

Earth Sciences 083F: Term Paper Assignment (Due Friday, November 17, 2006)

Basic Requirements and Due Date

To obtain full credit for Earth Sciences 083F, you are required to write a 2000 word report addressing some **scientific** aspect of biological evolution and/or paleontology. Some possible topics are provided at the end of this assignment outline. In order to avoid too much “monopolization” of resources in the library, a maximum of three people will be permitted to write on a specific topic. Once you have picked a topic, e-mail Cam your top three preferred topics in order of preference, so that he can notify you about which topics are taken and which topics are still available. Up-to-date sources of information are expected, especially for popular and highly controversial topics such as human evolution and mass extinctions.

You may either choose a topic on the list provided below, or choose a topic of your own (provided that you obtain permission from C. Tsujita). This term paper will be written in report form, as specified below. **Submit your term paper in the the Earth Sciences 083F drop box by Friday, November 17, 2006.** There will be a 10%/day penalty for late submissions (10 % off after 4:00 pm on the due date, and an additional 10 % each day thereafter; 10 % for weekends).

Some Details

Your mark will be primarily based on the content of your report, your writing abilities (including spelling and grammar), your organizational abilities, and your ability to distill information from multiple sources into a concise and coherent account of your topic (see “Further Comments” below). Reports should be broken into appropriate sections (i.e., “Introduction” and “Conclusions”, with appropriate headings in between for the main body of the report) and should include a title page (with your name, student number and topic) at the beginning of the document, and a “References” section at the end of the document. Specific headings for sections of the main body of your paper. All essays should be double-spaced and typed in 12-point font. **Essays showing evidence of plagiarism will be given a grade of zero.**

A Note on Quotations

You are discouraged from using direct quotations; wherever possible, express the concepts in your own words. If you that feel that a quotation is absolutely necessary, provide a citation as indicated above, followed by the page number of the publication you derived the quotation from (e.g., Heikoop et al., 1996, p. 287). If using an unauthored internet article, cite it as indicated above - a page number is not necessary.

Illustrations and Citations

It is encouraged that you use figures (pictures/graphs/charts) to illustrate your point (provided they help in explaining a concept discussed in your report). When you use a picture, you must refer to the corresponding figure number in the text of your report. Each picture should be assigned a figure number and caption, with a reference to the original source of the picture.

Example of how a figure should be referred to in the text:

The trilobite eye is similar to that of an insect in that it features an hexagonal close-packed arrangement of many lenses (Figure 1).

Example of figure caption (to appear below the actual figure):

Figure 1: Photomicrograph showing lens arrangement in a trilobite eye (from Boardman, 1984).

Citations in Text

Properly cite information used in the text of your essay in the style indicated below. For articles with more than one author, write the last name of the first author, followed by “et al.”

Hard-copy and authored internet articles

For hard-copy publications and , cite the last name(s) of authors, followed by year of publication.

Example sentence:

The bone structure of dinosaurs is well-documented (e.g., Bakker, 1987; Fredrickson and Olstott, 1996; Horner et al., 1996).

Another example sentence:

As documented by Olsen (1987), Frederickson and Olstott (1996) and Heikoop et al. (1996), volcanic ashfall can profoundly affect the health of marine communities.

Yet another example sentence (this one is for an authored internet article):

Research on the martian meteorite ALH84001 has provided intriguing evidence for possible ancient life on Mars (McKay et al., 1996).

Unauthored internet articles

If using a website article without an author, give an appropriate title (e.g., Mt. St. Helens Article, Discovery Channel Website).

Reference Format

Citations in the text and figure captions of your essay will correspond with full citations in a “References” section at the end of your report. This should be divided into the subheadings “Hard-copy publications and authored internet publications” and “Unauthored internet articles” These should be listed in alphabetical order (according to last name of author or short title of webpage). Your references must be written in the following format:

Hard-copy publications and authored internet articles

1) For scientific journal articles:

Heikoop, J.M., Tsujita, C.J., Risk, M.J., and Tomascik, T., 1996, Corals as proxy recorders of volcanic activity: evidence from Banda Api, Indonesia. *Palaios*, v. 11, p. 286-292.

2) For books:

Radinsky, L.B., 1987, *The Evolution of Vertebrate Design*. The University of Chicago Press, Chicago, 188 p.

3) For articles in popular magazines:

Fredrickson, J.K., and Onstott, T.C., 1996, Microbes deep inside the Earth. *Scientific American*, October, p. 68-73.

5) For articles in compendia:

Kidwell, S.M., and Bosence, D.J.W., 1991, Taphonomy and time -averaging of marine shelly faunas. *In*: Allison, P.A. and Briggs, D.E.G., eds., *Taphonomy: Releasing the Data Locked in the Fossil Record*. Plenum Press, New York, p. 115-209.

6) *For articles in conference symposia:*

Buddemeier, R.W., 1974, Environmental controls over annual and lunar monthly cycles in hermatypic coral. Proceedings of the Second International Symposium on Coral Reefs, v. 2, Great Barrier Reef Committee, Brisbane, p. 259-267

7) *For authored website articles*

McKay, D.S., Gibson, E.K., Thomas-Keprta, K.L., and Vali, H., 1996, Search for past life on Mars: possible relic biogenic activity in Martian meteorite ALH84001. Lunar and Planetary Institute website, <http://cass.jsc.nasa.gov/lpi.html>. Accessed February 19, 2005.

