Game Manual

Highrise - Introduction

The VEX IQ Challenge:

Creativity and innovation are key elements to advancing the fields of science, technology, engineering and mathematics (STEM) into the future. The VEX IQ Challenge was designed to provide students with open-ended challenges that allow them to create and innovate using their hands and minds. Students then have the opportunity to develop real-world connections to what they are learning in the classroom.

Working with robots in a collaborative game format can be a very powerful tool to engage students and enhance their math and science skills through hands-on, student-centered learning. Through participation in the VEX IQ Challenge, students can develop the essential life skills of teamwork and collaboration, as well as the critical thinking, project management, and communication skills required to become the next generation of innovators and problem solvers in our global society.

The VEX IQ Challenge, presented by the Robotics Education & Competition Foundation (RECF), is designed to inspire students to develop a lifelong passion for learning and an interest in pursuing educational and career opportunities in STEM fields.

For additional information, visit www.vexiq.com and www.roboticseducation.org/vex-iq-challenge

You can also follow us on Twitter @VEXRobotics and @REC_Foundation

Like us on Facebook at www.facebook.com/vexrobotics and www.facebook.com/RECFoundation

VEX IQ Challenge – Highrise – A Primer

VEX IQ Challenge Highrise is played on a 4 ft x 8 ft field, surrounded by a 2.5 inch tall perimeter. There are a total of thirty-six (36) Cubes, twelve (12) of each color, available as Scoring Objects in the game. There is one (1) Scoring Zone and are three (3) Highrise Bases on the field.

The Challenge theme this season is engineering. The Challenge includes the exciting Highrise robot game and the STEM Research Project. For more details on the STEM Research Project, visit www.roboticseducation.org/vex-iq-challenge/viq-current-game/

VEX IQ Challenge Highrise, provides an opportunity for students, with the guidance of an adult mentor, to build a VEX IQ robot to solve exciting engineering challenges. Students collaborate with their own teammates and with other teams in a teamwork format, to build the highest Highrise and maximize their score.
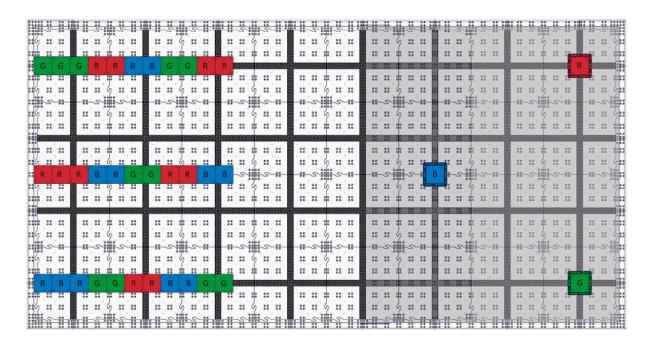
Students develop a tremendous sense of accomplishment in building a robot to solve the VEX IQ Challenge. Teachers, mentors, and parents will take pride in the fact that students are able to design, build, and program a VEX IQ robot with minimal adult assistance.

PLEASE SEE GAME APPENDIX FOR RULE DETAILS AND ADDITIONAL EVENT INFORMATION.
PLEASE SEE AWARDS APPENDIX FOR STEM RESEARCH PROJECT, AND AWARD INFORMATION.
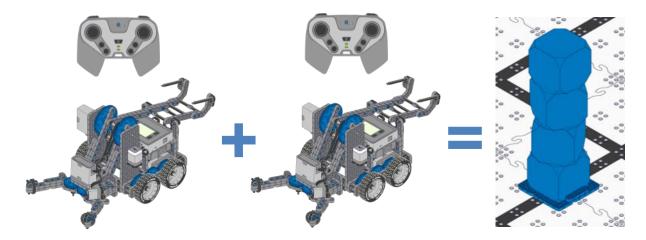
Highrise - Game Rules

OBJECT OF THE GAME:

Score points by moving the red, green, and blue Scoring Cubes from their starting position (left below) to the Scoring Zone (gray area below) and by building Highrises on each color's Highrise Base (right below) in a one-minute Match.
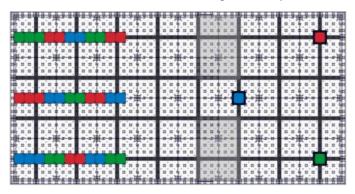

