**The Energy Skate Park (PhET Simulation)**

This simulation can be found in the t:drive in the physics/Ch 9 folder.

The purpose of this activity is to explore variables that impact conservation of energy and to use conservation of energy to predict the motion of a skater.

1. Select the Potential Energy Reference box in the upper right-hand corner. Note a line appears on the ground representing where PE=0. You can use your mouse to move this line around such as bringing it up to the lowest part of your ramp or we can change our ramp. For this experiment, we will leave the PE=0 reference on the ground. Grab the purple circle at the bottom of your ramp and bring it down to the ground.
2. Select your skater by pressing the “Choose Skater…” button. You can place your skater anywhere in the ramp by clicking and dragging on it.
3. Select the “Show Grid” box in the upper right-hand area of the screen.
4. Drag your skater to approximately the 4.5 m height and release. Select the measuring tape box in the upper right-hand area and measure precisely the highest point reached by your skater on either side. Use this value to calculate the speed your skater would have at the bottom of the ramp. Show your work below:

Heighest point = \_\_\_\_\_\_\_\_\_\_\_\_ Calculated speed = \_\_\_\_\_\_\_\_\_\_\_\_

Work:

1. Click the “Bar Graph” button. Describe the distribution of PE, KE and total energy of your skater as the skater changes position in the ramp.

b) Why is the thermal energy zero for the skater in all parts of the ride?

1. Change your location to Jupiter. Describe how the skater’s motion is different on Jupiter than on Earth. Explain why this occurs.
2. Change your location back to Earth and make sure your skater is moving freely in the ramp. Select the “Track Friction” button. Increase the track friction by moving the slider. Describe how the motion of your skater is different than what you observed in Step 4.

b) Select the “Bar Graph” button again if you closed the graph before. Describe how the PE, KE,   
 thermal and total energy are related.

1. Return the track friction to zero/none and select the “Hide Friction” button.
2. Select the “Edit Skater” button in the lower right area of the screen. Select 2-3 other masses for you skater beyond the one already listed. How does this impact the motion of your skater? Explain why the mass has this effect.
3. Explain how changing the mass impacts the PE, KE, and total energy of the system and their relationship to each other.