

# Martian Rescue - Autonomous Course



## **MISSION CHALLENGE**

A sandstorm has trapped a crew of Martians on the planet Mars. You have been assigned to help them find their Spaceship. They will know who you are by looking at your LCD panel and seeing “Martian Rescue.”

To be prepared, you will need to charge your BoT using power collected by the Mars Rover – Opportunity. Before you do though, you will need to clean the dust off the Solar Panel(s) so they will continue to collect energy. Turning on the crop grow light may also help you find the Martians.

## **DESCRIPTION**

The goal is to complete as many tasks as possible within five minutes.

Teams may have up to five members. The course will be inside a 10’ X 10’ area and will be constructed out of 24” foam interlocking mats - using the smooth side. Gridlines will not be provided on event course. There will be a 2’ - competitors only - perimeter around the course area ... only competitors are allowed in this area (no coaches, mentors, parents, observers). If a competitor needs advice they may visit with coach/mentor, etc. they may not touch the Bot or programming. This is to encourage student problem solving, critical thinking, and decision making. The BoT may be modified (engineered) to complete the mission. Participants will be allowed to restart the course as many times as they can during the allotted time. The “ReBoot” serves as a “refresh area/pit stop.” When the FRONT two wheels of the BoT enter the “ReBoot Area,” a BoT can: a. Be positioned to complete the remainder of the course. b. Utilize an additional program. c. Note: the clock will continue to run. The best score and fastest time will be used for final scoring and ranking. All judges decisions are final.

