EAS 100
PLANET EARTH

(Prof. L. Braile, Dept. of Earth & Atmospheric Sciences)
Fall, 2009

TERM PAPER ASSIGNMENT

(Please read this document carefully! Also, note Hints section on p. 4 and requirements on p. 5-6.)

OPTION #1: Term Paper

1. Select a topic of interest to you that is related to the Geosciences - Earth Science, Oceanography, Atmospheric Science, Astronomy. Your topic should not be so broad that it would take extensive research and a long paper to cover, nor so narrow that it will be difficult to find reference information. Some suggested topics are listed below, but you are free to select others. Your topic and the major emphasis of your paper must be scientific, in fact, geoscientific. Many topics have important political, social or economic aspects and you are free to discuss these, but the paper should be primarily a science paper. When you have selected your topic, find two or three key references to help you with your paper. The term paper is not really a research paper which is intended to completely review the latest findings on a topic. Rather, you are asked to investigate a topic of interest using a small number of good references and write a paper which displays your understanding of that topic.

2. Write a short paragraph (about two sentences) prospectus of your term paper describing your topic and how you plan to approach it in your paper. List at least two key references (author, title, publication, etc.) on your prospectus. Only one reference is required if you are reporting on (reviewing) a book. The prospectus is due on **Thursday, October 15**. You will get your prospectus back with an indication as to whether or not the topic is acceptable, and, in some cases, suggestions related to sources of information or other aspects of your proposed topic.

3. Write a 5-8 page (double spaced typed, text only, normal size type [12-point Times New Roman font; you should have about 300 words per page of text with this font and normal margins] and margins; figures, tables and references are extra) term paper on your topic. **A draft* of your term paper must be reviewed by a fellow student. The suggestions for improvements contained in the review should be considered when preparing the final version of your term paper. See section on Review below.** The term paper is due on **Thursday, November 19**. You may turn them in early. Late reports will be graded down. The term paper is worth approximately 15% of the course grade. **Your term paper will not be returned to you**. (You will be able to find out your term paper grade on Blackboard.) If you want to keep a copy, please be sure to make a copy before you turn in the paper. **Always retain a copy of your paper on your computer until after the semester.**

   *The draft of your term paper must be a reasonably complete (full length, edited) and typed version of your paper that can be given to a fellow student for review about one week or more before the due date. **Reviewer** and **Author's Response** forms will be available and must be turned in with the term paper.

OPTION #2: Lesson Plan for Teaching

1. In this option (designed especially for Education majors), you are to prepare a detailed lesson plan that could be used for teaching a Geoscience topic. The target grade level for your lesson plan is open, but grades 4-8 are suggested. Your lesson plan **must** consist of the following sections:
   (a) Educational Objective (a brief discussion introducing your topic and describing the principles, concepts, and skills to be taught).
   (b) Materials Required (a description and copies of materials including (paper copies of) transparencies, props, models, etc. needed for demonstration in teaching of the lesson).
   (c) Procedure (discussion of the procedure for teaching the lesson).
   (d) Scientific Background (a section of at least two pages in length and utilizing at least two references which gives the scientific background of the topic that you have chosen and demonstrates your understanding of the topics that are included in your lesson plan).

   Your lesson plan term paper must be reviewed by a fellow student (see point 3 above, and section on Review below).

2. The other aspects of the term paper assignment discussed above and below (length, prospectus, due date, etc.) also apply to this option.

REVIEW OF YOUR TERM PAPER

After writing a first (or second) draft of your term paper (either option #1 or option #2), have a fellow student in EAS 100 (enrolled in this course, this semester) review your draft term paper and provide you with written feedback on your paper. Use the constructive criticisms to revise and improve your term paper when you prepare your final version to be handed in on **November 19**. **Be sure to leave enough time to provide for this review process**. You will need to finish your first draft about a week before the due date in order to provide time for the review by another student and making your revisions for the final version of the paper.

Each student whose paper is reviewed will receive **10 points** in the homework grade. Each student who reviews someone else's paper will receive a maximum of **10 points** in the homework grade. Therefore, each paper should be reviewed and each student should perform one review on a paper.

