Unit 2: Energy & Momentum

Dynamics = understanding of forces to help us predict motion.

This unit → We'll look at how energy transfers (space / springs) and analyze situations using conservation of energy.

→ introduce momentum ("quantity of motion)

→ collision – we can predict outcome of simple collisions. (car crashes, billiard balls)

Space questions

- $F_g = GMm/r^2$ Newton's Universal law of Gravitation - Must use this version. $F_g = mg$ doesn't work
- M and m are mass (kg)
- G = gravitational constant
- r = radius = distance between centres of 2 objects (m and M)

Givens ****Make sure these are on your formula sheet!**

- $G = 6.67 \times 10^{-11}$
- $m_e = 5.98 \times 10^{24}$ kg
- $r_e = 6.38 \times 10^{6}$ m
- $m_{sun} = 1.98 \times 10^{30}$ kg
- $m_{moon} = 7.35 \times 10^{22}$ kg
- Distance from sun-earth ${}_sr_e = 1.5 \times 10^{11}$ m
- Distance from earth-moon ${}_mr_e = 3.94 \times 10^{8}$ m
- $r_m = 1.74 \times 10^{6}$ m
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Geosynchronous orbit = orbit in which the satellite stays above the same geographical place.

- Occurs at altitude (distance from earth's surface) of 3.58×10^{4} km