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MIDWEST VEX PROGRAMS

*Presents:*



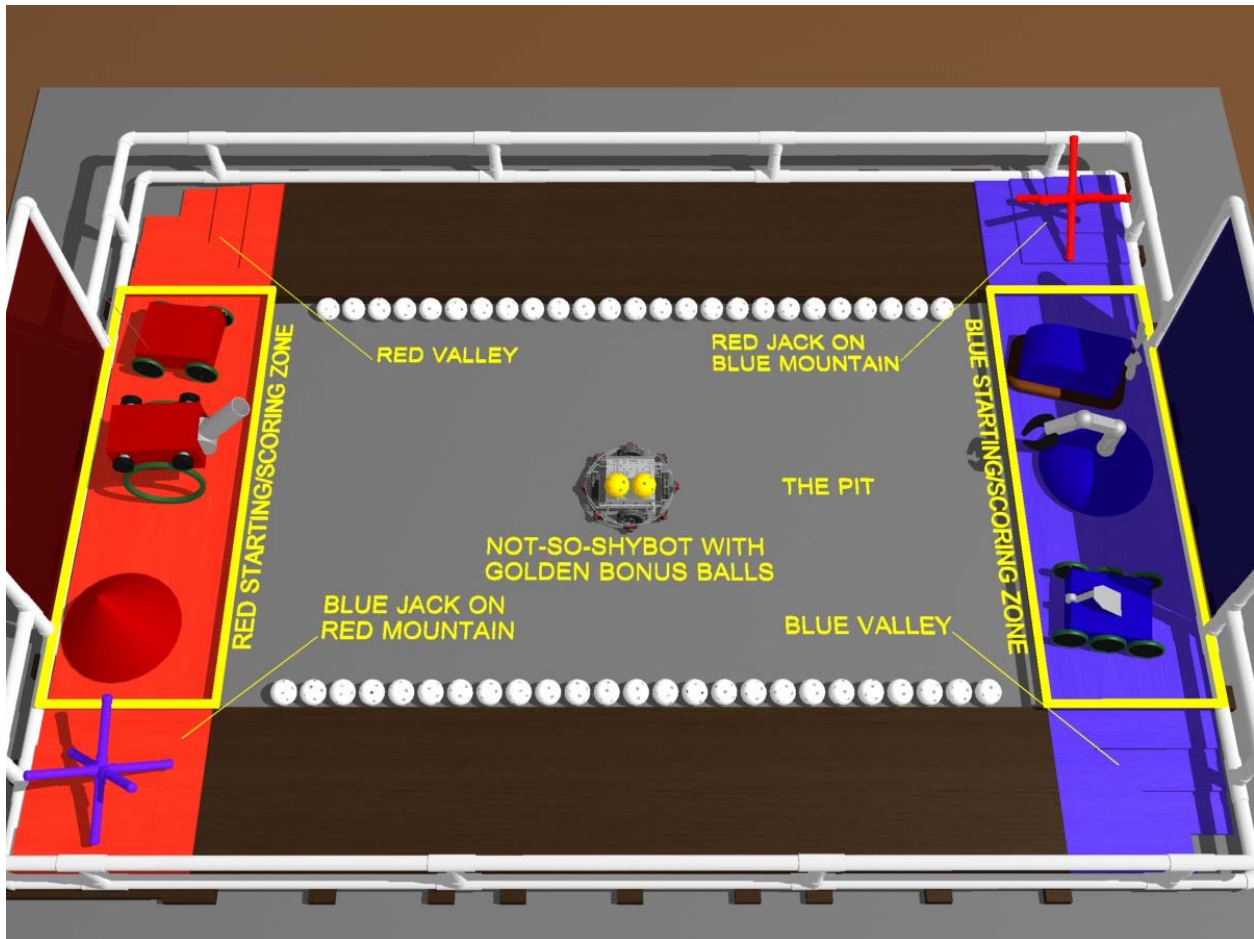
*The 2009 Midwest Vex Programs Robotics Challenge is Sponsored by:*  
**Rockwell Automation and American Acrylics USA, LLC**

# 1. Introduction

The 2009 Midwest Vex Challenge is High Jacked. This year's game will challenge you to work with your alliance partners to collect balls, raise Jacks, and climb cliffs to outscore your opponents and "High Jack" the match.

