Teaching Statement

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One of the most important things that I developed during my years taking science and in particular mathematics classes was the ability to problem solve, that is, to be able to take a given set of tools and/or formulas and figure out how they could be used to arrive at a solution. Examples of this in math can be as varied as determining what rules are needed to differentiate a particular function or reasoning out how a theorem can be proved using two or three others. This kind of problem-solving ability is one of the most important skills a person can have regardless of profession and is the most important thing I hope to instill in my students. I certainly do not expect them to remember every detail of a class twenty years from now, nice that that would be. But if they leave with a better sense of how to overcome the challenges that they will face in their careers and in their lives, then I will feel that I have accomplished my job.

Developing these problem-solving skills takes practice, so I am in favor of assigning regular, usually weekly homework assignments. The exercises in these assignments would range in difficulty, starting with easier problems to boost students' confidences and to enforce core ideas and ending with a few harder ones to challenge students and their ability to reason through problems. This also allows me to identify which students are understanding the class concepts well and which are struggling. I prefer my assignments to be worth many points, say ten points a problem for example, so that students get a feel for precisely how well they are doing from their grades. Students usually only get full credit when they do exceptionally well on a problem. If they make a small but significant error, I will take off a point or two; in this way, their grade is not too adversely affected but yet the missing points draw attention to their error so they know what not to do in the future. I also appreciate the effort students put into their work. Even when a student gives a wrong answer, I will often still give them up to half the available points if I can tell they made an effort using a reasonable but ultimately flawed line of thinking. Finally, I try to leave detailed comments where and when I can, pointing out where they went wrong in a problem or parts where they particularly impressed me.

Of course, I do not expect students to figure out the answers to these problems all on their own. Everyone needs advice now and again about how to overcome a particularly difficult challenge. I myself was a frequent user of faculty office hours as an undergraduate student and even to some degree as a graduate student. I really appreciated the help I received in guiding me through some of the harder problems, and I want to give my students the same opportunity.

Thus, I am in favor of holding several office hours a week at different times to give every student an opportunity to come should they choose to take advantage. I have already had some experience holding office hours as a teaching assistant, where I did not want to simply show students how to solve a problem but to help to guide them on their thinking about how to approach it so that they may reason out a solution for themselves. In this way they may have the skills to solve similar problems in the future. Additionally, office hours show me by who attends them which students really care about the class material and are making a concerted effort to learn it even if they are struggling with it.

As for teaching in the classroom, I hope to not only to be able to explain the theory of some particular material, but also to show how it can be used through several examples. For while knowing the theory is important, being able to use it well is just as important if not more so. I also want to show students how they should be thinking when approaching a particular problem and what line of reasoning they should employ in solving it. As for exams, they would be similar to the homework assignments and like them contain both easy and hard problems in order to really get some separation in the students' grades. I am in favor of allowing students to bring a sheet of notes with them to exams, within reason. This was often allowed in exams I took as a student, and I found it an effective way to make me study the material. In preparing these sheets, students will go over all the material and find a way to express it in their notes that makes sense to them. Furthermore, students spend less time memorizing formulas and more time learning how to employ them, which is really what I am after more anyway. Finally, I treat grading exams in a similar way to grading homework and try to have them back to students in a timely manner.

Everything I do in the classroom and beyond is to try to improve a student's ability to think critically, to develop good reasoning skills, and to be a good problem solver. I do not expect them to necessarily know for example how to solve a second-order differential equation twenty years from now, especially if they do not end up with a STEM career. But if they still have the thinking and logic it would take to solve such a problem and they could apply these abilities to problems they face in their own lives, then I would have accomplished what I would have set out to do.