












Name: _____

Period: _____

Forms of Energy : Highlight all of the energy forms you observe throughout this lab.

	Gravitational		Elastic		Chemical		Nuclear		Magnetic		Electrostatic		Mechanical		Thermal		Electrical		Sound		Electromagnetic
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1. Look at the equation for potential energy below:

$$PE = \boxed{} \times g \times \boxed{}$$

Mass Height

A. As the mass increases, would you expect the potential energy (PE) to increase or decrease? Explain your answer.

B. As the height increases, would you expect the potential energy to increase or decrease? Explain your answer.

C. Look at the three equations below. Notice that the mass and gravity stay the same in each equation, and the only difference is the height.

Circle the equation that will have the greatest potential energy. Use the space below to explain why you made your selection.

$$PE = \boxed{300\text{Kg}} \times g \times \boxed{62.0\text{m}}$$

Mass Height

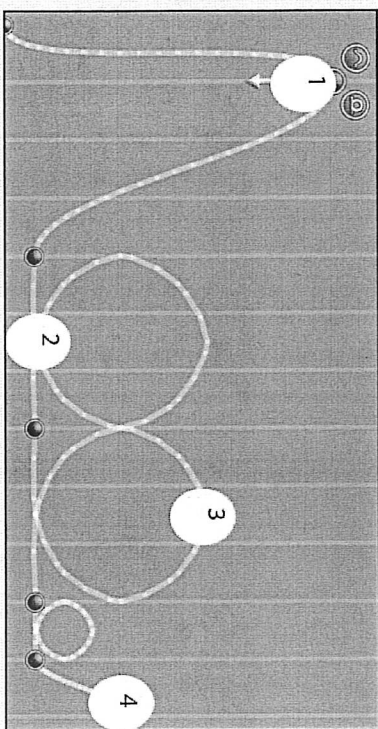
$$PE = \boxed{300\text{Kg}} \times g \times \boxed{16.6\text{m}}$$

Mass Height

$$PE = \boxed{300\text{Kg}} \times g \times \boxed{34.2\text{m}}$$

Mass Height

D. Look at the roller coaster track below. At which point (1, 2, 3, or 4) do you think potential energy would be the greatest? (Hint: Think about how height affects potential energy.) Explain your answer.








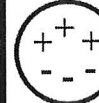




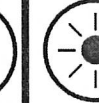
2. Use the space below to define: Friction

3. Use the space below to define: Thermal Energy (see page 9 in your book)

Name: _____

Period: _____

Forms of Energy : Highlight all of the energy forms you observe throughout this lab.

Gravitational 	Elastic 	Chemical 	Nuclear 	Magnetic 	Electrostatic 	Mechanical 	Thermal 	Electrical 	Sound 	Electromagnetic 
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Materials:

For this activity, you will need:

- One regular pencil
- Access and log in to: www.jason.org (Go to Operation: Infinite Potential>>Digital Labs>>Coaster Creator)
- Three colored pencils, markers, or crayons:
 - Red
 - Green
 - Orange

Getting started: Once you have chosen "Build Coaster Now!" in Coaster Creator, you will be asked to design your roller coaster car and add cars:

