Additional Material for Pendulum Lab

A motion that repeats itself at regular intervals of time is called periodic motion.

The smallest interval of time after which the motion is repeated is called its Time period.
Time period is denoted by T. Its SI unit is second.

The reciprocal of T gives the number of cycles per unit time. This quantity is called frequency of the periodic motion. It is represented by ν . The relation between ν and T is

$$\nu = 1/T$$

The unit of ν is s^{-1} . After the discoverer of radio waves, by Heinrich Rudolph Hertz (1857–1894), a special name has been given to the unit of frequency. It is hertz (abbreviated as Hz).
1 hertz=1Hz=1 oscillation per second= $1s^{-1}$

The force acting in a simple harmonic motion is proportional to the displacement and is always directed towards the centre of mass.

A particle executing simple harmonic motion has,
kinetic energy $K = 1/2\ mv^2$ and
potential energy $U = 1/2\ kx^2$
If there is no friction then the mechanical energy of the system,
(E = K + U) always remains constant even though K and U change with time.

The motion of a simple pendulum oscillating through small angles is approximately simple harmonic. The period of oscillation is given by,

$$T = 2\pi\sqrt{(l/g)}$$

The mechanical energy in a real oscillating system decreases during oscillations because of external forces.
For example drag force, inhibits the oscillations and transfers mechanical energy to thermal energy. The real oscillator and its motion are then said to be damped.