1.04 Law of Conservation of Energy Assignment

Title of Lab	
Student Name	
Your Science 2 Teacher	
Date	

Objective

The purpose of this assignment is to explore the law of conservation of energy through the research and design of a virtual skate park model. In part one, you will explore the energy skate park simulation. In part two, you will design your own skate park ramp.

Part One: Explore the Energy Skate Park

1. Select the **Energy Skate Park Lab** in the lesson.
2. Select the **Intro** simulation. Once the simulation loads, select all the following from the options located on the right-hand side of your screen:
   - Pie Chart
   - Bar Graph
   - Grid
   - Leave the mass on the center setting
   - U-shaped ramp icon
3. Drag your skater onto the highest part of the U-shaped ramp and select the start arrow to begin. You may use the pause button to stop your skater and the slow-motion button to slow the skater down.
4. Record your observations in **Data Table One**.

Research

Record your data in Data Table One. Use the terms: increases, decreases, or stays the same. Be sure to complete the entire data chart.

Data Table One: Skate Park Research

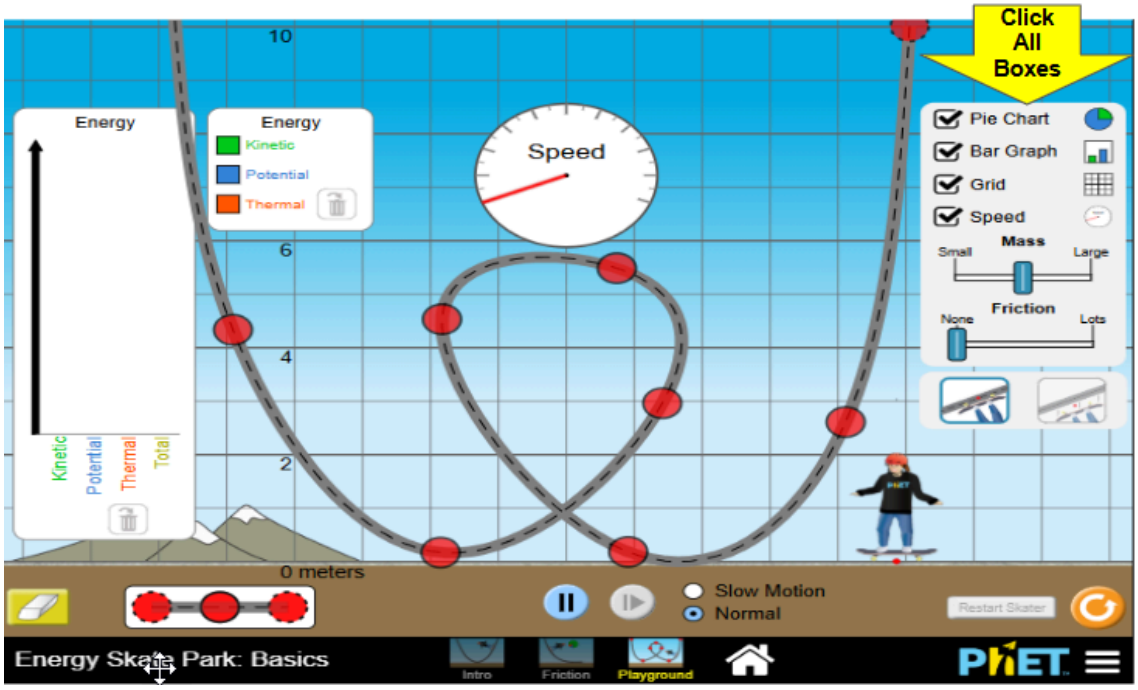
Position of the Skater on the U-shaped Ramp		**Amount of Potential Energy**	**Amount of Kinetic Energy**	**Speed**	**Total Energy**
1	**Moving DOWN the ramp from 6 meters to 2 meters**	CHOOSE 1	CHOOSE 1	CHOOSE 1	CHOOSE 1

4	**Moving <u>UP</u> the ramp from 2 meters to 6 meters**	CHOOSE 1	CHOOSE 1	CHOOSE 1	CHOOSE 1

Part Two: Design and Test a Skate Park Ramp

1. Select the **Energy Skate Park Lab** in the lesson.
2. Select the **Playground** simulation. Once the simulation loads, select all of the following options located on the right-hand side of your screen:
   - Pie Chart
   - Bar Graph
   - Grid
   - Leave mass on the center setting
   - Set friction to none
3. Design a skate park ramp. It must meet TWO requirements:
   a. It has one loop.
   b. It rests on the ground.

   TIP: A simple ramp will be easier to test later. Example ramp:



4. To design your ramp, use the ramp pieces located at the bottom center of the simulation. Drag and drop sections of the ramp onto the screen. Adjust the sections by selecting and dragging the red dots to extend, move, and/or connect each individual section.
5. Once you have completed your ramp, complete the **Design** section.

Design

Take a screenshot of your design or write a description of your design.

Place your description or image of design below.

Hypothesis

Create your hypothesis using the sentence starter.

Sentence Starter	Place your hypothesis below.
If the skater begins at a height of AT LEAST _____ meters, then the skater will have enough total energy to complete the skate park ramp from start to finish successfully.	**If my skater begins at a height ofAT LEAST** Choose 1 **meters then the skater will have enough total energy to complete the skate park ramp from start to finish successfully.**

Testing

It's time to test your design! During your trials, you will determine the lowest starting height possible to successfully complete the ramp from start to finish. Record the results for three trials ***Data Table Two.***

- *For trial one, test the height you selected for your hypothesis.*
- *For trial two, test a height HIGHER than your hypothesis.*
- *For trial three, test a height LOWER than your hypothesis.*

Data Table Two: Skate Park Testing

Test	Starting Height of Skater (meters)	Height where skater has Highest Potential Energy during run (meters)	Height where skater has Highest Kinetic Energy during run (meters)	Outcome: Successful or Unsuccessful Run?
1	Choose 1	Choose 1	Choose 1	Choose 1
2	Choose 1	Choose 1	Choose 1	Choose 1

3	Choose 1	Choose 1	Choose 1	Choose 1

Data Analysis

Test (independent variable): The starting height of the skater
Outcome (dependent variable): Successful or unsuccessful run

Use your data to answer the questions.

Questions	Place your answers below.
1. How do you know the starting height of the skater is the test variable?	
2. The Outcome Variable in this exercise is 'Whether or Not the Run is Successful'; how do you know that is the Outcome Variable?	
3. What is the lowest starting height of the skater that resulted in a successful run? Use data from **Data Table Two** to support your answer.	

Conclusion

Use the lesson and your data to answer the questions. Please write in complete sentences.

Questions	Place your answers below.
1. Do your results support or fail to support your hypothesis? Explain.	
2. Does your ramp design support the law of conservation of energy? Explain.	