1. Write the name of your roller coaster here:

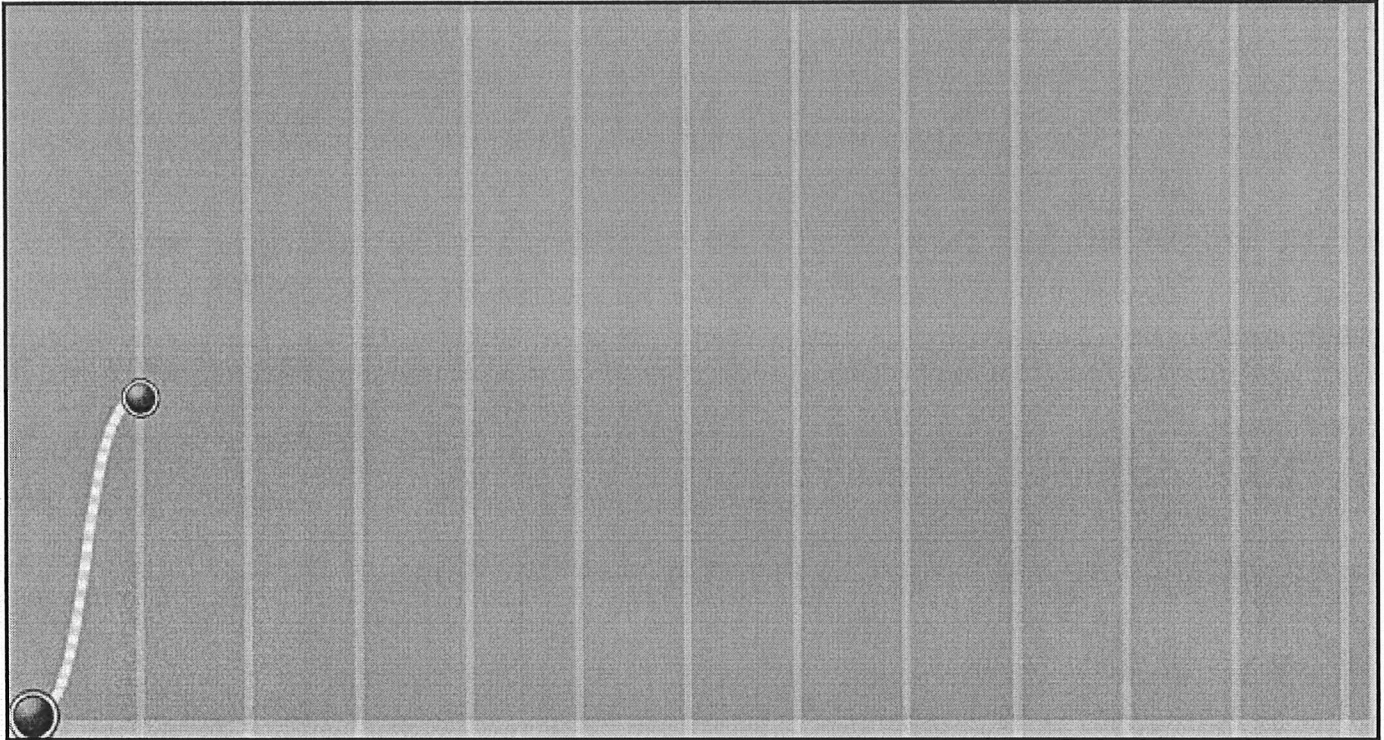
2. How many carts do you have?

3. What is the total mass of your carts? Fill in the appropriate squares below:

PE =		x	g	x		KE =	$\frac{1}{2}$	x		x		²
	Mass				Height				Mass		Velocity	

4. Once you have decided on your total number of cars, it will be time to build your track. With your regular pencil and using the box below, sketch the roller coaster track you have constructed.

Hint: It will take some practice and experimentation to make a successful roller coaster track. Learn from your mistakes and have fun!



A) Using the red colored pencil, circle the part of the track where you expect to find the *maximum potential energy*

B) Using the green colored pencil, circle the part of the track where you would expect to find the *maximum kinetic energy*

C) Using the orange colored pencil, circle the part of the track where you would expect to find the *maximum thermal energy*

5. Before you run your roller coaster, click on the very first node (these are the black dots) in your roller coaster. Look at the equation at the top of your screen, and fill in the numbers you see there:

$PE = \text{[]} \times g \times \text{[]}$ $KE = \frac{1}{2} \text{[]} \times \text{[]}^2$

Mass Height Mass Velocity

6. Run your roller coaster. Keep an eye on the bar that will start to fill up at the top and answer the following questions: (*Hint: You can rerun your coaster as many times as you like. When your coaster has finished running, select the "Back" button to go back to the track building screen. If you don't make any changes, clicking on "Next" will let you rerun the same track.*)

A) What is the dominant color of your bar when you are at the top of the first hill?

B) What type of energy does this represent?

C) What is your car doing when the bar is primarily green?

