The Lab Notebook

Introduction

Prior to the experiment, during the experiment and after the experiment, you need to write down information in your laboratory notebook. This is something you have to do in all experimental work, be it during lab courses at the university, research internships at the end of your bachelor's and during your master's, or in research jobs at the university or in companies. Lab notebooks also have a legal status, *e.g.* in patent cases or lawsuits when an accident happens. Consequently, lab notebooks are very important, and being able to keep a good lab notebook is an important skill for any (molecular) scientist!

The all-important rule for keeping a lab notebook is that ***not only you, but also someone else, should be able to understand what you did and exactly replicate the experiment that you performed, based on the information in your lab notebook***.

Some additional rules for keeping a lab notebook are:

- Write and draw using pens. Using a pencil for anything is not allowed.
- Never use Type-ex or some such to correct mistakes. Just strike out a mistake with a single line or a cross for complete sections. The original text must remain visible!
- Never remove pages from your notebook. If you made a big mistake, simply cross it out neatly and start again on the next page. Also, do not paste pages together to obscure things!
- Do not write any information that should be in your lab notebook on other pieces of paper. It is forbidden to make scrap notes and copy them later.
- Do not place loose papers in your notebook. If something should be in your notebook, paste it in, otherwise, keep the papers somewhere else.
- A lab notebook should be well-ordered, tidy and legible, but it does not have to be a work of art. It is vitally important to note down things *immediately* and *legibly* during an experiment, but your handwriting does not have to be of calligraphic quality.

Preparation form

Apart from your lab notebook, you also have to fill out a *preparation form*. This is not a general requirement, but something we do purely for didactical reasons. The information on the prep form should complement the information in your lab notebook. For more information, see the 'Preparation Form' folder on Brightspace.

Your lab notebook should be labelled with your name and start with a table of contents ('TOC', reserve the first 5 pages for this). Below, you will find a list of items that – if applicable – you should write in your notebook before, during and after an experiment.

Prior to the experiment

- **The experiment number** (your three-letter abbreviation, followed by a three-digit number, *e.g.* MSC084 for Maria Salomea Skłodowska-Curie's eighty-fourth experiment).
- **The date of the start of execution**.
- **A brief explanatory title of the experiment**.
- **Page numbers** (continuous numbering throughout your entire lab notebook) **and a corresponding TOC entry for the experiment** (title and page number).
- **A brief aim of the experiment**.
- **Descriptions and / or schematic drawings of *nonstandard* experimental setups**.
- **References** in the Vancouver style.[1]
- **If possible, a short (visual) summary of the experiment** (*e.g.* an overall reaction equation or scheme, or a brief description of the main steps in the protocol).
- **Preparatory schemes** (*e.g.* a pipetting scheme or a scheme detailing different reaction conditions such as temperatures, concentrations or waiting times) **and any fill-in schemes** (*e.g.* tables in which you can write measurement results; these can also be part of the preparatory schemes in the form of extra rows or columns).

During the experiment

A step-by-step account of what you actually did, any observations you make and any intermediate results you obtain. Depending on your personal preference, you can separate the step-by-step account, the observations and the results in separate paragraphs or sections, or you can write down everything in chronological order, as long as it is perfectly clear what you did, observed and achieved.

To be clear here as well: this is **THE MOST IMPORTANT INFORMATION IN YOUR LAB NOTEBOOK** (did you note the capital letters?). Some always find it difficult to keep track of the experiment in their notebook at the same time as carrying it out. Do not worry, we will teach you.

After the experiment

- **Final results and calculations**.
- **Results of analyses**, including annotations of spectra, figures, etc. and interpretations.
- **A brief discussion** of the results and their interpretation, and of things that went wrong, could be improved, need follow-up, *etc.*
- **A brief conclusion**.

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[1] Overton, T.L., Johnson, S. and Scott, J., *Study and Communication Skills for the Chemical Sciences*. 2nd edn, Oxford University Press, Oxford, 2015.