

# GETTING A GRIP ON THE MOON: EXPERIENCE ACTIVITY

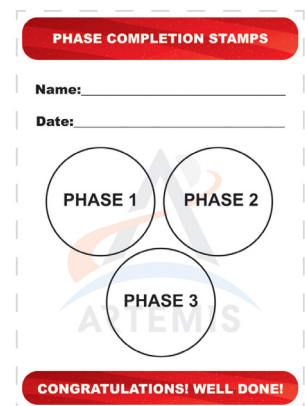
## Activity Guide (see student section)



### Getting a Grip on the Moon Role Selection and Preparation

In this activity students will be working in teams of four to solve a problem. Each member of the team will be taking on a real NASA career role. Below are the instructions for role selection and preparation.

1. Have each team member select a badge from the supply bin.
2. Students **SHOULD NOT** trade or change your badge with team members.
3. Have each person cut out and tape a single Stamp Card to the back of their badge. (See example to right.)
4. Put on badges and the included safety glasses.
5. Each team member will now perform the specific tasks of the job listed on their badge during this activity.
6. Play the introductory video from Explorer Josh for the students. Have the students review the Job Classification Task Sheet on page 14 of the Student guide (page 16 of this Educator guide) to answer the provided questions.



# JOB CLASSIFICATION TASK SHEET

Based on what you heard in the video and information from the Job Classification Task Sheet, what are the individual tasks you are responsible for throughout the phases of this activity?

Have each team member write a response, in pencil, to this question in the space below.

## Tools Engineer

Your Name: \_\_\_\_\_

## Mission Specialist - Geologist

Your Name: \_\_\_\_\_

## Human Factors Engineer

Your Name: \_\_\_\_\_

## Project Manager

Your Name: \_\_\_\_\_

# JOB CLASSIFICATION TASK SHEET

This Task Sheet can be referenced throughout the activity to remind you of your responsibilities.

## Tools Engineer

- Build the lunar rake attachment
- Test the tool and collect tool performance data
- Redesign and build a modified lunar rake attachment
- Test the redesigned tool
- Collect redesign performance data
- Provide final recommendations to NASA for the lunar rake

## Mission Specialist - Geologist

- Build the lunar collection cup attachment
- Test the tool and collect tool performance data
- Redesign and build a modified collection cup attachment
- Test the redesigned tool
- Collect redesign performance data
- Provide final recommendations to NASA for the collection cup

## Human Factors Engineer

- Build the lunar tool handle
- Test the tool and collect tool performance data
- Redesign and build a modified tool handle
- Test the redesigned tool
- Collect redesign performance data
- Provide final recommendations to NASA for the tool handle

