Appendix 6: How to Write a Laboratory Notebook

Exp. Number: 1 Exp. Name: Making a Volcano Date: 09/13/17

Name: Christina Rodriguez Lab partner: Asha Course & Sect… No.: CHM1045C/54871

Include a clear, bold heading for each section to make it easy for your readers to follow your work.

Always use ink to preserve the integrity of your data.

Purpose:

[Write the purpose or hypothesis for the experiment here. Always use your own words; copying exactly is plagiarism.]

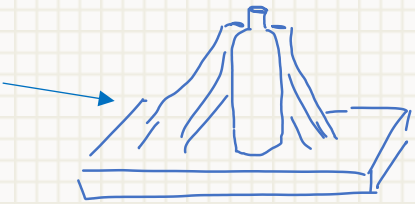
To create a baking soda volcano.

Procedure:

[Write the steps that you will take in the lab to complete the experiment. Do not simply copy the lab procedure since you will probably be allowed to bring it to lab. Think and summarize each part so that you can visualize the work before you arrive; imagine yourself performing each step – it will help you to be prepared and finish the work in the time allotted. Sometimes a flow chart or illustration will be helpful instead of text.]

Part A: make a volcano base with dough

1. Mix 6 cups flour, 2 cups salt, 4 Tbs vegetable oil, and 2 cups water into dough.
2. Mold the dough around a soda bottle inside a large baking dish.



Part B: make the volcano

1. Fill the bottle 3/4 with warm water. Add 3 drops of red food coloring and 10 drops of detergent.
2. Add 2 Tb baking soda to the bottle.
3. Slowly pour ~1/4 cup vinegar into the bottle.

Expt. idea from https://www.thoughtco.com/baking-soda-volcano-science-fair-project-602202.

Exp. Number: 1 Exp. Name: Mass, Volume, and Density Date: 09/13/17

Name: Christina Rodriguez Lab partner: Asha Course & Section No.: CHM1045C/54871

Data & Observations:

[The lab manual gives directions on how to format this section; make sure to read it and build any necessary tables before lab. In the lab, record data in your lab notebook as you work. Add notes about what you did and what it looked like, sounded like, smelled like, etc. Cross out any errors with a single line – an error may turn into eureka, and the lab notebook should be real and accurate. It can be used to help you remember what you did, communicate with others, or prove an idea on a patent. Take the time to write legibly. Space items neatly on the page. Remember units, significant figures, and leading zeros (.5290 g can turn into 5290 g with a single drop of water! 0.5290 g avoids this error, e.g. 05290 g will look strange and remind you that there was a decimal point.). Show your work neatly one time for each calculation type.

Your instructor may want you to initial and date below your last entry, and have a witness sign too since this practice is required in the real world. Going back to add or change data after the lab is unprofessional; initial and date any changes. This is one of the reasons pencil or erasable ink are not allowed.]

Prepared volcano cone.

Added red food color, hot water, and 2 Tbs Arm & Hammer baking soda. Added 1/4 cup ~~Balsamic~~ White vinegar – CR 9/13 vinegar.

Draw a single line through any error, date, and initial. Never scribble out a mistake.

After ~5 sec, foaming red mixture came out of opening. I slipped and poured too much vinegar. Foaming continued for about 30 sec. Some effervescent bubbles. Definite vinegar aroma.

Bubbles mixture overflowed the baking dish. Became less bubbly after ~5 mins.

(See picture attached at end of report (Fig. 1).)

Add notes to direct your reader's attention to important details.

Draw a single line through any large blank space so that the reader may know that nothing is missing.

Exp. Number: _1_____ Exp. Name: _Mass, Volume, and Density_____ Date: _09/13/17____

Name: _Christina Rodriguez____ Lab partner: _Asha_____ Course & Section No.: _CHM1045C/54871

Post-lab Questions:

[Answer post-lab questions here. Use complete sentences for open-response questions and show your work for calculations. Remember to explain completely; you cannot go back and fill in more detail after submission.]

Conclusions:

[Summarize your major findings. This section should be complete so that the reader has a clear understanding of the goals, results, and conclusions without being redundant to the previous sections. Show that you really understood what you did in the lab, instead of simply filling in numbers.

