Ohio State University Extension Lorain County 4-H School Enrichment Outreach

The Space Lander Challenge

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To conquer this challenge, think like a rocket scientist! NASA scientists and engineers imagine designs that will not only launch properly and sustain life for the astronauts, they also deliver them safely home. Fortunately, they've been doing this successfully for quite some time now.

From the **NASA Science MARS Exploration Program** website, I learned that NASA scientists are working to launch a Mars space lander vehicle, called the **Perseverance Rover**, in late summer 2020.

Perseverance is designed with a helicopter attached to it. This will aid the rover in locating and flying to a specific landing spot. Pretty cool!!

Perseverance rover - https://mars.nasa.gov/

Your challenge:

To help your 2 astronauts (marshmallows) remain **safely** inside your lander vehicle when it is dropped from different heights.

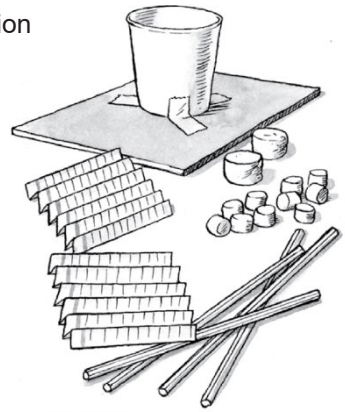
Your design challenge is to create a Space Lander.

Just like the NASA scientists and engineers, you'll need to consider some important things when creating your lander.

Shock absorption – Provide cushion as the lander hits the ground. Think SPRINGS and CUSHIONS.

Drag forces – Create "drag", aka air resistance so that your lander travels more slowly through the air for a potentially softer landing.

Stability – Can it fly and land without tipping the astronauts out of their cabin? We must keep them alive or the mission is over!



A lander under construction

Image credit: *Design Squad* TM/© 2008 WGB Educational Foundation

Materials needed:

1 - Small bathroom cup (~3 ounce)
6 - 3" x 5" index cards (or cardstock)
6 – straws (any)
10 small soft things – mini marshmallows, craft pom poms, small cotton balls – you get the idea!
1 ~4"x 4" base of a firm material – cardboard, foam, heavy paper plate, chip board, etc.
1 meter of masking or scotch tape
2 regular sized marshmallow "astronauts"

***No covering** is allowed over the "cabin" aka the cup.*

Testing:

Load your two astronauts (marshmallows) into the cabin and **DROP your lander from different heights**.

- Try 30, then 60, then 90 centimeters.
- Did BOTH of your astronauts land safely? Or did they bounce out?

Good luck! Happy designing and redesigning!