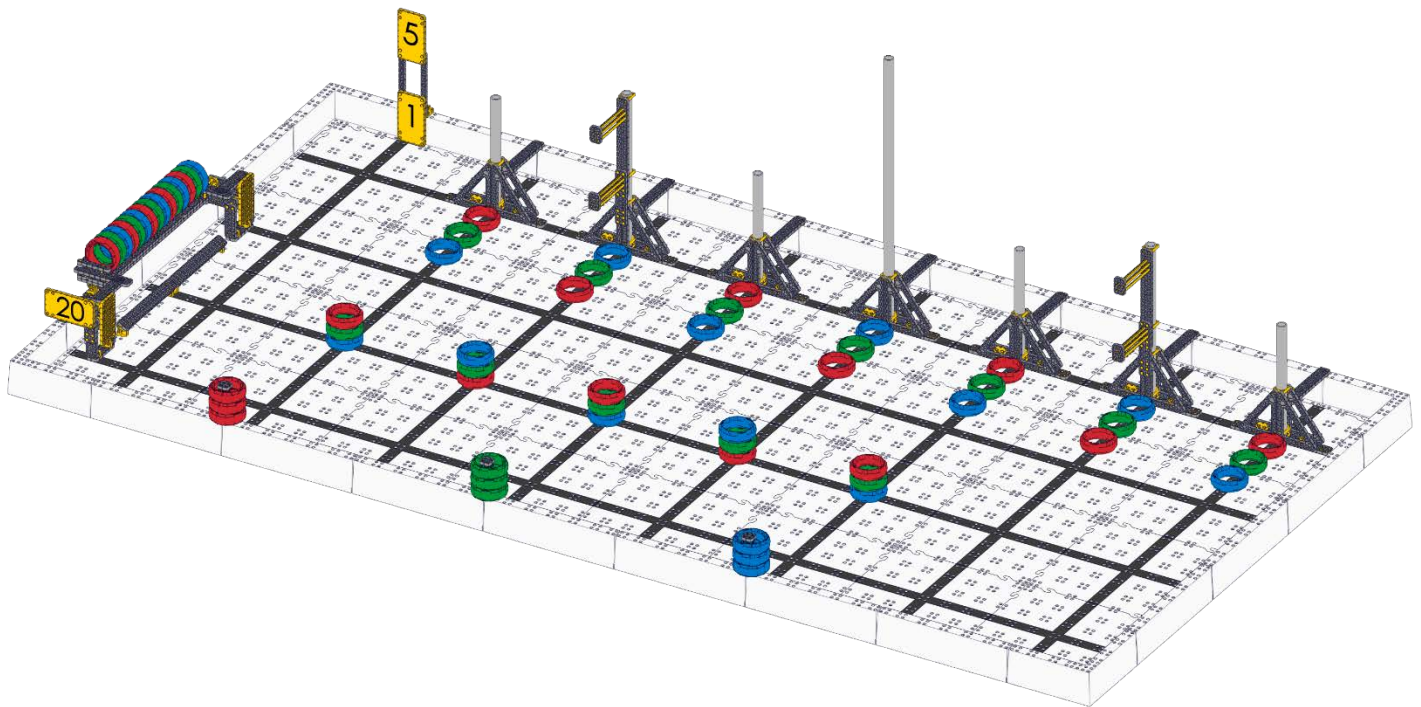


Figure 1 – Starting Configuration of the Field

VEX IQ Challenge Ringmaster – Game Manual

Each VEX IQ Challenge Ringmaster *Match* includes the following:

- Sixty (60) *Rings*.
 - Twenty (20) *Rings* of each color; red, blue, and green.
 - Fifteen (15) *Rings* start in the *Bonus Tray*.
 - Nine (9) *Rings* start on the *Starting Pegs*.
 - Thirty-six (36) *Rings* start at designated locations on the field.
- One (1) *Floor Goal*
- Four (4) *Low Posts*
- Two (2) *Horizontal Posts*
- One (1) *High Post*
- Three (3) *Starting Pegs*
- One (1) *Bonus Tray*