## 1.1. The Field

All matches are played on the standard Midwest Vex Programs Playing Field with a 10 feet by 14 feet PVC boarder and is covered by interlocking foam floor tiles from [www.softtiles.com](http://www.softtiles.com).



Along the perimeter of the Midwest Vex Programs Playing Field sits a 24 inch wide 2 1/8 inch tall platform. This platform ends in a sheer cliff that rings the 6 feet by 10 feet center of the playing field called The Pit.

The raised platform sections along the players' stations are colored for that alliance. These sections are the red and blue Scoring and Starting Zones. Each of these zones also contains a Mountain and a Valley on opposite corners.

A detailed bill of materials and assembly instructions will be made available on [www.midwestvex.org](http://www.midwestvex.org).

## 1.2. Scoring Elements

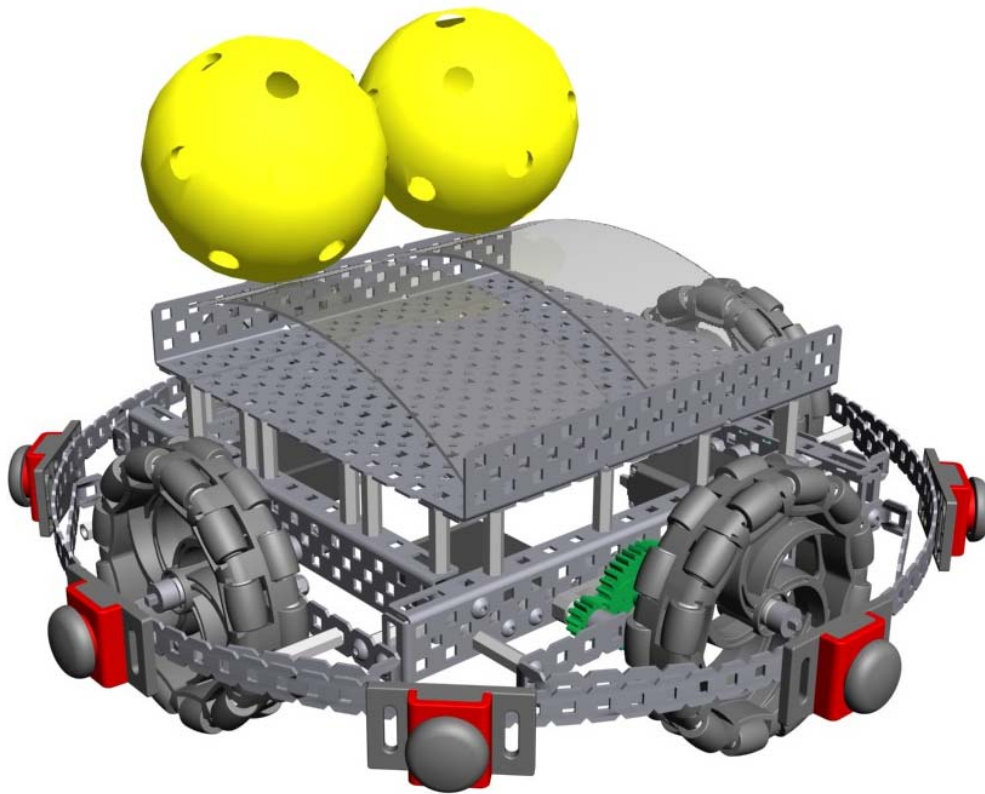
The primary scoring elements of the game are 12 inch circumference softball style wiffle balls. The pit is lined on opposite sides with 25 balls on each side. There are also two golden bonus balls which can be released onto the playing field.

The secondary scoring elements of the game are jacks constructed with 6-10 inch long by 1 inch diameter PVC arms. Each alliance has a single jack that starts on the opponent alliance's Mountain.

A detailed bill of materials, assembly instructions, and sources will be made available on [www.midwestvex.org](http://www.midwestvex.org).

