ACTIVITY AT HOME

PINK PALACE MUSEUM

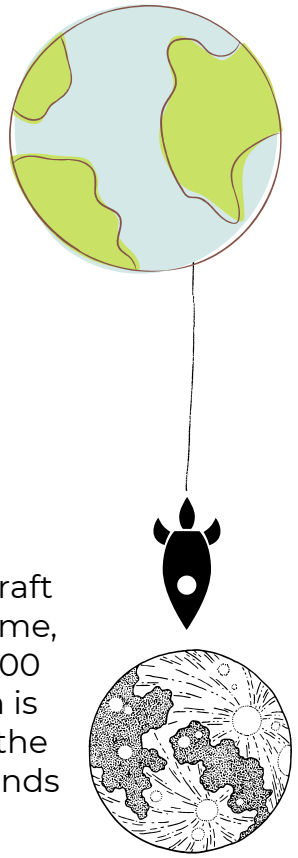
Space Science

ASTRONAUT LANDER

Determine what it takes to protect astronauts from landing impact.

Materials

- Small paper or plastic cup
- Stiff paper or cardboard
- Printer paper
- Index cards
- Regular marshmallows
- Mini marshmallows
- Rubber bands
- Plastic straws
- Tape



It takes about 3 days for a spacecraft to reach the Moon. During that time, a spacecraft travels at least 240,000 miles (386,400 kilometers), which is the distance between Earth and the Moon. The specific distance depends on the specific path chosen.

Procedure

- Tape the cup (open-side out) to the stiff paper or cardboard. The cup will act as a cabin for your lander. Place two regular sized marshmallows inside the cabin to be your astronauts. The cup has to stay open (no lids) and you can't tape your 'astronauts' to the inside of the cup.
- Use your paper to brainstorm ideas and designs that will allow your "astronauts" to land safely. The remaining materials can be used to make your shock-absorbing system, to attach to the paper platform..
- Test your design by dropping your lander from 1 foot in the air. If the "astronauts" bounce out, figure out ways to improve your design and retest until your "astronauts" survive the landing!

Results

You can use materials to soften the landing of the lander. The softer the landing, the less likely the "astronauts" are to fall out of the lander cabin.

Why?

When you jump off a high step, you bend your back and knees to absorb some of the energy and break your fall. That's what a shock absorber does—absorbs the energy of an impact. Soft things, like marshmallows, cotton balls, foam and bubble wrap absorb shock well.

Landing on the Moon is tricky. Since a spacecraft can go as fast as 18,000 miles per hour (29,000 km per hour) on its way to the Moon, it needs to slow down in order to land gently. If there are astronauts onboard, the lander also needs to keep them safe.

This activity was adapted from Jet Propulsion Laboratory.

To learn more about space science, check out the Sun, Earth, Universe exhibit at the Pink Palace Museum.