Unauthored internet articles:

If an author is not provided on the website, use the appropriate title cited in the text and give the full address of the website source you obtained the information from, plus the date at which the article was accessed. For example:

Mt. St. Helens article, Discovery Channel website,

<http://dsc.discovery.com/news/afp/20041004/helens.html>. Accessed February 20, 2005.

Pearls article, American Museum of Natural History website,

<http://www.amnh.org/exhibitions/pearls/>. Accessed February 21, 2005

Note: You will not use encyclopedia-type articles (either online or in printed form) as reference sources. This applies to sources such as Wikipedia, Encyclopaedia Britannica, Encarta and World Book. You are expected to seek out original articles whenever possible (to give credit where credit is due).

Possible Topics for Earth Sciences 083F Term Paper

- 1) The origin of life
- 2) The evolution of invertebrate skeletons
- 3) The evolution of sharks
- 4) The evolution of bony fishes
- 5) The evolution of sight in invertebrates
- 6) The early ancestry of vertebrates
- 7) The evolution of vertebrate jaws
- 8) The evolution of bony fishes
- 9) The evolution of amphibians
- 10) The evolution of snakes
- 11) The evolution of turtles
- 12) The evolution of mammal-like reptiles
- 13) The evolution of early mammals
- 14) The evolution of dinosaurs
- 15) The evolution of crocodylians
- 16) The evolution of pterosaurs
- 17) The evolution of plesiosaurs
- 18) The evolution of mosasaurs
- 19) The evolution of ichthyosaurs
- 20) The evolution of mammoths and mastodons

- 21) Why did the large Pleistocene mammals go extinct ?
- 22) The evolution of elephants
- 23) The evolution of rhinoceroses
- 24) The evolution of horses
- 25) The evolution of cats (prior to domestication)
- 26) The evolution of dogs (prior to domestication)
- 27) The evolution of bats
- 28) The evolution of whales
- 29) The early evolution of primates
- 30) The evolution of humans
- 31) Why did the Neanderthals go extinct ?
- 32) The early evolution of birds
- 33) The evolution of flightless birds (ratites)
- 34) The history of skeletonization in invertebrates
- 35) Possible causes for the Permian-Triassic mass extinction
- 36) The possible role of bolide (asteroid/comet) impacts in mass extinctions
- 37) Co-evolution of flowering plants and insects
- 38) The origin of sex
- 39) Evolution of reefs
- 40) The evolution of flight
- 41) Were dinosaurs warm-blooded or cold-blooded ?
- 42) The evolution of land plants
- 43) Evolutionary significance of the Burgess Shale fauna
- 44) The evolution of eyes
- 45) The evolution of lungs
- 46) Atmospheric oxygen levels and the evolution of early life
- 47) Biological bulldozers: effects of burrowing on the evolution of marine life
- 48) Evidence of early life on Mars
- 49) The evolution of predatory strategies in dinosaurs
- 50) The evolution of herbivory in dinosaurs
- 51) The evolution of parasitism
- 52) The evolution of hearing in vertebrates
- 53) Early invertebrate evolution: evidence from trace-fossils
- 54) Dinosaur nesting habits
- 55) The Mesozoic Marine Revolution
- 56) The evolutionary significance of the Mazon Creek fauna.
- 57) The evolution of invertebrate jaws.
- 58) The evolutionary significance of the Ediacaran fauna of Newfoundland
- 59) The significance of deep-sea hydrothermal vents in the evolution of life
- 60) The evolutionary implications of the "Snowball Earth" concept

Further Comments

- 1) Note that some of these topics are more specific than others. You are welcome to write an essay on a particular aspect of one of the more general topics above, provided that you obtain permission by the end of October.

- 2) Keep in mind that there may be others exploring the same topic as your own and that there might be considerably fewer resources available to you in the library if you are writing your essay at the last minute !
- 3) If you have any problems with writing your essay, or have concerns about your writing skills, you are welcome to consult with me, provided that you do so **at least two weeks** before the essay is due (preferably sooner than later).
- 4) It is suggested that your assignment be written in report style, clearly using headings to indicate major sections (i.e. beginning with “Introduction”, ending with “Conclusions”, and appropriate headings the main body of your paper). This will make it easier for you to structure your paper and recognize the major issues inherent in your topic.
- 5) The report will be marked according to the following criteria:
 - The “Introduction” section should contain a clear statement of what you are going to demonstrate in your paper, background information on topic including basic problems/issues and/or debated hypotheses.
 - Logical development of concepts and arguments (main body of essay).
 - Documentation (supporting evidence for major points).
 - The “Conclusions” section should comprise a synthesis of the main point(s) of your essay in 2 paragraphs or less.
 - Writing ability (e.g. spelling, grammar, punctuation, sentence structure), and organization (e.g. designating information to appropriate sections in your report).
 - Your ability to distill multiple sources of information into major concepts and arguments.
 - Appropriate number and quality of references (indicating that you put some effort into researching the topic and verifying the reliability of the information).

Good Luck, and have fun with your research !