

Renee Becker Team 1675  
Will Borzon Team 1675  
Sarah Wittman Team 1714  
Max Alexander Team 1675  
Katie Widen Team 1675

Present



2008 Milwaukee Mentor Vex Challenge  
September 13  
Rufus King High School  
Milwaukee, WI

# Table of Contents

## 1. Objective

## 2. The Field

2.1 Field Description

2.2 Field Elements

2.3 Game Pieces

## 3. Scoring

3.1 Official Scoring

3.2 Game Elements

3.3 Bonus Points

## 4. Matches

4.1 Field Crew

4.2 Match Safety

4.3 Match Setup

4.4 Match Types

4.5 Ranking

## 5. General Rules

5.1 Disqualification

5.2 Safety Hazard

5.3 Loss of Parts

5.4 Pinning

5.5 Flipping

5.6 Intent to Destroy

5.7 Human Player Actions

5.8 Home Zone

5.9 Scoring Objects

5.10 Robot Control

5.11 Robot Modification

5.12 Robot Identification

5.13 Rule Clarification

5.14 Referee Rulings

## 6. The Robot

6.1 Size Restrictions

6.2 Weight Restrictions

6.3 Controls

6.4 Pit Operation

6.5 Construction Restrictions

6.6 Materials

6.7 Additional Materials List

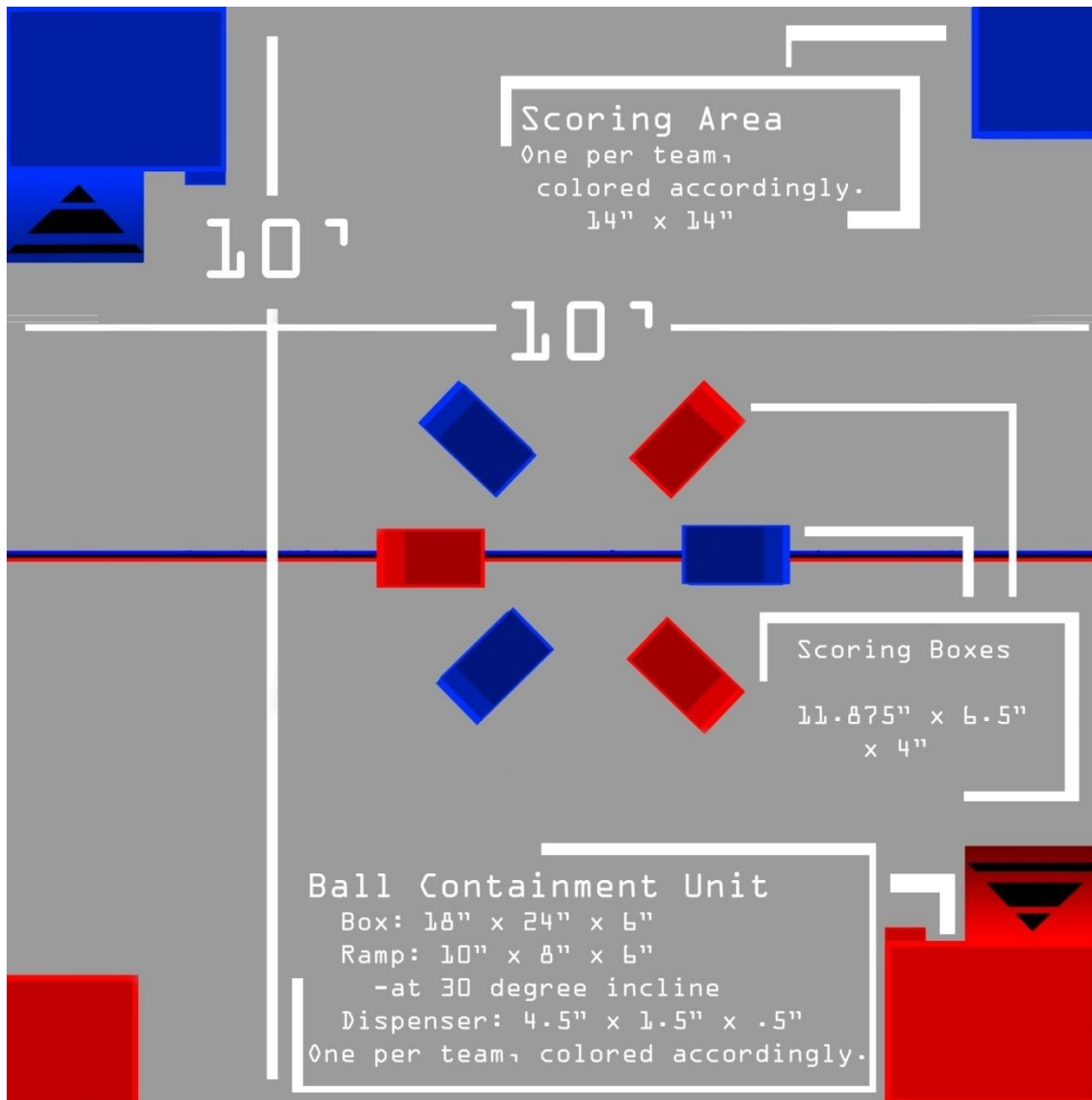
6.8 Energy Sources

## 1. Objective:

The point of the game!

The object of the game is to attain points by placing golf balls and ping-pong balls into specifically colored boxes, which can be moved into different sections of the field for a multiplied score. **Alliances will face off, 2 on 2, to accomplish this goal.**

## 2. The Field



## 2.1 Field Description

2.1.1 The playing field is constructed of PVC pipes and fittings, similar to the 2007 Milwaukee Mentor Vex Challenge. The field measures by 10' x 10' and the surface of the playing area consists of 2' x 2' interlocking dark gray foam floor interlocking tiles available from [www.softies.com](http://www.softies.com).

