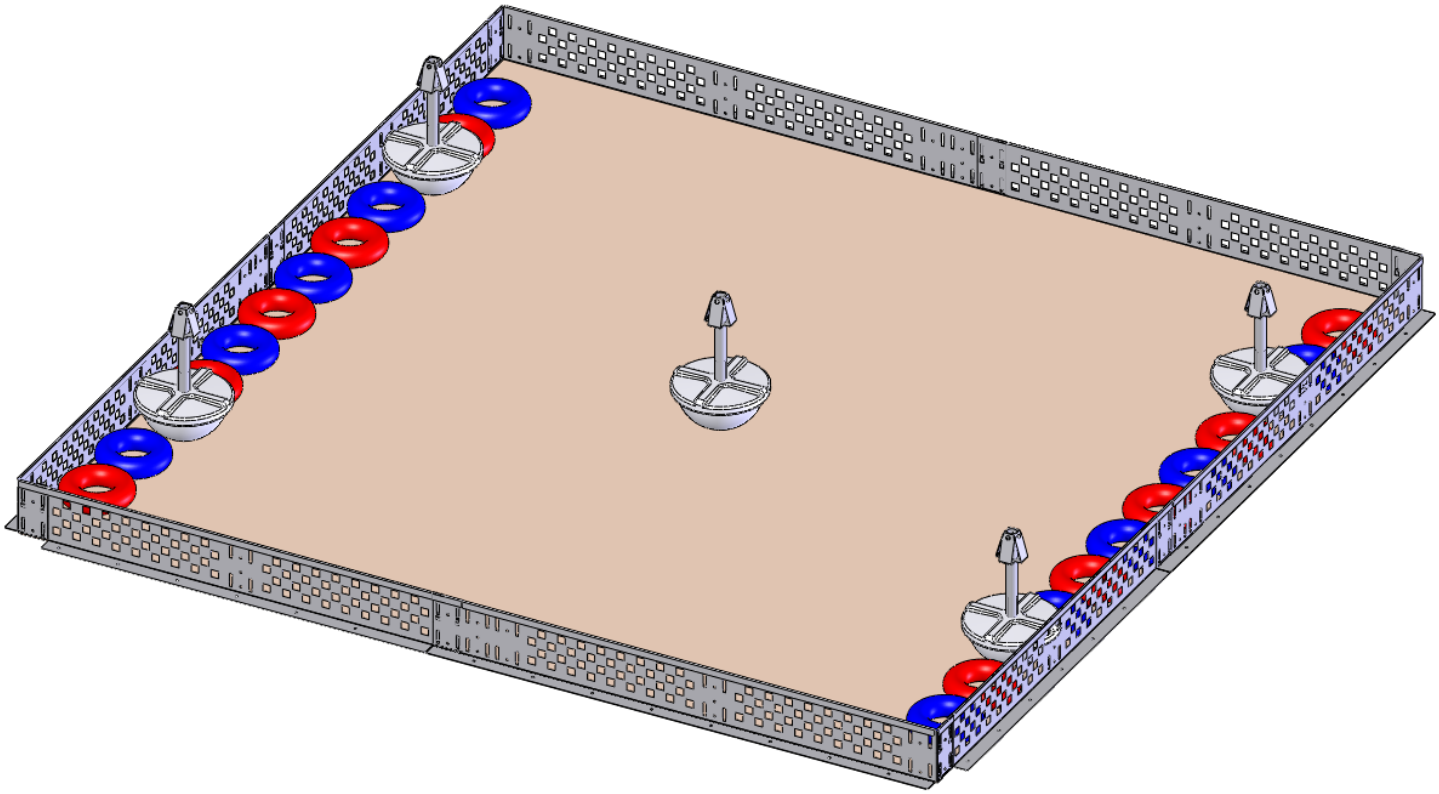
-Round Down-

Description & Overview

Round Down is a head-to-head robotics competition designed and scaled to be run in a classroom environment by a single teacher. This game provides a challenge for designers of all experience levels, and should result in exciting match play regardless of competitor skill.



Round Down is played on an 8 ft x 8 ft field with five (5) Goals along with ten (10) red tubes and ten (10) blue tubes. One robot is placed on each side of the field at the start of each match. All twenty (20) tubes start along two opposing edges of the playing field. Points are earned in Round Down by scoring tubes. Tubes can be scored in one of two ways, they can be scored by placing them over the goal post of a Goal or by simply moving them so they contact the base of a Goal.

The object of the game is simple: score as many Tubes, and take ownership of as many Goals as possible during a two minute match. Each tube in contact with the floor and the base is worth 1 point, each tube placed over the pipe of a Goal is worth 2 points and an Owned Goal is worth an additional 2 points. As an end of match bonus, a Team can earn an additional 5 points by lifting a Goal off the floor of the field. At the end of the match a referee will calculate the total score to determine the match winner.

Scoring	
Tube Touching floor and base	1 Point
Tube placed on Weighted Base	2 Points
Owned Goal	2 Points
Elevated Weighted Base	5 Points

