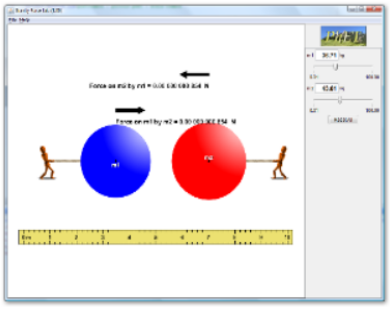
Name: _____ Period: _____

Gravitationally Attracted

Direction: You have already explored the variables that affect the amount of gravitational force acting between two objects. In this activity, you will quantitatively investigate how these variables affect the gravitational force.



Simulation Activity Part 1

Direction: Complete Data Table 1 below using the Gravity Force Lab simulation. For the position, make sure that the black dot in the center of each sphere is aligned with the indicated position. Record your answer in scientific notation with three significant digits.

Data Table 1

Mass of m1	Position of m1	Mass of m2	Position of m2	Force on m2 by m1	Force on m1 by m2
75 kg	3 m	65 kg	8 m	1.26×10^{-8} N to 1.36×10^{-8} N	1.26×10^{-8} N to 1.36×10^{-8} N
100 kg	3 m	95 kg	8 m	2.46×10^{-8} N to 2.56×10^{-8} N	2.46×10^{-8} N to 2.56×10^{-8} N
50 kg	1 m	75 kg	8 m	5.03×10^{-9} N to 5.17×10^{-9} N	5.03×10^{-9} N to 5.17×10^{-9} N
50 kg	3 m	75 kg	7 m	1.49×10^{-8} N to 1.59×10^{-8} N	1.49×10^{-8} N to 1.59×10^{-8} N
60 kg	1 m	25 kg	6 m	3.89×10^{-9} N to 4.03×10^{-9} N	3.89×10^{-9} N to 4.03×10^{-9} N

Simulation Activity Part 2

Now, it is your turn to control the variables in the Gravity Force Lab simulation. Complete Data Table 2 by using different masses and distances between the two spheres. Do not use the same information from Data Table 1. For the force, record your answer in scientific notation with three significant digits.

Name: _____ Period: _____

Data Table 2

Mass of m1	Position of m1	Mass of m2	Position of m2	Force on m2 by m1	Force on m1 by m2

Students will choose their own data for the masses and positions of m1 and m2. The force on m2 by m1 and the force on m1 by m2 should be equal.

Questions

Answer the following questions in a complete sentence.

1. What happened to the gravitational force when you increased the mass of the two spheres?
   When the masses of the two spheres were increased, the gravitational force increased.
2. What happened when you increased the distance between the two spheres?
   When the distance between the two spheres increased, the gravitational force decreased.
3. What can you infer from the data you have collected?
   I can infer that the gravitational force between two objects is directly proportional to their masses but inversely proportional to the distance between them.
4. Explain the gravitation force between you and Earth.
   The gravitational force exerted by Earth on my body is equal to the gravitational force exerted by my body on Earth. However, because of the big difference between my mass and Earth's mass, it seems like I am not exerting as much gravitational force toward the Earth.