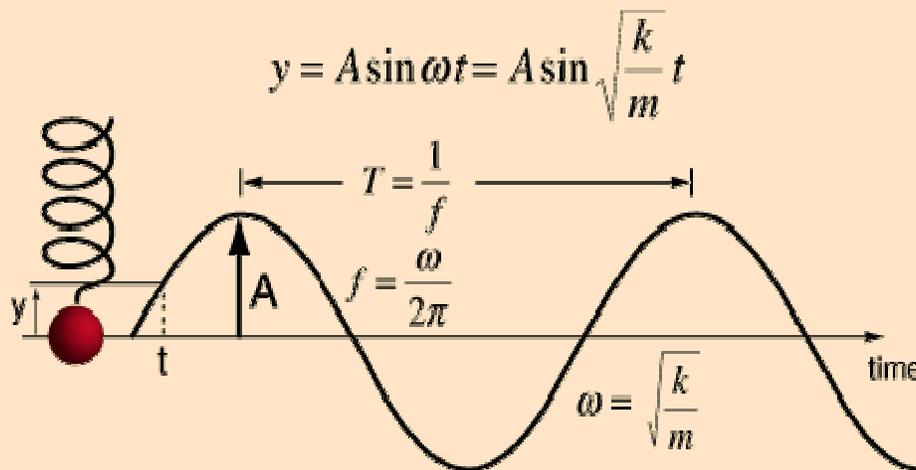


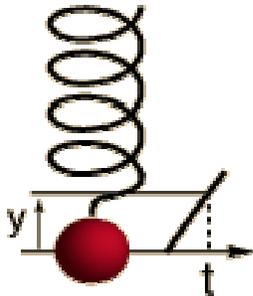
Simple Harmonic Motion

Simple harmonic motion is typified by the motion of a mass on a spring when it is subject to the linear elastic restoring force given by Hooke's Law. The motion is sinusoidal in time and demonstrates a single resonant frequency.



Simple Harmonic Motion Equations

The motion equation for [simple harmonic motion](#) contains a complete description of the motion, and other parameters of the motion can be calculated from it.



$$y = A \sin \omega t = A \sin \sqrt{\frac{k}{m}} t$$

The velocity and acceleration are given by

$$v = \omega A \cos \omega t$$

$$a = -\omega^2 A \sin \omega t = -\omega^2 y$$



The total energy for an undamped oscillator is the sum of its [kinetic energy](#) and [potential energy](#), which is constant at

$$E = KE + PE = \frac{1}{2} k A^2$$