Robot Renaissance

Saturday May 2, 2015

Oak Grove Middle School

1370 S Belcher Rd

Clearwater, FL 33764

Oak Grove Robotics and PTSA would like to invite all robotics teams to our first annual come and have fun event. Teams of all ages will be able to show off their robot building and programming skills in a variety of challenges. The Grove is home of the Golden Knights and our events are themed in a medieval manner but don't let the names deter from the games. Robots will be competing in these challenges:

Labyrinth
Enter the Castle
Rescue the Princess
Squires Grapple
Chariot Race
Draw the Wain
Joust

Registration information is found at the end of these rules and event details. Generally, teams can consist of 1-5 people. Only Lego pieces allowed, unless otherwise specified in the rules. Teams can have multiple robots, motors, sensors, etc. to compete in various events, but cannot have more than one robot entered into the same event.

General rules:

1. All robots are made entirely out of unaltered LEGO parts. The brains of the robot must be either the NXT or EV3 brick. Lego parts must be official. The only exception unless otherwise noted is string. Within this exception it must be understood that the sting used is similar to official Lego string in size and strength.

2. All robots must operate in autonomous mode (except during Rescue the Princess.)
3. Trophies will be given out for one winner and one runner-up for each event. In addition, their will be an overall winner and runner up based on the following point system:

10 pts for first in an event
7 pts for second in an event
5 pts for third in an event
3 pts for successful completion of event
+1 pt for ***Noble Act***
-1 pt for ***Un-chivalrous Act***

(Note: these acts will be observed by all judges/referees and discussed at trophy deliberations.)

4. To enter each team must fill out and submit the registration form. In addition, each team must have at least one adult advisor present at the competition per 10 kids. Registration is $5/event or $25 for the entire tournament for each team. To register complete the at-

tached registration form mail to:

Oak Grove Middle School
Attn: Kyle Wright
1370 S Belcher Rd.
Clearwater, FL 33764

Event Outline/Rules:

Labyrinth – The pathway will consist of an 8 foot by 8 foot area bordered by 2x4s painted black with the boards sitting on their narrow end, so they will extend 3 ½ inches up from the floor (see attached diagram). There will be one entrance and one exit. There will be lanes inside the 8x8 area created out of more 2x4s painted black. Each lane will be a minimum of 18 inches wide. The lanes will be set in a way where no dead ends are created. The robot will have to find its way through the maze using the touch or ultrasonic sensors (or both). The robot will earn one point for each foot it travels toward the exit. Each team will be given one attempt at the maze. At any point during the run if the robot stops making progress towards the exit the judge will give a ten second count down. At the end of the countdown if the robot has still not made progress towards the exit the run will be stopped and points awarded for progress made up to that point.

Enter the Castle – This obstacle course will be as close to the diagram below as possible. Each team will build, program and test a mobile robot to maneuver autonomously through an obstacle course to reach the castle.. The obstacle course will be designed as shown. A path will be located on a floor surface with boundaries indicated by flat matted blue painter's tape. All programming, design, build and testing efforts will cease promptly at the end of the build and program phase. At this time, each team will compete one at a time by placing their robot at the starting line of the obstacle course. The order in which teams will compete will be determined by a random drawing of the team names. At "go!" students will press the "RUN" button of the NXT microcomputer to send their robot off to navigate the course. Robots will attempt to maneuver without interacting with obstacles and navigate to the end of the course in the shortest amount of time.

The winning robot will be determined by the most points that are able to be achieved by successfully completing each section of the course. Tie scores will be determined by time. Students are not allowed to touch the robot after the start unless the robot is completely out of bounds and “off course” and/or the round has ended.

Rescue the Princess - In the Kingdom of Golden Knights some evil wizards have locked the princess in a secret room somewhere in the castle. You and your trusty robot have been hired by the King’s Guard to come in and save the day. Your job is to enter the castle grounds where the princess is hidden and save her from her captors. What we do know is the gateway to the castle is 12” x 12” and the princess is tied to the throne inside the castle. The princess is fragile so be careful not to drop her or your turn will end. Her captors may still be inside and your robot must enter alone. Therefore, you will be required to operate your robot via bluetooth while observing the inside of the castle on a monitor. You can use any cell phone with bluetooth to control an NXT/EV3. The winner of this event will be the robot who safely gets the princess out of the castle in the least amount of time.

Squires Grapple – Matches will be held on a 42 inch table acting as the grappling ring. The two robots will be placed so that they face opposite directions (see diagram.) The table will be white with a 2” black ring around it. Once the match starts, the winner will be determined by which robot is either pushed out of the grappling ring or is knocked/flipped over. The match will last for 1 minute. At the end of the minute, if no robot is a clear winner, then the robot that

is closest to the center will be called the winner. All robots must be autonomous and made entirely out of Lego pieces.

