

## Reading/Writing Model for Essay Assignments in Paleontology

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I use writing assignments often in teaching; writing clearly and effectively a hallmark of all educated persons and many students are coming in to college without as much preparation as previous students had. Using reading and writing in concert can help students practice a number of skills like synthesizing and evaluating information from different sources and formulating new research questions. This reading/writing exercise has proven very effective for me. It's not that different from many essay assignments – read some papers and write on a given subject – except in a few key ways:

- 1) The assignments are choreographed multi-step processes. Each student is assigned a particular reading from the primary literature for which he or she will be the primary discussant in a class discussion. The suite of readings must be carefully chosen so that together, they tell a story about the development of understanding about a particular topic or issue. After the discussion, the students are provided with the essay assignment. *The readings now comprise the core bibliography.*
- 2) On discussion day, have students talk about the papers *in chronological sequence*. There should be back and forth discussion, of course, but when this process works right, (which is most of the time, in my experience), the stepwise introduction and discussion of the papers allows students to see how the problem, whatever it is, was originally framed, how new information changed interpretations, how competing hypotheses are presented and become accepted (or rejected), how a clear resolution is (or is not) developed, and how new ideas and hypotheses are conceived.
- 3) After the discussion, students take away the essay assignment to ponder. The assignment should be targeted at concepts or ideas you're interested in having the students explore, based on the readings they've just done.

For this to work, students must take the time to read and understand the paper they've received. Because many students find reading the primary literature quite daunting at first, it's useful, particularly if students are just starting out reading primary literature, to discuss in class *how* to approach reading a journal article. Maybe most important is inculcating the idea that most people don't read straight through a paper, that multiple readings are important, and that it's not like reading a novel – it takes time to absorb.

The other key to success is choosing the right papers. This may take some research on the instructor's part, particularly for topics that aren't familiar at first. I have often had students come up after the exercise and explain that although they were confused at first, the sequential discussion was very effective at helping the student understand his or her own paper as well as the overall context. It's a simple idea, but it can be very effective. Good luck!

## Bug Creek Essay Assignment

You've read and discussed a sequence of papers about the richly fossiliferous, stratigraphically complex Bug Creek site. You saw how the ideas about the site changed over time, as well as how the implications (like whether dinosaurs survived into the Paleocene) changed with detailed study. The issue of what time these deposits represent has been resolved (and hurray for that), but there are many other unanswered questions that could be developed. (The nature of good science is that closing the door on one issue will open the door for some other area of inquest.)

Develop a new research question to address in the Bug Creek area. I'm not asking you to answer the question (though by all means, go for it, if you get inspiration), but rather formulate a research idea. Remember, the question can be very simple and straightforward.

Create an essay in the form of a research proposal. This proposal will consist of several parts.

1. An introduction that provides background on the region, specific location, time interval, and previous work. This background should support and inform the question you're leading up to and make its significance obvious
2. A section explaining the question to be addressed, its importance and relevance.
3. A short section outlining the research plan itself

You'll be citing the relevant literature for this exercise. That'll include at least some of the stuff in the reference list below, but would also draw in other things relevant to your question as well. There's no exact word count, but shorter than 1000 words means you haven't developed the idea and the background enough.

Your essay will be evaluated on two criteria: (1) your command of the background, (2) the development of your question; and (3) your correct and complete use of citations and references.

### Bug Creek Discussion Readings

Archibald, J. D. and W. A. Clemens. 1984. Mammal evolution near the Cretaceous-Tertiary boundary. In: W. A. Berggren and J. A. Van Couvering, (eds.) *Catastrophes and Earth History; the new uniformitarianism*. Princeton University Press, Princeton, N.J., p. 339-371.

Archibald, J. D., D. E. Fastovsky, and R. H. Dott. 1986. Comment and Reply on

- "Sedimentology, stratigraphy, and extinctions during the Cretaceous-Paleogene transition at Bug Creek, Montana. *Geology* 14(10):892-894.
- Fastovsky, D. E., and R. H. Dott. 1986. Sedimentology, stratigraphy, and extinctions during the Cretaceous-Paleogene transition at Bug Creek, Montana. *Geology* 14:279-282.
- Lofgren, D. L., C. L. Hotton, and A. C. Runkel. 1990. Reworking of Cretaceous dinosaurs into Paleocene channel deposits, upper Hell Creek Formation, Montana. *Geology* 18: 874-877.
- Lofgren, D. L. 1995. The Bug Creek Problem and the Cretaceous-Tertiary Transition at McGuire Creek, Montana. *University of California Publications in Geological Sciences* 140. 185 pp.
- This is Lofgren's treatise on the subject and pretty much the last bit needed to resolve the issue of what the age of the Bug Creek stuff is. Does not resolve whether extinction dino extinction is gradual or instantaneous, but does resolve the ages of the deposits and whether dinos persisted into the Paleocene (recounting some of above paper).
- This piece is far to long to be assigned as one of the readings, though you can excerpt the first part.
- Sloan, R. E., J. K. Rigby, L. M. V. Valen, and D. Gabriel. 1986. Gradual dinosaur extinction and simultaneous radiation in the Hell Creek Formation. *Science* 232(4750):629-633.
- Sloan, R. E., and L. V. Valen. 1965. Cretaceous Mammals from Montana. *Science* 148(3667):220-227.
- Smit, J., and S. Van Der Kaars. 1984. Terminal Cretaceous extinctions in the Hell Creek Area, Montana: Compatible with Catastrophic Extinction. *Science* 223(4641):1177-1179.