

## **CHEM 330 Technical Report Template**

You should format your document exactly like this template. Do not change any fonts, sizes, spacing, etc. Most journals have stringent formatting requirements, so a portion of your grade is dependent on your ability to follow the formatting guidelines exactly.

### **How to use this template:**

- Save a new copy of the template via File > Save As.
- Replace text by highlighting it and adding the text you've written.
- Use the Home Ribbon > Styles menu and the styles listed for each portion of the document.
- Delete this first page and all template text before turning in your manuscript.
- Avoid section headings at the bottom of the page with no text below them.
- Make sure figures and their captions are entirely on the same page (they do not have to be on the page where you refer to them). The same should be true for tables.
- The first paragraph of each section should be aligned flush left (i.e. no tab); subsequent paragraphs in the section should be indented one tab.
- There is no length requirement – be concise, but say what needs to be said. With 1.5X line spacing and reasonably sized figures, this will probably take about 15 pages.

## 2022 Water Quality report.

AUTHOR NAMES.

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**ABSTRACT:** (Word Style "Subtitle").

### Introduction (Style "Heading 1")

TEXT (Style "Normal Text"). The introduction to the paper serves to orient the reader to the topic at hand and provide a brief overview of the study at hand. If you've written a research paper or 5-paragraph essay for a class before, the introduction is much the same. You can think of it as a 5-paragraph essay that makes up the first section of your paper (but don't necessarily limit yourself to the 5-paragraph format). Of course, this means you will have to do research to write the intro! It should convey what questions the study is asking, why it's asking those questions, and what led the author(s) to ask those questions. It should also discuss any similar work that's been done previously and describe how the work relates to the previous studies. Provide context by citing relevant scholarly sources. There is no specific formula for what to include – the intro is your chance to decide what you think is important for the reader to know. Read *How to Write a Scientific Paper* by Chris Mack, section 2.2 for guidance. (2)

*The Introduction section should answer two questions: "What?" and "So what?" What is the paper about, and why should the reader care? (2)*

### Materials and Methods

Include subsections for each analyte.

#### *Alkalinity*

The methods section provides the reader of your manuscript a *detailed* account of how you completed your study. It should contain enough information that the reader could complete your study with no other resources. However, it should *not* contain extraneous details or irrelevant minutia (these belong in your lab notebook!). More information about what constitutes appropriate detail is provided in (2).

*There are really two interrelated goals at work: the reader should be given the ability to reproduce the results and the ability to judge the results. (2)*

### Style tips:

- Write in *past tense*.
- Use active voice (first-person is OK occasionally).
- All tables must have a title *above* the table and be numbered sequentially. Table 1 provides an example of this.

**Table 1: GC Instrument Parameters ( Style “Heading 3”)**

Parameter	Value
Make and Model	Perkin Elmer Spectrum One FT-IR (Fourier-transform infrared spectrometer)
Oven Temperature (°C)	140
Detector Type	TCD

- All figures (images or graphs) must have a caption (that includes a title and brief description of the figure) *below* the figure and be numbered sequentially. Figure 1 provides an example of a figure.

