Circular Motion Lab

**Materials:**

Circular motion apparatus with attached Newton meter

Meter stick

Stop watch

Electronic balance

**Procedure:**

* Measure the mass of the weight on the end of the string.
* Arbitrarily select a force on the Newton meter. Ex: 2N
* Swing the mass above your head in a horizontal circle in such a way that the newton meter consistently reads 2N.Be sure to move the center bar as little as possible.
* While swinging the mass, a partner will measure the time for 10 complete swings.
* Once finished with the swinging, measure the length of the radius of the string- be sure to pull the string out until the Newton meter reads 2N.
* Repeat the measurements for a total of 5 trials with different forces.

Put the data into a chart:

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
|  | F  (N) | r  (m) | T | Calculate | |  |
| trial #  mass (kg) = | for one spin | v  2πr/T | ac  (v2/r) |  |
| 0 | 0 | 0 | 0 | 0 | 0 | Be sure to graph this line. |
| 1 |  |  |  |  |  |  |
| 2 |  |  |  |  |  |  |
| 3 |  |  |  |  |  |  |
| 4 |  |  |  |  |  |  |
| 5 |  |  |  |  |  |  |

**Calculations:**

Calculate v using v = 2πr/T and insert into the chart.

Calculate a using Fc = mac and insert into the chart.

To find relationship between ac and *v* graph:

* ac vs v
* ac vs v2

To calculate mass:

Graph Fc vs ac

Mass will be the slope of the line

Calculate % error- using the measured mass from the balance and the calculated mass from the graph.