Chariot Race:

Build a chariot with a LEGO Mindstorm NXT or EV3 that completes a straight 10 meter track in as little time as possible. There are no guide lines to keep your Chariot in line. If it strays off the track and misses the finish line then it is given another last chance to make it to the end. This will be run as a series of head to head races, two robots at a time, the fastest one advances to the winning bracket and the slowest moves to the consolation bracket. Then, races will be run in each bracket to determine one winner of each.

Draw the Wain – How much weight can your NXT/EV3 push or pull? Using 500 gram increments placed onto a sled made from Lego pieces how much weight can your robot transport? The winner moves the most weight at least 50 cm. If the robot pull exceeds 2000 grams we will raise the track 5 degrees for every run but keep the weight at 2000 grams. Below is a diagram of the wain (cart/wagon) and it is recommended that your robot plan on pushing the cart from the back. We will have a hitch attachment if you want to pull, but have found that it breaks loose easily and pushing is a better option.

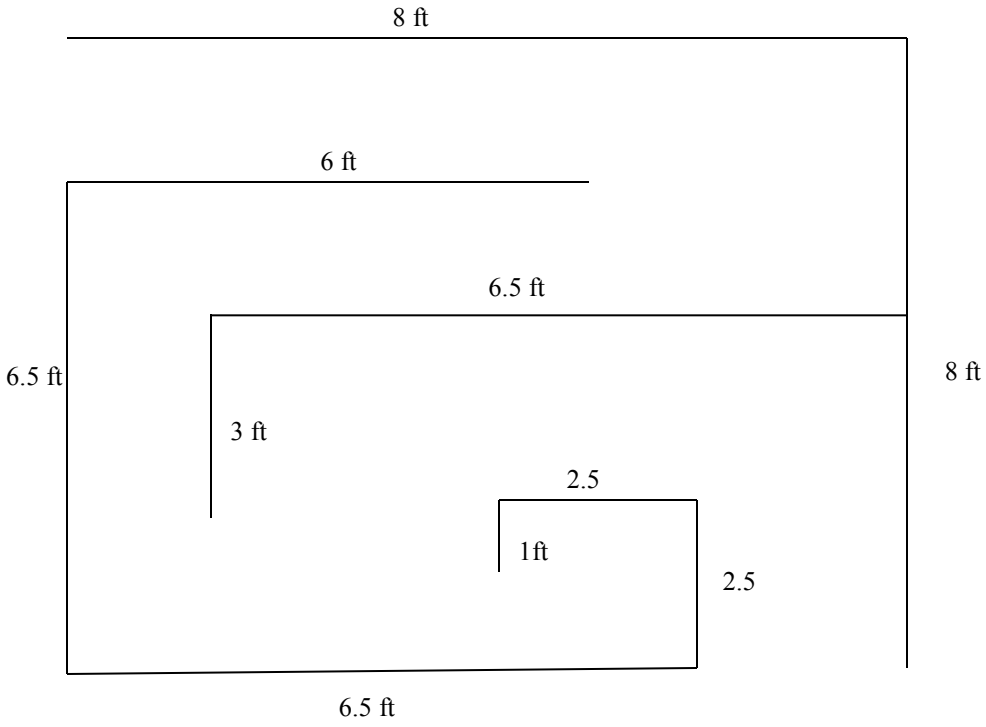
Joust - A standard FLL competition table (4 ft x 8 ft with 2" x 4" as sides) painted flat black with a 1" x 4" center piece acting as a tilt barrier. In addition, there will be a once inch wide white line painted one inch from the barrier and parallel to it. This allows for a line following option to teams who wish to use it. The tilt barrier is used to allow the robots to get close but not actually crash into each other, which of course is why barriers were used in real (late period) jousting. In order for this to work, everyone's robot (horse) needs to have some parameters. The maximum dimensions are 35cm in length or width but the maximum height should not exceed 16cm. Each robot is required to have a place for a standard Lego figure, seated upon a standard Lego horse* mounted on the robot, holding a lance** positioned to reach across the barrier to be able to touch the opposing figure. The figure will be provided and pictures can be found below. The figure should be positioned at a reasonable height to simulate the look and feel of a real joust and to provide some consistency between the teams. The angle of the lance to the barrier must not exceed 45° (or maybe 30°) to discourage sweeping the opponent with the broadside of the lance, they should use the tip.

