Physics

Fall 2025

Weeks 11 - 12

Monday / Tuesday (October 20 – 21)

- Test Review

Wednesday / Thursday (October 22 -23)

- District Unit 2 Test
- Unit 3 Intro Reading assignment

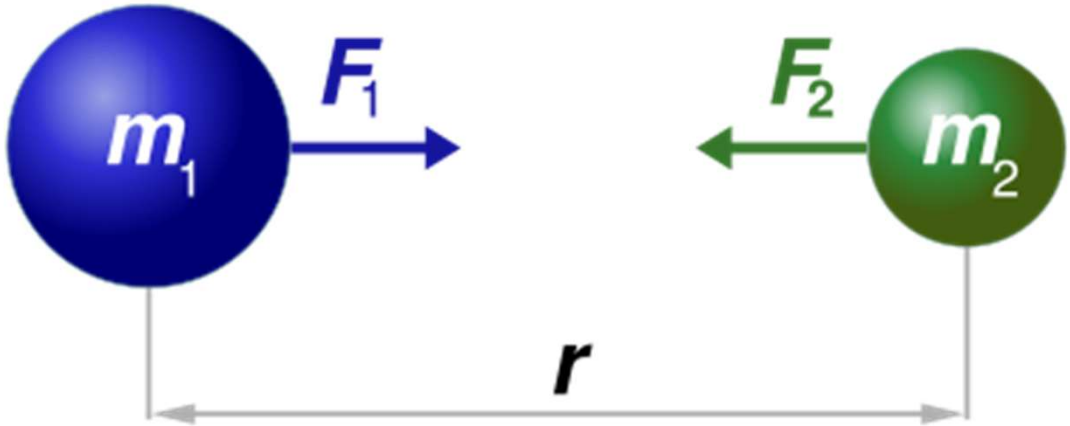
Monday / Tuesday (October 27 – 28)

Newton's Law of Universal Gravitation

- Any two objects attract each other with a gravitational force, proportional to the product of their masses and inversely proportional to the square of the distance between them.

- The force acts in the direction of the line connecting the centers of the masses.