1. Teamwork Challenge Matches

Two teams will collaborate in 60-second Teamwork Challenge Matches, working together to maximize their score. In Teamwork Challenge Matches, teams will move Cubes to the Scoring Zone and build single-color Highrises that match the color of each Highrise Base Cube. Both teams will receive the same total points at the end of each Teamwork Challenge Match.
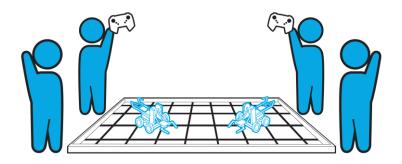
VEX IQ Challenge – Highrise

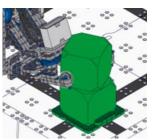**In Teamwork Challenge Matches**:
Field Set-Up - Each Robot must be placed in one of the two pre-defined starting positions (gray areas below) before the start of each Match. One Cube of each color (red, green, blue) is used as the Base Cube for each Highrise, while the other 33 Cubes are arranged exactly as shown.

Robot Operation - Each team has two Drivers that operate their team's Robot with the Controller, one at a time. The Drivers switch their controller between :25 and :35 remaining in each Match.
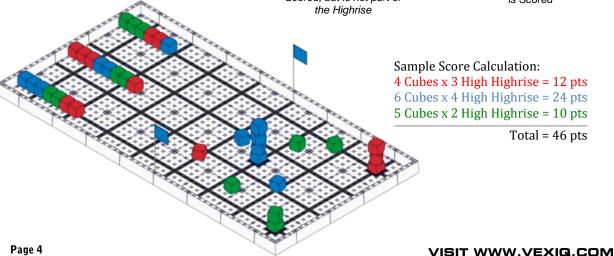

Scoring - The score is counted at the end of each 60-second Match, after all Cubes and Robots come to rest. Each Cube Scored in the Scoring Zone is worth a point value equal to the Highrise Height of the same color as the Cube. A *Cube* is *Scored* in the *Scoring Zone* if it is partially within the three dimensional area defined by the infinite vertical projection of the *Scoring Zone.*

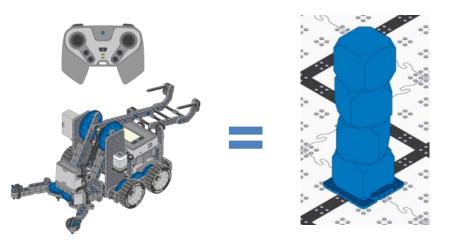*Cube touched by Robot is Scored, but is not part of the Highrise*

Cube in Scoring Zone held by Robot is Scored

Sample Score Calculation:

4 Cubes x 3 High Highrise = 12 pts
6 Cubes x 4 High Highrise = 24 pts
5 Cubes x 2 High Highrise = 10 pts
_____
Total = 46 pts

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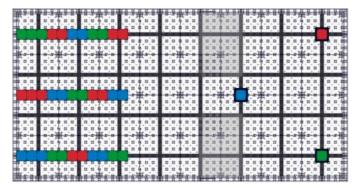# VEX IQ Challenge – Highrise

2. Robot Skills Challenge Matches

In Robot Skills Challenge Matches, there are also 60-seconds of driver controlled time to score as many points as possible, but this time it's as an individual team. Just like Teamwork Skills Challenge Matches, a team will move Cubes to the Scoring Zone and build single-color Highrises that match the color of each Highrise Base Cube.
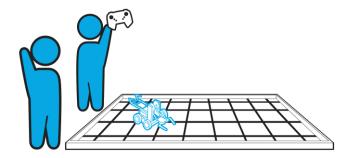

In Robot Skills Challenge Matches:

Field Set-Up - The Robot must be placed in one of the two pre-defined starting positions before the start of each Match. The field is set up exactly the same way as it is in Teamwork Skills Challenge Matches.
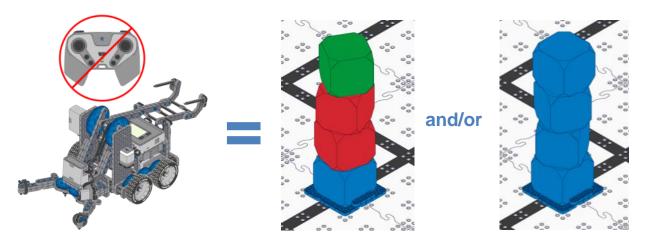

Robot Operation – Same as Teamwork Skills Challenge Matches, except that only one team is operating one Robot. The Drivers switch their controller between :25 and :35 remaining in each Match.