Game Rules

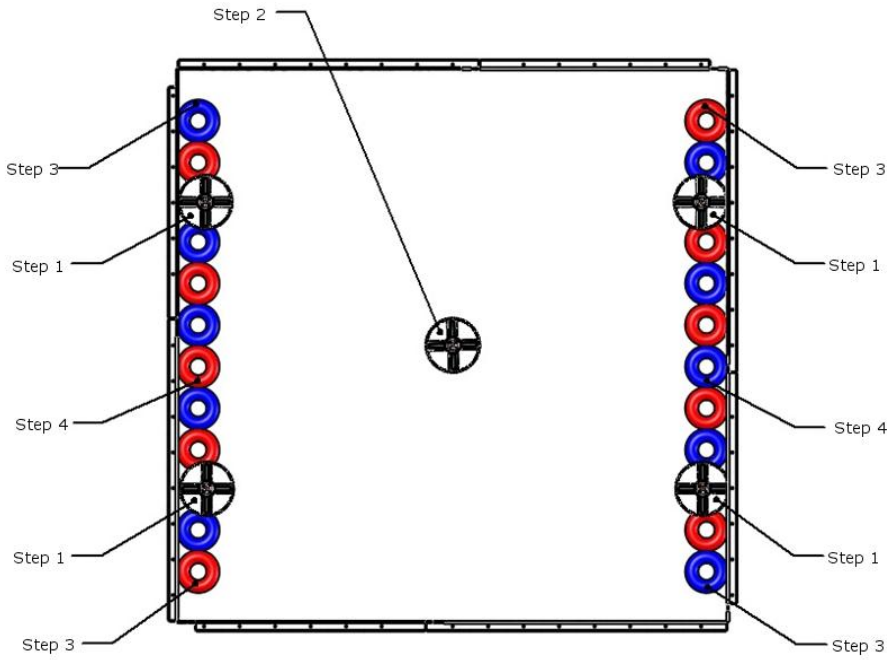
Field Setup

1. Matches are played on an 8 ft x 8 ft field which is filled with twenty (20) tubes and five (5) Goals

2. One robot is placed on each “empty” side of the field before each match.
   a. Robots may be placed anywhere along their wall, as long as they are in contact with the wall, and NOT touching any tubes.
   b. At the start of the match no robot may be more than twelve inches (12”) tall.

3. There are ten (10) red tubes and ten (10) blue tubes placed on the sides of the field, as shown.

4. There are five (5) Goals placed on the field, as shown.



On each side of the field:

Step 1. Two (2) Goals are placed along the “left” and “right” walls. Each Goal should start the match 22” from the nearest perpendicular wall. This is directly in front of a set of mounting holes.

Step 2. One (1) Goal is placed in the center of the field.

Step 3. Two (2) tubes are placed “outside” the four Goals in each corner, alternating colors, as shown.

Step 4. Six (6) tubes are placed between the two Goals on each wall, alternating colors, as shown.

5. The field surface (that the robots drive on) is not specified. Any available surface is allowable.
   a. Recommended Surfaces: Linoleum, Concrete, Plywood, Foam Tiles, Low-pile Carpet

Match Play

1. Two teams compete in each one vs. one match (each team will field one robot).
2. Matches are two minutes (2:00) long.
3. Robots are “Operator Controlled” the entire match; there is no Autonomous Robot Operation.
4. Any tubes that exit the playing field will be returned to play as fast as possible by field personnel; these will be placed in about the approximate location they exited the field.
5. Team Members are not allowed to interact or interfere with the robots or game objects in any way.
6. Robots are not allowed to intentionally attach to the field perimeter.
7. Strategies aimed at intentionally damaging the field, tubes, goals, or opposing robots are illegal.

Match Scoring

- **A team receives one (1) point for every ring of their color that is touching both the floor and a Goal.**
- **A team receives two (2) points for every ring of their color that has been placed on the post of a Goal.**
- **A team receives two (2) points for every Goal that they “own”**
- **A team receives five (5) points as an end game bonus for any goals they own that are elevated**

1. A tube is considered scored and worth one (1) point, if it is touching the ground and the base of a Goal AND no part of the tube encircles the goal post of a Goal.
2. A tube is considered to be scored and worth two (2) points, if any part of the tube encircles a goal post.
3. A Goal is said to be “owned” by the team that has the most tubes scored on that goal. If both alliances have the same number of tubes scored on the goal, neither alliance has “owned” the goal. An owned goal is worth 2 points.
4. A goal is considered Elevated and worth five (5) additional points for the team that owns it, if it is more than 2” off the ground at the time of scoring.
5. Scoring is done at the end of the match, when all objects have come to rest. As a result, tubes that are scored, then de-scored during the match are not counted as part of the total score.

Robot Construction

1. Robot construction is limited to the Robot Components from the VEX kits listed below.
    a. The packaging, manuals, tubes and other “non-robot” components from this kit are NOT allowed.
    b. Teams can utilize the individual sub-components from these kits so long as they do not use more parts than are available on the list below or parts not found in any of the kits on the list.

VEX Classroom Competition – Construction List

Allowed Robot Components

- (1) Protobot Robot Kit
- (1) Booster Kit
- (1) Metal & Hardware Kit
- (1) Microcontroller
- (1) VEX TX-RX Kit
  OR (1) VEXnet Joystick
- (1) Servo Kit
- (1) Motor Kit (5th motor)
- (1) 7.2V Robot Battery
- (1) Battery Mounting Straps
- (1) PWM Bundle
- (1) Limit Switch Kit
- (1) Bumper Switch Kit
- (1) Tank Tread Kit
- (1) Sprocket & Chain Kit
- (1) Advanced Gear Kit
- (1) Large Omni-Wheel Kit
- (1) Tank Tread Upgrade Kit
- (1) High Strength Gear Kit
- (1) High Strength Sprocket & Chain Kit
- (1) Linear Slide (2-pk)
- (1) Rack Gear Bracket (2-pk)
- (1) VEX Hinge (2-pk)
- (1) Rubber Band Pack
- (1) VEX Latex Tubing Pack (10-feet)

Note: The VEX Classroom Competition Team Bundles contains ALL the allowable components.
*For more information on these VEX kits & components refer to **www.VEXrobotics.com***

2. Robots may only be controlled by (1) VEX Transmitter OR (1) VEXnet Joystick.

3. Robots may use no more than (5) VEX Motors and no more than (1) VEX Servo.

4. Robots may use unlimited of the following VEX components: screws, nuts, bearings, bearing rivets, collars, washers, spacers, and zip ties.

5. Parts may not be attached in any way not provided as part of the VEX Robotics Design System
    a. Example – It is illegal to glue, weld, solder, or to stick parts together with chewing gum.

