**The Energy Behind A Roller Coaster**

**Performance Based Rubric**

**Marble Roller Coaster Project Criteria**

**Calculations (MUST SHOW WORK WITH UNITS)**

* **Height of initial drop, height of hill, height of loop, total length of track, mass of marble**
* **Calculate the Potential Energy at a specific point (must specify at which point).**
* **Calculate the Kinetic Energy at a specific point (must specify at which point).**
* **Calculate the Velocity (speed) of the marble over a set distance (must specify over which distance).**
* **Calculate the Acceleration of the marble over a set distance (must specify over which distance).**
* **Describe the marble’s journey from start to finish using the following terms (underline the terms in your description): *kinetic energy, potential energy, velocity, acceleration, friction, inertia, momentum, gravity, mass***

**Roller Coaster/Schematic**

* **Have a schematic of your roller coaster (an illustration with measurements will be sufficient; should be precise).**
* **Color Code and Label the following areas on your illustration:** 
  + **Most PE.**
  + **Most KE.**
  + **Where PE is converted to KE.**
  + **Where KE is converted to PE.**

**Test Run**

* **Test your roller coaster to verify that the marble will travel entire track (you are allowed 3 tries for a successful run).**

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| **Standards** | **Developing** | **On-Target** | **Mastery** |
| Science  Schematic  Test Run | No drawing provided.    Drawing not to scale or labeled.    On lined paper or too small.  All three trials are unsuccessful. | Drawing provided.    Drawing is close to scale and contains some labels.  On 8 x 12 copy paper.  Successful test run with modifications. | Drawing is detailed and labeled.  Drawing is to scale and colored.    On 8 x 12 copy paper.  Successful test run without modifications. |
| Math  Calculations | No specifications or calculations provided.  Does not include all necessary components.  Not accurate or organized. | Contains some specifications and/or calculations.    Includes some necessary components.    Accurate, however not organized. | All specifications and/or calculations provided.    Includes all necessary components.    Accurate and organized. |
| ELA | Little to no physics terminology was used in the multimedia presentation.  No summary of a roller coaster engineering career was included in the presentation. | Some physics terminology was used in the multimedia presentation.  A very basic summary of a roller coaster engineering career was included in the presentation. | Technical physics terminology was used in the multimedia presentation.  A thorough summary of a roller coaster engineering career was included in the presentation. |