Petrographic Problem-Solving Assignments

Student Hand-out Sheets

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ES 450: Introduction to Petrology

Petrographic Problem-Solving Assignment #1

ASSIGN: Week #2

DUE: Week #4

For the first Petrographic Problem-Solving Assignment, I have defined the problem for you. You will each be assigned ONE sample from the collection of rocks used in the Intro. to Rocks In-class Activity. We have already determined the type of rock that each sample represents and have collected a series of observations to support this interpretation.

The PROBLEM is to determine (as specifically as possible) the geologic conditions and/or the specific environment under which the sample formed. Propose a working hypothesis to address this geologic problem and then test the hypothesis using observations and data available from the thin section. You must support your interpretation using textural features and/or mineralogy that you directly observe in the samples. Data and observations may include the minerals present, percentages of minerals based on visual estimates, textural relationships, and specific lithology of the sample.

Prepare a NO MORE THAN 2 page paper that provides the relevant data, observations, and descriptions of the sample, identifies the geologic problem, proposes the working hypothesis, and tests this hypothesis. You may want to provide summary tables and use sketches or images to support your descriptions; however, all text, figures, and tables must fit within the 2 page limit! You should plan to use the digital camera that is available in the GeoData Processing Lab to capture images for your presentation and paper. The first time you use the camera check in with me so that I can make sure you are set up to operate the apparatus.

You will also need to prepare and give a brief presentation (about 5-7 minutes in length) summarizing the results of your study to the class. Be prepared to answer questions and defend your results. Please save your presentation on a “thumb drive” memory device and be ready to load your presentation on to the lab computer by 9:45 am on day of the presentation.

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Petrographic Problem-Solving Assignment #2

ASSIGN: Week #5

DUE: Week #7

For the second Petrographic Problem-Solving Assignment, we will focus on the igneous rocks samples (29, 58, 68, 72, 100, 138, 149, 160, 203, 237, 278, 281, and 340) used in the Igneous Rocks Classification Exercise. You will each be assigned ONE sample from the collection. You have already made a series of observations for each sample, including the minerals present, percentages of minerals based on visual estimates, textural relationships, and classified each according to the IUGS scheme.

For this particular assignment, you will be asked to do the following: (1) determine a geologic problem based on your study of the sample, (2) propose a working and testable hypothesis to address this geologic problem; and (3) test the hypothesis using observations and data available from the thin section. You must support your interpretation using mineralogy and/or textural features that you directly observe in the sample.

Prepare a NO MORE THAN 2 page paper that provides the relevant data, observations, and descriptions of the sample, identifies the geologic problem, proposes the working hypothesis, and tests this hypothesis. You may want to provide summary tables and use sketches or images to support your descriptions; however, all text, figures, and tables must fit within the 2 page limit! You should plan to use the digital camera that is available in the GeoData Processing Lab to capture images for your presentation and paper.

You will also need to prepare and give a brief presentation (about 5-7 minutes in length) summarizing the results of your study to the class. Be prepared to answer questions and defend your results. Please save your presentation on a “thumb drive” memory device and be ready to load your presentation on to the lab computer by 9:45 am on day of the presentation.

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Petrographic Problem-Solving Assignment #3

ASSIGN: Week #8

DUE: Week #10

For the third Petrographic Problem-Solving Assignment, you will each be assigned ONE metamorphic rock sample. The PROBLEM is two-fold: (1) interpret the origin of the textural features of the sample, and (2) determine the conditions of metamorphism (as specifically as possible) using both the TEXTURES and MINERALOGY of the rock. For types of metamorphic textures and their origins, refer to p. 432-442 in Sen. For interpreting metamorphic conditions based on mineral assemblage, consult p. 444-451 in Sen.

Propose a working hypothesis to address this geologic problem and then test the hypothesis using observations and data available from the thin section. You must support your interpretation using textural features and the mineralogy that you directly observe in the sample. Data and observations may include the minerals present, percentages of minerals based on visual estimates, textural relationships, and specific lithology of the sample.

Prepare a NO MORE THAN 2 page paper that provides the relevant data, observations, and descriptions of the sample, identifies the geologic problem, proposes the working hypothesis, and tests this hypothesis. You may want to provide summary tables and use sketches or images to support your descriptions; however, all text, figures, and tables must fit within the 2 page limit!

You will also need to prepare and give a brief presentation (about 5-7 minutes in length) summarizing the results of your study to the class. Be prepared to answer questions and defend your results. Please save your presentation on a “thumb drive” memory device and be ready to load your presentation on to the lab computer by 9:45 am on day of the presentation.

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Petrographic Problem-Solving Assignment: Take-Home Final Question

Name _____

ASSIGN: Week #10

DUE: Finals Week

The take-home portion of the final will be worth **5%** of the total course grade, and the in-class part will be worth **30%**.

Please include this page as the cover sheet for your two-page paper.

Sample #: _____ (either 116 or 194 or 200)

For this question, make observations of the sample, such as the minerals present (rock-forming minerals, accessory minerals, and alteration minerals), percentages of rock-forming and accessory minerals based on visual estimates, textural relationships, and correctly and specifically classify the sample according the IUGS scheme. Summarize these observations in written and/or table form, and use sketches, photos, and/or descriptions.

Based on these observations, determine a geologic problem that can be solved using the observations and data available from the thin section as well as additional resources from the course. Propose a working hypothesis to explain this geologic problem and test the hypothesis using observations from the thin section.

Prepare a **NO MORE THAN 2 page** paper (typed) that provides the relevant data, observations, and descriptions of the sample, identifies the geologic problem, proposes the working hypothesis, and tests this hypothesis.