MUNI
PHARM

PROTOCOL STRUCTURE

IDENTIFICATION: HEADER

- **Student's name and number** (UČO).
- Names of collaborators.
- The **date** of the lab exercise.
- The **number and name of the processed lab task**.

PROTOCOL COMPOSITION

- **Theory** – *Very briefly* (but at least 150 words).
- **Procedure** – *Very briefly.*
- **Data evaluation** – *An important part, that requires precise processing.*
  - Should be included: Weight/dilution calculations for preparing solutions. Measured values, calculations, final values, graphs, and tables. Commentary, discussion.
  - For the calculation, state the **complete calculation procedure with the result (including the unit!)**. If the calculation is repeated for several samples/measurements, it is enough to provide an example of the whole procedure for only one of them and then summarize the rest of the results clearly in the table.
  - Provide **tables and graphs clearly, and concisely**, including labels of axes, units in the table headers / on the axes, etc.
- **Conclusion** – *an important part, that summarizes the whole task and your results.*
  - Finally, **comment on the results and justify any measurement errors** (think about where they may have occurred in the procedure).

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PRINCIPLES OF CORRECT FORMATTING, TYPOGRAPHIC RULES, AND PRESENTATION OF RESULTS

DO NOT COPY!

- DO NOT COPY manuals or any parts of them into your protocols. Do not copy protocols from each other. Do not copy text from the internet, books and so on. THE TEXT NEEDS TO BE PARAPHRASED. EXPRESS YOURSELF IN YOUR OWN WORDS.

- In addition, if you do not know: copying = plagiarism, for which there is a risk of real sanctions (https://www.muni.cz/en/about-us/official-notice-board/plagiarism).

GRAPHS

- **Dependent variable on the vertical axis** (*y*-axis), **independent variable on the horizontal axis** (*x*-axis): verbally – dependence of *y* on *x*.
- Presence and **labels of axes (quantity including unit)**.
- **Numerical labels and correct proportions of axes**.
- Sufficient image quality.
- For laboratory exercise purposes, **a scatter plot** or scatter plot with a curve is ideal (it is important to display measured points in the graph).

TABLES

- Do not copy unformatted tables directly from Excel. Create and **format tables in the used text editor** (Word) or another suitable way.
- **Description of columns (headers) or rows** (where required) – to make the table structure understandable and self-explanatory.
- Do not write numbers with units in tables (**units should be written in the header** for the given quantity).

QUANTITIES AND UNITS

- Symbols of physical and chemical quantities should be written in italics.
- Follow a uniform format throughout the text – e.g., express units in reciprocal form (with multiplication sign), not with a slash (do not use **kg · m^{-3}** and **kg/m^3** both in the text; choose only one option).

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- **Use space between number and unit** (except when we use the unit in the sense of an adjective: *5M solution*, *20W bulb*, *10ml flask*).
- Use units in a uniform format (e.g., **ml** vs. **cm^3**).
- Molarity denoting "**M**" is described in the sense of an adjective. Therefore, it should never stand alone in the text (we use the unit **mol · dm^{-3}** for this purpose), and we do not separate it from the number by a space.
  - Correct: **2M solution; a solution with a concentration of 2 mol · dm^{-3}.**
  - Wrong: **2 mol · dm^{-3} solution; a solution with a concentration of 2M.**

MULTIPLICATION SIGN (MATHEMATICAL SIGN)

- In formulas and units, use the symbol:
  - Special character for a dot placed vertically in the middle – "**middle dot**" (can be used **primarily for units**, in samples can also be): **g · mol^{-1}**; keyboard shortcut *Alt + 0183.*
  - **Special character for multiplication** (**for formulas**; do not use for units): $m = \rho \times V$; keyboard shortcut *Alt + 0215.*
  - In some cases, it is possible to omit the sign: e.g., **mmol l^{-1}.**
  - Definitely **do not use the letter "x" or an asterisk ***; some sources do not recommend using a regular dot (**mmol.l^{-1}**).
- Multiplication signs should be separated from the surrounding mathematical expressions, numbers or units by a space.

INDEXING

- If required by a given type of notation, **format** the numbers or other designation types **such as subscript/superscript.**

TEXT ALIGNMENT

- Align the basic text to block (does not apply to headings or tables).

TEXT IN GENERAL

- Use only **one font type** throughout the whole document. Change the font size carefully and only if there is a reason to do so. Use **font size in the range of 10–12.**
- **Do not insert handwritten text / hand-drawn graphs in the protocol**.
- Ideally, use the equation editor to write equations.

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OTHER TYPOGRAPHIC PRINCIPLES

- Space after the dot, comma, semicolon, colon (in terms of expressing the ratio, also before the colon); space before and after characters expressing mathematical operations: plus sign, minus sign, equal sign or multiplication sign.
- Distinguish between a dash (–) and a hyphen (-) and pay attention to their correct use; a dash is separated from the surrounding text by spaces (exception for numeric range designation), and the hyphen is not.
- **Pay attention to the correct use of punctuation** in general.

CALCULATION AND RECORDING OF THE RESULT; ROUNDING

- In intermediate calculations, work with exact numbers (a high number of decimal places).
- In the final result, it is better to **round the number to about 4 valid places**.

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