

# Biscuit in the Basket

Vex Competition Tuesday March 13, 2018

Biscuit in the Basket 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.

The game is played on an 8 ft x 8 ft field, which is divided in half by a 12” tall wall. At the center of this wall is an 18” tall trapezoidal shaped goal, one on each side of the wall. There are also two 4” tall slots along the base of the wall leading into a 20” wide by 12” deep goal.

The objective of the game this year is to get as many of your hockey pucks into the goal as possible within the two-minute time limit (2:00). In addition, there will be a 2lb D-Shaped weight that can be placed into the goal, dropped into the tower, or balanced on the tower for bonus points. At the end of the match, referees will give points based on how many of your team colored pucks are in the goal, as well as where the weight is.

All points will be assigned at the end of the match. Each hockey puck of your color in your goal will be worth 10 points. If your colored weight ends the match in the corner goal, it will be worth 20 points. If your colored weight ends the match in the tower goal, it will be worth 30 points. If your colored weight ends the match balanced on the goal it will be worth 40 points.

## Field Setup

1. Matches are played on an 8 ft x 8 ft field which is divided in half by a 12” tall wall.
2. One robot is placed on each side of the divider wall corresponding to that teams color at the start of every match.
  - a. Robots may be placed anywhere, as long as they are ENTIRELY on their side of the field, and NOT touching any pucks or weights.
  - b. At the start of the match, no robot may be more than twelve inches (12”) tall.
3. There will be 12 pucks on each side of the field, 6 red and 6 blue as well as one weight as shown.
4. There will be one basket of the opposite color mounted to the corner of each side of the field as shown.
5. The field surface will be a smooth

## 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 objects that exit the playing field will be removed from play by the field personnel.
5. Team Members are not allowed to interact or interfere with the robots or objects in any way.
6. Robots are not allowed to intentionally attach to the field perimeter or divider wall.
7. Strategies aimed at intentionally damaging the field, balls, or opposing robots are illegal.

### Match Scoring

- A team receives ten (10) points for every puck of their color in the large goal on the opponent's side of the field.
- A team receives twenty (20) points if the weight of their color ends the match in their goal
- A team receives thirty (30) points if the weight of their color ends the match in the tower goal of their color.
- A team receives forty (40) points if the weight of their color is balanced on top of the tower at the end of the match
- No points will be awarded for getting a puck or weight into any goal of the opposing team's color.
- Scoring will be done at the end of every match, when all objects come to rest.
  - a. For the large goals, pucks will only be counted as scoring if they are entirely in the basket and not protruding over the edge of the goal.
  - b. For the center goal, weights will be counted as balanced if they are not being supported by the robot in any way (ie. If the robot is removed it will still be balanced).
- Objects that exit the field will be removed from play.

### Robot Construction

1. Robot construction is limited to the Robot components from the VEX kits listed below.
  - a. The packaging, manuals, balls, and other "non-robot" components from these kits are NOT allowed.
  - b. Teams can utilize any 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.

## VEX Classroom Competition – Construction List

### Allowed Robot Components

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- Protobot Robot Kit
- (1) Booster Kit
- (1) Metal & Hardware Kit
- (1) Microcontroller
- (1) TX-RX Kit
  - OR (1) VEXnet Joystick
- (1) Servo Kit
- (1) Motor Kit (5th motor)
- (1) 7.2V Robot Battery
- Battery Mounting Straps
- PWM Bundle
- Limit Switch Kit
- Bumper Switch Kit
- Tank Tread Kit
- Sprocket & Chain Kit
- Advanced Gear Kit
- Large Omni-Wheel Kit
- VEX Latex Tubing Pack (10-feet)

**Note: The VEX Classroom Competition Team Bundles contain ALL the allowable components.**  
For more information on these VEX kits & components refer to [www.VEXrobotics.com](http://www.VEXrobotics.com)

1. Robots may only be controlled by (1) VEX Transmitter, OR (1) VEXnet Joystick.
2. Robots may use no more than (6) VEX Motors and no more than (1) VEX Servo.
3. Robots may use unlimited of the following VEX components: screws, nuts, bearings, bearing rivets, collars, washers, spacers, and zip ties.
4. 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
5. VEX Electronics may not be modified in any way.
6. 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.
7. 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. This will be a double elimination tournament. Teams will be placed in the brackets randomly the day before matches.
2. Bye rounds may be assigned if there are an odd number of teams competing or if teams leave the competition.
3. If two teams tie in a match, the match will be continue to be replayed until a winner is declared.
4. A sample tournament bracket can be found at <https://www.printyourbrackets.com/pdfbrackets/21teamdouble.pdf>

#### Biscuit in the Basket Field

##### Materials:

Note: this is to make a complete field setup, only one quarter of the materials is necessary to make a ramp to practice on. In addition the competition field may vary slightly.

