

Period of a Pendulum Lab

A swinging pendulum keeps a very regular beat. It is so regular, in fact, that for many years the pendulum was the heart of clocks used in astronomical measurements at the Greenwich Observatory. There are at least three things you could change about a pendulum that might affect the *period* (the time for one complete cycle):

- the amplitude of the pendulum swing
- the length of the pendulum, measured from the center of the pendulum bob to the point of support
- the mass of the pendulum bob

Given: one meter of string, a protractor, a set of known masses, and other commonly available equipment

Find: The relationship between the period of a pendulum and its mass, length, and amplitude.

In order to make measurements and have the pendulum exhibit simple harmonic motion (SHM), the angle of displacement or oscillation must be relatively small ($\theta \leq 10^\circ$).

1. Set up a pendulum and determine the period of its motion.
2. Change any factor you think might affect the period and determine its value several times (minimum 5 times for each factor).
3. **Construct a table for each set of your data.**
4. From your data, determine the factors that are affecting the period of a pendulum's motion.
5. Construct a graph of the period of the pendulum vs the factor you identified in step 4. Include a title, labeled axes, and units.
6. Is the graph linear? If so, find the slope of the graph.
7. If your graph is not linear, what quantities should be graphed in order to make it a linear graph?
8. Construct a graph of the period of the pendulum vs the modified quantity.

Although you will perform these experiments as a group, each member of the group must **turn in an individual lab report**. It should follow the lab format (<http://my.ccsd.net/raquelsantana/resources/>) that includes the following sections:

- Title
- Objectives
- Hypothesis
- Materials/Equipment
- Procedure
- Data and/or graphs
- Calculations
- Conclusions