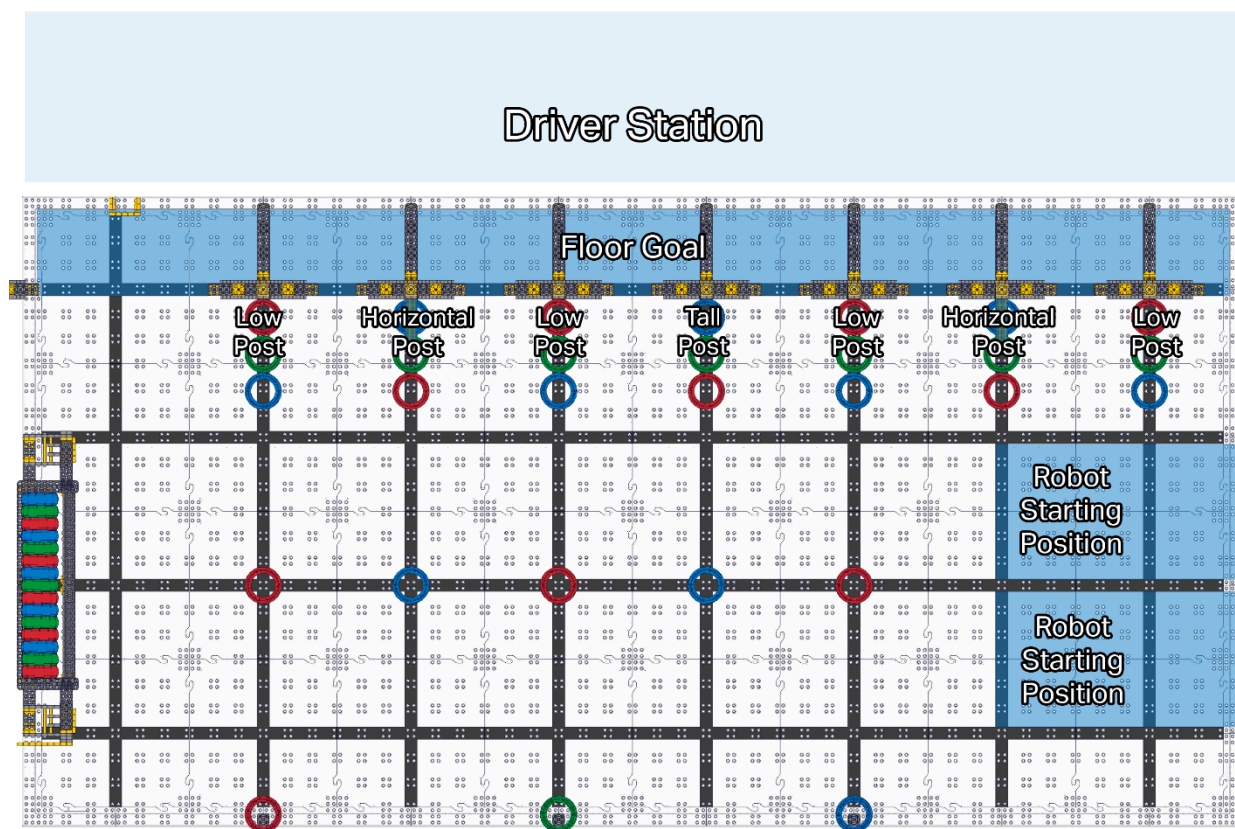


Figure 2 – Overhead drawing of the Field. The Starting Positions, Floor Goal, and Driver Station are highlighted.



VEX IQ Challenge Ringmaster – Game Manual

Game Definitions

Alliance – A pre-assigned grouping of two (2) *Teams* that are paired together during a given *Teamwork Match*.

Alliance Score – Points scored in a *Teamwork Match* awarded to both *Teams*.

Autonomous – A *Robot* that is operating and reacting only to sensor inputs and to commands pre-programmed by the *Students* into the *Robot* control system. There is no input from a VEX IQ Controller.

Bonus Tray – The tray like structure consisting of VEX IQ pieces attached to the end of the field perimeter with dimensions of approximately 15" (381 mm) wide and 3" (76 mm) deep. The *Bonus Tray* begins the *Match* with fifteen (15) *Rings* and can be *Released* by *Robots* by activating the *Latches* to earn points.

Disablement – A penalty applied to a *Team* for a rule violation. During *Disablement* a *Team* is no longer allowed to operate their robot and the *Drive Team Members* will be asked to place their controller(s) on the ground.

Disqualification – A penalty applied to a *Team* for a rule violation. A team that is *Disqualified* in a *Match* receives zero (0) points. At the Head Referee's discretion, repeated violations and *Disqualifications* for a single team may lead to its *Disqualification* for the entire event.

Driver – A *Student* team member responsible for operating and controlling the *Robot*.

Driver Controlled – A *Robot* operating under the control of a *Student Driver*.

Driving Skills Match – A *Driver Controlled* period, with one (1) *Robot*, that is sixty seconds (1:00)

Driver Station – The region behind the *Field*, where the *Drivers* must remain during their *Match*, unless legally interacting with their *Robot*.

Emptied – A *Starting Peg* is emptied if no part of the *Starting Peg* is within the volume defined by the outer edges of a *Ring*. (i.e. There are no rings encircling or surrounding the *Starting Peg*.)

Field Element – The field perimeter, *Floor*, *Posts*, *Starting Pegs*, *Bonus Tray*, and any supporting structures.

Floor – The part of the playing field that is within the field perimeter.

Floor Goal – The section of the *Floor* bounded by the inner edges of the field perimeter and the black line which runs the entire length of the field and passes under the support structures of the *Posts*. The black line is part of the *Floor Goal*.



VEX IQ Challenge Ringmaster – Game Manual

High Post – The one (1) vertical PVC pipe attached to the field and supporting structures with a diameter of approximately 1" (25 mm) and overall height of 24.5" (622.1 mm).

Horizontal Post – One of the two (2) pairs of horizontal posts consisting of VEX IQ pieces attached to the field and supporting structures with a diameter of approximately 1" (25 mm), starting height of 8" (203 mm) and 14" (356 mm), and overall length of 4" (108 mm).

Latch – The two (2) devices attached to the *Bonus Tray* which keeps the *Rings* in place. When both *Latches* are activated, the *Rings* in the *Bonus Tray* will be *Released*.

Low Post – One of the four (4) vertical PVC pipes attached to the field and supporting structures with a diameter of approximately 1" (25 mm) and overall height of 10" (254 mm).

Match – A *Skills Match* or a *Teamwork Match*

Post – A *Low Post*, *High Post*, or *Horizontal Post*.

Programming Skills Match – An *Autonomous* period with one (1) *Robot*, that is sixty seconds (1:00)

Released – The *Bonus Tray* is *Released* when both *Latches* have been activated and its *Rings* have begun moving towards the field due only to gravity (i.e. not due to contact by a *Robot* mechanism).

Ring – A red, blue, or green torus shaped plastic scoring object with an overall diameter of 3" (76 mm) and a "hole" diameter of 2" (51 mm) and a height of 1" (25 mm).

Robot – Anything that has passed inspection that a team places on the field prior to the start of a *Match*.

