

# Engineering And Robotics Learned Young

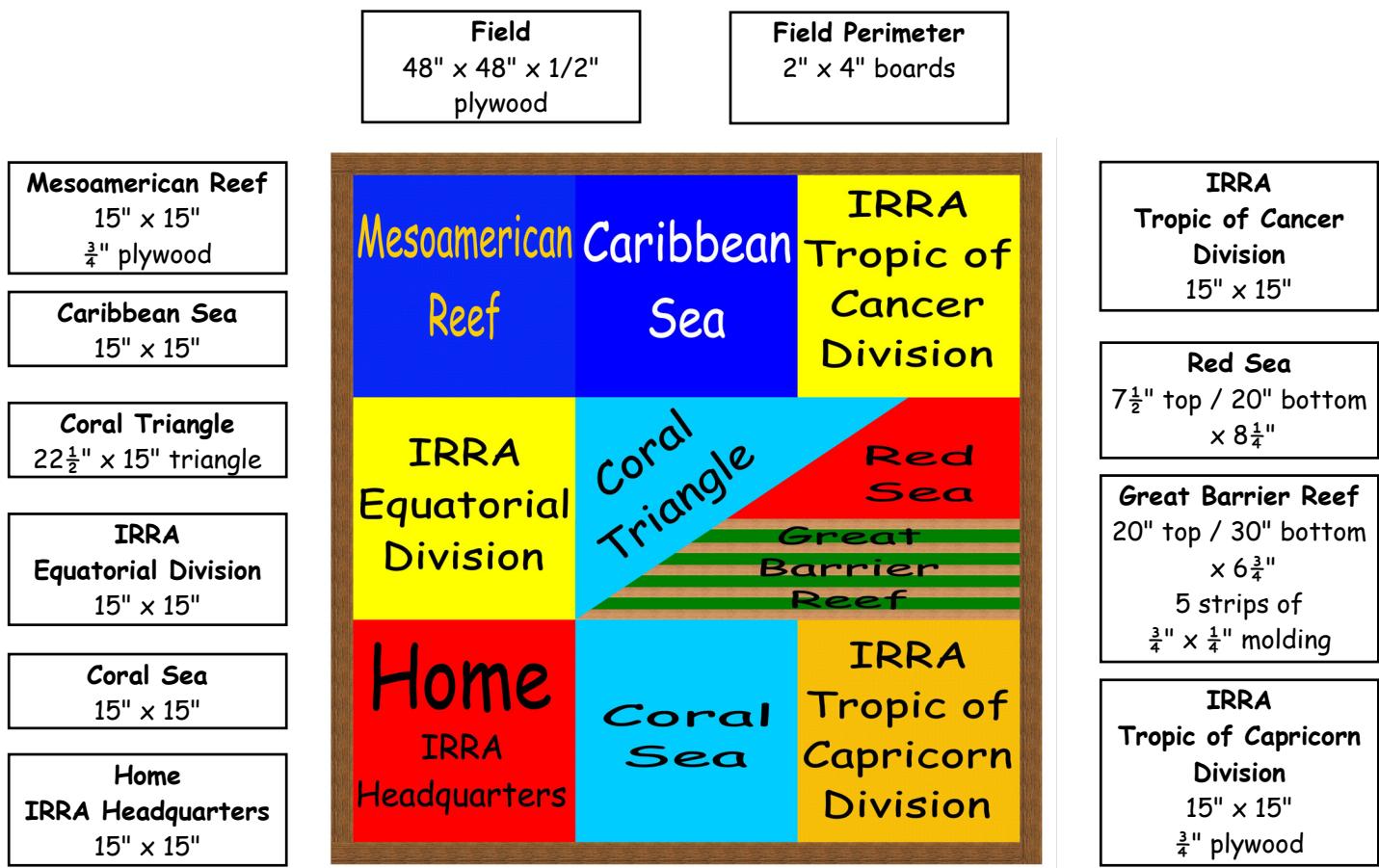
## ◆ EARLY ◆

### Spring 2008 Robotics Competition

Roboticists, the International Reef Restoration Administration (IRRA) thanks you for all of your commitment to help protect and restore the reefs of the World! IRRA now needs your help returning the reef robots from the reefs to the IRRA Divisions and Headquarters. Please help IRRA retrieve the reef robots for future reef restoration missions!

