

Macomb Academy of Arts and Sciences

Independent Student Research Program

Final Paper – Rubric

Scientific Paper Checklist – 100 points with all line items are worth 3 points except Science, which is worth 4.

3 2 1 0 No contractions

3 2 1 0 3rd person, passive voice, past tense

3 2 1 0 No spelling or grammar errors

3 2 1 0 Formatting exactly like Sliva, Ramey, or previous MA²S student work (Impact and Times Roman)

3 2 1 0 Paper is concise and does not contain a lot of extraneous information. Nothing is EVER “proven” in science. It is supported or an alternative is supported.

Abstract

3 2 1 0 Abstract has two to three sentences (minimum – more are ok) about Introduction, Methods and Materials, Results, and Discussion sections. Basically is an executive summary minus the error analysis paragraph.

3 2 1 0 Abstract is a single paragraph, approximately 150-200 words (Two paragraphs at most)

3 2 1 0 No hypothesis in this section

Title of Paper

3 2 1 0 Title gives information about the experiment, the subjects, and the methods, should mention dependent and independent variables, and makes sense

3 2 1 0 Title is a concise scientific statement and is not a creative-story type title.

Introduction (*The sections below are approximately the order in which an Introduction should be written*)

3 2 1 0 The purpose of study and the research location are given (will not be in same sentence)

3 2 1 0 Outline of the general area of study, including mention of the science involved with your study as you have already written about in your background paper

3 2 1 0 References should be made to similar previously done research, such as what you found when you completed your literature reviews.

3 2 1 0 The background and previously done research sections mentioned above should provide a coherent argument for your hypothesis

3 2 1 0 The hypothesis, which will be one of the last things written in this section

Methods and Materials

- 3 2 1 0 Experiment concisely written in order of occurrence and is reproducible. It is the story of what you *did* and is not an instruction manual for what you want the reader *to do*. It is not step by step. It includes equipment and procedures in the order they occurred.
- 3 2 1 0 Unique equipment that is important to the outcome is properly labeled with brand, model, city, and state. For example, “Pasco force sensor PS-2104, (Roseville, CA).” (Quote marks do not go in your paper)
- 3 2 1 0 Methods match the purpose and the hypothesis
- 3 2 1 0 Materials are not listed. Reader knows what materials were used because they are mentioned throughout the paper. Pictures, etc. are numbered and referred to.

Results

- 3 2 1 0 The Results section is written in sentence form, with hypothesis restated in first sentence. Important descriptive statistics are written in the prose of the sentences. *References can be made to figures and tables that contain the statistics, if there are a lot of them.* There should be a short statement of what the various statistics mean for the hypothesis, that is do they support it or an alternative.
- 3 2 1 0 Data has been summarized to testable statistics, like means, medians, and standard deviations. NO RAW DATA! (*Means and standard deviations are listed together*)
- 3 2 1 0 Data in tables and figures that complement the text rather than replacing it.
- 3 2 1 0 Tables and figures embedded within the Results section. They are correctly titled with “Figure” on bottom and “Table” on top and are correctly referred to within the text.

For those using t-tests, you should write those like the following example: “The recall scores for condition 1 and condition 3 were compared using an independent t-test and a significant difference between the two conditions was found, ($t(28) = 17.86, p < 0.002$).” In this case the stats mean the following: ($t^1(28)^2 = 17.98^3; p < 0.002^4$ 1. The statistic used, in this case a t-test, 2. The number of samples you compared to each other in your t-test, 3. The actual obtained value of the statistic, 4. The probability associated with that

Discussion

- 3 2 1 0 Start with a summary of the findings **without repeating results**, followed by a comparison to findings from other studies, expectations, or models
- 3 2 1 0 Give an evaluation of the methodology, that is state if the outcomes you found were due to the procedure or to something else. If something else tell or hypothesize what that could be.
- 3 2 1 0 An **explanation** is given for **why** the experimenter got the results he/she did. This is the most important part of the Discussion section.
- 3 2 1 0 Possible sources of error, how they affected things, and fixes to those sources of error are mentioned
- 3 2 1 0 Discussion of hypothesis and other trends, and appropriate statistical analysis

Conclusion

3 2 1 0 Brief summary of major findings

3 2 1 0 Ideas for future research that could be spawned from this research are given

Bibliography/Works Cited/Literature Cited

3 2 1 0 Entries are properly cited within the body of the main paper

Citations should be written like so for MA²S research papers: The wild west was a dangerous place. (1) Over two-hundred thousand people died at the hands of other people.(2) The first source you cite within your paper should be followed by a 1 in parentheses one space beyond the end of the punctuation for that sentence. Source 1 may be the source for the first ten sentences for which you have citations. Whenever you cite the second source, you put 2 in parentheses one sentence after that sentence. You continue this for all of the sources you cite. If you have a sentence later in your paper that is referencing source 1, put 1 in parentheses after that statement. You do not need to exhaust all of the sentences you want to write that come from source 1 by putting them together. Some sentences from source 1 may come after you referenced hundreds of other sources.

3 2 1 0 MLA format for each entry and the way entries are ordered within the bibliography

The first source you cite in your bibliography must be the first source you cite within your paper. If you do not cite any sources within your paper (BUT YOU SHOULD CITE AT LEAST 3-5 FOR YOUR MA²S RESEARCH PAPERS) then you should not have a bibliography. If you do not cite a source somewhere within your paper, and you should, then don't list it in the bibliography.

Science (4 pts)

4 3 2 1 0 Sound idea, good methodology, good analysis, good contribution to high school level science