6. VEX Electronics may not be modified in any way.

7. No robot may be more than twelve inches (12”) tall at the start of any match.
    a. The robot may expand above this limit after the match has begun.
    b. There is no limit on the robot footprint as long as it is less than 12” tall.

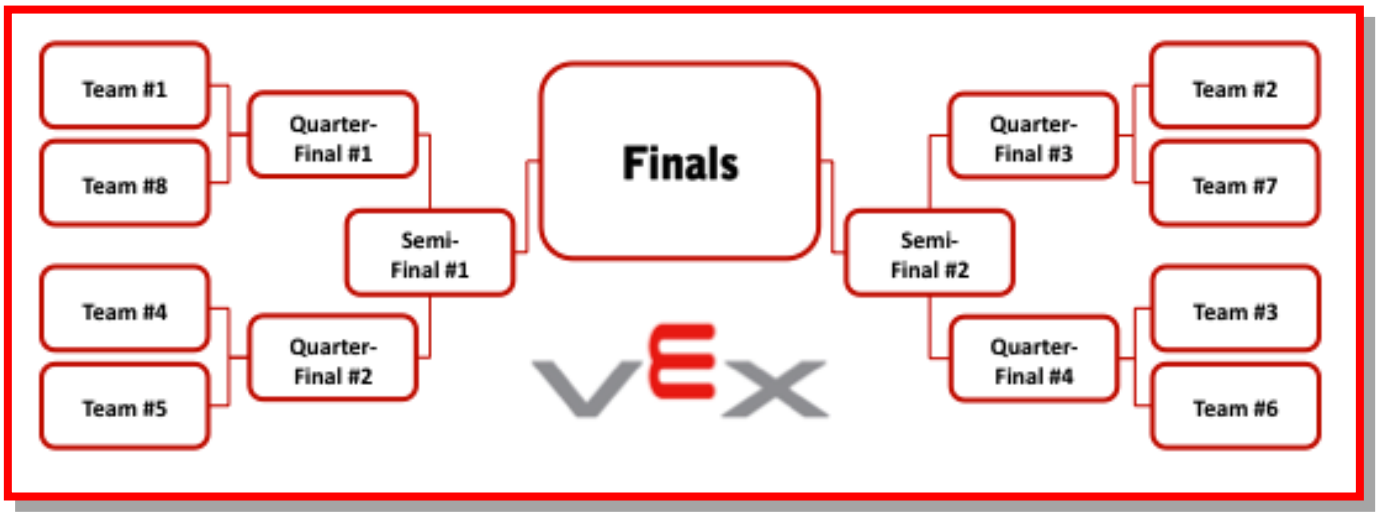
8. We encourage teams to show individuality by decorating their robots. As such, teams may add non-functional decorations provided that these do not affect the robot performance in any significant way or affect the outcome of the match.

Tournament Play

1. Teams will be ranked using a series of qualifying matches.
    a. Ideally these matches will be played as a round-robin tournament where each team plays every other team at least once; otherwise matchups should be randomly chosen.
    b. All teams should play an equal number of qualifying matches if possible.

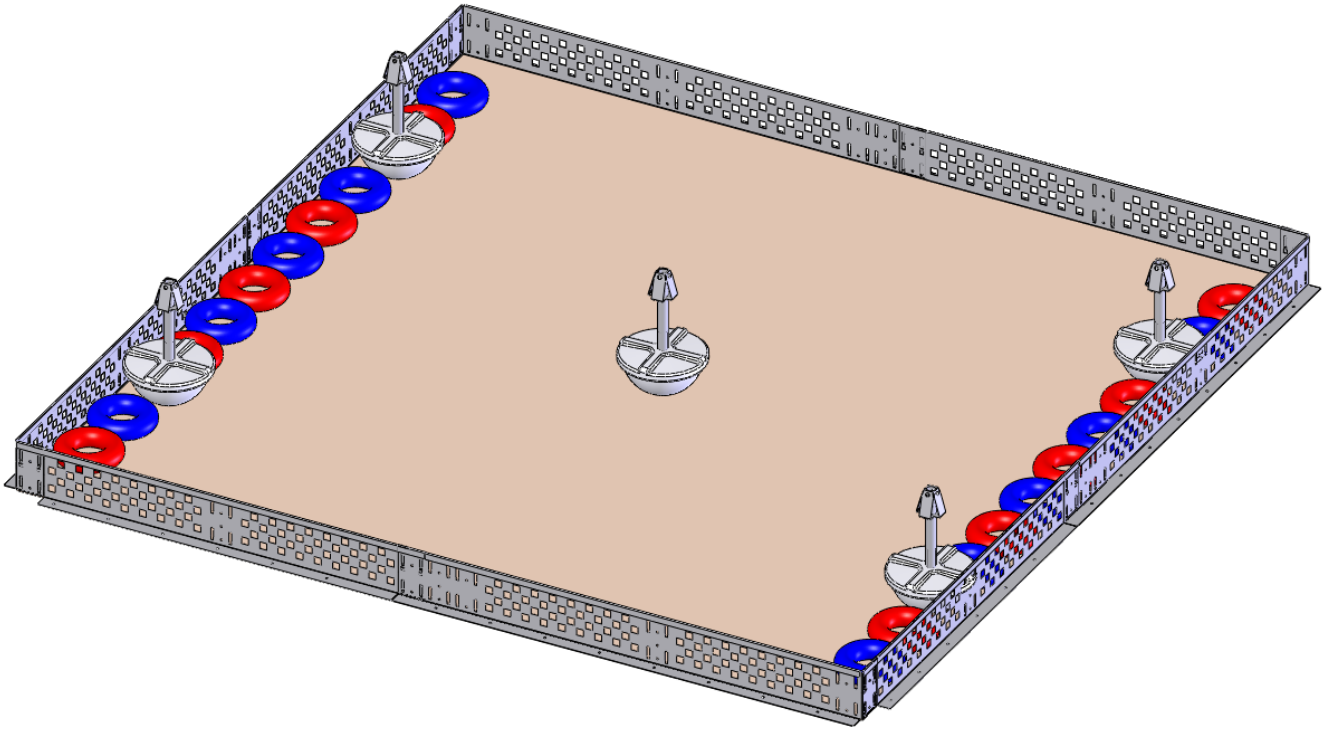
2. Teams are ranked based on their number of wins.
    a. If more than one team has the same number of wins, these teams are ranked based on their number of ties.
    b. If more than one team has the same number of wins and ties, these teams are ranked based on their highest score.
    c. If these teams also have the same highest score, they are then ranked by their next highest score, then their next, then their next, until the tie is broken.
    d. If all their scores are the also same, the ranking will be determined with a playoff match between the two teams. The team that wins is then ranked higher.

