

# POST-Lab Assignment

USE BLACK OR BLUE PEN IN YOUR LAB NOTEBOOK. NO PENCIL or ERASABLE PEN!

You can use color to annotate, but the majority of the writing needs to be in black or blue pen.

Make a mistake? Cross out with a SINGLE line. NO WHITE OUT – EVER!

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- Will physically turn in your Lab Notebook and Two Pager handout and/or will submit photos of work digitally.
  - Filling out data tables during lab, Calculations Section and Discussion Questions will be done in your Lab Notebook.
  - The rest of the sections will be done on your “Post-Lab Two Pager” handout.
  - The top of your lab handout will tell you which sections need to be completed each time.
  - Do NOT do extra sections than what is asked for at the top of your lab handout.
  - Not all sections on the Two Pager will be relevant to each lab. One of the things you are being assessed on is whether you can accurately determine which sections are relevant to the lab!
    - If a section is not relevant you can leave it blank, put a slash or x through it, or write NA for “not applicable.”
  - Will sometimes be graded for completion and/or accuracy. Not all completed sections will necessarily be graded every time, one section might be chosen, or all might be chosen for grading.
  - Professionalism matters – If I can't read it, if it looks like you did it last minute walking to class, if it looks like you put no thought, effort, care, detail into your work, that will be reflected in your score.
  - You must use adequate spacing and handwriting size to keep your work clear and understandable. Do NOT try to save space. You can always staple on an extra piece of binder paper to the back of your Post-Lab Two Pager. Clearly communicating your work matters more than saving a few pieces of paper.
    - If you run out of space for a section and finish it on binder paper, make sure to tell me that on your Post-Lab Two Pager so I don't mark you down before seeing your binder paper!
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## POST-LAB NOTEBOOK WORK

### DATA TABLES

- a. You started your data tables in your prelab and then filled them out during the lab.
- b. They get turned in with Post-Lab Notebook Work.
- c. Will be looking for:
  - Descriptive title, all data recorded, labels and units where needed, data recorded with appropriate sig figs based on the equipment being used, detailed and descriptive qualitative observations, any notes if something went wrong during the lab, etc

### CALCULATIONS

- a. Not all labs will have calculations. However, if there are ANY calculations happening you need to show them.
- b. Must show ANY calculation or manipulation of numbers done during and/or after the lab. If it is not a direct measurement there should be evidence of it in the calculation section.
- c. Sometimes the results of calculations are also put into your data tables. You still need to show the calculations here!
- d. Even “simple” calculations need to be shown. Includes adding, subtracting, metric conversions, averaging trials, etc.
- e. If the lab handout listed specific calculations in a numbered list then make sure to number the calculations in your lab notebook to match the lab handout.
- f. Make sure to give a short label of what you are calculation I know what the calculation is.
- g. The “flow of work” must be clear – if I can't follow what you are doing, if it is just random numbers scribbled on the page then I can't/won't grade it. Professionalism and clearly communicating thoughts matters even for calculations!
- h. Make sure you include units EVERYWHERE!

### POST LAB DISCUSSION QUESTIONS

- a. Number all questions.
- b. Do not recopy the question. Paraphrase into your answers so a reader can infer what the question was.
- c. Complete sentences not needed unless asked for. Complete thoughts and answers ARE needed!
- d. If it involves a calculation make sure to show all work, use units, sig figs, label and/or describe what you are doing etc.
- e. Answer with the level of thought and detail expected of your level of chemistry!

**The Post-Lab Notebook Work should be done before you do your Two Pager.  
It will help prepare you for the things that you will need to put on your Two Pager.**

## **POST LAB TWO PAGER SECTIONS**

### **LAB TITLE**

- I am fine if you use the same lab title that is on your lab handout.
- If you make your own lab title it should still be specific.

### **TOPIC**

- Make sure you are telling me the topic not the chapter or subtopic.
  - Chapter = big broad category (*Thermochemistry*)
  - Topic = the concept the lab is covering (*Calorimetry*)
  - Subtopic = too specific, a fact or part of the topic (*Specific heat*)

### **KEY VOCAB TERMS**

- This should be a bullet list of all the key terms related to the topic, not just words you haven't heard before!
- Just list them, you do not need to define them.

### **KEY EQUATIONS**

- This is where you tell me equations that will be relevant to the lab, not showing how you do your calculations.
- Make sure you label the equation so people know what it is for. Example – Density  $D = m/V$

### **KEY CONCEPTS EXPLAINED**

- Written in complete sentences.
- This is sometimes called a "Background Paragraph."
- It should be a summary of the topic the lab is about.
- It should read like a very dense little textbook paragraph.
- If I asked you to tell me everything you have learned about "Intermolecular Forces" you should pack it full of detail and specifics! I will be looking for specific key points.
- You are NOT telling me the procedure of the lab. You should connect it to the lab at the end of your paragraph.