Traditionally, first person is avoided in order to appear less biased. Passive voice is used instead (English composition professors, eat your heart out!). For example, instead of 'We mixed six solutions of different densities', write 'Six solutions of different densities were mixed.' Avoid unsubstantial and subjective comments such as 'I had a lot of fun' or 'a lot of crystals were obtained.' What did you learn? What mass of crystals was obtained?

Try the following structure:

First paragraph: Re-state your purpose or hypothesis. Was it met? What concept were you investigating and how does it relate to the experimental procedure? How did you go about your work and why? This is not the details of your procedure repeated again, but discussion of the processes. For example, describe the methods for finding volume of the unknown objects.

Second paragraph: Summarize your final results (not any intermediate results). What is your conclusion for each part? Use the values you obtain as evidence in your reasoning. Statements like, "see data table for values" are not acceptable! Discuss the validity and reliability of your data in answering the question. Are the results reasonable? How do you know? For example, if you obtained a density of 4 g/mL for a plastic, that would not be reasonable since typical plastics vary from 0.7 – 2.2 g/mL per the data table in the experiment. If you obtained unreasonable results, what were the expected results? Explain based upon what you know from lecture and the lab manual.

Third paragraph: Discuss any problems during the experiment and any errors. These should be more than errors within your control such as 'the glassware must have been dirty.' Describe how the errors might have affected the results. Include standard deviation and relative percent error discussions if relevant.]

The purpose of the experiment was to make a baking soda volcano. The purpose was met by mixing baking soda and vinegar, which had a chemical reaction to bubble and flow out of a formed dough volcano.

The color of the emerging bubbles was red due to the food color. Detergent helped to create extra bubbles. Initially, it was thought that Balsamic vinegar could be used.

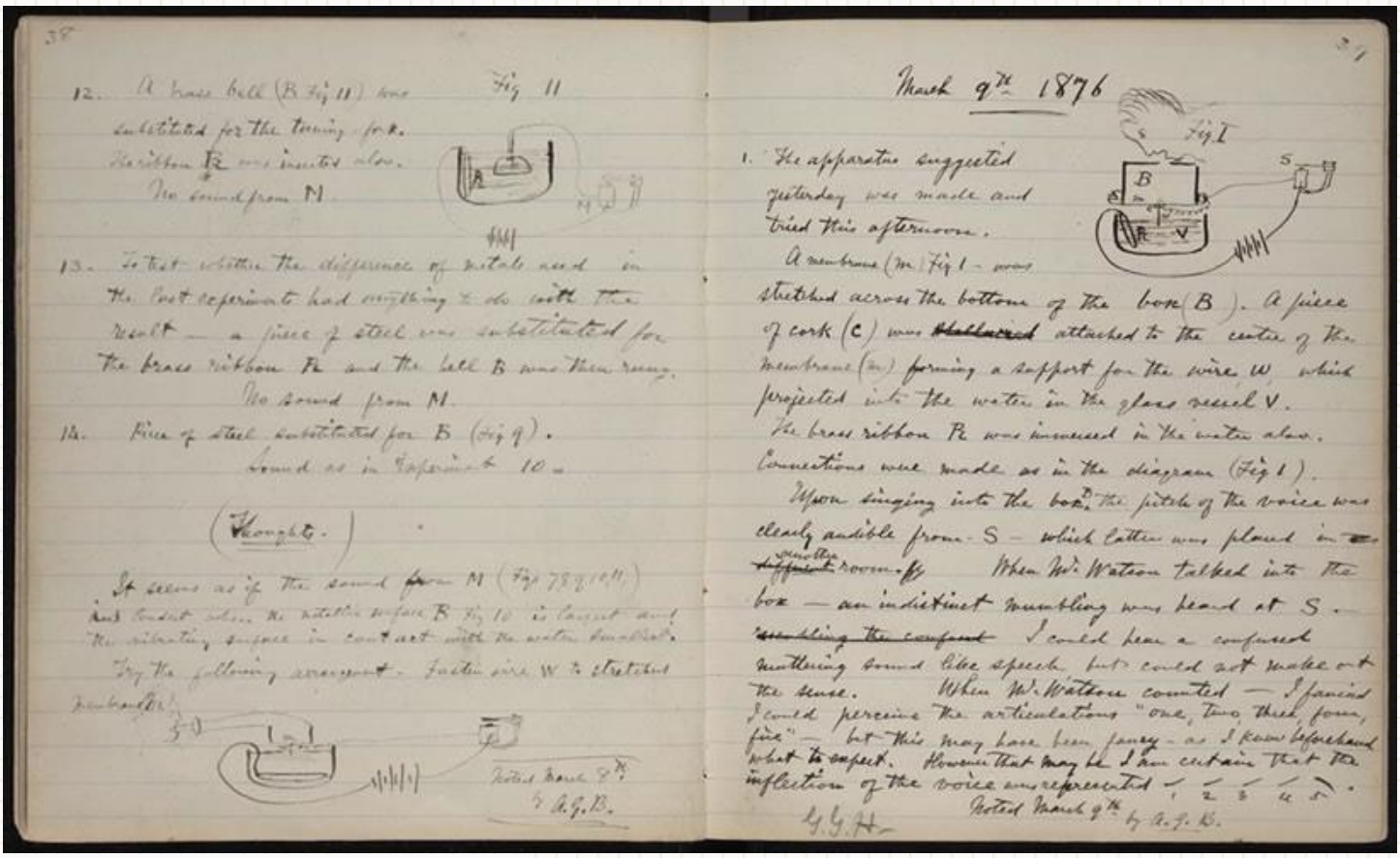
However, the decision was made to use white vinegar instead to avoid the brown color of the Balsamic.

