**General Physics eJournal 1**

**Uniform Motion: Terminal Velocity**

**Instructions:**

Follow the Writeup and fill out the eJournal as you complete the lab activities. Submit your eJournal report by uploading the completed WORD or PDF document to our class Learninghub site. If the Learninghub site is down, email the completed report file directly to a lab TA.

**Preliminaries:**

* Title:
* Name(s):
* Date:
* Time In & Out:

**Plan:**

**Hypothesis**

Form a hypothesis regarding the relationship between the air resistance drag force and the terminal velocity of a falling coffee filter. – sketch hypothetical graphs of Fdrag vs. v and Fdrag vs. v2 and include images of your graphs in this eJournal.

*Insert images of your graphs*

**Experiment Outline**

Briefly describe your plan for testing your hypothesis.

**Equipment List**

* List
* Equipment
* Here

**Action:**

Describe the techniques used to collect data by responding to the bullet point questions:

* How did you measure terminal speed of falling coffee filters?
* How did you vary the force (weight) acting on the stack of falling coffee filters?

*Insert labeled image of your apparatus*

Copy and paste a Tracker image of a falling stack of coffee filters with applied position points.

*Insert Tracker image of coffee filters*

**Results:**

Record the numbers of coffee filters in a stack, the corresponding terminal speeds (absolute value of terminal velocity), and speed-squared in Table I.

**Table I: Terminal Velocity and Velocity Squared
for Stacks of Falling Coffee Filters**

|  |  |  |
| --- | --- | --- |
| **# of filters** | **|vterm| (m/s)** | $v\_{term}^{2}$ **(m2/s2)** |
| 0 | 0 | 0 |
| 1 |  |  |
| 2 |  |  |
| 3 |  |  |
| 4 |  |  |
| 5 |  |  |

**Analysis:**

Insert an image of your graph of #filters vs. speed - displaying the power law trendline and equation; note the exponent of the power law, comparing the power of the exponent to the expected value of 2 for $F\_{drag}∝v^{2}$.

*Insert image of power-law graph*

Exponentmeas = \_\_\_\_\_\_\_\_\_\_\_

Percent difference in exponent = $\frac{\left|exponent\_{meas} - 2\right|}{2}×100\%$ = \_\_\_\_\_\_\_\_\_\_\_ %

Insert an image of your straight-line plot of #filters vs. v2, displaying the linear trendline and equation. Record the linear correlation coefficient, R, for the #filters vs. v2 graph. Interpret the correlation coefficient to assess how well the linear fit matches the data. Note that R = +1 is a perfect positive correlation, R = -1 is a perfect negative correlation, and R = 0 is no correlation.

*Insert image of linear graph*

Correlation Coefficient = R = \_\_\_\_\_\_\_\_\_\_\_\_ high correlation/low correlation (choose one)

**Conclusion:**

Discuss how your graphical analysis compares with your hypothetical predictions. Justify plotting #filters instead of Fdrag. What are the strengths and weaknesses of this experiment? How might you improve this experiment or explore it further? What might change if you performed a similar experiment with tiny sediments falling under gravity in water?