2.1.2 All official field dimensions will be within +/- 1/2" tolerance.

## 2.2 Field Elements

2.2.1 Ball Containment Unit (BCU): There are two Ball Containment Units on the field in opposite corners. They are 18" by 24" and 6" tall. A ramp leading up to the edge of the box is a 30-60-90 triangle, with a base of 8" and a hypotenuse of 10". The ramp is 16" wide and aligns with the right side of the field. The inside floor of the box will be slanted toward the corner closest to the center of the field with canvas fabric that is supported by beams of wood. **In this corner, a hole will be drilled on the front side of the box 4" in diameter.** In front of this hole will be a trough to hold 4 balls (golf balls) 7" long by 3" wide by .5" tall. This trough has an outer "lip" circling the perimeter. The lip was made with sawed off golf tees that were glued into holes in the trough's base (see picture below for clarification).

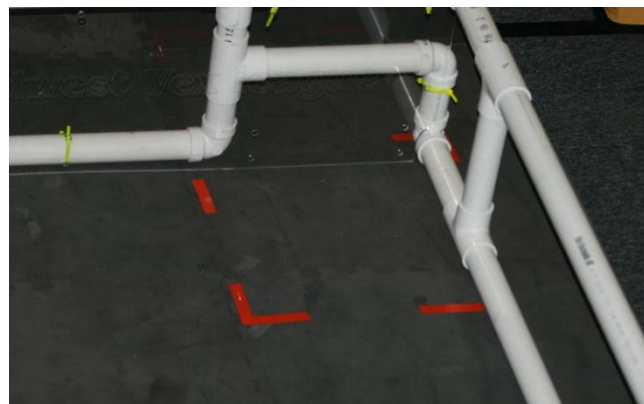


BCU- Blue



BCU- Red

2.2.2 Scoring Zones: The scoring zones, which are also the home zones, are areas in the corners of the field next to the ball containment units. These are 15" by 15", marked with electrical tape, and can fit two of the Scoring Boxes fully inside the scoring zone **(the zone also extends upward with no limit).** **One robot from each alliance starts in this area at the beginning of the match. The other robot from each alliance will start in the center of the field, in between the scoring boxes.**



(Red Start Area Picture)

## 2.3 Game Pieces

2.3.1 Golf Balls: The golf balls are worth 2 points if placed in the Scoring Boxes. There will be 200 golf balls on the field, approximately 100 in each BCU. They are 2.5" in diameter.



