

Name: _____

Period: _____ Date: _____

ENERGY SKATE PARK LAB**Energy Skate Park**

1. Go to: <http://phet.colorado.edu/en/simulation/energy-skate-park>
2. Select “Run Now”.
3. Click on “Choose Skater” and, well, choose a skater.
4. Click on “Edit Skater” at the bottom and set the mass to 65kg.
5. Check the box for “Grid”.
6. Drag the bottom of the track (middle dot) all the way down to ground level. Use the grid to set the top of your track at 7m. Start the skater at the very top of the track.
7. Click on the box for “Potential Energy Reference” and move the line to the bottom of the track.
8. Click on the box for “Show Pie Chart”.
9. Press Play. What does the pie chart represent, and how does it change? _____

10. Click on the Energy vs. Position Button.
11. Sketch the energy vs. position graph for the skateboarder as he moves from the top left to the top right. Label KE, PE, and Total Energy. Alternatively, you can hit “Fn” and “Prnt Scrn” buttons together on your computer to copy the image to your clipboard, paste the ‘screen shot’ into your document, then use the “crop” function to trim out the unnecessary parts of the picture leaving only the “Energy vs. Position” graph.

12. Calculate the potential energy of the skater at his maximum height (use the measuring tape to measure the highest point). _____

13. Using the answer from number 12, calculate the speed of the skater at the bottom of the ramp. ____

14. Calculate the speed of the skater when he is 1 m from the bottom of the ramp. _____

15. What do you think will happen to the skater when you add friction? _____

16. Add friction. Describe the changes in the pie chart, and explain what happens to the skater: _____

17. Were you right in number 15? _____
18. Click "Pause" and then "Return Skater". Set the Sim Speed to "slow". Click "Add Friction" and adjust the friction to "Lots". Press "Play", but pause the skater at the bottom of the first run down the ramp. Use the Energy vs. Position chart to find the amount of energy lost due to friction.

19. Keep the skater paused, set the friction to "None" and select Location "Moon". The gravity on the moon is about one sixth that of earth. How do you think this will affect the potential and kinetic energies of the skater?

20. Press "Play". What actually happened? Why? _____

21. Pause the sim and return the skater to the top of the ramp. Calculate the Potential Energy at the top of the ramp, and use this to find the velocity of the skater at the bottom of the ramp. Remember to use the new value for gravity on the moon.
- a. Potential Energy: _____
 - b. Velocity: _____

c. Calculate the percent change in velocity from earth (#13) to the moon: _____

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22. Press “Return Skater”, Set the Sim Speed back to “fast”, and press “Play”.
23. Sketch the energy vs. position graph and label KE, PE, and Total Energy or paste a screen shot of the “Energy vs. Position” graph for the moon. Zoom in to get a better graph.

24. How is the moon graph different from the earth graph? _____

25. How will the energies change on Jupiter? _____

26. Verify by switching to Jupiter and checking the graph. Make sure you start the skater at the top of the ramp. Adjust the axes of the “Energy vs Position” graph (zoom) to capture the entire plot and either sketch graph or paste a screen shot of it below.

