Lab 1: Getting the Most Out of Geologic Literature (20 points)

As a science student, chances are that you have read a few articles of scientific literature. Even so, you may not find the task particularly easy or direct. You are not alone. Ph.D. students often find articles difficult to wade through. This guide contains some helpful pointers and an example for how to get the most out of scientific literature—Happy reading!

Dictionaries
Advanced articles may use terminology that you have yet to encounter. Thus it is important to have a good geologic dictionary handy when reading an article. An excellent reference tool is the Glossary of Geology by Julia A. Jackson. It is available to you in several locations along with other dictionaries (usually adjacent on the shelf):

Science Library
Reference Section: QE5.B38—2 editions from 1987 and 1997, in library use only
3rd Floor: QE5.G37—2 editions from 1980, should be available for checkout
Main Library - Info Commons
Reference Section: QE5.B38—1 edition from 1997, in library use only
Antevs Library (G-S 211)
New edition—in library use or you can check this one out
Your TA (G-S 546)
You are allowed to pick my brain at most hours.

Wikipedia
While not always complete it can be a great start. I often go there first.

Types of Articles
Although scientific articles can range from 4 to 40 pages, they generally divide into two basic formats: the data format and the review format. Some articles, especially those which compile different types of data for tectonic interpretation, fall somewhere in between. Here is one strategy for reading these articles by section.

Article Sections
Data Review
Abstract Abstract
Introduction (Introduction?)
Methods Chapters…
Observations/Interpretations…
Discussion…
Conclusions Conclusion/Summary
References References
Figures Figures

Reading Strategy
Outlined below is a strategy for approaching these articles. This does not involve reading the article straight through! By design a scientific article contains the most relevant information at the start (an introduction or “Why is this problem worth discussing?” and “What is its background?”) and the finish (a conclusion or “What was
discovered?""). Select certain sections to read, focus on the driving points of the article, and ask key questions to yourself throughout the process.

**General Suggestions**

!!!If you get stuck, move on!!! Your question is likely to be answered later in the article or the answer may come to you with further reading.

**Take notes as you read.** You can do that on a separate piece of paper or in the margins of the article. This will help you remember key points and questions while you read the article.

**Before Reading**

1. **Consider the context of the article.** Our knowledge of the earth is more complete than it was last year, so certain aspects of older articles often become outdated. Still, many have merit and form the foundation for the current scientific community. Ask yourself: Was the article written before/during/after the plate tectonics revolution? When was it written compared to other articles you have read on the same subject? This will help you think ahead about what was known about the subject when the author wrote it.

2. **Find out what kind of article it is.** Is it about data or is it a review? Page through the article to see how it is laid out—you can use this information to customize your strategy for reading.

3. **Think about what you want to learn.** Why are you reading it? Do you need to understand everything the author says, or do you just need to understand some fundamental points? You don't always have to read the whole article! You need to read until you have reached your goal, and considering this will help you take more concise notes on aspects that are significant to you and work more efficiently.

**Strategy**

1. **Abstract:** Try it. If it's too heavy or you get stuck, move on.

2. **Introduction:** Read it. Key question: What questions are they trying to answer or what theories are they testing? What is the background of the problem?

3. **Figures:** Skim. If one looks interesting, then look closer, read the caption, and try to figure out what it represents.

4. **Conclusions:** Read it. Key questions: How well did they answer their initial question laid out in the introduction? Do you understand all the conclusions and how they got there? Take note of parts you don't understand so you can try to figure them out in the next step.

5. **Observations/Interpretations/Chapters:** Read parts to flesh out the story and answer your questions. If you still don't understand what they're trying to do, look at the methods section.

6. **Discussion:** Same as step #5.

7. **Conclusions:** Read again!
**Methods:** Read only when necessary for understanding, or if you’re trying to reproduce the results.

**References:** When reading the text, note references that you may want to look up. If you don’t understand something about the article, you may be able to answer it by looking at a previously published article that the authors cite. This is also a great source for background reading.

**After Reading**

1. **Have you determined what the authors are trying to tell you?** If not, figure out why. You may want to discuss the article with a fellow student, peer, or adviser.

2. **Consider what you didn't like about the author's story.** Does something not fit? Do you believe their conclusions? Take a moment to consider why/why not.

3. **Try to answer this question: What would you do next with this study?** What loose ends still need investigating? Could you think of a research proposal to write in order to address unanswered questions? This is where science really starts!

4. **Identify anything you don’t understand or have questions about.** This can help you get the most out of the in class discussions or discussions with your peers. I make it a point to always identify the points that need clarification after reading a paper.

**Tips for Locating Useful Journal Articles in the Future**

Web of Knowledge ([http://portal.isiknowledge.com/?DestApp=WOS&Func=Frame](http://portal.isiknowledge.com/?DestApp=WOS&Func=Frame)) has one of the most comprehensive databases of Geoscience related articles. It can be accessed from anywhere on the Arizona campus.

When searching for journal article, input a variety of key words related to its subject matter, such as “Detachment Fault” or “Plagioclase Zoning”, or an author’s last name and first initial if you seek work by a specific person. Articles returned by your search can be sorted chronologically, or by “times cited”, which is often the best method for locating the most relevant and fundamental papers on a topic. Most journal articles are linked through these databases, and can be downloaded and printed immediately.

**Your Assignment**

After the class exercise using the Hess, 1962 paper continue as groups by individually reading a section taking notes and then discussing as a group. Do for each section as time permits. Your notes should be in your own words. If you feel you need to use the same words as the author be sure to put quotes around it the author's words in your notes. Make sure to write down any questions you may have. These notes will help you write your literature review on this paper due next Wednesday. Turn in your notes from the Hess, 1962 paper and any comments you have about the process of reading scientific papers at the beginning of lab next week.