Simple Pendulum Lab   **Name:**

Physics II   **Date:**   **Period:**

Purposes

The purposes of this investigation are:

- ❖ to experimentally measure the following values for a simple pendulum at varying lengths
    - ➢ the period (T)
    - ➢ the frequency (f)
- ❖ to graph the following functions for a simple pendulum
    - ➢ x (t)
    - ➢ T (L)
- ❖ to demonstrate that a simple pendulum can be used to calculate gravitational acceleration

In our analysis we will measure these values for a pendulum at lengths of 0.1, 0.2, and 0.3 m, using an arbitrary mass, at an angle of 15 degrees. Make a knot at the end of a piece of string longer than 0.3 (make sure you have enough extra length to tie the string) from which you can hang your mass, and tie the other end around the knob of the crossbar of the stand, ensuring that the distance from the mass to the point of attachment is exactly 0.3 m. Use a protractor to measure a 15 degree angle and release the pendulum, using a stopwatch to time the period. Repeat this process several times until you are confident you have timed it accurately, then try the procedure again at lengths of 0.2 and 0.1 m. Compare your observed period with the expected period.

The second part of our analysis will have us use our observed period to calculate the gravitational constant. Round out the lab report with a free-body diagram of your pendulum, and graphs of period as a function of length, and position as a function of time. Formulate the appropriate equations and use the graphing tool of your choice. Draw and appropriately label your results.