Scored – A *Ring* is *Scored* if it is not touching a *Robot* and meets one of the following criteria:

1. The *Ring* is contacting the *Floor Goal*
2. Any part of a *Post* is within the volume defined by the outer edges of the *Ring* (i.e. part of the *Ring* is encircling or surrounding the *Post*).

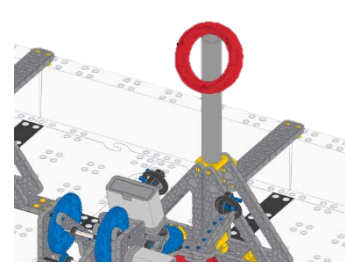
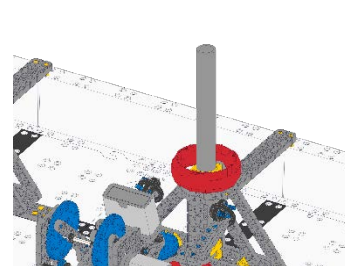
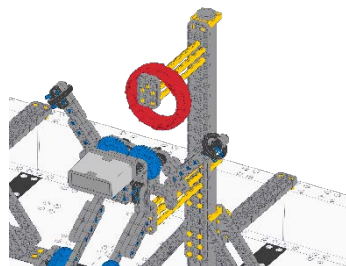
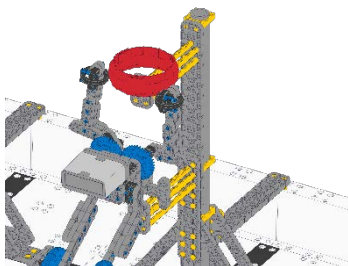


Figure 3 (left) – Example of a *Ring* not *Scored* on a *Post*
Figure 4 (left middle) – Example of a *Ring* *Scored* on a *Post*
Figure 5 (right middle) – Example of a *Ring* *Scored* on a *Post*
Figure 6 (right) – Example of a *Ring* not *Scored* on a *Post*



VEX IQ Challenge Ringmaster – Game Manual

Skills Match – A *Driving Skills Match* or *Programming Skills Match*.

Starting Peg – One of the three (3) vertical pegs consisting of VEX IQ pieces attached to the field perimeter, with a height of approximately 3" (76 mm) where three (3) *Rings* start the *Match*. *Starting Pegs* can be *Emptied* by *Robots* to earn points.

Starting Positions – The two designated 11" x 20" spots on the field where *Robots* must start the *Match*. Starting Positions are bounded by the inner edges of the long black lines, outer edge of the short black line and the top most outer edge of the field perimeter.

Student – Anyone born after April 30, 2004 (age 13 or lower) or enrolled in grade 8 or lower on April 30, 2018. Anyone enrolled in grade 9 on April 30, 2018 is **only** eligible to participate on a VEX IQ Challenge team when enrolled in a middle school or district, which includes grade 8, but not grade 10. *Students* are the individuals who design, build, repair, and program the *Robot*, with minimal adult assistance.

- *Elementary School Student* – A *Student* enrolled in grade 5 or lower or enrolled in grade 6 in a school, which includes grade 5, but not grade 7 (e.g., K-6, 2-6, 3-6, 4-6, 5-6).
- *Middle School Student* – Any eligible *Student* that is not an Elementary School Student.

Team – Two or more *Students* make up a team. A *Team* is classified as an *Elementary School Team* if **all** the members are *Elementary School Students*. A *Team* is classified as *Middle School* if **any** of its members are *Middle School Students*. *Teams* may be associated with schools, community/youth organizations, or a group of neighborhood *Students*.

Teamwork Match – A *Driver Controlled* period with one (1) Alliance that is sixty seconds (1:00)

Uniform – A *Post* is considered to be *Uniform* if all of the following criteria are met:

1. There are at least two (2) *Rings* scored on the *Post*.
2. All *Rings Scored* on the *Post* are the same color.

VEX IQ Challenge Ringmaster Game Rules

Scoring

- A *Ring Scored* in the *Floor Goal* is worth one (1) point.
- A *Ring Scored* on a *Post* is worth five (5) points.
- *Rings Scored* on a *Uniform Post* are worth double their normal value (i.e. ten (10) points each)
- An *Emptied Starting Peg* is worth five (5) points.
- A *Released Bonus Tray* is worth twenty (20) points.

VEX IQ Challenge Ringmaster – Game Manual

Safety Rules

<S1> If, at any time, the *Robot* operation or *Team* actions are deemed unsafe or have damaged the *Field Elements* or *Rings*, the offending team may be *Disabled* and/or *Disqualified* by the determination of the referees. The *Robot* will require re-inspection before it may again take the field.

General Game Rules

<G1> All team members, which includes all students and adults associated with a team, are expected to conduct themselves in a respectful and positive manner while participating in the VEX IQ Challenge. If team members are disrespectful or uncivil to staff, volunteers, or fellow teams at an event, the team may be *Disqualified* from their current or upcoming *Match*. Judges may also consider team conduct and ethics when determining awards.

In all aspects of the VEX IQ Challenge program, the *Students* make the decisions and do the work with adult mentorship. The VEX community prides itself on being a positive learning environment where no one is bullied, harassed, berated or places unnecessary stress upon students and/or event volunteers. Stressful and challenging situations are viewed as teachable moments to model positive behaviors and good sportsmanship.

<G2> When reading and applying the various rules in this document, please remember that common sense always applies in the VEX IQ Challenge.

