***teaching:***

*1. To impart knowledge or skill to;*
*2. To condition to a certain action or frame of mind;*
*3. To cause to learn by example or experience;*

***philosophy:***

*1. The critical analysis of fundamental assumptions or beliefs;*
*2. The disciplines presented in university curriculums of science and the liberal arts;*
*3. A set of ideas or beliefs relating to a particular field or activity; an underlying theory.*

*(from theFreeDictionary.com)*

**C**uriosity and creativity are two intrinsic characters of human beings. I firmly believe that chemistry is a subject in which students can satisfy their curiosity of the natural world, and furthermore, a subject that triggers the vast potential of students' creativity. In a broad sense, I envision the chemistry class as a portal for teaching the next generation of citizens to deal with the environment, energy issues, personal and community wellbeing in a responsible and proactive way. On the other hand, chemistry class should also be a place where the passion for science be sparked in future scientists.

**W**hen I first entered graduate school, we were assigned as graduate student instructors for freshman Chem1A class. I learned many things, including effective communication skills with freshman students, the reinforcement of safety rules in the lab, the consistency in grading and evaluation, etc. Looking back, however, I feel the first semester was not very successful, partly because I was only aiming for mediocrity. I enjoyed smart students, but did not worry to motivate some students who showed little interest in chemistry. Later on, I had to reflect on my teaching skills, and furthermore, my teaching philosophy. What are my teaching objectives and the skills I want my students to learn? Do I just want them to pass the exam with a decent grade, or do I also want to impact lives through teaching? Do I just want to get students memorize formulas or do I hope to facilitate the acquisition of life-long learning skills? I think good teaching should accomplish all the above, and more importantly, the latter ones. My next two semesters of teaching went better. Students with different levels of maturity, interest and motivation no longer overwhelmed me but encouraged me to make the lab and discussion sessions accessible to all students. I started to pay more attention to the needs of students with different learning skills and different knowledge bases. My teaching experience was a learning experience too, and it will be so in the future.

**I**n scientific classes, we deal with multiple levels of learning. The basic one is the acquisition of knowledge such as memorization of chemical names, jargons, formulas, and theories. With the help of class demonstrations, hands-on experiments, visual-and audile-experiences, this basic goal may be achieved fairly quickly. However, scientific learning is more than this. Creativity in students should be encouraged and fostered. Students need to apply the memorized knowledge in problem solving, especially when they explore new realms of science in the future. They need to create new solutions to problems, formulate new ideas and strategies for new challenges. These skills cannot be learned in one day and must be accomplished through training. I cannot agree more with what a professor says in his teaching philosophy: "I have come to realize that ultimately students learn what we examine for. If we test for learning of facts, students will learn facts. If we test for problem

solving, they will learn to be better problem solvers." Problem sets will be an inherent part of my class because I consider the problem-solving process very important. Fortunately, chemistry problems sets can be made quite relevant to daily lives and presented in a larger context. Science is as much important to an individual as to the whole society. Even much of the freshman chemistry class is relevant to daily life, important industrial reactions, and natural chemical processes. This kind of mindset will be encouraged through my teaching. In addition, students will realize that learning takes place in a sense of community such as in a discussion group or among lab partners. This is all the more important if they choose a career in science in the future. From my own experience as a student, I learned a lot from my fellow students, and from my lab co-workers. As a Chem1A and 1B instructor, I experimented with several techniques such as asking students explain and demonstrate a concept to the whole class, or giving students the opportunities to help one another during discussion and office hour sessions. In addition, I encouraged switching lab partners once in a while. This gave the students a chance to learn from unfamiliar fellow students, and helped them to form a sense of collaboration.

**I**n addition to these ideals and principles, I have other objectives as a teacher. First, I want the students to take responsibility for their learning. It is obvious that active participants of a class learn better. However, at the same time, teachers must be willing to be engaged and sometimes challenged by students who are engaged deeply in a class. A group of students who are actively involved, thinking and questioning the material presented to them will be welcomed by me. Second, students should learn where to find information. This is especially necessary for students living in a world flooded by information. In this sense, a teacher is a guide for the student rather than just a giver of knowledge. My own experience advocates for this principle. Based on a survey of the original papers by J. C. Slater, I published my first paper in "College Chemistry" in my senior year on a misrepresented concept of nuclei model in text books. Students should be taught to mine primary journal literature and evaluate its relevance and importance. Even in introductory chemistry class, students can learn this by making posters or giving presentations on selected research topics based on their literature search and review. In physical chemistry classes, global warming, greenhouse effect and alternative fuel economy can all become topics of heated discussion. Students can be asked to critically evaluate different models and theories, and discuss the implications of their findings.

**M**y teaching is also likely to reflect some outstanding professors that I have interacted as a student. They were passionate about science, approachable, humble, and generous with their time. At the same time, they challegned their students with no reserve to think orignally and critically. As I said, my teaching experience will be a learning experience too. I am aware that each class provides new challenges and opportunities for my own learning as a teacher and a researcher. As chemical science grows and matures, my knowledge also needs to grow and mature. Ultimately, my goal is to help my students build firm foundations of chemistry knowledge, discover their curiosity towards a scientific discipline, and become creative in their learning and problem-solving.

– Luning Zhang