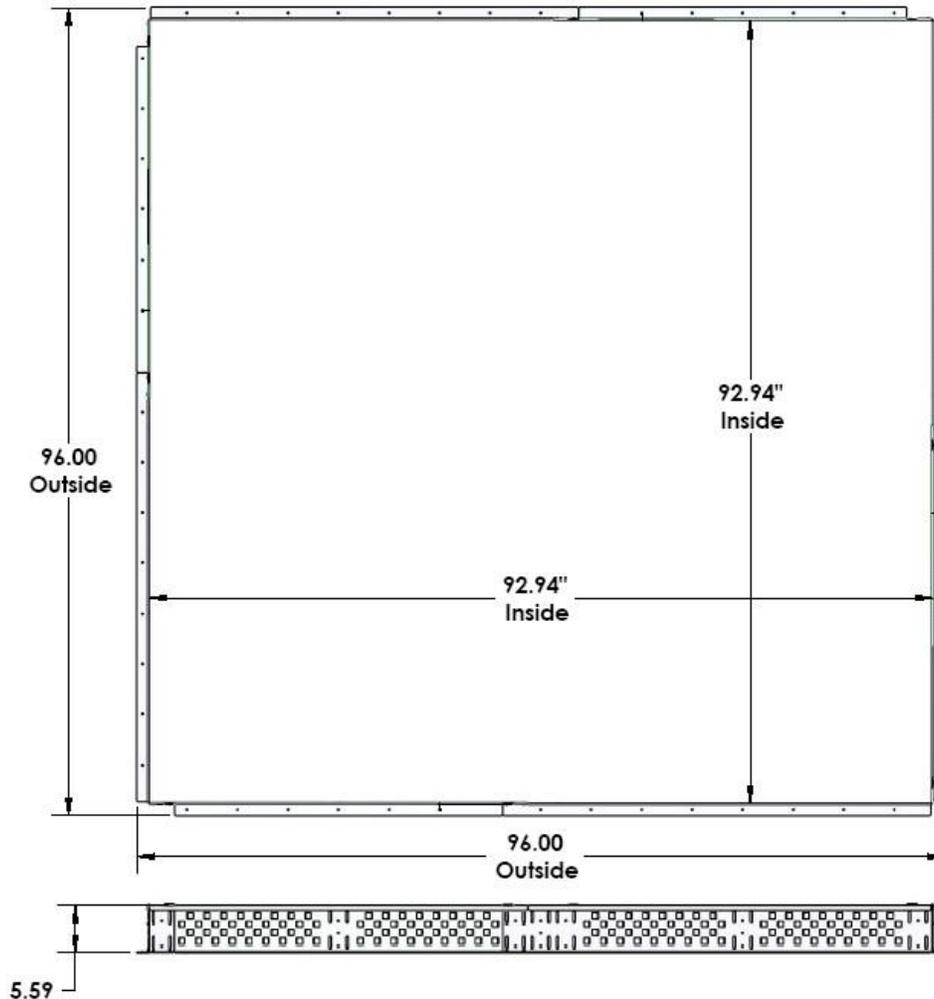
- (1) Vex Classroom Competition Field Kit (278-1004)
- (4) 13” x 21” x ½” Plywood
- (4) 21” x 26” x ½” Plywood
- (4) 21” x 21” x ½” Plywood
- (2) 4’ x 8’ x ½” Plywood (For mounting field to)\*
  - Nails or Wood Screws
- (1) 4’ x 8’ Commercial grade no-pile carpet
- (2) Crate
  - a. Exact crate can be found here - <http://www.michaels.com/large-crate-with-cutout-handles-by-artminds/10542734.html>
- (12) Hockey Pucks
  - a. Pucks can be found here - [https://www.amazon.com/Faswin-Classic-Ice-Hockey-Puck/dp/B01FQ6H3V6/ref=sr\\_1\\_2\\_sspa?s=sporting-goods&ie=UTF8&qid=1517600043&sr=1-2-spons&keywords=hockey+pucks&psc=1](https://www.amazon.com/Faswin-Classic-Ice-Hockey-Puck/dp/B01FQ6H3V6/ref=sr_1_2_sspa?s=sporting-goods&ie=UTF8&qid=1517600043&sr=1-2-spons&keywords=hockey+pucks&psc=1)
- (1) D – Shaped 2lb Weight

a. Can be found here - D-Shaped weights – Walmart <https://www.walmart.com/ip/CAP-Walking-D-Shaped-Neoprene-Walking-Dumbbells-2pk/39200897>

\*Field does not have to be mounted to plywood or carpet, however two goals will need to be mounted in such a way that they do not move when hit by robots.