One improvement could be to use a larger baking dish since the small one could not contain the mixture.

Appendix:

[Here, include any extra materials such as graphs, print-outs from instruments, Make sure to follow the guidelines for using Excel such as filling the page with the graph, including title, axes labels and units, significant figures, trend line with equation and R^2 value (if required). Enumerate and title each graph and table.]

A few famous lab notebooks for inspiration:

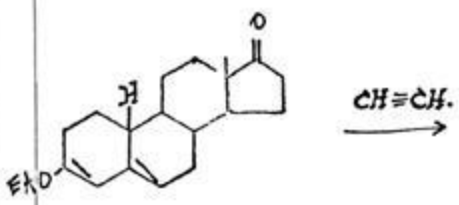


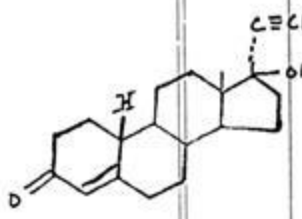
Page from Alexander Graham Bell's notebook. By Alexander Graham Bell [Public domain], via Wikimedia Commons.

114

$C_{20}H_{26}O_2$.- PM 298.41
C, 80.49 H, 8.78.

15 OCT 1951





LM-114-Cr
$\lambda_{max}^{alc.}$ 240 (4.36)

LM-114-Au
Kofl. 200/204°
$[\alpha]$ -31.73 Py
$\lambda_{max}^{alc.}$ 240 (4.38)

Se disuelve 1g. de éter enol de 19 nor androstendiona en 25 cc. de Tolueno anhidro y se agrega a una solución de 1g. de Potasio en 25 cc. de alcohol amílico terciario en atmósfera de Nitrógeno enfriada para acetileno durante la noche a temperatura ordinaria con agitación mecánica.

LM-114. (1253)
CO:- 1656?
OH?
poca muestra?

A la mañana siguiente se vierte en 50 cc. de agua y se agregan 30 cc. de ácido clorhídrico en 25 cc. de agua; se calienta en baño de vapor y arrastra con vapor.

La solución del potasio se logró por calentamiento en glan-col agitando con d'agitador magnético en atmósfera de nitrógeno.

