Author:

Teacher: Dr. Duick

Conceptual Physics

Date:

Time:

Acceleration Lab: Using a ticker tape timer to determine the acceleration of a falling object

INTRODUCTION

Paragraph 1: What was the purpose of this lab?

Paragraph 2: The upshot paragraph (sentences 1-4 you ***CAN*** have personal pronouns in this paragraph)

(*you may copy this verbatim*) We hypothesize that the acceleration caused by gravity could be measured using two methods the first method was through the use of three equations (Final Velocity, Total Time, and Acceleration). The second method was through the use of graphing of final velocity versus time and determining the slope, which would be acceleration. We would accept our hypothesis if just one of our trials was within 10% of the true value for acceleration 9.81m/s^2.

We accept /reject based on the data that ……

Give specific data numbers why you accept or reject the hypothesis.

MATERIALS METHODS

Ticker timer: (1 paragraph explaining how to work the timer)

Equations: (1 paragraph explaining using an example of the equations):

Vf=m/0.0167s,

$a = (Vf – Vo) /t,$

$D= ½ a t^2.$

Ti Graphing: (1 paragraph explaining the STAT listing functions on the TI calculator)

Using the STAT function on a Texas Instrument (#), calculations were made to plot_____ vs. _____ and obtain a linear regression. L1 consisted of the number of dots from the start (5,10,15,20). L2 ….

RESULTS

TABLE 1: Data from equation method to determine acceleration

Trial	Total Dots[A]	Time Transpired[B]	Distance last two dots[C]	Final Velocity[D]	Acceleration[E]	Percent Error[F]
1						
2						
3						

A= Measure from ticker timer

B= Dots / 60

C= measured in meters

D= Distance last two dots ÷ 0.0167

E= (Final velocity ÷ Total time)

F= (|derived acceleration – 9.81|) ÷ 9.81

TABLE 2: Trial 1 Distance traveled from start (meters) to determine acceleration via graphing

Dot Position	Distance traveled from start in meters[A]	Time transpired in seconds[B]	Falling Average velocity[C]	Falling Final Velocity[D]
5				
10				
15				
20				

A= measured from the start to the dot position 5, 10, 15, and 20. (L1 on Ti84)

B= dots/60 (L1/60 on Ti-84)

C= distance traveled from start ÷ time transpired (L1/L2 on a Ti-84)

D= falling average velocity * 2 (L3*2 on Ti-84)

TABLE 3: Trial 2 Distance traveled from start (meters) to determine acceleration via graphing

Dot Position	Distance traveled from start in meters[A]	Time transpired in seconds[B]	Falling Average velocity[C]	Falling Final Velocity[D]
5				
10				
15				
20				

A= (these needs to be filled in)

B=

C=

D=

TABLE 4: Trial 3 Distance traveled from start (meters) to determine acceleration via graphing

Dot Position	Distance traveled from start in meters[A]	Time transpired in seconds[B]	Falling Average velocity[C]	Falling Final Velocity[D]
5				
10				
15				
20				

A= (these needs to be filled in)

B=

C=

D=

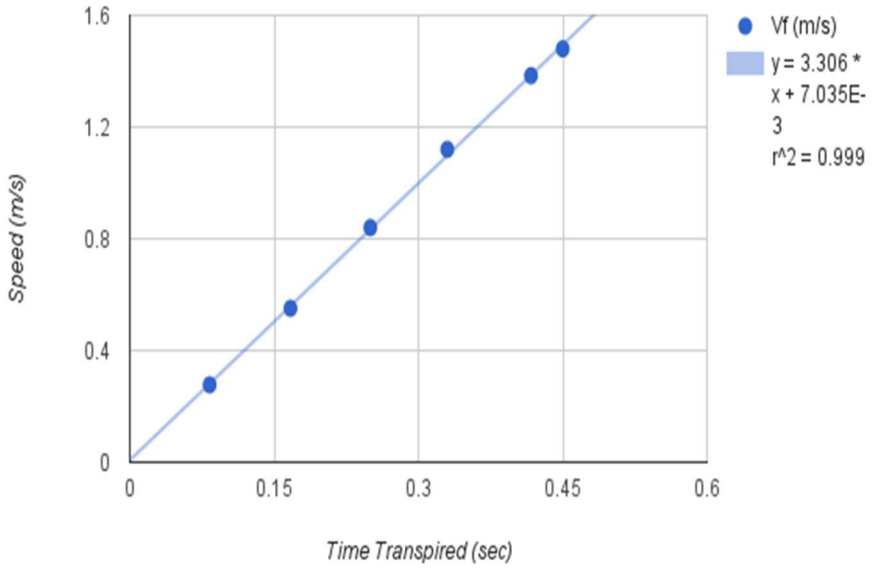


Figure 1: Speed in m/s Vs time, slope is equal to the acceleration of the ball using the timer for trial 1.

