

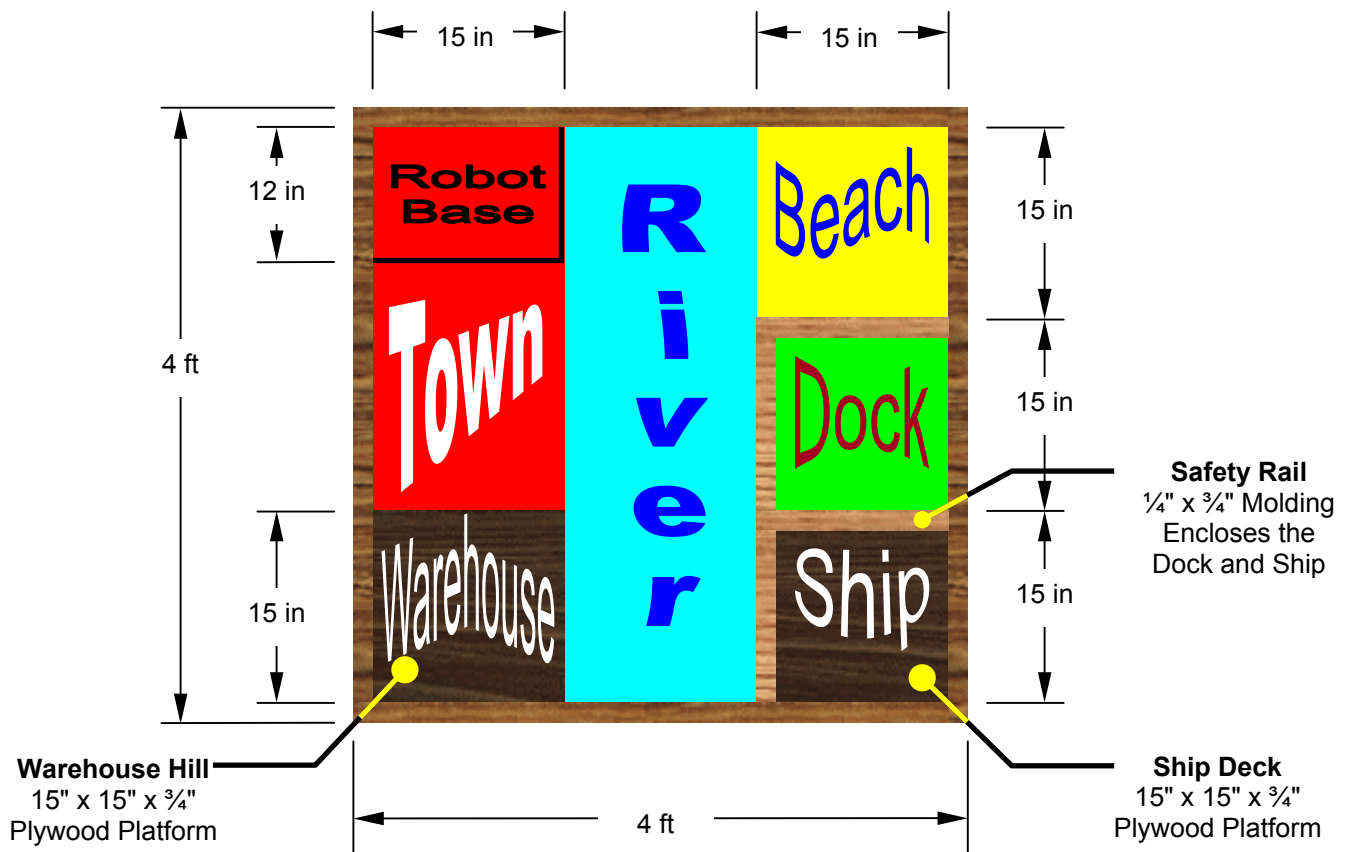
# Spring 2004 Engineering And Robotics Learned Young (EARLY) Robotics Competition

