

Mission to Mars Exploration

Day 1

- ⊕ Introductions
- ⊕ Rules and Regulations
- ⊕ 5 Days Overview
- ⊕ Overview of basic building tips
- ⊕ Drop Test
- ⊕ Bot Construction
- ⊕ Basic Movement (Habitat Prep)

Day 2

- ⊕ Learning to use Touch and Light Sensors
- ⊕ Intro to Missions (Crater Loop, Gas Pockets)

Day 3

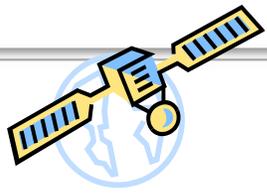
- ⊕ Continue Missions
- ⊕ Learning to use Ultrasonic and Encoder Sensors
- ⊕ More Missions (Alien Spores, Lava Danger)

Day 4

- ⊕ Introduce all other missions
- ⊕ Construct Board
- ⊕ Assign missions to various teams.

Day 5

- ⊕ Presentations



Missions Simulation

At Space Training Deck

You will be receiving training missions everyday.

The Space Deck is an onboard testing area that simulates different planetary phenomena.

Here you can test your robots for preparing the final missions. The final missions will be revealed by this Thursday.

Missions include:

- Gas Pockets
- Crater Loop
- Lava Danger
- Cave Drop
- Habitat Prep
- Alien Spores

Basic Rules apply to all training missions:

1. Robots may be built by individuals or teams,
2. Robots cannot be touched once the mission begins.

Scoring

Each robot gets three attempts at placing the sensor.

Only the Highest total score out of the 3 trials is used as your final score.

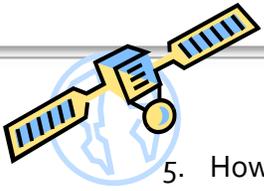
Bonus : 60 points for success at 1st attempt. 40 points for success at 2nd attempt. 20 points for success at 3rd attempt.

Report

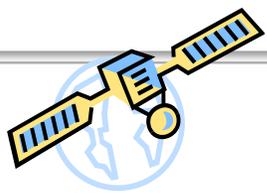
Attention Cadet. The information you gather from this mission is very important. Please prepare a detailed report and submit it to your Mission Commander.

Report Questions:

1. Discuss what you learned about robotics.
2. How do robots know what to do?
3. What is programming? Which programming language do you use?
4. How would you control robot's speed?



5. How do wheels and treads affect travel and why?
6. Summarize how you think robots can help man in space.



Gas Pocket Mission Simulation

Problem: Gas Pockets are dangerous to planetary explorers! You must design a robot that will place a methane gas probing device inside a marked target area. The closer you place the sensor, the more Cadet Reward Points you will earn.

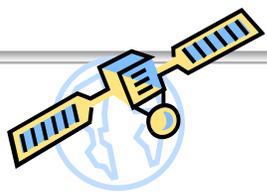
Rules

1. Penalty for touching robot once the mission begins.
2. The Gas Sensor should be placed as close as possible to the center of the target.
3. Each attempt ends after 30 seconds.
4. Scoring is based on the final position of the probing device.
Device straddling a scoring line receive the higher of the two point values.
5. The Gas Sensor must be completely separated from the robot.
6. The Gas Sensor must not tip over.



Methane gas probing device

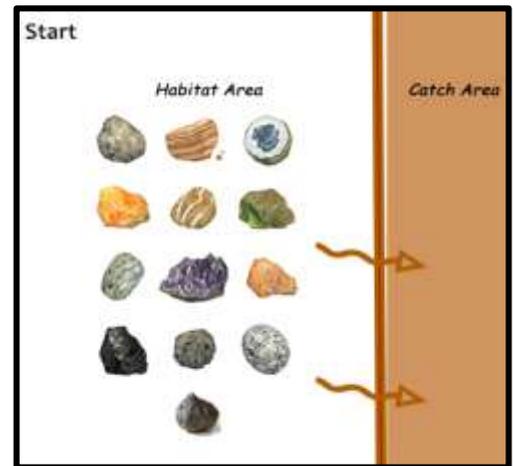




Habitat Prep Mission Simulation

Problem: Rocky Terrain creates space domes!

The destination planet is expected to be very rocky. In order to create stable, long-term housing for SR SPACE AGENCY teams, a designated area must be cleared. Cadets must design a robot that will remove rocks from a defined area into a "catch" area. The more rocks you remove, the more Cadet Reward Points (CRPs) you will earn.

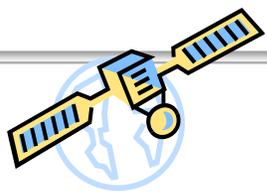


Rules

1. There should be N number of rocks (determined by your Command) randomly spread on the course.
2. The mission ends after one minute.
3. Rocks must be pushed off the "habitat" area into a "catch" area.
4. Scoring is based on the number of rocks correctly removed.
5. Rocks must be completely inside the "catch" area to be counted.
6. Rocks pushed beyond the "catch" area are not counted.

Scoring

- Each robot gets two attempts at completing the mission.
- Counts of 3 Cadet Reward Points for clearing each rock to the designated area.



