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| **Name** |  |
| **Your Partner’s Name** |  |

**PreAP Physics – Gravity Force Lab**

Today, you will use the Gravity Force Lab PhET Simulation to investigate what the gravitational force between two objects depends on and experimentally determine the Universal Gravitational constant, G.

**PreLab with TED Talk Video**

1) Based on the video, and your own experiences, how would you define gravity?

2) Write the formula for the force of gravity (Law of Universal Gravitation). Label each variable and constant and include its units.

**Part 1 – Qualitative Observations**

**\*Open the Gravity Force Lab PhET Simulation\***

1) What can you change about the simulation?

2) Examine the formula for the force of gravity above. What three things can you change in the formula that you can also change in the simulation?

3) Change each variable and record what happens to the gravitational force as you change it. Be specific and use scientific language (i.e. use terms like increase, decrease, remains constant).

**Part 2 – Quantitative Measurements**

In this section of the lab, you will develop your own method for determining the gravitational constant G in the formula for gravity using the simulation and Excel. You will develop your own procedure, collect data, graph your data, find a best fit line and interpret its slope to find G.

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| Thinking Questions |
| 1. What data will you need to collect to determine the value for “G”? |
| 1. How will you put this information into a data table that Excel can help you graph and find the best fit line? |
| 1. Write your procedure here \*Remember a good procedure is a series of steps that someone else could execute\* |

Conduct your investigation recording your data in Excel. Answer the questions that follow after you have completed your analysis.

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| Conclusion Questions |
| 1. What is your value for G based on your data? \*Include proper units\* |
| 1. How close is your value for G to the accepted value? |
| 1. What do you think contributes to the value for G’s not being identical? |
| 1. What the advantages and disadvantages of using a computer simulation for this lab? |
| 1. What equipment or materials would you need to conduct a hands-on investigation to determine the value for G? |
| 1. How would you define gravity based on your investigations with the computer simulation? |