Gravity Force Lab

In this experiment, you will use a simulation to measure the gravitation force between two masses. You’ll determine how the strength of the force of gravity depends on the two masses and the distance between them.

To run the simulation, go to phet.colorado.edu and find the Gravity Force Lab. Click on Run Now.

Part 1. Qualitative Observations

1. Use the slider on the right-hand side of the screen to increase the mass of m1. Does the gravitational force between the two masses *increase*, *decrease*, or *remain the same*?

2. Decrease the mass of m1. Does the gravitational force *increase*, *decrease*, or *remain the same*?

3. Use the second slider to increase the mass of m2. Does the gravitational force *increase*, *decrease*, or *remain the same*?

4. Decrease the mass of m­2. Does the gravitational force *increase*, *decrease*, or *remain the same*?

5. Click on either one of the two masses and drag it so they are closer together. Does the gravitational force *increase*, *decrease*, or *remain the same*?

6. Drag either mass so they are farther apart. Does the gravitational force *increase*, *decrease*, or *remain the same*?

Part 2. Quantitative Measurements

Changing Mass 1

1. Click “Reset All” to get everything back to the original values.

2. In this part, you will be changing m1, but keeping m2 and the distance between them constant. On your page, record the mass of m2. Use the on-screen ruler to measure the distance between the centers of m1 and m2, and record it on your page.

3. Make a data table to record the mass of m1 (in kg) and force (in Newtons).

4. For at least 9 more different data points, change the mass of m1, and then record the mass and gravitational force in your data table.

5. Sketch a graph next to the table to illustrate the change

Conclusion:

Changing Mass 2

1. Click “Reset All” to get everything back to the original values.

2. In this part, you will be changing m2, but keeping m1 and the distance between them constant. On your page, record the mass of m1. Use the on-screen ruler to measure the distance between the centers of m1 and m2, and record it on your page.

3. Make a data table to record the mass of m2 (in kg) and force (in newtons).

4. For at least 10 different data points, change the mass of m2, and then record the mass and gravitational force in your data table above.

5. Sketch a graph below your table to illustrate the change.

Conclusion:

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| Changing Mass 1 | | | |  | Changing Mass 2 | | | |
| Mass 1 | Mass 2 | Distance | Gravity |  | Mass 1 | Mass 2 | Distance | Gravity |
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Changing Distance

1. Click “Reset All” to get everything back to the original values.
2. In this part, you will be keeping the masses of m1 and m2 constant but changing the distance between them. On your page, record the masses of m1 and m2.
3. Make a data table to record the distance between the centers of the masses (in meters) and force (in Newtons). Leave room for a third column, which you’ll fill in later.
4. Move m1 to the left side of the screen. Place the on-screen ruler so that the zero mark lines up with the center of m1.
5. For at least 10 different data points, move m2 to a different location, and then record the distance between the masses’ centers, along with gravitational force, in your data table.
6. Sketch a graph beside your table to illustrate the change.

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| Changing Distance | | | |
| Mass one | Mass two | Distance | Gravity |
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Conclusion: