

Research Paper – Earth Forces

Due dates:

Title and paragraph description: March 19

Final paper: May 1

This document gives information on how to: “get started” on a topic, look up references on computerized databases, decide on the scope of the paper, properly cite references, and avoid plagiarism.

General Comments:

When choosing a topic for and determining the scope of a paper, it is best to read first the most general kinds of articles that you can find (ie a geophysics textbook, *Scientific American* article, etc). Such overview information allows you to understand the entire scope of the topic you have chosen, informs you about the types of information that you will find in more detail elsewhere, and lets you better decide on which aspect of this topic you will focus. After reading such articles you can then focus in on specific issues by consulting scientific research papers in specialized journals such as *Nature*, *Science*, *Journal of Geophysical Research*, etc.

Our goals in having you write this paper are: to get you accustomed to locating references through the computerized bibliographic databases (very reliable) and through the Internet (of varying reliability), to get you accustomed to finding materials in our library, to teach you how to move from the generalities to the specific details of a topic, and to help you learn how to write a scientific research paper (both in terms of form and content).

You should write about some topic related to “Earth Forces” that interests you. The topic should be sufficiently broad to interest a general scientific reader but not so broad that you are unable to cover the topic in detail. Examples of previous successful papers include

The 670 km mantle discontinuity

The geomagnetic field and magnetic field reversals

The seismic structure of the moon

The search for magma chambers beneath Long Valley caldera, California

Geophysical study of the New Madrid seismic zone

Geophysical exploration for ground water

The Andes subduction zone

The San Andreas Fault

The pattern of mantle convection

The earth’s inner core

Please keep in mind that whatever you choose to write about, you should focus sufficiently to get into the real "nitty gritty". We do not want a paper that has 5 sections, each of which is a superficial overview of some topic. We want to see evidence that your research on this topic challenged you intellectually and that you learned a great deal from it. We specify 10 pages double spaced text as a general target for the length, although you should use whatever length you need to cover your topic within reasonable limits (say, within 8-14 pages). It is good to include a few figures to help the

reader understand your topic.

Make sure that the paper is well organized. Make an outline for yourself; consider a reasonable flow of material, beginning with some overview types of statements and moving into more detail (after you have told the reader what the flow will be). Assume that your reader is an intelligent scientist, but do not assume that the reader already knows more about the subject than you do--explain, define, make it clear to the reader that **you** know exactly what is going on. Choose appropriate subheadings to help guide your reader to the flow of your paper – it is difficult to read a paper that is 10 pages long without headings!

Format: printing, citation

Scientific journal articles (and, thus, research papers) are not usually written in the same format as papers for English composition classes. From our (snobbish!) viewpoint, we emphasize clarity and content (not form) in scientific papers. For instance, except in unusual circumstances, there should be no footnotes or endnotes in your papers. Citations for ideas and paraphrased wording from other authors (there should be many of these in your paper) are placed in parentheses in the text as (authors' names, date); a complete bibliography of all your **cited** references is at the end of the paper. To cite two different articles by the same author that were published in the same year, e.g., Sloan, 1998, designate them Sloan, 1998a and 1998b in BOTH your internal citations and your reference list. In that way, the reader can distinguish the articles.

In referencing sources on the Internet, please give the full URL address of the document/home page. Also include any available information concerning who generated the document, e.g., John Smith, Department of Geology, Univ. of Somewhere. **Be aware of the difference in the level of author's accountability between materials on the Internet** (anyone who can use html can post essentially what he/she wants, and can "borrow" materials from any other available sources) **and articles published in reputable journals** (manuscripts reviewed carefully by experts in the field; authors must re-write their manuscripts and re-submit them for approval by an editor who decides whether the final version is good enough to be published). In the "References Cited" section at the end of your paper, make a special section just for Internet references. Give each citation a brief, descriptive name, such as "Web Pasteris" (for a Web article by Pasteris) or "Web Asbestos 1" and "Web Asbestos 2" (for two different Web articles on asbestos). List the Web references in alphabetical order according to the citation "names" you have assigned them, e.g., Web Asbestos 1, Web Asbestos 2, Web Pasteris. Use those same names for the internal citations within your paper. This protocol makes it easy for the reader to go directly from the paragraph of interest in your text to the URL of the source of the information.

Nitty gritty: Approximately 10 pages of double-spaced text; figures and tables do not count in the 10 pages of text; one-inch margins all the way around the page; number the text pages; double-space the lines; use at 11 or 12 point type. There should be appropriate headings and sub-headings to help guide the reader to the organization of the paper. Write your own captions for the figures you present, as well as giving the citation for the figure in your caption. The paper should begin with a short abstract.

Rough Draft

You should always produce a rough draft of your paper for your own use (I do not require you to hand it in). Set the paper aside for a while and then read it through, or else ask a friend to read it. Make extensive edits on your rough draft before producing a final version. In case you are interested, scientific papers that we submit for publication will typically go through about five to ten “rough drafts” before the final, publication form.

The Bottom Line

Write this paper as if you truly were trying to teach someone about the topic you have chosen. You may be writing similar reports for colleagues in your working group on the job someday. Given that it is not possible for everyone to learn all the potentially useful information or techniques for a given job, members of a group often have to specialize and to bring each other “up to speed” on a topic, i.e., write a report or give a short tutorial. Consider this paper in that light.

Citations, Quotations, Paraphrasing

Because most of the information that you will present is new to you, you should have frequent citations, i.e., identification of the papers from which you gained your information. We would expect that most paragraphs in your term paper will have one or more citations.

I also have found in the past that not all students are familiar with how to provide information on a new topic without simply quoting what some other author has written. The best method to write your own term paper is to read several other authors' papers/chapters, take notes on the information (keeping track of the source), digest what they have said, outline your own way to express the material, and then write it down (citing those authors as the source of your information). Of course, in some cases, there is something very specific you want to express, and the source-author has said it the best way you can think of. Then, you can quote that author, **place his/her statements in quotation marks**, and not only cite the name and date of the publication but also the specific page.

Common Mistakes

The most common mistakes made by large numbers of students typically are:

improper citation of references either in the text itself and/or in the reference list
lack of an abstract (see directions);
lack of page numbers (these help the reader);
poor sentence structure and/or paragraph structure.
Poor organization – lack of section headings
Subject too broad for adequate coverage

Grading Criteria:

Topic choice (reasonable scope and challenge)

Completeness of coverage

Demonstration of understanding

Over-all organization and section headings

Sentence and paragraph structure

Grammar and Spelling

Citations (in text and reference list)

References (quality and diversity)

Personal input (expression and defense of opinion or point of view)

Abstract