D) At what point during this ride is it most desirable to see a lot of orange? What does the orange bar represent?

7. When your coaster reaches the end of its run, circle the ends state of your coaster:

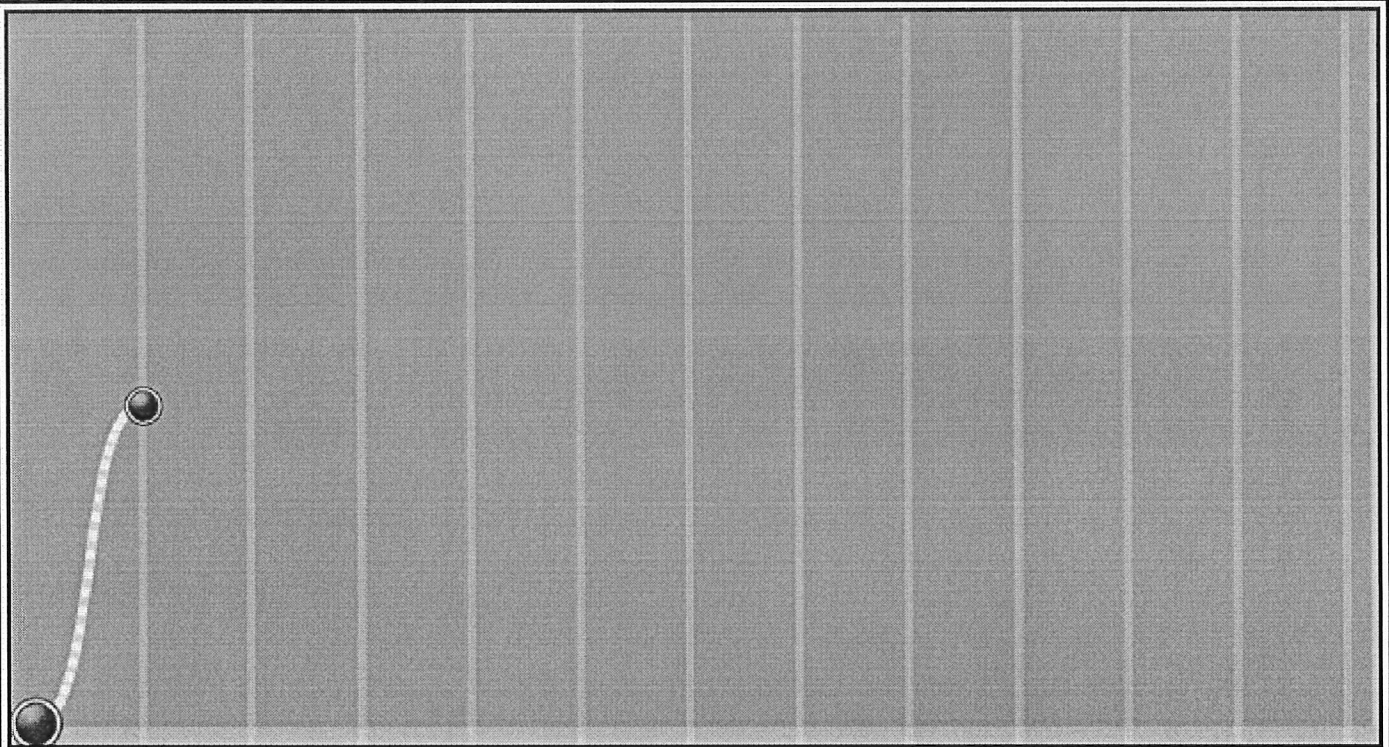
crash

success

stuck

If your coaster was *successful*, do not close your game. Keep the game open. Get the post-lab from your teacher in order to proceed.

If your coaster got *stuck* or *crashed*, go back to the track builder and modify your coaster. Record your modifications on the following page.



Explain why you made the changes you did (how do you think this will increase your opportunity for success?)

