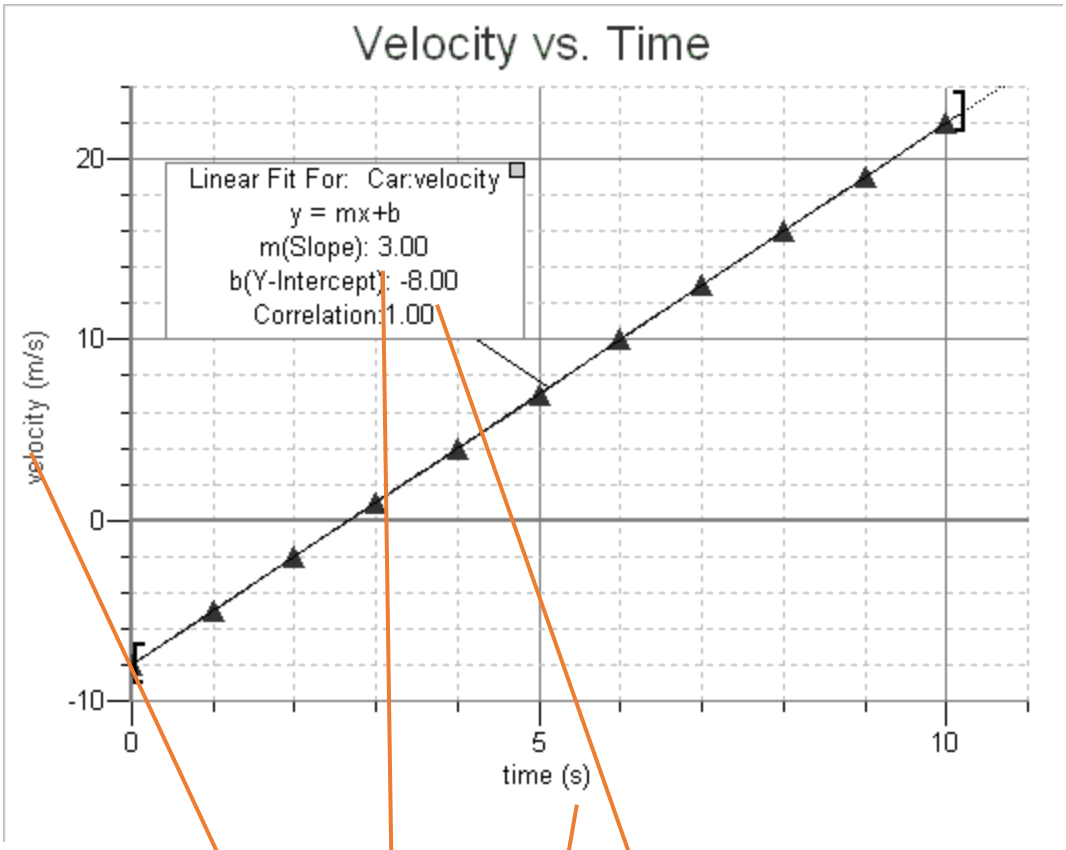
How to do "Physics Math-Modelling"

So you want to "math model" a graph to understand, get an A, or just bored an interested, this is what you need to know how to do. See the pattern and succeed.

y	=	**m**	**x**	+	**b**
↓		↓	↓		↓
Dependent Variable (aka the y axis)		Slope number and the division of the y-units with the x-units	Independent Variable (aka the x axis)		Intercept (initial value or error)

