

DESIGN challenge

To design and build a model of a Lunar Buggy that will carry equipment and astronauts on the surface of the Moon as well as determine the best slope of ramp for the rover to travel the farthest distance.



OBJECTIVE

To demonstrate an understanding of the Engineering Design Process while utilizing each stage to successfully complete a team challenge.

PROCESS SKILLS

Measuring, calculating, designing, evaluating

MATERIALS

General building supplies

Meter stick

Digital scale

Small plastic people (i.e. Lego)

Plastic eggs

Pennies or washers (“cargo”)

Wheels

Something to use as a ramp (preferably a flat surface that would enable the buggy to roll for 25 cm or more)

STUDENT PAGES

Design Challenge

Ask, Imagine and Plan

Experiment and Record

PRE-ACTIVITY SET-UP

Set up a small ramp for the students to use with their Lunar Buggies. It can be made with something as simple as a large book set up on a table or a piece of wood propped up on chair.

MOTIVATE

- Show the video about the Apollo 15 Lunar Rover on the Moon:

<http://starchild.gsfc.nasa.gov/Videos/StarChild/space/rover2.avi>

- Ask students to pay attention to the comments made about the difficulties in driving on the lunar soil.

SET THE STAGE:

ASKIMAGINE &PLAN

- Share the *Design Challenge* with the students
- Remind students to imagine a solution and draw their ideas first. All drawings should be approved before building.

CREATE

- Challenge the teams to build their Lunar Buggies based on their designs. Remind them to keep within specifications.

EXPERIMENT

- Students must test their designs down the ramp and record the distance travelled for each trial.
- Students should try a “Goldilocks” experiment with how much cargo weight their Buggies can support by adding pennies to the plastic egg.

IMPROVE

- Students should *improve* their Lunar Buggy models based on results of the *experiment* phase.



CHALLENGE CLOSURE

Engage the students in the following questions:

- *Did the cargo mass make a difference in your Buggy's performance?*
- *How did the slope of the ramp affect your Buggy's performance?*

PREVIEWING NEXT SESSION

Ask teams to bring back their Lunar Buggy models for use in next session's challenge. You may want to store them in the classroom or have the facilitator be responsible for their safe return next session.

Ask teams to think about potential landing pods for use during the next session. Tell students they will be building the landing pod out of the materials that have been available to them. The pod will be dropped from as high as possible (out a second story window, off a tall ladder, or from the top of a staircase).

DESIGN challenge

To design and build a model of a Lunar Buggy that will carry equipment and astronauts on the surface of the Moon as well as determine the best slope of ramp for the rover to travel the farthest distance.

Design a
Lunar Buggy
Teacher page