## 1.3. The Not-So-Shybot

The Shybot has warmed up to the alliance robots since they met in Conefusion. The Shybot is now the Not-So-Shybot and is really excited to play in the Pit. Once an alliance robot comes up and asks the Not-So-Shybot to play, there is no stopping this easily excitable game element.



The Not-So-Shybot is the keeper of two golden bonus balls. The Not-So-Shybot will release a golden bonus ball for each Jack brought down from a Mountain.

## 2. Playing The Game

The objective of the game is to score balls and Jacks in the Scoring Zones.

### 2.1. Starting Positions

Each alliance must have all of their robots start completely in the Starting Zone of their alliance color.

### 2.2. Scoring

Balls, Jacks, and robots can be used to score points at the end of the match in the following manner:

Description	Scoring Value
A ball in your Scoring Zone	1 point
A ball in your Valley	3 points
A bonus ball in your Valley	10 points
A bonus ball atop your Jack	20 points
Three robots in your Scoring Zone	25 points
Your Jack atop your Mountain	50 points and “High Jack” 1 Ranking point

All match scoring is accessed at the conclusion of the match when all elements have come to rest. To be considered scored, balls, robots, and Jacks must not be supported by any other element.

All scoring tallies and decisions by the head referee are final. Inquiries may be made before the start of the next match by one student team member.

### 2.3. General Rules

#### 2.3.1. Players

Each team on an alliance must provide and designate two student players for each match. Only one player may have control of their team’s robot at any time. Failure to provide two players at the beginning of the match will result in a disqualification.

#### 2.3.2. Disqualification

Any robot may be disqualified based on the actions of the robot or team members that violate the rules of the game, present a safety hazard, or are destructive to the field or field elements. Upon a disqualification determined by the head referee, the offending team’s robot must be disabled and that team will receive zero points for that match. Non-disqualified alliance partners will receive the score earned by all teams on their alliance at the conclusion of the match. A disqualification of a single alliance partner during an elimination match will result in the disqualification of the entire alliance.

### **2.3.3. Personal Protection Devices**

All participants are required to wear safety glasses on the field and in the pits. Teams must provide their own safety glasses.

### **2.3.4. Safety Hazard**

Referees may request that teams alter their robot if the referees determine the robot presents a safety hazard. Referees may prevent any robot they determine to present a safety hazard from entering the playing area.

### **2.3.5. Loss of Parts**

All robot parts must remain attached to the robot for the duration of the match and must not cause an entanglement issue for other robots. Any loss of parts that may result in a safety hazard or hazard for other robots may be disabled or disqualified at the discretion of the referees.

### **2.3.6. Out of Bounds**

Any robot that comes into contact with any object outside of the field will be disabled. Any robot that forces another robot out of bounds will be disqualified at the discretion of the referees.

### **2.3.7. Pinning**

If any robot causes another robot to be held against an obstacle and cannot move for greater than 5 seconds after which the offending team must back off for 5 seconds or will receive a 5 point penalty.

### **2.3.8. Flipping**

Robots must not actively or passively cause an opposing alliance robot to be flipped. Any robot that flips an opposing alliance robot may be disqualified at the discretion of the referees.

### **2.3.9. Intent to Destroy**

Strategies resulting in the destruction or damage of an opposing alliance robot or the field or field elements will not be tolerated and may result in a team being disqualified at the discretion of the referees.

### **2.3.10. Scoring Objects**

Any scoring object that leaves the playing area during a match will be returned to the field near the point of exit at a referee or volunteers' earliest convenience.

### **2.3.11. Not-So-Shybot**

Any action taken by a robot that lifts, latches onto, flips, or causes damage to the Not-So-Shybot will result in a 10 point penalty, disabling, or disqualification at the discretion of the referees.

### **2.3.12. Robot Control and Interaction**

Team members may only control or interact with their robot through the normal operation of the Vex control system. Robots must observe the disabled state of their controller.

### **2.3.13. Robot Modification**

Teams are encouraged to continuously improve their robot to adapt to new ideas and strategies during a competition as long as these modifications are within the rules stated herein. Robots are subject to inspection at any time at the discretion of the referees.

