The Engineering Lab Challenge
by Melida Reeves

Teaching is my passion. A year ago, I was teaching third grade and felt that I had found my niche. My classroom was structured. I was organized, knew my standards, had a handle on classroom management, and could easily establish a sense of community in my room. As a result, my students were thriving both academically and socially. I knew how to help my struggling learners and how to challenge my gifted learners. My students’ state assessment scores were the highest in the district and among the top in the state. I felt like I was an effective teacher and that I was doing the best from my students. I was confident in my teaching ability. Then along came my engineering lab challenge.

When I was asked to create an engineering lab for grades K-6 at Mount Lebanon Elementary, I thought, “Sure! I can do that!” How hard could it be? After all, in my mind, I was an effective teacher who knew how to get the best from my students. I embarked upon this new journey with excitement and an open mind, not knowing exactly what to expect but feeling certain that I was up to the challenge.

Looking back, I realize that I really did not know how to most effectively teach my students or challenge them as I wanted. I could help them learn, but could I help them to change the course of their futures?

Year of Learning
The first hurdle was to undo some of the “teaching” that teachers like me had done. I needed to help the students realize that there is not just one answer to a problem or challenge, nor only one way to get there. I had to teach them to try new things without being afraid to fail. Our motto became, “We’re engineers. We’ll just modify it if it doesn’t work.” It took a long time for the students to realize that it is only failure if you give up. Students were not comfortable not knowing my exact expectations. My students wanted to do it “just right” and “just like you want it, Mrs. Reeves.” I constantly reminded them that I had no preconceived notion of what a project should look like and this whole concept was new to me as well. As long as it met the criteria I had set forth, it was a success in my eyes. After a few weeks, my students learned that everyone’s product/project would look different, and that it was perfectly okay. Students even began to value the differences, and through open discussion realized that they could adapt others’ ideas to make their own project even better.

I had to dismiss many of my expectations. Each time I thought I knew what to expect during a lesson, students surprised me by taking the concept in a direction that I hadn’t thought of during my planning. Once comfortable thinking outside the box, students consistently amazed me with their ideas and ability to problem solve. Their ideas and designs were far greater than I ever could have imagined.

I had to learn to talk less and observe more. My direct instruction became a five-to-ten minute presentation at the beginning of class, with the rest of the time being spent actively questioning students to push their thinking. I spent a great deal of my time observing and learning from the student explanations. Students quit asking how to do something because they realized my answer was either going to be, “What do you think?” or “Try several ideas and see what happens.” They began to push their own thinking and creativity to new levels.

I learned it wasn’t good enough to possess a general knowledge of the standards. I had to thoroughly learn math and science standards for every grade level in order to effectively plan lessons that correlated with classroom content. When the activities in the lab utilized information that students were learning in class, it made things concrete for them. They began to realize that classroom information is not just for making a good grade on a test, but also has real-life applications.

Success Beyond My Imagination
The engineering lab success stories from this year are almost too many to name. They didn’t happen because there was a wonderful teacher in the classroom. As I learned this year, I had “teaching” all wrong! The stories happened because students were given the freedom to make choices and exercise their creativity, encouraged to take risks by thinking outside the box, and provided an environment in which they were exposed to new experiences.

Obviously, the learning that takes place in the classroom is reinforced in the lab, but we are also discovering that the learning that takes place in the lab is being carried back to the classroom. Teachers comment that students are more comfortable speaking up with unique ideas and are more willing to try new methods and explain their thinking. Students are also using the lessons learned in the lab to help their peers in other classes.

Changing Their Future
This year has been an amazing journey for me as a teacher. As I reflect back, I keep thinking about all the experiences that my kindergarten students will have under their belts by the time they are in sixth grade. Those students will have been exposed to a wide variety of engineering fields, with hands-on experiences in most of them. As my students enter middle and high school, I hope they will continue to seek out opportunities in STEM because of the foundations provided at Mount Lebanon Elementary. Through the engineering lab, I hope that I can hook all kids on learning, even those students who may have once thought that “school isn’t for me.” Opportunities and experiences such as the ones provided in the engineering lab are the vehicles to keep our students engaged and eager to learn.

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