

## Honors Chemistry Lab Notebook Checklist

### 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  $\mu\text{L}$  of the crystal violet solution, rather than the 400  $\mu\text{L}$  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:

$$\text{Percent Error} = \frac{|\text{measured} - \text{actual}|}{\text{actual}} * 100\% \qquad \text{Percent Difference} = \frac{|\text{measured}_1 - \text{measured}_2|}{\left(\frac{\text{measured}_1 + \text{measured}_2}{2}\right)} * 100\%$$

- 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.

Continue to the next page →

### **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.

**Please note that exemplars for both courses are located on [www.PedersenScience.com](http://www.PedersenScience.com) .**