

2. Look at the equation for kinetic energy below:

$$KE = \frac{1}{2} \boxed{} \cdot \boxed{}^2$$

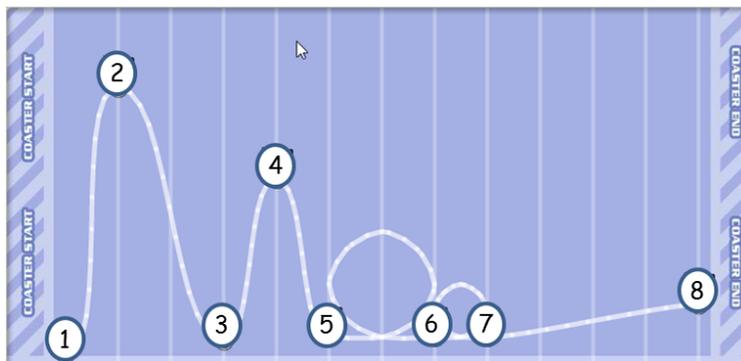
Mass Velocity

- a) As the mass increases, would you expect the kinetic energy (KE) to increase or decrease? Explain your answer.

- b) As the velocity increases, would you expect the kinetic energy to increase or decrease? Explain your answer.

- c) Do you think the mass or the velocity has a greater impact on the kinetic energy? Explain your answer.

3. Look at the roller coaster track below.



- a) At which point (1-8) do you think *potential energy* would be the greatest? Explain your answer.

b) At which point (1-8) do you think *kinetic energy* would be the greatest? Explain your answer.

c) Dissipated energy is wasted energy in the form of sound and/or thermal energy. At which point (1-8) do you think *dissipated energy* would be the greatest? Explain your answer.

Part 3 - Creating a Coaster

1. Choose the "Build Coaster Now" option and begin to design and build your roller coaster.
2. Launch your coaster and be sure to observe the moving energy bar (PE-KE-DE) at the top of the screen.

Complete after 1st launch

3. Did your coaster successfully complete the track? Explain why you think your coaster did, or did not, successfully complete the track.
4. What did you notice about moving energy bar (PE-KE-DE) at the top of the screen while your coaster traveled along the track?

5. If necessary, continue to launch your coaster and make adjustments until it successfully completes the course. Record your best score and be sure to show your teacher.

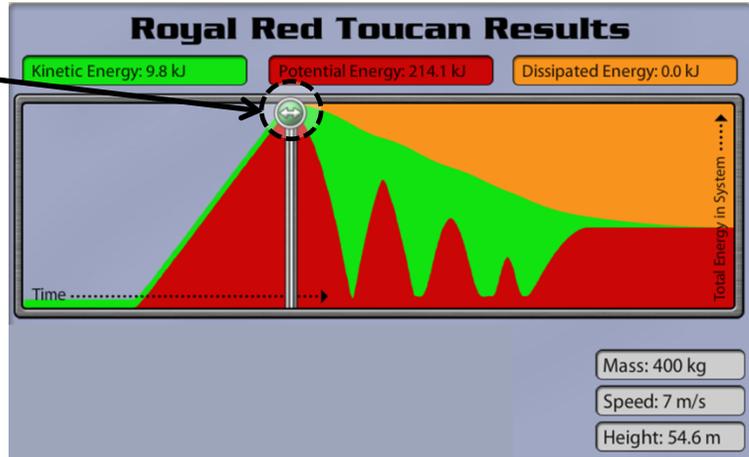
Your Top Score

Part 4 - Coaster Analysis and Reflection

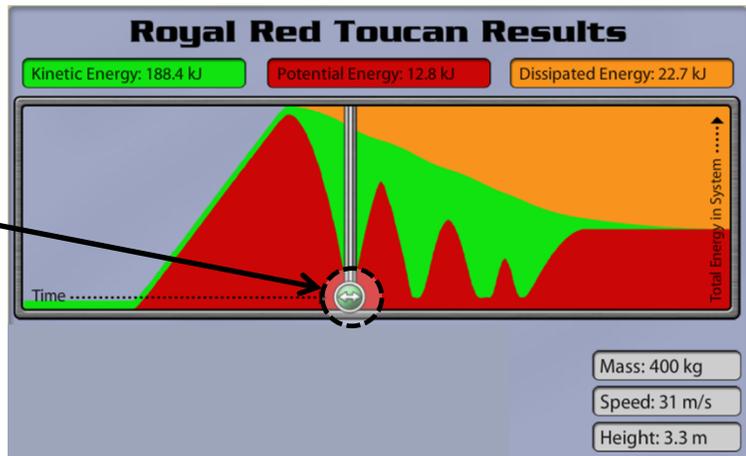
- The "Results" graphs below highlight two specific points traveled by a roller coaster - top of the tallest hill (first point) and bottom of the tallest hill (second point). After successfully completing the roller coaster course, consider the same two points on your "Results" graph and complete the following questions.

The node, or point, can be moved or manipulated by using your computer mouse. You will notice that the information/data changes as it is moved along the graph.

First Point



Second Point



- Write down the correct numbers for the corresponding values for your first point and your second.

Component	First Point	Second Point
PE		
Height		
KE		
Speed		

- b) What do you notice about the relationship between potential energy and height?

 - c) What do you notice about the relationship between kinetic energy and speed?
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2. Explain what your roller coaster is doing at the point where there is no longer any green. How would this graph be different if your roller coaster *crashed*?

 3. Was your potential energy greatest at the beginning, towards the middle, or towards the end of your roller coaster? Explain your reasoning.

 4. Was your kinetic energy greatest at the beginning, towards the middle, or toward the end of your roller coaster? Explain your reasoning.

 5. Was your dissipated, or thermal, energy greatest at the beginning, towards the middle, or towards the end of your roller coaster? Explain your reasoning.

6. The Law of Conservation of Energy states that energy can be neither created nor destroyed. In other words, energy can be changed from one form to another, but all of the different forms of energy add up to the same total amount of energy.

a) Consider your experience with the Coaster Creator and describe how this relates to a coaster successfully completing the course.

b) Choose **any** two points after the first hill and provide the energy values in table below.

Component	First Point	Second Point
PE		
KE		
DE		
Total		

c) How does the information compiled in the table above support the Law of Conservation of Energy?