Getting Rid of the Mathematic Phobia: "I Can't Do Math."
By Annie Carpenter

Why is it acceptable for a high school student to express that they cannot do math, yet a student at that same level expressing that they cannot read would be unacceptable, in fact unimaginable? My decision to go into mathematics education had many goals with it. One of those goals was to eliminate this phrase, "I can't do math." Unfortunately, the means to eliminate this came with the idea of making math easy for students fostering a feeling of success. However, in doing this the beauty of mathematics is lost creating superficial understanding. After several years of working with students and mathematics a realization came that making math challenging though problem solving is far more powerful than making math easy through problem doing. There is much greater gratification in struggling through a problem and finding a conclusion than simply repeating a process that gets the grade.

The decision to become a mathematics educator was not in the original plans, but ultimately, was the right choice. Studying mathematics as an undergraduate at the University of Iowa and working with students who struggle with math created a mission that I became very passionate about. Working with these struggling students opened my eyes to the fact that they are completely capable, they just need the right tools and mindset. Wanting to do something about this, I obtained a K-12 teaching degree as well as the mathematics degree I originally set out to get.

Currently, I am finishing my 13th year of this mission as a Geometry and Calculus instructor at Boone High School. Throughout the other 11 years I have taught many different levels including middle school grades 6-8, high school Pre Algebra A, Pre Algebra B, Algebra I, Geometry, Algebra II, and Calculus. It has been an amazing experience to work with all these levels and really get to know what is vital at each level in order to be successful in the successive classes as well as in future endeavors. A common issue witnessed throughout these 13 plus years is that students struggle with problem solving at every level. Wanting to continue to grow as a mathematics educator, I decided to pursue a master's degree. In the summer of 2012 I began the Master's of School Mathematics (MSM) program through Iowa State University. It has been a great fit because teaching through problem solving has been a common theme.

Problem solving is not just a process it is a way to think. We can teach strategies on how to problem solve or we can teach mathematics through problem solving. Personally I believe that we need to do both. If teachers only teach strategies and don't give students the opportunities to use those strategies in a way that is not a "cookie cutter" activity, students will be problem doers instead of problem solvers. If teachers only teach through problem solving, students will not fill their toolbox full of strategies to use for all different types of problems. Without the proper tools, students will shut down and use defense mechanisms such as expressing, "I don't get math."

Part of what makes teaching problem solving so difficult is that this generation of students lives in an instant gratification mindset. The beauty and power of mathematics can only be appreciated and understood through delayed gratification. This seems to be the biggest challenge I have in the classroom. Students want to get the answer quickly and easily believing that if they struggle they do not get math or are not good at it. In reality, struggling is how we learn math best.

The biggest problem with trying to change this mindset in a classroom full of 30 students is that there are several different levels of development. In a high school geometry class there might be a student or even several that are at level 0 of the Van Hiele Model of Development while several others are at level 1, 2, and 3. Creating a rich problem solving experience means that we have to meet the needs of all the levels. If we only teach to the level 2 students, research shows that students at the level 0 or level 1 will not be successful. This causes a great need to differentiate instruction to meet the individual needs. Wanting to give every student the opportunity to struggle but not shut down has proven to be a challenging task due to the diverse levels of learners present in each class.

Throughout my teaching experiences I have added several goals to that first goal I made when I decided to go into mathematics education. A goal added recently is to help students become better problem solvers. Evaluating my own problem solving process, I believe a true problem solver looks at the problem at hand, tries a strategy that they feel fits the situation, knows when to jump ship if that strategy is not getting them anywhere, and then tries a new strategy. In other words they keep trying and realize that every unsuccessful attempt has taught them something and eventually they will put it all together. This is where delayed gratification comes in. Students need to understand that sometimes we learn more by making mistakes and that the learning is more important than the answer.

It took several years for me to develop this mindset myself. I always felt like I was good at math because I could always get the answer fairly easily. It wasn't until proofs in geometry that I realized that the fun in math comes when you really have to think. These are the types of experiences I try to offer my students and I am hoping to develop further through this class. Ultimately, I want to create students that are problem solving for learning not just problem doing.

Discovering that there is no perfect curriculum or even one single method to teach mathematics through problem solving heavily influenced my decision further my education. Each set of young individuals has different needs and backgrounds causing constant adjustment and review of curriculum each year and teaching strategies. I hope to continue to develop a better understanding of what true problem solving looks like and improve implementation of it in my classroom. I look forward to learning new strategies and possibly an overall framework to help my students with this.