

## **Writing research-supported learning material for introductory geosciences**

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### **Writing a Lecture Tutorial Workbook:**

Lecture Tutorials are 1 to 3 page worksheets that use different questioning approaches, such as figure interpretation and Socratic questioning, to assist students in learning difficult concepts and overcoming misconceptions. The goal of our work is to make well-written and effective Lecture Tutorial worksheets available for instructors to use with their students in the classroom.

Some strengths of this work are that these worksheets increase the interactive component of lecture, allow students to participate in and evaluate their own learning, and give students the opportunity to “talk science” with each other, skills that are useful for the success of two-year college students. Lecture Tutorials are also easy for instructors to use and can be inserted into a previously prepared lecture.

One major challenge has been to publicize their existence and coach faculty how to use them most effectively. We were able to design a SERC webpage about Lecture Tutorials (see url below), to increase awareness and promote effective use. Also, the publisher WH Freeman has been helpful in marketing the book by distributing free instructors copies and funding and hosting workshops and webinars.

Karen Kortz and I found in a research study that not only do Lecture Tutorials increase learning by 12% over an extended lecture on the same material, but also that most students, especially two-year college students, like them and find them to be useful.

### **Writing a New Introductory Geology Textbook:**

Another type of material that I have been designing for introductory geoscience classes is a new textbook. Anecdotally, many faculty members do not think their students get much out of their textbooks, either because the students do not read them, or because they become confused by the details and jargon. In order to address these issues, Karen Kortz and I are working on creating a textbook which will be of high interest to faculty with these concerns. We have an estimated publication date in late 2014.

The goal of the work is to create a textbook based on cutting edge research about how introductory students learn. Some of the strengths of this textbook are that it has a very strong focus on figures and images, cuts out less relevant details emphasizing the major concepts, and has a reduced number of geology-specific terms. We hope to increase student success in two-year college geology courses by giving them a new tool (the textbook) to learn the fundamental concepts of geology.

One challenge we anticipate is to win over instructors who currently use other textbooks, because this new textbook is so revolutionary. Preliminary research results suggest that two-year college students prefer this new style of textbook, feel they would learn more from it, and predict that they would be more likely to read it than traditional textbooks.

SERC website about Lecture Tutorials:

[http://serc.carleton.edu/NAGTWorkshops/teaching\\_methods/lecture\\_tutorials/index.html](http://serc.carleton.edu/NAGTWorkshops/teaching_methods/lecture_tutorials/index.html)

W H Freeman website about the Lecture Tutorial workbook:

<http://www.whfreeman.com/Catalog/product/lecturetutorialsinintroductorygeoscience-secondedition-kortz>