Excellence in Laboratory Notekeeping*

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* Notes and examples from *Writing the Laboratory Notebook, 1st Ed.* by H.M. Kanare

Reasons for Keeping a Notebook

- Records the original intent of a scientific investigation
- Preserves the experimental data and observations for future reference
- Assists future researchers with the understanding/reproduction of your experimental observations
- A well organized notebook is a valuable resource!
  - Prime source of information for writing a dissertation or paper
  - Time can be saved with a well-written notebook

Organizing and Writing the Notebook

The notebook can be divided into two sections: the front matter and the body

- The front matter includes a table of contents, a preface, a table of abbreviations, etc.
  - Generally 3-5 pages
  - Written over the course of the project
- The body generally contains the following subjects in some form
  - Introduction
  - Experimental Plan
  - Observations/Data
  - Results/Discussion
  - Conclusion

The Front Matter

- Table of Contents
  - Dates
  - Page Numbers
  - Subject
- Preface - lists the authors and the purpose of the work in general terms
  - Name, affiliation, co-workers, etc.
  - Goal of the work and any progress to date
  - Location of the work, equipment, samples, etc.
- Table of Abbreviations
  - List any polymer abbreviations used in notebook
  - Describe nomenclature used in sample labeling

The Body: Introduction

- Title of the project
- The date
- Clear statement of the scientific problem
  - Detailed
  - Personal thoughts and/or historical information leading to the project
  - Literature review

Experimental Plan

The experimental plan is a statement of what you want to do and what approach you will take to solve the problem

- It preserves a record of your original intent
- You can use flowcharts, outlines, or numbered lists
- Safety precautions and material properties can also be included

Observations and Data

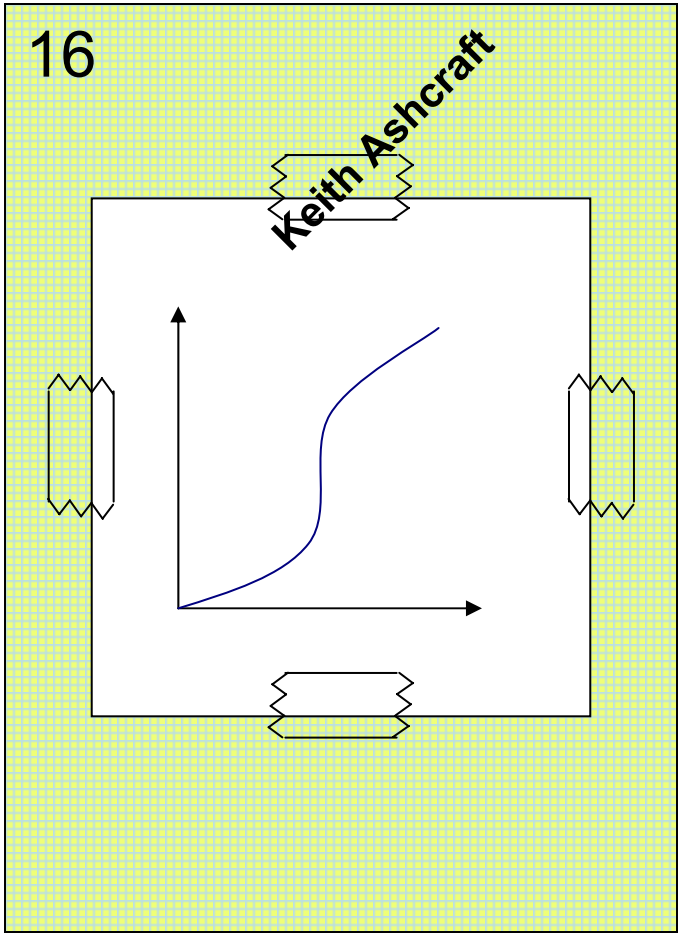
- Begin this section with details of the equipment, sample names, calibrations, etc.

- The rest of the section is simply a record of your raw data
  - Be objective and honest in recording observations
  - Leave interpretations for later; draw conclusions or conduct calculations later
  - Be prepared for the unexpected observations; have all the experimental details noted
  - Observations and data should be recorded soon after experiment
  - Make note-keeping an integral part of whatever you do, i.e., write down whatever happens when it happens

Results and Discussion

This is an opportunity to reflect on what was done and observed

- This section can contain charts or graphs, calculations, tables of interpreted data, and prose
- Speculation is appropriate



Conclusion

The conclusion summarizes the goal of your work, what was done, and what you found

- Numbered conclusions help organize ideas
- The conclusion should contain all the information that you would put into an abstract describing the work

Detail Check

Introduction

- Record all information needed to identify research materials, including the manufacture, lot number, purity, etc.

Experimental Plan

- Use proper names for labware and vessels
- Write down details of experimental procedure at least once

Detail Check Continued

Observations and Data

- Describe procedures that were used to clean and prepare glassware, mixers, or other vessels
- Note how reagents were mixed, measured, etc.
- Pay attention to heating rates and levels of agitation
- Note the time taken in between and during steps
- Note the calibration date on instruments
- Note the type of water used

FAQ's

How much should I write?

The general rule is to write with enough detail that another researcher could repeat your work based on your written descriptions and make the same observations.

Do I have to include all experiments, even if they failed?

Failed experiments can be included in the notebook; failed experiments can provide insight and ideas about future experiments or conclusions.

Can I have more than one notebook?

As with most of these notebook guidelines, whether or not your separate projects will depend on your preference and the details of your projects.

Will a notebook help secure a patent?

The notebook will not only provide information for a patent application, but it can also be used as evidence to support your invention.