

DESIGNING AN EGG DROP MODEL



Pods for Emergency
Supplies

Day 2:
Designing an Egg Drop
Model



1

WARM-UP
Connecting to Futura
Workspace

FMEI 2.1 WARM-UP

The screenshot shows the Futura Workspace interface. At the top, it says "SCIENCE 8 - LUMIO - 1 | FORCE AND MOTION". On the left, there is a sidebar with navigation options: "DAILY AGENDAS", "SUBMISSIONS & FEEDBACK", "MANAGE GROUPS", and "MANAGE ROLES". The main content area displays an agenda with five items. Item 2, "Designing an Egg Drop Model", is highlighted with a red box and a green circle. Below it, a sub-item "Day 2: Designing an Egg Drop Model" is also highlighted with a green circle and a checkmark. To the right of the agenda, a message titled "DAY 2" and "Designing an Egg Drop Model" is displayed. The message is from Nisha Kar, Project Director, and contains a welcome message and a list of deliverables. At the bottom of the message, there are "UNSEND" and "RESEND" buttons.

SCIENCE 8 - LUMIO - 1 | FORCE AND MOTION

DAY 2

Designing an Egg Drop Model

Hi interns,

Welcome back! I hope you found what you read in the Dossier useful, because today you will continue research on how to protect falling objects. Mechanical engineers often start by reading, and then they make physical models to test out ideas. This is what you will do today.

You'll be experimenting with how to best protect something small and fragile. Make careful decisions about the design based on what you learned from the readings in the [Dossier](#). I expect you to take detailed notes on your design and test results—what you learn today will help make sure you design a top-notch supply pod for International Disaster Aid.

Deliverables:

- Part 1: Egg Drop Design sheet
- After Hours: Reread and revise annotations in Chapter 2: "Collisions and Impact Forces"

Stay focused,
Nisha

Nisha Kar, Project Director
Futura | Mechanical Engineering Division

◀ UNSEND RESEND ▶

Open the [Futura Workspace](#).

1. Select the **Force and Motion Engineering Internship** from the login page.
2. Read the new Daily Message from your project director.



FMEI 2.1 WARM-UP

DAY 2

Designing an Egg Drop Model

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Stay focused,
Nisha

Nisha Kar, Project Director
Futura | Mechanical Engineering Division



FMEI 2.2 EGG DROP CHALLENGE



Engineers read texts to research how best to approach a problem and use physical models to investigate important concepts.

For the next two workdays, you will construct a pod that protects an egg during a drop.

This will help you learn about how to protect the emergency supplies in a real supply pod.

We will use the egg drop to learn more about how to reduce impact forces.

Can we see force?

One easy and inexpensive way to measure impact force is to see at which point something breaks.

An egg, which is both fragile and small enough to protect, is perfect for our tests.

Today, you will be creating an Egg Drop Model—a pod that should protect an egg when it falls to the ground.





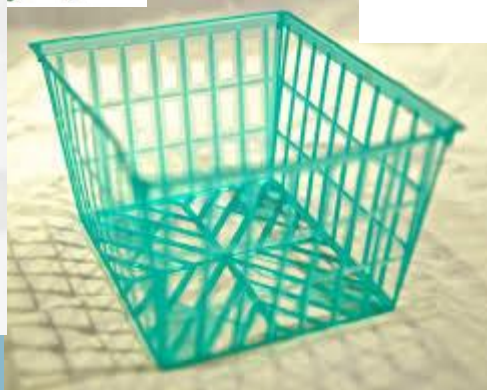
FMEI 2.2 EGG DROP CHALLENGE

Share initial ideas.

How might you reduce the impact forces on the egg?

Use information from the reading they've done so far to support your ideas.

MATERIALS:





FMEI 2.2 EGG DROP CHALLENGE

Egg Drop Design



Team Members _____ Date _____

INSTRUCTIONS

1. **Plan:** Choose the materials for your Egg Drop Model. Sketch and label your initial design in the space below.
2. **Build:** Make your design.
 - Before you test, record the mass of your model. Be sure your egg is inside!
3. **Test:** Bring your Egg Drop Model to the test.
4. **Analyze:** Reflect on your design in the Design Reflection.

