Name _____

Energy Instructor's Guide

Use PhET Energy Skate Park simulation,
http://phet.colorado.edu/en/simulation/energy-skate-park

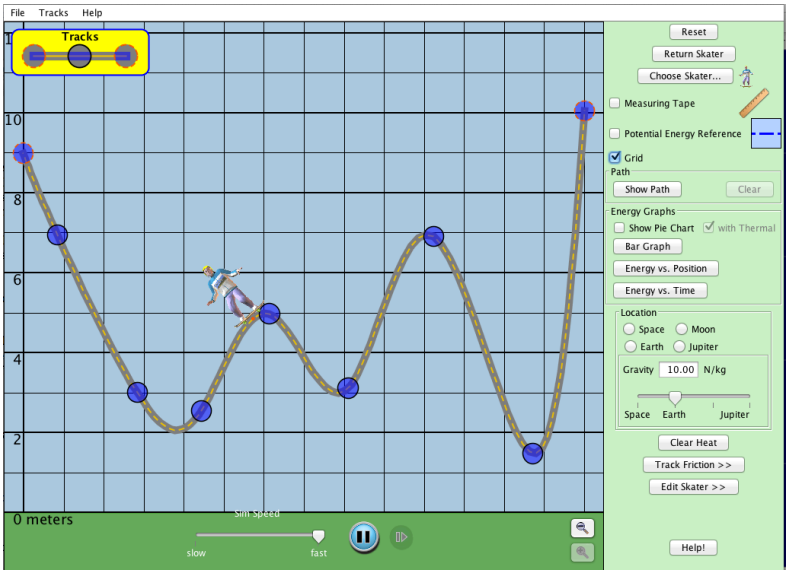
A skater rides the skate track roller coaster shown. The skater is attached to the track and cannot come off. There is no friction between the track and the skater, its an awesome ride! The track is essentially a plot of gravitational potential energy versus position. Let the skater's mass be 100 kg, and let g = 10 m/s^2. Note the vertical scale on the left.

1. Create the track shown, and save it to your computer. Later you can Open the saved track file. Select Grid, Edit the skater, setting mass = 100 kg, set gravity to 10 m/s^2. Set track friction to 0.

   To show plots, select Energy vs. Time

2. If the skater begins in the specified well, what value must his mechanical energy, E, not exceed if he is to be:

   Drag skater to specified height and position, and press the play button. Show Energy vs. Position graphs, if desired. Close graph before next question.



3. If the skater starts on the left most ramp at a height of 6 m, initially at rest, where will his speed be the greatest?

Open Energy vs. Position graph to see answer.

4. The skater starts on the left most ramp at a height of 8 m, initially at rest., on which hill top will the magnitude of his centripetal acceleration be the greatest? (Assume that the radius of curvature of the hills are the same.)

   In this case, where are the skater's equilibrium points (where the slope of **F** is 0)? Which are stable? Which are unstable?

   Where are the skater's turning points? Note: skater's body actually turns around.