PHY100S - The Magic of Physics - Class 5

The Atoms of Democritus
And Newton's Particles of light
Are sands upon the Red Sea shore,
Where Israel's tents do shine so bright.

-- William Blake

Finish §5.2

$$F = G\frac{Mm}{r^2}$$

G — Universal Gravitational Constant

$G = 6.7 \times 10^{-11}$ in SI units

§5.5 – Newtonian Worldview

Little to add to text

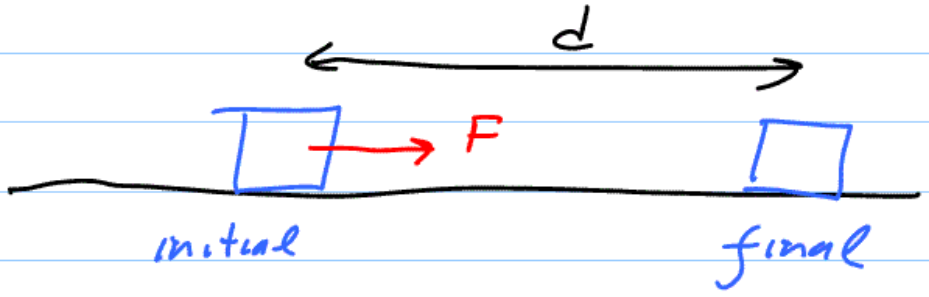
⊙ Universal natural laws

- Atomism
- Absolute Space & Time
- Objective observation.
- Every physical system is predictable.

CHAPTER 6 - ENERGY

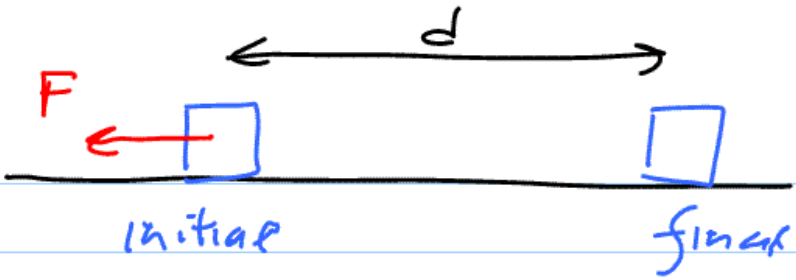
§6.1 - Work

↳ "physics-speak" not identical to everyday usage.



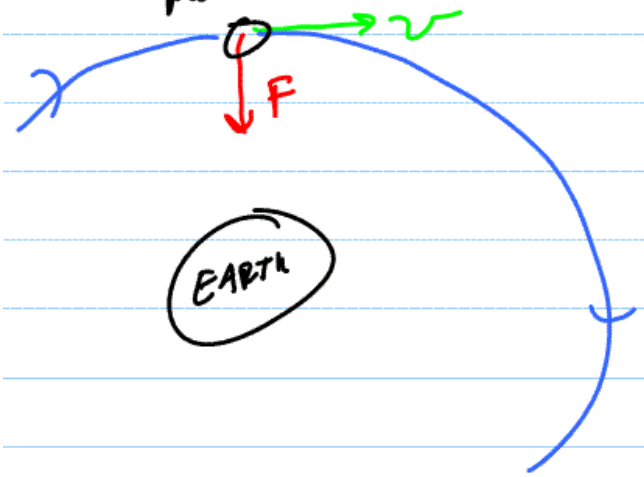
work by F on object ≡ Fd

(+)ve number ← speeds up object



$(-)^{ve}$ number

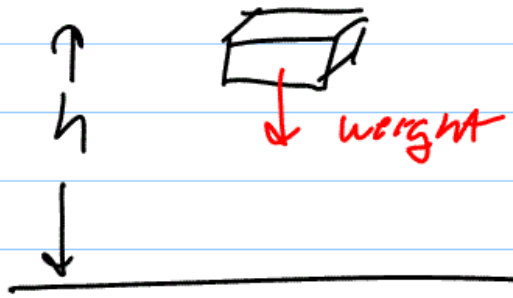
slow down the object



Work = 0

speed constant

§6.2 & §6.3 - Work & Energy

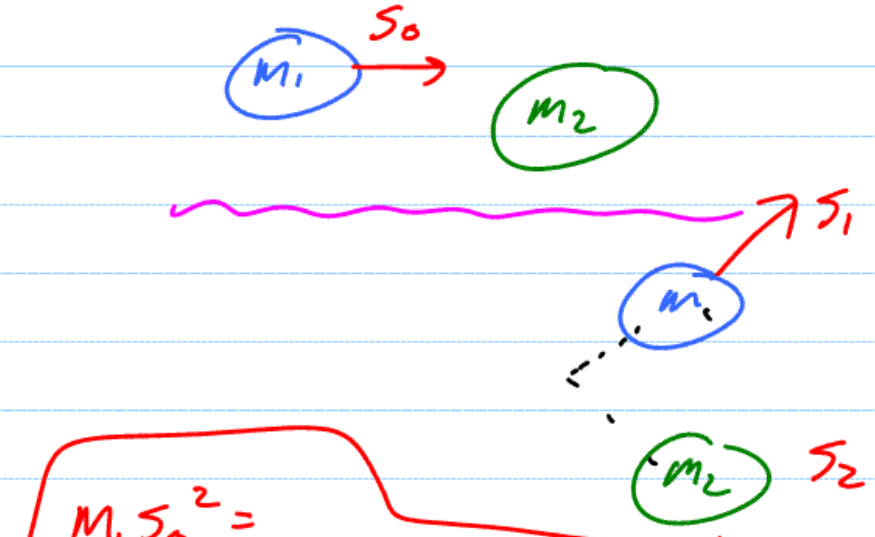


W = weigh x h

$$W = \frac{1}{2} m s^2$$

s = speed at bottom

LEIBNIZ



$M_1 s_0^2 = M_1 s_1^2 + M_2 s_2^2$ (conserved)

ms^2 - fundamental to universe

"vis viva" - living force

$ms^2 \Rightarrow \frac{1}{2} ms^2 \equiv$ kinetic energy

KinE

W = weight $\times$ vertical distance $= \frac{1}{2} ms^2$

$mg \times$ vert dist $= \frac{1}{2} m s^2$