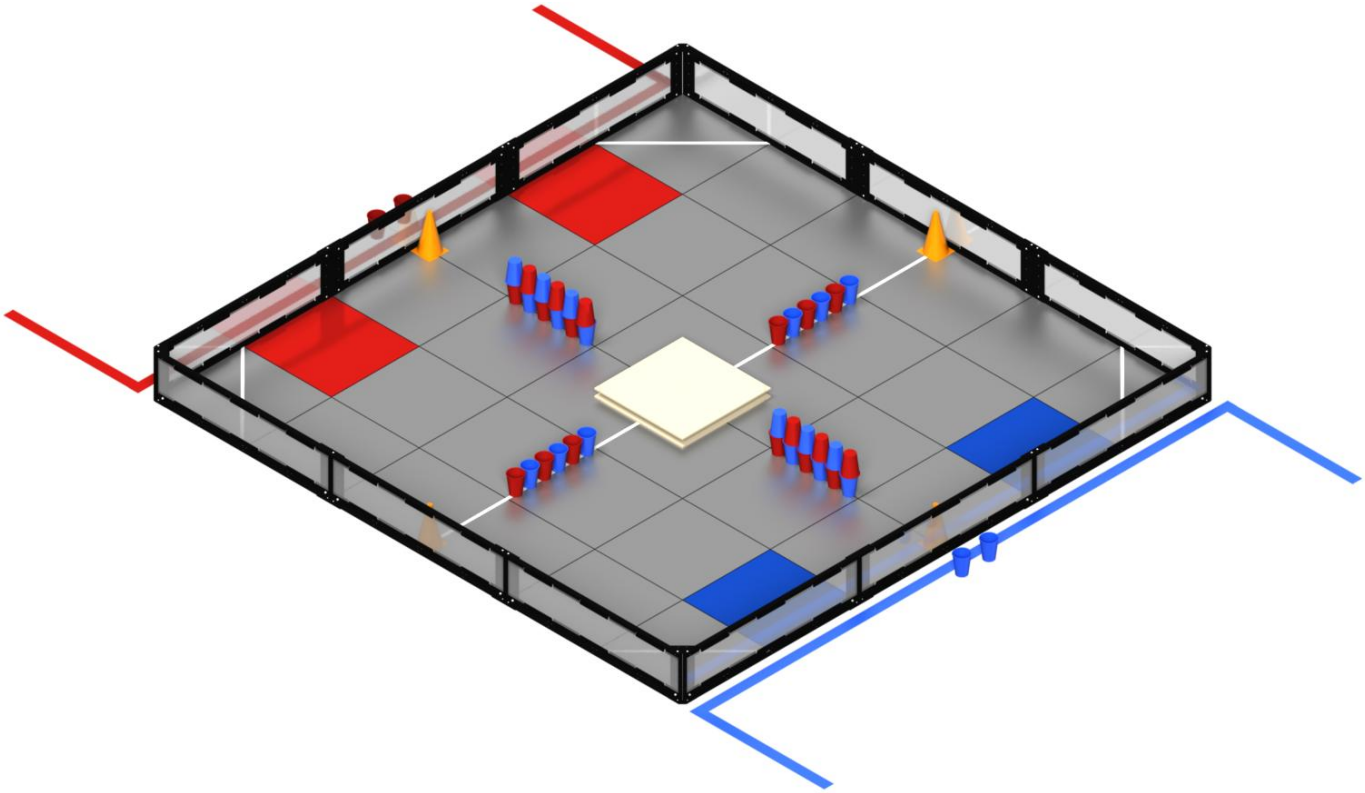
KIWIBOTS NEW ZEALAND

Tic-Tac-Topple!

KiwiChallenge 2014
Release 1



KIWIBOTS NEW ZEALAND

1

Introduction

Overview

This section provides an introduction to “Tic-Tac-Topple!” the 2014 KiwiChallenge and the Vex Robotics Competition.

Kiwibots – Who we are and what we do

The NZ Robotics Charitable Trust (trading as KIWIBOTS) with the support of Massey University was formed to inspire interest in science and technology in NZ schools by bringing the FIRST robotics program to New Zealand.

Kiwibots decided to introduce the VEX competition in New Zealand as it offers students many more chances to compete against other schools rather than only once a year as is the case with FIRST. Changing from one competition a year to one a month means that students can now refine their ideas and learn from their mistakes.

The foundation sponsors of the Kiwibots were Fisher and Paykel Healthcare, Glidepath Limited and Federal Express (FedEx) with support from the Employer and Manufacturers Association (EMA) (Northern), Qantas, Amcham, Massey University and Smales Farm.

The Kiwibots run the KiwiChallenge as a short game to be played during the “off season” to allow new teams to get up to speed and to give the teams not travelling to the World Championships something to do after the Nationals until the new season’s game pieces arrive in New Zealand.

