

Mission 3.1: Collecting Mysterious Moon Rocks

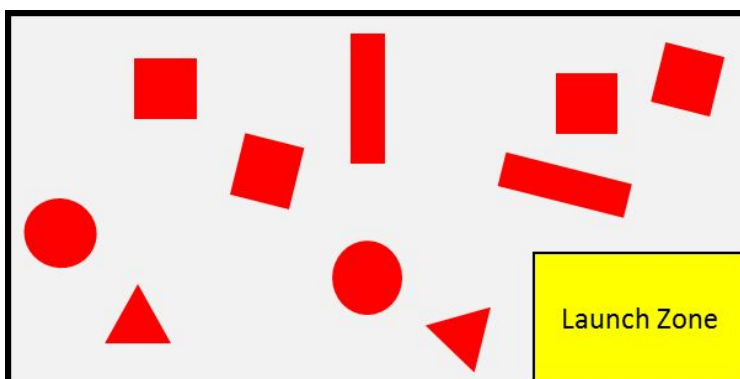
Names:

From: STARS Headquarters	3/22/46 14:23
To: STARS Elite Scientific Team	
Subject: Mineral Mining and Collection	
STARS Elite Scientists!	
We are in need of your help, an meteorite full of rare and new minerals just crash landed, and we need you to perform a multitude of tasks. We need you to build and program a robot to pick up minerals from the surface of the meteorite, and safely return the minerals to the base.	
Much thanks, STARS Headquarters	

Mission Objective: To build and program a robot able to pick up various sizes of items off the ground, to carry materials collected, and drop off materials at the launch site.

CAUTION! You only have 2 minutes and 30 seconds to get as many minerals collected as possible, along with having up to 3 different programs, a max of 2 sensors equipped on your robot at once, and only being able to restart at the launch zone 20 times during the 2 minutes and 30 seconds period.

Mars Map: Minerals are located on the field at random but recommended distance between objects is 6-8 inches. Launch zone is located in the lower right hand corner of the field, and will most likely be distinguished by a colored piece of paper or tape.



Sketches and designs of robot:

What are the best sensors to use in this specific mission? What made you choose that sensor instead of the other options?

Possible programming steps/blocks:

What blocks and sensors would work the best with the current challenges?

What blocks and forms of measurements would work best with this challenge and the robot design?

Mission 3.2 : Saving the Base

Names:

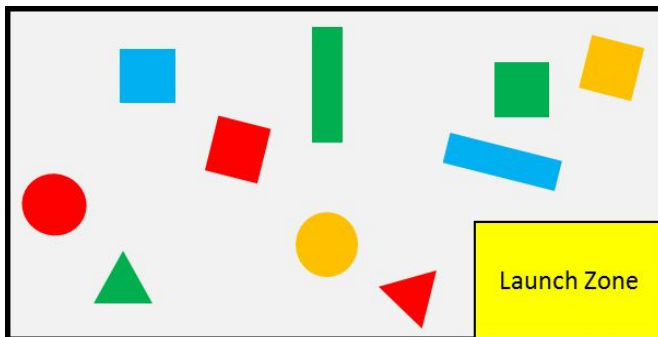
The Asteroid you're currently dealing with is rich in precisely four different kinds of valuable minerals. The yellow ore you see is a rock with a high concentration of gold, and is very valuable. The Green ores on the asteroid contain a high concentration of Copper, a metal that is incredibly useful in the electronics industry! Blue ore contains Cobalt, which is used in many batteries. Lastly, the red ores found here hold a metal we've never seen on earth, and it's vital that we study it more!

The catch is that you cannot pick up more than one type of material at a time, as that will slow down the process back at the mining base. Before the mission, the mineral will be picked at random for your team and your only to collect that mineral throughout the mission.

Mission Objective: Collect one type of mineral and bring it back to the mining base, in 2 minutes and 30 seconds. Every piece of incorrect metal will cause you to lose .5 points. You can only transport 2 metal pieces at a time and they must be the same color.

CAUTION! A team can have up to 8 different programs and can only have up to 3 sensors equipped at a time.

Map: Different color objects are the different colored metals, and are placed at random.



Before You Build:

- Which sensor(s) would help you the most with this objective?
- What program block should you use?
- How should you build the mechanism to pick things up? How will your robot carry the metals?

Describe/Draw Your Design:

Mission 3.3 : Crystalline Crates

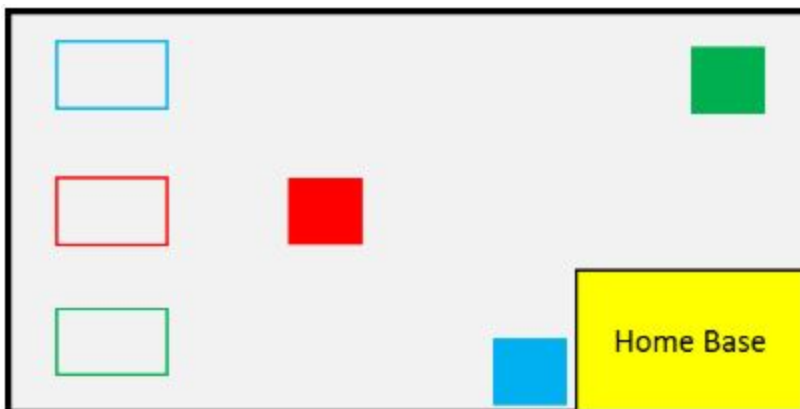
Names:

