Final Paper Assignment

Your overall goal is to select an article from the chemical literature, use whatever resources are necessary to understand this article, and write about what you have learned in a formal paper aimed at a Macalester student who has taken a full year of general chemistry. This substantial exercise is in lieu of a final exam for the course, and will be worth 15% of your final grade (as noted in the course syllabus).

The paper must be between 1500 and 2500 words in length, excluding table and figure captions, acknowledgments, and references.

Here are your specific tasks:

I. Select an article from the list below. Ideally, you should choose one before our library orientation on Thursday, November 4. You are encouraged (but not required) to sign up in groups of two or three for an article. However, no more than three students can choose any one article. Signing up for a particular paper will be on a “first-come, first-served” basis. Each of the following articles comes from the *Journal of Chemical Education* (*J. Chem. Ed.*), published by the American Chemical Society. (The course web page has a link to a .pdf of each article.) *J. Chem. Ed.* provides a forum for chemistry instructors to share ideas about enhancing student learning in both the classroom and the laboratory. Each article listed below was written to help both teachers and students better understand important and interesting topics in chemistry. A significant part of your paper will contain your evaluation of how successful the authors were at their task!

- Ainscough, E. W.; Brodie, A. M. Nitric Oxide—Some Old and New Perspectives. *Journal of Chemical Education* 1995, 72, 686-692. [NO is important in both the atmosphere and in biochemistry.]
II. Begin to read deeply and critically. You should not expect to be able to understand every concept discussed in your article, or even know what every word or acronym means. (I often have the same experience when I read research articles.) Instead, you should think of your chosen article as a gateway into a particular area of chemistry. Begin the “unpacking” of your article by seeing what your textbook says. You will also need to look up at least some of the references cited in your article. (One of the issues you should comment on in your final paper is the completeness of the article’s Literature Cited list.) Other textbooks, scientific dictionaries, and even other articles in the Journal of Chemical Education can be great sources of fundamental chemical information. You are welcome to use the Internet, but you should be careful about the content you find online. A big advantage of printed sources of scientific information is that most of their content has been reviewed and evaluated. You all know that, in contrast, anyone can set up a web page. You are required to consult at least two articles and two books (including your textbook).

Feel free to consult chemistry faculty as well. We all enjoy talking about science! I also encourage you to talk with classmates who have chosen the same paper. You can help explain difficult concepts to each other, and share particularly helpful references. However, note that each individual must turn in his or her own report.

III. Begin writing your paper even before you are done with all your research. I find that the very process of writing invariably improves my own understanding of a topic, and also refines my subsequent searching of the scientific literature. Keep the following content and writing goals in mind:

A. Content. Your paper will be addressed to a fellow Macalester student who has taken a year of general chemistry. You can assume that the student has read and understood Atkins and Jones. Your paper must accomplish the following:

1. Convince the reader of the intellectual importance and “real-world” relevance of the topic. This involves putting your J. Chem. Ed. article into a larger context. You should provide enough background information to help the reader, but not so much information that you risk boring or overwhelming her.

2. Explain the chemical concepts discussed in the J. Chem. Ed. article. (If your article is particularly rich in content, you may choose to focus on only a few concepts.) I know that many of the articles refer to more advanced topics covered in later chemistry classes. Your challenge is to employ the general chemistry concepts your reader knows to lead him to at least a partial
understanding of the material. (This is the challenge faced by all scientists whenever they are communicating with non-specialists. Most successful scientists do well in this regard. This is your opportunity to start learning this most important skill.)

3. Evaluate the quality of your J. Chem. Ed. article. Answer questions such as, How well did it explain the material? How engaging was it? Was there outdated, or even incorrect, information? How helpful and complete was its list of cited references? Would you recommend this article to your fellow Mac student?

B. Writing. Strive to be as clear and organized in your writing as possible. You should present a highly coherent narrative whose ideas flow from sentence to sentence, and from paragraph to paragraph. No writer achieves this in her "unofficial" first draft. You should therefore expect to revise your paper a number of times before you turn in your "official" first draft. Good writing take lots of hard work, but it is worth it, both to yourself and to your readers. As Samuel Johnson once observed, "What is written without effort is generally read without pleasure."1

Coherence within a text presupposes that each sentence is free from errors of grammar, syntax, and punctuation. Consult Andrea Lunsford’s Easy Writer for the rules of standard written English. Using Word’s spell checker and your own careful proofreading should eliminate most spelling errors.

Using tables, figures, mathematical equations, and chemical structures will often improve the clarity of your discussion. Here are my expectations for each textual device:

1. Tables: Use Word’s Table utility. Be sure to label each column and row, and give the table a brief title.

2. Figures: You may use computer software to draw a figure; do not draw it by hand. You are welcome to take figures from other sources, but you must give credit to the books, articles, or web sites you took them from. Each figure must have a (brief) caption.

3. Equations: They must not be hand-written. Make sure that subscripts and exponents look like subscripts and exponents! Equations that take more than one line of characters should be entered using Microsoft Equation. (Access this program by choosing Object from the Insert pull-down menu in Microsoft Word.)

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4. Chemical structures: You should either scan these in from another source, or use the program ChemDraw (available in the department’s computer lab) to render them. See me, a Chem Department tutor, or Emma Whitcomb for help with ChemDraw. (Learning this software now will give you a head start on Organic Chemistry next year!)
At the start of your paper, have a short **Title** that includes the reference to the *J. Chem. Ed.* article you are analyzing. At the end of your paper, have a section headed **Acknowledgments**. Here, you must mention everyone who has helped you with your paper, both students and faculty, and state briefly how they helped you. (This is standard practice in scientific writing). Below your acknowledgments section, have a section headed **References**. Remember that you must cite at least two articles and two books (one of which should be your textbook). As always, cite references using the American Chemical Society format:

**Books without Editors**: Author 1; Author 2; Author 3; Author 4. *Book Title*, number of edition; Publisher: Place of Publication, Year; Chapter(s) Cited. For example,


**Books with Editors**: Author 1; Author 2; Author 3; Author 4. Chapter Title. In *Book Title*, number of edition; Editor 1; Editor 2, Eds.; Publisher: Place of Publication, Year; Number of Any Specific Chapter(s) Cited. For example,


**Articles**: Author 1; Author 2; Author 3. Title of Article. *Name of Journal Year, Volume*, Beginning–Ending Page. For example,


**Web Sites**: Cite their URL. Also note the last day you accessed the site. For example,


**IV. Turn in a first draft by Wednesday, November 24** (the day before Thanksgiving).

**V. Meet with Emma Whitcomb to discuss your first draft the week after Thanksgiving.**

**VI. Turn in your final version to me by the last day of the semester, Tuesday, December 21.**
Grading:

Emma and I will assign letter grades (A, A-, B+, B, B-, C+) on both scientific content and writing quality. Careful and thoughtful attention to the above content and writing expectations will earn you an A. The correspondence between letter grades and points is summarized here:

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<tr>
<th>First Draft</th>
<th>Final Draft</th>
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<tr>
<td>Graded by Emma Whitcomb</td>
<td>Graded by Keith Kuwata</td>
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<td><strong>Total Possible Points = 50</strong></td>
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References