PART 1: DESIGNING AN EGG DROP MODEL

Plan and Build: Draw your design. Record your Egg Drop Model's mass.

Mass of the Egg Drop Model (grams): _____

Describe your design:



FMEI 2.2 EGG DROP CHALLENGE

Test Results: Record your results in the space below. Sketch or describe what happened to the pod and to the egg when it collided with the ground.

PART 2: ANALYZE YOUR EGG DROP MODEL

Design Successes: Which parts of your design worked? Why do you think they worked?

Design Failures: Which parts of your design did not work? Why do you think they did not work?



FMEI 2.2 EGG DROP CHALLENGE

PLAN YOUR NEXT ITERATIVE TEST.

Draw and describe your revised design.

What would you change?

Why would you make these changes? Describe the science concepts that support your decisions.



FMEI 2.2 EGG DROP CHALLENGE

Futura Mechanical Engineer's Dossier

You will begin research on collisions and impact forces by reading portions of their Futura Mechanical Engineer's Dossier.

A *dossier* (DAW-see-ay) is a term professionals sometimes use for a set of related documents, including all of your project details.

Your Dossier includes the background information you need to complete this Engineering Internship.

Use the Table of Contents (bullet point lines) to navigate the other chapters in the dossier.

Futura Mechanical Engineer's Dossier



Collisions and Impact Forces

You may be familiar with [collisions](#). These are events in which two objects hit each other, such as a bug hitting the windshield of a car or a soccer player kicking a ball. Every collision [exerts](#) an equal-sized force on each object involved in the collision. These [forces](#) can change the objects' [velocity](#), or speed in a particular direction.

A dropped supply [pod](#) hitting the ground is another example of a collision. Earth and the pod experience the same amount of force during the collision, but because Earth is so big, it's barely affected. The pod, on the other hand, can be damaged by the force of the collision because it experiences a big change of velocity—to zero! [Engineers](#) are not concerned with how the collision affects Earth, so they focus on only one of the equal forces exerted during the collision: the force exerted on the pod. This force is called the [impact force](#).

3

HOMEWORK
After-Hours Work



NSEI 1.3 HOMEWORK

After-Hours Work: Interns read and annotate the Request for Proposals (RFP).
Select NEXT to submit your annotations

NEXT >

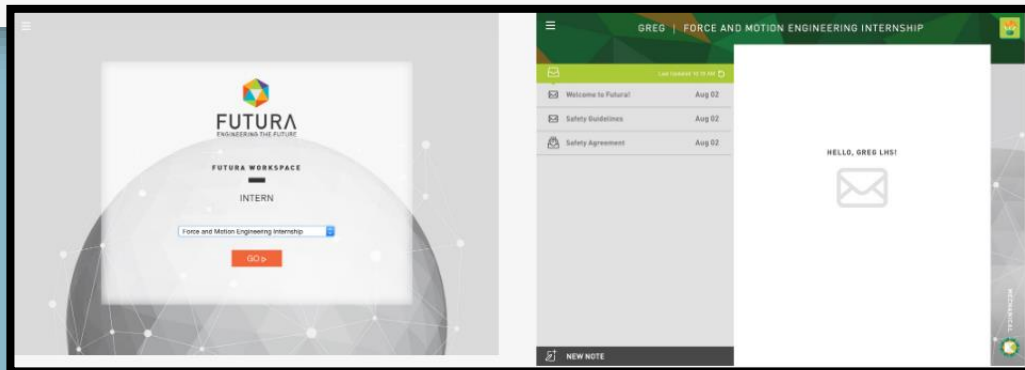
HAND IN

Reading Request for Proposals

Return to the **Futura Workspace** and be sure you've completed all internship tasks for the day.

- Open the Dossier.
- Read and annotate Chapter 1: "Request for Proposals" (RFP).
- If your internship coordinator has told you to submit your annotations, move on the next student screen to hand them in.

Remember to select the Force and Motion Engineering Internship from the login page for the Futura Workspace.



Submitting Annotations

Review your annotations, answer the reflection question below the article, and then select HAND IN to submit your article.