<G3> At the beginning of a *Match*, each *Robot* must:

- a. Only be contacting the *Floor*.
- b. Fit within a 11" x 20" area, bounded by the *Starting Position*.
- c. Be no taller than 15"

An offending *Robot* will be removed from the *Match* at the Head Referee's discretion.

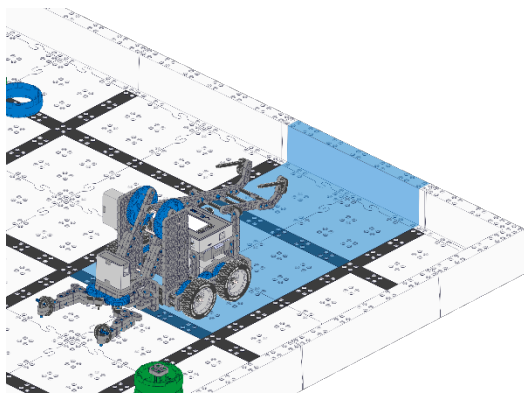


Figure 7 (left) – Example of an Illegal Starting Position per <G3b>

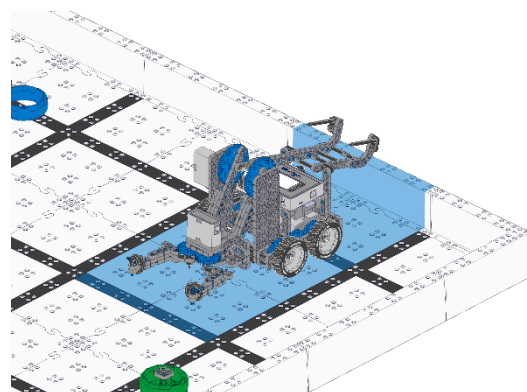


Figure 8 (right) – Example of a Legal Starting Position



VEX IQ Challenge Ringmaster – Game Manual

<G4> During the *Match*, *Robots* may not expand beyond the 11"x20" area they were limited to at the start of the *Match*. However, *Robots* are permitted to expand beyond the 15" high starting requirement. Violations of this rule will result in a warning for minor offenses that do not affect the match. Major and/or score affecting offenses will result in a *Disqualification*. Teams who receive multiple warnings may also receive a *Disqualification*, at the Head Referee's discretion.

<G5> Each team shall include two *Drivers*. Teams with only one *Student* in attendance at an event are granted an allowance to use a qualified *Driver* from the event. No *Driver* may fulfill this role for more than one team at any given event.

During a *Match*, *Robots* may only be operated by the *Drivers*. No *Driver* shall operate a *Robot* for more than thirty-five (35) seconds. The two drivers must switch their controller between twenty-five (:25) seconds and thirty-five (:35) seconds remaining in the *Match*. The second *Driver* may not touch his/her team's controls until the controller is passed to him/her. Once the controller is passed, the first *Driver* may no longer touch his/her team's controls. Violations of this rule will result in a warning for minor offenses that do not affect the match. Score affecting offenses will result in a *Disqualification*. Teams who receive multiple warnings may also receive a *Disqualification*, at the Head Referee's discretion.

<G6> During a *Match*, the *Drivers* must remain in their *Driver Station*, except when legally interacting with their *Robot* as per <G15>. *Drivers* are not allowed to use any sort of communication devices during their *Match*. Devices with communication features turned off (e.g. a phone in airplane mode) are allowed.

<G7> *Drivers* are prohibited from making intentional contact with any *Field Element* or *Robots* during a *Match*, except for the allowances in <G15>. Any intentional contact may result in a *Disqualification*. Accidental contact will not be penalized, unless the contact directly impacts the final score of the *Match*. This type of accidental contact may result in a *Disqualification*.

<G8> *Rings* that leave the playing field will not be returned to the playing field.

<G9> Scores will be calculated for all *Matches* immediately after the *Match* and once all objects on the field come to rest. Any *Scoring*, *Emptying*, or *Releasing* that takes place after the *Match* due to *Robots* continuing to drive after the *Match* will not count. Referees are not allowed to review any videos or pictures from the *Match*.

<G10> *Robots* may not intentionally detach parts or leave mechanisms on the field during any *Match*. If an intentionally detached component or mechanism affects game play, the team shall be *Disqualified* at the Head Referee's discretion.

<G11> *Robots* may not grasp, grapple, or attach to any *Field Elements*. Strategies with mechanisms that react against multiple sides of a *Field Element* in an effort to latch onto said *Field*



VEX IQ Challenge Ringmaster – Game Manual

Element are prohibited. The intent of this rule is to prevent teams from both unintentionally damaging the field, and from anchoring themselves to the field. Minor violations of this rule that do not affect the match will result in a warning. Score Affecting offenses will result in a *Disqualification*. Teams that receive multiple warnings may also receive a *Disqualification* at the Head Referee's discretion.

<G12> *Robots* must be designed to permit easy removal of *Rings* from any grasping mechanism without requiring that the *Robot* have power after the *Match*.

<G13> Field tolerances may vary by as much as ± 1 " unless otherwise specified. Teams must design *Robots* accordingly.

<G14> Replays are at the discretion of the Event Partner and Head Referee, and will only be issued in the most extreme circumstances.

<G15> If a *Robot* goes completely out-of-bounds (outside the playing field), gets stuck, tips over, or otherwise requires assistance, the *Drivers* may retrieve & reset the *Robot*. In the process they must:

1. Signal the Referee by placing their VEX IQ Controller on the ground.
2. Move the *Robot* to a *Starting Position*.
3. Any *Rings* in possession of the *Robot* while being handled must be removed from the *Robot* and taken out of play for the remainder of the *Match*.