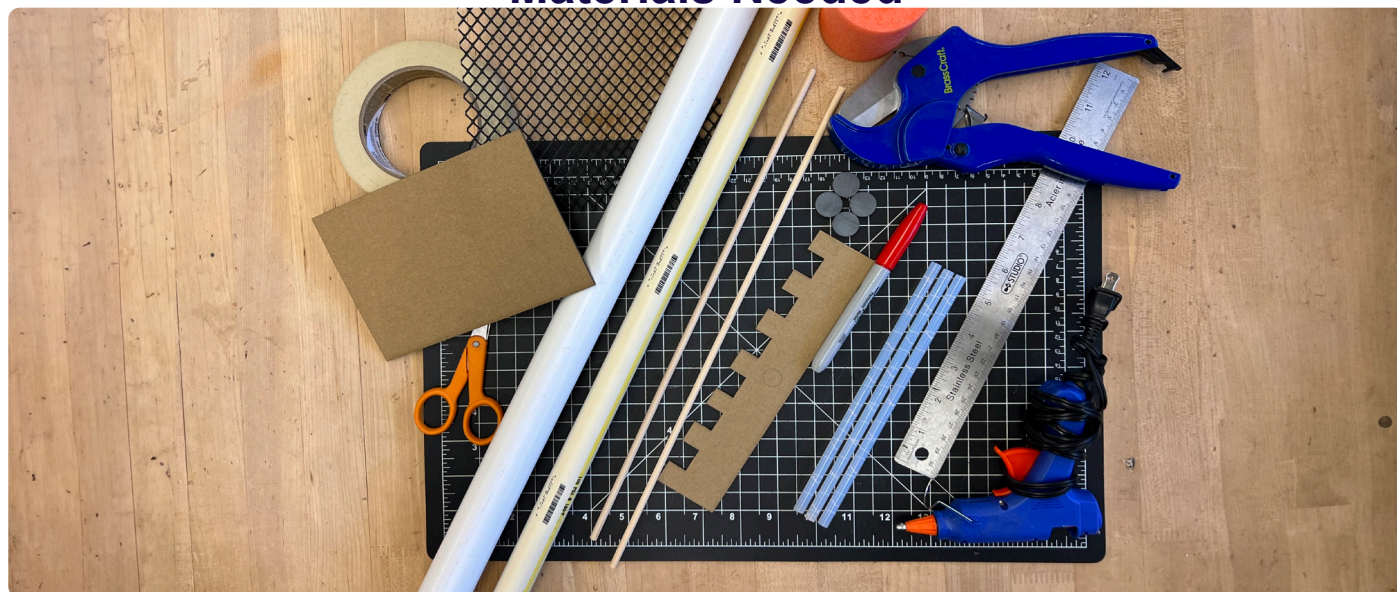
## Project Manager

- Build the lunar tongs
- Test the tool and collect tool performance data
- Redesign and build modified lunar tongs
- Test the redesigned tool
- Collect redesign performance data
- Provide final recommendations to NASA for the lunar tongs
- Assist team members with tool build responsibilities
- Contact Mission Director when each phase is complete to get red completion sticker

# BADGES AND STAMP CARDS

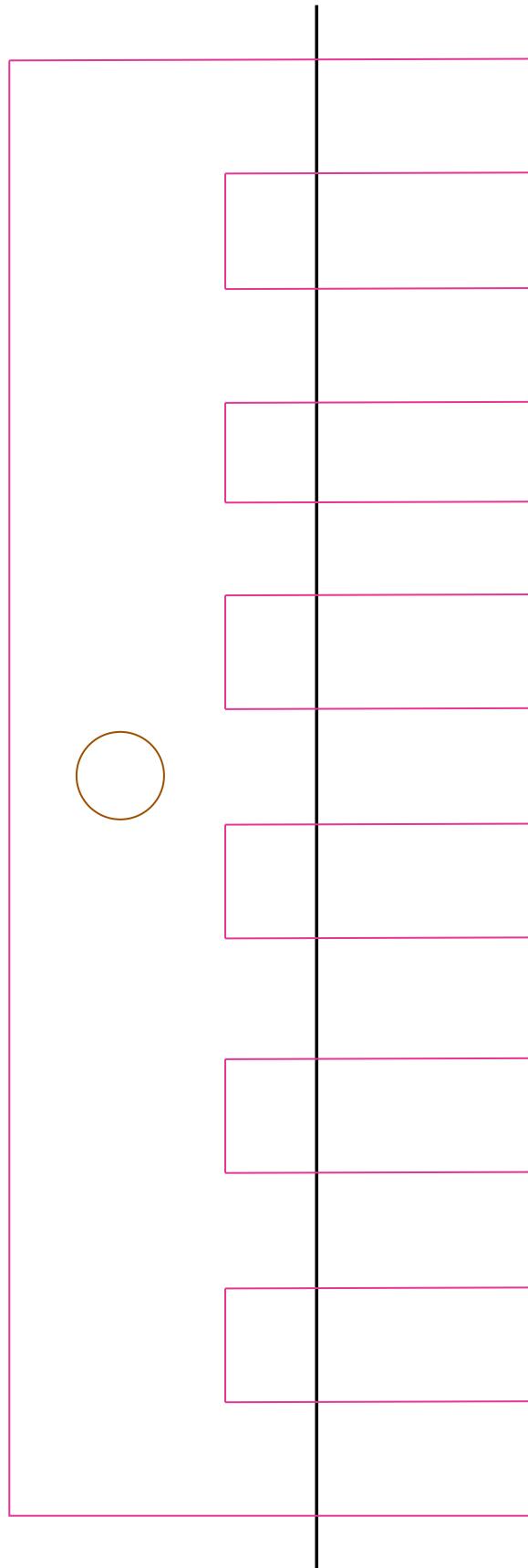
|  |  |  |  |
|--|--|--|--|
| <p><b>NASA<br/>EXPLORATION<br/>EXPERIENCE</b></p>  <p><b>Tools Engineer</b></p>           | <p><b>PHASE COMPLETION STAMPS</b></p> <p>Name: _____<br/>Date: _____</p> <p>PHASE 1      PHASE 2<br/>PHASE 3</p> <p><b>CONGRATULATIONS! WELL DONE!</b></p> | <p><b>NASA<br/>EXPLORATION<br/>EXPERIENCE</b></p>  <p><b>Mission Specialist - Geologist</b></p> | <p><b>PHASE COMPLETION STAMPS</b></p> <p>Name: _____<br/>Date: _____</p> <p>PHASE 1      PHASE 2<br/>PHASE 3</p> <p><b>CONGRATULATIONS! WELL DONE!</b></p> |
| <p><b>NASA<br/>EXPLORATION<br/>EXPERIENCE</b></p>  <p><b>Human Factors Engineer</b></p> | <p><b>PHASE COMPLETION STAMPS</b></p> <p>Name: _____<br/>Date: _____</p> <p>PHASE 1      PHASE 2<br/>PHASE 3</p> <p><b>CONGRATULATIONS! WELL DONE!</b></p> | <p><b>NASA<br/>EXPLORATION<br/>EXPERIENCE</b></p>  <p><b>Project Manager</b></p>              | <p><b>PHASE COMPLETION STAMPS</b></p> <p>Name: _____<br/>Date: _____</p> <p>PHASE 1      PHASE 2<br/>PHASE 3</p> <p><b>CONGRATULATIONS! WELL DONE!</b></p> |

