NM Junior Academy of Science Formatting Rules for Technical Papers

Revised December 2021

Before starting to write your paper, make sure you understand the requirements for the NM Junior Academy of Science Paper Competition.

- Your paper must be about your own scientific experimentation, theoretical work in pure mathematics or physics, development of a computer model, or engineering project. Participation in a science fair is *not* required.
- The competition consists of two equally weighted parts: a written manuscript and an oral presentation with questions.
- The manuscript must be submitted electronically and adhere to the rules in this document.
- There are submission and competition deadlines.

Technical papers differ from other literary papers in their composition and format.

- Composition. Technical papers include the following sections: an abstract; a body divided into labeled sections (Introduction, Methods, Results, Discussion or Conclusions); appendices, acknowledgements, and references.
- Format. Technical papers are submitted to be publication-ready using rules defined by a journal. NMJAS and the *New Mexico Journal of Science* use the publication rules for the American Chemical Society, which specifies everything from fonts and margins to references and mathematical equations.

The rest of this document details both the format and composition.

General Document Format

- Page set up: standard letter paper with 1" margins throughout; left-aligned; single spaced; continuous sections (no page breaks except as noted); page numbers in the lower right corner.
- Font: Times New Roman 12-point; section titles capitalized.
- Specific formats for equations and citations are given later.
- For other elements such as units of measure and chemical equations, see the submission guide for the *NM Journal of Science*.

General Document Structure

Your paper should include the following sequential parts: Cover Page, Title Page, Abstract, Main Body, Acknowledgments, and References. Define new terms in the body of the paper, not in a glossary. Insert figures, equations, and images into the document, clearly labeled, and captioned. Center equations on a single line.

Cover Page. This is separate from the title page. Include the following contact information

- Title of paper
- Division (junior or senior)
- Student name, home address, phone, email
- School name, address
- Sponsor name, address, phone, email

Title Page. Include the following on a page by itself

- Title – fully CAPITALIZED, left-aligned, at the top of the page
- Author's name (you)
- Abstract – see below for details
- Contact information at bottom of page in a single line – email address, school name and city/town

Abstract: This should appear under your name. The word ABSTRACT should be CAPITALIZED. The abstract is a summary of the content of your paper in 200 words or less. In one or two paragraphs define the problem, describe the methods you used in your project, summarize the results, state the conclusions.

Body of Paper. The body of the paper is limited to 4,500 words. It is composed of four main sections; Introduction; Methods; Results; and Discussion or Conclusions. Section headings should be CAPITALIZED and on their own line. Subsection headings such as Background or Materials should be underlined in sentence case, on their own line. Give credit in the body with author-date citations (Allen, 2013). There are more details on references later in this document.

Introduction. Describe the background for your work; state the problem or questions, and the goals. Give appropriate credit for others' work using the author-date citation style (Smith, 2022).

Methods. Explain what you did, what materials you used, and what procedures and instruments you used. Describe the work so someone else could replicate it.

Results. Describe what happened. Data should be summarized (raw data can be included as an appendix). Analyze your data using graphs, tables, and descriptions. Be sure to give tables, graphs and figures a title. Label both axes of graphs and all columns of tables. Mathematical formulas should be numbered and formatted as described later. Conclusions go in the Discussion section.

Discussion/Conclusions. Describe your conclusions (even the obvious ones) and, if appropriate, discuss suggestions or implications for further work.

Acknowledgements. Thank individuals who have helped you in any way with your project.

References. List the complete information about each reference you cited in the body of the paper in alphabetical order by author. Specific formatting details are given below.

References

The format for references has changed from previous years to be publication-ready for the *NM Journal of Science*. They follow the author-date format of the ACS Author Guidelines.

Citations within the body of the paper include the author and date within parentheses.

- Single author – (Smith, 2022)
- Two authors – (Smith and Jones, 2002)
- More than two authors – use first author et al. (Smith et al., 2022)
- If the author's name is used in a sentence, include just the date in parentheses – *Smith (2022) demonstrated the new process.*

Reference Citation List

The end of the paper is where complete information about cited references are listed alphabetically by last name of the primary author. Use initials rather than given names for authors. Abbreviate the names of cited journals according to Chemical Abstract Service Source Index.

Cite all the references within your manuscripts by author and date alphabetically. All references should end with a period. Left-justify the first line and indent all other lines by 2 spaces. Do not leave blank lines between references.

The format for citations can be complicated, depending on the source of the information. In general, it is *«Authors». «Date», «Publication», «Volume/page».* Some specific examples are given below.

ACS Publications Home Page. https://pubs.acs.org/ (accessed 2022-01-10). – Website

Bard, A. J.; Faulkner, L. R. Double-Layer Structure and Absorption. In *Electrochemical Methods: Fundamentals and Applications*, 2nd ed.; John Wiley & Sons, 2001; pp 534−579. – Printed book

Foster, J. C.; Varlas, S.; Couturaud, B.; Coe, J.; O'Reilly, R. K. Getting into Shape: Reflections on a New Generation of Cylindrical Nanostructures' Self-Assembly Using Polymer Building Block. *J. Am. Chem. Soc.* 2019, *141* (7), 2742−2753. DOI: 10.1021/jacs.8b08648. – Journal article

Examples for every kind of citation can be found in the ACS Style Quick Guide.

Formatting mathematical equations

Note: Papers from winners to be published in the *NM Journal of Science* cannot use the Microsoft Word Equation Editor, although it is acceptable for all other cases. The publishing software does not recognize these equations or special characters. This will be addressed on an as-needed basis.

Type equations centered on a single line with a chronological number reference right aligned. An example of a student paper is below.

where a is a constant that is a property of the swimsuit surface. Water flows slower near the swimsuit surface because that surface 'drags' the water with a shear stress τ_0. In the flow, the shear stress is the gradient of the velocity times the density of water. Right on the swimsuit surface, this shear stress is τ_0 where

$$\tau_0/\varrho = du/dy|_{y=0} \tag{3}$$

(where ϱ = density of water). Equations (2) and (3) show that a higher shear stress on the surface of a swimsuit (i.e. higher drag) will result in a steeper gradient of velocity in the boundary layer. Now, because u_{loss} has the opposite sign of u (Eq. (1)), the shear stress on the swimsuit surface is

$$\tau_0 = - \varrho\, du_{loss}/dy|_{y=0} \tag{4}$$

Inserting Eq. (2) into Eq. (4), we obtain the skin drag, which is the shear stress on the surface of the swimsuit:

$$\tau_0 = a\, \varrho\, u_0 \tag{5}$$

Thus, a swimsuit with a greater value of a gives a higher skin drag. This skin drag coefficient a can be obtained by performing a linear regression analysis on $\ln(u_{loss})$ as a function of y.

We could take advantage of the knowledge that on the swimsuit surface,

$$u_{loss}|_{y=0} = u_0 \tag{6}$$