Hogg Middle School  
May 15, 2004

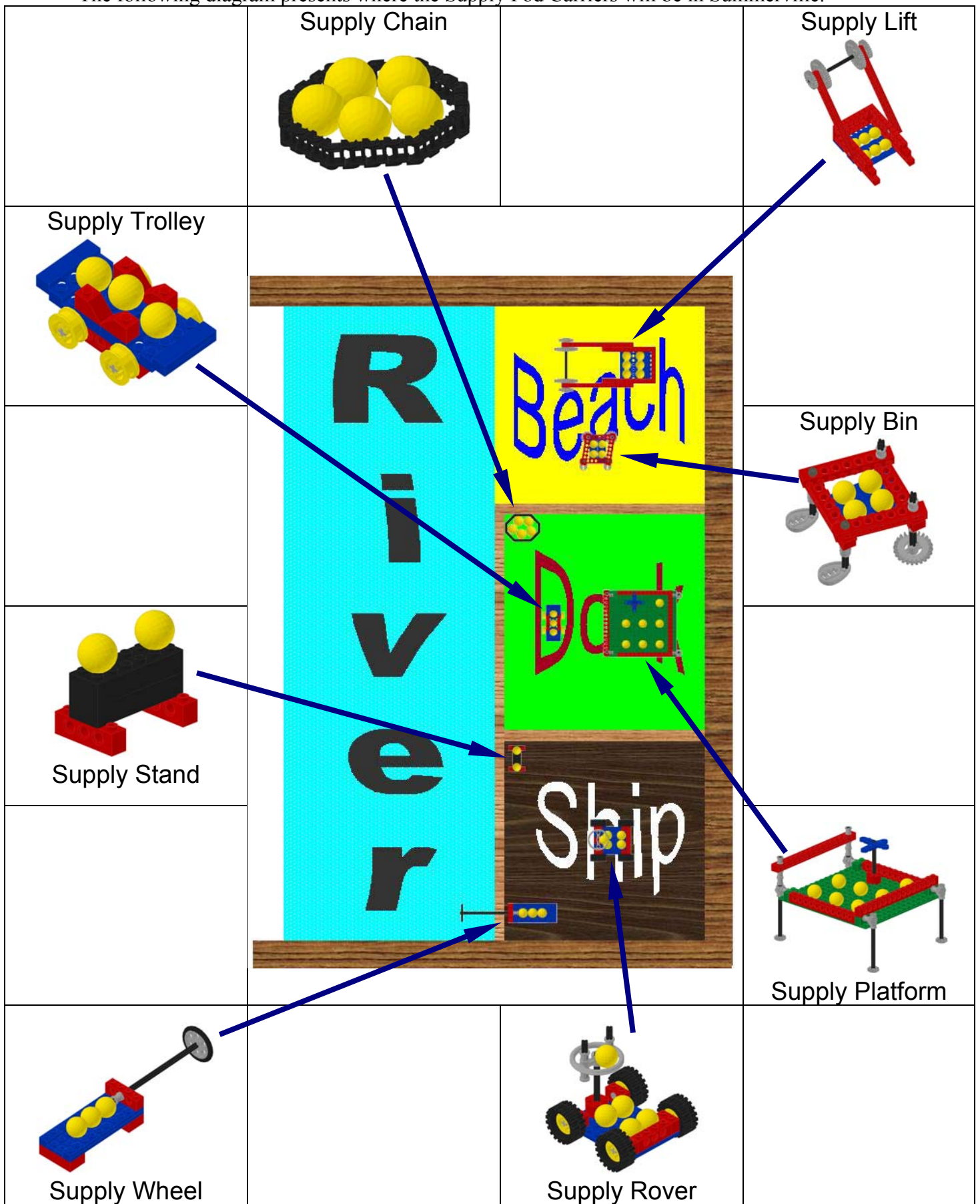
Roboticists, your hard work last fall to provide rescue supplies to Sunset Island was a great success. In fact your relief efforts were so successful that there are a lot of extra supplies on the island. The Islanders have put their town back together and now they want to share the extra supplies with other people in need. So, they have shipped the supplies back to Summerville, but they need your help loading them back into the warehouse. A robot that can take the supplies from the ship, dock and beach area and bring them back into town would be the perfect solution. So, can you help restock the Summerville warehouse? Thank you again for saving Sunset Island!

Below is everything that we know about the mission.

- The team must be ready to execute the mission on May 15, 2004 at Hogg Middle School.
- The equipment available for a team to build a robot or robots is 3 LEGO Motorized Simple Machines Kits.
- The following diagram presents the environment that will be encountered.



- The following diagram presents where the Supply Pod Carriers will be in Summerville.



## Rules

1. The team has 2 minutes to complete the mission.
2. There will be 35 Supply Pods on the playing field at the beginning of each mission.
3. The team's score is determined at the end of the 2-minute mission.
4. If a Supply Pod is moving when time expires, the judge will wait until the Pod has stopped moving before determining its scoring position.
5. The team scores 5 points for each Supply Pod in the WAREHOUSE.
6. The team scores 3 points for each Supply Pod in the TOWN.
7. The team scores 1 point for each Supply Pod in the ROBOT BASE.
8. A Supply Pod counts as in the WAREHOUSE if it is anywhere on the raised area of the WAREHOUSE.
9. A Supply Pod counts as in the TOWN if it is entirely inside the TOWN boundary.
10. A Supply Pod counts as in the ROBOT BASE if any part of the Supply Pod is breaking the plane of the zone.
11. The team's robot/robots and all parts must start inside of the ROBOT BASE at the beginning of the 2-minute mission.
12. The ROBOT BASE is the 12" x 16" boundary extended vertically (i.e. the robot can not hang over the line at the beginning of the mission).
13. The line indicating the ROBOT BASE is part of the ROBOT BASE.
14. The team can touch their robot without penalty when the robot is partially inside the ROBOT BASE but after touching, the robot must be completely inside the ROBOT BASE to continue the mission.
15. The team's robot/robots must start inside of the ROBOT BASE every time it is returned to the ROBOT BASE during the mission (i.e. no part of the robot can be breaking the plane of the ROBOT BASE line after being touched by a team member).
16. A penalty of 5 points will be assessed if a team touches their robot, including parts that have become separated from the robot, which is outside of the ROBOT BASE.
17. If a robot is touched, the robot must be returned to the ROBOT BASE to continue the mission.
18. The controller and wire are NOT considered part of the robot.
19. The robot shall not have any elastic stored energy (i.e. stretched rubber band) when the mission begins or resumes after touching but elastic stored energy can be generated from activating a motor.
20. The controller and wire can ONLY be used to provide electrical power to robot motors (i.e. it can not be used to drag the robot, corral Supply Pods, etc.).
21. If a controller or wire is used illegally (judges call), the team will be required to immediately place the robot back in the ROBOT BASE to continue the mission.
22. A team may touch any playing piece, including Supply Pods COMPLETELY inside the ROBOT BASE without penalty.
23. If a playing piece is illegally touched, the playing piece along with any Supply Pods it is holding will be removed from play for the remainder of the mission.
24. A playing piece is NEVER considered part of the robot.
25. Relief supplies are very valuable. A penalty of 5 points will be assessed for each Supply Pod that leaves the playing field.
26. All judge's rulings are final and may not be appealed.

