“I never teach my pupils; I only attempt to provide the conditions in which they can learn.” Learning is an inherently active and iterative process. I believe that my role as a teacher is to facilitate and guide this process. A large part of effectively guiding active learning is presenting new material in the right light, and I put great effort in explaining difficult and hard concepts in an easy and clear manner. Every semester, I judge my success or failure as a teacher based on whether my students not only know and understand the relevant material, but also whether they understand why the subject matter is worthy of study. For instance, when I teach calculus this usually has to do with humans being able to easily perceive and discuss things which change smoothly, and the power of this in describing both pure and applied problems. In advanced courses, I emphasize the idea of “mathematics for the sake of mathematics”, and take the viewpoint that mathematical problems are interesting in their own right. In motivating the development of a new method or definition, I believe it is important to motivate it as an answer to a particular purely mathematical problem as well as to motivate it as a solution to specific physical or philosophical problem. Ultimately, I will feel satisfied with my students if they remember not only the definitions and methods, but also the motivations and the reasons why these are important.

Modern mathematics is one of the great achievements of humankind. It is a massive logical edifice with infinite detail and intricate structure. When I teach, I make every effort to reveal some level of this edifice to my students. I believe that simple questions lead naturally from one area of mathematics to another, and that it is my job to communicate these connections to students. To this end, in earlier courses I generally give a couple of “extra credit” lectures to students each term. These lectures are on material that is immediately accessible but outside of the typical non-math major curriculum. Typical topics are continued fractions, modular arithmetic and the Chinese Remainder Theorem, Turing machines and computability, and Euler’s formula and roots of unity. In advanced courses, I spend time discussing generalizations, open problems, and connections between other areas of mathematics.

When I am teaching, if it is feasible I try to limit the amount of lecturing that I do, and to encourage the students to interrogate the subject matter on their own. In particular, I tend to mix board work with student-driven learning. This generally comes down to lecturing for a short amount of time in order to give a high-level viewpoint of the material, and then asking the students to work and discuss some open-ended problems in groups. After the students have worked for some time, I ask for volunteers to write their solutions on the board. I then finish up class with a discussion of the problems, and talk about further directions of inquiry.

The way to develop a mind is to stretch it and challenge it with interesting problems. The level of abstraction that mathematics presents allows for the formulation of some of the most difficult problems, and forces students of mathematics to be perpetually challenging themselves. I know that some students will leave my class and rarely have to think about math again, but I hope that the capacity for critical and deep thought that mathematics encourages will stay with them.

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