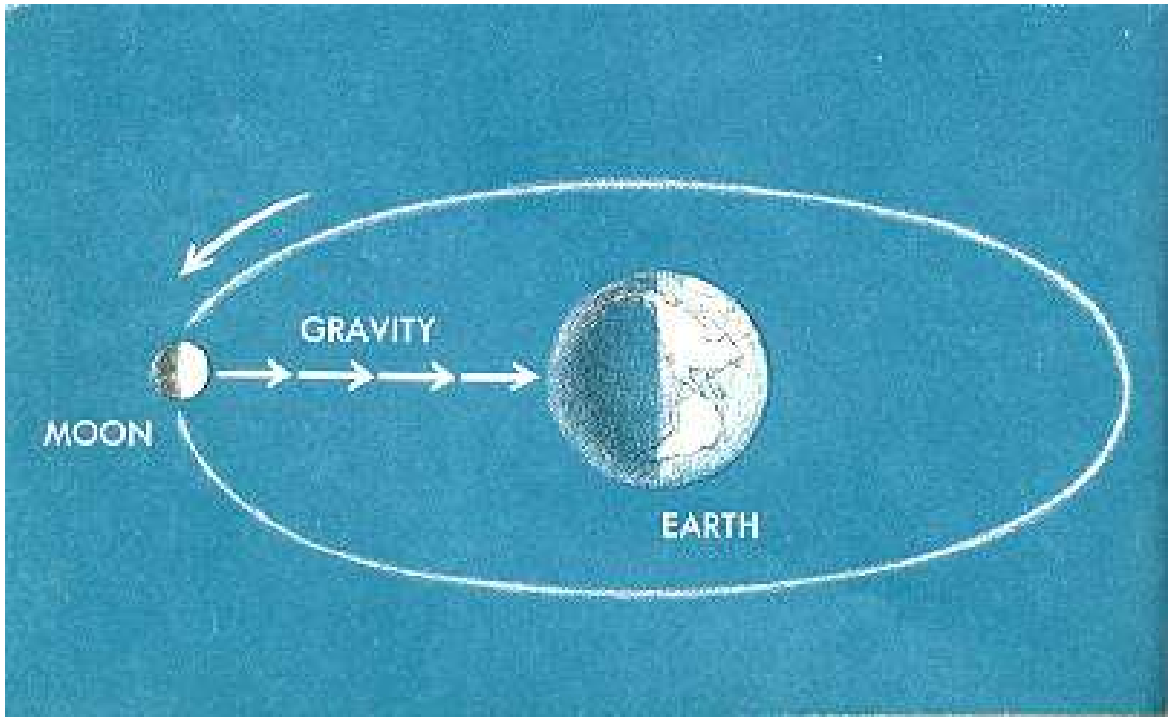
Newton's Law of Universal Gravitation



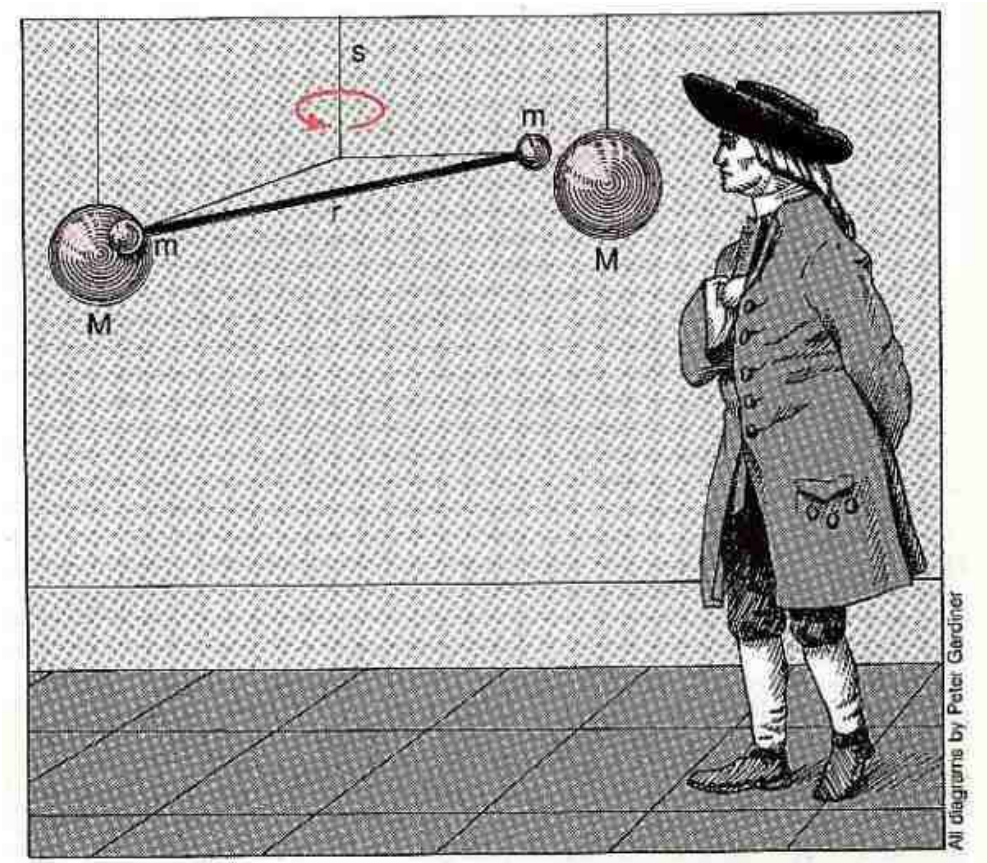
$$F_1 = F_2 = G\frac{m_1 \times m_2}{r^2}$$

http://scienceblogs.com/startswithabang/upload/2009/07/meet_our_second_moon/400px-NewtonsLawOfUniversalGravitation.svg.png

Why does the moon not fall straight down onto the earth?



Henry Cavendish's experiment determined the proportionality constant G in 1798.