3. The top ranked teams will play in an elimination tournament to determine the winner.
    a. Two teams play in each series of the playoffs; the first team to win two matches wins the series and advances to the next round of the playoffs.
    b. The tournament structure will vary depending on the number of teams participating.
    c. Here is a sample tournament bracket:



Round Down Field

Round Down is played on an 8 ft x 8 ft field. Along the edges of the field are ten (10) red tubes and ten (10) blue tubes. There are also five (5) Goals; – four (4) along the edges of the field and one (1) in the center of the field.



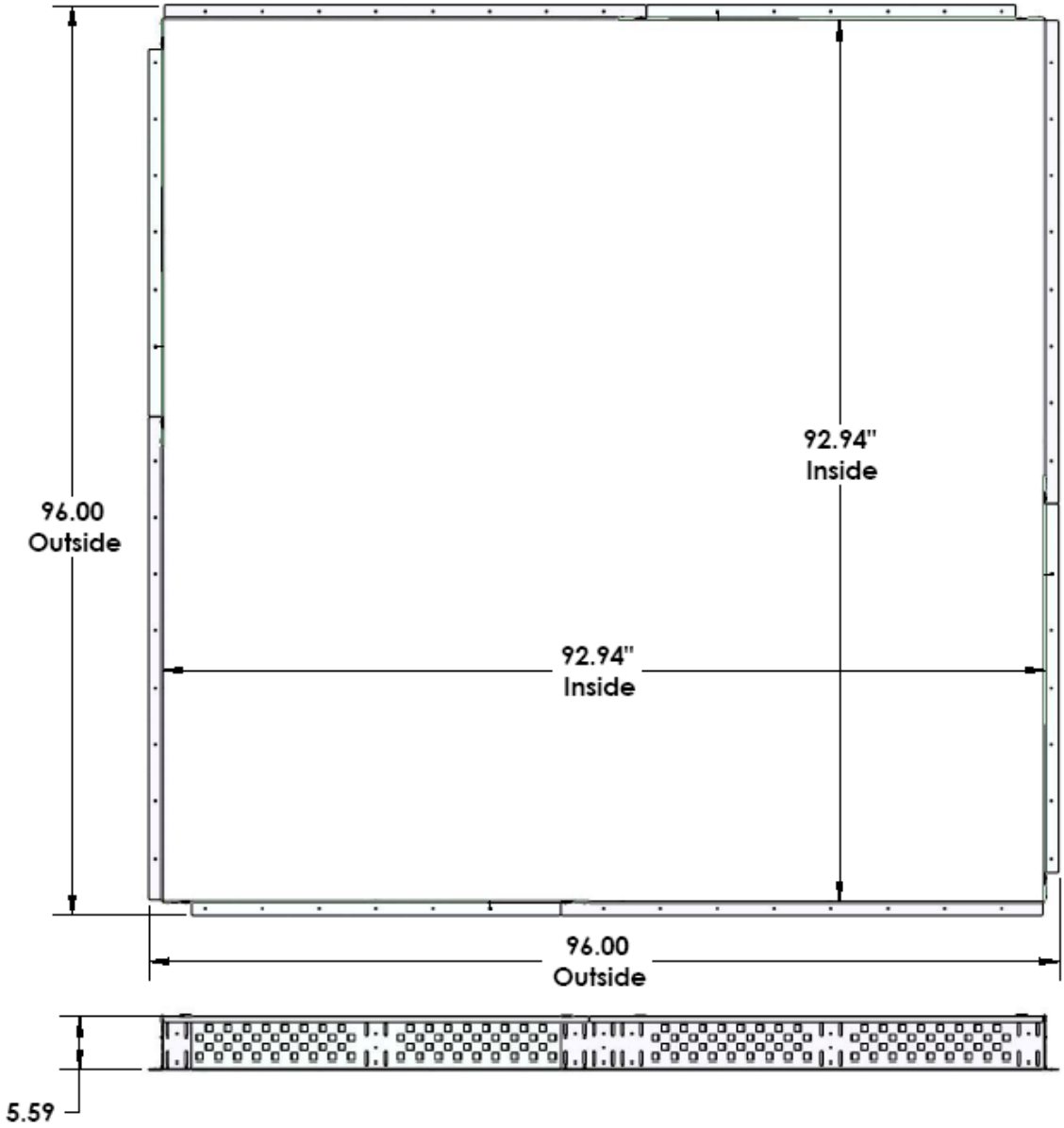
The VEX Round Down Game Elements Kit (276-2241) available at VEXrobotics.com, includes the official Round Down field objects, including Goals, and tubes.

Round Down is designed to be played in the VEX Classroom Field Perimeter (sold separately). This field was designed specifically for implementation in a classroom environment. Its robust sheet-metal construction can handle all the rigors of competition. The field requires NO tools for assembly and can be fully set up or taken apart for storage in less than five minutes.

Critical Field Specifications

Perimeter Dimensions

The field is surrounded by a 5.59 inch tall sheet metal perimeter. This perimeter is constructed of (8) brackets in a square configuration. The inside of the field measures 92.94” x 92.94”.