Play:
The goal shall be to run along the barrier and touch or unhorse the opposing knight using the lance. Teams must start from two opposite ends of the barrier on opposite sides. Robot must begin it's run in contact with the end wall (short side). Robot must not touch the barrier except incidentally with the lance or the figure if it falls.
Each team will have a certain period of time before the game, and at the start of each run, to make the necessary adjustments to the position of their knight, lance, and robot to give their best chance to touch the opponent.
Teams will set their robots in place and indicate they are ready when asked by the Mistress of the list. When both teams are ready the MoL will proclaim "Laissez Aller!!" and the robots will commence their run.
Each pair of team will run three passes and have points totaled to determine status.

Points:
3 points for a touch with the lance upon the opponent.

5 points for a broken (dropped by contact) lance.
10 points for unhorsing the opponent.
Points awarded to both teams as per their actions.
Penalties:
Hitting the horse.
Touching the barrier.
Sweeping with the lance broadside.
Any un-chivalrous behavior.
Failing to loudly yell HUZZAH!!!! When a good hit is made!

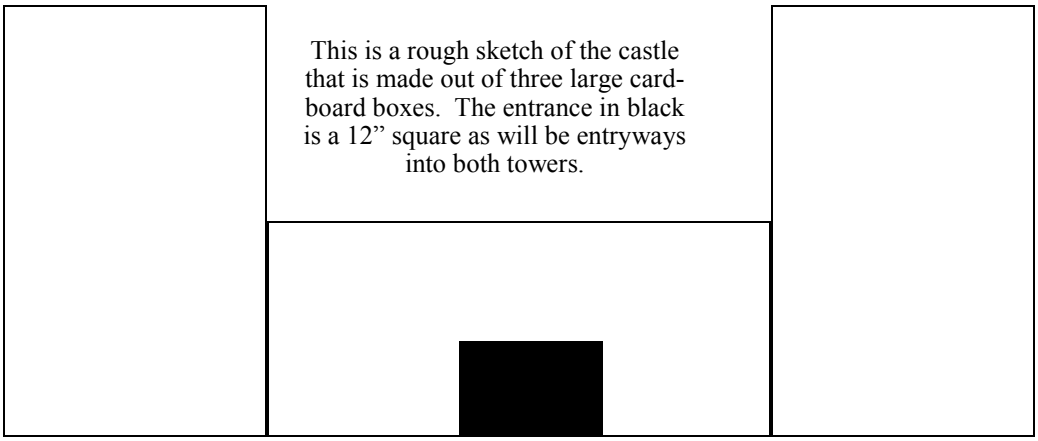
Labyrinth



Enter the Castle

Eventually there might be a map or something here, but at this time just be aware that it's similar to the Labyrinth as far as maze principal. However, we anticipate having obstacles such as draw bridge, maybe a dragon, etc. It still in the design phase. To be successful, your robot will need to be able to evaluate and respond to multiple sensors as it moves.

