

DESIGN challenge

To design and test a Reusable Launcher for the Crew Exploration Vehicle (CEV). The CEV should travel 5 meters when launched.



OBJECTIVE

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

PROCESS SKILLS

Measuring, designing, evaluating

MATERIALS

General building supplies

Meter stick or measuring tape

C-clamps

Rubber bands of various sizes

Model CEV from previous activity

STUDENT PAGES

Design Challenge

Ask, Imagine and Plan

Experiment and Record

PRE ACTIVITY SET UP

See next page.

MOTIVATE

- Show the first two minutes of the video titled “Constellation: Flight Tests”.
(if time permits, show all)
www.nasa.gov/mission_pages/constellation/multimedia/index.html
- Ask the students what was the most important lesson learned from those images? (test, test and test again!)

SET THE STAGE:

ASKIMAGINE &PLAN

- Share the *Design Challenge* with the students.
- Emphasize that the objective is to build a launcher producing repeatable results. It is more important for the CEV to launch the same distance each time than for the CEV to be launched the farthest.
- Remind students to ask questions and brainstorm ideas, then break into teams to create a drawing of a reusable launcher. All drawings should be approved before building.

CREATE

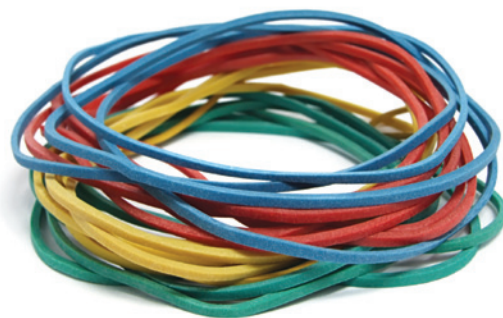
- Challenge the students to build a Reusable Launcher based on their designs.

EXPERIMENT

- Conduct two sets of tests: 3 launches, each using three different set-ups. Record data.

IMPROVE

- Students improve the Reusable Launcher based on results of the tests.



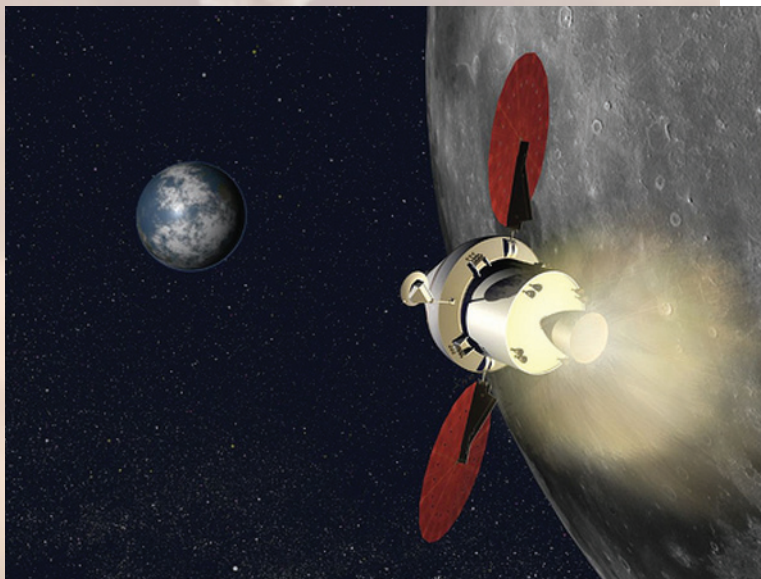
CHALLENGE CLOSURE

Engage the students with the following questions:

- *Why was it important that the launcher be reusable?*
- *Why was it important that your results were repeatable?*

PREVIEWING NEXT SET OF ACTIVITIES

The Moon is a very harsh environment. There is no atmosphere to protect astronauts and their equipment from solar radiation and the extreme temperature swings between night and day. Next session, we will begin to find ways to protect astronauts from those extreme temperature changes.



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Launch Your CEV
Teacher page