Formative Evaluation for Learning Retention

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GEOL 302: Mineralogy

Recent papers on student learning and retention have shown that high-stakes testing (such as only a midterm and final) creates a high-stress environment before the exam and does not help learning and retention of material. In fact, after a month, only 4–20% (depending on the study) of material is retained. To help students retain material in Mineralogy (that they will use again and again in other classes), I have added several, less formal ways to assess their work and support retention of learning.

Quick Grade Homework

Day 1 starts with a discussion. What is mineralogy? What is a mineral? I then introduce the class mineral—Hazenite, named for Robinson Professor Robert Hazen. We look at concept maps to see what they are, and together we create a concept map for Hazen and Hazenite.

Homework: Create a concept map on "What is a Mineral?" due in 2 days
Grading: I grade it fast by using a basic scale: 2 = good/excellent, 1 = poor but completed, 0 = not completed

Multiple Attempts for Improving Grades

1) For the "2-point" homeworks, they either get the points or not. They can add up points toward 10 points overall (5% of the final grade). I give at least 7 homeworks, so they can *do more assignments* and get up to 14 points. And yes, some students do get 14 points!
2) Lab options. The 11 labs in this class are very important learning experiences.
    a. I automatically *drop the 2 lowest lab scores*. These can either be "0" if they have a bad week or are sick. This means I do not have to make up missing labs for individual students. Some students complete all labs, so this makes their final grade higher.
    b. *Revision of labs*. After the lab has been handed back, they can resubmit corrections within two weeks. This has to be done on the original lab in a different color or highlighted. They get half-credit for any work they redo.
        i. This policy strongly encourages students to look at their returned labs and see what they got incorrect so they can improve for the next time (the techniques build on each other).
        ii. It eliminates the "extra credit" that some students ask for at the end of the semester.
        iii. It is not overwhelming. I thought this was a crazy thing to offer, but it is only a few students that take advantage of it.