Answer the following for each figure:

1) **What is it? Answered in the title**
2) **Why did you do it?**
3) **What were the results?**

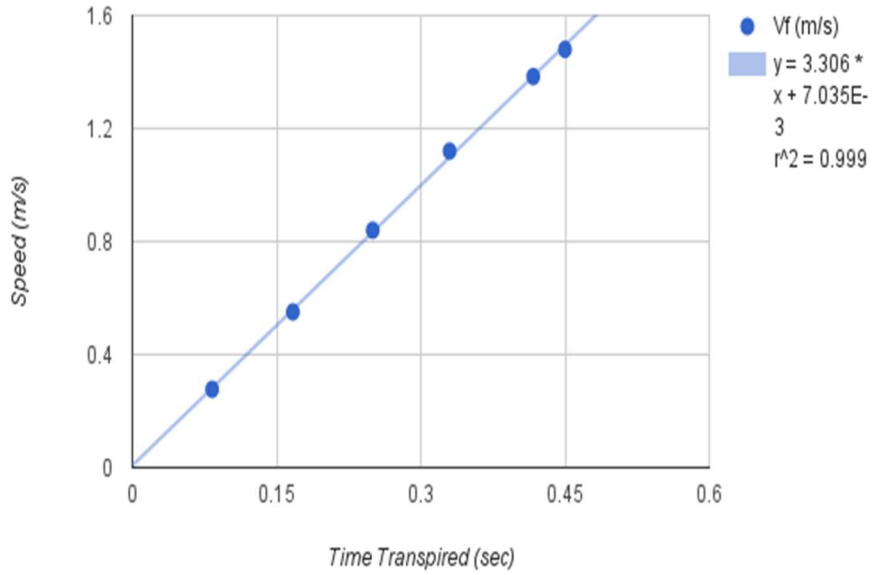
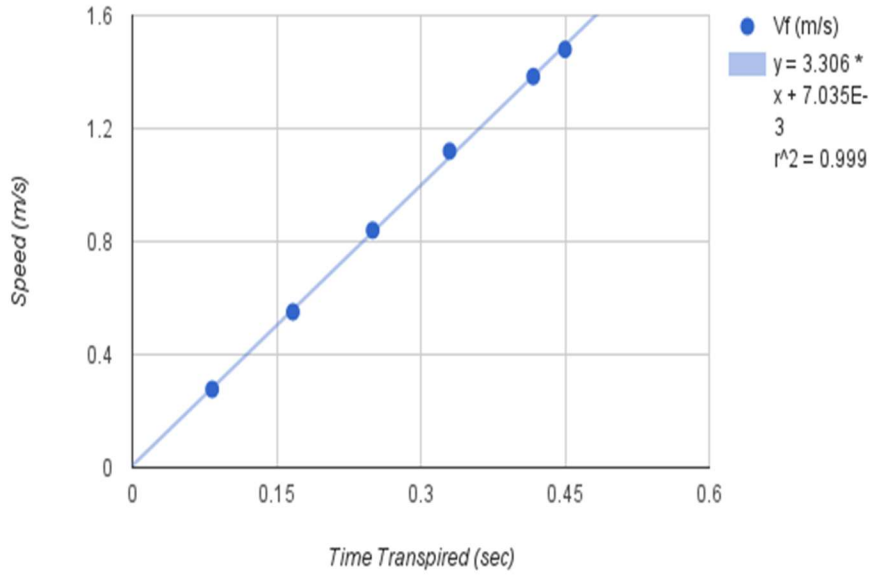

1.6
1.2
0.8
0.4
0
0
0.15
0.3
0.45
0.6
Speed (m/s)
Time Transpired (sec)
Vf (m/s)
y = 3.306 * x + 7.035E-3
r^2 = 0.999

Figure 2: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Vf (m/s)
y = 3.306 * x + 7.035E-3
r^2 = 0.999

Figure 3:

CONCLUSION

This section may use personal pronouns. There are four things you should cover in this section

1) Whether or not you accept or reject your hypothesis
2) Why you think the data agrees or disagrees?
3) What was your percent error?
4) Problems that occurred during the experiment?
5) What would be the next step, or how you could improve the experiment for it to work better?