**Design Process Packet**

***Learn about the Problem: Vocabulary***

* Engineering design process
* Collision
* Momentum
* Speed
* Mass

***Learn about the Problem: Research/Information on Safety Guidelines for Vehicles***

*Things that make vehicles safe for passengers:*

|  |  |
| --- | --- |
| **Vehicle Safety Feature** | **How it works / What it is made of** |
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***Generate Ideas: What a Safe Vehicle Looks Like—Prototype Ideas***

***Design Solution for Your Best Plan to Prototype and Test***

Explain the design approach that you will prototype and test*… (Example: We think cushion-type safety features are the best during a head on collisions. And we think that heavier cars better survive head-on collisions.)*

***Initial Design Materials Used***

|  |  |  |
| --- | --- | --- |
| Model Material | How many/How much | What it’s being used for |
| Cotton fill |  |  |
| Cardboard |  |  |
| Tag board |  |  |
| Felt |  |  |
| Foam paper |  |  |
| Craft sticks |  |  |
| Chenille stems/pipe cleaners |  |  |
| Balloons |  |  |
| Rubber bands |  |  |
| Plastic straws |  |  |
|  |  |  |
|  |  |  |

***Sketch your final design with materials identified.***

***Initial Testing & Analysis***

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **Car/Group #** | **Car Mass**  **(grams)** | **Run Length (meters)** | **Run Time**  **(seconds)** | **Testing Success (Y/N)** | **Car  speed** | **Momentum (m\*v=p)** |
| **1** |  |  |  |  |  |  |
| **2** |  |  |  |  |  |  |
| **3** |  |  |  |  |  |  |
| **4** |  |  |  |  |  |  |
| **5** |  |  |  |  |  |  |
| **6** |  |  |  |  |  |  |
| **7** |  |  |  |  |  |  |
| **8** |  |  |  |  |  |  |
| **9** |  |  |  |  |  |  |
| **10** |  |  |  |  |  |  |

***Initial Results Summary***

Initial results: (List details of what happened to your vehicle during/after crash.)

Initial conclusions:

***Redesign/Rebuild Materials Used***

|  |  |  |
| --- | --- | --- |
| Model Material | How many/How much | What it’s being used for / Problem that is being fixed |
| Cotton fill |  |  |
| Cardboard |  |  |
| Tag board |  |  |
| Felt |  |  |
| Foam paper |  |  |
| Craft sticks |  |  |
| Chenille stems/pipe cleaners |  |  |
| Balloons |  |  |
| Rubber bands |  |  |
| Plastic straws |  |  |
|  |  |  |
|  |  |  |

***Redesign Approach***

*To improve on our first design, we decided to…*

*Because…*

***Redesign Testing & Analysis***

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **Car/Group**  **#** | **Car Mass**  **(grams)** | **Run Length (meters)** | **Run Time**  **(seconds)** | **Testing Success (Y/N)** | **Car Speed** | **Momentum (m\*v=p)** |
| **1** |  |  |  |  |  |  |
| **2** |  |  |  |  |  |  |
| **3** |  |  |  |  |  |  |
| **4** |  |  |  |  |  |  |
| **5** |  |  |  |  |  |  |
| **6** |  |  |  |  |  |  |
| **7** |  |  |  |  |  |  |
| **8** |  |  |  |  |  |  |
| **9** |  |  |  |  |  |  |
| **10** |  |  |  |  |  |  |

***Redesign Results Summary***

Final results: (List details of what happened to your vehicle during/after crash.)

What worked? What didn’t work?

Final conclusions: