Pendulum Lab

**Purpose:**

The goal of this lab was to calculate gravity using the slope of a graph of time squared vs. (L^2/12+D^2)/D. To get the required data to graph, we measure the length of the period of a meter stick, acting as a pendulum, of various lengths. To do this, we use the photogate to measure the period of the swinging meter stick at lengths of .65m, .75m, and .99m. When we plott our data and get the slope, we can then set this slope equal to 4pi^2/g, and solve for “g” to calculate the acceleration due to gravity from the lab.

**Materials:**

* 1 meter stick
* Calculator
* CBL unit
* Photogate
* 1 C-clamp
* 1 paperclip
* Wooden blocks
* Metal rod with base

**Data:**

T^2= 4pi^2 \* (L^2/12 + d^2)

g d

|  |  |
| --- | --- |
| X | T^2 |
| 0.5833 | 2.390116 |
| 0.5833 | 2.377764 |
| 0.5833 | 2.377764 |
| 0.66007 | 2.729104 |
| 0.66007 | 2.79104 |
| 0.66007 | 2.692881 |
| 0.7055 | 2.876416 |
| 0.7055 | 2.896804 |
| 0.7055 | 2.910436 |

**Graph:**

M= 4pi^2/g

4.2415= 4pi^2/g

G= 9.3076

Percent error = (9.81-9.3076)/9.81 \* 100 = 5.2% error

**Conclusion**:

After calculating the gravity in our lab, we discovered that g= 9.3076. While this is not the actual value for the acceleration due to gravity, it is very reasonable considering the possible sources of experimental error. The most likely source of error is that the meter stick experienced friction with the edge of the table, causing an error in the period time. In conclusion, the value we calculated for g, 9.3076, is an acceptable value when we take into account the factors that could cause error.