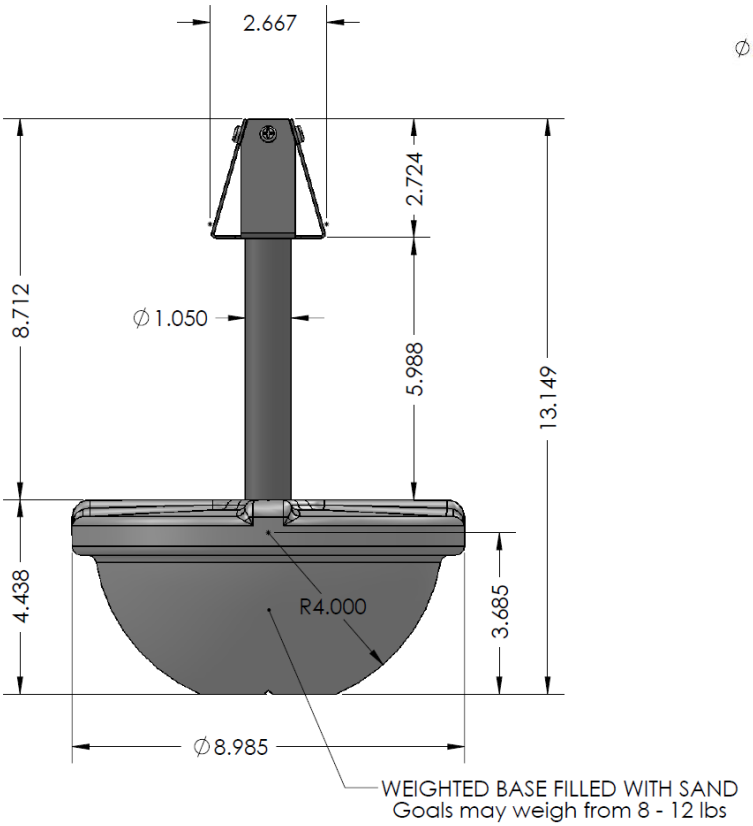


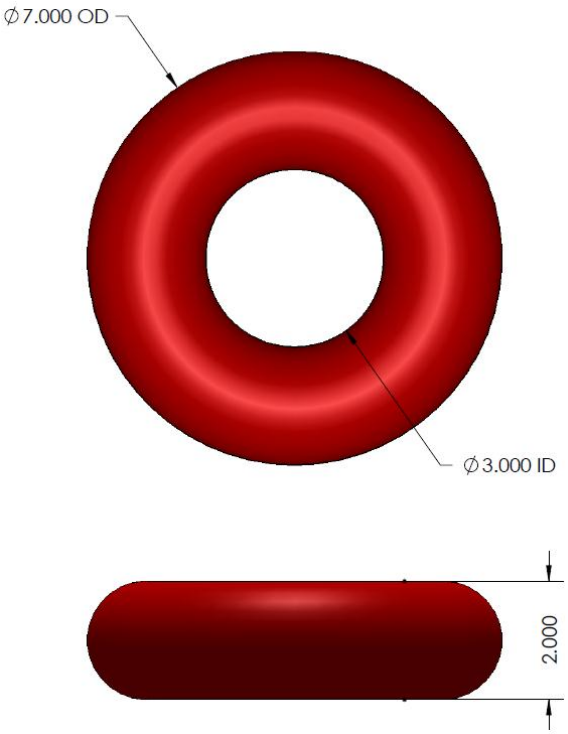
The outside of the field measures 96” x 96” so it can be mounted on two 4 ft x 8 ft pieces of plywood if desired.

Critical Field Specifications cont.

Tube & Goal Dimensions

The Goals are filled with sand (sold separately) for weight. Depending on the type of sand used, the weighted bases will weigh between 8-12 lbs.





Goal
Height – approximately 13 inches
Diameter – Approximately 9 inches
Weight – 8-12lbs

Tube
Outside Diameter – Approximately 7 inches
Inside Diameter – Approximately 3 inches
“Height” – Approximately 2 inches
Weight – approximately .2lbs

Unofficial Field Construction

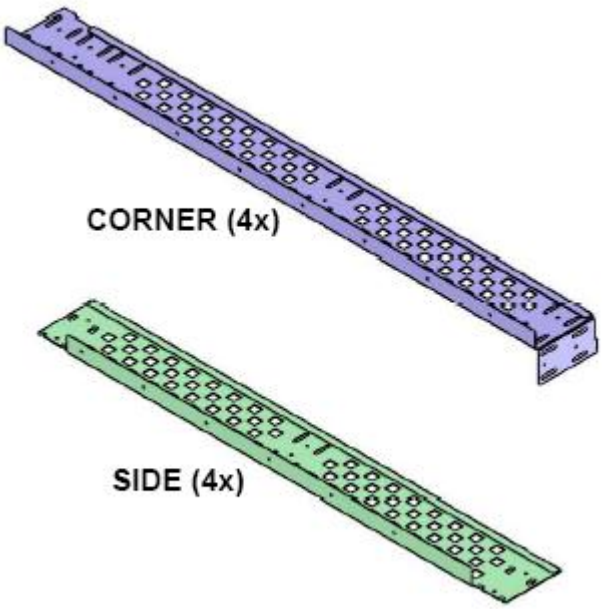
The official field is *NOT* needed to play Round Down.
There are a number of methods to build a “close enough” field to play the game. It is also possible to build stand-in objects for practice.

A full field perimeter can easily be constructed out of 8-foot long 2x6 boards. Goals can be mocked up with PVC pipe and a wooden block for a base.

Round down can also be played with different game objects. If tubes matching the official Round Down game objects are not available, it is possible to play the game with something else. (Obviously in this case the robots might not be able to play with official game objects, if they were designed for something else).

