## The Incredible Egg Drop

Launch Date: Wednesday, May 10<sup>th</sup>

Task: Construct a capsule to protect an egg being dropped from a 3<sup>rd</sup> floor window (approximately 9 meters). An egg will be provided the day of the egg drop. You may NOT use any peanut butter in your capsule OR messy food/substances. Ask if you are unsure. You must be present for testing. This will not be made up, give your capsule to a friend if you know you will be absent. You are required to test your capsule at home.

## **Parameters:**

☐ Must fit in a milk crate	е
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☐ Must weigh at least 600 grams/0.6 kg (1.3 pounds)

□ No parachute

\*Violation of any parameters will result in a 5 point deduction

## **PLANNING**:

Sketch potential designs in the space below and brainstorm ideas. Pick the best and build it! (2 points)

**List Materials**: (1 point)

<u>DIAGRAM</u>: Draw a picture of your final design below and label each part. Use arrows and labels to show how <u>gravity</u>, <u>air resistance and inertia</u> will affect the capsule. (9 points)

**TESTING:** Perform at least 2 trials at home and complete the data table. In the space provided, explain what these tests proved and any modifications you made. *(6 points)* 

TRIAL	ELEVATION OF DROP	OBSERVATIONS
1		
2		

Explanation of modifications you made after testing: (do not say "none")		

<b>EXPLANATION:</b> In the space below, write a paragraph explaining the				
design of your capsule. Explain how gravity, air resistance and inertia				
affect the capsule's fall and how you designed it with these forces in				
mind. (5 points)				
In the second paragraph, explain how your knowledge of Newton's Laws influenced your design (at least two of the three laws). <i>(5 points)</i>				

<b>CALCULATIONS</b> : Using the equation	ons below, calculate the force your
capsule hits the ground with AND (4 points)	the potential energy of your capsule.
Mass of capsule =	
Height = 9 meters	
Acceleration = 9.8 m/s <sup>2</sup>	
Plug those measurements into the form which the capsule will hit the ground.	nula below to calculate the force with Write your answer in the box provided.
Force=Mass x Acceleratio	n PE = Mass x Gravity x Height
Force =  RESULTS: What happened to the of successful? (2 pts.)	PE = capsule after the drop? Were you
Did your egg break?	

## **SCORING GUIDE**

Planning / 2				
-Sketch possible designs				
Materials List/1				
Diagram/9 -List materials used in construction (NO PEANUT BUTTER!) (1 pt.)				
-Gravity, air resistance, inertia labeled correctly (6 pts.)				
-Neat, detailed drawing of capsule (3 pts.)				
Testing / 6 -Data Table Complete -Observations explained -Modifications listed				
Explanation / 10 -Description of how gravity, air resistance and inertia affect capsule -Description of how Newton's Laws influenced design (at least two of three)				
Calculations/Results / 6				
-Accurate calculation of force				
-Accurate calculation of potential energy -Results				
+ 5 points if egg is unbroken				
-5 points if parameters not met				
Total / 34 Points				