In the fall semester of 2007, I wrote a paper titled “What makes things float? Density and buoyancy misconceptions,” for Dr. Foley in SED 690. The paper dove into the depths of misconceptions within density and science in general. The paper included four references and had extensive application to my own practice, in particular when I teach the unit on density and buoyancy. In the paper, I explored many topics, from developmental misconceptions in very young children, to misconceptions that we hold on to into adulthood.

The assignment developed and displayed my awareness of one of the major reasons that students do not retain newly learned scientific concepts; misconceptions. Science educators everywhere know that students enter their classrooms with their own ideas about the very same concepts we teach them. These misconceptions are so rooted within their brains that students revert back to displaying those same misconceptions years later after they have been taught the correct concept many times over. The paper spoke about how students learn to deconstruct their misconceptions and either add on correct concepts or replace them completely. Constructing lessons that specifically address these misconceptions are both a challenge and a necessity in science classrooms.

The paper easily extends to current issues in science education such as the possible adoption of district approved “lessons” and their impact in schools, especially in LAUSD. Some of these district approved lessons address misconceptions and some do not. With the possibility that soon many of us may have district mandated model lessons to teach, it is important that teachers understand how to integrate opportunities for students to confront and remake their misconceptions. As a teacher, I feel prepared to investigate common misconceptions within the specific science that I teach and also add structures within generic lessons that force students to confront their preconceptions.
Misconceptions also stand in the way of test scores. Testing is an educational hot button topic. There are many who are against high-stakes standardized testing and some that are for it. In order for students to not revert to choosing their misconception on a test, lessons must be structured differently. Every new lesson must begin by drawing out students’ existing thoughts and ideas about that topic. In addition, every lesson should supply an opportunity for students to review those original thoughts after acquiring new ideas, and to reconcile them within their existing framework. This assignment is a prime example of how our Master’s work is readily applicable to current educational issues and their impact on schools.

I learned many interesting things about specific density misconceptions. Previously, I only thought that my students had misconceptions about the difference between weight and mass, or the meaning of volume; now I understand that the misconceptions go beyond that. Some of my students hold on the misconception that floating or sinking only depends on one variable. These students can display developmental misconceptions such as difficulty integrating two variables (mass and volume). I also learned that many highly educated people can hold two competing explanations for common scientific ideas, one of which is their original misconception, otherwise known as their “common sense” idea and the other being the correct scientific concept. Depending on circumstances and context, different versions of the explanation would be offered by the person. The awareness of the existence of dual explanations for one concept in one person was extremely helpful to me as an educator and a Master’s candidate.

As a Master’s candidate I feel that the assignment has educated me about my own misconceptions as well as the most common density misconceptions among students. I feel confident in my ability to address and build upon the most typical misconceptions in science lessons. What is more, I know that I’ve grown as an educator and a Master’s candidate by specifically isolating and addressing the most common misconceptions in students. This area of education is in constant study and discovery.