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Presentations & Paper

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Working in pairs, everyone in the class will give a series of presentations to the class over the course of the semester. Each pair will have a single topic that they will follow throughout the semester, you will report on the issues associated with the topic at the societal and scientific level, and you will lead class discussions on specific Inorganic Chemistry problems associated with your topic. Beyond learning and applying inorganic chemistry principles, this project should help you to see how chemistry and science in general impacts larger decisions that we all make as citizens. Additionally, you will develop scientific searching, indexing, and referencing skills that are important to everyone who does technical writing.

There are 4 parts to this project (accounts for 35% of your course grade):

I. Overview: societal issues associated with your topic
II. Overview: major scientific challenges associated with your topic
III. Specific examples from the recent literature related to inorganic chemistry topics
IV. Review paper summarizing key issues, papers, and inorganic chemistry

I. Overview: societal issues associated with your topic

In your first in-class presentation, you will identify the major societal issues associated with your topic. In this presentation, you will discuss the major problem that technology is trying to solve or improve and specifically tie it in to some larger issues (e.g. energy availability, pollution issues, etc.). The goal here is to put the chemistry and technology issues into a larger context of how science can be part of the solution to larger problems. Think of this as trying to explain to your parents or friend why it is important to study some fundamental area of chemistry (when they may not care about the chemistry itself!). This will be a fairly broad overview and won't require extensive knowledge of inorganic chemistry; it will draw heavily from review articles, popular literature, and web-based resources.

II. Overview: major scientific challenges associated with your topic

In your second in-class presentation, you will identify the major scientific challenges associated with your topic. This will require you to narrow the focus from the societal issues and explain how your topic is one option for addressing the larger problem. Then, you will need to talk about some of the larger technical challenges or unsolved problems that must be overcome. Again, this is an overview and will therefore use literature that provides overviews of the field.

III. Specific examples from the recent literature related to inorganic chemistry topics

For the remainder of the semester, you will give a series of presentations on primary research articles investigating your topic. You will present the key data and experiments and lead the class discussion of the inorganic chemistry involved. In choosing your papers, you should look for research that incorporates research methods and inorganic chemistry concepts that we are discussing in class. These papers will need to be approved at least a week before the presentation, and you will need to use SciFinder and/or Scopus to identify appropriate articles.

IV. Review paper summarizing key issues, papers, and inorganic chemistry

Based on your presentations and literature searching over the course of the semester, you will write a paper summarizing the key issues, papers and inorganic chemistry associated with your topic. For the chemistry, you will largely focus on the research articles you presented in class, but you will likely need to augment these with other papers from the literature. Over the course of the semester, you will be required to develop and submit outlines of the various sections of the paper to help you organize your thoughts and the literature associated with your topic.

Topic Choices

I realize that this will be difficult for you to make at the beginning of the semester. I have a number of suggestions listed below, but this is not meant to be an exhaustive list. We will spend some time at the beginning of the semester talking about the primary areas of modern research in inorganic chemistry to give you a better idea about what the possibilities are. I will also work with you to find out about your interests in chemistry so that we can identify an topic that is aligned (as best as possible) with your interests. Here are some potential ideas:

Graetzel cell photovoltaics
Methane monooxygenase (bioinorganic methane oxidation)
Hydrogen production and / or storage
Nitrogen activation (Haber-Bosch process)
Nocera-type water splitting catalysts
Gray/Lewis artificial photovoltaics

Building Your Library

Developing your literature searching and management skills is an important goal of this overall assignment, and learning to use advanced features of search engines like SciFinder and Scopus will help tremendously. We will talk about search strategies in class and will work through some of the features in SciFinder. One of the most useful advances is that you can readily download complete citation information for articles that you come across and store them in your own personal library (Endnote or RefWorks are common programs for this). You will get in the practice of storing the relevant results of your literature searches and maintaining your library. You will hand in your library periodically, and we will use it as a framework to discuss progress on your paper. At the end of the semester, you will import the references directly from your library into your final review article, and the reference software will magically number all of the references and put them into the proper journal format.