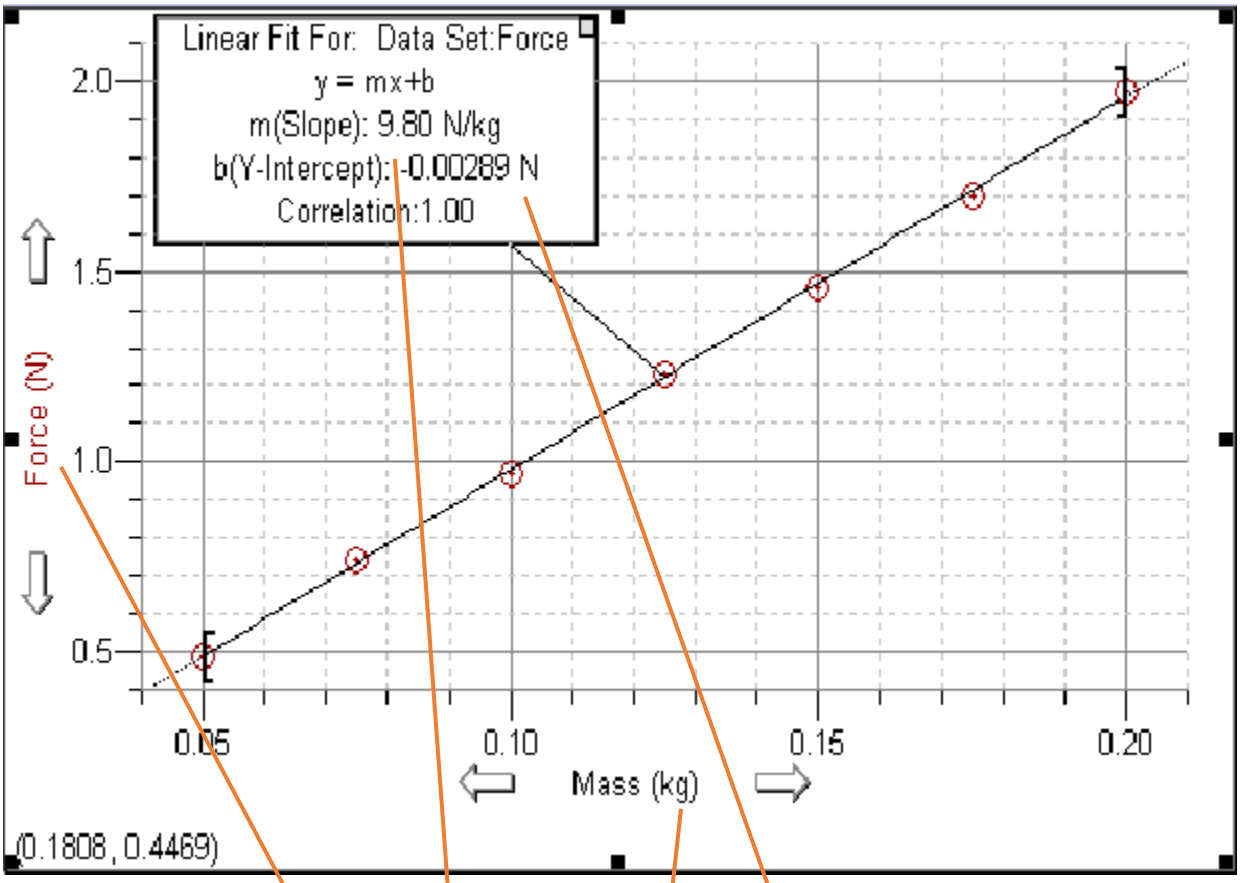


y = m x + b
↓ ↓ ↓ ↓
v = 3 (m/s²) t + -8.00 m/s

General Equation

$$v_f = at + v_i$$

Why Keep Intercept: The intercept is a big number and it makes sense that I can have an initial velocity.

