

AgRobotics Game Design, Objectives, and Rules

In addition to this document, please refer to the general contest rules and contestant eligibility and game play. The Agrobotics Mission Challenge will use the set of known challenges, outlined below, as well as additional unknown challenges that will be released on the day of the contest. Teams must pre-build and pre-program their robot prior to the competition for the known challenges. On the day of the contest, time will be given to account for additional building and programming for the unknown challenges. Teams will be allowed access to the game tables during this time.

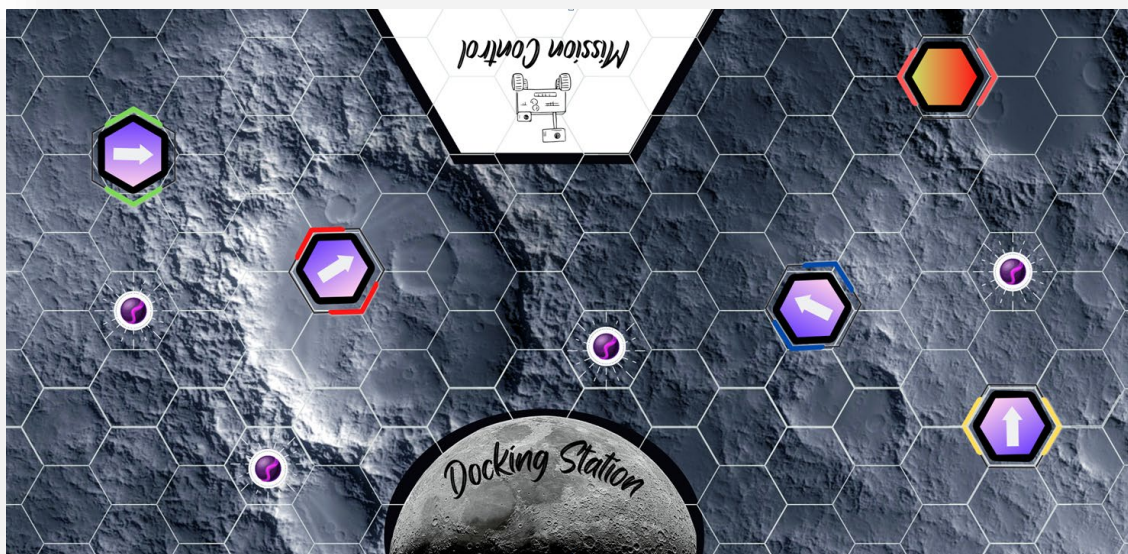
Game Theme

Lunar Base Harvest

Known Game Objectives

- Docking
- Deliver farming modules
- Deliver growing medium
- Deliver seedling containers
- Test soil and deliver nutrients

Game Mat Layout









The image shown above is available for teams to download (as a [PDF](#)) and printed at a source of your choosing. The game mat will fit inside a standard robotics game table frame (inside table dimensions = 45"x93").

The area where the robot can be launched from is called the PLAYER ZONE. The area located outside that is collectively called the GAME ZONE.

1. PLAYER ZONE
 - a) MISSION CONTROL
 - b) DOCKING STATION (if Objective 1 is completed)
2. GAME ZONE

Scoring

Obj. #	Objective	Description	Point Value
<p>1.</p>	<p>DOCKING STATION</p> <p>The Docking Ring is a ring magnet. It will be located in the resource tray at the beginning of the match.</p>  <p>The Docking Station Plate is a metal L bracket that will be mounted with wood screws on the 2"x4" table frame, centered with the DOCKING STATION. One side will be on top and the other will be on the inside of the game frame facing MISSION CONTROL.</p> 	<p>The robot must leave MISSION CONTROL, transport, and attach the Docking Ring to the DOCKING STATION Plate.</p> <p>Points are awarded when the Docking Ring is magnetically attached (not supported by the robot) to the DOCKING STATION Plate.</p> <p>This challenge is a prerequisite to all other challenges. No other challenges can be attempted until this one has been successfully completed.</p> <p>Once this challenge has been completed, the DOCKING STATION can be used as second PLAYER ZONE.</p> <div style="display: flex; justify-content: space-around; align-items: center;"> <div style="text-align: center;">   <p>(Points Awarded)</p> </div> <div style="text-align: center;">   <p>(Points Awarded)</p> </div> </div>	<p>50 points for successfully completing the challenge</p> <hr/> <p>50 points maximum</p>

2.

