

Name -
Period -

Date - June 2017



Name of Partners (First names): _____

Title of Lab - _____

Objective: To engineer and then test various model designs of roller coasters in the classroom. Considering the following design goals – **fastest / loop de loop / hills / spirals**
circle one

Hypotheses- a sketch of design will serve as part of your hypothesis.
Included sketch here with a **detailed written explanation of the design.**
(minimum 2-3 sent.) Explanation includes minimum 2 terms from course.
Consider the following: **KE, PE, speed, momentum, mass, friction, etc.**

Design 1 - Sketch 1	Coaster Name: PE Calculation: KE Calculation:
---------------------	---

LABEL: greatest GPE, greatest KE, location of greatest friction & PE / KE calculation

Identify Variables:

Independent variable (IV)- _____

Dependent variable (DV) - _____

List of (4 to 6) **constants** relevant to the experiment. -

List of your coaster building materials:

Find distance of track (meters) _____ **Find mass** of marble (grams) _____

Once you have completed the build and are ready to start time trials, then you may request a stop watch and roller car (marble) to begin collecting data.

DATA TABLE: you must include proper UNITS

Speed Calculation Design 1	Distance (m)	Times (sec)	Formula? Write it
Trial 1			
Trial 2			
Trial 3			
		Average Speed →	
PE = mass x height Find PE		KE = mass x speed Find KE	
Speed Calculation Design 2	Distance (m)	Times (sec)	Formula? Write it
Trial 1			
Trial 2			
Trial 3			
		Average Speed →	
PE = mass x height Find PE		KE = mass x speed Find KE	P=(M*V)

Sketch 2

Coaster Name:

PE Calculation:

KE Calculation:

LABEL: greatest GPE, greatest KE, location of greatest friction & PE / KE calculation

Analysis / Conclusion

1. Compare and contrast the Gravitational **Potential Energy** in both designs. What effect do you imagine GPE would have on average top speed of a coaster and what if any effect did it have on your BOTH your coaster designs?

2. Compare and contrast the **kinetic energy** in both designs. What variable was manipulated or changed to adjust the KE (*momentum*) in this experiment. Explain; where was the greater momentum and why?

3. Design 1 - Describe how the shape or position of the track affected the speed of the marble. Discuss locations on the track where the marble flew off, got stuck or did not perform as expected?

4. Design 2 - Describe how you redesigned, tweaked and engineered the coaster differently for design 2 and why?

5. If you had an unlimited budget, what would you add to your coaster to make it the best in the world? Describe the perfect setting. What type of energy source would it use? What would be the most efficient energy source? What might be the most outlandish type of energy to use to make it more exhilarating? How would this coaster thrill its passengers?
