314 Term paper - Away Team Mission Reports

In the (slightly tongue-in-cheek) context of the course, we will ask for a 'mission report' from each expedition member.

The final goal for each person is an approximately 5-to-8 page paper (double-spaced, 12 pt. font) investigating a particular (and detailed) aspect of Earth's habitability.

A good topic should use some of the material covered in class, but also involve some new and independent research. The mission commander is particular fond of back-of-theenvelope calculations of simple physics, and if that can be incorporated naturally into the paper, so much the better (though this is not a requirement).

We are using this as a writing exercise too, so the process of creating the paper is strongly iterative, a hallmark of clear technical writing. Avoid bad tendencies picked up from creative writing classes: a scientific report should be objective and dispassionate. Thus, florid adjectives that implore humankind to save itself should be avoided. Ask me if you think you are susceptible to rhetorical flights of fancy, and I'll give you feedback.

Timeline:

1. For Thursday, 8th November, pick a term-paper topic, and write an abstract, and provide a few initial references (properly cited) **Bring two copies to lab, and email me a copy.**

2. For Friday, 22nd November, at least 4 pages of a draft of your paper. **Bring two copies to lab.**

Extra Credit

If you repeat the comments and revision process one more time with a different partner from the class, you can receive extra credit. If you take this step seriously, you can earn an **extra 5% bonus** of the full total course grade. It must be a serious effort to earn this credit.

4. For Friday 6th December. Submit **term-paper portfolio**, consisting of:

a) original abstract, with comments from partner written on.

b) draft, with comments from partner written on.

c) second iteration, with comments from partner (if applicable for bonus)

d) final paper.

e) half-page discussion of how you have incorporated feedback during revisions.

Mission commanders want information on the following three sectors:

I. Natural resources - energy, minerals

II. Natural resources -- food and water

III. Natural hazards – geological, weather.

Examples of topics that might be tackled:

Resources: Does Earth have enough to sustain a colony? In each case: how much of the resource is needed; how will it be found; how will the resource be evaluated and what are the consequences of its exploitation?

Energy resources
Fossil – oil, gas, coal, uranium
Other – wind, biomass, wind, geothermal, hydro

2. Mineral resources Basic – Iron, aluminum, copper, silicon, CaCO3 (for construction) Trace – Gold, silver, additives for steel, etc

3. Hydrological resources (Surface hydrology, Sub-surface Atmospheric cycles, cryosphere)

Environment: Is Earth a safe place? In each case: How is risk quantified; can specific events be predicted and how can societal impact be minimized?

1. Geological hazards Earthquakes ,Volcanoes, Landslides Meteor impacts

2. Severe weather Hurricanes, Tornados and severe thunderstorms, Floods

3. Climate variability with scales of a few years Droughts, El Nino, Pacific Decadal Oscillation, Monsoon variability

4. Long term climate variability: Hundreds to thousands of years Desertification, Ice Ages, Stability of ice sheets, Potential for sudden, catastrophic changes

The more precisely defined a question the easier it will be to write. Your goal over the next week is to think about what topic you would like to do, do a little bit of research on it, and then describe your question and your approach. Please try and be specific as possible. We are asking you to do this to get you started. This should be something that

you work on a little bit every week until it is due, thinking about it, and building up the material to research.

References

I expect a well-referenced paper. This doesn't mean you need a lot of references, but you need to be able to back up definitive statements made in the paper with specific citations. Referring to web sites is okay, if they are credible, long-lived websites. Something like NY Times or the website Realclimate.org, or NOAA.gov is okay as long as it is justified by the context. In general, good web sites will give original references from academic journals and you should use those or textbooks as much as possible. **Do not reference Wikipedia!** But you can certainly peruse Wikipedia to find sources for their articles. Then go look up those sources.

You should anticipate using at least three or four major and different sources, and that you express an understanding of the arguments made within those references. Expressing opinions is fine, but they must be well supported by referenced facts. The credibility/stature of your sources will be a factor in our evaluation of the depth of your analysis. A good set of authoritative references will increase your grade.

Resources

-Realclimate.org for climate material

-Your textbooks

-Science magazine (www.scienceonline.org (on campus))

Nature magazine (www.nature.com (on campus))

Library:

Databases are very useful for finding original references. Georef (http://www.lib.washington.edu/resource/search/ResSearch.asp) is especially useful.

You can get onto the online databases from off campus, here:

http://www.lib.washington.edu.offcampus.lib.washington.edu/types/databases/

or on campus, here

http://lib.washington.edu/types/databases/

and to online journals including Nature and Science from off campus

http://lib.washington.edu.offcampus.lib.washington.edu/types/ejournals/

or on campus, here

http://lib.washington.edu/types/ejournals/

How to cite material

You will need at least three references for your research paper. *References will need to be properly cited both in the text and in a Works Cited section at the end of your paper.* To reference an item in the text you need to know the authors of the paper and the year published. For example if Adam Campbell wrote a paper in 2010 and was the only author listed you would cite this paper like:

"Crane Glacier reacted to ice shelf collapse with by enhancing basal sliding (Campbell, 2010)"

For a 2010 paper written by two authors, Campbell and Gerard Roe, and Campbell is the first author listed, your in text citation would be:

"The Little Ice Age Event has been clearly demonstrated to not be a globally coherent climate event (Campbell and Roe, 2010)"

For a 2010 paper written by more than two authors with Campbell as the first author listed, your in text citation would be:

"Research has demonstrated graduate students are overworked (Campbell et al., 2010)"

The Works Cited or References section at the end of your paper needs to properly cite references. Given a list of references at the end of your paper, and arrange them in alphabetical order. Here as some examples of how to reference different kinds of source materials:

Journal:-

Vaughan, D. G. and C. S. M. Doake. 1996. Recent atmospheric warming and retreat of ice shelves on the Antarctic Peninsula. *Nature*, **379**(6563), 323-331

Here Vaughan and Doake are the authors and 1996 is the year of publication. "Recent atmospheric ..." is the title of the paper. Nature is title journal. 379 refers to the volume number, 6563 is the issue number and 323-331 are the pages of the issue where the article was printed.

Book:-

Doniger, Wendy. Splitting the Difference. Chicago: University of Chicago Press, 1999.

Website:-

Evanston Public Library Board of Trustees. "Evanston Public Library Strategic Plan, 2000–2010: A Decade of Outreach." Evanston Public Library. http://www.epl.org/library/strategic-plan-00.html (accessed June 1, 2005).

The value of peer-reviewed articles:-

All important scientific research is published in peer-review journals, which means that expert colleagues in the field have reviewed the paper, and that there likely has been

some iterative revision of the paper, based on those expert comments.Peer-reviewed journals are not perfect, but the system does ensure a level of expert review that is a better guide to what is correct than any other What is so important about "Peer Review"?

"[Peer Review] is an undisputed cornerstone of modern science. Central to the competitive clash of ideas that moves knowledge forward, peer review enjoys so much renown in the scientific community that studies lacking its imprimatur meet with automatic skepticism. Academic reputations hinge on an ability to get work through peer review and into leading journals; university presses employ peer review to decide which books they're willing to publish; and federal agencies like the National Institutes of Health use peer review to weigh the merits of applications for federal research grants."

-- Chris Mooney -- publisher of the online magazine Skeptical Inquirer

Put simply, peer review is supposed to weed out poor science. However, it is not foolproof -- a deeply flawed paper can end up being published under a number of different potential circumstances.

--Mike Mann and Gavin Schmidt, RealClimate.org