We will provide you with a **reviewer form** on which to write the review and to turn in along with the term paper. There will also be an author's **response form** to document the changes that you made in your term paper from the review that you received. If you have problems finding someone to review your paper, we will help you find someone who is not already doing a review. The advantages of including this review process in your term paper preparation are: (1) obtaining a critical review of your paper should allow you to improve your paper; (2) performing the review allows each student to read a brief paper on a different topic and provides experience in reviewing another student's work.

SUGGESTED TERM PAPER TOPICS:

Greenhouse effect
Cretaceous/Tertiary Mass Extinction
Acid rain
Earthquake prediction
Dinosaurs
Global Climate Change
Volcanic hazards
Origin of life

Causes of Ice Ages
Air pollution
Earthquake hazard assessment
Ground water pollution
The East Africa Rift System
The San Andreas Fault
Earth's magnetic field
Hotspots

Nuclear Winter
Voyager II discoveries
Black Holes
Scientific method of nuclear testing verification
Milankovich orbital predictions
Theories of the Origin of the Universe

Oil spills
Ocean pollution
New techniques in weather forecasting
Coastal erosion
Radiometric dating
The age of the Earth
Meteorites
Geology of the Grand Canyon
Stellar evolution
Hurricanes
Oil exploration
Geologic hazards
Radon

FINDING USEFUL REFERENCES:

1. Many references can be found in the main library, but you should spend some time in the Earth and Atmospheric Sciences library (Room 2215, second floor of CIVL building). The **EAS 100 Reference List** (see web page web.ics.purdue.edu/~braile/eas100/eas100home.htm) will also be useful in finding good references. Also, use one recent reference to find others by using the citations in the text and the bibliography. These methods will generally be superior to simply using an electronic search which will usually result in a list dominated by out-of-date books. Examples of previous student term papers are available on the reserve shelf of the E&AS library. Electronic searches (of card catalog) are mostly limited to books (not journal articles) and tend to produce less useful and out-of-date sources.

2. Use the **EAS 100 Reference List** to get you started with a useful, recent reference.

3. Because recent "light" science books may be useful for your topic, you may have better success finding some references in the Purdue undergraduate library, the public library or by purchasing inexpensive paperbacks in local bookstores.

4. Because your topic may be included as a chapter or section of textbooks on Earth, Ocean, Atmosphere or Astronomical sciences, recent textbooks in the Purdue libraries may be useful. One problem with this method is that textbooks usually don't have a good list of additional references to follow-up or find more information. Some recommended textbooks include:

<u>Earth Science:</u>

Judson, S., M.F. Kauffman and L.D. Leet, Physical Geology, Prentice-Hall, Englewood Cliffs, NJ, 484 pp., 1987.

Press, F. and R. Siever, Earth, Freeman, San Francisco, 649 pp., 1983.

Skinner, B.J. and S.C. Porter, The Dynamic Earth: An Introduction to Physical Geology, 2nd Edition, J. Wiley & Sons, Inc., New York, 570 pp., 1992.

Stanley, S.M., Earth and Life Through Time, 2nd Edition, W.H. Freeman and Company, New York, 689 pp., 1989.

<u>Oceanography:</u>

Duxbury, A.C. and A.B. Duxbury, An Introduction to the World's Oceans, W.C. Brown, Dubuque, IA, 408 pp., 1989.

Gross, M.G., Oceanography: A View of the Earth, Prentice Hall, Englewood Cliffs, 5th Edition, 441 pp., 1990.

<u>Atmospheric Science:</u>

Ahrens, C.D., Meteorology Today, West Publishing, St. Paul, MN, 582 pp., 1988.

<u>Astronomy:</u>

Abell, G.O., D. Morrison and S.C. Wolff, Exploration of the Universe, Saunders College Publishing, Philadelphia, 682 pp., 1991.

Beatty, J.K. and A. Chaikin (Eds.), The New Solar System, Sky Publishing Corp., Cambridge, 3rd Edition, 326 pp., 1990.

