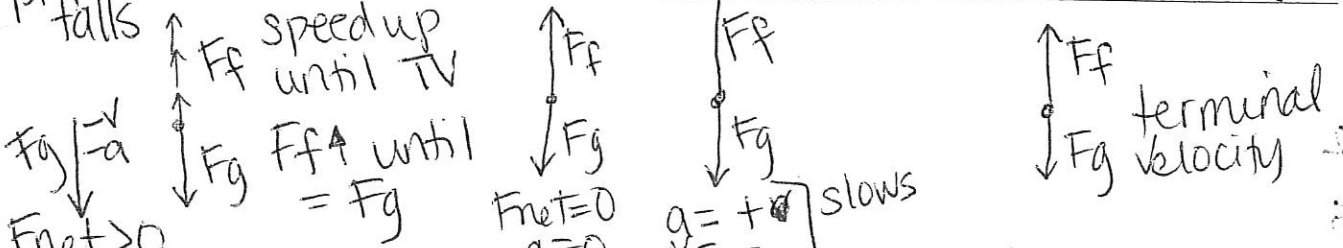


TERMINAL VELOCITY LAB

Watch the Skydiving video and take notes: <http://www.youtube.com/watch?v=ur4006nQHsw>



Question: Does the mass of an object affect its terminal velocity?

What is terminal velocity:

Free body diagram of coffee filter:

Model: make the invisible visible

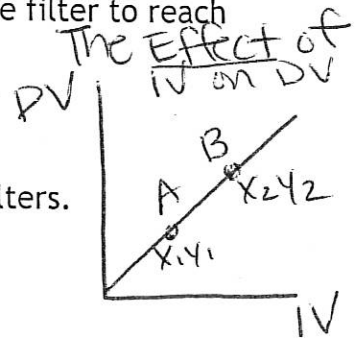
Hypothesis/Testable Prediction: If the mass increases then the terminal velocity will _____ because the force of gravity will _____ and the friction force will _____.

(increase, decrease, remain constant) increase, decrease, remain constant

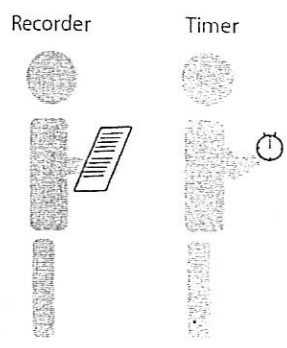
increase, decrease, remain constant

Procedure:

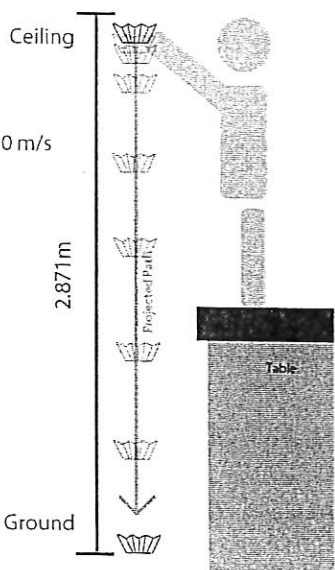
1. Measure a reference height against an open wall that is greater than 1.5 m above the ground and record this height. _____ m
2. Begin dropping coffee filters from the above distance in order for the filter to reach terminal by 1.5 m.
3. Begin timing the coffee filter when the filter passes the 1.5 m mark.
4. Stop timing when the filter hits the ground.
5. Repeat 3 times.
6. Repeat this procedure with 2, then 3, then 4...all the way up to 8 filters.



Terminal Velocity Lab Apparatus



Release Velocity: 0 m/s



Independent Variable: _____

Dependent Variable: _____

DV goes on the _____ axis.

slope = $\frac{\Delta y}{\Delta x}$

steep slope = high correlation between variables

high

not high

RESULTS

# of filters	1	2	3	4	5	6	7	8
Trial #1 time (sec)	1.4	0.9	.85	0.7	0.6	0.37	0.55	0.45
Trial #2 time (sec)	1.43	0.97	.67	0.75	0.7	0.6	0.56	0.45
Trial #3 time (sec)	1.56	0.8	.7	0.75	0.6	0.65	0.45	0.46
<u>Average</u> time (sec)	1.46	0.89	0.74	0.73	0.63	0.54	0.52	0.45

Record the mass of 8 filters and then divide by 8 to get the average mass for one filter.

Since Terminal Velocity is constant, calculate the velocity of falling by using the formula $d = v \times t$.
Manipulate the formula here to get velocity:

$$d = v \times t$$

$$v =$$

# of filters	Mass (grams)	Average Velocity (m/sec)
1.		
2.		
3.		
4.		
5.		
6.		
7.		
8.		

TRENDS:

Graph your results using a best-fit line: Don't forget title, units, labels, and largest scale possible!

What is the slope of your line? Steep or shallow.

What is the actual value? Remember the formula: $y_2 - y_1 / x_2 - x_1$
Show your work on the graph:

A large value for slope means there is a high correlation or effect between the two variables. Is there a high or low correlation between mass and terminal velocity?