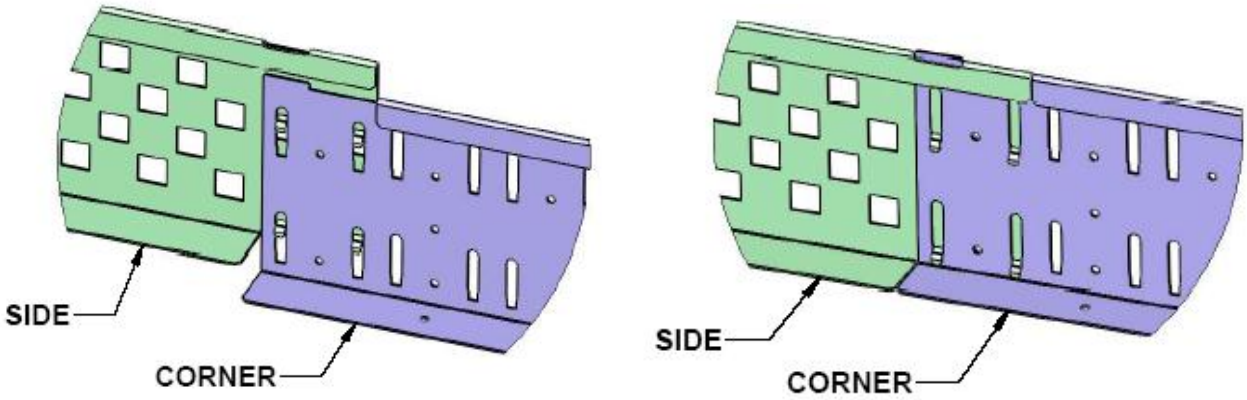
Field Assembly Instructions

The official Round Down Field consists of two different types of metal pieces:



1. The first step to assembling the field is to connect a SIDE piece with a CORNER piece as shown. Insert all four (4) hooks on the SIDE into the slots on the CORNER. Then, slide the SIDE down over the CORNER such that all four hooks are seated at the bottom of their slots.

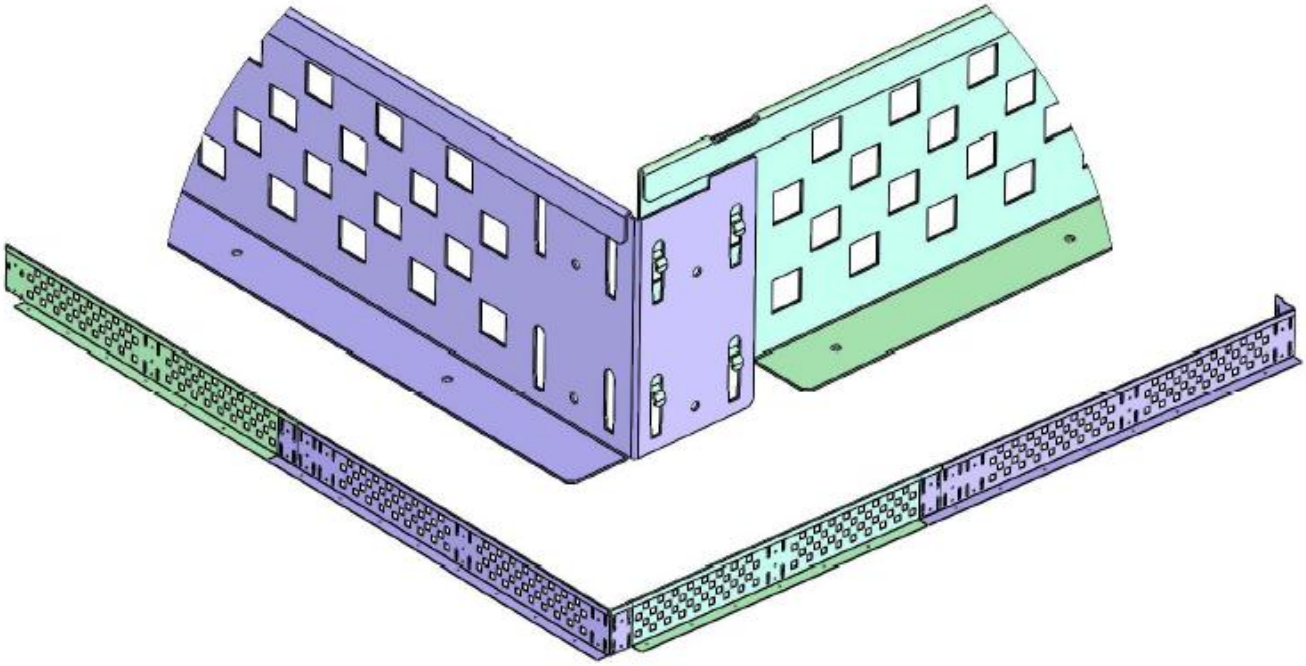
   Note: This is the standard method of connection and will be reused at all field joints.



2. Repeat Step 1 for four (4) identical assemblies.

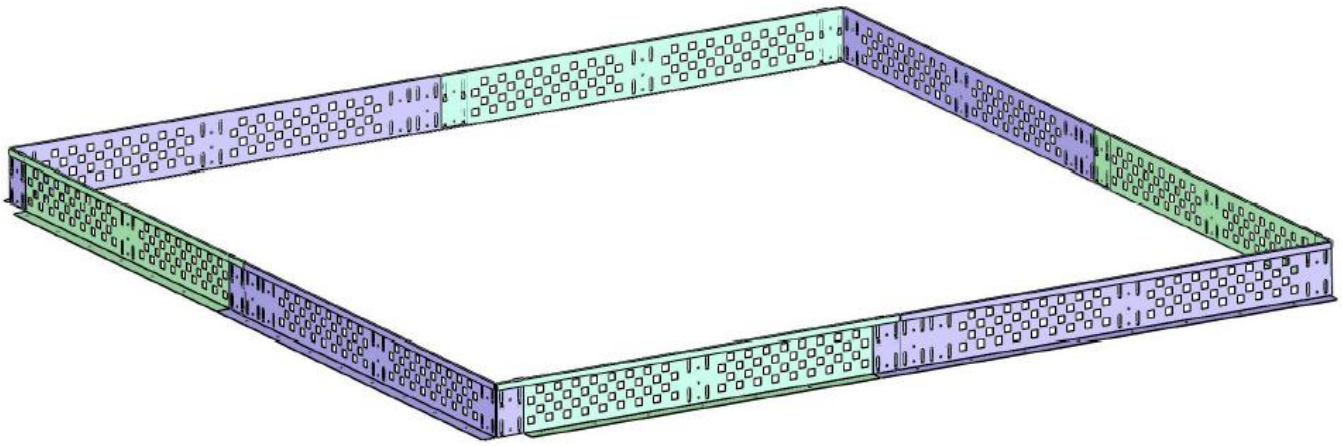
Field Assembly Instructions cont.