TIC-TAC-TOPPLE! – A Primer

“Tic-Tac-Topple!" is an exciting and dynamic game which will provide teams with a high paced challenge for the duration of two minutes. Matches feature alliances of two teams playing from opposite sides of the playing field. Teams will compete to score the most points by completing various tasks including pushing cups into field goals, manipulating and scoring them on cone goals and navigating a way onto the seesaw-like toppler.

While participating in the "*TIC-TAC-TOPPLE!*" 2014 *KiwiChallenge* season, teams will develop many new skills in response to the challenges and obstacles which stand before them. Some problems will be solved by individuals, while others will be handled through interaction with their student teammates and mentors. Teams will work together to build a VEX robot to compete in tournaments. After the season, students come away not only with the accomplishment of building their own competition robot, but with an appreciation of science and technology and how they might use it to positively impact the world around them. In addition, they cultivate life skills such as planning, brainstorming, collaboration, teamwork, and leadership as well as research and technical skills.

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The Game

Matches are played on a 12' x 12' field initially set up as illustrated in the figures below. Two *alliances* – one "red" and one "blue" – composed of two teams each, compete in each *match*. The object of the game is to attain a higher score than the opposing *Alliance* by scoring more of your *Alliances* coloured *Cups* in the floor *Corner Goals* and *Cone Goals* in an attempt to own them. *Owned Goals* that create a straight line of three across the field will give that *Alliance* a *Line Bonus*. The *Toppler* can be *Owned* by tilting it to your *Alliances* side of the field. Bonus points are given if your *Robot* is also parked on the toppler at the end of the *Match*.

Drivers and coaches must stay within their *Alliance stations* during the match. After a match driver or coaches must not touch their robots until advised that they can by the referee.

