25/12/14

RISHIK PILLA

UNIVERSAL GRAVITATION

GRAVITATIONAL FORCE

Universal Gravitation was a law developed by Sir Isaac Newton. It states that any two bodies in the universe attract each other with a force directly proportional to product of their masses and inversely proportional to the square of the distance between them. This is the same in all of the universe.

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

F = Gravitational force

m_1 = mass 1

m_2 = mass 2

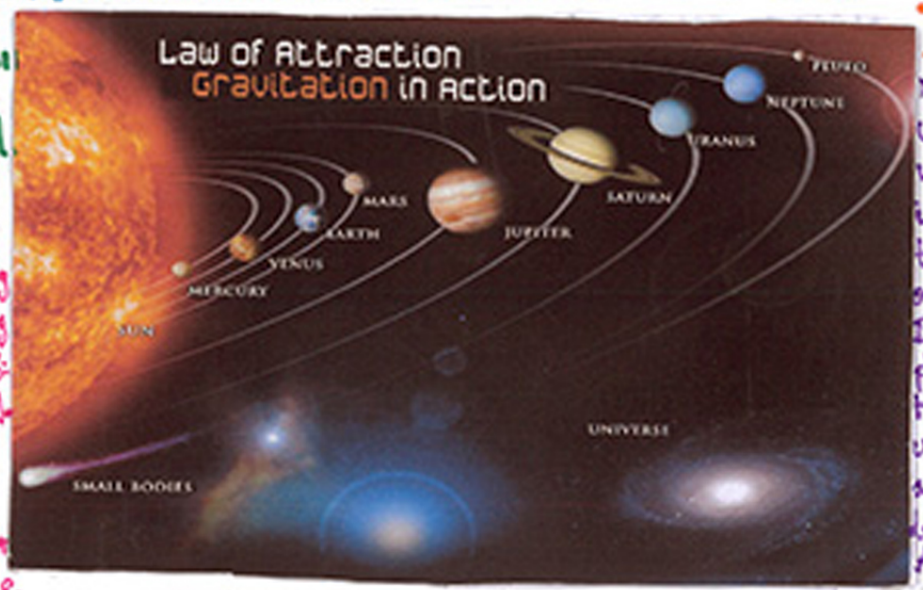
r = distance between centres of masses

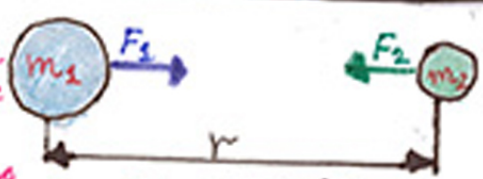
G = Gravitational Constant

The value of G was experimentally found by Henry Cavendish in 1798:

$G = 6.67 \times 10^{-11} N m^2/kg^2$

The force of gravity is a vector quantity. Particle m^1 attracts particle m^2 with a force directed towards m_1. The same also happens the other way, directed to m_2.

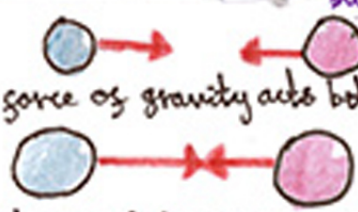




$F_1 = F_2 = G\frac{m_1 \times m_2}{r^2}$

IMPORTANCE OF THE LAW

Newton's Law of Universal Gravitation was significant as it made the laws that govern motion on Earth and Universe. It also rejected philosophical thoughts. His research said universe is rational and could be described by laws. Also, basic facts such as acceleration on Earth surface which is 9.8 m/s^2



The force of gravity acts between all objects.

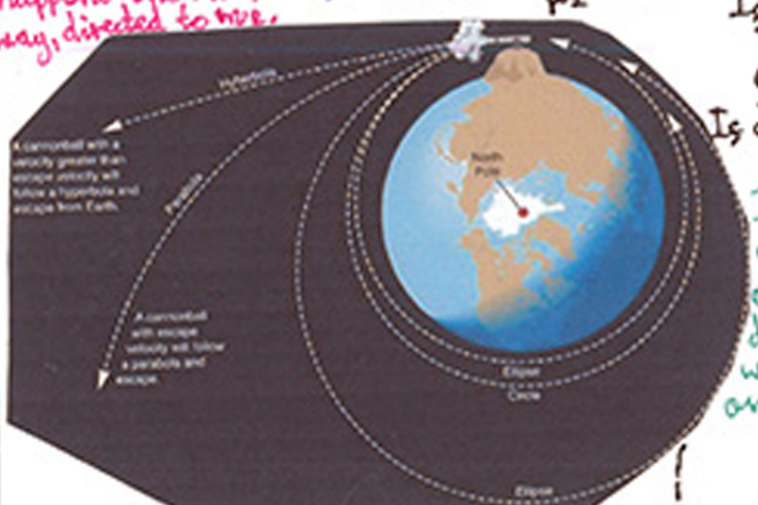
If mass increases, force of gravity increases.

If distance increases, force of gravity decreases.

NEWTONS APPLE

Isaac Newton's story of an apple is famous worldwide, although no one knows the exact events leading to his renowned discovery. The story - One day Newton was sitting under an apple tree when one apple fell and hit him on the head.

SIR ISAAC NEWTON



HOW ORBITS WORK?

To explain how one body can orbit another, he made an imaginary experiment of a cannon on top of a very tall mountain. When fired, the cannonball follows a curve, falling faster from gravity.