### **IMPORTANT OR UNIQUE LAB EQUIPMENT, SET UP, or NAMED LAB TECHNIQUES**

- You are NOT listing your materials section. You are NOT telling me the procedure.
- You are showing me any special/new/unique equipment that is important to the lab, and describing any special techniques that will be used in the lab.
- Label drawings, explain how special equipment works, how you do the named lab techniques etc
- Examples – If you are using a digital balance to weigh an object before and after you do something to that object you would draw a picture of the balance and explain that you will be "weighing by difference"

### **SIG FIGS RELATED TO LAB EQUIPMENT**

- Report how many sig figs the each piece of lab equipment had and which one limited the sig figs in your calculations.
- Example – Digital Balance = 5 SF, Graduated Cylinder = 4 SF, limited by graduated cylinder
- Your calculations should reflect the appropriate number of sig figs based on the equipment used in lab.

### **YOUR EXPERIMENTAL RESULTS**

- List the final results you obtained.
  - You are NOT listing all your data or individual trials – we average trials together, we don't report every single one.
- Include all relevant results. Often students will be testing multiple things and only report one of the results.
- Clearly label what your results are and have units on them. Do NOT just put a number in the box.
- Your experimental results may not always be numerical. That is fine! Depends on the lab.

### **ACCEPTED VALUE/RESULTS**

- What value/result should you have gotten? What is considered the "correct" answer?
- This will either be given to you in the lab handout, during class, or you will look it up online.
- It is fine if you didn't get this! Your experimental results don't always match the accepted ones - labs aren't perfect!

### **PERCENT ERROR AND/OR PERCENT YIELD CALCULATIONS**

- Sometimes we calculate Percent Errors, or Percent Yields, or describe in words what the error was, etc.
- If it is a calculation (percent error, percent yield, etc) then make sure to show the calculation.
- If it is not a calculation make sure you are being detailed in your written description.

## **POSSIBLE LAB ERRORS**

- This is one of the hardest and most important sections. Take it seriously!
- Number the errors so that you can refer to them easily in the next box.
- I will be looking for very specific key errors that are “big deals” to the lab. Yes, you have figure out what those are!
- Do not ever say “human error” – that isn’t a “thing!” Obviously we are humans, not aliens or cats.
- ONLY say errors that did or may have reasonably happened. If you didn’t knock over your beaker, or mix up your test tubes, or have Godzilla come break your scale, don’t list those as error! Don’t list all sorts of crazy things!
- You are listing errors that are built into the way we did the lab or things that truly happened. Example – We did not maintain a constant temperature during the reaction, we did not specify how long to let the reaction stir for, we did not use real filter paper when filtering our product we just used coffee filters, etc.
- If you list a source of error you should be able to brainstorm a way to fix it! Example – change lab procedure to specify how long to stir the rxn for, use better filter paper to trap more particles, etc. I can, and will ask you for your ideas!
- If you really did make an error that is ok – as long as you tell me about it. If you forgot to heat your reaction like the procedure said then list that. But make sure you can tell me what affect that might have had on your final results. Example – reaction mixture was not heated, you should be able to tell me that means you will make less product if I ask you. AND you should be more careful next time!
  - If an error you make ever impacts your data to the point that it is useless - you will either get data from another group or use sample data that I provide. Talk to me and we will decide which is best based on which lab it is.

## **MATHEMATICAL IMPACT OF LAB ERRORS ON RESULTS**

- One of the other hardest and most important sections! Take it seriously!
- For each error you listed in your Lab Error box you need to tell me what the impact on your results were.
  - Example: If Error #1 was that some of your solid product slipped under the filter paper then your Mathematical Impact box would say: Error #1 = Final yield of product will be lower than accepted.

## **WAY TO EXTEND OR IMPROVE THIS LAB**

- Think of a way to improve the lab procedure to help address one or more of your sources of error, or a way to extend the lab to test another substance/variable/aspect to further your learning.
- Be specific! You can’t just say something like “do another trial, “test a different compound” or “use better equipment.”
- Make sure to explain how/why this would be a good change or addition.

## **EXAMPLE TEST QUESTION ON THIS TOPIC**

- Brainstorm a question related to the lab topic that you think I might put on a quiz or a test.
- You may NOT copy the question from a worksheet or the internet. Copying results in a zero. Do not try to play games and “paraphrase” it by changing one word...that counts as plagiarizing too! Actually think of your own question.
- Write the Q out exactly as it would be on a quiz or test – if it needs data then make up fake numbers and include them.
- Make sure your question shows sufficient depth and complexity so that I can tell that you have learned what is important from this chapter! Do NOT just say something like “tell me everything you know about intermolecular forces.” Do NOT say something specific to the lab like “what was the molar mass of the unknown in the lab?”

## **SOLVED EXAMPLE TEST QUESTION ON THIS TOPIC**

- Show all your work and solve the question you came up with. If it is not a math question that is ok, but give a thorough and detailed answer with key terms/phrases etc.

# **The Post-Lab assignments can change at teacher’s discretion**

ALWAYS read the top of the lab handout, the assignment instructions posted on Schoology and listen to your teacher’s instructions!  
Those supersede what is on this handout – this is a generic set of guidelines and expectations.  
If in doubt – ASK! Ahead of the due date!