### **2.3.14. Robot Identification**

Robots must have their robot clearly marked so its alliance color and team identification can be seen from all sides from a minimum distance of 15 feet and cover a minimum area of 15 square inches (eg: 3 x 5 inch index card). This identification is must be supplied by the team.

### **2.3.15. Rules Clarification**

All requests for rules clarification should be submitted to [rules@midwestvex.org](mailto:rules@midwestvex.org). Official rule clarification will be posted publicly on the event web site.

### **2.3.16. Referee Rulings**

All referee decisions are final. Any inquiries may be made by one student team member before the start of the next match.

## **2.4. Matches**

At the beginning of all matches alliance robots must start completely in their alliance starting zone. Each match will run for 2 minutes and upon completion the match all robots must be disabled. The competition is held in two phases: Qualification and Elimination.

### **2.4.1. Qualification Matches**

All teams will play in approximately the same number of qualification matches. The number of qualification matches that each team will play at the event is determined by the number of teams present when the qualification match schedule is generated. The qualification match schedule will be made available before the start of the first qualification match and will include the match number, alliance pairings, and alliance color.

Upon the completion of a qualification match, the Ranking Score for each alliance will be awarded based on the match score and location of the Jacks as determined by the referee. The alliance with the highest match score will receive **one** (1) Ranking Point and the other alliance will receive **zero** (0) match points and any team with their Jack atop their alliance's mountain will receive **one** (1) match point.

Ties in match scoring will be broken in the following manner:

1. Greatest number of non-bonus balls scored in your Scoring Zone during the match
2. Best of 3 Rock-Paper-Scissors competition between a single designated player from each alliance

Upon the completion of all scheduled qualification matches teams will be ranked based on the following criteria:

1. Highest Ranking Score
2. Highest Match Score
3. Highest Number of High Jacked Ranking Points

Ties in ranking are resolved randomly through a coin flip

#### **2.4.2. Elimination Matches**

Using the team ranking determined at the end of the qualification matches alliance selections will be made in a fashion similar to the FIRST Robotics Competition selection rules:

The top ranked teams pick an alliance partner in order of ranking during two rounds of alliance selections. A team may refuse to be selected by a picking team but in doing so they become ineligible to be picked by any other team. In the case that a top ranked team picks another top ranked team all following teams will be promoted. (The number of top ranked teams will be determined prior to the start of qualification matches based on the number of teams present with consideration to having the most number of teams play in the time available)

Elimination rounds are played in a single elimination tournament fashion and will be played until there is a single winning alliance. An elimination tournament round winner must win two matches to move on to the next round. The tournament bracket will be constructed such that the highest ranked alliance plays the lowest ranked alliance. In the case where there are an insufficient number of alliances in the first elimination round the highest ranked alliances will have a bye round.

### **3. Alliance Robots**

#### **3.1. Size Restriction**

At the beginning of a match the robot must fit in a box with a volume of 3,375 cubic inches (eg: 15 x 15 x 15 inches) with no single dimension exceeding 24 inches as determined by the referees.

#### **3.2. Controls**

Teams are required to use one and only one competition remote control. Robots must observe the disabled state of the remote control from the tethered field control connection. Robots may only use non-tethered communication and control when on the field. Robots must be tethered during any other operation including in the pit area.

#### **3.3. Construction and Materials**

##### **3.3.1. Non-Destructive Design**

A robot must be designed to operate only within the confines of the playing field, be non-destructive and leave no piece or part behind on the playing field.

##### **3.3.2. Power and Energy**

A robot must be powered by a single six cell 7.2V NiCd battery. Alternate energy sources and storage listed below may be utilized in conjunction with electrical powered operation:

- A change in potential energy due to a change in the altitude of mass
- Deformation of rubber bands

### **3.3.3. Parts**

A robot may be constructed from the following functional items:

- The contents of two Vex Robotics Design System Starter Kits
- Up to \$200 in additional Vex accessories or kits currently available at [vexrobotics.com](http://vexrobotics.com)
- String up to ¼ inch in diameter
- Rubber bands up to 1 inch in width

A robot may use an unlimited amount of non-functional decoration as long as it does not conflict with any other rule.