**PhET simulation: Gravity Force Lab—Due Friday**

**Instructions:** Type ALL answers directly into this document. Insert graphs as an image where instructed below (right click on LoggerPro’s graph (only the graph—not the data table!), copy, then paste into the appropriate location). Note: for this lab we are NOT analyzing uncertainty. No max/min slopes, no error bars, and no error propagation required. Data points, as well as all graph labels, must be clearly visible AND readable. Remember titles on your graphs. Fill in, at minimum, the 15 lines given in the table.

**Name:\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Date: \_\_\_\_\_\_\_\_Period: \_\_\_\_\_**

**Part 1: Distance and Force**

**Controlled Variables:** *List values with units*

**Mass 1 =** \_\_\_\_\_\_\_\_\_\_\_\_\_\_ (kept constant)

**Mass 2** = \_\_\_\_\_\_\_\_\_\_\_\_\_\_ (kept constant)

***Table 1: Separation distance and resulting forces***

|  |  |
| --- | --- |
| Distance Between Masses / m | Force acting on Masses / N |
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1. Create a graph to show the relationship between the separation distance and the resulting force. Title this graph **“Graph 1: Distance and its effect on Force”**.

***Insert the graph as an image here***

This is not a linear relationship. What kind of curve fit/relationship does the data fit?

Linearize your graph. Explain, below, what you did to linearize your data, and show 1 sample calculation for that process:

Make sure you insert an appropriate title, and have the appropriate axis labels on your new graph.

**Insert your graph as an image:**

* 1. What is the equation for your linearized graph? Replace the “x” and “y” with the proper symbols representing what you put on each axis.
  2. What is the slope, including units?

*{part 2 is below…scroll to next page!}*

**Part 2: Mass and Force**

**Chosen controlled variables:   
Constant Mass of Object 1** = \_\_\_\_\_\_\_\_\_\_\_\_\_ **Constant Separation distance** = \_\_\_\_\_\_\_\_\_\_\_\_

***Table 2: Mass of Object 2 and resulting forces***

|  |  |
| --- | --- |
| Mass of Object 2 / kg | Force acting on Masses / N |
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1. Create a graph to show the relationship between the changing mass and the resulting force. Title this graph **“Graph 3: Mass and its effect on Force”**.

***Insert graph as an image here***

* 1. What is the equation for your graph? Replace the “x” and “y” with the proper symbols representing what you put on each axis.
  2. What is your slope, including units?

1. Data-based prediction: How might the relationships be connected? Are there any similarities among your results?