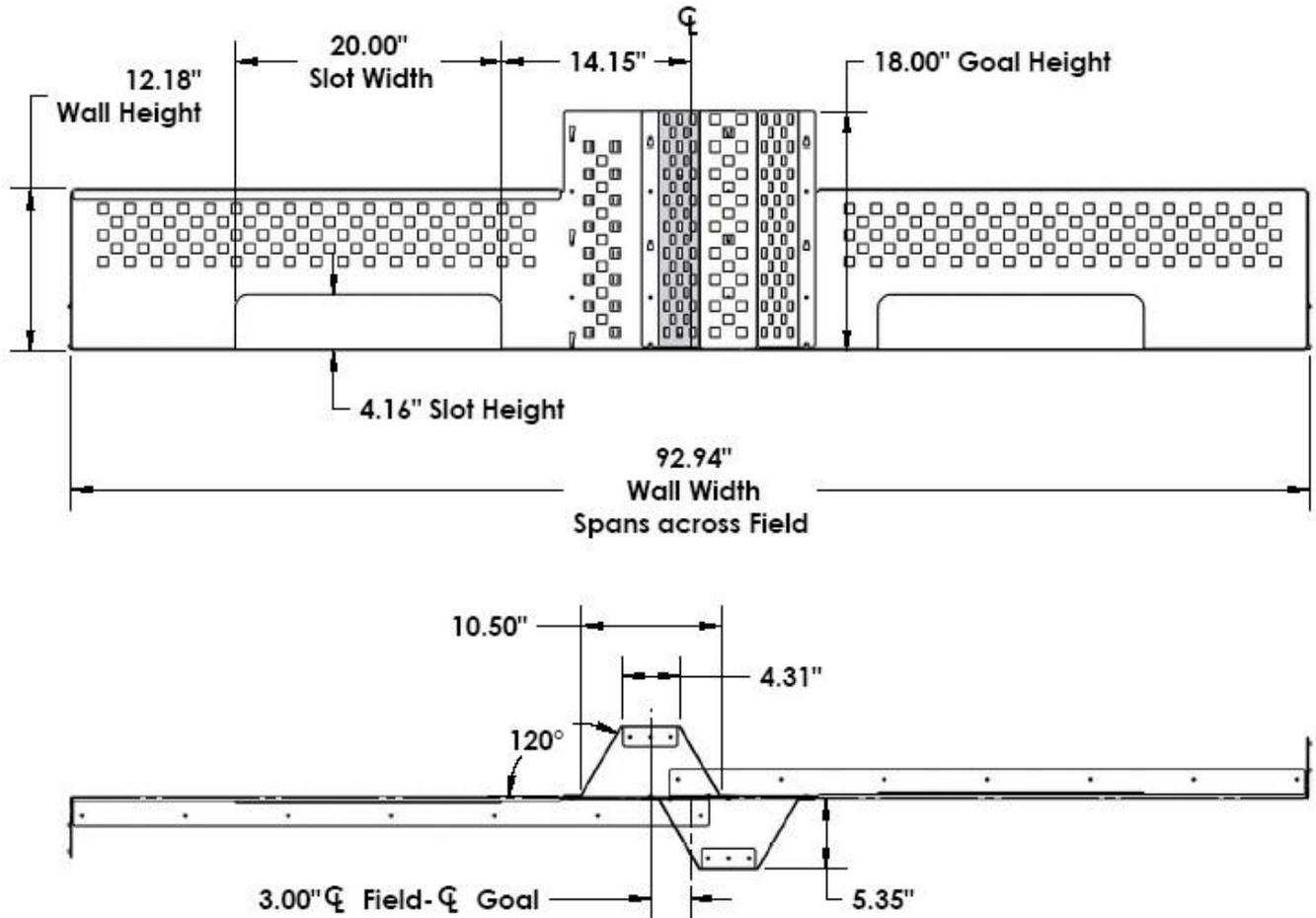
### Perimeter Dimensions

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 carpet covered plywood if desired.



### Wall & Goal Dimensions

The center wall dividing the field is 12.18" tall, and stretches across the entire field (92.94") directly down the center. There are two 20" wide x 4.16" tall slots in the wall for discs to slide through.



In the center of the wall there are two 18" tall goals. These goals are 10.5" wide at the wall, 4.31" wide at the tip, and project out from the wall 5.35". The goals are 3" offset from the center of the field.

After the main field has been setup, the four additional ramps will be added. These ramps will be 21" long, approximately 22" long, and 13" tall. Each will be mounted and secured directly over the slots in the wall via bolts or zip ties. The small gap between the two ramps will need to be accounted for when designing robots.

### Unofficial Field Construction

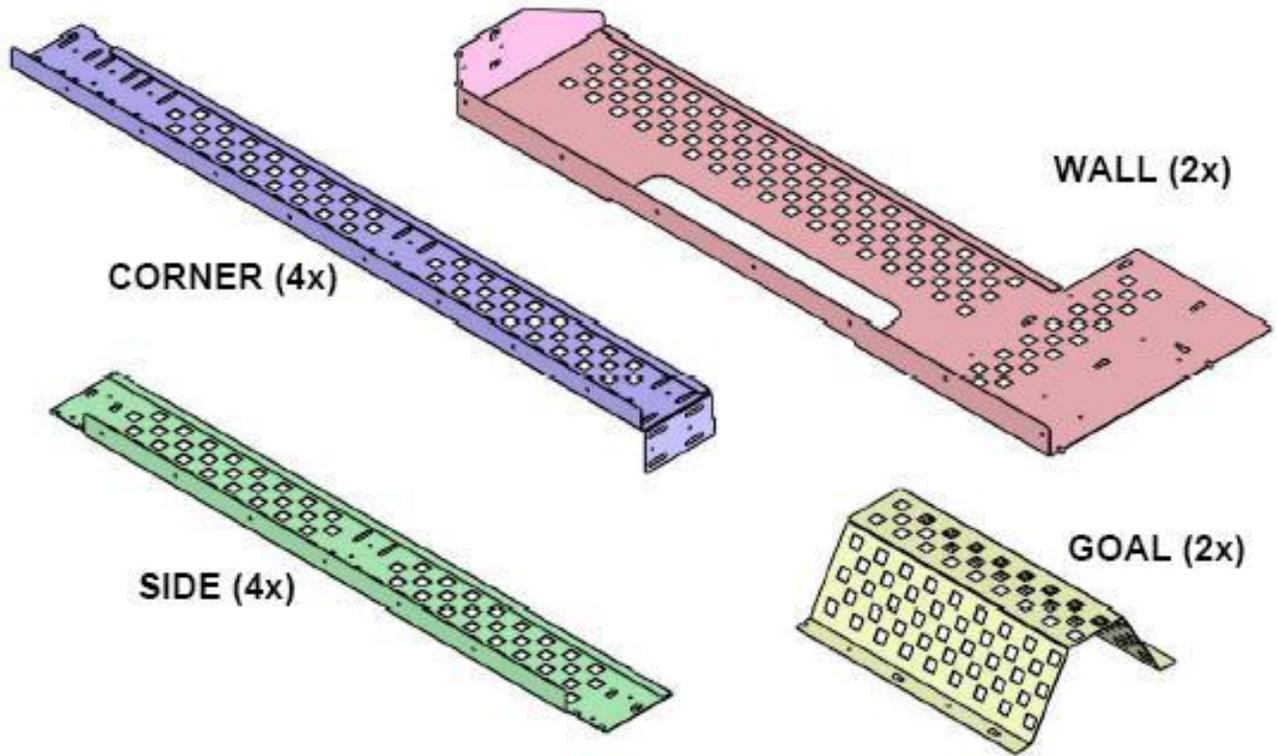
The official field is *NOT* needed to play Biscuit in the Basket.