3. Connect two (2) of the assemblies together as shown below. They should hook together in the same manner described in Step 1. The SIDE piece of one assembly should connect to the CORNER piece of the other assembly.



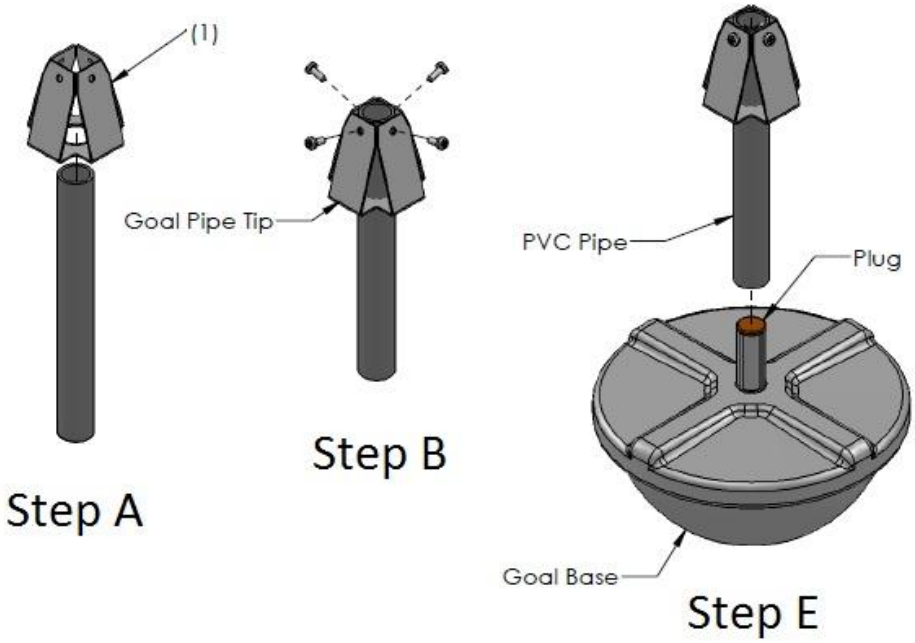
4. Repeat Step 3

5. Connect the assemblies from Step 3 & Step 4 together to complete the field perimeter.



Field Assembly Instructions cont.

6. Goal Assembly

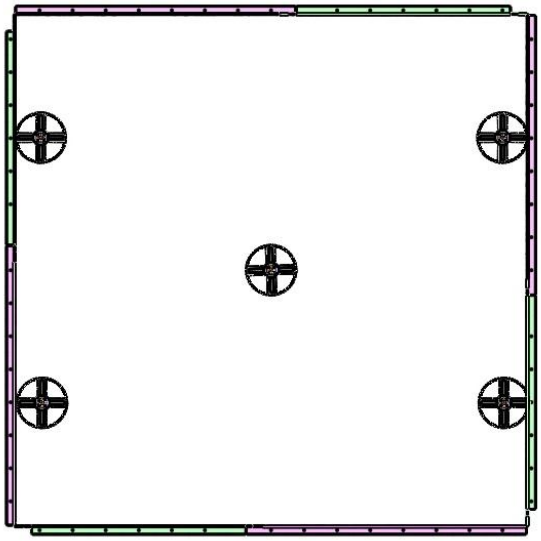


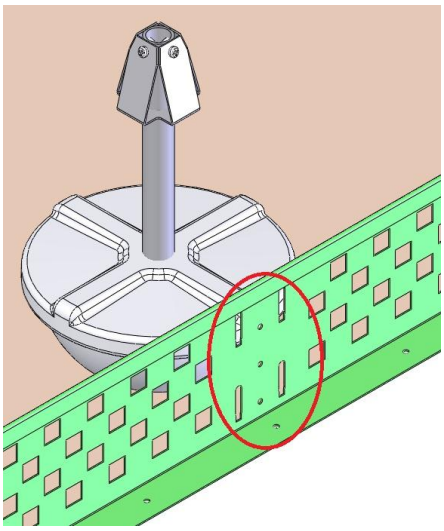
a. Slide a “Goal Pipe Tip” (1) over one of the 9” long Goal Pipes.
b. Using a #2 Phillips Head Screwdriver, install (4x) #10 x ½” long sheet metal screws through the holes in the Goal Pipe Tip and into the Goal Pipe.
c. Repeat steps “A” and “B” for a total of 5 Goal Pipes with Goal Pipe Tips installed
d. Pull the plug out of the top of a Goal Base and fill with dry sand until 9-11lbs. Replace the plug.
e. Press a Goal Pipe from step C onto the top of a Goal Base. The pipe will be press fit and may require a moderate amount of force to install.
f. Repeat steps “D” and “E” for a total of 5 Goal Bases.

Note: To ensure that the Goal Pipe does not slip off of the Goal Base during play, it may be necessary to wrap a piece of electrical tape around the top of the Goal Base to increase the force of friction between the Goal Pipe and the Goal Base.

Field Assembly Instructions cont.

