

Name \_\_\_\_\_  
SI Physics  
Period \_\_\_\_\_

Date \_\_\_\_\_  
Lab #9H (55 pts)  
Mrs. Nadworny

Partners:

Due Date \_\_\_\_\_

## Acceleration Due to Gravity

**NO Lab Write-Up Required**  
attach conclusion

### Purpose

- To determine the acceleration due to gravity

### Materials

- Tennis ball
- stopwatch
- meter stick
- marble
- Bounce Pad

### Procedure

- Hold a tennis ball at the ceiling or out of the window. Record the distance from bottom of the ball to the ground, measuring to the nearest whole centimeter. Convert your distance to meters.
- Drop the tennis ball and time its fall using a stopwatch. Do NOT round to the tenths place, KEEP all digits from the stopwatch. Record in the data table below.
- Return the tennis ball to the height in step 1 and repeat four more times.

**Data Collection:** Complete the data table below. Remember to record measurements to the proper number of significant figures.

Trial	Distance (cm)	Distance (m)	Time (s)	Acceleration (m/s <sup>2</sup> )
	± _____	± _____	± _____	
1				
2				
3				
4				
5				

(15 pts)

**Data Processing:** Calculate the magnitude of the acceleration of the ball due to gravity for **each** trial. Show a **single** sample calculation below and then summarize all your results neatly in the data table.

(5 pts)

Givens and Unknowns:

Equation:

Substitution:

Solution:

d =

t =

v<sub>i</sub> =

a =

\* After you calculate the magnitude of the acceleration for each trial, calculate the range, average and uncertainty in the average for the acceleration below. Show your work in the space provided. (10 pts)

Range	Average	Uncertainty

Experimental Value for Acceleration due to Gravity = \_\_\_\_\_  $\pm$  \_\_\_\_\_ m/s<sup>2</sup>

### Percent Error (5 pts)

Calculate a percent error between your experimental value and the accepted value of 9.81 m/s<sup>2</sup>. Show all of your work using the GUESS method. [Do NOT use a negative with any of the values for g.]

### Conclusion (20 pts)

- Paragraph One
  - Restate the purpose/research question of the lab. (Ex – The purpose of this lab was to . . . )
  - Summarize the experiment using only one or two sentences. Do NOT restate the entire procedure. (Ex – In this experiment we . . . )
  - State your experimental value for acceleration due to gravity. (Ex – My experimental value for the acceleration due to gravity was . . . )
  - State your percent error for method 1. (Ex – My percent error from the accepted value was . . . )
- Paragraph Two
  - Write about one idea that was reinforced during the lab or one new concept you learned. (Ex – Ideas that were reinforced during this lab include . . . OR Concepts I learned during this lab include. . . )
- Paragraph Three
  - Identify one possible source of error in this lab. (Ex – A source of error that occurred during this lab includes. . . )
    - Explain how it happened. (Ex – This error occurred because . . . )
    - Explain how it affected your data collection (Ex – This led to an increase/decrease in our distance/time).
    - Explain how it affected your overall results (Ex – This led to an increase/decrease in our value of acceleration due to gravity).
    - ❖ Do not say “human error.” If something was the result of you being a human and not being perfect, explain exactly what occurred. Blaming your calculations, faulty equipment, lack of technology or imprecise tools is also not acceptable. Avoid highly improbable events, such as wind gusts or dramatically shifting gravitational fields.
    - ❖ Air resistance and wind gusts will NOT be accepted as sources of error.
    - ❖ Be as specific as possible – explain if it increased or decreased – use descriptive words such as minor, considerable, or drastically.
  - Explain how the identified source of error (above) could be reduced in future experiments.