Flipping Physics Lecture Notes:

Frequency vs. Period in Simple Harmonic Motion

We have already defined the period, T, of simple harmonic motion as the time it takes for one full cycle or oscillation. Frequency, f, is defined as the number of cycles or oscillations per second. Hopefully you recognize then that frequency and period are inverses of one another.

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

The units for frequency are $\frac{cycles}{second}$ which we call hertz (Hz) after the 19th century German physicist Heinrich Hertz[♥] (1857-1894) who was the first to give conclusive proof of the existence of electromagnetic waves which were theorized by James Clerk Maxwell's electromagnetic theory of light which we will learn about later.

For example, if we have a vertical mass-spring system with a period of 0.77 seconds, the frequency of that mass-spring system is:

$$f = \frac{1}{T} = \frac{1}{0.77} = 1.2987 \approx 1.3 \frac{cycles}{second} \; or \; 1.3 \; Hz$$

Which means the mass-spring system should go through 1.3 oscillations every second.

Another example, if we have a pendulum which goes through 15 cycles in 11 seconds, then the frequency of that pendulum is:

$$f = \frac{15 \; cycles}{11 \; seconds} = 1.\overline{36} \approx 1.4 \text{ Hz}$$

Which we can compare to the period of the pendulum:

$$T = \frac{1}{f} = \frac{1}{1.36363} = 0.733333 \approx 0.73 \text{sec}$$

♥ https://commons.wikimedia.org/wiki/File:Heinrich_Rudolf_Hertz.jpg