Lunar Lander

Objective:
Students build a lunar lander equipped with a landing shock absorber.

Suggested Materials:
• Cardboard
• 9oz Plastic Cup
• Index Cards
• Recyclable materials
• Rubber Bands
• Straws
• Tape
• Scissors
• Marshmallow or Cotton ball

Parent or Guardian Activity Summary:
Junior scientist must use what they know and can investigate about gravity, motion, and forces to design and build a shock-absorbing system that will protect an "astronaut" when they land. Just as engineers had to develop solutions for landing different vehicle types on the Moon, students follow the engineering design process to design and build a shock-absorbing system out of paper, cardboard, straws, rubber bands and recyclable materials.

Setup Instructions:
• Lay out all assembly items.
• Designate a landing zone on the floor near the assembly station.

Additional Notes:
Use a marshmallow or cotton ball as the “astronaut.” If the “astronaut” bounce out, figure out ways to improve your design. Study any problems and redesign. For example, if your spacecraft tips over as it falls through the air, make sure it’s level when you release it. Also check that the cup is centered on the cardboard. Finally, check that the weight is evenly distributed. Add soft pads or change the number or position of the shock absorbers. For an extra challenge, make it so the top of the cup cannot be covered up by materials.
Lunar Lander
Landing on the Moon is Tricky

Your task: Build a shock absorber for your Lunar Lander that will enable you to land safely on the Moon.

You will need:
- Cardboard
- 9oz Plastic Cup
- Index Cards
- Recyclable materials
- Rubber Bands
- Straws
- Tape
- Scissors
- Marshmallow or Cotton ball

Procedures:

1. Design a shock-absorbing system. Think springs and cushions.

2. Put your spacecraft together.

3. Add a cabin for the astronauts. Tape the cup to the platform. Put an astronaut (the marshmallow or cotton ball) in it. (NOTE: The cup must stay open—no lids!)

4. Test your Lunar Lander by dropping it at chest height. If it works keep dropping it from higher up, how far up can you go? If it does not work, go back and redesign it. Don't worry if it does not work the first time, NASA engineers go through hundreds of prototypes before something works.

Example:


Challenger Center activity adapted for use in The Museum of Flight education programs