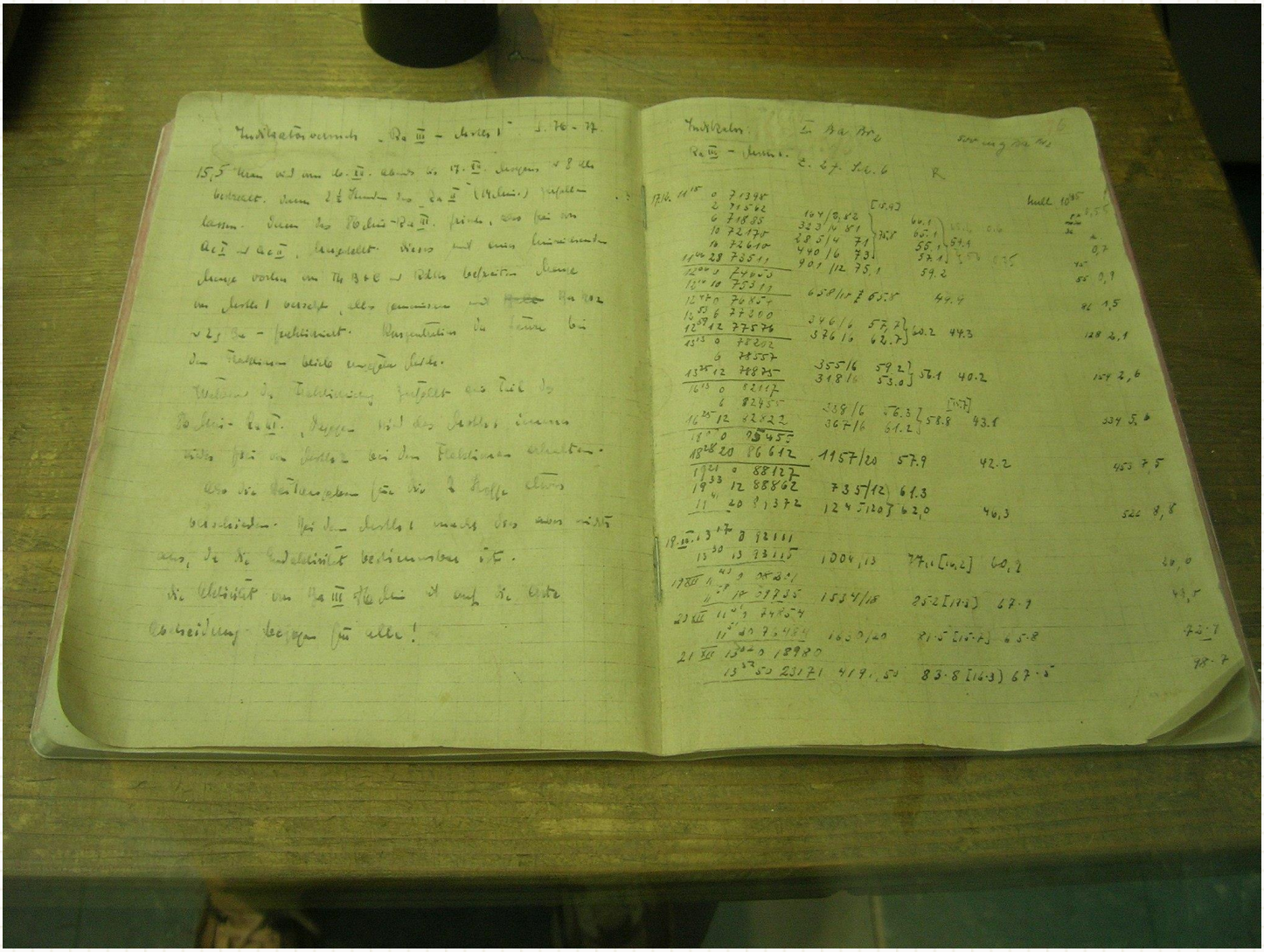
LM-114-An
suf. 1331.-$CHCl_3$
CO:- 1668
OH libre
Δ^4-3-ona.

Después del arrastre con vapor se filtró 7.8 g. de cristales incoloros que se mandó para espectro y para análisis $C_{20}H_{26}O_2$.- La muestra analítica F: 198/200° cristalizada de Acetato de etilo.

La substancia cruda se obtuvo pasando el compuesto por alúmina con éter.

LM-114
C, 80.83
H, 8.80
$[\alpha]$ -20.49 43.9 +10
$[\alpha]$ -20.66. 72.6 -10

Lab notebook page from Luis Miramontes synthesis of estradiol. From la Familia Miramontes-Vidal [Public Domain], via http://scifunam.fisica.unam.mx/mir/LEMC/obra/images.html.



Otto Hahn's notebook from exhibit of the Experimental Apparatus with which the team of Otto Hahn, Lise Meitner and Fritz Strassmanndiscovered Nuclear Fission in 1938. By J Brew [CC BY-SA 2.0 (http://creativecommons.org/licenses/by-sa/2.0)], via Wikimedia Commons.