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. (For example, it is possible to use a piece of cardboard 12" tall to simulate the height of the wall.)

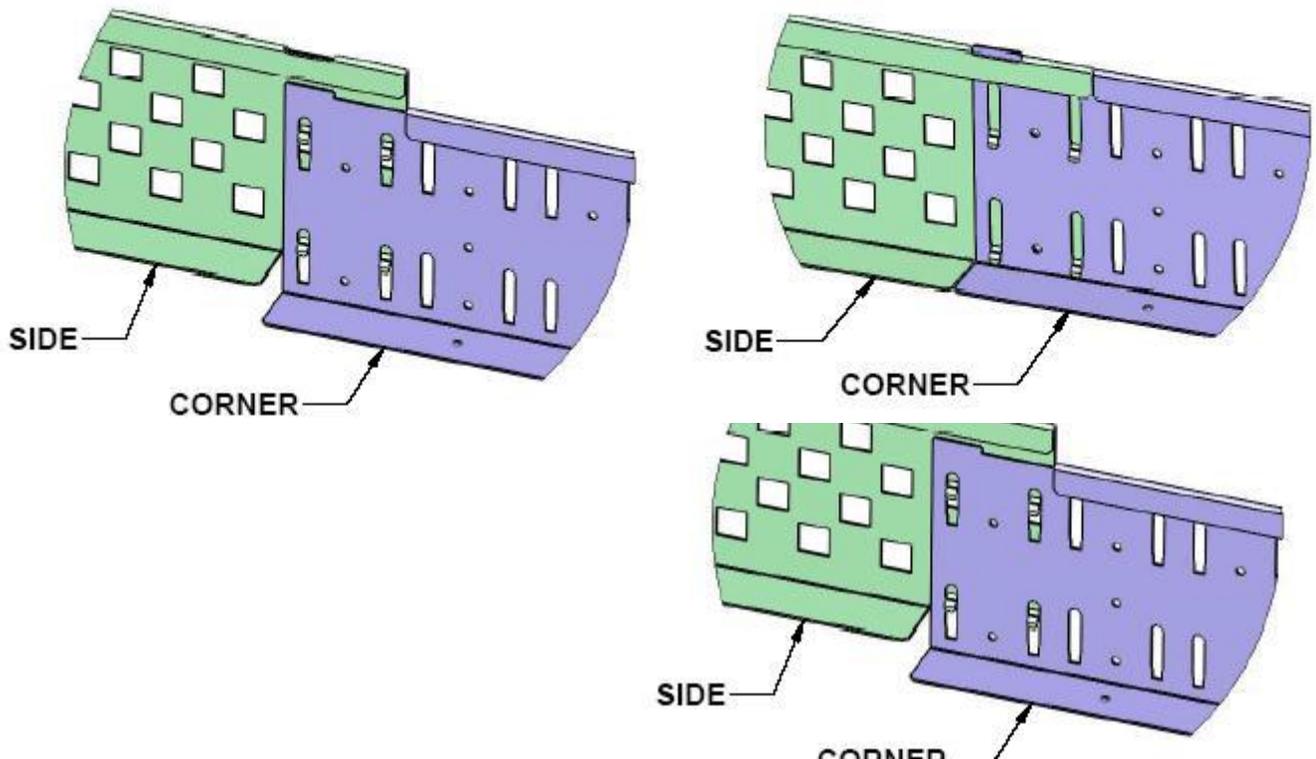
A full field perimeter can easily be constructed out of 8-foot long 2x6 boards. The wall can be mocked up from plywood and 2x4 boards.

## Field Assembly Instructions

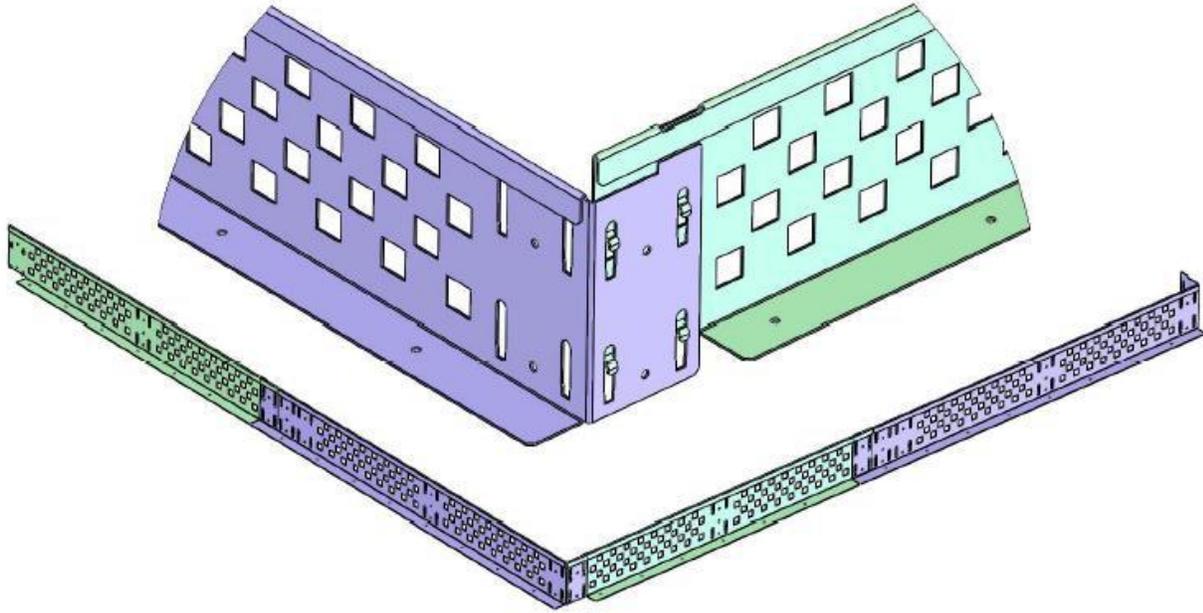
The Disc Jockey field consists of four different types of metal pieces:



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.

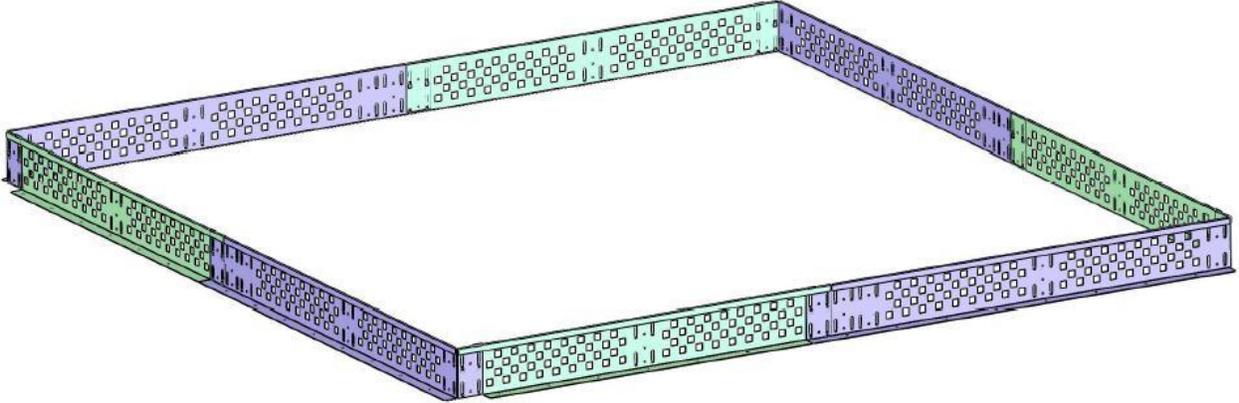


2. Repeat Step 1 for four (4) identical assemblies.
3. Connect two (2) of the assemblies together as shown below. They should hook together in the same manner described in Step 1. The SIDE piece of one assembly should connect to the CORNER piece of the other assembly.

