



Vocabulary

Vocabulary: Forces & Motion 2

Isaac Newton:

Sir Isaac Newton was one of the greatest scientists and mathematicians that ever lived. Newton had new ideas about motion, which he called his three laws of motion. He also had ideas about gravity, the diffraction of light, and forces. Newton's ideas were so good that Queen Anne knighted him in 1705. His accomplishments laid the foundations for modern science and revolutionized the world.

- He was born in England on December 25, 1643—the same year that Galileo died. He died in 1727.

Newton's Laws of Motion:

Newton's First Law of Motion:

An object at rest tends to stay at rest unless acted upon by an unbalancing force. An object in motion tends to stay in motion with the same speed in the same direction, unless acted upon by an unbalancing force.

Newton's Second Law of Motion:

Acceleration is produced when a force acts on a mass. The greater the mass of the object being accelerated, the greater the amount of force needed to accelerate the object.

- $F = ma$ (force = mass x acceleration)

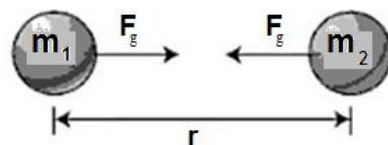
Newton's Third Law of Motion:

For every action, there is an equal and opposite reaction.

Universal Law of Gravity:

Law formulated by Sir Isaac Newton that states the following:

- Every object in the universe pulls on every other object.
- The more mass an object has, the greater its gravitational force (pull); this is summarized in the following mathematical equation:



$$F_g = G \times \frac{m_1 \times m_2}{r^2}$$

where:

F_g = gravitational force between objects

m_1, m_2 = the masses of the objects

r = distance between the objects

G = the universal gravitational constant

- The greater the distance between two objects, the less attraction they have for each other.

mass & weight:

Mass is the measure of the amount of matter an object consists of. Weight is the measure of the force of gravity exerted on an object by the Earth.

$$w = mg \quad (\text{weight} = \text{mass} \times \text{acceleration due to gravity})$$