## Purpose

The purpose of this lab is to determine the acceleration due to gravity.

## Hypothesis

If the height an object is dropped from increases, the time it takes to fall to the ground increases by a value proportional to the height.

## Methodology

During the experiment, a basketball was dropped from differing heights off bleachers. The heights were based off where the stairs and platforms of the bleachers were. The first drop (1.54 m) was done halfway up the stairs to the main walking platform of the bleachers. The second (2.96 m) was from the main walking platform of the bleachers, and the third drop (3.80m) was done off of the stair halfway up the bleachers. The ball could not be dropped from any higher than this because our tape measure’s length was limited. The timer was started when a verbal countdown hit zero, and it was stopped once the ball hit the ground. The countdown was the best way that the dropping of the ball and the starting of the timer could be synchronized. This countdown and measurement was repeated 3 times for each height to achieve a more accurate measurement.

## Data

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| xi (m) | t1 (s) | t2 (s) | t3 (s) | tavg (s) | a (m/s2) | % error |
| 1.54 | .83 | .65 | .84 | .77 | -5.19 | 153% |
| 2.96 | .97 | .90 | .92 | .93 | -6.84 | 169% |
| 3.80 | .95 | 1.20 | 1.12 | 1.09 | -6.40 | 165% |

## Constants and Equations

## Analysis

The data does not support the hypothesis due to the high percent error. However, the data was very precise, which indicates constant acceleration. One possible error was that the timer may not have been started as soon as the ball was dropped. This would have resulted in the shorter times and the higher percent error. Another possible source of error is that the ball may have accidentally been given lift, causing it to start to move downwards later.