205A HONORS PHYSICS ACCELERATION LAB

Name:

Date:

TITLE: Free Fall Five: Analyzing Motion of Objects in Free Fall

OBSERVATION:

In the ...

HYPOTHESIS:

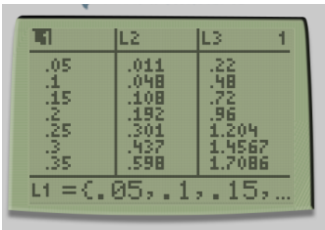
I hypothesize that the acceleration of the balls from greatest to least would be

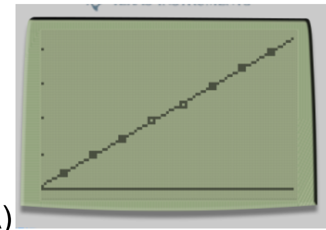
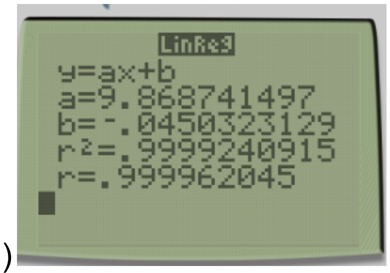
> > > >

EXPERIMENT:
(written in past tense, no personal pronouns. Object should be subject - remove this red prompt)

To determine the speed and distance that occurs during free fall, High speed video was used to ……...

DATA/RESULTS:



(A)

(B)


(C)

Figure 1: TI - Graphing of the Rubber Ball.

(A) The distance (L2) the rubber ball fell was recorded for each 0.05 sec segment (L1). To determine the average velocity (L3) the equation V=d/t was used (L3= L2/L1). Because of constant acceleration, the final Velocity (Vf = L4) was determined by doubling the average velocity (L4= L3 * 2).

(B) Velocity (L4 = Y- axis) was plotted against time (L1 = X axis) to produce a line.

(C) A linear regression was calculated using L1 as the X variable and L4 as the Y variable, to produce the equation for a line y = ax + b, where a is the slope of 9.87 is the speed of acceleration. To determine the percent error the equation ((|O-E|)/E)*100 was used to give the value ((|9.87 - 9.81|)/9.81)*100 = 0.612% error

(A)


(B)


(C)

Figure 2: TI - Graphing of the Lead Ball.
(A) The distance (L2) the ball fell was recorded for each 0.05 sec segment (L1). To determine the average velocity (L3) the equation V=d/t was used (L3= L2/L1). Because of constant acceleration, the final Velocity (Vf = L4) was determined by doubling the average velocity (L4= L3 * 2).
(B) Velocity (L4 = Y- axis) was plotted against time (L1 = X axis) to produce a line.
(C) A linear regression was calculated using L1 as the X variable and L4 as the Y variable, to produce the equation for a line y = ax + b, where a is the slope of **#.##** is the speed of acceleration. To determine the percent error the equation ((|O-E|)/E)*100 was used to give the value ((| **#.##** - **#.##** |)/ **#.##**)*100 = **#.##** % error)

(A)

(B)

(C)

Figure 3: TI - Graphing of the Large Steel Ball.

(A) The distance (L2) the ball fell was recorded for each 0.05 sec segment (L1). To determine the average velocity (L3) the equation V=d/t was used (L3= L2/L1). Because of constant acceleration, the final Velocity (Vf = L4) was determined by doubling the average velocity (L4= L3 * 2).

(B) Velocity (L4 = Y- axis) was plotted against time (L1 = X axis) to produce a line.

