EEB 4611: Guidelines for Research Paper

5 Feb:	topic due
24 Mar:	outline due, including central question or thesis
31 Mar:	draft due for peer review (2 copies)
9 Apr:	peer review due
16 Apr:	final draft due

Objective: To develop and investigate a biogeochemically-relevant scientific question and communicate your research in the form of a research paper.

This document gives some guidelines and helpful hints for your research paper. Please be sure to ask if you have any questions.

Your paper should be 7-10 double-spaced pages (papers longer than 10 pages will not be accepted!). References and figures are not part of the page count. Use a 12-point font and margins that are at least 1 inch on all sides. You will not be penalized if your paper is shorter than 7-10 pages, however you must include all of the necessary information.

Grading: The paper is worth 100 points. Meeting each of the 5 deadlines listed above is potentially worth 50 points (10 points per deadline). An approximate breakdown of the rest of paper grade is:

1. Central question or problem clearly stated with a brief description of why it is important and interesting.
2. Arguments, insights, and conclusions articulated, accurate and supported by sources
3. Written to appropriate target audience using proper terms, explanations of concepts and jargon, and formal tone
4. Properly formatted with Title, Abstract, Introduction, Conclusion, and References
5. Organized into complete yet concise paragraphs with strong topic sentences that are well linked together
6. Written with complete sentences, in active voice, without spelling or grammatical errors

Paper structure: The research paper should reflect investigation into a question of interest to you and of scientific relevance to the course. I want to see that you can *synthesize* ideas that are in the literature. The paper should ***not*** be a "regurgitation" of this information but rather should be focused on a central point. Keep in mind that the more focused your research topic or question is, the easier it will be to identify relevant information to present in your paper.

Suggested outline:

Title: The title should be clearly stated and carefully reflect the content of the paper

Abstract : Summarizes the paper. The abstract includes an introduction to your central question, why this question is interesting or important, and your main conclusions regarding this question.

Background/Introduction: What is the importance of this topic and why did you choose it for your research paper? What is the "history" of this issue or idea? How does this fit into the "big picture"? The background section should address the question: why should we care?

Research question/hypothesis: Describe the essential research question(s) or the central thesis of your paper and summarize why this is biogeochemically important, and relevant. A clear statement of your research question or thesis is a key component of a good paper.

Literature results: Describe the results of studies published in the literature that address your research question. How have these studies approached this question? Were the methods appropriate for the study? What are the results of published studies? Do the results all agree with each other – is there consensus? Why or why not? It is generally useful to organize this section into a few paragraphs, each of which should make a point that supports or addresses your overall research question.

Conclusions: Provide your assessment of the state of knowledge in this area. What is known? What is still unknown? What implications do the results have? How does this knowledge advance science?

Other Tips:

- Use the following format for literature cited (same as that used in many scientific journals, for example *Limnology and Oceanography*). Make sure all your references are correct. Use scientific journals only. No websites are acceptable as citations. Include DOI reference information for those journals published online.

Article: Fenchel, T. 1986. Protozoan filter feeding. Prog. Protistol. **1:** 65-113.

Falkowski, P. G., R. T. Barber, and V. Smetacek. 1998. Biogeochemical controls and feedbacks on ocean primary production. Science **281**: 200-206.

DeLonge, M., P. D'Odorico, and D. Lawrence. 2008. Feedbacks between phosphorus deposition and canopy cover: The emergence of multiple stable states in tropical dry forests. Global Change Biology **14**: 154–160, doi: 10.1111/j. 1365-2486.2007.01470.x.

Book: Stumm, W., and J. Morgan. 1981. Aquatic chemistry, 2nd ed. Wiley.

Chapter: Codispoti, L. A. 1983. Nitrogen in upwelling systems, p. 513-564. *In* E. J. Carpenter and G. Capone [eds.], Nitrogen in the marine environment. Academic.

Thesis: Kimmance, S. A. 2001. The interactive effect of temperature and food concentration on plankton grazing and growth rates. Ph.D. thesis. Univ. of Liverpool.

- Pick a topic that **truly interests** you. You will spend a lot of time reading and writing about this subject, and it shouldn't be a painful experience.
- Do not say "prove" or "disprove" re: your hypothesis. Say "reject" or "fail to reject"/"support." (Because that's how science works!)
- Writing style: Use active voice when possible. Each paragraph should have a topic sentence. Eliminate nonsense phrases. Ex. "It is the purpose of this experiment to…" can be shortened to "This study shows…" (among other things). Eliminate statements such as "it is clear that." Be direct and to the point.
- In general, avoid abbreviations. For example, use laboratory, not lab, and mathematics, not math.
- The first time you use an acronym, write out what it stands for and put the acronym in parentheses, for example: American Mathematical Association of Two-Year Colleges (AMATYC). After that you can use the acronym.
- Libraries and sources: The most useful references are articles written in peer-reviewed scientific journals. Edited volumes (edited books containing review articles) are also useful. Most of the ecological journals and books are housed in Magrath Library and the Entomology/Fisheries/Wildlife Library. Some of the journals related to climate change and geochemistry are located at Walter Library.
- World Wide Web Citing information from the World Wide Web in your term paper is NOT appropriate in almost all instances. If you feel you can justify use of the WWW, please come see me and we will discuss it individually.
- Electronic Indexes Google Scholar, Web of Science, BIOSIS (and Biological Abstracts), and Geobase are the most useful indexes for searching the ecological literature. The TA and your reference librarians can help you get started with these indexes if you are not already familiar with them. You will be introduced to them formally in Discussion.
- VERY IMPORTANT: **Evidence of plagiarism or academic dishonesty will result in a failing grade and a letter to this effect in your student file. It's not worth it! I will check your sources. I have had problems with this in the past and will not tolerate it.** Plagiarism is deliberately handing in another person's work as your own. It may be the work of a classmate, a scientist whose work you read while researching a topic, or something you pulled of the internet. It may be overt, in the form of copying answers from a colleagues' test, or it may be subtle, in the form of quoting or paraphrasing information from another source without properly acknowledging that source. If you want to use the exact wording from a published work, because you think it effectively makes a point, you must put the passage in quotation marks and cite the reference. More often, you will want to paraphrase another's ideas. Paraphrasing consists of expressing what an author is saying in your own words. In

this case you should include reference to the author you paraphrase to indicate that the ideas are someone else's and not yours. If you are not clear about the differences between scholarly citation, collaboration and paraphrasing, please consult see me or see the resources available at http://writing.umn.edu/tww/plagiarism/index.htm.

Research Paper Grading Rubric

Name_____

Research Paper Grading Rubric

Criteria	Excellent	Good	Fair	Weak
1. Central question clearly stated with an introduction that makes clear why it is important and interesting.				
2. Arguments, insights, and conclusions articulated, accurate and supported by sources				
3. Written to appropriate target audience using proper terms, explanations of concepts and jargon, and formal tone				
4. Properly formatted with Title, Abstract, Introduction, Conclusion, and References				
5. Organized into complete yet concise paragraphs with strong topic sentences that are well linked together				
6. Written with complete sentences, in active voice, without spelling or grammatical errors				

Comments:

Final Grade_____