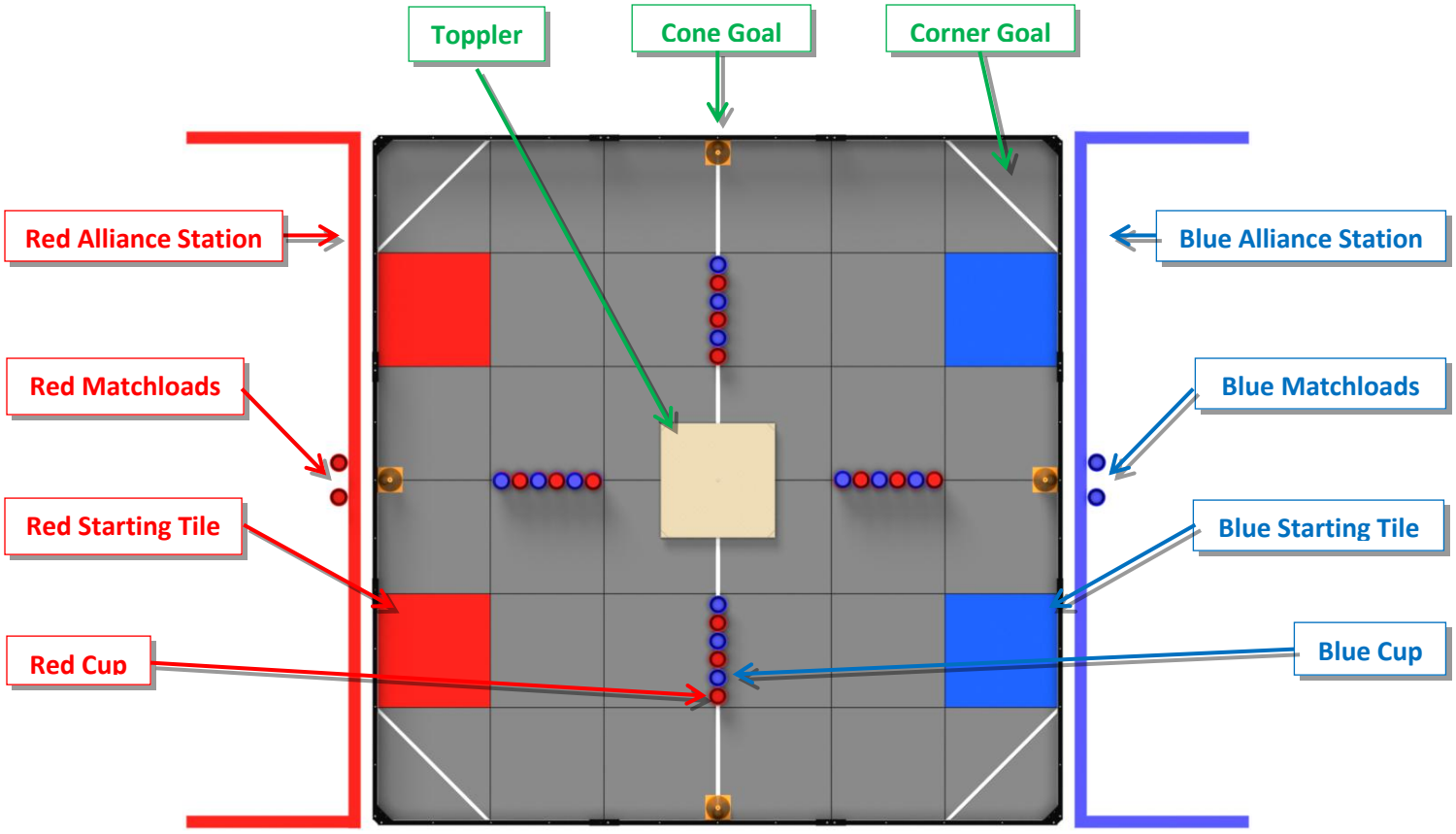


Figure 1: *Full field set-up*

There are a total of 40 *Cups* available as *Scoring Objects* in the game, twenty (20) red and twenty (20) blue. Each *Alliance* will have Two (2) *Cups* of their colour available as optional *Matchloads*. Thirty-six (36) *Cups* will start at the designated location on the field.

Definitions

Adult - Anyone not meeting the definition of *Student*.

Alliance – A pre-assigned grouping of two teams that work together for a given *Match*.

Alliance Starting Tile - A coloured tile (red or blue), which designates the location where *Robots* of that coloured *Alliance* must start the *Match*.

Alliance Station – The designated region where the *Drivers* and *Coaches* stand during any *Match*. This is defined by the side of the field on which their *Alliance Starting Tiles* are situated and is outlined by tape of the alliance's colour.

Coach - A *Student* or *Adult* mentor designated as the team advisor during the *Match*. Only one (1) of these is allowed per team on the field at any given time.

Cone Goal – One of four (4) 9" tall plastic cones situated around the field. These are available from Rebel Sport stores. See figure 2

Corner Goal – One of four (4) floor goals located in the corners of the field. Each goal takes up half a tile.

Cup – A 12cm tall plastic cup available in both red and blue. Each set will come with 50 cups of each colour. If you would like to buy them they are available from Gilmours stores or can be ordered from Chris Hamling.

Disqualification - A penalty applied to a team for a rules violation. A team who is *Disqualified* in a Qualifying Match receives zero (0) WP and SP. When a team is *Disqualified* in an Elimination Match the entire *Alliance* is *Disqualified* and they receive a loss for the *Match*. At the head referee's discretion, repeated violations and *Disqualifications* for a single team may lead to its *Disqualification* for the entire tournament.

Driver - A student team member responsible for operating and controlling the *Robot*. Only two (2) of these are allowed per team on the field at any given time.

Driver Controlled Period – The 2:00 (two minute) time period in which the *Robots* are operated by the *Drivers*.

Entanglement - A *Robot* is considered to have *Entangled* an opposing robot if it has grabbed or hooked the opponent *Robot*.

Field Element - The Foam Field Tiles, Field Perimeter, *Cone Goals*, *Toppler* and all supporting structures.

Line Score – A bonus applied when your *Alliance Owns* three (3) *Line Stations* in a row. This can be lengthwise, width-wise or diagonally across the field.

Line Station – The four (4) *Corner Goals*, four (4) *Cone Goals* and the *Toppler*

Match - A *Match* consists of the *Driver Controlled Period* for a total time of 2:00 (two minutes).

Matchload - The two (2) *Cups* available in each *Alliance Station* of that alliances colour to be loaded at any time during the *Match*.

Owned Goal – To own a goal your *Alliance* must:

-Have more of your coloured *Cups* – if a *Corner Goal*
-Have the top *Cup* – if a *Cone Goal*
-Have tilted the *Toppler* so that it is touching your *Alliances* side of the field. If it is touching both sides simultaneously then it is not *Owned.*

Parking Bonus – Ending the *Match* with your *Robot* touching only the *Toppler* will result in your *Robot* getting a bonus score.

Pinning - A *Robot* is considered to be *Pinning* an opposing *Robot* if it is inhibiting the movement of an opponent *Robot* while the opposing *Robot* is in contact with the foam playing surface and another *Field Element*.

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

Scored - A *Cup* is *Scored* if it meets all of the following criteria.

-For a *Corner Goal*

1. The *Cup* is fully within the outermost edges of the goal area, extended infinitely perpendicular to the foam tiles.
2. The *Cup* is not touching a *Robot* of the same colour as the *Cup*

- For a *Cone Goal*

1. The *Cup* is placed so that its lowest point is higher than 4" above the foam tiles.
2. The *Cup* is fully supported by the Cone either through direct contact, or through contact with other *Cups*
3. The *Cup* is not touching a *Robot* of the same colour as the *Cup*

Scoring Object - See "*Cup*"

Student - Anyone enrolled in a pre-university school or home-schooled as part of a pre-university educational curriculum.

Trapping - A *Robot* is considered to be trapped if an opposing *Robot* has restricted it into a small, confined area of the field, approximately the size of one foam field tile or less, and has not provided an avenue for escape.