Scoring - Same as Teamwork Skills Challenge Matches. Each Cube Scored in the Scoring Zone is worth a point value equal to the Highrise Height of the same color as the Cube.

VEX IQ Challenge – Highrise

3. Programming Skills Challenge Matches

During the 60-second Programming Skills Challenge Matches, a single team's robot scores as many points as possible using only sensors and preprogrammed instructions stored in the VEX IQ Robot Brain. Robots will move Cubes to the Scoring Zone and build mixed-color and/or single-color Highrises upon Highrise Base Cubes.

and/or

In Programming Skills Challenge Matches:

Field Set-Up - Exactly the same as Robot Skills Challenge Matches. The Robot must be placed in one of the two pre-defined starting positions before the start of each Match.
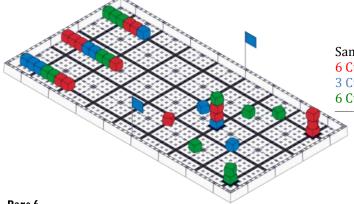
Robot Operation - Each team has two Drivers that activate programs using the buttons on the Robot Brain only. No Controllers are used or allowed. Drivers may handle and/or retrieve robots from the field of play and return them immediately to a legal starting position as often as necessary, but programs can only be activated from a legal starting position.

Scoring - The score is counted at the end of each 60-second Match, after all Cubes and Robots come to rest. Scoring is similar to, but NOT exactly the same as Teamwork Challenge and Robot Skills Challenge Matches.

- A Cube Scored in the Scoring Zone is worth a point value equal to the Programming Skills Highrise Height of the same color. Note: Highrise color is defined by the Base Cube color.
- If a Programming Skills Highrise consists solely of Cubes of one color, then the Scored Cubes of this color are all worth double the Programming Skills Highrise Height.

Sample Programming Skills Score Calculation:
6 Cubes x 6 (3 High Single-Color Highrise) = 36 pts
3 Cubes x 4 (4 High Multi-Color Highrise) = 12 pts
6 Cubes x 4 (2 High Single Color Highrise) = 24 pts
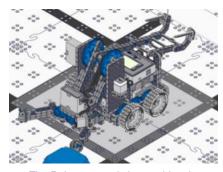_____
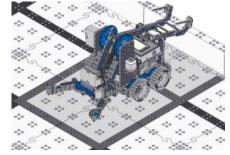Total = 72 pts

Highrise - Robot Inspection Rules
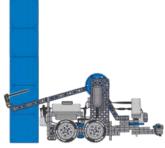
ROBOT INSPECTION:

- All VEX IQ Challenge Robots must pass a full inspection prior to participating in any matches.
- Each Robot must clearly display its VEX IQ Challenge Team Number on two VEX IQ Challenge License Plates
- Each team may ONLY inspect and use ONE Robot at any VEX IQ Challenge Event

ROBOT SIZING:

- At the start of any Match, a VEX IQ Challenge Robot must meet two sizing requirements:

The Robot may only be touching the floor within a 13" x 13" space

The entire Robot must fit within a 13" x 19" x 15" tall volume

- Robots may expand to ANY size after the start of a match

ROBOT CONSTRUCTION:

- Robots may only be built from official robot components from the VEX IQ Product Line. See www.vexiq.com for details.
- Non-functional decorations are also allowed
- A VEX IQ Challenge Robot places limits on the following components:

One Robot Brain and One VEX IQ Battery Pack

Up to Six Smart Motors

One Controller

- All other VEX IQ parts and components can be used in any quantity
- No parts or components may be modified in any way (including, but not limited to bending, cutting, and melting).
- The following types of mechanisms are NOT allowed:
  - Those that could damage the playing field or field components
  - Those that could damage other robots
  - Those that intentionally detach from the rest of the Robot
  - Those that pose an unnecessary risk of entanglement.

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