***Simple Harmonic Motion Lab***

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***Purpose:***

1. Develop the sinusoidal equations of motion for a pendulum.
2. Compare the experimental period to the calculated period using $T=2π√(\frac{L}{G})$.

***Equipment:***

* Small Mass,
* Fishing line,
* Ring stand,
* Camcorder,
* Logger Pro,
* Excel.

***Procedure:***

1. Set up pendulum and equipment to measure distance from center (refer to video for set up).
2. Start recording at an adequate distance away to still see mass and meter stick clearly.
3. Release mass from a height an appropriate distance away and record video for at least 4 complete cycles.
4. Analyze video using Logger Pro and Excel and get time versus distance from center data.
5. Calculate the period of the sin wave and compare it to the theoretical period derived from the above formula.

***Data:***

* Video Data – The video recording of the experiment can be found back on Derek’s AP Labs website on the page where this lab was found.
* Length of Pendulum: 38cm
* Tabular Data: (next page)



* Graphical Data:



***Data Analysis:***

 The experimental period derived from the sinusoidal equation found is 1.246s. This is found using the equation T = $\frac{2π}{B}$. The theoretical period of the same pendulum is 1.237s. This was found using the equation $T=2π√(\frac{L}{G})$ where L equals .38m. After calculating the percent error of the experimental data vs. the theoretical answer there is a .728% error.

% Error Calculation: [(1.246-1.237)/(1.237)] x 100 = .728%

***Conclusion:***

 After the completion of this lab both of the objectives of this lab have been completed. The sinusoidal equation for the Simple harmonic motion of a pendulum has been formed and the experimental period was compared with the theoretical period. With a percent error of .728% this verifies the accepted relationship between the length of a pendulum and its period. Due to the insignificant amount of error no sources of error were present that could not be controlled. Possible improvements to the experiment would be using a HD camera that would provide better video quality and less motion blur.