

AP Physics Lab Notebook Checklist

All mandatory and optional labs, activities, and investigations should be written in your lab notebooks. The following checklist will help to ensure all students meet my expectations for their lab reports.

Introduction:

- Includes title, College Board big ideas, and learning objectives (available on website)
- Includes a question to be investigated.
- Includes the purpose and objectives of the investigation.
- Includes answers to pre-lab questions and all calculations (if required)

Methods/Materials/Procedures:

- Includes a reference to the lab document or lab hand-out. For example, it is permissible to write: “The methods and materials for this lab were followed according to the protocol outlined in AP Chemistry Lab #5- Synthesis and Analysis of Alum”.
- All deviations and modifications from the outlined protocols must be explicitly addressed in this section. For example, a student may write: “I used 500 μL of the crystal violet solution, rather than the 400 μL called for in the lab protocol”. Another example, “I used a Vernier digital photogate to determine the final velocity of the steel ball, instead of the stopwatch and meter stick referenced in the lab manual.”
- Include labeled sketches of apparatuses utilized to collect data in the labs. For example, you may have sketches of a titration apparatus, gravimetric filtration, the color change of a chemical reaction, the conical pendulum scribed by a flying pig, electrical circuits, free-body diagrams, etc.

Data Collection and Analysis:

- All data must be compiled in an organized data table. It is often possible to use the templates provided in lab originals and manuals; however, you are encouraged to create a data table that best fits your anticipated data set.
- Graphs are made by hand and must have a title, labeled axes with units, proper increments along each axis to ensure a maximum spread of data points, and must be at least $\frac{3}{4}$ of an entire page.
- Graphs that are linearized must include the modification used to linearize and the equation for the line.
- Percentage error and percentage difference must be completed on all applicable data sets. Show all work for full credit. Here are the equations for each calculation:

$$\text{Percent Error} = \frac{|measured - actual|}{actual} * 100\% \qquad \text{Percent Difference} = \frac{|measured_1 - measured_2|}{\left(\frac{measured_1 + measured_2}{2}\right)} * 100\%$$

- Sources of error must be explicitly addressed in all labs. Please avoid the term “human error” and use the terms systematic and random error. Always acknowledge sources of error. [Click here](#) for the hand-out.
- Data excluded from analysis must be referenced along with a justification for the exclusion.
- The degree of uncertainty in all measurements should also be addressed along with the propagation of error.
- All data with decimals will need a zero preceding the decimal. (e.g., **0.52**)
- State your claim after collecting evidence and data. This is a single sentence that shows a relationship between the independent and dependent variable based on your evidence and data.

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Lab Questions and Conclusion:

- All lab questions must be answered in complete sentences. Answers to questions requiring calculations should explicitly reference the calculations. Answers without calculations clearly referenced will not receive credit.
- The question numbers on the original lab document or lab manual should correspond with the numbers used in your lab notebook.
- At minimum, the conclusion should be 5-7 sentences in length. Your conclusion should always indicate the relationship to one or more scientific principles. Here are some topics you may choose to discuss in your conclusion: 1). Revisit the question and claim for the lab investigation; 2). Discuss your data and why the results support your claim; 3). Discuss how the results would be affected by changing the number of measurements, measurement techniques, or the precision of measurements; 4). Review and critique your experimental design or procedure and decide whether the conclusions can be justified based on the procedure and the evidence presented; 5). Propose suggestions that would limit your experimental sources of error; 6). Discuss new ideas and questions this lab may have generated for you; 7). Suggest how you could explore some of these new ideas and questions.

Lab Notebook Format:

- Update your table of contents before turning in your notebook.
- Write in blue and black ink only. Refrain from using white-out.
- Incorrect or changed answers should be marked out with a single line.
- Check the top of each page to ensure you have a title, page number, and date (e.g., 20 AUG 2020).
- Use “To Page/From Page” pagination as you do in your STEM journals and biotech notebooks.
- Place a single diagonal line through any unused spaces of the notebook exceeding 1/5 of a page. This also includes any blank pages and the section of a page that might be left at the very end of a lab.
- Double check to ensure I will be able to easily follow the flow of information required for the lab.
- Lab notebooks do not need to be neat and perfect. You will make mistakes in science. Please do not feel you ever need to rewrite your work.
- All students are required to be recording data in their own lab notebooks while conducting the lab.