Marble Roller Coaster Project

Research, design, and build a roller coaster. Your roller coaster cannot be prefabricated or from a kit. It must have at least 2 hills (including the starting point), one loop, cannot have a top, and must be free-standing. Your roller coaster will transport a marble that you supply (you can use any model or size marble). You must bring your marble when the project is tested and presented. Be sure to include your name and class period on your project/rubric.

Recommended materials: Measuring tape, hot glue gun, foam pipe insulation, wood, plastic, Styrofoam.

Marble Roller Coaster Project Criteria

20 points – built coaster: at least 2 hills (including the starting point), one loop, cannot have a top, and must be free-standing.

30 points – 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*

30 points – Roller Coaster/Schematic

- Have a schematic (scaled drawing) of your roller coaster.
- Color Code and Label the following areas on your illustration:
  1. Most PE.
  2. Most KE.
  3. Where PE is converted to KE.
  4. Where KE is converted to PE.

10 points – Durability Built to Last; The coaster can be transported to school and/or around classroom and still work.

10 points –Test Run Test your roller coaster to verify that the marble will travel entire track (you are allowed 3 tries for a successful run). If the marble roller coaster is too large, then a video of the presentation done at home is acceptable as long as it is in a playable format (i.e. wmv or mp4) and you are visible in the video.

Marble Roller Coaster Project Rubric

Criteria	Does not meet	Meets	Exceeds
Build coaster	• Missing two or more required components	• Missing one required component	• Has all required components
Calculations	• No specifications or calculations provided. • Does not include all necessary components. • Not accurate, original or organized. • Has poor aesthetic appeal.	• Contains some specifications and/or calculations. • Includes some necessary components. • Accurate, however not original or organized. • Has some aesthetic appeal.	• All specifications and/or calculations provided. • Includes all necessary components. • Accurate, original, and organized. • Has aesthetic appeal.
Schematic and Roller Coaster	• No drawing provided. • Drawing not to scale or labeled. • On lined paper or too small.	• Drawing provided. • Drawing is close to scale and contains some labels. • On 8 x 12 copy paper.	• Drawing is detailed and labeled. • Drawing is to scale and colored. • On paper larger than 8 x 12.
Durability	Does not work without extensive adjustments after moving.	Needs small modifications when moved.	Built to last; no adjustments needed.
Test Run	All three trials are unsuccessful.	Successful test run with modifications.	Successful test run without modifications.
			Total: _____/100

Marble Roller Coaster Projects are due Tuesday May 19th