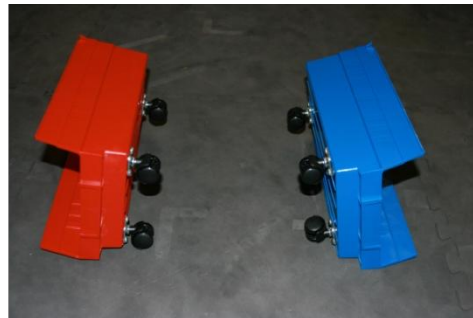
2.3.2 Ping Pong Balls: The Ping Pong Balls are worth 4 points if placed in the Scoring Boxes.



2.3.3 Scoring Boxes: Boxes measuring 4" by 6.5" by 11.875", they are arranged in alternating colors (Blue and Red) around the center of the field in a circle with a diameter of 35". These boxes have three casters on the bottom; two on the front corners and one located in the center on the back and are easily pushed around. Although the height of the colored boxes is 4", the total height of the scoring boxes is approximately 5.5" with casters. These boxes also have a small lip on one of the 6.5" sides, the bottom of this lip is approximately 3.5" from the ground with casters.



Top View



Side View



Circle of Scoring Boxes

### 3. Scoring

3.1 Official Scoring: To be determined at the end of the match. However during the match there will be real time scoring. This scoring is unofficial and is only to serve as a strategic aid to alliances.

#### 3.2 Game Elements

3.2.1 Ball Containment Units (BCU): Golf balls that are worth 2 points are located in these at the beginning of the match. Robots can remove golf balls from any BCU.

3.2.2 Scoring Zones: Finishing the match in the scoring zone of your alliance is awarded 10 points.

3.2.3 Scoring Boxes: Each team will start with three scoring boxes on the field, as mentioned in rule 2.3.3. Every ball within a scoring box at the end of a match awards points to its corresponding team, ping-pong balls are worth four points, golf balls are worth two. Teams can not remove balls from the other teams scoring boxes or tip over opponents scoring boxes. Each incident is treated as a 15-point penalty.

3.2.3.1 For every scoring box fully within its corresponding team's scoring zone, double points will be awarded. The double points are not applied to a robot in a scoring zone.

3.2.3.2 For every scoring box within the opposing team's scoring zone, a times zero multiplier will be applied.

	Red Box	Blue Box
Red Zone	X 2	x 0
Blue Zone	x 0	x 2
Neutral	x 1	x 1

3.2.3.3 Standard scoring will be used for every scoring box not within a scoring zone.

3.3 Bonus Points: Alliances will be awarded twenty extra points for each robot that is at least half within the BCU. At the end of the match, the referee will judge "half of a robot".

### 4. Matches

#### 4.1 Field Crew

A field crew team consists of three members: One driver, one human player, and one coach.

4.1.1 Driver: the driver is the only person who may touch the controls of the robot. The driver may not touch any game piece.

4.1.2 Coach: The coach cannot touch the controls or the game pieces; they cannot interact with the robot in any way. (Optional position)

4.1.3 Human Player: The Human Player's job is to score points via ping-pong paddle and ping-pong balls. Each human player will be given one ping-pong paddle and ten ping-pong balls. These players are allowed to knock their own alliance's ping-pong balls into the playing field, but only with their paddles. Ping-pong balls that are entered into the field will be closely monitored by referees, and balls entering the field that have not been touched by a human player's paddle will not be counted.

4.2 Match Safety: Safety glasses are a required at all times during the matches to ensure the maximum possible eye protection. Safety glasses are also required at all times in the pit area and on the competition field. Teams will not be permitted to compete unless all team members on the competition field are wearing safety glasses. Teams must provide their own safety glasses for the event; the event coordinators will not supply safety glasses.

4.3 Match Setup: The robots must be setup with the following considerations.

4.3.1 On each alliance one robot must start the match completely in the starting zone, while the other starts the match inside the center circle, see rule 2.3.3 for reference to the center circle.

4.4 Match Types: The competition will consist of Qualifying Matches followed by Elimination Matches. Each match is 2 minutes and 30 seconds long. There is no autonomous period and the robot will remain under the control of one individual for the duration of the match.

#### 4.4.1 Qualifying Matches

4.4.1.1 All teams will play in approximately the same number of Qualifying Matches (the number of matches will differ by no more than one match). Teams will be paired with random alliance partners for each Qualifying Match. The length of the event and the number of teams competing will determine the number of Qualifying Matches at each event. Teams playing in extra matches will be deemed surrogate teams and the results of that extra match will not affect their ranking.

4.4.1.2 Teams will be given their schedule of Qualification Matches before the start of the first match. The Qualification Match schedule will show the match number, the alliances competing in each match, and the color that each alliance is assigned for that match.

4.4.1.3 At the end of each Qualifying Match, the total number of points scored by each alliance will be considered their Qualification Points.

4.4.2 Elimination Matches: Elimination matches are to be run the same as the qualification matches.

4.4.2.1 During elimination matches, the #1 ranked alliance will play the lowest ranked alliance entering the elimination matches (i.e. if there are 4 alliances in the elimination matches, #1 will play #4, and the #2 ranked team will play the second-lowest ranked team, and so on.)

4.4.2.2 The number of teams participating in elimination matches will be at most 8 but may be increased or decreased prior to the start of the event based on the number of teams participating.

4.4.2.3 Alliance selection procedure for the elimination matches will be run like FRC elimination alliance selection, in which the 1st place team will pick first and the 4th place ranked team will pick last. If a team ranking in the top 4 places is picked, then the next seeded team will pick.

## 4.5 Ranking

At the end of the qualifying matches, teams will be ranked from 1 to N (N being the total number of teams present) based on the following:

- Most wins
- Total number of Qualification Points
- Most matches with robot in the BCU
- Coin toss

## 5. General Rules

5.1 Disqualification: Robots may be disqualified based on their actions that violate the rules of the game. If a referee calls for a disqualification during a match, the robot will be disabled and they will receive a score of 0 for the match. If disqualification is not determined until the completion of the match, the offending robot will receive a score of 0 for the match. The alliance partner of a disqualified robot will still receive the score earned by both robots for their duration in the match, provided that they are also not disqualified. In both situations the opposing alliance will receive a score based on the points that they earned.

### 5.2 Safety Hazards:

5.2.1 Referees may request that teams alter any portion of their robot that is considered a safety hazard. It is the right of the referees to prevent teams from playing in matches until such changes are made to the robot.

5.2.2 Referees will disqualify any robot that they deem to be a repeat safety hazard. A safety hazard is any direct action of, or mechanical failure on said robot that may increase the possibility of immediate damage to other robots, field objects, or personnel.

5.3 Loss of Parts: All parts of the robot must remain attached to the robot for the duration of the match and must not cause any hazard of entanglement to any other robot. The robot's team that causes the loss of parts may run the risk of disqualification. Minor pieces that unintentionally become detached from the robot and do not affect the outcome of the match will not cause a disqualification.

5.4 Pinning: Pinning occurs when an opposing robot is held against an obstacle and cannot move, in any direction, because of your robot's presence. The closest referee will visibly count out pinning, for a duration of five (5) seconds. If a robot is being pinned for five seconds, the team doing the pinning must back off for at least five seconds before they can resume. Failure to do so will result in the disqualification of the aggressor.

5.5 Flipping: Robots may not intentionally flip an opposing team's robot. The flipping robot will be penalized 15 points from the match score if in the referee's decision they initiated a lifting action that results in flipping. In incidents where the flipped robot initiates action or both robots are in motion, penalization may not occur and will be at the discretion of the referees.

5.6 Intent to Destroy: Strategies aimed solely at the destruction of or damage to an opponent's robot or the field is not in the spirit of the competition and will not be allowed. It is up to the referee to give a warning or disqualify the robot from the match.

5.7 Human Player Actions: Human Player's actions will be closely monitored during the match, and the following actions will result in penalty:

5.7.1 Hitting Ping Pong Balls: Human Players will not be allowed to intentionally hit ping pong balls at opposing robots, or humans. Any Human Player caught doing so will be removed from the field for the remainder of the match.

5.7.2 Robot Interaction: A team may not touch any robot during play; if they do so then they will be disqualified. Referees will signal all teams when it is okay to pick up their robots and proceed to the pit area.

5.8 Home Zone: At the start of the match, teams may place their robot anywhere inside the designated robot home zone corresponding to their team color. The starting area is defined by the outer boundary of the tape. Alliances must make a joint decision as to which alliance-colored starting area their robots will be placed in before each match.