Hamblin, W.K. and E.H. Christiansen, Exploring the Planets, Macmillan Publishing Co., New York, 451 pp., 1990.

Pasachoff, J.M., Astronomy, Saunders, NY, 1987.

Pasachoff, J.M., Contemporary Astronomy, Saunders, NY, 1985.

Snow, T.P., Dynamic Universe: An Introduction to Astronomy, 1983.

HINTS ON COMPLETING YOUR TERM PAPER:

Read this document carefully!

1. Select a topic that interests you.

2. Do a good job of researching (library, etc.) to find good resources.

3. You might choose a thesis (a particular position to take on an issue) to provide a focus for the paper.

4. Outline your paper in order to organize your thoughts and material.

5. Organizing your paper with sections and headings will help you present your material and aid the reader in understanding your paper. The paper should include an **introduction**, **background**, **data/evidence**, **results**, **discussion**, **conclusions**, **references**, copies of supporting **figures**, **tables**, etc., which illustrate the points made. Be sure to cite (see information on **citations** below), in the text, specific references to information that comes from published resources.

   The easiest (and recommended) way to handle **references** and **citations** is illustrated by the examples below (the author's name(s); if more than 3, put first author's name *"and others"*; followed by the date of publication. If publication is a book, also include page numbers):

   Examples citation in your text:

   Earthquakes which occur in stable continental crust are commonly associated with ancient rift zones (Johnston and Kanter, 1990).

   .....

   Johnston and Kanter (1990) show that although intraplate earthquakes occur less frequently than earthquakes at plate margins, their potential size and efficient wave propagation in stable continental crust results in significant seismic risk.

   .....

   Example of reference format for separate reference page:

   Johnston, A.C., and L.R. Kanter, Earthquakes in stable continental crust, *Scientific American*, **262**, 68-75, 1990.

6. A small number (1 to 5) figures or tables (xerox copies of figures [with appropriate captions] from your reference sources), or drawings of your own may help you explain your topic. Figures and Tables are optional and **do not count** in the length requirement (5-8 pages of text, double spaced typed, 12-point Times New Roman font, normal margins; with these settings, you should have about 300 words per page of text **– if you do not, adjust the font and margins and add additional writing as necessary to be consistent with the page requirement**). If you include figures, they can be placed at the end of the paper or embedded in the text (if embedded, be sure that the 5-8 pages of text is maintained).

7. **Use the metric system in referring to numerical values that include dimensions (units)!**

8. Don't bother with fancy covers, etc. A neatly typed paper with a title page, and your name, that is firmly stapled together is all that is necessary.

9. Use the EAS 100 Reference List to help you find reference material for your paper. Some references that appear in normal electronic searches in libraries are excellent. However, many are dated (decades old) and may be of limited value because so much has been learned about the geosciences in the last 20 years or so. You do not need many references to find the material to write a good paper on your topic. **However, if you have only one or two sources, they cannot be the textbook and an encyclopedia or dictionary. You must have at least one journal article or book reference.**

10. Get started early - don't put it off until the last minute. **Be sure to provide time for review of your paper by a fellow student and final revisions based on the review. *Reviewer* and Author's *Response* forms must be used and turned in with the term paper.**

11. **IMPORTANT! – Do not be tempted** to use a term paper obtained from the Internet or some other source **or to copy sentences or paragraphs from the Internet or other reference!** A simple Internet search can distinguish papers that are copied. **Plagiarism is copying or direct paraphrasing a sentence or more without citing the original source. ("Paraphrasing should not include the replication of vivid phasing, chains of syntax or sequences of ideas. Where those things are involved, direct quotation marks should be employed." Thomas Mallon, author of *Stolen Words*, 1989, as quoted in USA Today, January 17, 2002.) Direct quotations must be placed in quotes in your text and be cited (citations).** Specific information that you obtain from a reference **must** be cited. **You may copy specific sentences (must be in quotes), Figure and Tables from an Internet, book or journal source to include in your paper to support your own writing and objective. However, the copied material must be cited (such as in the Figure caption, or Table information), and the copied Figures and Tables do not count toward the minimum five page length requirement.** To avoid plagiarism or filling your paper with direct quotes, a good method is to prepare notes and outlines from your reference material, then use only your notes and outlines (along with citation information) to write your term paper **with your own organization and in your own words.**

12. If you turn in your prospectus early, we will get it back to you early. You may also turn in your paper early if you wish.

