How I Abolished Grading

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Here is the story of one teacher who abolished grading in a high school calculus class.

I started teaching high school calculus at my school a couple of years ago. When I started teaching the course, I used a traditional assessment strategy: I would assign homework daily, end the week with a quiz and then end the unit with a multiple choice/written exam.

My classes would start with around 30 students, and by the end of the semester the class size would be 20. What I did was weed out the weak. One day I realized that I wasn't weeding out the weak mathematicians, but instead weeding out the weak test writers.

This year, after many talks with first-year university and college professors, administrators, teachers, students, and parents, I am proud to say that I have abolished grading. We are currently in the middle of our semester and I have not graded a single item of student work.

Before you continue, I want to remind you that this does not mean I have not assessed, but not one student in my calculus classes has received a grade at this point (other than the report card mark, which I must give).

How does it work?

First, I went through my outcomes, given to me by the government, and identified what the "rocks" are. These rocks are the outcomes that I expect the students to master above all other outcomes. I chose these particular outcomes after my discussions with others and considering what will be helpful for students to succeed in the future.

Next, these outcomes were rewritten in student-friendly language and then provided to the students on the first day of class.

My teaching schedule did not change, nor did the speed at which I have taught the course; what has changed is the speed at which the students can learn. Once I had taught two or three outcomes to a level at which I felt that the class had mastered the outcome, I administered a summative assessment. Each child wrote it as a traditional exam, but it looked drastically different from a traditional exam. Each assessment was entirely written, broken up by outcomes and tested only the basics of the outcomes. There were no trick questions, just simple questions that would assess "Can the child demonstrate this outcome, on his or her own, at a basic level of understanding?"

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When I assessed these assessments, I would write only comments on them, and either *Outcome demonstrated* or *Need to learn* for each outcome assessed (not on the overall assessment). It is very important to understand that "Outcome demonstrated" is not a

100 per cent mark, as a student could make a minor mistake and still achieve this—I am assessing understanding the outcome, not perfection.

Next, if the child received a "Need to learn," he or she had to

1. demonstrate the understanding of the questions given at a later date; this usually occurred after a lunch session, a quick conversation or multiple conversations with the child;
2. hold a conversation explaining how he or she made the mistake earlier and how the student's understanding had changed; and
3. write another assessment on the outcomes.

If, after completing these three steps, the student could demonstrate the outcomes, I would count this as "Outcome demonstrated," just as if the child had done it the first time. I do not deduct marks based on the number of tries needed.

If the child still does not demonstrate understanding (which, I have seen, is extremely unlikely), then he or she must repeat the same three steps.

After five to seven outcomes have been taught, each child is assigned an open-ended project. This project consists of each student creating a problem illustrating the math in the five to seven outcomes and solving it. The expectation is that the problem is one that is deep, relevant and for a purpose. This part is not always easy! For example, a student, to demonstrate his understanding, created a Call of Duty video and determined the rate of change of a ballistic knife falling in the video.

These projects usually range from three to five pages and must be handed in individually, but can be worked on with assistance from others and/or textbooks.

To assess these projects, I follow the same pedagogy noted above. I use comments only, and give guidance regarding any errors I see. The projects are then handed back to each student, who can go back, make corrections, and resubmit it. This process is repeated until the child achieves perfection on the project.

I have even abolished the traditional final exam. The expectation now is that the students must give me a 30- to 45-minute presentation about the rocks of the course and demonstrate their understanding of all the rocks.

How do I get a final mark percentage?

I simply take the number of outcomes and projects completed (at the end of the course) and divide by the total number of outcomes and projects. This may not be the best strategy, but it seems to work for me right now. I do weight projects twice as much—I have 20 outcomes and 5 projects, so the total is $(20 + 5 \times 2 = 30)$.

Below is my updated list of rocks.

Determine solutions to P(x)>0	Demonstrate the product, and chain, quotient rule, and implicit diff using various functions.	Determine the area between curves (or the x-axis) over a given interval
Computing limits using theorems and calculator	Draw a function using derivatives	Determine the antiderivative (both definite and indefinite) of Trig and rational functions, both with and without u substitution
Explain the concept of a limit	Solve an optimization problem	Demonstrate the integral properties of sum, difference and multiplication by a constant to integrals, as well as switching the bounds
Explain continuous vs discontinuous, and sketching	Determine points of inflection, both graphically and algebraically	Determine the area between curves over a given interval
Show, with an explanation, that the slope of a tangent line is a limit	Determine the area between curves (or the x-axis) over a given interval	Calculate the mean value of a function over an interval
Determine the equation of tangent lines on a curve	Link displacement, velocity and acceleration of an object moving with nonuniform acceleration with trig, rational and poly functions	

David Martin has been a teacher for nine years. He has a master of mathematics from University of Waterloo, and is currently a division math and science lead teacher. Over the last six years, he has been part of the Math Council of the Alberta Teachers' Association. Zombies, prime numbers and scary movies are only some of his many interests. For more of David's blogs please visit http://realteachingmeansreallearning.blogspot.ca.