This rule is intended so teams can fix damaged *Robots* or help get their *Robots* "out of trouble." It is not intended for *Teams* to use as part of a strategy to gain an advantage during a *Match*. If a Head Referee sees *Teams* strategically exploiting this rule, they may be *Disqualified* from said *Match*.

<G16> *Robots* are not allowed to remove *Rings* from the *Bonus Tray* when it is not *Released*. Minor violations of this rule that do not affect the match will result in a warning. Major (score affecting) offenses will result in a *Disqualification*. Teams that receive multiple warnings may also receive a *Disqualification* at the Head Referee's discretion.

<G17> Adults may assist *Students* in urgent situations, however adults should never work on or program a *Robot* without *Students* on that *Team* being present and actively participating. Violation of this rule may result in *Disqualification* from an upcoming *Match* or the entire event.

<G18> All rules in this manual are subject to changes, and not considered official until August 17th, 2017. We do not expect any major changes to take place; however we do reserve the right to make changes until August 17th, 2017. There will also be scheduled manual updates on June 15th, 2017 April 5th, 2018. Teams are strongly encouraged to review the VEX IQ Forum for rule updates and clarifications: www.vexiqforum.com

VEX IQ Challenge Ringmaster – Game Manual

Robot Inspection



Description

Every *Robot* will be required to pass a full inspection before being cleared to participate in the Challenge. This inspection will ensure that all *Robot* rules and regulations are met. Initial inspections will typically take place during team registration/practice time. Every team should use the rules below as a guide to pre-inspect its *Robot* and ensure that it meets all requirements.

Definitions

Robot – An operator controlled vehicle designed and built by a VEX IQ Challenge team to perform specific tasks on the field. The *Robot* may be constructed using only the VEX IQ platform parts and mechanical/structural components from the VEX Robotics by HEXBUG product line. No other parts will be allowed on the *Robot*. Prior to participating in matches, each *Robot* will be required to pass an inspection. Additional inspections may be required at the discretion of event personnel.

Inspection Rules

<R1> The team's *Robot* must pass inspection before being allowed to participate in any *Matches*. Noncompliance with any *Robot* design or construction rule may result in disqualification of the *Robot* at an event.

- a. If significant changes are made to a *Robot*, it must be re-inspected before it will be allowed to participate in a *Match*.
- b. *Teams* may be requested to submit to random spot inspections by event personnel. Refusal to submit will result in *Disqualification*.
- c. Referees or inspectors may decide that a *Robot* is in violation of the rules. In this case, the team in violation will be *Disqualified* and the *Robot* will be barred from the playing field until it passes re-inspection.

<R2> Only one (1) *Robot* will be allowed to participate per team in the VEX IQ Challenge. Though it is expected that teams will make changes to their *Robot* at the event, a team is limited to only one (1) *Robot*. The VEX IQ System is intended to be a mobile robotics design platform. As such, a VEX IQ Challenge robot, for the purposes of the VEX IQ Challenge, has the following subsystems:

Subsystem 1: Mobile robotic base including wheels, tracks, or any other mechanism that allows the *Robot* to navigate the majority of the flat playing field surface. For a stationary *Robot*, the robotic base without wheels would be considered Subsystem 1.



VEX IQ Challenge Ringmaster – Game Manual

Subsystem 2: Power and control system that includes a VEX IQ legal battery, a VEX IQ control system, and associated Smart Motors for the mobile robotic base.

Subsystem 3: Additional mechanisms (and associated Smart Motors) that allow manipulation of game objects or navigation of field obstacles.

Given the above definitions, a minimum *Robot* for use in any VEX IQ Challenge event (including Skills Challenges) must consist of subsystem 1 and 2 above. Thus, if you are swapping out an entire subsystem of either item 1 or 2, you have now created a second *Robot* and are no longer legal.

- a. Teams may not participate with one *Robot*, while a second is being modified or assembled.
- b. Teams may not switch back and forth between multiple *Robots* during an event.

<R3> To participate in an official VEX IQ Challenge Event a team must first register on robotevents.com. Upon registering they will receive their VEX IQ Challenge Team Number and two (2) VEX IQ Challenge License Plates. Every *Robot* should have their VEX IQ Challenge License Plates displayed on two opposing sides, with their VEX IQ Challenge Team Number clearly written upon it.

- a. The VEX IQ Challenge License Plates are considered a non-functional decoration, and cannot be used as a functional part of the *Robot*.
- b. These number plates must fulfill all *Robot* rules



Figure 9 – A VEX IQ Challenge License Plate with a VEX IQ Challenge Team Number written upon it.

<R4> At the start of each *Match*, the *Robot* must satisfy the following constraints.

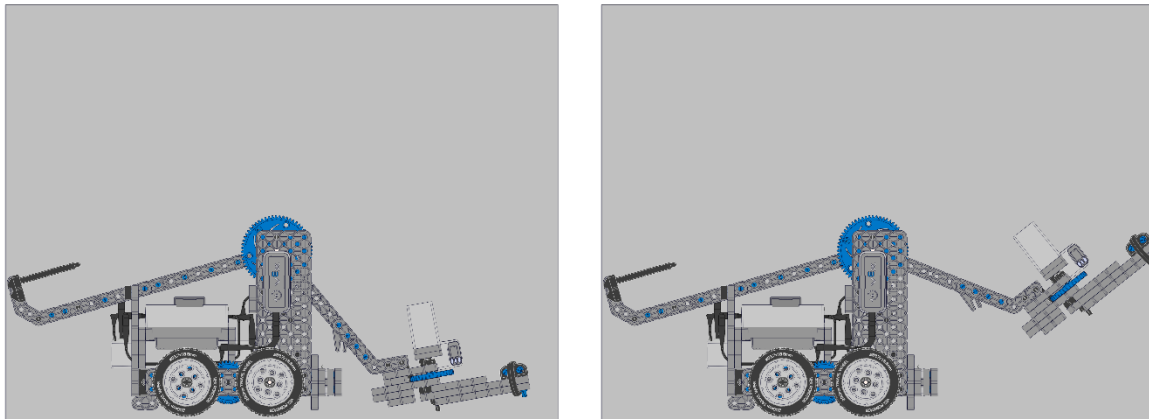
- a. Only contact the *Floor*.
- b. Fit within a 11" x 20" area, bounded by the *Starting Position*
- c. Be no taller than 15"



