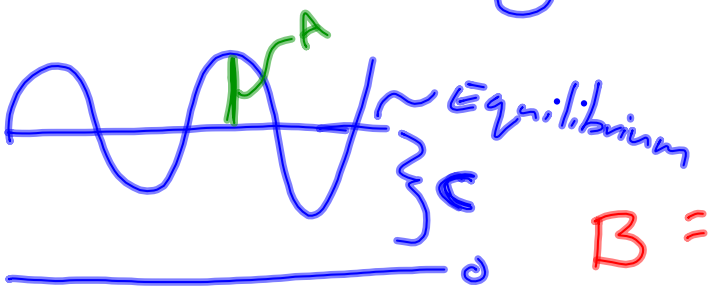
Size of bounce does not
(m) change period (s)
Less mass decreases period

Anatomy of sine

$$x = A \sin(B \cdot t) + C$$

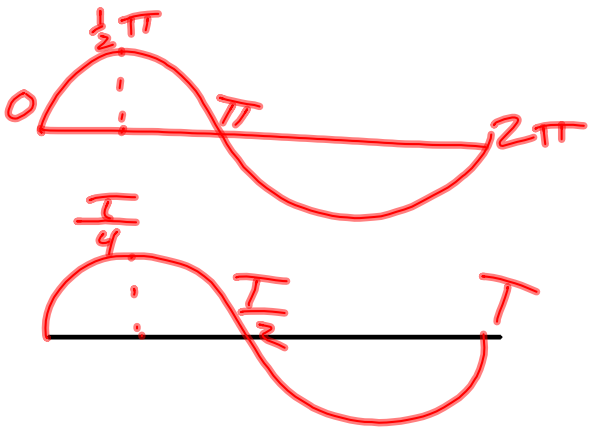
C = how far are we from position 0



A = Amplitude

B = conversion factor

$$2\pi = B \cdot T$$



$\omega = \frac{2\pi}{T} = B$
↳ angular velocity
angular frequency

$T = \frac{1}{f}$

$\omega = 2\pi f$

$$x(t) = A \sin(\omega t) + C$$

$$x(t) = A \sin\left(\frac{2\pi}{T} t\right) + C$$