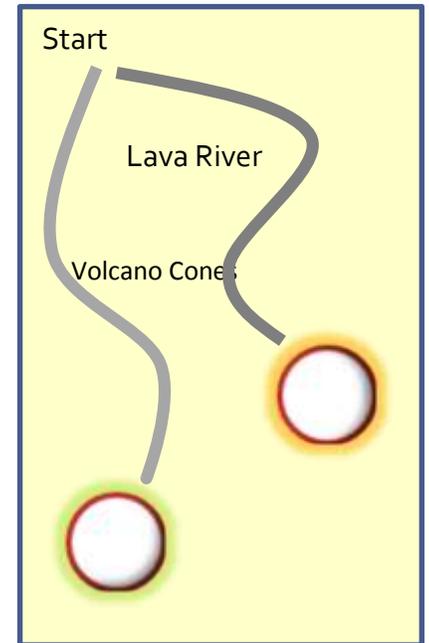
Lava Danger Mission Simulation

Problem: Lava can melt your robot into metallic goo. Be Careful! You must design a robot that will track a lava river to its source and place a Lava Eruption Chip inside the volcano's main cone. Cadet Reward Points are earned by the number of successful "drops".

May use 2x2 LEGO bricks to represent Lava Chips.

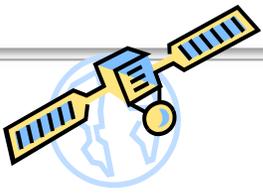
Rules

1. The "Lava Chip" must be dropped inside the cones.
2. The mission ends after one minute.
3. Scoring is based on the number of Chips successfully placed.
4. The Chips can be inside of or lean against the cone walls.
5. After successfully placing a chip, Cadets may lift the robot into the start position and attempt to place a new chip in the second cone. Bonus points are rewarded for placing two separate Chips in two separate cones using only one program.



Scoring

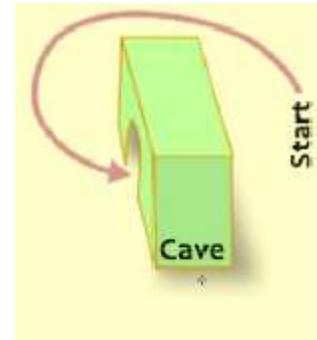
- Each robot gets three attempts at placing the lava Chips.
- 2 Cadet Reward Points for each chip placed.
- You may pick up the robot back to the Start point after each delivery.
- If your robot manages to return to "Start" by itself, you will be rewarded 20 points for each automatic return.



Cave Drop Mission Simulation

Problem: A space cave close to habitat areas are potential threats: on this mission, they could harbor gases, chemicals, or hostile life forms. Cadets must design a robot that will place a cave monitoring device inside a nearby cave.

May Use a LEGO Rim for tank tread to represent a Cave Probing device, or apply your imagination.

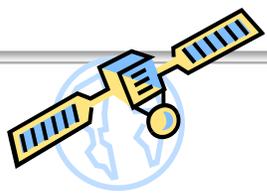


Rules:

1. The robot must not “crash into” or even touch the cave.
2. The mission ends after 30 seconds.
3. The Cave Sensor must be placed completely inside the cave entrance.
4. The robot must “carry” and “place” the sensor (not push it).

Scoring:

- Each robot gets three attempts to complete the mission.
- 10 Cadet Reward Points awarded for each probing device safely deposited into the cave.



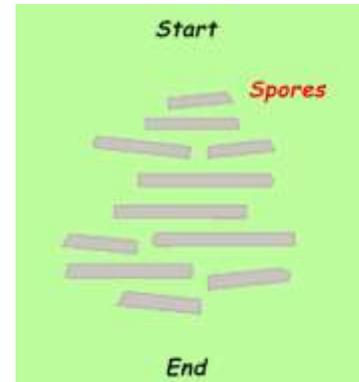
Alien Spores Mission Simulation

Problem: Alien spores may be growing beneath your feet!

On an unexplored world, you can't take anything for granted. Sensors can help you track bio-forms (such as alien spores) that may be festering near your landing zone.

Design a robot that will count spores from point A to point B.

Your robot should signal an audio "beep" at the end its run: one beep for each spore counted.

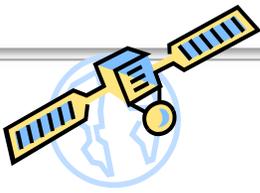


Rules

1. Robots must stop after reaching the "end" square. Missions end after 1 minute.
2. At the end of each mission, Robots must emit one "beep" for each spore counted.
3. Robots that do not beep are awarded no points.
4. Points are accrued by passing over spores.

Scoring

- Each robots gets three attempts at completing the mission.
- Highest total spore count after three missions.
- 5 Cadet Reward Points for each detected Spore.
- 1 point will be removed by wrong detection.



Cadet Report

Cadet Name: _____

Each Cadet must log their note for each mission he/she attempts. Your report will provide SR-Space Agency much information to improve our Space Navigation for our future SR Space Cadet!

Mission Name	Date mission accomplished Report	Cadet Reward Points
Habitat Prep	See sample below	
Gas Pocket		
Crater Loop		
Lava Danger		
Cave Drop		
Alien Spores		

Extra Rewards:



Accomplish Flowchart Design



Accomplish Above and Programming



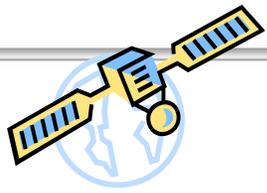
Accomplish Above and Demonstrate Patience in Trouble Shooting



Beyond Expectation



Help others



Template :

Mission Name	Status: Issue(s): Hardware: Software: Solution(s): Hardware: Software:	
--------------	--	--

Sample:

Habitat Prep	Status: I have managed to create stable, long-term housing for SR SPACE AGENCY teams by removing 5 out of 10 rocks . Issues: Hardware: <ul style="list-style-type: none">- the pushing attachment keeps coming off. Software: <ul style="list-style-type: none">- my program often goes haywire, and did not loop back to the Start point. Solutions: Hardware: <ul style="list-style-type: none">- Instructor helps me to create bracing using 2 connectors instead of one. Software: <ul style="list-style-type: none">- Had to design first with flowchart.- Do pseudo testing with it first before programming.	
--------------	---	--