VEX IQ Challenge Ringmaster – Game Manual

A *Robot* may not expand beyond its 11" x 20" starting area constraint at any time during the match. However, *Robots* are permitted to expand beyond their 15" starting height constraint at any time during the match.

Note: Teams must remain within the 11" x 20" area throughout the match; this includes the full range of motion by any appendages. An arm that extends out of these constraints while operating during the *Match* would make the *Robot* illegal.



Figures 9 & 10 – A *Robot* which starts the match with the legal size constraints, but then as the arm rotates, becomes too large.

<R5> The starting configuration of the *Robot* at the beginning of a *Match* must be the same as a *Robot* configuration inspected for compliance, and within the maximum allowed size.

- a. Teams using more than one *Robot* configuration at the beginning of *Matches* must tell the inspector(s) and have the *Robot* inspected in its largest configuration(s).
- b. A team may NOT have its *Robot* inspected in one configuration and then place it at the start of a *Match* in an uninspected configuration

<R6> Robots may be built ONLY from Official *Robot* Components from the VEX IQ product line, unless otherwise specifically noted within these rules.

- a. During inspections if there is a question about whether something is an official VEX IQ component, a team will be required to provide documentation to an inspector that proves the component's source. Such types of documentation include receipts, part numbers, or other printed documentation.
- b. Only the VEX IQ components specifically designed for use in *Robot* construction are allowed. Using additional components outside their typical purpose is against the intent of the rule (i.e. please don't try using VEX IQ apparel, team or event support materials, packaging, field elements or other non-robot products on a VEX IQ Challenge *Robot*).



VEX IQ Challenge Ringmaster – Game Manual

- c. Products from the VEX EDR or VEXpro product line cannot be used for *Robot* construction. Products from the VEX product line that are also cross listed as part of the VEX IQ product line are legal.
- d. Mechanical/structural components, aside from those excluded below, from the VEX Robotics by HEXBUG product line are legal for *Robot* construction. However, electrical components from the VEX Robotics by HEXBUG product line are illegal for *Robot* construction.
The following mechanical and structural components from the VEX Robotics by HEXBUG product line are excluded:
 - i. All rubber bands
- e. Official Robotics Components from the VEX IQ product line that have been discontinued are still legal for *Robot* use. However, teams must be aware of <R6a>.
- f. 3D printed versions of VEX IQ components are not legal for use.

Note: A comprehensive list of legal parts can be found in the VEX IQ Challenge Legal Parts Appendix, at <https://www.vexrobotics.com/vexiq/competition/viqc-current-game>.

<R7> Official VEX IQ products are ONLY available from VEX Robotics & official VEX Resellers. To determine whether a product is "official" or not, consult www.vexiq.com.

<R8> *Robots* are allowed to use the following additional "non-VEX IQ" components:

- a. Teams may add appropriate non-functional decorations provided that these do not affect the *Robot* performance in any significant way or affect the outcome of the *Match*. These decorations must be in the spirit of the event. Inspectors will have the final say in what is considered "nonfunctional".
 - i. Any decorations must be backed by legal materials that provide the same functionality, (i.e. if your *Robot* has a giant decal that prevents *Game Objects* from falling out of the *Robot*, the decal must be backed by VEX IQ material that also prevents the *Game Objects* from falling out).
- b. Rubber bands that are identical in length and thickness to those included in the VEX IQ product line (#32 & #64).

<R9> Additional VEX IQ products that are released during the challenge season are considered legal for use.

- a. Some "new" components may have certain restrictions placed on them upon their release. These restrictions will be documented in a Team Update. Team Updates will be posted to the "VEX IQ Challenge Ringmaster" home page in the Competition section of www.vexrobotics.com.



VEX IQ Challenge Ringmaster – Game Manual

<R10> *Robots* must use ONLY one (1) VEX IQ Robot Brain.

- a. *Robot* brains, microcontrollers, or other electronic components that are part of the VEX Robotics by HEXBUG, VEX EDR, or VEXpro product line are not allowed.
- b. *Robots* must use one of the VEX IQ 900 MHz radio, VEX IQ 2.4 GHz radio, or VEX IQ Smart Radio in conjunction with their VEX IQ Robot Brain.
- c. The only legal method of driving the *Robot* during *Teamwork* and *Driving Skills Matches* is the VEX IQ Controller.

<R11> *Robots* may use up to six (6) VEX IQ Smart Motors.

- a. Additional motors cannot be used on the *Robot* (even ones that aren't connected).

<R12> The only allowable sources of electrical power for a VEX IQ Challenge *Robot* is any one (1) VEX IQ Robot *Battery* or six (6) AA batteries.

- a. Additional batteries cannot be used on the *Robot* (even ones that aren't connected).

<R13> Parts may NOT be modified.

- a. Examples of modifications include, but are not limited to bending and cutting.