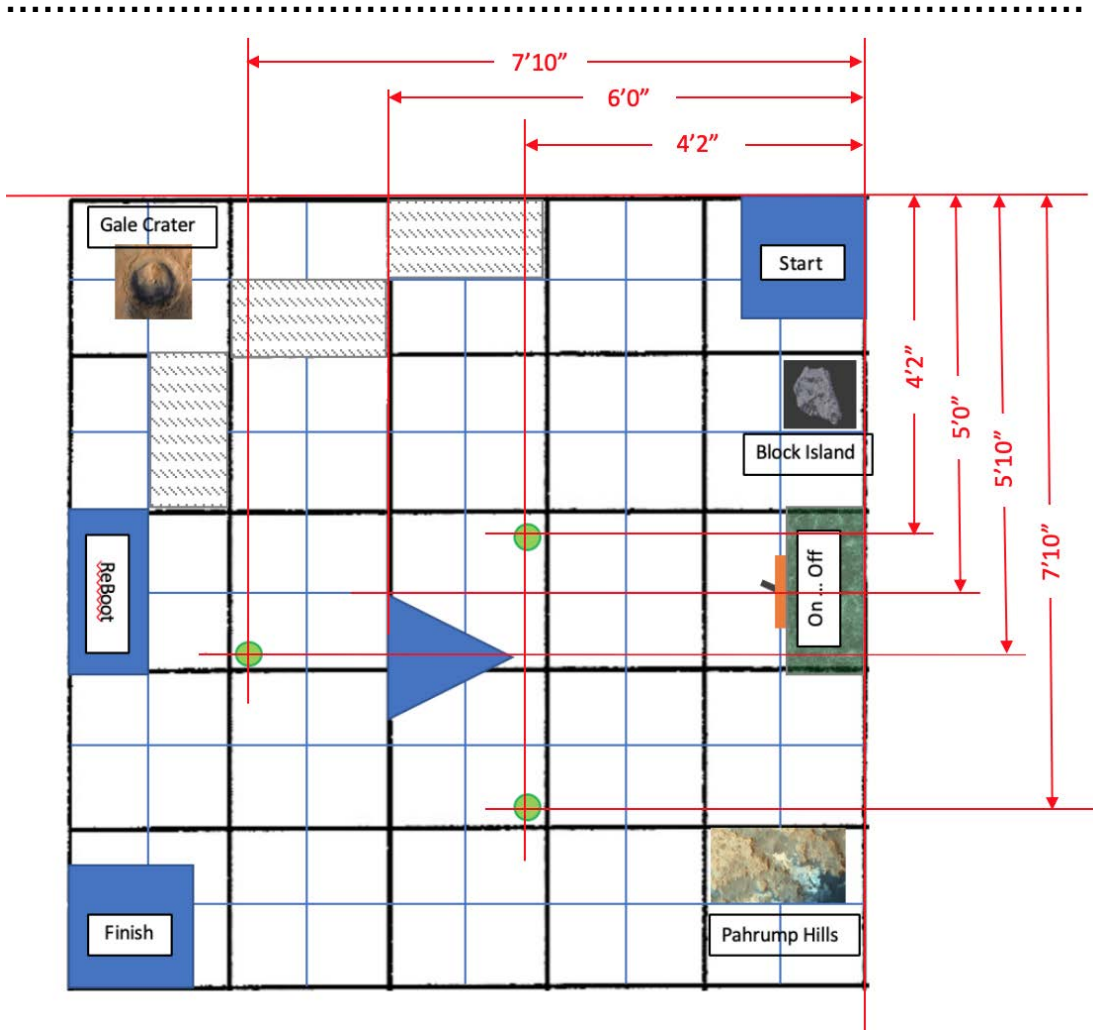
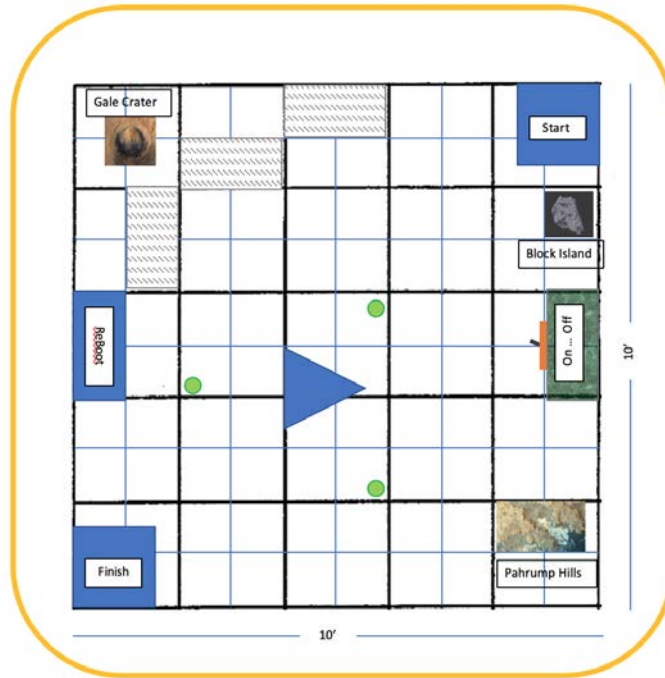
## **RULES/POINTS**

1. The team will have 5 minutes to complete the course avoiding obstacles. Once the bot enters the competitors area, only the students are allowed to touch or engage with the bots.
2. All wheels must remain in contact with the ground (Judges’ discretion).
3. Once the BoT begins a challenge, it should not be touched.
  - If the participant chooses to affect (“touch”) the BoT for a route adjustment, the student must first inform the judge of the adjustment.
  - Each adjustment will result in the following penalties: First course adjustment - 20 seconds added to final time. Second course adjustment - 30 seconds added to final time. Third course adjustment – start over (time will not be stopped).