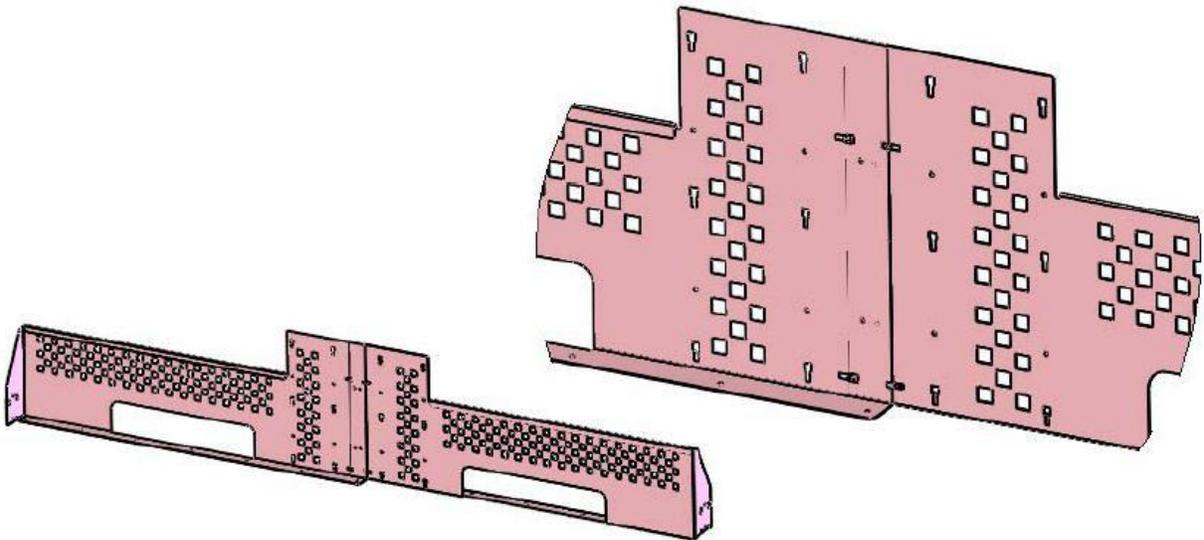


4. Repeat Step 3

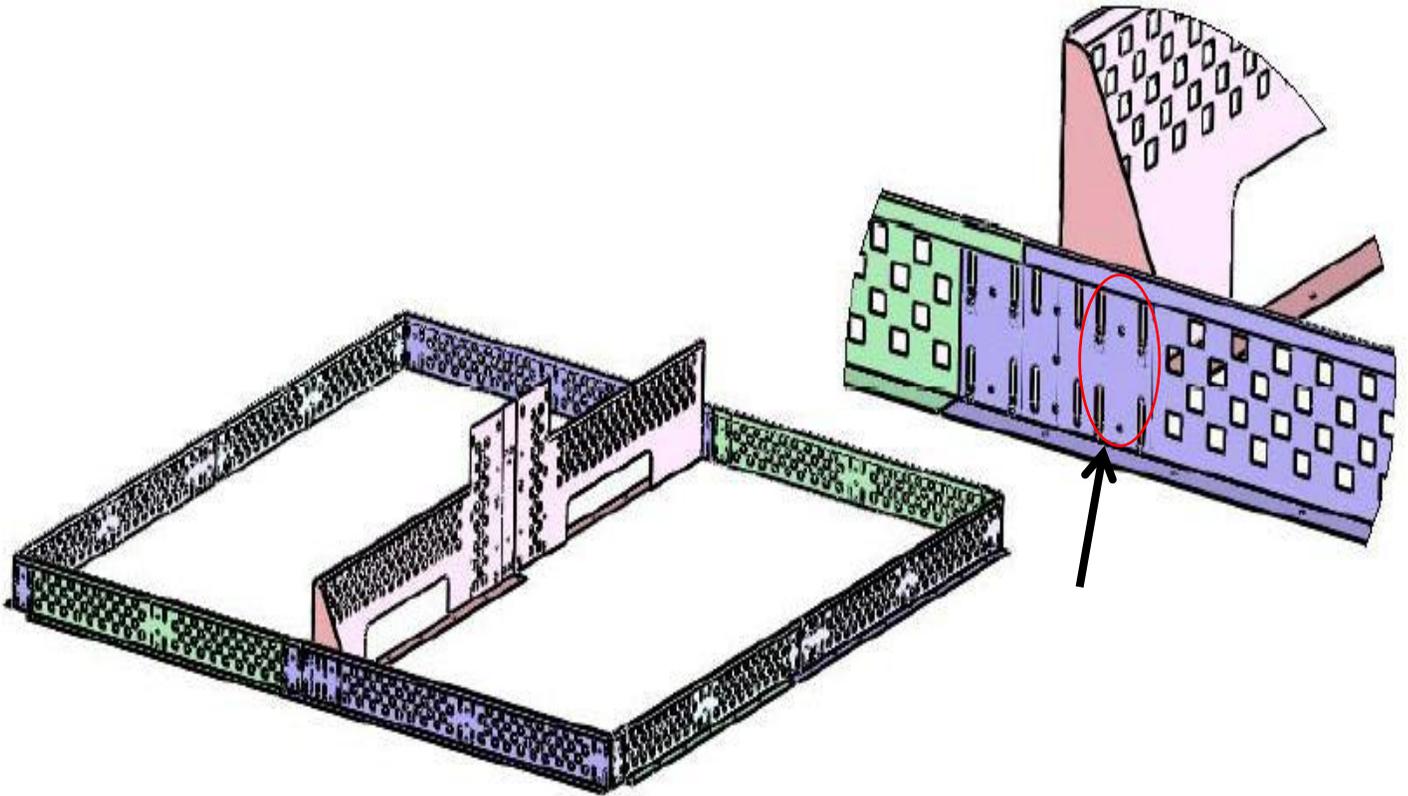
5. Connect the assemblies from Step 3 & Step 4 together to complete the field perimeter.



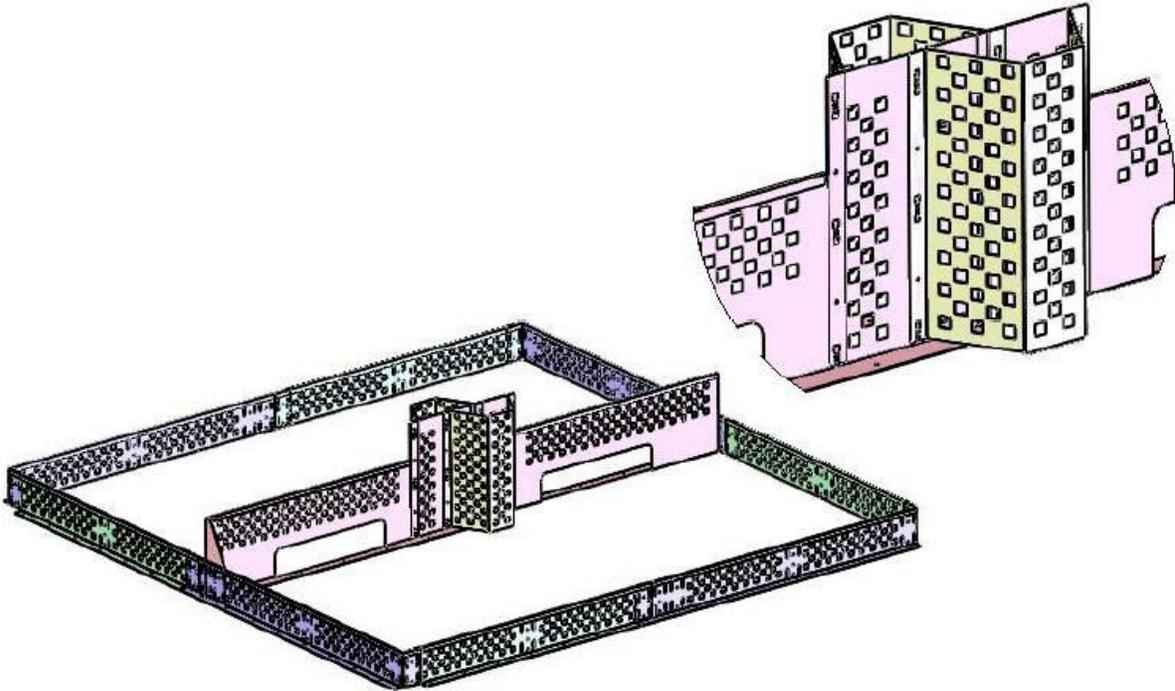
6. Attach the two (2) WALL pieces together as shown. Note, each WALL piece has two (2) hooks to engage in two (2) slots on the other wall piece. Ensure that all four (4) hooks are fully engaged.