<R14> The following types of mechanisms and components are NOT allowed:

- a. Those that could potentially damage playing *Field Elements*, specifically the *Rings*.
- b. Those that could potentially damage other *Robots*.
- c. Those that pose an unnecessary risk of entanglement.

<R15> A *Robot* is deemed successfully inspected when it has been recorded as "passed" by an Inspector and the inspection form has been signed by the Inspector and a *Student Team* member.

<R16> *Teams* must bring their *Robots* to the field prepared to play. *Teams* should ensure that their batteries are charged before they place the *Robot* on the field.

<R17> *Teams* should make sure that their VEX IQ firmware is up to date.

VEX IQ Challenge Ringmaster – Game Manual

The Event

Description

The VEX IQ Challenge will consist of:

- Teamwork Challenge
 - Each Teamwork Challenge *Match* consists of two teams, operating as an *Alliance*, to score points. The Teamwork Challenge may include *Practice*, *Qualifying*, and *Finals Matches*. After the *Qualifying Matches*, teams will be ranked based on performance. Typically the top teams will then participate in the *Finals Matches* to determine the Teamwork Challenge champions. The number of teams participating in the *Finals Matches* is determined by the Event Partner.
- Robot Skills Challenge
 - In this challenge teams will compete in sixty (60) second long *Matches* in an effort to score as many points as possible. These *Matches* consist of *Driving Skills Matches*, which will be entirely *Driver* controlled, and *Programming Skills Matches*, which will be autonomous (no VEX IQ controller) with limited human interaction. Each *Match* will consist of only one *Robot*.

Awards will be given to top teams in each format. Awards will also be given for overall performance in the judged criteria. Please review the Awards Appendix for more details.

Definitions

Disqualification – A penalty applied to a team for a behavioral violation. When a team is disqualified in a *Match*, they receive zero (0) points.

Finals Match – A *Match* used to determine the Teamwork Challenge champions.

Practice Match – An un-scored *Match* used to provide time for teams to get acquainted with the official playing field.

Qualifying Match – A *Teamwork Match* used to determine the event rankings.

Teamwork Challenge

Teamwork Qualifying Matches

At the event, *Practice Matches* may be played from the team registration time until the team meeting begins. Every effort will be made to equalize practice time for all teams, but they may be conducted on a first-come, first-served basis. These *Matches* are not scored, and will not affect team ranking.

VEX IQ Challenge Ringmaster – Game Manual



Schedule

- The *Qualifying Match* schedule will be available prior to opening ceremonies on the day of the event. This schedule will indicate alliance partners and *Match* pairings. For events with multiple fields, the schedule will also indicate on which field the *Match* will take place.
- The *Qualifying Matches* will start immediately after opening ceremonies in accordance with the qualifying *Match* schedule.
- Teams will be randomly assigned an alliance partner to collaborate in each *Qualifying Match*.
- All teams will be scored on the same number of *Qualifying Matches*.
- In some cases, a team will be asked to play in an additional *Qualifying Match*, but will not receive credit for playing this extra *Match*.

Teamwork Challenge Rankings

- At the conclusion of each *Match*, the score will be determined.
 - Each *Team* will receive the points scored for the Alliance Score
- For a *Qualifying Match*, if **no** member of a team is present in the driver station at the start of a *Match*, that team is declared a “no show” and will receive zero (0) points. A “no show” is treated exactly the same as a *Disqualification*. The team’s alliance partner will receive all points scored in this *Match*.
- Each team will have the same number of *Qualifying Matches*
- Points earned for each team in each *Qualifying Match* are added to get the team’s total points
- One out of every four (4) *Qualifying Matches* will not count towards the rankings. If an event has between four (4) and seven (7) *Qualifying Matches* per team, then the lowest score for each team will not be counted. If an event has between eight (8) and eleven (11) rounds, then the two lowest scores for each team will not be counted. If an event has twelve (12) or more rounds, then the three lowest scores will not be counted.
- Teams are ranked by total points.
- Ties in ranking are broken by:
 - Removing the lowest score from each team’s total and comparing the new total score
 - If still tied, the next lowest score will be removed (on through all scores)
 - If still tied, teams will be sorted by a random electronic draw

Teamwork Challenge Finals Matches

- At the conclusion of *Qualification Matches*, the top teams will advance to the *Finals Matches*.
- The number of *Finals Matches* will be determined by the event organizers.
- The first and second ranked teams form an *Alliance*, third and fourth ranked teams form another alliance (and so on) for the *Finals Matches*.



VEX IQ Challenge Ringmaster – Game Manual

- Starting with the lowest ranked alliance, each alliance participates in one *Finals Match*. After all the *Finals Matches* are run, the highest score of those *Matches* is the winning alliance. Second highest score finishes in second place, and so on.
- If there is a tie for first place, the tied alliances will each play a tiebreaker *Match*. The alliance with the highest score in tiebreaker *Matches* will be declared the winner.
 - If there is a tie in the tiebreaker *Matches*, a second set tiebreaker *Matches* will take place.
 - If they remain tied after the second set of *Matches*, the higher seeded alliance will be declared the winner. (The lower seeded team must exceed the higher seeded team in order to be declared the winner)

Teamwork Challenge Rules

<T1> Referees have ultimate authority during the event, including all three types of *Matches*. **Their rulings are final.**

- a. The referees are not allowed review any recorded replays.
- b. Referees will review the field at the end of each *Match* and accurately record the game score. If there is a disagreement with the scoring, only the team *Drivers*, not an adult, may share their questions or concerns with the referee. Once the field is cleared for the next team, the *Drivers* can no longer dispute the *Match* score.

<T2> The only people from a team permitted to be by the playing field are the two *Drivers*, who are identified by their drive team badges. These badges are interchangeable, but not during a *Match*.