Toppler – The 600mm x 600mm MDF platform in the centre of the field. The top platform is raised 6cm off the field tiles and can be tipped in all directions. The toppler can be seen in Figure 4. Assembly instructions are also attached

***Figure 2**: Cone Goal*

***Figure 3:** A red and blue cup*

***Figure 4**: Toppler*

Game Rules

Scoring

- One (1) *Cup* in a *Corner Goal* is worth one (1) point
- One (1) *Cup* on a *Cone Goal* is worth three (3) points
- *Owning* a goal gives a bonus of five (5) points
- A *Line Score* is worth fifteen (15) points
- *Parking Bonus* is worth ten (10) points

Safety Rules

<S1> If at any time the *Robot* operation is deemed unsafe or has damaged the playing field, surface, other *Robots*, or elements, by the determination of the referees, the offending team may be *Disqualified*.

<S2> If a *Robot* goes completely out-of-bounds (outside the playing field), it will be disabled for the remainder of the match.
Note: The intent is NOT to penalize *Robots* for having mechanisms that inadvertently cross the field border during normal game play.

General Game Rules

<G1> When reading and applying the various rules in this document, please remember that common sense always applies in the VEX Robotics Competition and "TIC-TAC-TOPPLE!"

<G2> Each team shall include up to two D*rivers* and one C*oach*.

<G3> During a *Match*, the *Drivers* and *Coach* must remain in their *Alliance Station*.

<G4> *Cups* that leave the playing field are considered out of play. These objects will be returned to the field at the nearest available place to where they exited. They may be returned in any orientation. A *Cup* will never be returned to a scored position. Teams may not intentionally remove *Scoring Objects* from the field, while not in the process of scoring or descoring. Violations of this rule will result in a warning for minor offenses which do not affect the match. Egregious (match affecting) offenses will result in a *Disqualification*.

<G5> Drivers and coaches are prohibited from making intentional contact with any game object, field object, or *Robot* from either *Alliance* during the course of a *Match*. Accidental contact will result in a warning with no further penalty, unless the contact directly impacts the final score of the *Match*. This type of accidental contact will result in a *Disqualification*.

<G6> During a *match*, *robots* may be remotely operated only by the *Drivers* and/or by software running in the on-board control system. Violations of this rule will result in a warning for minor offenses which do not affect the M*atch*. Egregious (match affecting) offenses will result in a *Disqualification*

<G7> Scores will be calculated for all *Matches* either immediately after the *Match* or when all objects on the field come to rest.

<G8> *Robots* may not intentionally detach parts during any *Match*, or leave mechanisms on the field. If an intentionally detached component or mechanism affects game play the team shall be *Disqualified* at the referee's discretion.

<G9> Strategies aimed solely at the destruction, damage, tipping over, or *Entanglement* of *Robot*s or *Field Elements* are not part of the ethos of the VEX Robotics Competition and are not allowed. However, KIWIBOTS Tic-Tac-Topple is an interactive game. Some incidental tipping, *Entanglement*, and damage may occur as a part of normal game play. If the tipping, *Entanglement*, or damage is ruled to be intentional or egregious, the offending team may be *Disqualified* from that *Match*. Intent to remove supporting structures from *Field Elements* will be ruled as damage. Eg. removing Rubber bands from the *Toppler*.

All teams are responsible for the actions of their *Robots*. This goes for teams who are driving recklessly and potentially causing damage, but also goes for teams who drive around with a small wheel base and arm extended. Teams should design their *Robots* such that they are not easily tipped over or damaged by minor contact with other *Robots* or the *Toppler*.

<G10> *Robot*s must be designed to permit easy removal of Scoring Objects from any grasping mechanism without requiring that the *Robot* have power after the *Match*.

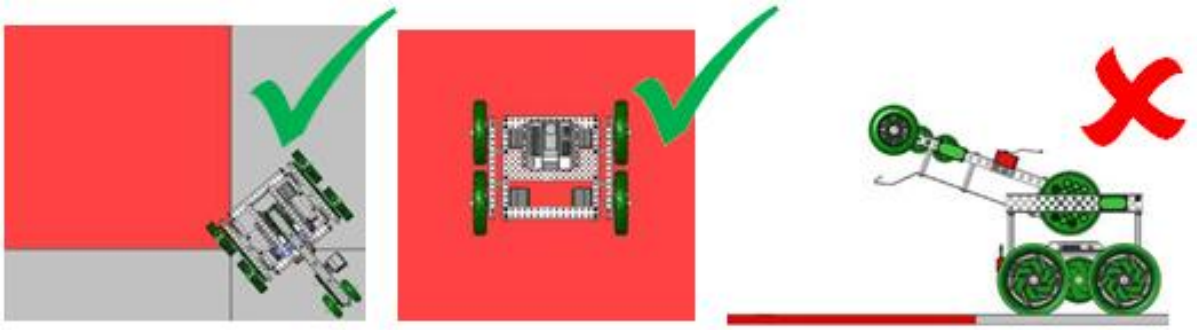
<G11> Field tolerances may vary by as much as ±1", except where otherwise noted, so teams must design their *Robot*s accordingly.