## Materials Needed



| Qty     | Build Materials per Tool          | Qty | Tools                         |
|---------|-----------------------------------|-----|-------------------------------|
| 3       | Magnets                           | 1   | Permanent Marker              |
| 1       | Test Rake Profile                 | 1   | Metric Ruler                  |
| 1       | 1 in PVC Pipe                     | 1   | Scissors                      |
| 1       | 3/4 in PVC Pipe                   | 1   | Pencil                        |
| 1       | 1 in long Dowel Rod               | Qty | Fabrication Lab Station Tools |
| 1       | 4 in x 6 1/2 in Cardboard         | 1   | Warm Melt Glue Tool           |
| 1       | Steel Can or Coda Can             | 1   | PVC Cutter                    |
| 1       | Masking Tape                      | Qty | Lunar Tongs                   |
| 1       | Plastic Mesh                      | 2   | Paint Sticks                  |
| 1       | Pool Noodle section (foam grip)   | 3   | Rubber Bands                  |
| Several | Blue & Red or Decorative Stickers | 1   | Dowel                         |
| Qty     | Templates / Pages                 |     |                               |
| 1       | Test Rake Template                |     |                               |

# Rake Template



## Rake Template Laser Cut Settings

These are the settings for a Glowforge laser utilizing the drawing from page 17. Your laser machine settings for 2 mm cardboard may be different. The single long cut line on the diagram is to make the tangs of the rake less effective by making them shorter. If you prefer longer rake tines ignore that cut step. You may also ignore using the laser and can use the diagram from page 17 as a template to trace and cut with scissors or razor tool.

## Glowforge® print settings

**Design id: 7BG1AYAL4BUXJY7LNMPKC9QAIPUUA**

**Timestamp: Tue Oct 03 2023 13:02:21 GMT-0700 (Pacific Daylight Time) Version: 1.0**

**Step 0: #000000 Cut::Manual**

**Step 0: #000000 Speed=314**

**Step 0: #000000 Precision Power=full**

**Step 0: #000000 # of Passes=1**

**Step 1: #9e5000 Score::Draft**

**Step 2: #e53595 Cut::Manual**

**Step 2: #e53595 Speed=328**

**Step 2: #e53595 Precision Power=full**

**Step 2: #e53595 # of Passes=1**

# PREPARING THE EXPERIENCE ROOM

- Tables with even numbers of students (partner students together for assembly task and groups of 4 for the Experience activity)
- Projector screen/TV for Explorer Josh video
- Place to set up child's pool with "lunar regolith" and red tape and entry barrier (for the Experience activity)



## SAFETY CONSIDERATIONS

- Students should wear safety goggles and cut-resistant gloves when working with scissors, PVC cutters, and warm melted glue
- Students should practice safe cutting techniques when using scissors. Be sure to carefully support the piece being cut. Be careful about where their free hand is placed.
- Students should use the warm melt glue tool only at the glue station and follow these precautions:
  - Warm melt glue tool tips can be extremely hot; use caution
  - Do not use the warm melt glue tool in a high traffic area
  - Protect the power cord so it is not loose; it could get caught on something or become a tripping hazard
  - Store the warm melt glue tool in holder when not in use
  - Maintain a clear area with no clutter
  - Do not set the warm melt glue tool on combustible materials and keep the area clear of combustible materials (loose paper)
  - Use a drip mat under the warm melt glue tool
  - Do not do any overhead work with the warm melt glue tool
  - Do not leave it unattended while plugged in and not in use
  - Use protective eyewear and keep loose hair and clothing tied back