On Keeping A Laboratory Notebook – Musings by Joel Thornton (with input from a variety of copyrighted and non-copyrighted material)

Being a good scientist begins with a good notebook. Unfortunately, keeping good records is not an innate ability, it is learned, often the hard way.

1. **Why keep a good notebook**
   a. Need a primary and original source of the experimental protocol taken, data obtained, insights and observations during data collection, thoughts on further work to do

   b. One never knows just what observation, result, mistake, etc may become the next scientific revolution. If you are not open to observing and noting, you won't be part of such advances

   c. To have a single location where you organize your thoughts, remind yourself of what you've done and thus easily determine what is to be done.

   d. To allow another person/persons to replicate your work – often necessary for a new finding to become accepted, or simply for your work not to be lost to the dustbin of history.

   e. To make money. Issues regarding intellectual property disputes (who had the idea for that new latte-bot?). A patent lawyer will ask for your notebook.

2. **What to put in your notebook**
   a. EVERYTHING (while not possible, that should be your goal)

   b. The date and time stamp of any new entry

   c. A clear title for a new set of experiments or thoughts (a title of "Temperature Lab" isn't particularly useful)

   d. Statements about the purposes, goals, and expected issues surrounding the upcoming experiment

   e. Clear descriptions of any methods and apparatus used; providing sketches, make and model of an instrument, sensor, etc; if protocols followed can be found elsewhere, note this and provide a reference, but clearly identify and describe any deviations from the procedures given in that reference, i.e. is what you are doing really in that reference??

   f. Any observation that could conceivably be useful for you or someone repeating the experiment to know whether similar results are being obtained along the way. E.g. "mixed salt into water and noticed the flask became very cool to the touch", or "signal after making this change was too low to detect"

g. All hand collected data in well organized and legible tables, with UNITS clear

h. If data is stored in electronic files, note the file name and creation date as well as a location of the original and any copies.

i. Illustrative calculations performed with the data clearly providing step-by-step approach through equations – even if most calculations were done with computer algorithms.

j. Summary of thoughts on the outcomes, conclusions about what worked, what didn't, etc.

3. How to write in your notebook

a. IN PEN (INK) ONLY - NEVER PENCIL

b. NEVER ERASE, WHITEOUT, TEAROUT, ETC. If you make a mistake simply draw one line through it and put the correct value, word, etc with a date and initial

c. Legibly – it won't do you or anyone else any good if it is all chicken scratch

d. Real time – don't take notes on a paper towel for later entry, use your notebook and only your notebook