

Eggnaut Engineering Challenge



Learning Target:

I can engineer a device that will protect a raw egg from breaking when dropped from a height.

Materials:

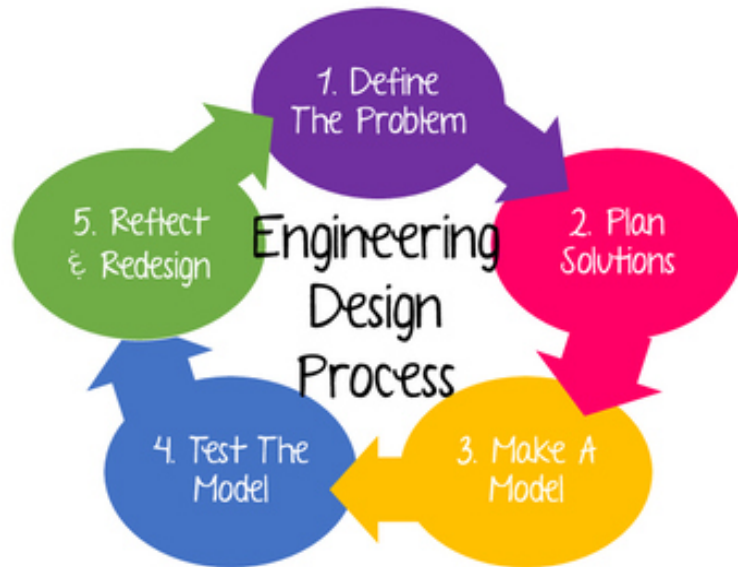
- 1 raw egg (more eggs if you have them for multiple trials)
- Paper
- Pencil
- A variety of craft supplies (ex. cardboard, plastic, glue, tape, etc.)

Activity:

Aerospace companies like NASA, SpaceX, and Blue Origin are currently working on the next generation of space capsules to take astronauts to the moon and Mars. In this activity you will work like an aerospace engineer using the design cycle to create a device (space capsule) that will prevent a raw egg (astronaut) from breaking when dropped from a height.

Design Requirements

- The device should protect the egg from breaking when dropped from the highest possible height.
- **NO PARACHUTES** are allowed.
- Device cannot be lowered by a string /rope or travel down a slide. It must freefall to the earth.
- No gasses (i.e. helium) can be used.
- Maximum size of the device:
 - Height – 6 inches
 - Length – 6 inches
 - Width – 6 inches



Define The Problem

- What is the problem that needs to be solved?
- What information, product specifications, restrictions, etc. are there?
- What additional information do I need?

Plan Solutions

- Brainstorm 5 things that you think should be part of your product.
- Draw 3 different ideas for how your product should look.
- Based on your 3 possible ideas, make a final design plan drawing. Include measurements, materials, colors, etc.

Make A Model

- Build a prototype of your product.

Test The Model

- Check to make sure your prototype meets all the requirements (product specifications, restrictions, or other information you determined)
- Test multiple times without an Egnaut to make sure your product works like your plan indicates.

Reflect and Redesign

- Based on your testing, what changes need to be made?
- Make necessary changes.

Conduct Actual Drop Test (Parent/Guardian permission and supervision required!)

- Install your Egnaut in the device.
- Make a prediction of how high you can drop the device before the egnaut cracks or breaks.
 - *Example: I predict that my device will protect the egnaut from a fall of 12 feet.*

- With adult help, drop your device from increasing heights to determine the maximum height that your device can keep the eggonaut from breaking. 3 trials at each height would be ideal if you have several eggs. Keep data on each drop, as to the height of the drop and your eggonaut's condition.
 - *Example:*

Height	Condition
8 feet	egg intact
9 feet	egg slightly cracked but not leaking
10 feet	egg broken in many pieces

Present Your Product

- Take a picture of your device before you conduct your actual drop test.
- Write a claim / evidence-based statement that includes your prediction and summarizes your results.
 - *Example: I claim that my prediction was incorrect. My evidence is that my device protected the eggonaut from breaking at a height of 8 feet. That is 4 feet less than my prediction.*

What is Due:

Submit your picture of the completed device, your final planning sketch, and claim / evidence-based statement on Schoology or by email.