DELIVER FARMING MODULE

The Farming Module is represented by a black atrium grate. It will be located in the resource tray at the beginning of the match.



It will be delivered to the Farming Module Zone pictured below.



Prerequisite: Objective 1 must have been successfully completed.

The robot must transport the Farming Module to the Farming Module Zone. The object must fit completely within the red and black-lined border of the zone.

Points will be awarded at the end of the match.



(Points Awarded)



(No Points)

50 points for successfully completing the challenge.

50 points maximum

3.

DELIVER SEEDLING CONTAINERS TO MODULES

Modules will be represented by four (4) plastic hexagon shaped jars secured to the game mat using Dual Lock Velcro strips. Each jar will be placed on its side.



The jars will be placed on green, red, yellow, and blue bordered hexagons printed on the mat. The mouth will face the same direction indicated by each arrow. Plastic jars will not have a lid on it.



Seedling Containers are represented by yellow, green, blue and red 2-inch neoprene plant collars. Collars will be located in the Resource Tray at the beginning of the match. There will be 3 red, 3 yellow, 3 green, and 3 blue collars.



Prerequisite: Objective 1 must have been successfully completed.

The robot must deliver 3 of the matching-colored SEEDLING CONTAINERS on top of 4 different MODULES.

No more than 3 SEEDLING CONTAINERS can be placed on top of each MODULE. No points will be awarded for any extra SEEDLING CONTAINERS placed on top of the MODULES.

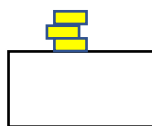
Bonus points will be awarded if the 3 Seedling Containers are vertically stacked on top of the Module.

<TOP VIEW>



(Points)

<SIDE VIEW>



(Points + Bonus)



(No points, blue collars belong in the blue jar)

Points will be awarded at the end of the match.

25 points for each container successfully placed. (300 points possible)

Bonus of 50 points for each stack of 3. (200 points possible)

500 points maximum

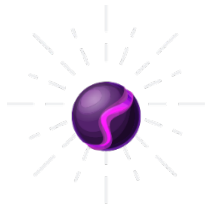
4.

DELIVER GROWING MEDIUM TO GROWING CONTAINERS

Growing Containers will be represented by silicone baking cups.



For Juniors, those will be located in the four (4) circular markers pictured below. Silicon cups will not be secured to the game mat.



For Seniors, on the day of the contest Growing Containers will be randomly placed on the game mat within one of the many printed hexagons.

This random placement for seniors will not change the day of the contest but will be different at the next competition. For example, State Fair will be different than Fort Worth.

(Clarification added 10/11/22)

Growing Medium will be represented by reusable K-cups (with lids closed).

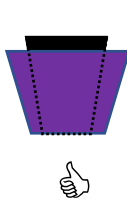


Prerequisite: Objective 1 must have been successfully completed.

The robot must deliver Growing Medium into the Growing Containers. There is a maximum limit of 1 Growing Medium per Growing Container.

To earn points, the Growing Container must remain within its original hexagon location throughout the match. If a team is not going for points for this challenge, the robot may move/retrieve this game piece. (Rule clarification added 10/11/22)

The Growing Medium must rest completely inside the Growing Container in an upright, fully vertical position.



(Points Awarded)



(No Points)

Points will be awarded at the end of the match.

100 points for each Growing Medium successfully delivered (400 points possible).

100-point bonus if all 4 containers are successfully delivered.

500 points maximum

5.

TEST SOIL AND DELIVER NUTRIENTS

This challenge will require the use of three 3-sided dice. During the match, one team member will roll 1 green, 1 red, and 1 blue die (only one roll per match) into the RESOURCE TRAY provided.



The number shown on the top of each die will determine the soil test results and indicate how many units of each nutrient will need to be delivered. Plastic jars (same as objective #3) will be placed on green, red, and blue bordered hexagons printed on the mat. The jar will not have a lid on it.



Nutrients units will be represented by 1-inch, colored foam blocks.

Green = Nitrogen (N)
 Red = Phosphorous (P)
 Blue = Potassium (K)



Dice and a total of 9 blocks (3 blocks for each color) will be

Prerequisite: Objective 1 must have been successfully completed.

