2nd Law of Motion

The rate of speed change (acceleration)
is given by the ratio of force to mass.

$a = \frac{F_{net}}{m}$

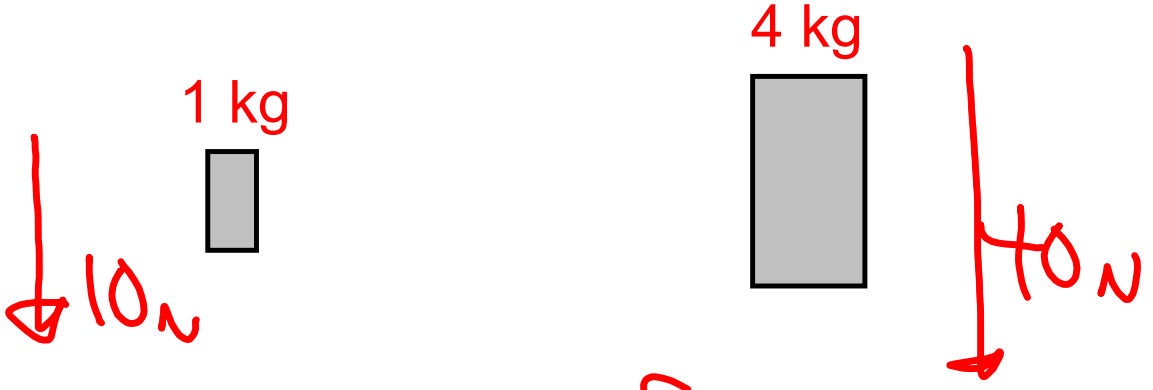
acceleration (m/s every second) = $\frac{\textbf{Net Force (N)}}{\textbf{mass (kg)}}$

So a Newton is the force required to accelerate 1 kg at a rate of 1 m/s every second.

That means a Newton is a kgm/s every second

Why do all things fall at the same rate (when drag is not an issue)?

The 2nd Law explains it!



$a = \frac{F_{net}}{m}$

$= \frac{10\,N}{1\,kg}$

$= 10\,\frac{m}{s}$ every sec

$a = \frac{F_{net}}{m}$

$= \frac{40\,N}{4\,kg}$

$= 10\,\frac{m}{s}$ every sec.

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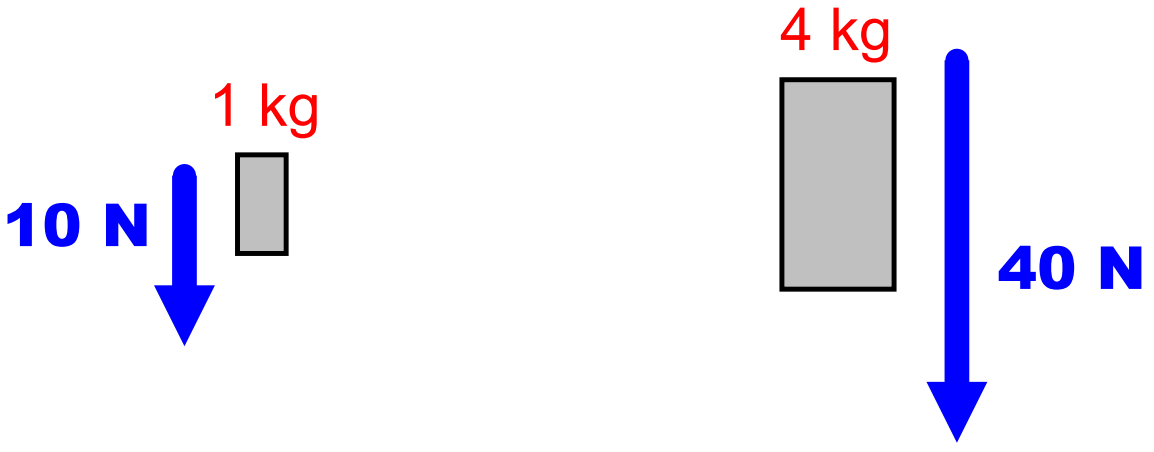

$$\text{accel} = \frac{10\ \text{N}}{1\ \text{kg}} \qquad \text{accel} = \frac{40\ \text{N}}{4\ \text{kg}}$$

accel of free fall = 10 m/s every sec.

g

gravitational field strength $\Longleftrightarrow$ acceleration due to gravity

$1g = 10 \frac{N}{kg}$ $1g = 10 \frac{m}{s}$ every sec

downward downward

$F_w = mg$ $a_{freefall} = g$