Name: _____

Roller Coaster Calculations

Instructions: In the space below, draw a sketch of your roller coaster and label the 5 points where we will be collecting data. The five points are 1) the starting point of the coaster, 2) the first bottom of the hill, 3) the top of the hill, 4) the second bottom of the hill, and 5) the end of the track.

Now that you've labeled your points, fill out the table below with the expected values of Potential Energy and Kinetic Energy.

Marble Mass:_____ **Marble Diameter:**_____

$PE = mgh$ $KE = \frac{1}{2}mv^2$ $v = \sqrt{\frac{2(KE)}{m}}$ $ME = PE + KE$

Theoretical Data

Point	Height (m)	PE (J)	KE (J)	v (m/s)	ME (J)
1					
2					
3					
4					
5					

Name: _____

Now it is time to record your data using the photogates and the CPO Timers. For increased accuracy, get 3 times at each point and then use the average time for your calculations. Remember, for the average velocity of the marble, you will have to divide the marble's width by the average time through the photogate at each point.

NOTE: <u>Don't</u> just subtract the PE from your initial ME to find KE!

Actual Data

Point	Height (m)	PE (J)	t_{avg} (s)	v_{avg} (m/s)	KE (J)	ME (J)
1						
2						
3						
4						
5						

What do you notice about your ME in your actual calculations vs. the theoretical calculations?

Did ME stay the same in both? If it changed, what was the cause?

Remember, the Law of Conservation of Energy states that energy cannot be created nor destroyed, so where did that energy go (if ME decreased) or come from (if ME increased).