GEO 310 -- Mineralogy
Laboratory #1 8/28/08

Essentials of Physical Properties in Mineral Hand Samples

Our goal is not to be able to identify every mineral on sight, but rather to develop the tools of pure scientific reasoning needed to educate the ultimate decision on what a given unknown substance may be. Remember, most of the mineral kingdom in terms of named species makes up only a miniscule proportion of rocks.

The purpose of this exercise is to get familiar with looking at minerals. Terminology will be introduced that will be used in describing minerals, but mineral names will not be critical to us today. In order to be successful in identifying unknown minerals it is more important to be able to make and record accurate observations than to memorize details about minerals—details such as that come with experience. I urge you to make use of the binocular microscopes and your hand lens!

We will employ a group teaching approach. I have separated the key physical properties into four critical groups related to: the determination of hardness (hardness group), how minerals characteristically break (cleavage/fracture group), a variety of features related to appearance (mineral appearance group), and everything else (sounds a bit broad, but it covers what's left pretty reasonably). You will have the first hour of lab to go over "your" samples. Refer to your textbook and record notes as appropriate. When time is called, each group will have about 20 minutes to present their findings to the group. "Teachers" will be expected to answer questions from "students". "Students" are expected to take notes.

Grades are in part individual (your contributions to the group and your participation in the teaching of your material and answering questions), and in part collective (depending on how much I have to get involved). You will have an opportunity to comment confidentially on the effectiveness of your group.

The hardness group: [Wende, Earl, Osborne, Lepore] You will have a set of minerals of known hardness. Your goal is to test these until you all (1) are confident that you can do this individually, (2) are ready to give the group essential tips on how to do a proper hardness test, and what to avoid.

The cleavage/fracture group: [Fetherston, Wilcox, Morgan, Linguanti] You will have a set of samples that have known fracture and cleavage attributes. Your goal is to examine these samples (and crush some for yourself) until you all (1) are confident that you can assess this individually, (2) can give the group essential tips on what to look for when assessing cleavage in a sample and how to avoid pitfalls.

The mineral appearance group: [Tracy, Coniski, Stevens] You will have a set of samples with particular appearance characteristics noted. Your goal is to examine these samples until you all (1) are confident that you can identify these properties individually, (2) can give the group essential tips on what to look for when assessing these surficial features.

The everything else group: [Sa, Anderson, Achiek, Wojdyla, Clark] Using your established knowledge base, you will go through sets of samples in order to find examples of the other key physical properties that help to identify minerals. Your goal is to examine these samples until you all (1) are confident that you can identify these properties individually, (2) you can go through good examples of each of these features or phenomena for the group, noting where there are any particular challenges.

Everything Else: acid reaction, alteration and association, feel, fluorescence, magnetic susceptibility, odor, radioactivity, specific gravity, striations, tenacity

*** for next week:** Everyone will be expected to go through the full suite of minerals and satisfy themselves that they can use the terms in the "habit" handout effectively (note the illustrated version of this will be posted on the course web site). Any of these terms will be fair game for tests/quizzes (you may expect one next week, in fact), but you should concentrate on functional understanding rather than rote memorization. The samples from the four groups will be available for study throughout the week, as well.

In next week's lab we add to our arsenal of mineral diagnostic tools when we confront issues of crystal form.