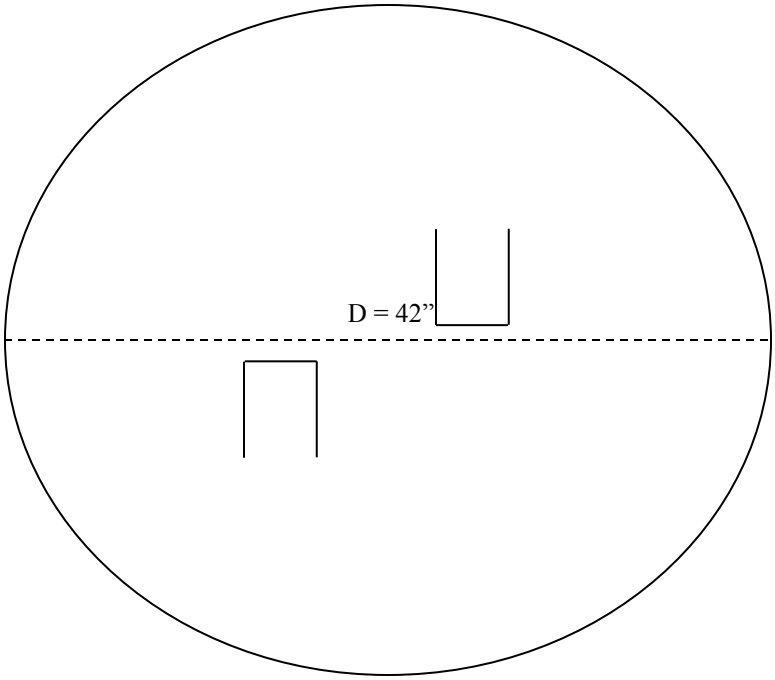
Rescue the Princess



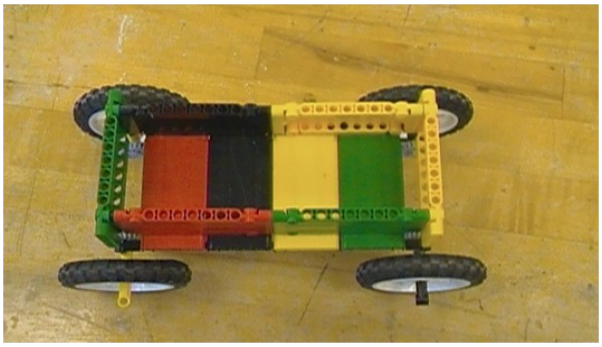
In one of the towers the Lego princess will be seated on a throne made out of Legos. When it gets built, we will send out an image to the email list. Remember your robot will enter the castle, find the princess, and bring her out. Success will be given for bringing just the princess or the princess and her throne. Inside the castle will be a series of security cameras used for the purpose of navigation. Remember, the robot must be moved via Bluetooth for this event.

Squires Grapple

Think Sumo wrestle here. The mat is a reconditioned 42” round table top painted all white with a two inch black ring around it. It sits about an inch of the ground. There will be two starting marks and robots will be placed facing opposite directions.

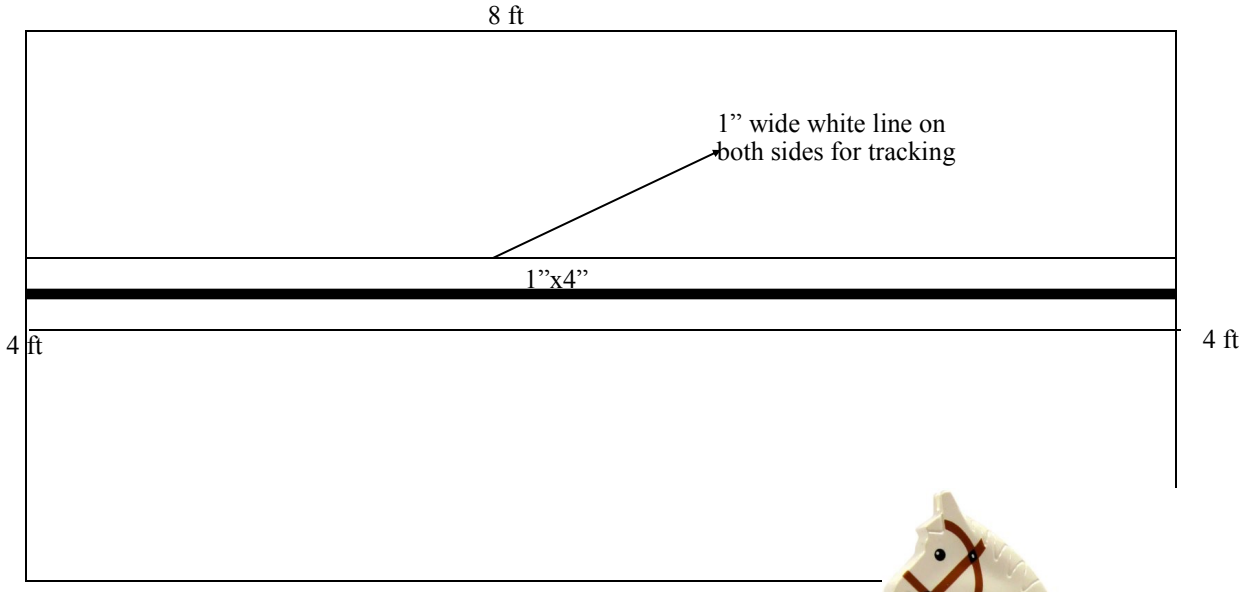


Draw the Wain



These images will change. The cart will be similar.

Joust



Lego horse will look like this and the lego figure will be standard issue with the lances being identical and 3D printed PLA. Remember, the goal is not to destroy robots.

Robot Renaissance Registration

Team Name: _____ Coach Name: _____

Email: _____Phone: _____

School/Organization: _____

Address: _____

Check which events you will be participating in:

___Labyrinth
___Enter the Castle
___Rescue the Princess
___Squires Grapple
__Chariot Race
___Draw the Wain
___Joust

Team Members (1-5 per team)

1. _____

2. _____

3. _____

4. _____

5. _____

Payment due by April 15th. Once registration is received you will be notified. In addition, you will be added to the email list with updates. If you should have any questions in the meantime please contact Kyle Wright at wrightky@gmail.com or 937.371.6869

Please make a copy of this form for your records and mail the form along with payment to:

Oak Grove Middle School
Attn: Kyle Wright
1370 S Belcher Rd
Clearwater, FL
33764