oscillations flowchart

$period$ T unit $= \frac{s}{cycle}$ $\xleftarrow{f = \frac{1}{T}}$ $frequency$ f unit $= Hz = \frac{cycles}{s}$ $\xleftarrow{\omega = 2\pi f}$ $angular\ frequency$ ω (romega) unit $= \frac{rad}{s}$ $\xleftarrow{\omega = \sqrt{\frac{k}{m}}}$ $spring\ constant$ k unit $= N/m$

$\omega = \sqrt{\frac{g}{L}}$ $\rightarrow$ $pendulum$ $length$ L unit $= m$
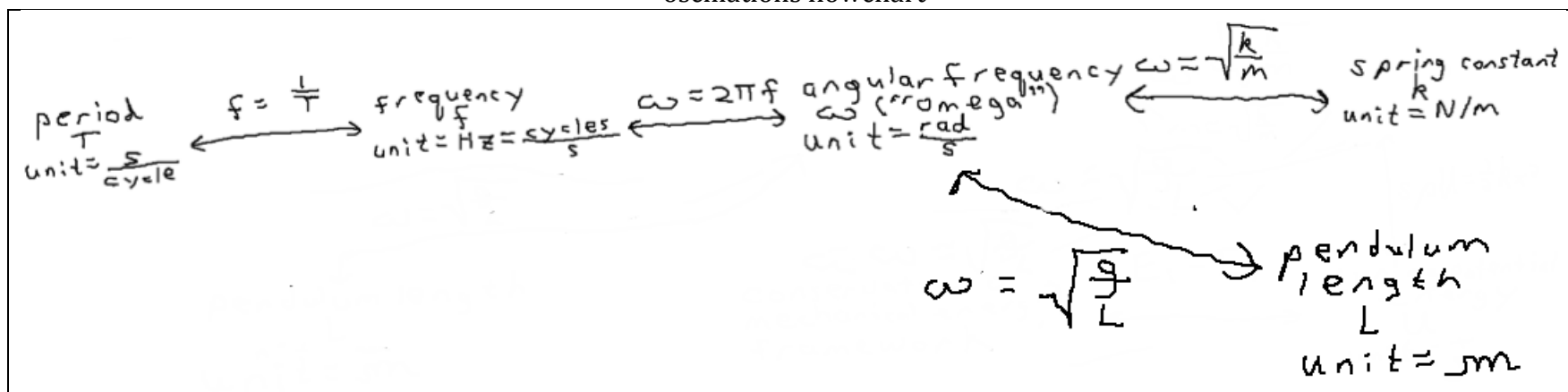
horizontal spring

	sp$U$ $\frac{1}{2}kx^2$	x	K $\frac{1}{2}mv^2$	v
maximum expansion / maximum compression	maximum	maximum	0	0
natural length	0	0	maximum	maximum

In this table, x is defined as the displacement of the spring from its natural length.

pendulum

	gr$U$ mgh	h	K $\frac{1}{2}mv^2$	v
maximum height	maximum	maximum	0	0
hanging vertically	0	0	maximum	maximum

In this table, h is the pendulum's vertical height, with height zero defined as the pendulum's height when it hangs vertically.

vertical spring

	gr&spU $\frac{1}{2}ky^2$	$\dot{y}$	K $\frac{1}{2}mv^2$	$\dot{v}$
maximum height / minimum height	maximum	maximum	0	0
midpoint of oscillation	0	0	maximum	maximum

In this table, y is defined as the displacement of the spring from the midpoint of its oscillation.

In this table, U represents the total potential energy, i.e., the sum of the gravitational and spring potential energies, defined in such a way that U will equal zero at the midpoint of the oscillations.