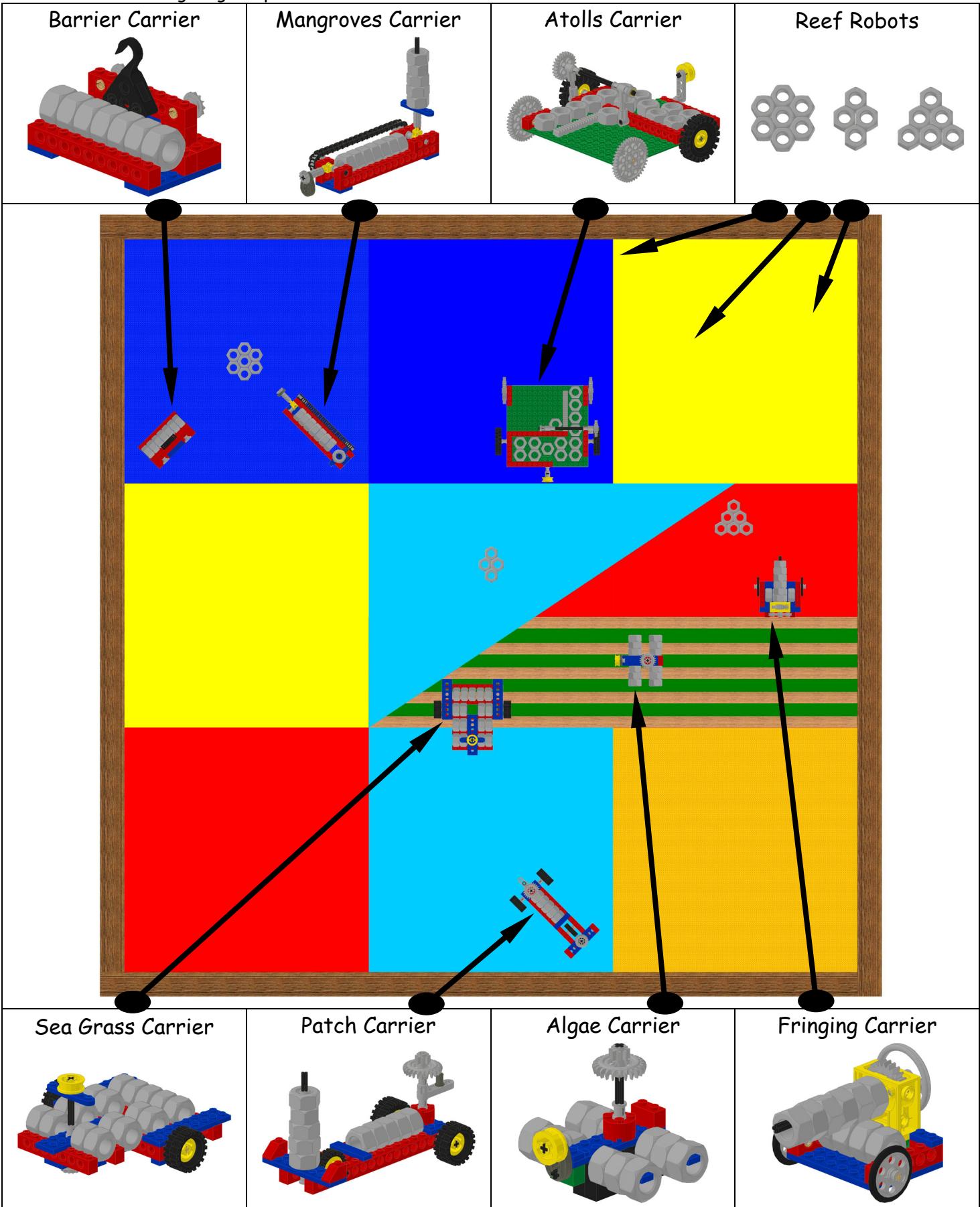
Below is everything that we know about the mission.

- The team must be ready to execute the mission for your EARLY Tournament.
- 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 World

- The following diagram presents where the *Reef Robots* and *Carriers* will be in the World.