<G12> All teams must adhere to all VEX Robotics Competition Rules and KiwiChallenge Rules as they are written, and must abide by the listed intent of the rules. Every team has the opportunity to ask for official rules interpretations by emailing Chris Hamling. Any responses will be made public and should be treated as official rulings from the KiwiChallenge Game Design Committee and represent the correct and official interpretation of the KiwiChallenge Rules.

<G13> All teams are expected to conduct themselves in a respectful and professional manner while competing in VEX Robotics Competition events. If team members are disrespectful or uncivil to event staff, volunteers or fellow competitors, they may be *Disqualified* from their current or upcoming *Match*. It is important to remember that we are all judged based on how we deal with adversity. It is important that we all exhibit maturity and class when dealing with any difficult situations that may present themselves in both the VEX Robotics Competition and life in general.

Specific Game Rules

<SG1> At the beginning of each *Match*, each alliance *Robot* must be placed such that they are touching one of the coloured alliance tiles and not touching any *Scoring Object* other than those permitted. This is shown in the diagram below.



Figures 5, 6 & 7: *From left to right, legal starting position, legal starting position, illegal starting position*

<SG2> Any *Matchloaded Cups* introduced during the *Match* must be either gently placed on a *Robot* of your own colour while it is touching an *Alliance Starting Tile* or gently placed on an *Alliance Starting Tile* of your own colour. Violations of this rule will result in a warning for minor offenses which do not affect the *Match*. Egregious (match affecting) offenses will result in a *Disqualification*

• A Driver or Coach may introduce *Matchloads* at any point during the *Driver Controlled Period*.

<SG3> A *Robot* cannot *Pin* or *Trap* an opposing *Robot* for more than five seconds during the *Driver Controlled Period*. A *Pin* or *Trap* is officially over once the *Pinning Robot* has moved away and the *Robots* are separated by at least 2 feet (approximately one (1) foam tile). After ending a *Pin* or *Trap*, a *Robot* may not *Pin* or *Trap* the same *Robot* again for a duration of 5 seconds. If a referee determines this rule to be violated, the offending *Robot* will be *Disqualified* for the match.

<SG4> During the *Driver Controlled Period*, *Drivers* and *Coaches* may handle their own *Robot* as long as the R*obot* has never left the *Alliance Starting Tile*. The intent of this rule is to allow teams to fix *Robots* which were unable to move at the start of the *Match*. Violations of this rule will result in a warning for minor offenses which do not affect the match. Egregious (match affecting) offenses will result in a *Disqualification.*

Note: During the handling specified in <SG4> *Robots* may be repositioned, but must return to a valid starting position as per <SG1>

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The Robot

There are specific rules and limitations that apply to the design and construction of your robot. Please ensure that you are familiar with each of these robot rules before proceeding with robot design.

<R1> Each Robot must only be constructed by the parts supplied in a **Classroom and Competition Super Kit** these parts are listed in the Appendix: With the following substitutions allowable:-

1.1 5 motors OR (4 motors and 1 servo) may be used
1.2 2 or 3 wire motors are acceptable in any mix
1.3 Only the same quantity or parts as those listed in the **Classroom and Competition Super Kit** may be used.
1.4 Either Aluminium, Steel or a mixture can be used as long as the metal is identical to that listed and does not exceed the quantity specified.

As a USB A-A tether cable is included in the classroom kit teams will be allowed to program their robots even though there is no autonomous part to the competition.

#32 Rubber Bands are legal in the KiwiChallenge. They have dozens of uses on a robot. The spring like properties make it perfect for latches, triggers, and return mechanisms.

- #32 Rubber Bands
- Synthetic Rubber
- Length is 3"

<R2> Robots will not be limited by size. However we do want to see teams try keep to 18” x 18” x 18”. The intention of this rule is not to have robots which are built to block, pin, cover entire field etc.

<R3> Robots must use VEX 7.2V batteries. These can be either the 2000mHa or 3000mAh variations.

<R4> Up to Four (4) VEX Omni-directional Wheels and four (4) VEX Mecanum wheels are permitted.

