



Instructions for Egg Lander

(for 6th Graders)



Overview of the Mission:

The only thing more unnerving than the launch of a spacecraft to a planet is entry, descent, and landing (EDL) onto the surface. Those few “minutes of terror” make even the most seasoned EDL engineer a nervous wreck. After the Phoenix spacecraft plunged into the Mars atmosphere at 16,000 mph, it had six minutes to slow down to 7.9ft/s (0.09 mph) in order to make a safe, soft landing on the surface, all controlled automatically through the robotic sensors aboard the spacecraft. Borrowing from the classical egg drop, in this activity, you will design and build a descent and landing system for an egg.

Imagine that you are a space engineer with the task of designing a lander that will safely get its cargo and astronauts (an egg) onto a planet’s surface after being launched from an orbiting spacecraft. What will it need to land safely?

You may design a blueprint ahead of time to plan what your lander will look like. You may use materials from home to create your lander. We have listed some suggested material below, but feel free to use whatever materials from home that you think would be useful.

If you would like to view a successful landing of the Insight Mars lander from 2018, with your parents’ permission, visit: <https://www.youtube.com/watch?v=C0lwFLPiZEE>

Building your Lander:

- **You MUST USE A SANDWICH OR SNACK-SIZE ZIPLOCK BAG to hold your raw egg* & please make sure it is completely sealed.**

***NOTE: Eggs will not be provided by the school**

- **Your lander may not be bigger than 12” high and 12” wide.**
Some suggested materials are: paperclips, drinking straws, popsicle or craft sticks, string, masking tape, rubber bands, pipe cleaners, paper, bubble wrap, Styrofoam packing materials, scissors, ruler, small plastic garbage bags. *Feel free to use any other materials from home that you can think of to make a successful lander!* **(NO PEANUT BUTTER/NUTS ALLOWED AND NO OTHER MESSY FOOD ITEMS LIKE JELLO, WATERMELON, ETC.)**
- Note that if it is a windy day, you may have to cut your parachute that morning or your lander might just blow away!

Launch Day: Space Day, May 5th, 2023

- Bring your lander to school and Ms. Ofer and staff will drop your lander from the roof and see which ones land safely!
- **REMEMBER: write your name on it and your teacher’s name** if you would like it returned to you after the landing. *Make sure everything is VERY secure because the Egg Landers will be stored in garbage bags with others before their launch.*

Assessment Criteria:

Is it well made and attractive?

Does it meet appropriate criteria & constraints?

Did your egg (astronaut) survive?

Which landers seemed to work best and why?

Additional Challenge: Your management would like to cut costs on this mission. As a space engineer you know if the lander is lighter, you could save money on materials and transportation. Can you design a lander that is less than 1 pound (including your egg)?



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