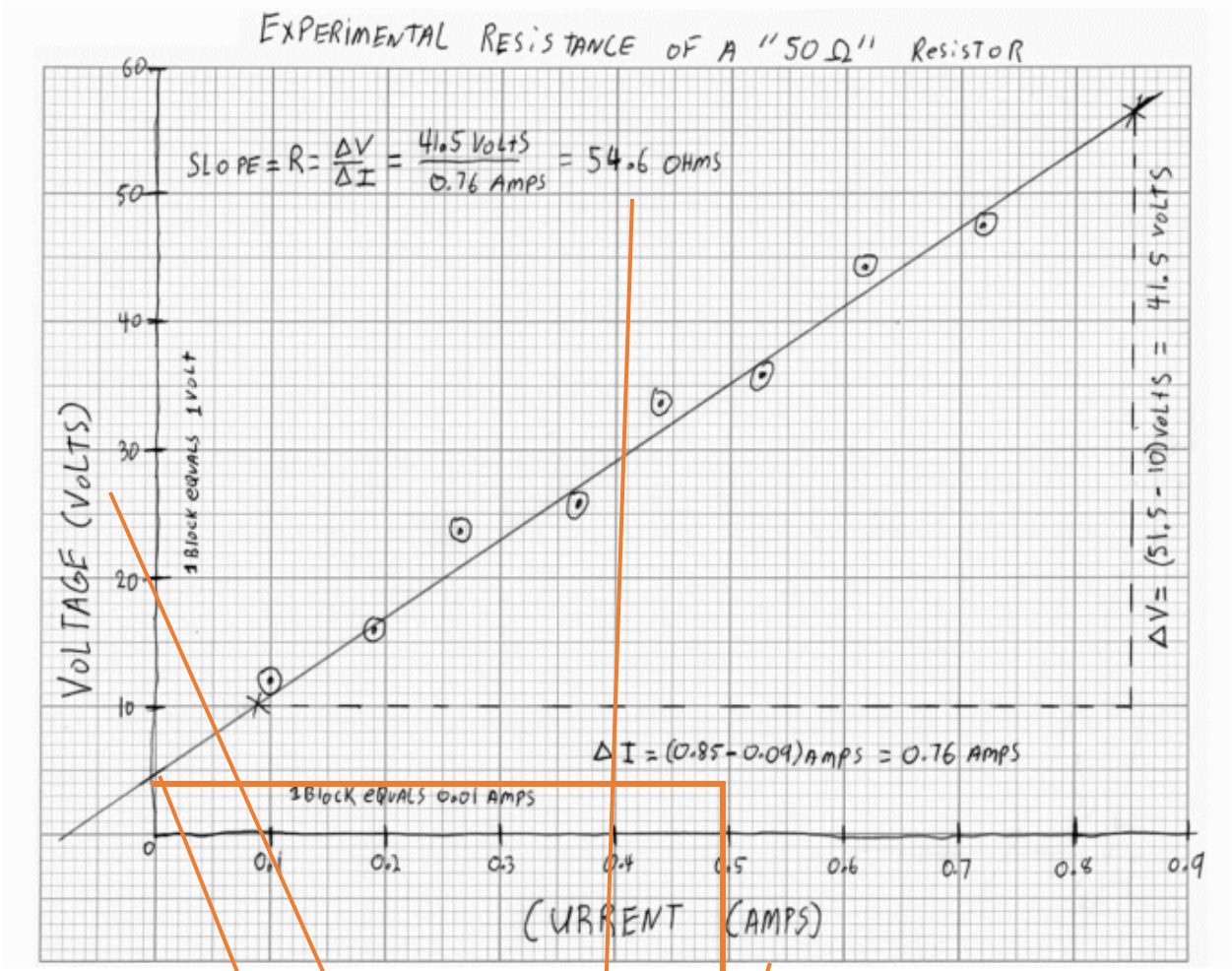


y = m x + b
↓ ↓ ↓ ↓
F = 9.80 N/kg M + -0.00289N

General Equation

F = am or F = ma

Why Keep Intercept: The intercept seems small so it is probably zero but there is some error. Also, if I have zero mass or zero acceleration, I have zero Force.



y = m x + b
↓ ↓ ↓ ↓

V = 54.6 V/A A + 5V

General Equation

$V_f = kA + V_i$ or $V_f = \Omega A + V_i$

Why Keep Intercept: The intercept is relatively big and it makes sense that I can have an initial velocity like for a battery or something.

Interpreting R^2

- R^2 is a representation of how much correlation or "validity" a study has. An R^2 may be between 0 and 1.

- $R^2 = 0$ means there is no correlation at all (e.g., eating bananas makes the planet Jupiter smaller)

- $R^2 = 1$ means there is a complete 1:1 relationship of events (e.g., sleeping 6-7 hours a day reduces fatigue.)

- $R^2 = 0.5$ means that it is inconclusive and we don't know (e.g., yawning helps athletic performance….yes, no, maybe…no one knows)

- In this class you want R^2 values above 0.7 and preferable around 0.9

- If you have a low percent error and a higher R^2 value, you still cannot trust your data because you don't accurately documented a bad relationship.