(C) A linear regression was calculated using L1 as the X variable and L4 as the Y variable, to produce the equation for a line y = ax + b, where a is the slope of **#.##** is the speed of acceleration. To determine the percent error the equation ((|O-E|)/E)*100 was used to give the value ((| **#.##** - **#.##** |)/ **#.##**)*100 = **#.##** % error)

(A)

(B)

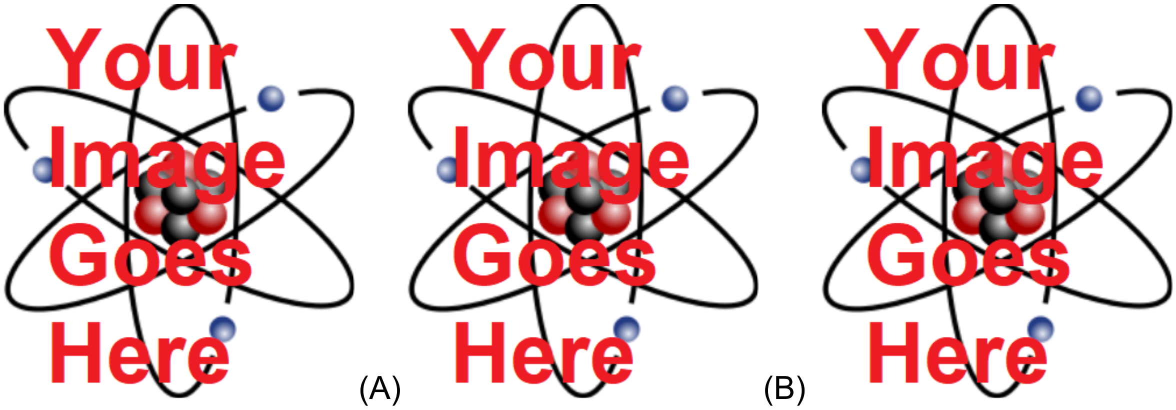
(C)

Figure 4: TI - Graphing of the Small Steel Ball.

(A) The distance (L2) the ball fell was recorded for each 0.05 sec segment (L1). To determine the average velocity (L3) the equation V=d/t was used (L3= L2/L1). Because of constant acceleration, the final Velocity (Vf = L4) was determined by doubling the average velocity (L4= L3 * 2).

(B) Velocity (L4 = Y- axis) was plotted against time (L1 = X axis) to produce a line.

(C) A linear regression was calculated using L1 as the X variable and L4 as the Y variable, to produce the equation for a line y = ax + b, where a is the slope of **#.##** is the speed of acceleration. To determine the percent error the equation ((|O-E|)/E)*100 was used to give the value ((| **#.##** - **#.##** |)/ **#.##**)*100 = **#.##** % error)



(A) (B) (C)

Figure 5: TI - Graphing of the Styrofoam Ball.

(A) The distance (L2) the ball fell was recorded for each 0.05 sec segment (L1). To determine the average velocity (L3) the equation V=d/t was used (L3= L2/L1). Because of constant acceleration, the final Velocity (Vf = L4) was determined by doubling the average velocity (L4= L3 * 2).

(B) Velocity (L4 = Y- axis) was plotted against time (L1 = X axis) to produce a line.

(C) A linear regression was calculated using L1 as the X variable and L4 as the Y variable, to produce the equation for a line y = ax + b, where a is the slope of **#.##** is the speed of acceleration. To determine the percent error the equation ((|O-E|)/E)*100 was used to give the value ((| **#.##** - **#.##** |)/ **#.##**)*100 = **#.##** % error)

