

Newton's Discovery About Gravity Activity

Gravitational Attraction

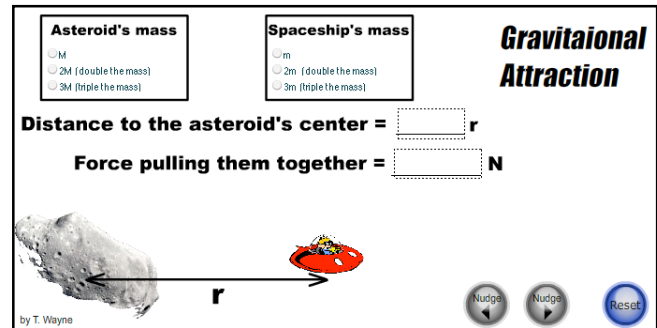
Go to <http://www.mrwaynesclass.com/gravity>

Follow the capitalization or else you will get a "404: Page does not exist."

A page with a simulation looking the one below should open up.

The spaceship can be dragged left and right with the mouse. The, "Nudge," buttons can be used to easily move the spaceship small distances.

Your task is to work with a partner to figure out what affects the pull of gravity. You are to create an experiment to PREDICT how the pull of gravity will be affected by multiplying the distance by some number, "X," and how the pull of gravity will be affected by changing the mass by multiplying it by a number, "N." From these rules that you create you should be able to correctly answer the following questions.



Write your answers on a separate sheet of paper.

1. If the initial force at some distance, r , is 1.00×10^2 N, then what is the force of attraction at a distance of exactly $3r$?
2. If the initial force at some distance, r , is 1.00×10^2 N, then what is the force of attraction at a distance of exactly $4r$?
3. If the initial force at some distance, r , is 1.00×10^2 N, then predict what the force of attraction at a distance of exactly $5r$ will be.
4. If the initial force at some distance, r , is 1.00×10^2 N, then what is the force of attraction at a distance of exactly $\frac{1}{2} r$?
5. If the initial force at some distance, r , is 1.00×10^2 N, then what is the force of attraction at a distance of exactly $\frac{1}{3} r$?
6. If the initial force at some distance, r , is 1.00×10^2 N, then what is the force of attraction at a distance of exactly $\frac{1}{4} r$?
7. If the initial force at some distance, r , is 1.00×10^2 N, then what is the force of attraction at a distance of exactly $\frac{1}{10} r$?
8. Mathematically, make up a law that describes how the force of attraction, F , change as the space ship is moved closer to asteroid, "Ida?" Call this distance " r ."
9. If the initial force at some distance, r , is 1.00×10^2 N, then what is the force of attraction when the mass of asteroid, "Ida," is halved?
10. If the initial force at some distance, r , is 1.00×10^2 N, then what is the force of attraction when the mass of asteroid, "Ida," is tripled and the mass of the spaceship is doubled?
11. Mathematically, make up a law that describes how the force of attraction, F , changes as the space ship's and the asteroid's masses are changed. Call the masses, m_1 , m_2 .
12. If the initial force at some distance, r , is 1.00×10^2 N, then what is the force of attraction if the mass of asteroid, "Ida," changes by a factor of 6, the spaceship's mass is tripled and the spaceship is moved away from asteroid, "Ida," to a distance of the spaceship is increased to $3r$?
13. By what factor has the spaceship's distance, " r ," changed by if the masses are unchanged from the initial condition and the force of attraction has changed from $3,60 \times 10^2$ N to 4.00×10^2 N?
14. Mathematically, make up a law that describes how the force of attraction, F , changes as the space ship's mass, the asteroid's mass, and distance between are changed. Call the masses, m_1 , m_2 , and the distance r .
15. How does the term, "inverse square," apply to your law in the previous question?