Circle the end state of this track. If the track is successful, proceed to the post lab. Otherwise try again. Record your modifications

crash

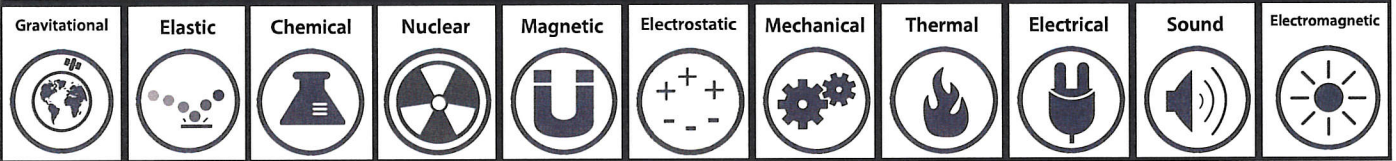
success

stuck

Name: _____

Period: _____

Forms of Energy : Highlight all of the energy forms you observe throughout this lab.



Materials:

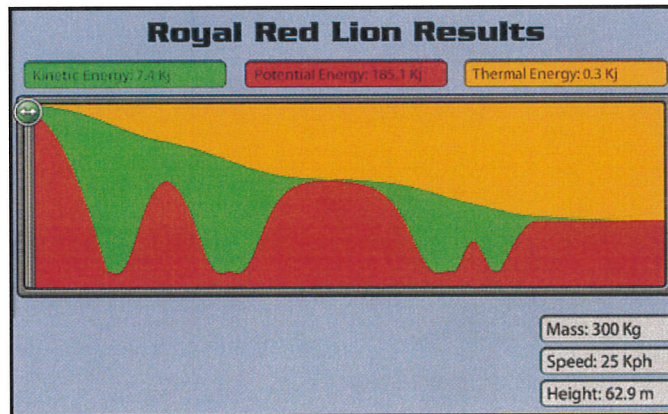
For this activity, you will need:

- One regular pencil
- Completed copy of your Coaster Creator-Prelab
- Access and log in to: www.jason.org (Go to Operation: Infinite Potential>>Digital Labs>>Coaster Creator)
- Three colored pencils, markers, or crayons:
 - Red
 - Green
 - Orange

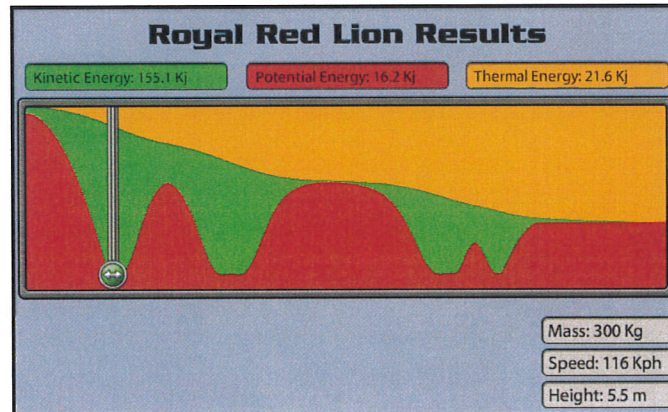
Before answering questions about your own successful roller coaster, respond to the following questions:

1. Compare two different points on the same "Results" graph:

First Point



Second Point



* See Post Lab Handout (separate)

A. Write down the correct numbers for the corresponding values of the *First Point*. Don't forget to label your units.

PE

Height

KE

Speed

B. Write down the correct numbers for the corresponding values of the *Second Point*. Don't forget to label your units.

PE

Height

KE

Speed

C. What do you notice about the relationship between *potential energy* and *height*? As height increases, explain what happens to *potential energy*.

D. What do you notice about the relationship between *kinetic energy* and *height*? As height increases, explain what happens to *kinetic energy*.

E. What do you notice about the relationship between *kinetic energy* and *speed*? As *speed* increases, explain what happens to *kinetic energy*.

F. What do you notice about the relationship between potential energy and speed? As *speed* increases, explain what happens to *potential energy*.

2. Once you have built a successful track, go to your results page and recreate the graph found there in the box below using:

Red to represent *Potential Energy*

Green to represent *Kinetic Energy*

Orange to represent *Thermal Energy*



A. 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*?