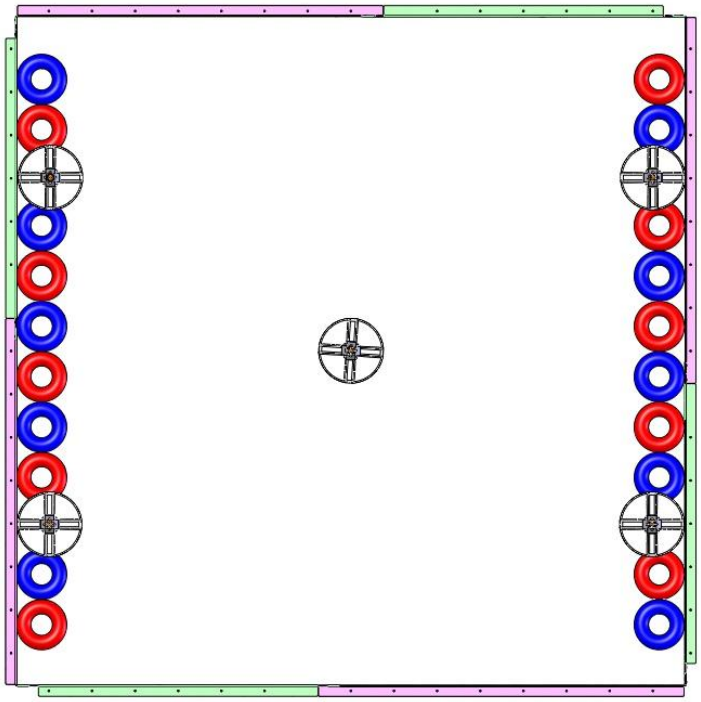
7. Place five (5) Goals, as shown.





Note: It may be helpful to use the mounting slots as a guide when placing the Goals.

8. Place twenty (20) tubes on the edges of the field with the Goals, alternating colors, as shown.



Additional Field Options

Although the VEX Classroom Competition field perimeter snaps together as a tool-less assembly there are 0.205” diameter holes in all of the pieces. If a user plans on leaving the field assembled for an extended period of time, standard VEX screws and nuts (#8-32) can be used to bolt the field components together.

The field is also designed to fit on top of two (2) 4 ft x 8 ft pieces of plywood laid side by side. All of the field brackets have bottom flanges with holes in them; these holes allow users to screw the field down onto the plywood.

Additional Game Options

This document provides a detailed foundation set of rules and specifications, it is a “recipe” for a Round Down competition; however this is not the only correct recipe. The VEX Classroom Competition and the Round Down game are specifically designed to scale to the needs and circumstances of participants. It is easy to modify rules to tweak the way the game is played.

Game Rules Modifications
The Round Down game itself can be changed to suit your needs. A few possible adjustments are described below, but these are only a small sample of what is possible:

- Add an autonomous period at the beginning of each match where human operators have no control over their robots.
- Rearrange the field layout
- Use taller goalposts
- Use different game objects.
- Change the point values for scored objects.
- Play each match 2 vs. 2
- Modify the seeding or tournament structure.
- Etc…

As long as the game rules are adequately described to teams ahead of time, a tournament can modify almost any aspect of the competition. Larger and more wide-spread tournaments & competitions should post any changes they are making to this basic set of rules so teams know how that competition will differ from what they are used to; in a single classroom environment or a smaller scale competition, this is not as important.

Major deviations from the “foundation” set of rules and field specifications listed above may have undesired results on the game play, but that is just part of the fun!

Robot Construction Rules Modifications
As long as some key robot construction rules are in place it is possible to modify the rules to suit your needs and circumstances. It is recommended that some limit be placed on the quantity of motors & servos allowed, as well as the control system and battery used. Beyond that there are a number of ways to adjust the rules (modifying the maximum robot starting size, etc).

One of the most common ways to modify the rules is to scale up or down the list of allowable robot parts. There are very successful competitions that only allow teams to use a single Protobot kit for robot construction, and there are very successful competitions that allow their teams to custom fabricate whatever parts they want; there is a broad spectrum of options. It is important for each competition to be tailored to best suit its participants.

Round Down Score Cards

Match #: **Initials:** **Winner:** RED BLUE

Red Alliance Teams:				
Tubes Touching Floor and Base		X 1 =		+
Tubes Placed on Weighted Base		X 2 =		+
Owned Goals		X 2 =		
Elevated Weighted Bases		X 5 =		=
RED ALLIANCE TOTAL SCORE				

Blue Alliance Teams:				
Tubes Touching Floor and Base		X 1 =		+
Tubes Placed on Weighted Base		X 2 =		+
Owned Goals		X 2 =		
Elevated Weighted Bases		X 5 =		=
BLUE ALLIANCE TOTAL SCORE				

Match #: **Initials:** **Winner:** RED BLUE

Red Alliance Teams:				
Tubes Touching Floor and Base		X 1 =		+
Tubes Placed on Weighted Base		X 2 =		+
Owned Goals		X 2 =		
Elevated Weighted Bases		X 5 =		=
RED ALLIANCE TOTAL SCORE				

Blue Alliance Teams:				
Tubes Touching Floor and Base		X 1 =		+
Tubes Placed on Weighted Base		X 2 =		+
Owned Goals		X 2 =		
Elevated Weighted Bases		X 5 =		=
BLUE ALLIANCE TOTAL SCORE				

Match #: **Initials:** **Winner:** RED BLUE

Red Alliance Teams:				
Tubes Touching Floor and Base		X 1 =		+
Tubes Placed on Weighted Base		X 2 =		+
Owned Goals		X 2 =		
Elevated Weighted Bases		X 5 =		=
RED ALLIANCE TOTAL SCORE				

Blue Alliance Teams:				
Tubes Touching Floor and Base		X 1 =		+
Tubes Placed on Weighted Base		X 2 =		+
Owned Goals		X 2 =		
Elevated Weighted Bases		X 5 =		=
BLUE ALLIANCE TOTAL SCORE				