4. The LCD screen on the Bot will need to display the words “Martian Rescue.” If using another programming language, the student must first inform the judge - an LED blink SOS/Morse Code, etc may be used. (one point)
5. The solar panels must be cleaned and light turned on before the Martians are rescued. It does not matter which one you do first.
6. When the light is switched on, one point will be awarded.
7. Cleaning the Solar Panels - Elementary may clean one panel, Middle School may clean two panels, High School may clean three panels.
  - Sweep the panel three times (forward – back – forward) (one point)
    - A sweep must be within 2” from the end of the front and back of the panel. Within 2” of the FRONT wheel.
    - Two FRONT wheels must be on the solar panel while sweeping or the movement does not count.
  - When solar cleaning is complete, delay BoT for 3 seconds (one point)
  - After delay, BoT is to make a sound signaling it is charged (one point)
8. Each Martian rescued is worth 1 point. A Martian is considered rescued if any portion is inside the ships “triangle leg area.” If a Martian is rescued and remains standing an additional point will be awarded.
9. If the BoT runs into the spaceship and it shifts location, it will remain in its new location.
10. At the end of the time limit, if a BoT wheel is touching any part of the finish area, one point will be awarded.
11. If course is completed before time is called, one point will be awarded.
12. If there is a tie, one team will become Team A the other Team B. Equal number of sticks/paper labeled A and B will be placed in a "can." Ask a random person to draw a stick/paper - the letter on the stick/paper determines the winner.

**Martian Rescue Layout Next Page ....**

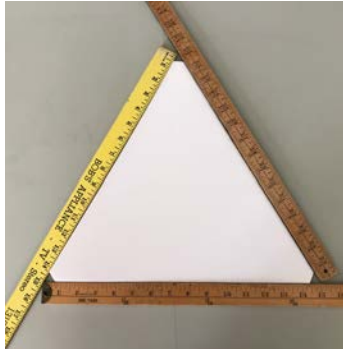
# Martian Rescue Layout (each block = 12")



Start and Finish Area = 18"x18"

Solar Panels, On/Off, ReBoot = 12" x 24"

On/Off Switch = 3" x 4.25" x .75", the switch extends 2.5". The center of the switch will be 4.5" up and centered on 24" wide surface



Spaceship = 15" equilateral triangle base and measures 11" off floor



Martians = 8" tall, 1.75" neck, base 2.5" diameter - the exterior will be modified so they will not roll as much - the interior will contain materials to help prevent tipping. Approximate weight - fill bottle with 50ml of water and the weight is about the same

The Martian will be placed on the center of the location on the layout.



Solar Panels, Start – Finish - ReBoot areas, Martian locations, and Spaceship Triangle will be drawn on the mat with LIQUID CHALK MARKERS (non-toxic, water based)



Example:

### **Obstacles STL's**

Gale Crater

<https://nasa3d.arc.nasa.gov/detail/gale-crater>

Pahrump Hills

<https://nasa3d.arc.nasa.gov/detail/pahrump-hills>

Block Island

<https://nasa3d.arc.nasa.gov/detail/block-island>

**MARTIAN RESCUE SCORING SHEET ... 5 minutes to complete the course**

**Team Name:**

**Number of Team Members:** 1 2 3 4 5

Levels	Elementary	Middle School	High School	Points	Total
LCD screen display "Martian Rescue"				1	
Light Switched On				1	
One Solar Panel Cleaned				1	
Two Solar Panels Cleaned	X			1	
Three Solar Panels Cleaned	X	X		1	
3 second Delay at end of Solar Panel Cleaning				1	
After Delay BoT Sound				1	
Number of Martians Rescued	1 2 3	1 2 3	1 2 3	1 point each	
Number of Martians Standing	1 2 3	1 2 3	1 2 3	1 point each	
Finished Area				1	
Complete Course Before Time Called				1	

**\*Final Score:** \_\_\_\_\_

**Time:**

First Course Adjustment				add 20 Seconds	
Second Course Adjustment				add 30 Seconds	

**\*Final Time:** \_\_\_\_\_

\*The best score and fastest time will be used for final scoring and ranking

Tie breaker 2: one team will become Team A the other Team B

This is Team (circle one): Team A Team B

Ask a random person to draw a stick/paper - the letter on the stick