<T3> During *Matches*, two teams form an *Alliance* that will play on the field.

<T4> There are no time outs in the *Qualifying Matches* or *Finals Matches*.

<T5> If an Alliance wants to end a *Qualifying Match* or a *Finals Match* early, both teams should signal the referee by placing their controllers on the ground. The referee will then signal to the teams that the *Match* is over and will begin to tally the score.

<T6> At many events, the playing field will be placed on the floor. Some Event Partners may choose to elevate the playing fields. At the 2018 VEX Robotics World Championship, the platforms will be 18" high.



VEX IQ Challenge Ringmaster – Game Manual

<T7> At the 2018 VEX Robotics World Championship, violation of the following rules could result in *Disqualification* from a current *Match*, upcoming *Matches*, or the entirety of the event:

- a. <G1>, especially:
 - i. Egregious disrespect or incivility towards event staff, volunteers, or fellow competitors, either from *Students* or from any adults associated with a Team.
- b. <G5>, especially:
 - i. *Drivers* operating for more than one team at the event.
- c. <G17>, especially:
 - i. Adults designing, programming, or building a *Robot* without *Student* participation.
 - ii. Note: Top-performing *Robots* will be under additional scrutiny regarding this rule by event staff (judges, head referees, etc). This scrutiny could include interviews with *Students*, on-the-spot build tests, or on-the-spot programming tests. If *Students* are unavailable for these interviews when an adult is seen building or programming the *Robot*, or if no *Student* present can explain the build/programming design work that went into their *Robot*, event staff will assume that <G17> has been violated.
- d. <R1>, especially:
 - i. Making significant changes to a *Robot* without undergoing re-inspection.
 - ii. Note: “Significant changes” could include (but is not limited to) adding or removing a mechanism, modifying *Robot* functionality, or replacing electronic components.
- e. <R2>, especially:
 - i. Bringing multiple *Robots* to the event.
 - ii. Using the same *Robot* for multiple teams.
 - iii. Using a separate *Robot* for *Skills Matches* and for *Qualifying/Finals Matches*.



VEX IQ Challenge Ringmaster – Game Manual

Robot Skills Challenge

Robot Skills Challenge Rules

Please note that all rules from “The Game” section of the manual apply to Robot Skills, unless otherwise specified.

At the beginning of each *Skills Match*, the robot may be placed in either of the two *Starting Positions* on the field.

Robot Skills Challenge Scoring

All scoring is the same as outlined in “The Game” section of this manual.

- A *Ring Scored* in the *Floor Goal* one (1) point.
- A *Ring Scored* on a *Post* is worth five (5) points.
- *Rings Scored* on a *Uniform Post* are worth double their normal value (i.e. ten (10) points each.)
- An *Emptied Starting Peg* is worth five (5) points.
- A *Released Bonus Tray* is worth twenty (20) points.

Robot Skills Challenge Format

- The Robot Skills Challenge field is set up as described in “The Game” section of this manual.
- Teams will play *Skills Matches* on a “first come, first served” basis.
- Teams may participate in a number of *Skills Matches*, to be determined by the event organizers.
- There will be two drivers for a *Driving Skills Match*. *Drivers* must switch their controller with between thirty-five (:35) and twenty-five (:25) seconds remaining in the *Driving Skills Match*. If a team only has one *Driver*, that *Student* may only operate the *Robot* for a maximum of thirty-five (35) seconds.
- There are two specific rules for *Programming Skills Matches*, which are listed below.

Programming Skills Match Specific Rules

<PSC1> A team may handle their *Robot* as many times as desired during a *Programming Skills Match*.

- a. Upon handling the *Robot*, it must be immediately brought back to a legal starting position. Drivers are allowed to reset or adjust the *Robot*.
- b. If the *Robot* is possessing any *Rings* when the *Robot* is being handled, these *Rings* will be removed from the playing field and can no longer be used



VEX IQ Challenge Ringmaster – Game Manual

- c. If there are any *Rings* in the *Robot Starting Position* where the *Robot* is being placed, these *Rings* will be removed from the playing field and can no longer be used.

<PSC2> Teams must bring their VEX IQ Controller to the field with them, although *Drivers* start the *Robot* by pressing a button on the brain or manually activating a sensor, and may not engage the *Robot* with the VEX IQ Controller during the *Programming Skills Match*. The VEX IQ Controller must not be on during the *Programming Skills Match*.

Robot Skills Challenge Rankings

- For each *Skills Match* teams are awarded a score based on the above scoring rules.
- Teams will be ranked based on the sum of their highest *Programming Skills Match* score and *Driving Skills Match* score, with the team with the highest sum being declared the *Robot Skills Challenge Winner*.
- In the case where two teams are tied for the highest score, the tie will be broken by looking at both teams' next highest *Programming Skills Match* score. If the teams remain tied, the tie will be broken by looking at both teams' next highest *Driver Skills Match* score. This process will repeat until the tie is broken
- If the tie cannot be broken (i.e. both teams have the exact same scores for each *Programming Skills Match* and *Driver Skills Match*), then the following ordered criteria will be used to determine which team had the "best" *Programming Skills Match*:
 1. Number of points for *Rings Scored on Uniform Posts*
 2. Number of points for *Rings Scored on Posts*
 3. Number of points for a *Released Bonus Tray*
 4. Number of points for *Emptied Starting Pegs*
- If the tie still cannot be broken, the same process in the step above will be applied to the teams' highest *Driver Skills Match*.
- If the tie still isn't broken, events may choose to allow teams to have one more deciding match or both teams will be declared the winner.