1. Measure the amplitude.
2. Measure the period.
3. Discuss the angular frequency.
4. Express the mathematical formulation of the position versus time (don’t forget the phase shift).

1. Derive the period of a simple pendulum.

2. Derive the period of a physical pendulum (any shape you like; I will depend on it).

4. Derive the period of an industrial spring.
A mass $m$ (4kg) is attached to a spring. The spring is compressed by a distance $d$ of 0.5m, and released from rest. Derive the differential equation modeling SHO using either Newton’s method of Energy (Hamiltonian), and obtain the specific equation describing the position of the mass attached to the spring as a function of time (i.e. obtain). The solution of a Simple Harmonic Oscillator (SHO) differential equation is:

$$x(t) = A \cos \omega t + B \sin \omega t$$