Introduction

In my Natural Science class, we examined how energy flows through a lava lamp. Prior to any discussion, however, we documented our prior knowledge of the topic in order to compare it to our new understanding after being instructed on it. The following is my findings of both prior and new knowledge, along with my reflections on the change.

Understanding of “How does energy flow through the lava lamp?” prior to taking class:

Prior to taking the class, I believed that electricity flowed into the electric cord, through it, and into the bottom of the lamp. I thought the energy heated the lamp up, which heated up the wax, and since heat rises, so too would the wax. I thought this because the wax would stretch upward and break off into wax blobs. As they moved away from the heat, they cooled down and would sink back down. I figured that the energy was cycling in the wax blobs as they heated up and cooled down.

My understanding of how lava flowed through a lava lamp was significantly low. It was just enough to pass for being correct in a discussion among non-experts; but, I was in no shape to elaborate. The convincing factor might have been because I was able to throw in words I had heard below, such as heat energy, and I was able to state with confidence that heat rises up.

My misconceptions and inaccurate knowledge about the topic come from a few factors. First, I believe that having inadequate exposure to the topic inhibited me from forming a foundation on the topic. No one in my family or network of friends had an interest in or reason to explore the topic in depth with me. Second, I did not develop a real interest in energy; my love has always been English and Language Arts. I will even admit that at times I have been known to tune out the topic when it is discussed for the intrinsic value in doing so. Third, I think a large
part of my lack of prior knowledge has much to do with the fact that I am female. According to some recent books on gender differences, such as *Why Gender Matters: What Parents and Teachers Need to Know About the Emerging Science of Sex Differences* by Leonard Sax (2005) and *Boys and Girls Learn Differently! : A Guide for Teachers and Parents* by Michael Gurian, (2001), there appears to be substantial research regarding gender differences in the way brains are wired. Both above-mentioned books claim that girls tend to understand the concrete better than the abstract; whereas boys tend to be the opposite. If girls truly do have more difficulty in topics that are abstract, such as physics and chemistry, then that would also help explain why I did not pursue it more.

**New understanding of “How does energy flow through the lava lamp?”:**

After taking the class, I have acquired a new understanding of how energy flows through a lava lamp. I know that energy comes in through the electric cord and goes into the light bulb. The energy then goes from the light bulb into the bottle by radiation. The energy is transferred to the wax that rests on the metal ring by conduction. This is because they are in direct contact. The energy changes the density of the wax as it heats up; the molecules expand out from each other, causing the wax to become liquid-like blobs. By convection, the heat moves the liquid-like wax blobs up. By radiation, the heat energy moves from the glass and out in electromagnetic waves. The rising blobs start to cool down as they move away from the heat. Their density starts to change back into being more compact and solid as the molecules move closer together again. The greater density of the wax blobs causes them to descend back down toward the metal ring. The cycle then continues.
Reflection on change in knowledge:

My knowledge on the topic of energy changed in quite a few ways. I understand that there were three types of heat transfer playing a role in the lava lamp: conduction, convection, and radiation. I now see how all three types are different as well as how they interact. Conduction was the heat transfer by direct contact; convection was the heat transfer by mass movement of fluids; and radiation was the heat transfer by electromagnetic waves. Each type of heat transfer was evident in creating movement of energy.

I acquired this new understanding of energy by using the lava lamp. The lava lamp was a great activity to work with because all three types of heat transfer were active, and I was able to see their effects. I discussed this topic in my small group, which helped us formulate some thoughts about density, which I probably would not have thought of otherwise. In addition, I originally believed that the energy was cycling within the wax blobs, but after exploring how energy flows through a lava lamp, I am now aware that only the wax blobs cycle; the energy flows through the lava lamp and out of it.

Based on using a handout and the textbook as resources, the status of my knowledge has increased. I was able to fill in some gaps in the foundation I had on energy, as well as build on some of the concepts. One example would be that I already had an idea about the energy from the electric cord turning into heat energy. Now, I am able to build on that concept and elaborate about the heat transfer types. In terms of increasing my knowledge in this area, I may want to explore heat transfer occurring in items other than a lava lamp. Doing so may benefit me especially if I do some comparing and contrasting with different items.
Conclusion

In conclusion, learning about how energy flows through a lava lamp benefited me greatly. Not only can I impress my engineer husband, but I can feel confident in grasping a very abstract concept. As a teacher, my perceptions as well as my knowledge will be transferred to my students. As a female teacher who may especially influence female students, it is that much more important that I transfer the correct perceptions and knowledge.