**Adkins EGG-celent Egg Drop**

**“ONLY THE BEST WILL SURVIVE”**

**Name\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**

**Other group member(s)\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**

**Date\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**

**Period\_\_\_\_\_\_\_**

**PROJECT IS DUE ON TUESDAY, APRIL 23.**

**RULES:**

* **You may have only a maximum of 3 people in your group. You may work alone if you prefer.**
* **Each person in the group must complete the questions individually.**
* **YOU MUST USE A RAW EGG ONLY!!!**
* **I must be able to be able to easily access the egg after the drop.**
* **The raw egg must be in a ziplock baggie in case it does crack or break, then it will not be hard to clean up.**
* **On 4/23 during class, you will drop your project from 8 feet (2.4 meters) onto cement. If your egg survives, you will be able to move on to the next round. The 2nd round will be a 13 foot (3.9 meters) drop on cement and will happen on another day.**
* **The winner(s) from each class from the 13 foot drop, will compete against each other for the “GOLDEN TICKET TO HOLLYWOOD”!!!**
* **On Monday, April 15, you will submit a drawn design of your project, including a list of the materials you will be using.**
* **These questions will be due on Monday, April 22.**
1. **Key Question: Based on the fragility of an egg, what materials and design concepts need to be considered to protect an egg during a drop from over 3 m?**

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1. **Materials used:\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ how many? \_\_\_\_\_\_**

 **\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ how many? \_\_\_\_\_\_**

 **\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ how many? \_\_\_\_\_\_**

 **\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ how many? \_\_\_\_\_\_**

 **\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ how many? \_\_\_\_\_\_**

 **\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ how many? \_\_\_\_\_\_**

1. **Should your container be made rigid?\_\_\_\_\_\_\_\_\_ Or, is it better if it collapses?\_\_\_\_\_\_\_\_\_\_\_ Explain your answer choice.\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**

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1. **Should the egg be able to move, or should it be held immobile?\_\_\_\_\_\_\_\_\_\_**

**Why did you choose that answer?\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
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1. **How can it be designed to withstand multiple drops from the proposed height (s)?\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**

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1. **How did you construct your design?\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**

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1. **On the graph paper you are given, graph your practice drops. You must at least have 4 practice drops from 8 feet. Measure the time in seconds (s) that it took your project to reach the ground. Your dependent variable (y axis) is the time in seconds, your independent variable (x axis) is the “drop number”.**
2. **What is the mass (in grams) of your design w/ the egg? (You may use the scales in Mrs. Adkins room BEFORE Tuesday, April 23 if you need to.)**

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1. **Is there anything unique about your design? \_\_\_\_\_\_\_ Explain if you answered yes. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**
2. **Does your design fit into a 12” x 8” container? \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**
3. **In paragraph form (5-7) complete sentences, explain how Newton’s**

 **Three Laws of Motion relate to the egg drop project. Please number**

 **your sentences. Write this on lined paper and attach to this paper.**

1. **What is the mass of the container plus the raw egg (in Kg)?\_\_\_\_\_\_\_\_\_**
2. **What is the weight of the container plus the egg (in N)?\_\_\_\_\_\_\_\_\_\_\_\_\_**
3. **What is the acceleration of the container during its fall (in m/s2)?**

 **\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**

1. **What is the final velocity of the container immediately before impact**

 **(in m/s)? \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**

1. **What is the time of the fall (in s)?\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**
2. **What is the Force of impact (in N)? \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**
3. **What is the momentum of the container plus the egg upon impact (in**

 **Kg x m/s)? \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**

**STANDARDS**

**SC.7.P.10 Forms of Energy**

* **A Energy is involved in all physical processes and is a unifying concept in many areas of science.**
* **B Energy exists in many forms and has the ability to do work or cause a change.**

**SC.7.P.11 Energy Transfer and Transformations**

1. **The Law of Conservation of Energy: Energy is conserved as it transfers from one object to another and from one form to another.**
2. **Recognize that adding heat to or removing heat from a system may result in a temperature change and possibly a change of state.**

**SC.7.P.11.2 Investigate and describe the transformation of energy from one form to another**

**SC.7.P.11.3 Cite evidence to explain that energy cannot be created nor destroyed, only changed from one form to another.**

**SC.912.P.12.3**

**A. Motion can be measured and described qualitatively and quantitatively. Net forces create a change in motion. When objects travel at speeds comparable to the speed of light, Einstein's special theory of relativity applies.**

**B. Momentum is conserved under well-defined conditions. A change in momentum occurs when a net force is applied to an object over a time interval.**

**C. The Law of Universal Gravitation states that gravitational forces act on all objects irrespective of their size and position.**