Further research of the asteroid has shown that within the asteroid there are precious crystals, however the crystals are very fragile. Miner have carefully hand-carved the crystals from the walls and delicately packaged them within crates for pick-up by our rovers. Dropping, tipping, flipping a crystal could cause them to fall and shatter into dust, and you can't break any because the crystals would then lose value. There are 3 different kinds of crystals and the mining base has 3 different zones for each crystal. Green crystals must be polished before being sent to Earth, red crystals must be heat-treated, and blue crystals must be dissolved into water.

Mission Objective: Get the crystals to their respective zones without tipping or dropping the crates in 2 minutes and 30 seconds.

CAUTION! The robot can only pick up one crate at a time, and if two crates are contacted by the robot at once, a penalty will be added. The robot can have up to 9 different programs and up to 3 sensors equipped.

Map:



Before You Build:

- Which sensor(s) would help you the most with this objective?
- What program block should you use?
- How should you build the mechanism to pick things up? How will your robot carry the metals?

Describe/Draw Your Design:

Mission 3.4 : When Rover Breaks Down

Names:

An autonomous rover working on the asteroid to sort the metals has broken down and its code has been corrupted. We recovered what we could, but it's still not complete, we need you to fix both the code and hardware, and get it up and running.

Mission Objective: Fix the robot so it can complete its original task, without referencing old codes of past robots.

CAUTION! You cannot replace big or main pieces of the robot.

Before You Fix:

- Which sensor(s) would help you the most with the objective of the old robot?
- What program block should you use?
- What doesn't work and why doesn't it work?

Describe/Draw the Problems:

Describe/Draw Ways to Fix the Problems:

Mission 3.5 : Charging the Turbine

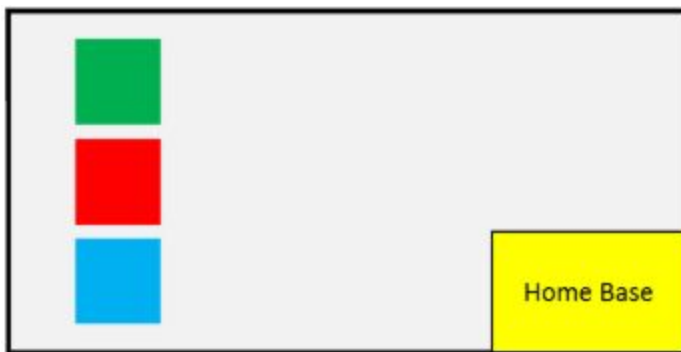
Names:

Scientists, catastrophe has struck the mining asteroid! The now-hollow interior has caused instability on the surface of the asteroid, and the power station supplying the mining base has collapsed into the heart of the asteroid. The base can last 2 weeks on reserve power before they run out. Luckily, 3 power turbines have survived the accident, however, the 3 turbines must be turned manually, and can only be turned 180 degrees at a time due to the immense effort and power required to turn the turbine. After a turbine has been rotated, your robot must get back to base to have its fuel cell swapped, and then it's back out to turn turbines again.

Mission Objective: The robot needs to be able to locate the wheel and then rotate the wheel until the turbine has turned 180 degrees, return to base, and then go back out to rotate the turbine again.

CAUTION! You have 2 minutes and 30 seconds to turn the turbine as many times as possible, and your robot may not make contact with a human unless it is in the launch zone. You can have up to 5 different programs and only 3 sensors equipped at a time.

Map: Each colored block is a turbine, all located 12 inches from the left side wall, with the red turbine in the middle, green turbine 10 inches from the top, and the blue turbine 10 inches from the bottom.



Before You Build:

- Which sensor(s) would help you the most with this objective?
- What program block should you use?
- How should you build your robot to be able to turn the wheel?

Describe/Draw Your Design:

Mission 3.6 : Metallic Movement

Names:

The mining base on the asteroid is up and running again, finishing up with the crystal and packaging the crystals to send home. The minerals need to be packed as quickly as possible before the asteroid collapses in on itself. It has been decided that a rover that can pick up and dump the minerals in large amounts would be the most efficient way of moving the minerals onto the rocket returning to earth.

Mission Objective: You are to collect as many minerals as possible and deliver it to the rocket's collection point, where you will deposit the minerals in a dumping or pouring fashion. This is your final mission, good luck, and thank you for all you have done.

CAUTION! You can have up to 5 different programs, and the robot can only have human interference in the home base, where you will start and end.

Map:



Before You Build:

- Which sensor(s) would help you the most with this objective?
- What program block should you use?
- How should you build your robot to most efficiently pick up and dump the minerals?

Describe/Draw Your Design:

