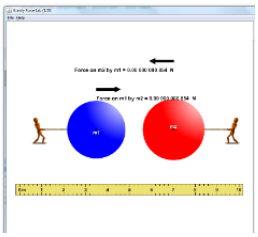
Gravity Force Lab



Name:_____ Period: _____

PHET GRAVITY LAB

Go to http://phet.colorado.edu/en/simulation/gravity-force-lab

Qualitative Observations

1. Move the masses closer. When the masses move closer together the force between them becomes (Greater/Less/the same)

2. Move the masses further apart. When the masses move away the force between them becomes (Greater/Less/the same)

3. Double Mass 1. When mass 1 is doubled the force between them becomes (Greater/Less/the same)

4. Cut Mass 2 in half. When the mass is reduced the force between them becomes (Greater/Less/the same)

5. In any of the situations did the forces ever differ from one another in magnitude?

6. In any of the situations did the forces ever not point in opposing directions?

7. What physics LAW explains questions 5 and 6 (either give name or definition)

Quantitative Analysis: It is now time to build a model. First, let us examine the relationship between mass and force.

8. Separate Mass 1 and Mass 2 so that their centers of mass (*black dots*) are 6 meters apart.

9. Set Mass 2 to 30.0 kg.

10. Start Mass 1 at 1.0 kg. Collect 8 data points with the gravitational force being your dependent variable and your Mass 1 being independent. Record your data in Table 1.1. *Hint: Write all force values to the same scientific notation power (i.e. –x 10^{-10})*

11. Redo the experiment but set Mass 1 to 30.0 kg and collect data on Mass 2's relationship to force. Record your data in a table labeled Table 1.2.

Table 1.1

Mass 1 (kg)	Mass 2 (kg)	Force (N)
1	30	
5	30	
8	30	
10	30	
18	30	
20	30	
25	30	
30	30	

Table 1.2

Mass 1 (kg)	Mass 2 (kg)	Force (N)
30	1	
30	5	
30	8	
30	10	
30	18	
30	20	
30	25	
30	30	

12. Does it matter which mass increases?

13. What type of relationship is there between Mass and force?

Now, let us examine the relationship between distance and force.

14. Set both masses to 5 kg.

15. Collect 8 data points with the gravitational force being your dependent variable and the distance between the masses being your independent variable. *Note: Take note you can move the ruler and the masses to maximize your range.* . Record your data in a table 2.1 below.

Table2.1 (Masses held constant : Mass1 = 5kg, Mass2 = 5 kg)

Distance (meters)	Force (N)
10.0	
8.0	
6.6	
5.8	
4.6	
3.4	
2.0	
1.5	

16. What type of relationship do you think exists between distance and the force of gravity?