Henry Cavendish with the famous torsion balance experiment that determined the gravitational constant G and demonstrated Newton's inverse-square law of gravitation. Large lead spheres placed close to small ones caused angular deflections

http://www.newscientist.com/data/images/archive/1639/16390101.jpg

The Value of G.

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

Change of Gravitational Force with Distance

- Law of universal gravitation is known as an inverse square law.

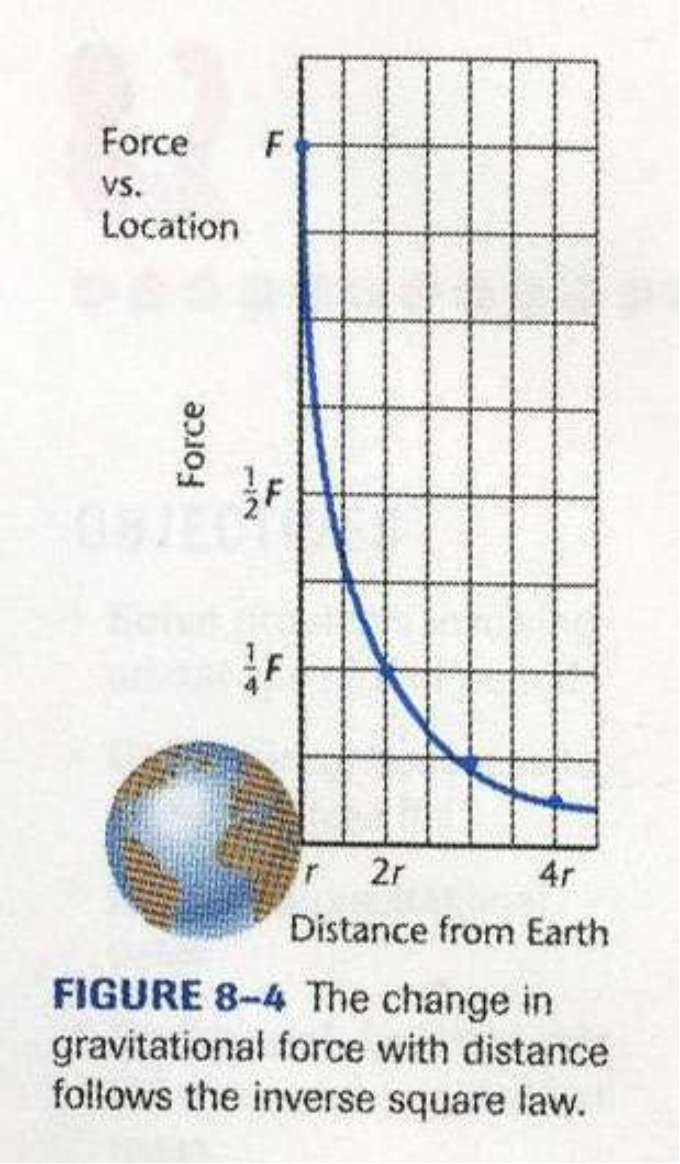


FIGURE 8–4 The change in gravitational force with distance follows the inverse square law.

Wednesday / Thursday (October 29 – 30)

- Lab: Circular Motion

- T: 5D - describe and analyze acceleration in uniform circular and horizontal projectile motion in two dimensions using equations
- O: I will be able to explain centripetal force and how it can cancel out gravity
- D: by completing the lab and writing a CER about my findings.
- A: centripetal force / acceleration
- Y: How does centripetal force explain the international space station staying in orbit around the Earth?

Calculations for Circular Motion

- Distance = circumference = $2(\pi)(r)$
- Time = period = T = time to complete revolution
- Velocity = circumference / period = d/T
- Two forces must be equal: gravity pulling weights down and centripetal force pulling weight up.
- Gravitational Force = mass x gravity= hanging mass x 9.8 m/s^2
- Centripetal Force = mv^2/r
  - = mass of rubber stopper times velocity times velocity divided by radius

Friday (Halloween)

- C-day
- Pep rally