



# LUNAR GEOLOGY





## Next Giant Leap: Lunar Geology

### Objective:

Students operate a robot arm to pick up lunar rocks and to analyze these rocks to classify the mineral composition.

### Materials Needed:

- ✓ Lunar Rock Collection
  - 3 Robot Arms with Controllers
  - 3 Basalt Rock Samples
  - 3 Breccia Rock Samples
  - 3 Storage Containers
- ✓ Lunar Rock Analysis
  - Basalt Rock Samples
  - Breccia Rock Samples
  - Hand Lens

### Summary of Student Action:

Students control a robot arm to pick up a lunar rock and transfer it into the storage container. Students then use the hand lens to analyze the rock samples and determine the type of lunar rock being observed.

### Setup Instructions:

- Assemble the robot arm based on the included instructions and calibrate the controller.
- Set up the robot arm so that it can reach the rock samples and move them to the storage container.
- Optional: install the included software that allows students to program the robot arm as opposed to directly controlling it.
- Group the three unique rock samples together and spread them out on the station:
  - Basalt
  - Breccia
- Place the hand lenses around the station for student use.
- Place information sheets around the station.

### Additional Notes:

For older participants, use the software included with the robot arm to introduce programming opposed to direct control. Students will identify the rocks by color, texture, and the presence and size of grains.



# Next Giant Leap: Lunar Geology

## Lava Tubes have been Discovered on the Moon

**Your task:** Collect moon rocks using a robot arm and determine their mineral composition.

**You will need:**

- ✓ Robot Arm
- ✓ Moon Rocks
- ✓ Hand Lens
- ✓ Mineral Information Sheet

**Procedures:**

1. Practice using the controller to move the robot arm up, down, left, and right.
  2. Use the robot arm to pick up the first rock sample.
  3. Move the rock sample to the storage container.
  4. Release the rock sample into the storage container.
  5. Repeat the instructions for the second sample.
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1. Find a hand lens at the station.
  2. Find the two groups of rock samples at the station.
  3. Select one rock sample from each group to analyze.
  4. Use the hand lens to make the following observations:
    - Color – Examine the rock’s color keeping in mind a rock can be more than one color.
    - Texture – Feel the rock’s surface to determine how rough or smooth the rock is.
    - Pores – Look for holes in the rock’s surface. The holes, or pores, could be large or very small.
    - Grains – Observe if the sample is made from individual pieces of rock. Grains can be small or very large.
  5. Compare your observations to the Information Sheet at the station to identify each rock sample.



## LUNAR GEOLOGY INFORMATION SHEET

<b>ROCK</b>	<b>COLOR</b>	<b>TEXTURE</b>	<b>PORES</b>	<b>GRAINS</b>
Basalt	Black or Dark Gray	Very Rough	Yes	No
Breccia	Combination of Brown/Gray/White	Rough	No	Very Large