

Assessment Summaries, Geology BS and BA, 2018-2019

Overview

We present an assessment from the Geology BS & BA program that evaluates our Program Learning Outcomes 2) Skills and 3) Analysis

GEOL 361 Igneous & Metamorphic Petrology - Spring 2019

PLO 2 Skills and PLO 3 Analysis

Rock Suite Project. Term-long comprehensive study of a suite of rocks.

This project assesses a significant portion of the Geology Core: a strong foundation in both Mineralogy (GEOL 360) and Igneous & Metamorphic Petrology (GEOL 361) is required to demonstrate competence in this task. The project serves as an early capstone to the 'hard rock' geology content that we provide, which in turn serves as a fundamental part of a geologist's understanding of the Earth's chemical and physical make-up. It builds and tests the strength of a student's observational and analytical skills to identify, classify, and interpret the origins of Earth materials. Students analyze rock hand samples and thin sections, identifying the minerals, modal mineralogy, textures, etc. so that they can understand and describe each rock's petrogenesis. Once students have this information for their entire rock suite, they then synthesize those results and explain how those samples fit into geologic history of the sample area. An assignment-specific scoring sheet is used in the quantitative assessment.

Main Findings: Only four students were assessed (the class enrollment, 3rd year Geology majors). The mean score was 8.3 out of 12, (8 is meeting PLO), with a standard deviation of 3.9 (n=4). Two of the four enrolled students produced very poor quality Rock Suite Projects (scores of 6 and 4 out of 12). In spite of having fulfilled the prerequisite course requirements in mathematics, chemistry, and physics, the preparedness of these two non-typical students was atypically very low; furthermore one of these students did not possess the self-motivation required for the project. If the project results for these two students are not considered, the project statistics reported above improve dramatically to a mean score of 11.5 out of 12, with a standard deviation of 0.7 (n=2) for the typical students.

Scores are typically higher in the areas of 'Methods', 'Hand Sample Descriptions and Observations' and 'Thin Section Descriptions and Observations' (i.e., Skills), with lower scores in Synthesis/Discussion sections (i.e., Analysis), consistent with early- and mid-level students having some difficulty in analysis and integration.

Recommendations for Improvement: All students assessed took advantage of the opportunity to receive feedback on a draft version; this is a key component of the project and will continue. In particular, comments on the synthesis of data into a reasonable geologic story, as well as the production of effective abstract and conclusion sections, allow for dramatic improvement in these areas. The instructor may incorporate peer review in the future, as motivation for submitting an improved final product, and to allow students to develop evaluation skills. Since preparedness in inorganic chemistry is crucial for success in the course, the instructor may test that knowledge early on, and suggest e.g., SCAA tutoring in chemistry for students who do not perform well. Because this project provides an excellent introduction to the methods used by and skills required of a professional geologist and incorporates all of the Geology BS/BA PLOs, it will continue to be a component of program assessment.

Closing the Loop: Preparation of this assessment report has already led to fruitful discussions between the instructor and the dept Chair regarding prerequisites and recommendations for improvement. The major advisor should meet with incoming transfer students in particular, to determine preparedness in inorganic chemistry, since this course is the first UD course in the major.

CSUEB Geology BA/BS. Program - GEOLOGIC MATERIALS

APPLIED TO: GEOL 361 - Igneous & Metamorphic Petrology, Spring 2019: Rock Suite Project

6 students evaluated

Class Total average (all students): 8.3 out of 12, (8 is meeting PLO), standard deviation: 3.9

Average (typical students only, see above): 11.5 out of 12, (8 is meeting PLO), standard deviation: 0.7

Average (non-typical students only, see above): 5 out of 8, (8 is meeting PLO), standard deviation: 1.4

CSUEB Geology Program Assessment

Rubric: Lab Project

Course: GEOL 361

Semester: Spring, 2019

Assignment: Rock Suite Project

Student ID	Observational Skills (3 possible)	Organization (3 possible)	Connection, Synthesis, Transformation (3 possible)	Presentation (3 possible)	Total (12 possible)
'Typical' students (see above)					
1	3	3	3	2	11
2	3	3	3	3	12
'Non-typical' students (see above)					
3	1.5	1.5	1.5	1.5	6
4	1	1	1	1	4

GEOL 361

Igneous and Metamorphic Petrology

Instructions and Guidelines for Rock Suite Project

SYNOPSIS: You will carry out a petrological research project for the rock suite of your choice from our outstanding collection. Then, similar to Mineralogy class last semester, you will create and submit a manuscript suitable for publication in a petrological journal. However, this semester, your manuscript will be based upon your *own* research, data collection, observations, discussion-synthesis, and conclusions. The rock suite project will be worth 20% of your overall course grade; do not take the project lightly! I recommend that you begin early in the semester, as significant out-of-class lab time will be required.

TOPIC:

Choose a rock suite from our extensive collection. I suggest that you first look at the rock suites to learn which are available, then do some research on localities of interest before making your choice. I can help you decide if you want, just ask!

RESEARCH:

Your paper should include the general geology of your samples (geologic setting, location, previous work by others, etc.). The bulk of research, however, will be complete hand sample and thin section descriptions, following the same procedures as used in the class lab exercises. Collect data systematically - prepare tables and figures as appropriate. Labeled photographs, photomicrographs, and sketches are an excellent way to convey information. When you have completed the research, integrate what you observe about your samples with the bigger regional geologic picture. This is the quantum leap - you must synthesize your observations to come up with a petrogenesis for your rock suite that is supported by your observations. This requires a lot of thought.

MANUSCRIPT FORMAT:

Following examples from the journal *Geochemica et Cosmochemica Acta* (posted on Blackboard).

Organize your paper as follows:

Title

Abstract: 200 to 300 words; what did **you** do, how did **you** do it, what did **you** find out

Introduction – Geologic History – Setting etc. (you will have to research this...)

Methods – how did you carry out your study of your rock suite samples

Results – your hand sample and thin section descriptions, etc. (can be an Appendix...)

Discussion – how do your samples fit into the context of the geologic setting and characteristics of your field area? Synthesize your results into a story...

Conclusions – what did you find?

Reference List

GUIDELINES:

In your paper you are expected to reference your sources -- class readings, any published source (books or articles) or the Internet (however, as the quality of materials on the Internet can vary drastically, you should use some discretion here). For a paper of this size, 10 cited references is a good average. **YOUR PAPER MUST BE YOUR OWN WORK.** Do not lift sentences directly from a text; this is plagiarism and is subject to academic punishment. You must express the ideas and concepts in your own words. But you **MUST** cite/reference the source of your information -- give credit where credit is due. If you do not cite the source of your information, this is also plagiarism. Feel free to use illustrations – plots – diagrams, etc. (remember a picture says a thousand words...), just be sure to include Figure Numbers, Figure Captions, and Figure References.

Do not use quotes unless it is necessary to illustrate your point or you are critiquing someone else. For this paper, you should be able to express your ideas in your own words. Do not use terms or jargon that you are not familiar with. If I do not understand what you are writing about, I will come to you and ask and you must be able to explain what you mean.

Remember that petrology is a science concerned with phenomena at a wide variety of scales - from mappable units, to hand samples, to microscopic examination. Your paper should reflect this breadth of scale. Your paper should include a map of the geology and sample locations if available.

I will help you every step of the way - research, petrography, paper organization, etc. Just ask!
The best way to get my help is to turn in a draft!!

REQUIREMENTS:

Length: 7-8 pages of double-spaced text (excluding title page, abstract, references, tables and figures).

1 inch margins all around with 12 pt font.

Follow the format for the journal *Geochimica et Cosmochimica Acta* for style (references, figure captions, organization, etc.). The instructions for contributors are found in each January issue of that journal (copy on our bookshelf; also scanned and posted on Blackboard).

DUE DATES:

Rock Suite Selection deadline: see syllabus.

Draft deadline: see syllabus. **You must turn in your draft paper on this date. I will grade it and return it to you with comments. If you are satisfied with your grade, you have completed the assignment.**

Revised deadline: see syllabus. If you are dissatisfied with your grade, you may edit/rewrite your paper and turn it in (along with the graded draft) on the revised deadline for a revised final grade.

Grading Sheet

NAME _____ **ROCK SUITE** _____ **YEAR** _____
(100 Points Possible)

(5) **Title**

(15) **Abstract**

(10) **Introduction and Geologic Setting**

(5) **Methods**

(15) **Hand sample descriptions and observations**

(15) **Thin section descriptions and observations**

(15) **Discussion (Synthesis)**

(15) **Conclusions**

(5) **References: usage and list**

Overall