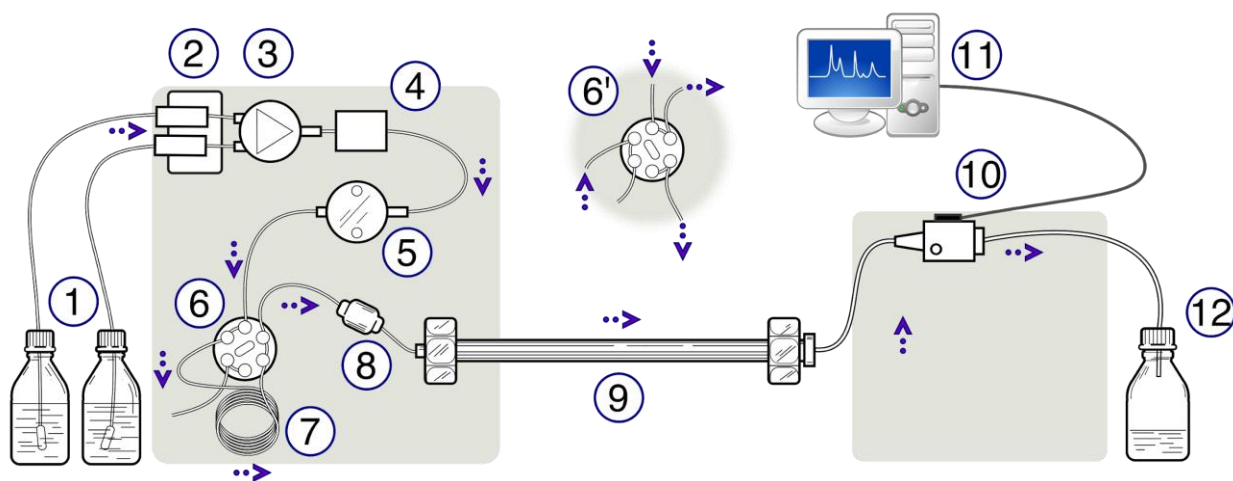


Figure 1: (Style “Heading 4”) A block diagram of the HPLC used for this study. (1) Solvent reservoirs, (2) Solvent degasser, (3) Gradient valve, (4) Mixing vessel for delivery of the mobile phase, (5) High-pressure pump, (6) Switching valve in “inject position”,

(6') Switching valve in "load position", (7) Sample injection loop, (8) Pre-column (guard column), (9) Analytical column, (10) UV Detector, (11) Data acquisition, (12) Waste or fraction collector. By WYassineMrabetTal CC BY-SA 3.0 [Note: you do not have to include a block diagram in your report. This is just showing how to format the caption under a figure.]

## Results and Discussion

The Results and Discussion section serves two purposes: (1) to present the results (data) and (2) to put those results into context with a thoughtful discussion about whether the results were anticipated, how they compare to previous work, and how they can be explained using models, theories, general knowledge, and reasoning. Note that the results section should be a logical argument based on evidence, not a chronological description of the experiment.

You must present results supporting every conclusion you draw; likewise, you must use sound logic when interpreting the results to draw conclusions. Similarly you must not withhold results that don't support your hypothesis or conclusions; all results must be reconciled, whether they agree or not.

*Evidence does not explain itself. The purpose of the Discussion section is to explain the results and show how they help to answer the research questions posed in the introduction. This discussion generally passes through the stages of summarizing the results, discussing whether results are expected or unexpected, comparing these results to previous work, interpreting and explaining the results (often by comparison to a theory or model), and hypothesizing about their generality. (2)*

You may also include subsections in the Results and Discussion as necessary.

## Conclusion

The conclusion should provide a brief summary of the results, highlighting the key breakthroughs or findings. It should specifically relate the conclusions back to the research questions posed in the introduction and explain their significance. Finally, it should provide recommendations for future improvements or expansions upon the study. It should not just repeat other portions of the paper.

*The Conclusions section should allow for opportunistic reading. When writing this section, imagine a reader who reads the introduction, skims through the figures, then jumps to the conclusion. The conclusion should concisely provide the key message(s) the author wishes to convey. (2)*



## References

You should only cite scholarly sources. Points may be deducted for sources that do not meet the qualifications of a scholarly source. The lab manual is not a scholarly source! Please refer to this [flowchart](#) to determine if your source counts as scholarly. If in doubt, it's probably not scholarly.

Your references should be cited in a separate “References” section at the end of your report in the [ACS \(JACS\) format](#). Citations should be numbered by the order in which they appear in the text and referred to by number. All citations that appear in the text **MUST** be cited (using parentheses and italic numbers, e.g. (28), and all citations listed in the references section must appear in the text. Journal titles should be in italic font and may be abbreviated according to the standard journal abbreviation found in the [CASSI database](#). Year of publishing should be in bold font. **Include a DOI number in your references.** Note that references are in a smaller font to save space.

There is no specific length/number requirement for your references, but 5 is probably about right. It all depends on your execution – 7 poorly cited or irrelevant references is certainly insufficient; alternatively, 3 well-selected references are often enough.

### Example References:

- (1) Lack, D. A.; Lovejoy, E. R.; Baynard, T.; Pettersson, A.; Ravishankara, A. R. Aerosol Absorption Measurement Using Photoacoustic Spectroscopy: Sensitivity, Calibration, and Uncertainty Developments. *Aerosol Sci. Technol.* 2006, 40 (9), 697–708. DOI: 10.1080/02786820600803917.
- (2) Mack, C. A. How to Write a Scientific Paper. SPIE. 2018. doi: 10.1117/3.2317707