## Playing Field Notes

1. The base of the playing field is a 4' x 4' sheet of 3/8" plywood.
2. The outer boundary of the playing field is made of 2" x 4" boards, with the short edge attached to the playing field. Below is a picture of the playing field at the beginning of the mission.



3. The WAREHOUSE and the SHIP'S DECK are 15" by 15" pieces of 3/4" plywood, glued to the bottom left and bottom right corners of the playing field.
4. The SHIP DECK RAIL is made by attaching two pieces of 1/4" x 3/4" screen molding on top of the plywood at the outer edge (RIVER and DOCK side of the plywood). The molding can be purchased at Home Depot (part # 927-139) and is the same material used for the DOCK RAIL.
5. The DOCK RAIL is made by attaching two pieces of 1/4" x 3/4" screen molding on the boundary between the DOCK and the RIVER and the DOCK and the BEACH. The molding should be placed on the inside perimeter of the DOCK (i.e. pieces should be 15" and 14-1/4" long). The molding can be purchased at Home Depot (part # 927-139) and is the same material used for the SHIP DECK RAIL.
6. The WAREHOUSE does not have a rail.
7. The Supply Pods are standard (5/8" diameter) marbles. The package of 100 marbles that is displayed below can be purchased at Wal-Mart for about two dollars.



8. The field setup is displayed below.



9. The position of the screen molding at the DOCK and SHIP DECK is displayed below.



## Frequently Asked Questions

Do we need to bring the any game pieces to the tournament?

- No, you only need to bring your robot. There will be playing fields with all of the necessary parts set up for the competition when you get to Hogg Middle School.

How many rounds will we compete in?

- Each team will have a minimum of 3 rounds in which they compete.
- Depending on the number of teams that enter, more rounds may be scheduled, but all teams will compete in the same number of rounds.

Does the Supply Pod count as "in a zone" if the carrier which it resides is "in the zone"?

- The Supply Pod must be in the zone (i.e. beach, dock, or ship) for it to score. The supply pod carrier location does not matter.

Can the team modify a robot while it is in the base?

- Yes, they can add or subtract without penalty as long as the "stuff" they bring to the table is not from more than 3 Simple Machine kits. They can also load (Supply Carriers and Supply Pods that are in base) without penalty. Remember, all of the "stuff" must fit in the ROBOT BASE at the beginning of the mission.

If the Supply Carriers fall apart, is there a penalty?

- No, it is not a penalty but intentional destruction is not allowed. If destruction (intentional or unintentional) is occurring AND the team does not heed a warning given by the judge (ex. "Hey guys, please quit running the carrier into the wall like that", the judge will instruct the team to retrieve the robot (with penalty) and sit out the remainder of the mission. Finally, some of the carriers will be "glued" together but none of the Supply Pods will be glued to the carriers.

May we glue our robot together?

- NO! There should be no other materials other than that of the 3 Simple Machines Kits used. Please remember that these kits have to be used for future competitions.

Do we have to use 3 Simple Machines Kits to build our robot?

- The total sum of parts available in 3 Simple Machine Kits can be used in any combination to build your robot. You do not have to use all of the parts. You may not use additional Lego parts from any other Lego kits.

May we modify the LEGOs?

- No, LEGO bricks and parts cannot be modified in any way. Even the strings cannot be cut to make shorter strings. Please remember that these kits have to be used for future competitions.

Should our robots be built when we arrive for the competition at Hogg Middle School?

- Yes, please be ready to compete when you arrive at the competition. Learn the game ... build a 'bot ... practice ... make your 'bot better ... practice ... make your 'bot even better ... practice, practice, practice.

Please contact [Lucien.Junkin@jsc.nasa.gov](mailto:Lucien.Junkin@jsc.nasa.gov) or [Chris.Culbert@nasa.gov](mailto:Chris.Culbert@nasa.gov) with any questions or comments.

Thank you for maintaining the spirit of the game!