
Chem 461 Spring 2009

Term Paper and Presentation Assignment

The goal of this assignment is for each of you to present a scientific thesis supported by at least two different pieces of experimental data from the primary literature. The assignment will have several smaller deadlines throughout the semester, an oral presentation to the class during the last weeks of the semester, and final submission of the paper by Wednesday, May 6 (last day of classes). The assignment will be broken into several smaller assignments to distribute the points and effort over the whole semester.

General Requirements:

- 5–8 pages, not including references or the title page
- Double-spaced; 12 pt font; 1 in. margins
- Minimum of three references from the primary literature (textbooks, Web sites, and review articles not allowed)
- All figures numbered with a descriptive caption; all figures discussed in the body of the paper
- Your classmates are the audience for the paper

The paper will be broken into three main parts: (i) introduction, (ii) current research, and (iii) conclusions and future work. In the introduction of the paper, you will provide the following information:

- What is the general background on the topic?
- Historically, what have been the major breakthroughs relating to your topic?
- What is the overall significance of your topic in biochemistry? Why is it an important area of research?
- Are there some common techniques typically used in studying your topic? How do they work?

In the current research section of the paper, rather than offering a review of the relevant literature on their topic, you will provide detailed analyses of at least two experiments that support your thesis statement. To this end, you will answer the following questions for each of the experiments you choose to highlight:

- What is the authors' hypothesis?
- What experimental method are the authors using to address their hypothesis?
- How will this method allow the authors to address their hypothesis (as in, how does the experiment work)?
- What will the data look like if the authors' hypothesis is correct?
- Describe the data in your own words. Did the results support the hypothesis?
- Were there any flaws in the experiment or were there other samples or studies that could have provided additional information?

In the final section of the paper, you will summarize the significance of the data you presented and suggest future directions for research. In addition, recommend at least one specific experiment that would be interesting.

Schedule:

Mini-Assignment Schedule:

Week	Assignment	Points (200 total)
2	Introduction to the literature databases	
3	Paper topic due: Friday	5
4	Paper proposal due (title, abstract, bibliography)	10
8	Paper outline due	25

11	Rough Draft due: in-class review session	10
12-15	In-Class Presentation, exam question	75
15	Final Draft due: Wednesday, 5pm	75

Introduction to the literature databases:

In week 2 we will meet with our science librarian to learn about searching the electronic resources available to us for researching this assignment.

Paper topic (5 points):

Topics can be any biochemistry-related subject, and will be due by Friday of week 3 during class.

Paper proposal (10 points):

This is the part of the assignment where you will generate your thesis statement by searching the primary literature for an interesting aspect of your topic. Your thesis will be based upon at least two different pieces of evidence found in your literature search. The abstract will tell me if you have a focused point and evidence supporting it. The bibliography will be annotated (short description of relevant points and/or background from each reference) and contain at least 3 primary references related to your thesis.

Examples:

Topic of Interest	Thesis Statement
How blood substitutes work	The chemical structure of polyfluorinated hydrocarbons has a direct effect on the solubility of oxygen gas and the overall efficacy of the blood substitute.
Aging and cancer	The interaction between the DNA double-strand break repair proteins Ku and TRF-1 is important for telomere capping, which is necessary to prevent chromosomal fusion.
Prion disease	Derivatives of acridine and phenothiazine with aliphatic side chains off the middle ring have been shown to inhibit the conformational change of PrPc to the disease-causing PrPsc by binding to the C-terminal α -helix.
Prion disease	Copper binding induces a conformational change in normal prions, protecting them from conversion into the protease resistant prions.
Forensic chemistry	ELISA and GC-MS allow for determination of methadone concentration in the blood postmortem and the comparison of these two values for accuracy.
Dietary fat and heart disease	Oxidized LDL receptor LOX-1 binds to C-reactive protein and mediates its inflammatory effect on endothelial cells
Dentistry-related chemistry	Microorganisms such as <i>Streptococcus mutans</i> create an acidic oral environment that causes demineralization of the enamel and dentin of the human teeth, resulting in tooth decay.

Paper outline (25 points):

Before Spring Break, you will write a detailed outline of your paper, with preliminary citations where appropriate. You don't need to use grammatically correct sentences, and your outline will

be graded for scientific content and flow. I will give you a grading rubric I will use to evaluate this outline.

Rough Draft (10 points):

You will turn in a complete rough draft (including proper grammar, transitions, and citations) in week 11. As groups of 3 students, you will perform a peer-review process, evaluating two of your peers' papers using the same rubric I will use to grade your final draft, and making additional comments, as you feel appropriate. The following class session will be devoted entirely to this review process, with the groups meeting to discuss the comments for each of the rough drafts they read. You will turn in your rough draft and the two scoring rubrics you completed (with your comments), and will be graded on having a complete draft and your participation in the review process. The drafts and rubrics will be returned to you.

Oral Presentation and Mini-Exam #5 Question (75 points):

During weeks 12-15 you will give an oral presentation (~15-20 minutes, depending on time constraints) of your topic and one of your chosen experiments to the class. This presentation is intended to allow the class to learn about several different biochemical topics and experimental methods/evidence for a particular conclusion. It is also a chance for you to streamline your analysis and presentation of the evidence for final submission of your paper. You will notify the class before the day you present what your topic and primary literature reference will be.

(15 points) You will distribute one written exam question (For Mini-Exam #5) on or before the day you present your paper to the class. You will also prepare an answer to the question, which you will give to me beforehand. The question should reflect one or more points you address in your presentation. All students' questions will be on Mini-Exam #5, and depending on their difficulty I will decide how many of them you will answer for the exam. You should prepare to answer all of them.

(65 points) You will be evaluated on your presentation of:

1. Clear background information necessary to understand the experiment
2. An understandable description of the experiment
3. Description of the experimental result and the authors' conclusions
4. Critical Analysis of the experimental result: does it support the authors' hypothesis and how well?

Final Draft (75 points):

Due the last day of classes, Wednesday, May 6, at 5 pm. Since it is never fun to have everything due right at the end of the semester, you should feel empowered to actually write this final draft as soon as you perform the peer review process (~1 month before the end of term). You will be evaluated using the same rubric used by your peers during the review process.

NOTE: Mini-Exam #5 will have only the exam questions brought by students to the presentations, so be sure that you read the papers and attend the presentations.