Teaching Statement

I have always loved doing mathematics, but as an undergraduate teaching assistant for abstract algebra I realized that I also loved teaching mathematics. Since then I have been fortunate to learn from many gifted teachers, and I have used them as models in developing my own teaching philosophy. Following their example, one of my central goals is to aid students in the understanding of mathematics in a way that builds confidence and a thirst for learning. In part, this is achieved through taking care of the basic essentials of teaching: thorough preparation for class, clear communication, and concern that the students learn (students can instantaneously detect an uninterested teacher!). But the students must also be engaged in doing mathematics in order to understand it. One of the most effective ways to foster engagement and a spirit of inquiry is to center classes around problem solving and active learning.

For example, over the past few years I have taught two introductory level courses for non-mathematics majors at the University of Illinois. The most challenging course for me was a College Algebra course for students from under-represented groups. In teaching such a class, immersing the students in solving basic algebra exercises is absolutely essential. I began each class with a short quiz, continued with a highly interactive lecture, and finished by breaking the students out into groups to work problems together under my supervision. Group work created a welcome atmosphere for students to learn from their peers and gave me the opportunity to regularly assess areas in which students had difficulty. I used this information to prepare upcoming lectures.

In calculus recitations my goal was also to get students engaged in group-oriented problem solving. I have served as a teaching assistant for calculus classes on many occasions, and found that while directing group work is more difficult than working through examples on the board, it is a more effective way for students to learn. I began by asking the group for an idea to start a particular problem. As we progressed I found a balance on when to jump in - students often go astray, but they learn better if they have to overcome mistakes on their own. In cases where a group did not know how to proceed, I asked leading questions to get them moving. For example, I was recently helping a student with a problem that often comes up in the beginning of Calculus III: finding a parametric description of the line of intersection of two planes, given the Cartesian equations of the planes. I encouraged the student
to think geometrically about the problem, first asking what data is needed to
describe a line in three dimensions. He remembered that he needed a point
and a direction vector. He was unsure of how to proceed after this, so I asked
what data is needed to describe each plane. After a little memory jogging,
he realized that the normal vectors to the planes are easily obtained from
the equations. Finally, I asked him how the normal vectors of the planes are
related to the direction vector of the line. At this point he was on his way to
discovering that the cross product of the normal vectors gives the direction
vector of the line. This kind of directed exploration, especially with other
students, really solidifies the mathematical concepts introduced in lectures.

At all levels of teaching, I work to show my students that I care about
each of them succeeding. While this is not necessary for all students, there
are often a few students for whom showing interest in their success plays a
role in building the self-confidence necessary to overcome academic hurdles.
I believe this care can be conveyed in every aspect of teaching. Part of this is
being sensitive to how students learn. I have found it helpful, especially for
non-mathematics majors, to work out lots of examples, connect to real world
problems, and introduce definitions and concepts via concrete calculations.
I also make each lecture as interactive as possible, pausing frequently for
questions and soliciting student input. If students feel comfortable asking
questions, this helps me identify problematic issues and focus on those. When
supervising group activities, I am encouraging and suggestive, building as
much as possible on what the group has already accomplished on their own.
I also make it a priority to be available to my students. Most semesters I
have a student or two who regularly seeks out help in office hours.

During my time at Illinois I feel that I have grown as a teacher and
I continually strive to learn better teaching skills from those around me.
Through nine semesters of teaching in graduate school I have learned much
about teaching from student responses, both written and otherwise. I also
am privileged to be surrounded by professors and peers with a wealth of
teaching experience. I think the lessons I have learned from these groups are
the reason I have been on the list of teachers ranked as excellent three times
and have been nominated twice for the mathematics department teaching
award for graduate students. I feel very fortunate to have the opportunity
to teach mathematics, and look forward to continuing to learn and grow as
a teacher in the future.