Intro to Energy Model PhET Lab   First/Last Name _____ Per. __

In this lab, you will analyze energy transfer between gravitational potential energy, kinetic energy, and dissipated energy (thermal energy in this sim) as a skate boarder rides inside a half-pipe.

Pre-Lab
Define the following:
1. Gravitational Potential Energy (E_g)

2. Kinetic Energy (E_k)

3. Dissipated Energy (E_{diss})


Part A - No Friction
1. **Open the Energy Skate Park** Basics PhET simulation as instructed in class.
2. **Check the Bar Graph option** on the right of the simulation.
3. Click on the skateboarder, place him on the track at the top of the half-pipe, and let him go. Click the slow-motion option at the bottom to make things easier to follow.
4. As the skateboarder rides back and forth…
    a. Describe how the potential energy changes.

    b. Describe how the kinetic energy changes.

    c. Describe how the total energy changes.

5. **Now click the Pie Chart option** on the right of the simulation and observe the pie chart as the skateboarder rides back and forth.
    a. What does the total size of the pie represent?

6. **Now check the Grid option** on the right of the simulation. As the height of the skateboarder changes…
    a. Describe how the potential energy changes.

    b. Describe how the kinetic energy changes.

7. **Now check the Speed option** on the right of the simulation and observe the speedometer. As the speed changes…
    a. Describe how the potential energy changes.

    b. Describe how the kinetic energy changes.

Part B - Friction

1. **Now click the Friction** tab at the top of the simulation.
2. **Check the bar graph** option and pie chart option on the right of the simulation.
3. **Turn friction on** and set the slider bar for the friction amount at roughly 25%.
4. **Click the slow-motion option** at the bottom to make things easier to follow.
5. Place the skateboarder on the track at the top of the half-pipe and let him go.
6. As the skateboarder rides back and forth...
   a. Describe how the potential energy changes.

   b. Describe how the kinetic energy changes.

   c. Describe how the thermal energy (dissipated energy) changes.

   d. Describe how the total energy changes.

7. After the skateboarder comes to a stop, turn on the Grid and Speed options on the right of the simulation.
8. Place the skateboarder on the track at the top of the half-pipe and let him go again.
9. As the skateboarder rides back and forth...
   a. Describe how the maximum velocity changes.

   b. Describe how the maximum height changes.

Part C - Track Playground Ranking Tasks (friction turned off)

Do the ranking tasks below assuming no friction. Use the Track Playground tab for help.
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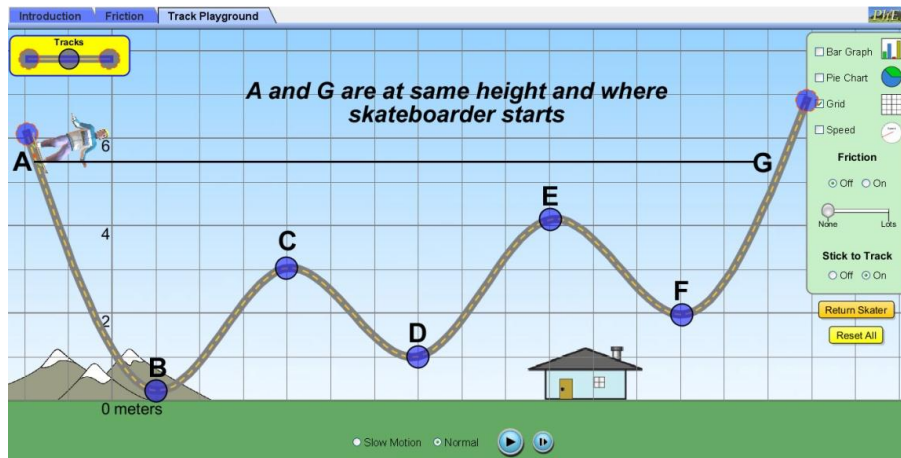
1. Rank the skateboarder positions A – G above in order of greatest potential energy to least potential energy. Ties are possible.

   ___   ___   ___   ___   ___   ___   ___

2. Rank the skateboarder positions A – G above in order of greatest kinetic energy to least kinetic energy. Ties are possible.

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