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The Toppler

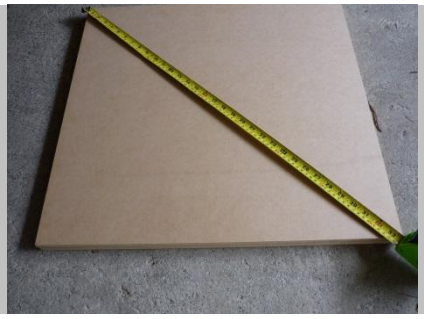
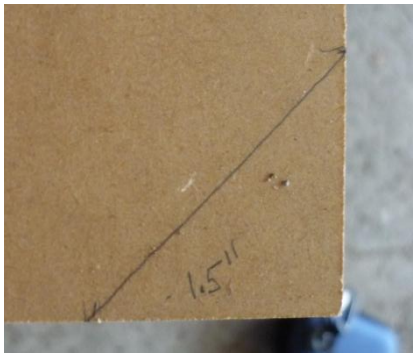
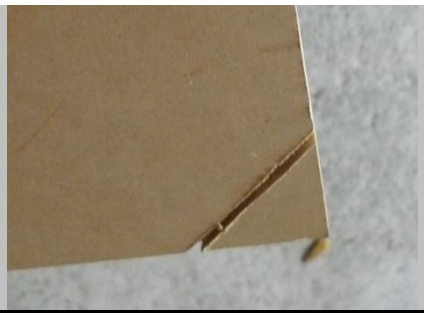
To make the Toppler you will need:

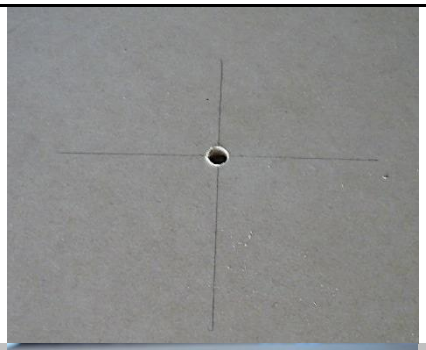
- 1 x 1200mm x 600mm x 12mm MDF from Bunnings....00810812
- 1 x M8 Coach Bolt and nut from Bunnings.....00231328
- 2 x 5/16 Mudguard Washers from Bunnings.....00251648
- 2 x M8 Nylocks from Bunnings.....00248562
- 12 x size 32 rubber bands.....275-1089
- VEX Base plate

Tools:

- Saw
- Straight edge
- Hammer
- Wrench
- Drill
- 8mm Drill bit

Instructions are as follows:

1		• Cut the 1200mm x 600mm board into two 600mm x 600mm boards.
2		• Mark the centre of each of these boards. This can be done by drawing a straight, diagonal line from each of the corners • Once the centre point is found, use a VEX base plate positioned in the centre to mark the screw positions on the board to drill later. Only do this on one of the boards
3		• Measure 1.5” from each edge and mark, join together to that in each corner is a little triangle
4		• Use the saw to make a ~4mm wedge into the board following each of these lines. This is to hold rubber bands

5		• Drill a 8mm hole in the centre of each board, as marked by the crossing the lines. • Use a 4.5mm bit to drill the Baseplate screw positions.
6		• Put the screw through the hole in the board with the baseplate holes so that the wedges are face up and use the hammer to hit the screw into the board so that it bites the wood.
7		• On the opposite side of the board place one of the washers and use the wrench to put on the Nylock so that it is tight against the washer
8		• Screw the second Nylock on so that when the second washer is placed on top of it, there is approximately 1” between it and the first washer.
9		• Place the second board on top of the screw so that the wedges are pointing away from the first board. • The end of the screw should end up flush with the board, if it does not adjust the second Nylock as needed.
10		• Place 3 Rubber bands on each corner, using the wedges. If the top board does not sit so that it is level you may add additional rubber bands until it is. The screw head should be at the bottom. Note: never reduce the amount of rubber bands on a corner.

Cone Goals

To make a Cone Goal you will need:

- 1 x 9” Marker Cone Rebel Sport.....8011682
- 2 x 1” VEX Standoffs.....275-1016
- 4 x 0.385” 8-32 VEX Screws.....275-1003
- 8 x VEX Washers.....275-1024

Tools:

- Drill
- 3.5mm drill bit

OR

- A sharp tapering point

Instructions are as follows:

1		• Find the centre point of one of the base edges and measure 15mm either side. • If you are using a field with cut field tiles then measure mark 7mm from the base, if you are using a field without cut tiles then measure up 20mm
2		• Drill or use a sharp object into the two outer crosses made. Each hole will need to be about 3.5mm in diameter
3		• Put a washer onto a screw and place it through one of the holes, place another washer on the other side and screw on a standoff. Repeat this for the other hole. • Screw the remaining screws into the end of the standoffs each with two washers on. This is so we you don’t lose them while in storage or when not attached to a field wall.

4		• To attach to a field wall remove the outer screws but leave one washer on each, push through the predrilled holes in the field wall. Put the second washer on and screw into the standoff. Note: Once attached the screw/washer configuration should be: Screw head-washer-field wall-washer-standoff-washer-cone-washer-screw head.