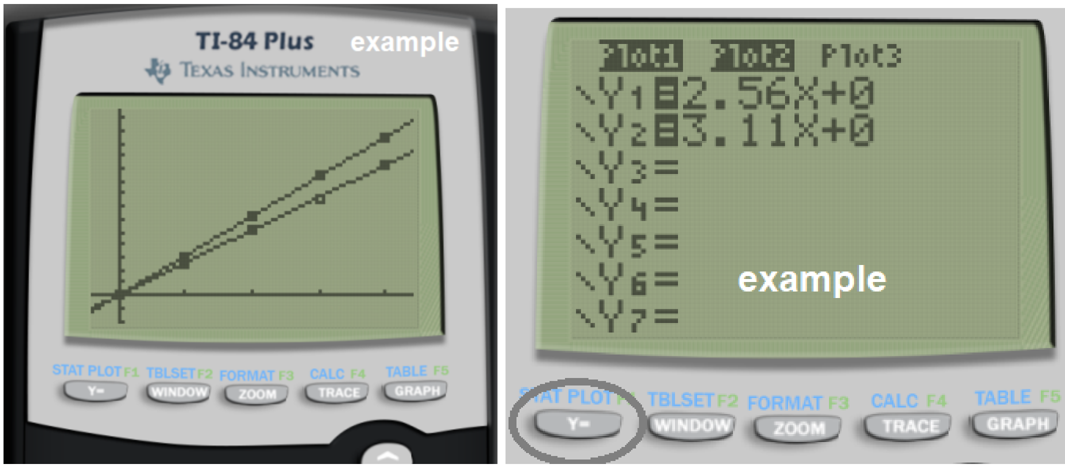


Figure 6: TI Calculator- Velocity Vs Time graph just the Fastest Ball and Slowest Ball.

You want a legend naming the two balls and what the difference of accelerations were between them (results).

For help go to … http://drduick.com/videos/35.html

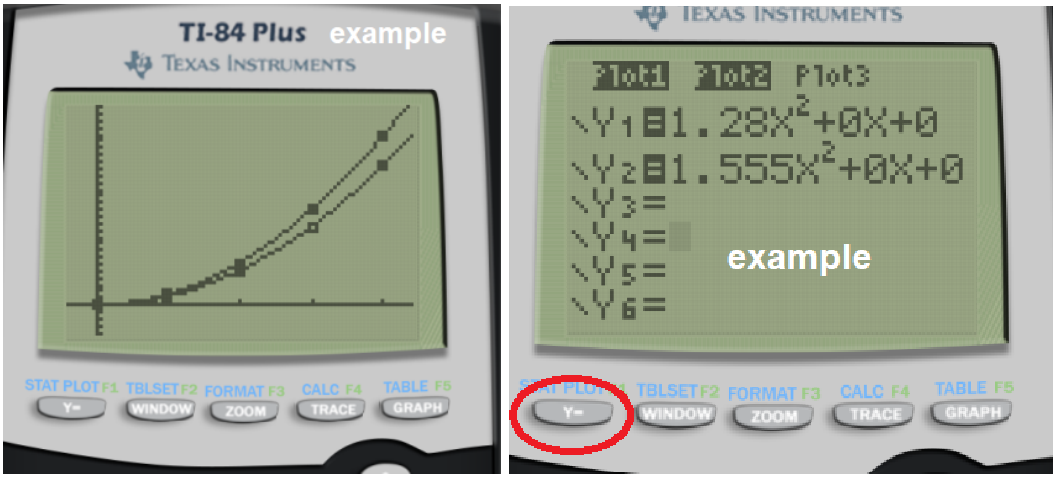


Figure 7: TI Calculator- Position Vs Time graph of just the Fastest Ball and Slowest Ball. You want a legend naming the two balls and what the difference of quadratic equations (curved line) were between them (results).
For help go to … http://drduick.com/videos/36.html

CONCLUSION:

In this study we determined the acceleration of….. We hypothesized that the ***(restate hypothesis)***……… Our data shows that the acceleration of the balls were ***(give actual numbers)***……. We also determined that the ball with the smallest percent error was (***insert name of ball)*** with a percent error of ***#.##% (3 sig figs)***, compared to (***insert name of ball)*** which had the largest percent error of ***#.##% (3 sig figs).*** With this information we ***(accept/reject)*** the hypothesis because …..

RED PROMPT:
remove all prompts in ( ) and insert your information
Insert actual numbers for #.###% and make sure it has 3 significant digits.
Choose either accept or reject and give reason why.
Remove this red prompt when done