# Teaching Statement

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For inspiration when teaching, I draw on my positive past experiences both as a teacher and as a student. I recall how good teachers have motivated me and I remember the successes I have enjoyed while in front of the classroom myself. I have had complete responsibility for a total of eight sections of courses. These included several flavors of calculus and vector geometry. My teaching–related experience includes tutoring various levels of mathematics from precalculus to abstract algebra. I also have experience assisting students involved in computer–based courses in calculus and linear algebra. All this has served to educate me in the art of teaching. The list of lessons I carry foremost in my mind is as follows:

1. Set concrete goals

   This includes goals set by the department and by myself, for the students corporately and individually. I use as primary guides the department documented course goals and suggested homework sets. As I organize lectures I make the concepts included in these resources central. In the past when the course I taught included a standardized exam, I verbally set the goal for my students to master the material well enough for our section to do better than the course average. I then helped them towards that goal by assigning sample test problems throughout the semester in order to keep the exam constantly in mind and review material as we proceeded. On an individual level I try to challenge students to stretch themselves.

2. Challenge each student

   When giving attention to individuals, I gauge their learning styles and potential and then try to convince them to outdo themselves. Sometimes this involves helping them to understand their own responsibility for their mastery of the subject and for their grade. At other times that is not an issue. Then I am free to challenge them further – to excel as opposed to simply pass. I have fond memories of teachers who were not content to let me simply learn the material but dared me to expand my horizons by researching ideas that the class did not cover. I particularly recall a high school teacher who provoked my curiosity enough to spend time trying to guess what relations of the plane had various geometrical shapes as graphs. Also memorable is a computer science professor who engineered my first encounter with the gamma function by challenging me to extend Pascal's triangle to negative numbers and fractions. These examples stand out due to the fact that they were unusual in my early education. I would certainly embrace opportunities to pass on this gift – the challenge to go and find out – to students in my classroom as well as to student researchers under my advisory.

3. Instill confidence

   Of anything that can be directly said to a class, the most effective speech I have given is the one that lets the students know how much self confidence their teacher has. A marvelous way to instill confidence in those under my tutelage is to convince them that *I* believe in *my* abilities: first, that I can solve without trouble every problem in their text, and second, that if they will do what I ask, I can bring them to that point as well. Of course, to follow through on my half of this deal requires effort and careful preparation.

4. Prepare for everything

   For many years it has been impressed upon me that the value of a given lecture is directly proportional to the amount of time and effort spent in preparing it. I owe it to my audience to spend adequate time to ensure that the notes are well-organized, clearly presented, and given with vivid examples. I have had success with varying my presentation, including visual aids such as upturning my bicycle on the lectern to demonstrate the chain rule. I also believe that planning for interactive learning including group work and presentations by individual students is of value. In the past, I have scheduled students ahead of time to present the solution to a problem at the next class meeting. This allows them to get help with the material or with presenting it before having to put their work on the board. The use of technology such as computer mathematics packages is also important and valuable both in preparing demonstrations and as a tool for the students to master.

5. Assume nothing

   When approaching a group of students, it is tempting to assume that they have mastered a certain prerequisite level of material. I find it more practical to assess their knowledge first with short diagnostic quizzes. I note individual levels of knowledge and the overall level of the group. The latter I report back as I go over the quiz with the class. This allows me an opportunity to let them know what they are going to have to review in order to do well with the new material I plan to present. It also gives them a chance to mentally revive the thought processes that they should be ready to use.

6. Communicate enthusiasm

   I welcome any chance to impart my love of mathematics and physics. There is opportunity in the classroom to harness my sharing impulse to motivate the students. I believe that good grades and prerequisite knowledge for future experiences are important for students to achieve. It is also important for them to have a grander motivation than mere necessity. Indeed, it is often a means to the more pedantic end that the students feel excited about what they are studying. Thus I try to communicate the importance of mathematics and physics as realms of beauty and discovery. I try to introduce the bigger picture by hints of what lies behind the concepts that are covered on the test, as well as by optional assignments encouraging exploration. For example, my students in vector geometry were treated to a brief description of the principles of general relativity that generalized the projectile equations they were learning. On another occasion, the project groups my sections were divided into were given names of famous algebraic groups. For extra credit they could write a brief report on their name, for instance, the Monster simple group or the Fundamental group of a topological space.

These are the ideas that have been impressed upon my mind by experiences in classrooms so far. I am very interested in learning more and plan to continue to enrich my knowledge of what it means to teach well through literature, interaction with other educators, and experimentation of my own based on what I read and hear. I am always interested in finding new methods and tools to help me encourage students to be creative in their approach to problems while insisting on correctness in their solutions. It is always important in this process to get feedback such as student evaluations and comments, scores from standardized testing, and peer reviews. In student evaluations from my most recent four sections I was given an averaged overall rating of 3.1 out of 4. Some specific categories included were "Apparent knowledge of subject matter," "Concern and respect for students as individuals," and "Fairness in assigning grades." In each of these three I was given an averaged rating of 3.5 out of 4. Student comments include "[Mr. Forcey] is very thorough. He goes over many examples and happily answers any questions we have," and "Mr. Forcey is an excellent teacher and makes an above average effort to help you succeed; he is also very fair and makes the material as stimulating as possible." So far I am happy with the results, and I plan to do my best to ensure that satisfaction is strictly increasing!