Jimmy Casey
Partners: Blake Segars, Other Guy

University of North Georgia, Department of Physics and Astronomy

In this experiment, students were expected to create a pendulum to test the force of gravity of earth. Students performed three trials to increase accuracy. The average force of gravity of all three trials was 10.13 m/s^2.

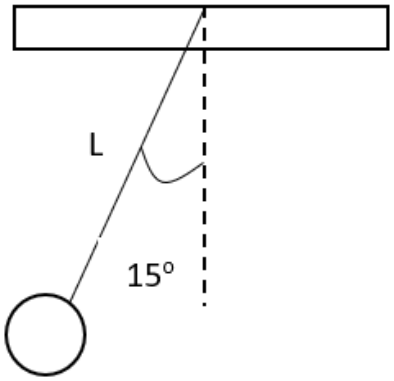
I. INTRODUCTION

Gravity is the force that attracts objects of mass towards earth. With the period of a pendulum of a known length, one can calculate the force of gravity.

II. PROCEDURE

Students are to set up a pendulum with a string and weight. They measured the length of the pendulum from the fixed point to the center of mass at the bottom. They held the mass out approximately 15° from the point of equilibrium (this help to have a more accurate measurement). They timed the pendulum in motion for 10 periods after releasing the mass. Then they divided the time by 10 to find average period. They used the period and the pendulum equation to find force of gravity. Test for length of 30 cm, 40 cm, 50 cm.

Diagram1: Pendulum with controlled length and approximate angle before release.



III. DATA

Length of pendulum (cm)	Force of gravity (N)
30 cm	10.38 N
40 cm	9.96 N
50 cm	10.01 N

Table of points taken from experiment 1-3

IV. ANALYSIS

Equations:

$$T = 2\pi\sqrt{L/g}$$

We chose an uncertainty of +/- 0.2 seconds

Our determined force of gravity is higher than the accepted force of gravity. When finding the uncertainty when 0.2 seconds is added to the time the average force of gravity is returned to 9.89 N.

V. Summary

The uncertainty in this experiment derived from the human error of timing and if the pendulum's motion was not 2-dimensional. We could have used a photo gate to get a more accurate time for the period. If the pendulum's swing transferred some energy to the z-axis then the period on the x,y plane would have decreased prematurely.