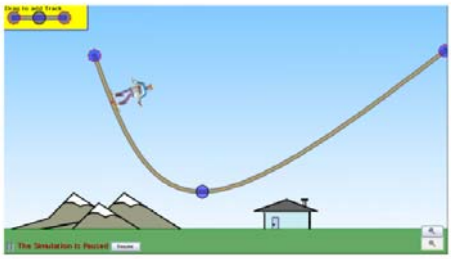
Energy Skate Park Simulation

Open the Energy Skate Park sim at http://www.colorado.edu/physics/phet.
Play with the sim for a few minutes: adding track, resetting the skater when he falls off the track, resetting the track, etc. Then answer the questions below.

Questions:

1. Reset the track to its **original position** by hitting the top "Reset" button.
How does the height reached by the skater compare to his initial starting height? **Explain**.
(Use the "pause" button and the measuring tape to help you determine this!)

2. Drag one end of the track so that it has one steep slope and one gradual slope. How does this affect the height reached by the skater? **Explain**.



3. Click on the "Potential Energy Reference" check box. Move the line to the bottom or the top of the track and note the movement of the skater.

a. Does the position of the reference line affect the motion of the skater?

b. Briefly explain what the potential energy reference line is and its purpose.

4. Move the Potential Energy reference line to the bottom of the track. Click the bar graph button. As the skater moves back and forth what can you say about his amount of:
    a. Potential energy

    b. Kinetic Energy

    c. Total Energy

5. Reset the track and increase the amount of friction. What type of energy does friction generate?

6. How does the addition of friction affect:
    a) Speed of the skater at the bottom of the track. Explain.

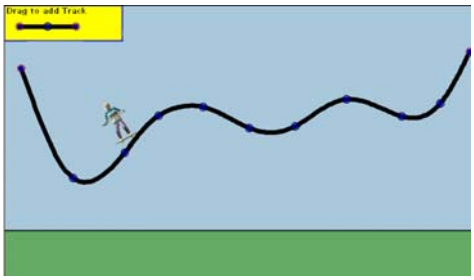
    b) The height reached by the skater on the opposite side of the track. Explain.

    c) The total energy of the skater.

7. Reset the track and observe the skater on the Moon and on Jupiter.
    a) How does the skater's speed on the Moon compare to Earth. Explain why this occurs.

    b) How does the skater's speed on Jupiter compare to Earth. Explain why this occurs.

8. Build a track and let the skater follow it. If the skater hits the ground hard what type of energy is generated?



9. Build a good track (one where the skater doesn't biff) and sketch it on your paper. Then turn on the energy Pie Chart and Bar Graph. (You may need to move things around a little to see everything.)
    a) At 4 different points along your track sketch the bar **or** pie graphs of the skater's energy on your drawing.

    b) Reset the skater and add a little friction. Sketch new bar **or** pie graphs at the same 4 points on your drawing.

Conclusion:

What can you conclude about the total amount of energy in a system that has:

a) No friction?

b) Friction?