Requirements for the Force and Motion Lab Report (done individually and submitted through Canvas)
Although most students are able to conduct reliable scientific investigations and draw reasonable conclusions, many struggle putting together a report that provides sufficient evidence that completely supports stated conclusions. Read this section carefully as it will help guide your writing. The rubric that will be used in grading your report can be found in a separate document on Canvas.

- The lab report must be a Word file smaller than 10 MB.

- It must be submitted through Canvas before your next lab class.

- The lab report must include the following <u>three</u> components:

    o **Cover Page** – Each lab report must have a cover page. It should include the individual student name, date of submission, course number and section, and title of the report.

    o **Part I - Discussion and Conclusion: This section is to be written <u>individually</u> by each student.** The details can be found at the blue arrow below.

    o **Part II – Your group's Lab Records 05 should be included at the <u>end</u> of your lab report.** This section should be the actual lab records already submitted by your group. It will NOT be graded as part of your lab report but you <u>will</u> earn points for including it. It is here so your instructor and anyone else who reads your report can look at the data tables and graphs. Rather than have you redo these for your lab report, it is much easier just to include it at the end of your individual discussion like this. Please be sure to keep all names on the lab records included here. Also, you may make small changes to this section if it will help clarify things for the grader, such as including Table or Figure numbers that were inadvertently left off when your lab records were submitted.

Requirements for Part I: Discussion and Conclusion

Many of the requirements for this section have already been discussed with your lab group, but all responses should now be written in your own words in the conversational format of a lab report. Each report, once submitted, will go through a plagiarism prevention service in Canvas. It will automatically compare your report to all other submissions in the system (this goes back years). Although Part II (lab records 05) will obviously show up as matching your lab partners' reports, this section should not show up that way (your instructor can check this). *Please do not copy and paste the list of requirements below into a Word file and fill it out like a worksheet. This will cause your plagiarism matching percentage to increase dramatically. Rather, write it as a <u>thoughtful essay or argument using multiple paragraphs</u>.*

a. **Research question.** Remind the reader what research question was investigated in this lab. Tell the reader which variables (IVs) were tested to address the research question.

b. **Evidence.** This section of the report discusses the **evidence** which supports, or even refutes, your claim. This is a multi-part discussion so be sure each is addressed in light of both IVs.

    i. **Evidence (data) collected by your group**
       1. Discuss how each of the 2 experiments your group conducted led to a separate claim about a given IV. Be sure to refer to the graphs located in Part II (which should be a repeat of your Lab Records 05) in your discussion. Use Figure numbers on the graphs so you can refer to them by figure number.

       2. Discuss <u>how</u> each of the two experiments supported essentially the same final experimental mathematical model. Be sure to let readers actually know what that model is here as well**.**

3. Indicate the **conditions** for which your experimental mathematical models hold.
4. Discuss how the conditions of your models limit the generalizability of your results.

   ii. Evidence (models) provided by other groups
   The experimental models of other groups can be used as further evidence for the validity of your model. Discuss the two models of at least 2 other groups and describe how their outcomes support (or refute) your models. Be sure to cite these groups using their group number.

   iii. Scientific theory as evidence for your model
   1. State the scientifically accepted (theoretical) model for this lab.
   2. Discuss for the reader <u>how</u> well both of your experimental models fit with the same theoretical model, that is, Newton's 2nd Law (F=ma). As part of this discussion, be sure to indicate whether or not there is consistency between the **constants** in both experimental models with the theoretical model as well as the **relationships between the variables** in these models.

c. **Confidence in claim(s).** This section of the report should discuss for the reader the level of confidence you have in your outcomes. This is a multi-part discussion so be sure each is addressed.

   i. Discuss what makes you confident, or causes you to lack confidence, in the **actual data measurements** your group collected for both experiments. Again, refer to any Tables or Graphs in Part II using their table or figure number.
   ii. Discuss what makes you confident, or causes you to lack confidence, in the **trend lines or mathematical model provided by Excel** for each of the 2 IVs.
   iii. Discuss how the outcomes of at least **two other groups** add to or subtract from your confidence in your claim(s).
   iv. Discuss how the **theoretical model** adds to or subtracts from your confidence in your claims. Be descriptive even if you feel you are slightly repeating something written earlier in the report.
   v. Errors will affect your final claims and the confidence you have in them.
      1. Discuss which **errors** (random and/or systematic) may have been present in the investigation.
      2. For each error mentioned, discuss <u>how</u> it may have impacted your experimental models. You may refer to the theoretical model in your discussion to help you know how the error may have affected your own model.

d. **Future Work.** Discuss how you might improve your experimental design if you were to repeat the experiment. This <u>could</u> include a discussion about how you might reduce random and/or systematic error, what other variables you might test (if warranted), what equipment you might use instead of what was provided to you, how you might extend the conditions for which your model holds, etc. Not all of these need to be included in your discussion, but rather these are provided to get you thinking about this. Be logical in this discussion as related to your own experiments rather than mention everything you can possibly think of here.

e. **Grammar usage, reference citation, and written as an essay**. It is important to proofread your writing and to correct mistakes in spelling, grammar, and punctuation. When referencing the work of others, use the APA style. Also, as indicated earlier, the report is to be written as an essay rather than an outline or as if filling in a worksheet.