SI units

mks units

base units

meter (m) : length

kilogram (kg) : mass (≈ 2.2 lbs on earth)

second (s) : time

derived units

1 Newton = 1 $\frac{kg\ m}{s^2}$ force

1 Joule = 1 $\frac{kg\ m^2}{s^2}$ energy

$E = mc^2$ c = speed of light 3×10^8 m/s

energy in 5 kg

$m = 5\ kg$

$E = (5\ kg)(3 \times 10^8\ m/s)^2$

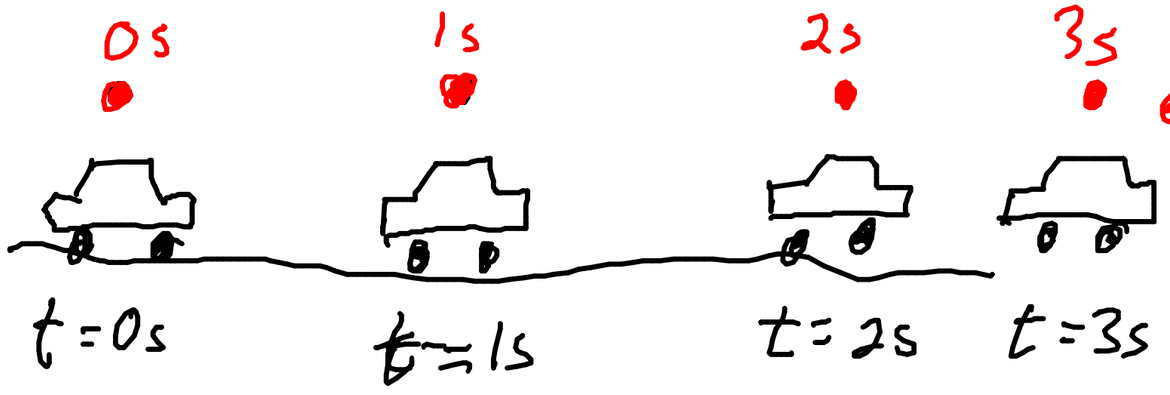
$= (5\ kg)(9 \times 10^{16}\ m^2/s^2)$

$= 45 \times 10^{16}\ \frac{kg\ m^2}{s^2}$

$= 45 \times 10^{16}\ J$

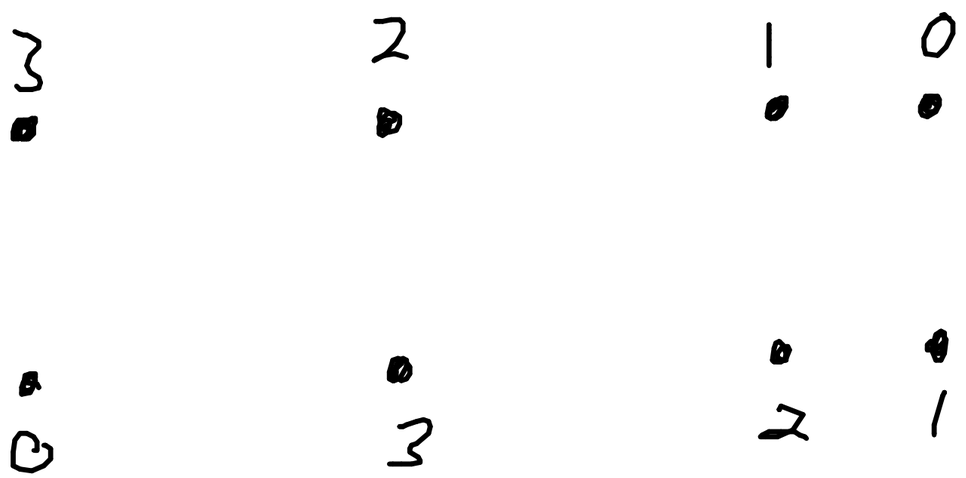
Motion or Kinematics ("how things move")

changing position or orientation w/ time



← motion diagram

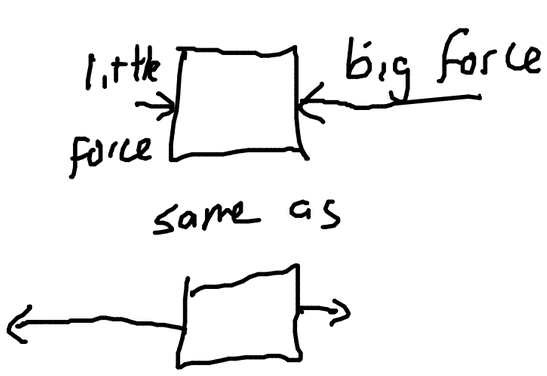
points at regular intervals of time - sequence

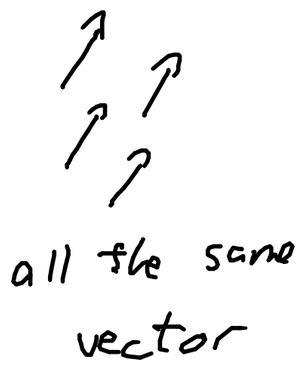


(We'd want more dots - smaller interval to understand this better)

Vector : quantity with magnitude & direction
e.g. velocity, force

Graphically, represented by arrows
length of arrow = relative magnitude





Algebraically, vectors are written with hats

$\vec{V}$ "V-vec"

Graphically, we can add vectors by "linking" them into a chain
& drawing arrow from back to front