7. Install the wall assembly from Step 6 onto the field perimeter assembly from Step 5 as shown. The wall assembly has four hooks on each end which will grab onto matching slots on the field perimeter. Ensure the wall assembly is centered such that it divides the field in half.
  - a. There are (3x) sets of mounting slots near the center of the field. Ensure the wall is installed in the correct set, (furthest from where the SIDE and CORNER pieces are joined) as pointed out by the arrow in the image below.

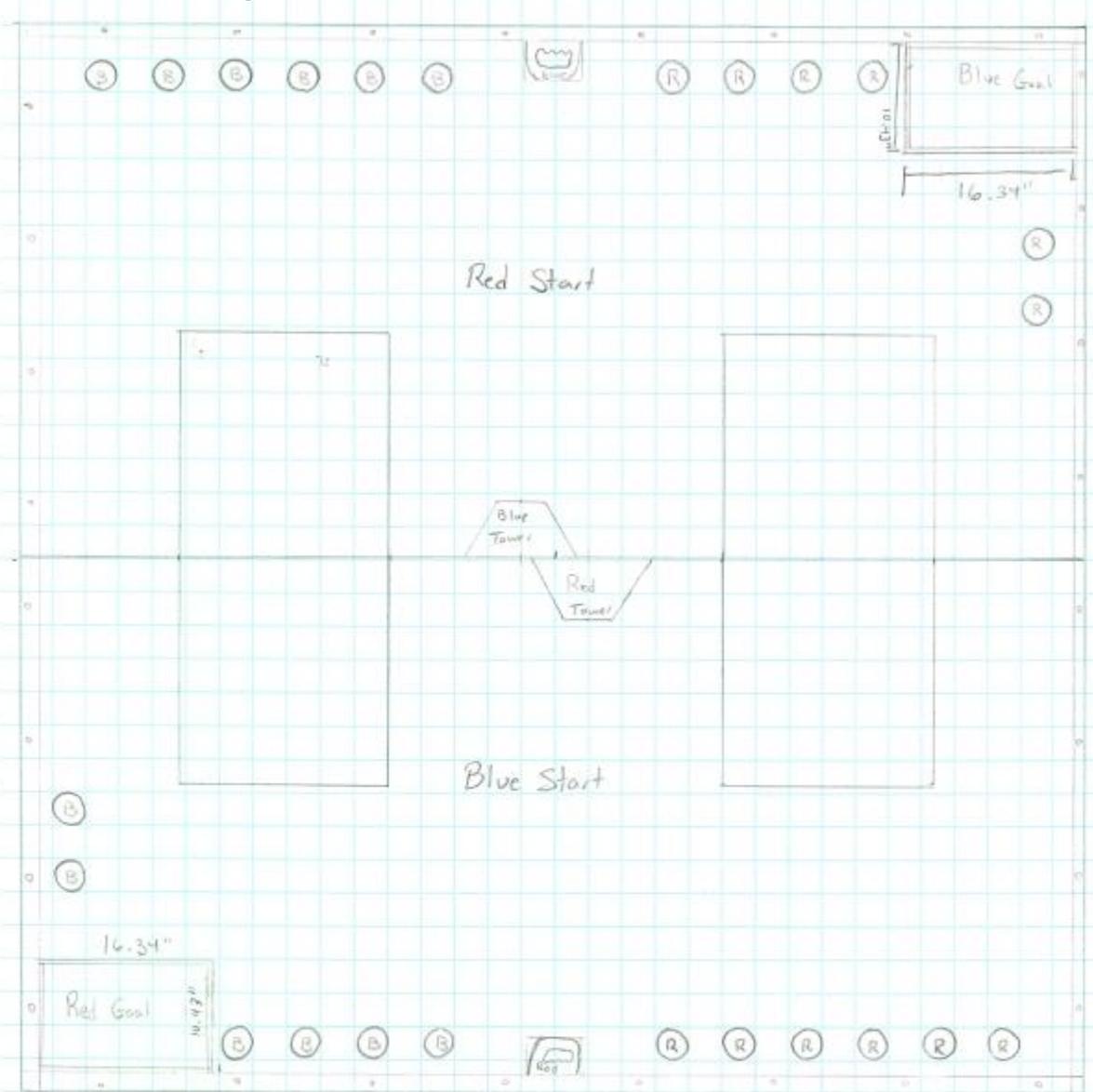


8. Attach the two (2) GOAL pieces onto the wall assembly as shown. Place the goals such that if you are looking at the center wall, the goal on your side of the wall is toward the right. Ensure that all six (6) hooks on each GOAL piece engage fully into their mounting slots.



