Physics Lab Rubric

The following rubric uses many components of the Cambridge grading system, to better prepare you for the Cambridge test at the end of the year. **Pay careful attention to detail.** Check the example on my weebly from the circles lab if you need help. *All sections except the conclusion should be completed as a group & shared amongst group members. This document (one for each group) should be shared to McKeon before the start of class on the due date. The conclusion must be done individually & must be unique to each class member. The conclusion must be printed and turned in individually at the start of class on the due date.*

Cheating/Copying will result in a zero for the assignment, without the ability to retake.

Format (2 points)	1. Name, team member names, title (a creative, fun title can potentially earn a bonus point). Report is **typed** or written in **pen**. The conclusion is printed and submitted individually and the rest is submitted via a shared google doc. There should only be one google doc for the entire group. However there should not be any conclusions in that shared document. 1st semester: **graphs are created in PASCO Capstone;** 2nd semester: **graphs are handwritten in pencil** 2. Each section clearly labeled, neat, and organized.	
Aim (1 point)	1. Aim or purpose is clearly stated.	
Variables (2 points)	1. Independent and dependent variables are correctly defined. 2. Independent and dependent variables are clearly defined (full name, abbreviation, and unit).	
Apparatus (2 points)	1. Sketch or diagram of experimental setup (how did you set up the lab initially) 2. Diagram has all parts labeled.	
Procedure (3 points)	1. **Clear** and brief sequence of steps taken during the experiment. Include the values that you measured. Include any precautions. Do not include how to set up the apparatus. Just say "set up apparatus as shown in diagram." Do not include how to interpret the data. 2. Include information on what to change and what to keep constant each trial.	
Data (4 or 7 points)	1. Measurements organized into a neat, clearly organized table. 2. Column headers are labeled with abbreviations and units are given in the proper format. If not stated earlier, a key is provided for what each abbreviation stands for. 3. All measured values are given to an appropriate number of decimal places (based on the measurement device used). All values have the same number of decimal places. 4. Data represents a good number & range of points. (8x10 rule when possible) If applicable... 5. Calculated data is included (with column headers and units given in the proper format) 6. Calculated data has the same number of significant figures (or one more than) as the values in the raw data. 7. Formulas (with variables, not numbers) and an example for how to calculate the calculated information are present	
Evaluation of Data (5 points)	1. Graphs (hand drawn if 2nd semester) are included and properly labeled (with the same abbreviations used in the data tables and with units given in the proper format). [2] • 2nd semester: Axes should be chosen so that your data occupies at least half of the graph. • 2nd semester: Points should be small (not "blobs") and should be accurately placed. 2. When appropriate, draw a line of best fit. You should have the same number of points on either side of the line. Your data points should not be connected. • 2nd semester: a triangle should be used to indicate the points used to calculate the gradient. The triangle should be at least half of the drawn line. • 2nd semester: work should be shown for gradient calculation 3. Mathematical model (equation for the line of best fit) is included, if appropriate. Mathematical model should be written with appropriate variables (not x and y), correct number of significant figures, and units [2] • 2nd semester: work should be shown for calculating y-intercept if it cannot be clearly read from the graph	
Conclusion (13 points) ***Completed and submitted individually (via a printed document)***	1. Written explanation of relationships discovered in experiment (____ is proportional/inversely proportional to _____. So if _____ increases then...). [2] 2. Mathematical model is included again. 3. Discuss the **physical** meaning of the slope of your graph. What would it mean if your slope was bigger or smaller? What is the physics term associated with the slope? [3] 4. Discuss the y-intercept. What does it **physically** represent? What is the physics term associated with the y-intercept? Are the values you got appropriate for the lab? If not, what would we have expected the y-intercept to be? [3] 5. From your discussion of points 3 and 4, derive and give the general form of the mathematical model we discovered (aka the new formula). 6. Define any new physics terms from this lab (such as the slope, y-intercept or any other **new** terms discussed). 7. At least 2 sources of error are mentioned. You should always have a source of error. **Sources of error are not things you did wrong**, they are reasons the quality of the lab may be poor. If you are stuck, think about what you would do differently to make the experiment more accurate. (Do you need better measuring devices? Does it matter what angle you look at the measuring device?) **Be specific.** Stating "Human error" or "we messed up" will result in zero points for the entire conclusion section. If you performed a simulated (on the computer) lab, include sources of error you might encounter if you had done the lab in real life. 8. How could you adjust the lab to reduce error from the source you previously mentioned? Do not just put something like "measure better" or "use a computer." **Be specific.**	
	Total (out of 32 or 35)	