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*Pendulum Lab*

Procedure/Purpose-

 The purpose of the pendulum lab is to use the period and the distance from the center of mass to calculate Earth’s gravity. By using a photogate and a meter stick, one can swing the meter stick as a pendulum and measure its period. Furthermore, using the equation T^2= ($4π$^2/g) (L^2/12+D^2)/D one can find the slope of T^2 v.s (L^2/12+D^2)/D and set it equal to ($4π$^2/g) to calculate gravity.

Materials-

Meter Stick

Paper Clip

Photogate

C-Clamp

Metal Rod with Base

Modeling Clay

Wood Blocks

CBL Unit

Data-

|  |  |
| --- | --- |
| 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=4π^2/g

4.2415=4π^2/g

G= 9.3076 m/s^2

Error= (9.81-9.3076)/9.81x100= .51/9.81 x 100= 5.1987%

Conclusion- Through the trials I was able to use D (distance from the center of mass) and T (period) of the meter stick to create the graph of T^2 vs (L^2/12+D^2)/D. Through the graph I was able to calculate the slope and set it equal to 4π^2/g. Furthermore, I used the slope to calculate g (Earth’s Gravity) to be 9.3075 m/s^2. This calculation is very reasonable as it is only 5.2% off from the actual value of gravity (9.8 m/s^2). In conclusion, I was able to use the period and distance from center of mass of the pendulum to calculate a value of gravity reasonably close to the actual value.