Name:\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

**Introduction:** *For this lab, you will be conducting a series of experiments to determine the effect of 5 different variables on the Total Energy of a swinging pendulum system. To collect your data, use the following Phet Simulation (* [*https://tinyurl.com/pendulum-sim*](https://tinyurl.com/pendulum-sim)*) .* ***Be sure to select the “Energy” section of the Phet Simulation.***

**Variable #1) Angle To Which the Pendulum is Raised**

|  |
| --- |
| **Part 1)** Predict how changing the angle to which the pendulum is raised will affect the Total Energy of the pendulum system: |
| **Part 2)** Write a brief explanation of a procedure you can follow that will let you take data that you can use to determine if changing the angle to which the pendulum is raised affects the total energy of the system. **Your procedure should include performing at least three different trials.** |
| **Part 3)** Perform your procedure above and record your findings below. You can describe qualitative data, or a quick sketch. |
| **Part 4)**  Using the data collected above and what you know about Kinetic and Potential Energy, explain **how AND why** the angle to which the pendulum is raised affects the total energy of the pendulum system. |

**Variable #2) Mass of the Pendulum Bob**

|  |
| --- |
| **Part 1)** Predict how changing the mass of the pendulum bob will affect the Total Energy of the pendulum system: |
| **Part 2)** Write a brief explanation of a procedure you can follow that will let you take data that you can use to determine if changing the mass of the pendulum bob affects the total energy of the system. **Your procedure should include performing at least three different trials.** |
| **Part 3)** Perform your procedure above and record your findings below. You can describe qualitative data or do a quick sketch. |
| **Part 4)**  Using the data collected above and what you know about Kinetic and Potential Energy, explain **how AND why** the mass of the pendulum bob affects the total energy of the pendulum system. |

**Variable #3) Strength of the planet’s Gravity**

|  |
| --- |
| **Part 1)** Predict how changing the strength of the planet’s gravity will affect the Total Energy of the pendulum system: |
| **Part 2)** Write a procedure that will let you take data to determine if changing the planet’s gravity affects the total energy of the system. **Your procedure should include performing at least three different trials.** |
| **Part 3)** Perform your procedure above and record your findings below. You can describe qualitative data, or a quick sketch. |
| **Part 4)**  Using the data collected above and what you know about Kinetic and Potential Energy, explain **how AND why** the strength of the planet’s gravity affects the total energy of the pendulum system. |

**Variable #4) Friction at the Pivot Point**

|  |
| --- |
| **Part 1)** Predict how changing the friction at the pivot point will affect the Total Energy of the pendulum system: |
| **Part 2)** Write a brief explanation of a procedure you can follow that will let you take data that you can use to determine if changing the friction at the pivot point affects the total energy of the system. **Your procedure should include performing at least three different trials.** |
| **Part 3)** Perform your procedure above and record your findings below. You can describe qualitative data or do a quick sketch. |
| **Part 4)**  Using the data collected above and what you know about Kinetic and Potential Energy, explain how **how AND why**  the friction at the pivot point affects the total energy of the pendulum system. |

**Variable #5) Length of the pendulum string**

|  |
| --- |
| **Part 1)** Predict how changing the length of the pendulum string will affect the Total Energy of the pendulum system: |
| **Part 2)** Write a brief explanation of a procedure you can follow that will let you take data that you can use to determine if changing the length of the pendulum string affects the total energy of the system. **Your procedure should include performing at least three different trials.** |
| **Part 3)** Perform your procedure above and record your findings below. You can describe qualitative data or do a quick sketch. |
| **Part 4)**  Using the data collected above and what you know about Kinetic and Potential Energy, explain **how AND why** the length of the pendulum string affects the total energy of the pendulum system. |