Classroom and Competition Super Kit Contents

Motion
- 7 x 2-Wire Motor 393
- 1 x Claw Kit Assembly (includes motor)
- 4 x Shaft Coupler
- 37 x Shaft Collar
- 12 x Shaft, 3" Long
- 4 x Shaft 11mm long
- 4 x Shaft 2" long
- 2 x Shaft 4" long
- 4 x Shaft 12" long
- 44 x Bearing Flat
- 6 x Bearing, Pillow Block
- 4 x Lock Plate, Plastic
- 6 x Spur Gear, 12-tooth
- 4 x Spur Gear, 36 tooth
- 10 x Spur Gear, 60-tooth
- 4 x Spur Gear, 84-tooth
- 20 x Rack Gear, 19-tooth
- 4 x High Strength 12-tooth Gear
- 4 x High Strength 36-tooth Gear
- 4 x High Strength 60-tooth Gear
- 16 x High Strength Square Gear Insert
- 16 x Free Spinning Gear Insert
- 4 x Intake Roller
- 1 x 2.75" Wheel (4-pack)
- 4 x 4" Wheel
- 2 x 4" Omni-Directional Wheel (2-pack)
- 25 x Tank Tread Traction links
- 30 x Conveyor-belt Base links
- 10 x Short Conveyor-belt inserts
- 10 x Medium Conveyor-belt inserts
- 10 x Tall Conveyor-belt inserts
- 4 x High Strength 6-tooth Sprocket
- 2 x High Strength 12-tooth Sprocket
- 2 x High Strength 18-tooth Sprocket
- 2 x High Strength 24-tooth Sprocket
- 2 x High Strength 30-tooth Sprocket
- 280 x High Strength Chain Links
- 40 x Chain Attachment Links
- 2 x 12" Long Linear Slide Track
- 2 x 17.5" Long Linear Slide Track
- 2 x Rack Bracket
- 4 x Inner Delrin Slide Truck
- 4 x Outer Delrin Slide Truck

Structure
- 8 x Bar, 25-hole
- 2 x Bar, 20-hole
- 2 x Chassis Bumper (25-hole)
- 2 x Chassis Bumper (20-hole)
- 4 x Chassis Rail (25-hole)
- 4 x Chassis Rail (16-hole)
- 4 x C-Channel, 1x2x1x15 hole
- 1 x C-Channel, 1x2x1x20 hole
- 2 x C-Channel, 1x2x1x25 holes
- 2 x C-Channel, 1x5x1x25 holes
- 2 x Plate 5x5 holes
- 2 x Plate 5x15 holes
- 2 x Plate 5x25 holes
- 2 x Angle, Slotted 30 holes
- 2 x Angle, Slotted 30 holes Inverse
- 2 x Angle, Segmented 25 holes
- 4 x Gusset, Pivot
- 4 x Gusset, Angle
- 4 x Gusset, Plus
- 10 x Standoff 1/2in
- 8 x Standoff 1in
- 4 x Standoff 2in
- 4 x Standoff 3in
- 102 x Screw, 8-32 x 1/4" Long
- 42 x Screw, 8-32 x 1/2" Long
- 28 x Screw 8-32 x 3/8"
- 14 x Screw 8-32 x 3/4"
- 3 x Screw, 8-32 x 1 1/2" Long
- 10 x Screw 6-32 x 1/4in
- 10 x Screw 6-32 x 1/2in
- 6 x Locking Screw, 6-32 x 1/4" Long
- 6 x Locking Screw, 6-32 x 1/2" Long
- 172 x Nut, 8-32 Keps
- 28 x Nut, Nylock 8-32
- 30 x Washer, Steel
- 10 x Washer, Plastic
- 82 x Bearing Pop-Rivet
- 26 x Shaft Spacer, Thin (4.6mm)
- 20 x Shaft Spacer, Thick 8mm
- 50 x 4" Tie Wraps

Logic, Control & Electronic
- 1 x VEX Cortex Microcontroller
- 1 x USB A-A Tether Cable
- 6 x Motor Controller 29
- 1 x VEXnet Joystick
- 2 x VEXnet Key 2.0
- 1 x LED Indicator Pack
- 3 x Cable, VEX "Y"
- 3 x Cable, 3-Wire Extension, 6"
- 3 x Cable, 3-Wire Extension, 12"
- 1 x Cable, 3-Wire Extension, 24"
- 1 x Cable, 3-Wire Extension, 36"
- 2 x Bumper Switch (2-pack)
- 2 x Limit Switch (2-pack)
- 1 x Motor 393 Integrated Motor Encoder (2-pack)
- 1 x Potentiometer (2-pack)
- 1 x Smart Charger
- 1 x Smart Charger Power Cord
- 1 x 8-Bay AA/AAA Smart Battery Charger
- 1 x VEXnet Backup Battery Holder
- 1 x Line Tracker
- 1 x Ultrasonic Range Finder
- 1 x Optical Shaft Encoder (2-pack)
- 1 x 7.2V Robot Battery NiMH 3000mAh
- 1 x AAA NiMH Rechargeable Battery 6-pack

4

The Tournament

The main challenge of the VEX Robotics Competition will be played in a tournament format. Each tournament will include *Qualifying*, and *Elimination Matches*. After the *Qualifying Matches*, teams will be ranked based on their performance. The top teams will then participate in the *Elimination Matches* to determine the tournament champions.