The robot must deliver the precise amount of Nutrients (N, P, and K) inside each corresponding, color coded Module. The amount is determined by the roll of the dice.

Example Roll: 1 green (N), 3 red (P), 2 blue (K)

<TOP VIEW>



(needs 2 blue) (needs 3 red only) (needs only 1 green)

150 points for the correct amount of nutrients successfully delivered to each module (450 points possible)

100-point bonus for placing all nutrients successfully delivered to all 3 modules.

550 points maximum

	<p>in the Resource Tray at the beginning of the match.</p> <p>As an example, all of the green blocks will be delivered to the module with the green border printed on the game mat.</p>		
ALL KNOWN CHALLENGES			1,650 points possible

Game Piece Supply List

(no product or company endorsement implied nor intended)

Product Description	Number of Pieces Used in Game	Purchase Link
Printed vinyl game mat	1	Link
Ring Magnet	1	Link
L Angle Bracket	1	Link
Atrium Grate	1	Link
Plastic Hexagon Jars	4	Link
3-sided dice (red, green, and blue)	3 total, 1 of each color	Link
1" Foam Blocks (red, green, and blue)	9 blocks total (3 of each color)	Link
Dual Lock Velcro	As needed	Link
Reusable K Cups	4	Link
Silicone Baking Cups	4	Link
Neoprene Collars	12 total (3 sets of 4 different colors)	Link

Rules of Play

1. At the beginning of the match, your team's robot must start in MISSION CONTROL. At least one part of the robot must be touching inside the border of MISSION CONTROL.
2. The GAME ZONE is the area outside of MISSION CONTROL.
3. The RESOURCE TRAY is a plastic tray that will be placed on the outside of the game table and will hold game pieces for known and/or unknown challenges. Game pieces in the RESOURCE TRAY may not be accessed until the match begins.
4. Robots must be launched from MISSION CONTROL or the DOCKING STATION (once earned) throughout the match. Before being launched, at least one part of the robot must be touching inside the boundary. Once launched, the robot must completely exit MISSION CONTROL or the DOCKING STATION (once earned) before completing the objective.
5. Each match will be 5 minutes long.
6. Time begins when the announcer says "**BEGIN**" and continues until the announcer says, "**TIME**".
7. Robots must complete all challenges autonomously.
8. Any structures built by the team or game pieces cannot be placed onto the GAME ZONE by human players but is permitted to be placed by the robot so long as it is done autonomously and is permitted by challenge rules.
9. No containers used by game officials to store game pieces can be used by the team/robot.
10. Players may retrieve their robot at any time during the match without penalty. When retrieved, the robot must return to MISSION CONTROL or the DOCKING STATION (once earned). Judges will not assist in any retrievals.
11. Possession is defined as a piece that is not touching the playing surface and is under the control of the robot.
12. Items in possession of a robot may be retrieved once any part/piece of the robot has broken the plane of MISSION CONTROL or the DOCKING STATION (once earned) boundary.
13. If the robot is in possession of a game piece in the GAME ZONE, and the robot is retrieved by the player, the game official will return the game piece(s) to its original location/state.
14. A player is not allowed to touch any game piece except when the piece is completely inside the MISSION CONTROL or the DOCKING STATION (once earned) boundary, OR if the robot is deemed in MISSION CONTROL or the DOCKING STATION (once earned) AND in full possession of a game piece(s). Once the piece is deemed inside MISSION CONTROL or the DOCKING STATION (once earned), contestants may remove the game piece from the game table/robot and store it in the RESOURCE TRAY.
15. If a contestant intentionally touches a game piece in the GAME ZONE, the team will be given a 50-point penalty per occurrence. In such cases, the piece will be returned to its original starting position by contest officials as quickly as possible.
16. All competing team members are allowed around the game table during competition, and any member may touch the robot when necessary.
17. Teams not competing must remain at their tables or staging area.
18. Good sportsmanship is always expected. This is crucial during practice times. Practice time on the game table may be restricted as build time progresses.

19. At the conclusion of the match, it is the responsibility of the team captain to review the score sheet with the judge and then initial at the bottom, signifying agreement of the final match score. Scores are final after this point and cannot be contested.