# Mission Rules

1. The team has 2 minutes to complete the mission.
2. There will be 99 *Reef Robots* on the playing field at the beginning of each mission, represented by  $\frac{1}{2}$ " inch nuts.
3. The team's score is determined at the end of the 2-minute mission.
4. If a *Reef Robot* is moving when time expires, the referee will wait until the *Reef Robot* has stopped moving before determining the *Reef Robot's* scoring position.
5. There are 4 scoring zones: **IRRA HEADQUARTERS**, **IRRA TROPIC OF CAPRICORN DIVISION**, **IRRA EQUATORIAL DIVISION**, and **IRRA TROPIC OF CANCER DIVISION**.
6. The team scores 1 point for each *Reef Robot* that is in a scoring zone.
7. The team scores **Bonus Points** for *Reef Robots* that are distributed amongst the scoring zones.
  - If there are at least 10 *Reef Robots* in each of 2 scoring zones, the team scores 25 bonus points.
  - If there are at least 10 *Reef Robots* in each of 3 scoring zones, the team scores 50 bonus points.
  - If there are at least 10 *Reef Robots* in each of 4 scoring zones, the team scores 100 bonus points.
8. The following are scoring examples:

# of Reef Robots in IRRA HEADQUARTERS	# of Reef Robots in IRRA TROPIC OF CAPRICORN DIVISION	# of Reef Robots in IRRA TROPIC OF CAPRICORN DIVISION	# of Reef Robots in IRRA TROPIC OF CAPRICORN DIVISION	Bonus Points	Score
40	8	5	0	0	53
10	7	14	3	25	59
11	12	10	10	100	143
0	0	0	65	0	65
24	0	15	10	50	99
35	20	0	0	25	80
0	23	52	0	25	100
Yellow Highlight Qualifies for Bonus Points for containing at least 10 <i>Reef Robots</i> in scoring zone					

9. A *Reef Robot* counts if it is breaking the plane of a scoring zone.
10. A *Reef Robot* in multiple scoring zones simultaneously (i.e. straddling two scoring zones) counts in the zone that results in the most **Bonus Points**.
11. Only the parts that are contained in three LEGO® Motorized Simple Machines kits may be used to construct the robot (i.e. no other materials such as glue may be used on the robot). The kit parts may not be altered.

12. The team's robot/robots and all parts must start inside the **HOME** at the beginning of the 2-minute mission (i.e. no part of the robot may be off the playing field when the mission starts). The parts do NOT have to be assembled together and the parts can be removed from and returned to the field during the 2-minute mission.
13. The **HOME** is the 15" x 15" boundary extended vertically (i.e. the robot can not extend over the line at the beginning of the mission).
14. The team can retrieve their robot without penalty when the robot is partially inside the **HOME** by lifting the robot vertically. After retrieving, the robot must be completely inside the **HOME** to continue the mission.
15. Any **Reef Robot** or **Carrier** that remains with the robot when the robot is retrieved without penalty remains in play. This rule is intended to eliminate the need for the referee to determine if a **Reef Robot** or **Carrier** is completely in the **HOME** when a robot is retrieved after entering the **HOME**. It is NOT intended to allow teams to retrieve their robot in such a way as to drag **Reef Robots** or **Carriers** into the **HOME**; **Reef Robots** or **Carriers** that are dragged into their base will be removed from play by the referee.
16. The team's robot/robots must start inside of the **HOME** every time it is returned to the **HOME** during the mission (i.e. no part of the robot may be breaking the plane of the **HOME** after being touched by a team member).
17. A penalty of 10 points will be assessed if a team touches their robot, including parts that have become separated from the robot, that is outside of the **HOME**.
18. If a robot is touched, the robot must be returned to the **HOME** to continue the mission.
19. The controllers and wires are NOT considered part of the robot.
20. The robot shall not have any elastic stored energy (i.e. stretched rubber band) when the mission begins or when the robot is returned to the **HOME**, but elastic stored energy can be generated from activating a motor.
21. The controller and wire can ONLY be used to provide electrical power to robot motors (i.e. it can not be used to drag or corral a robot, **Reef Robots** or **Carriers**).
22. If a controller or wire is used illegally (referee's judgment), the team will be required to immediately place the robot back in the **HOME** to continue the mission.
23. A team may touch any **Reef Robot** or **Carrier** COMPLETELY inside the **HOME** without penalty.
24. If a **Carrier** is illegally touched, the **Carrier** along with any **Reef Robots** it is holding will be removed from play for the remainder of the mission.
25. A **Carrier** is NEVER considered part of the robot.
26. Because **Reef Robots** are very valuable, a penalty of 10 points will be assessed for each **Reef Robot** that is ejected from the playing field. No penalty will be assessed for **Reef Robots** that are removed by a team member or referee.
27. All referees' rulings are final and may not be appealed.

Please visit the EARLY Neighborhood Forums at [www.EARLYrobotics.org](http://www.EARLYrobotics.org) or contact [Mission.Control@EARLYrobotics.org](mailto:Mission.Control@EARLYrobotics.org) with any questions or comments.

Thank you for maintaining the spirit of the game!