Newton’s Laws of Motion Design Challenge Name: .

Design an apparatus that will protect an egg when it is dropped from a high point. To be successful, your egg must not break or crack after being dropped. An object remains at rest or maintains a constant speed and direction of motion unless an unbalanced force acts on it. When an unbalanced force acts on an object, the change in speed or direction depends on the size and direction of the force. You will use your apparatus to demonstrate and explain the cause and effect relationship between simple observable motion and unbalanced forces. Newton’s Laws of Motion will guide your design process and material selection.

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| **Newton’s First Law** | **Newton’s Second Law** | **Newton’ s Third Law** |
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**Materials**:

* Popsicle Sticks
* String
* Cotton Balls
* Dixie Cups
* Masking Tape
* Any other self-supplied, teacher approved materials

**Design:**

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| **Material** |
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Use the space provided and the materials chart to sketch out possible designs. Circle your final design or attach your final blueprint to this paper.

**Data Collection**:

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| --- | --- | --- | --- | --- | --- | --- | --- |
| **Height** | **Mass (kg)** | **Time (s)** | **Distance (m)** | **Avg Velocity**  **(m/s)** | **Avg Velocity x 2 = Vf (m/s)** | **Acceleration**  **(m/s2)** | **Force**  **(N)** |
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**Analysis and Conclusion:**

1. Describe your egg after the fall. Did it survive, crack, or break?

2. Describe your apparatus after the fall.

3. Describe the best features of your design? Why?

4. If you were able to redesign your apparatus, what would you change? Explain.

5. Explain how the egg drop experiment demonstrates Newton’s Three Laws of Motion.

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| Newton’s Law | Explain how the egg drop experiment demonstrates each law. |
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**Extension:** Use your data to calculate the potential and kinetic energy of your apparatus.