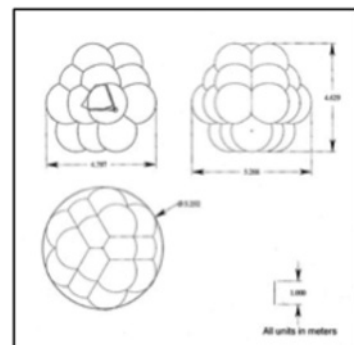
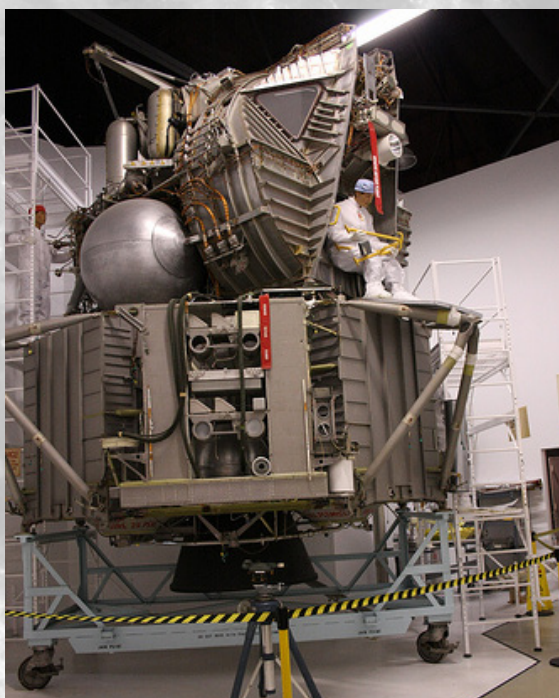
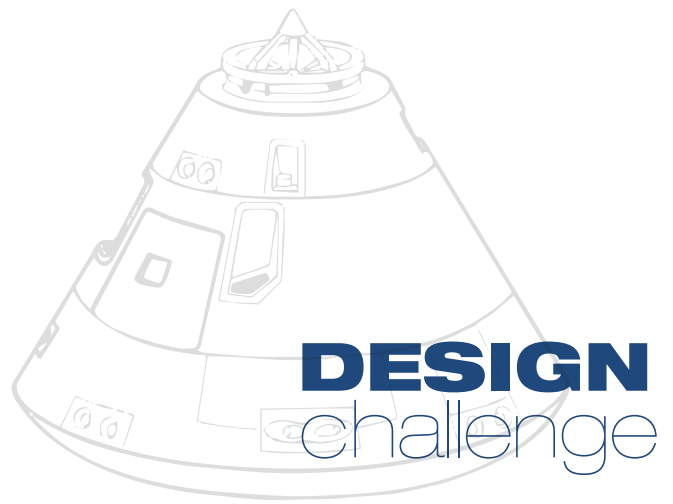


Fragile Cargo! Handle with Care!



Now that you have designed a Lunar Buggy that will transport astronauts around the lunar surface, you need to think about safely delivering this vehicle to the Moon. When NASA sent its two robotic rovers, **Spirit** and **Opportunity**, to Mars, they landed on Mars in a very interesting fashion. They fell out of the Martian sky, slowed down by a parachute and then bounced on the surface until they came to a stop! How did they do that? The rovers were inside a landing pod made of AIR BAGS! But the Martian atmosphere and surface is very different from the Moon, so to repeat this on the Moon would require several design modifications.



THE CHALLENGE:

Each team must design and build a Landing Pod that will safely deliver your Lunar Buggy to the Moon's surface. The Landing Pod must meet the following constraints:

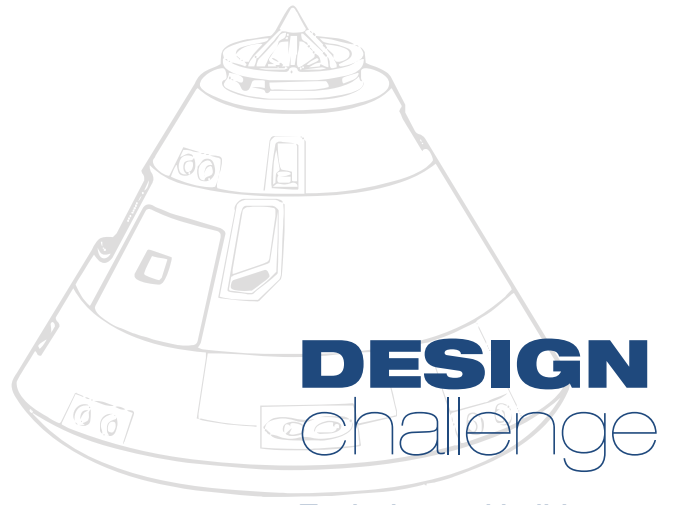
To design and build a Landing Pod for the model Lunar Buggy that was built in the previous session.

- 1. The Landing Pod must safely deliver your Lunar Buggy to the surface from a height given by the teacher.*
- 2. The Landing Pod must land RIGHT-SIDE up and the Lunar Buggy must be able to roll out, so it must land in the correct orientation.*
- 3. Materials of the Landing Pod must be reusable for other missions on the lunar surface. If a balloon pops or tape folds over on itself, those items are no longer reusable.*
- 4. The Landing Pod must have a hatch or door for release of the Lunar Buggy, and should then roll out with no more than a nudge onto the ramp. Therefore, the Lunar Buggy cannot be taped or glued inside the Landing Pod.*
- 5. The Lunar Buggy should not suffer any damage from the lunar landing and still be able to roll down a ramp.*

Design a
Landing Pod
Student page

ASK IMAGINE & PLAN

Draw your Landing Pod and label the materials you plan to use to protect your Lunar Buggy. Make sure to indicate the “door” or “hatch” on the Landing Pod.



DESIGN challenge

*To design and build a
Landing Pod for the model
Lunar Buggy that was built
in the previous session.*

Design a
Landing Pod
Student page

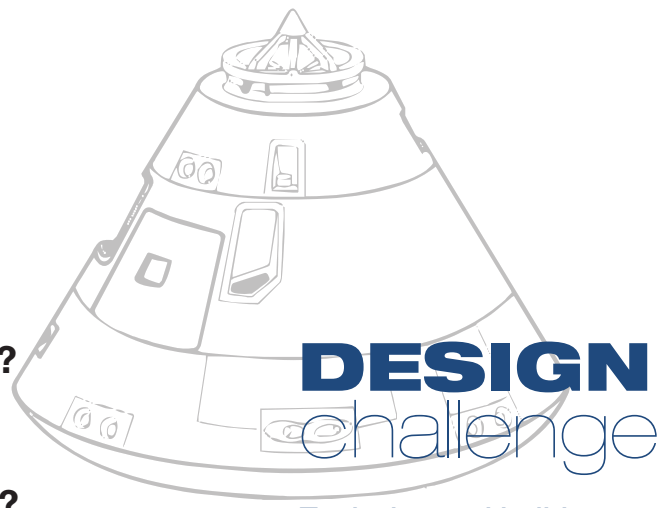
Approved by: _____

Experiment & Record

Make two test drops with your Landing Pod, but use a height that is less than the final drop height given by your teacher. Record what happens to your Landing Pod and the Buggy inside.

Landing Pod Data Table

Trial	Drop Height (m)	Observations
1		
2		



Was the Landing Pod damaged during the fall?
Yes No

Was the Lunar Buggy damaged during the fall?
Yes No

If you answered yes to either question above, discuss with your team how you should design the Landing Pod differently. If there is time, make changes in your drawing and add those changes to the Landing Pod.

Now for the actual lunar landing! Follow your teacher's instructions and answer the following questions.

To design and build a Landing Pod for the model Lunar Buggy that was built in the previous session.

Design a
Landing Pod
Student page

Post Lunar Landing Questions

Did the Landing Pod remain closed during impact? (YES or NO)	Did the Lunar Buggy land in an upright position? (YES or NO)	How far did the Buggy roll beyond the ramp? (cm)

Draw a picture showing your Lunar Buggy and Landing Pod after the drop. Include any damage that may have occurred.