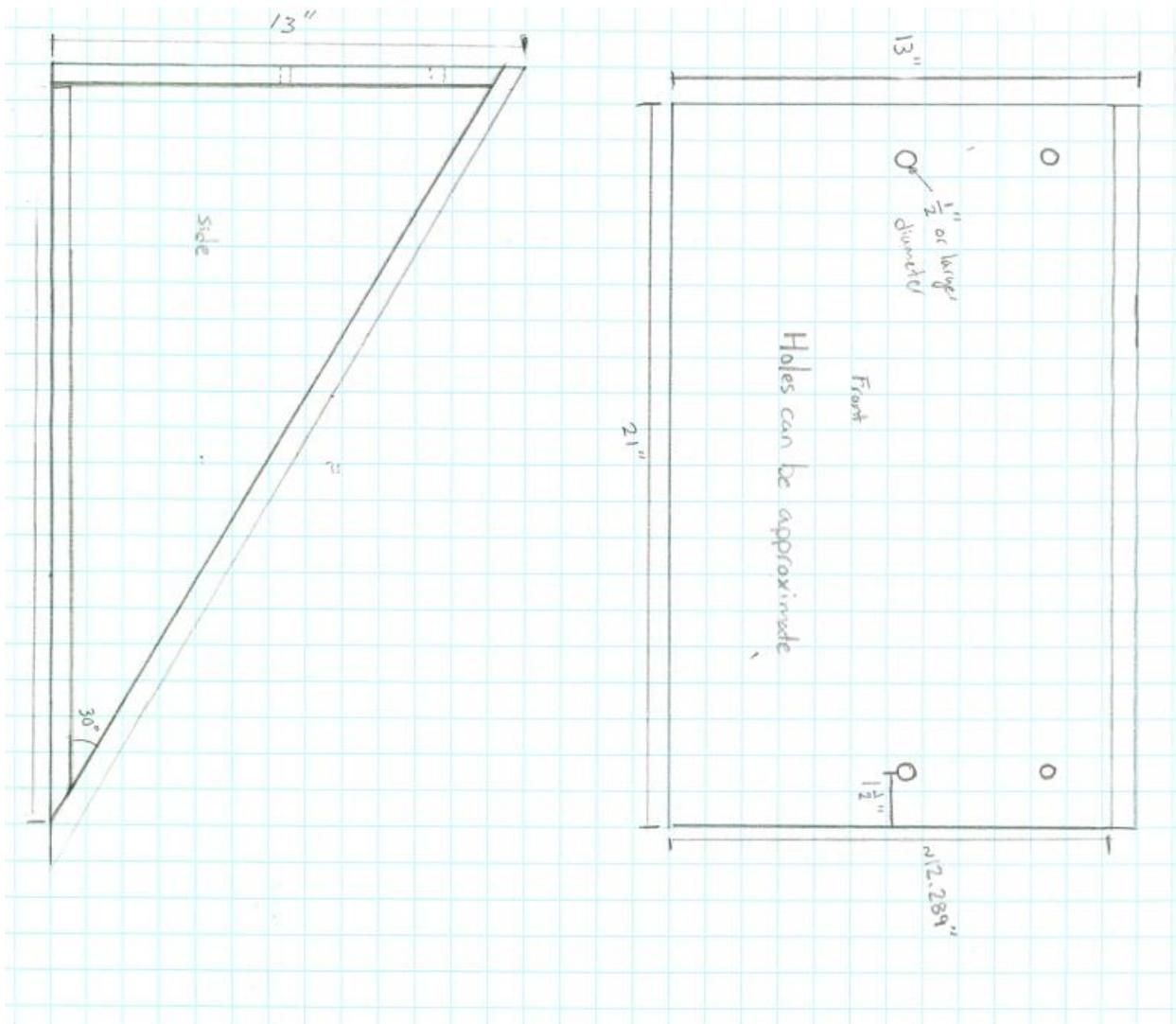
9. If desired, attach the assembled field to carpet covered plywood using wood screws or other methods.

10. Attach the two baskets to the shown corners using zip-ties or bolts
  - a. Ensure the basket is firmly mounted and can take hits from a robot without moving



Puck in your goal = 10 points  
 Weight in your goal = 20 points  
 Weight on your tower = 30 points  
 Weight on tower = 40 points

11. Attach the four ramps to the wall directly over the slots using bolts or zip-ties.
- Note: the holes in the backside of the ramp are meant for this purpose, they can be resized as necessary so long as the ramps are firmly mounted to the wall and will not move when hit.
  - Note: there will be a small gap at the top between the two ramps, this will not be covered at the official tournament.
  - Note: **The floors will be covered in carpet, however the ramps will be bare plywood. Robot designs should account for this!** ←←←←←



Match Number:				Winner:			
Team 1:				Team 2:			
Hockey Pucks of Correct Color in goal:		x10 Points		Hockey Pucks of Correct Color in goal:		x10 Points	
Weight in Correct Color Goal?		x20 Points		Weight in Correct Color Goal?		x20 Points	
Weight in Correct Color Tower Goal		x30 Points		Weight in Correct Color Tower Goal		x30 Points	
Weight balanced on Tower		x40 points		Weight balanced on Tower		x40 points	

Match Number:				Winner:			
Team 1:				Team 2:			
Hockey Pucks of Correct Color in goal:		x10 Points		Hockey Pucks of Correct Color in goal:		x10 Points	
Weight in Correct Color Goal?		x20 Points		Weight in Correct Color Goal?		x20 Points	
Weight in Correct Color Tower Goal		x30 Points		Weight in Correct Color Tower Goal		x30 Points	
Weight balanced on Tower		x40 points		Weight balanced on Tower		x40 points	

Match Number:			Winner:	
Team 1:			Team 2:	
Hockey Pucks of Correct Color in goal:		x10 Points	Hockey Pucks of Correct Color in goal:	x10 Points
Weight in Correct Color Goal?		x20 Points	Weight in Correct Color Goal?	x20 Points
Weight Hung from Tower		x50 Points	Weight Hung from Tower	x50 Points