- *Elimination Matches*. After the *Qualifying Matches*, teams will be ranked based on their performance. The top teams will then participate in the *Elimination Matches* to determine the tournament champions.
- *Alliance Captain* – A student chosen to represent their team during *Alliance Selection* for the final *Elimination Matches*.
- *Alliance Selection* – The process of choosing the permanent alliances for the *Elimination Matches.*
- *Disqualification* – A penalty applied to a team for a rules violation. When a team is disqualified in a *Qualifying Match* they receive zero (0) *WP* and *SP*. When a team is disqualified in an *Elimination Match* the entire alliance is disqualified and they receive a loss for the match.
- *Elimination Match* – A match used to determine the championship alliance. Alliances of three face off in a best two of three series, with two teams playing in each match. The first alliance to win two matches will proceed to the next round.
- *Practice Match* – An un-scored match used to provide time for teams to get acquainted to the official playing field.
- *Qualifying Match* – A match used to determine the rankings for the *Alliance Selection*. Alliances compete to earn *Win Points* and *Strength of Schedule Points*.
- *Strength of Schedule Points (SP)* – The second basis of ranking teams. *Strength of Schedule Points* are awarded in the amount of the score of the losing alliance in a *Qualifying Match.*
- *Win Points (WP)* – The first basis of ranking teams. *Win Points* are awarded for winning (two points) and tying (one point) a *Qualifying Match*.

Qualifying Matches

Schedule

- The *Qualifying Match* schedule will be available prior to opening ceremonies on the day of competition. This schedule will indicate alliance partners and match pairings. It will also indicate the alliance's colour – red or blue. For tournaments with multiple fields, the schedule will also indicate which field the match will take place on.
- 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 compete against two randomly assigned opponents 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.

Rankings

- At the conclusion of each match, *Win Points (WP)* will be issued:
  - Winning teams of a *Qualifying Match* receive two (2) *WP*
  - Losing teams of a *Qualifying Match* receive zero (0) *WP*
  - If a *Qualifying Match* ends in a tie, all four teams receive one (1) *WP*
  - If a team is *Disqualified* they receive zero (0) *WP*

- All teams in each *Qualifying Match* will also receive *Strength of Schedule Points (SP)*.
  - The number of *SP* assigned for each match, is that of the losing alliance's score.
  - In the event of a tie, both alliances will receive the same *SP* (equal to the tie score).
  - If a team is disqualified they receive zero (0) *SP*
  - If both teams on an alliance are *Disqualified*, the teams on the winning Alliance will be awarded their own score as their *SP* for that match.

- 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) *WP* and zero (0) *SP*. A "no show" is treated exactly the same as a *Disqualification*.

Elimination Matches

- The *Alliance Selectio*n process will consist of two rounds of selection, such that eight alliance captains will form elimination alliances consisting of three teams.
- These eight alliances will participate in a tournament to determine the event champions.
- If a team is *Disqualified* during an *Elimination Match*, then their entire alliance is Disqualified, and the match will be recorded as a loss.

Alliance Selection Process

- Every team will choose a student to act as a team representative.
  - These student representatives will proceed to the playing field at the designated time to represent their teams in the *Alliance Selection*.
- There will be eight alliances formed in the *Alliance Selection*.
- In order of tournament ranking, the student representative of the highest ranked team not already in an alliance will be asked to step forward as an *Alliance Captain* to invite another available team to join their alliance.
- A team is available if they are not already part of an alliance, or have not already declined an alliance invitation.
  - If the team accepts, it is moved into that alliance.
  - If a team declines an invitation, they CANNOT be invited into another alliance, but are still available to select their own alliance if the opportunity arises.
  - If a team declines, the *Alliance Captain* from the inviting team must then extend another invitation.
- This process will continue until all eight *Alliance Captains* have been designated and chosen one alliance partner.
- **The same method is used for each *Alliance Captain's* second choice. Teams will select in the same order they did in the first round**. Any teams remaining after alliance eight makes their second choice will not compete in the *Elimination Matches*.
- Some smaller events may choose to use a different alliance format to better suit the number of teams, please see the event modification section of this document for more details.

Elimination Scoring

In the elimination rounds, teams do not get *Win Points*; they get a win, loss or tie. Within each bracket of the Elimination Match Ladder, matches will be played to determine which alliance advances, as follows:

- The first alliance to win two matches advances.
- Any tied matches will be replayed until one alliance has two wins, and advances.

Tournament Rules

<T01> Referees have ultimate authority during the competition. **Their rulings are final.**

a) The referees will not review any recorded replays.
b) Any questions for the referees must be brought forward by a student drive team member within the time period of two (2) qualifying matches or immediately after the score is announced of an elimination match.

<T02> There are no time outs in the qualifying rounds; in the elimination rounds, each alliance will be allotted ONE time out of no more than three minutes, as permitted by the head referee. The matches must progress according to schedule.

a) If a robot cannot report for a match, at least one member of the team should report to the field for the match.