13. You must turn in a paper copy of your term paper and, keep an electronic copy of your paper.

14. When you have finished your term paper, check to see that all of the requirements (above and in the next section) have been met.

EVALUATION CRITERIA FOR TERM PAPER:

1. Format (~30%)
   a. Length, following directions
   b. References and citations (listed and adequate)
   c. Organization, neatness, readability

2. Content (~70%)
   a. Organization of material (Intro, body, conclusions).
   b. Clear objective.
   c. Scientifically sound.
   d. Text, figures, tables understandable, relevant, and support objectives/conclusions.
   e. Text which demonstrates your understanding of the chosen topic.

3. **You must have the following (requirements):**

   a. **Citations (indication in your text that refers to the reference source; the source must be listed in your reference list) in your paper for all quotations, figures, tables or other information that you have copied from the Internet, books or other sources, and to refer to specific information from your references that you have included in your text. Citations and reference list must correspond (each reference has corresponding citation(s) in your text).**
   b. **Citations must be of the form: (author(s), year) or: (author(s), year, page number(s)) if the source is a book. For Internet sources use a unique key word such as EPA.gov for an EPA website and list the complete URL (http://www... etc.) in your reference list.**
   c. **Reference List (for journals articles: author, title, journal, volume, pages, year; for books: author, title, publisher, pages, years; for Internet sources: list full URL).**
   d. **You must use at least one non-Internet source that must also not be the EAS 100 textbook, a dictionary or an encyclopedia. You must have at least one journal article or book source.**
   e. If you choose Option #2 (Lesson Plan), the scientific background must include citations.
   f. Proper format for your reference list (author, title, journal, volume, page numbers, year) or (author, book title, publisher, location of publisher, number of pages in book, year).
   g. **Metric units.** Except in a direct quote from an article or book, convert non-metric units to metric or put the metric equivalent in parentheses.
   h. Figures and tables **must have a caption and include the source (citation)**.
   i. **Please note length requirement: 5-8 pages of text, double spaced, typed. Figures, Tables or other copied materials, and reference list do <u>not</u> count in the minimum 5 page requirement.** Font should be 12 point Times New Roman or equivalent. Margins should be approximately 1 inch (2.5 cm) top and bottom, 1.25 inch (3 cm) on the left and 1 inch (2.5 cm) on the right. With these settings, you should have about 320 words per page – you can count words with the *Tools* option provided by your word processor.

GEOSCIENCE READING:

This reading list is not necessarily designed for use in finding information for your term paper, but some of the references (especially the periodicals) may be good sources. This list contains books and magazines that contain interesting 'light' science, including some geoscience topics.

<u>Books</u>

Chaos - James Gleick
Ice Time - T. Levenson
Coming of Age in the Milky Way - Ferris
Beginnings - I. Asimov
A Brief History of Time - S. Hawkings
Cosmic Dawn - Chaisson
Basin and Range - J. McPhee
Rising from the Plains - J. McPhee
(and other Geology-related books by McPhee)
From Stone to Star - C. Allegre
Dinosaur Heresies - R. Bakker
Books by Stephen Jay Gould, Nigel Calder, Steven Schneider
Ancient Light - Alan Lightman
Krakatoa – Simon Winchester
A Crack in the Edge of the World – Simon Winchester

<u>Periodicals</u>

Scientific American
American Scientist
Smithsonian
National Geographic
Astronomy
Earth Science
Geotimes
Discover
Earth
Sky and Telescope
Earth in Space
Earthquakes and Volcanoes
Weatherwise
Meteorological Magazine
Rocks and Minerals
Air and Space