Picket fence free fall lab essay sample

Environment, Earth

To get the average acceleration, you take the minimum and maximum accelerations and divide by 2. 9. 77 + 9. 87 = 19. 64

19. 64/2 = 9. 82

In order to find the precision, take the difference between the minimum and maximum accelerations (0. 10 m/s^2) and divide that with 9. 82 (the average acceleration). After you take that result and multiply by 100. 0. 10/9. 82= 0. 01018

0. 01018 X 100 = 1. 018 %

Graphs:

On next page.

Preliminary questions:

1. The additional information I need to determine the average speed of the Picket Fence as it moves through the Photogate is the amount of time need to go through it.

2. If an object is moving with constant acceleration, the shape of its velocity vs. time graph is a linear line.

3. The initial velocity of an object does not have anything to do with its acceleration due to gravity. Analysis Questions:

1. The minimum, maximum, and average values for acceleration are in the data table.

2. The shape of the position vs. time graph for free fall would be a parabola because the velocity increases.

3. The shape of the velocity vs. time graph is a linear line. It is not a parabolic shape like that of the position vs. time graph because the

acceleration is constant which means a straight line of the velocity vs. time graph.

4. Results in table

5. Percentages in the data tables.

6. The accepted value for g (gravity) is 9. 8 m/s/s, and all the calculated accelerations from the first six runs are within.

7. Prediction for acceleration vs. time graph in graphs.

8. The average acceleration is the same with the acceleration vs. time graph because the slopes are 0. Extensions:

1. G (acceleration) is determined in the data charts above.

2. Dropping the picket fence from higher above would change the time, and velocity, but it wont change the acceleration.

3. Throwing the picket fence downward would change the velocity and time, but not the acceleration due to gravity. Throwing the picket fence upward would also change the velocity and time but not the acceleration.

4. Adding air resistance would change the results.

5. The altitude affects the acceleration due to gravity because the closer you are to the center (of earth), there’s more gravity. Gravity decreases with altitude, since greater altitude means greater distance from the Earth’s center. Other factors that cause acceleration to vary is the radius of the earth at different points. Variations in G from sea level to the mountains are very small and can be ignored. Conclusion:

The purpose of the Picket Fence Free Fall Lab was to examine the acceleration of objects as they fall to earth. During free-fall the only force

that should be acting upon the object is the earth’s gravitational pull (9. 8 m/s/s), therefore the velocity of the object should always equal 9. 8 m/s/s. In this lab the picket fence was dropped repeatedly through a photogate connected to Logger Pro, which allowed the fence’s acceleration and velocity to be recorded and graphed.

The results of the experiment confirmed the theory that objects will fall with a constant acceleration equal to g (9. 8 m/s/s). During the 6 runs, the picket fence was dropped from the same height and had an average acceleration of 9. 82 m/s/s– which is extremely close to the expected value of 9. 8 m/s/s. This proves that none of these circumstances had any effect on the acceleration of the fence and that only gravity influenced its fall. The results of this experiment were extremely consistent. The maximum and minimum accelerations only varied 0. 10. The percent error between the average acceleration in the six runs and the accepted value for gravity was only 1. 018%. Therefore, the data collected was very accurate.