5.9 Scoring Objects: Any scoring object that leaves the playing area during a match will not be returned to the field and is ineligible to be scored.

5.10 Robot Control: Team members may interact with their robot during a match only through the normal operation of the VEX control system. Only designated drivers may be in contact with the controls during the match.

5.11 Robot Modification: Teams are allowed to modify their robots in between matches as long as the robot remains compliant with all specifications and rules after the modification. Any modification should be brought to the attention of the referees or head inspector prior to the start of the team's next match. Teams may be subject to re-inspection at the discretion of the referees/head inspector.

5.12 Robot Identification: Teams must have their team number clearly marked on four sides of their robot. The numerals should be at least 2" high for easy visibility. Teams must also have the ability to designate either Blue or Red alliances with a color insert or flag. These inserts must be provided by the team and must not be a functional part of the robot.

5.13 Rule Clarification: All questions or requests for rule clarifications should be submitted to [mentor\\_vex@midwestvex.org](mailto:mentor_vex@midwestvex.org)

5.14 Referee Rulings: All referee decisions regarding rules of play and scoring are final. If there are any questions the head referee will make the final decision

## 6. The Robot

6.1 Size Restriction: At the start of each match, every part of the robot must fit, unconstrained, in a stable position, within a cube with 15" sides. The robot may only contact the surface of the field in starting position. Robots will be measured before the beginning of qualification and elimination matches.

6.2 Weight Restriction: There is no restriction on the robot's weight, and it will not be measured at the competition.

6.3 Controls: Teams will be required to use one (1) competition remote control. Frequency modules will be provided by the competition coordinators and are not allowed to be brought to the competition site. Each team's remote is required to be tethered to a field disable tether during matches.

6.4 Pit Operation: Teams must bring a tether for robot control in the pit area. Robots may not be operated outside of the competition field or pit area. Failure to follow this rule may result in forfeiture of the next round of competition.

6.5 Construction Restrictions:

6.5.1 A robot must be designed to operate by reacting only against features within the confines of the playing field boundaries and may not interact with anything outside the boundaries of the playing field.

6.5.2 Gaining traction by use of adhesives or by abrading or breaking the surface of the playing field is not allowed and will be considered to be damaging the playing field and is subject to disqualification.

6.5.3 A robot may not intentionally contaminate the playing field or an opponent's robot with lubricants or other debris.

6.5.4 Teams may use 7.2V NiCd batteries of any manufacture, but only one battery (six cells) may be used on the robot at a time. The battery cost does not count towards the cost limit listed below.

6.5.5 Only parts from the VEX Robotics Design System Starter Kit are permitted unless specified on the additional materials list below.

6.5.6 Modifications are permitted to the mechanical parts of the kit. Teams may opt to buy their own replacement or spare parts from [www.vexlabs.com](http://www.vexlabs.com), but these may not be used as part of the robot until the part fails. Teams may NOT intentionally modify any of the kit electronics. Modification of items on the additional materials list is also permitted.

6.5.7 A parts outline form the VEX Robotics Design System Starter Kit can be found at <http://www.vexrobotics.com/vex-robotics-design-system.shtml>

6.6 Materials: There are few restrictions to the materials used on competing robots. All robots must use one, and only one, VEX Robot Controller, but may use any amount of VEX Robotics Design System parts (motors, sensors, pneumatics, metal, etc.) and any excess build materials (such as wood, metal, styrofoam, plastic, acrylic, rope, and unobtainium). We're encouraging creativity, but want to remind everyone to be graciously professional when designing your robots. Each team must submit a Bill of Materials outlining their parts and expenses before their first match. We ask that the Bill of Materials distinguish between starter kit materials and additional materials.

6.7 Additional Materials List: You may choose to program certain functions in your robot. The programming kit may be used to program custom functions to your robot.

6.8 Vexplorer: Any Vexplorer parts maybe used so long as the parts are accounted using the equivalent cost of the VEX parts. These pieces will be considered as part of the \$200 VEX accessories.

6.9 Energy Sources: The energy used by the devices in the competition must come solely from:

- A change in altitude of the center of gravity of the device
- Electrical energy delivered by the battery to the electronics and motors provided with the kit.