Möbius and More: A Fun Field Trip  By: Zean Khan (T-16)

On the TIME 2000 field trip to the New York Hall of Science in Queens, New York, on January 14, 2014, we had the pleasure of participating in a professional development workshop that involved us in activities that were not only fun and interesting, but that allowed us to express creativity and show how mathematics could be taught to capture the attention of the learners; something we, as future educators, should strive to accomplish in our classrooms.

Our workshop was held in an amiable-looking lab room, and we were led by an equally amiable instructor named Dustin. Being TIME 2000 students, we skipped the ice breaker and headed straight into our first activity. We were given a 4x6 index card and told to cut it in such a way that we could fit through the cut index card. Of course one might think this is impossible and preposterous. If you compare a 4x6 index card to your body, your first thoughts probably would be that there is no way, shape or form to cut that index card to fit around your whole body. I, however, was not fooled. Having done the same activity almost 10 years ago, I remembered that the first step was to fold the card in half and cut from the folded edge to its opposite edge several times, stopping right before reaching the other edge. Then, you would have to turn the card around and repeat for the opposite, unfolded edge. The final step would be to open the card and cut along where the paper was folded, except for the edges, as to keep the paper in one piece. For those of you who want to try this at home, you would find that the paper can now be pulled apart to accommodate a whole person!

Our second activity was simpler in concept but just as intriguing. We were given a sheet of paper titled “Bird’s Eye Puzzles,” which, as the title reveals, shows how some objects would look from an aerial perspective. The object of the activity was to guess what objects were illustrated. Some were simple, like a hot dog, coffee mug, and chair. Others were debatable, such as the witch that could have also been a teapot, or a slide, which I was convinced could have been a chocolate bar.

The third activity involved creating a clinometer, which is an instrument used to measure angles of elevation or depression. Created by using a template of a protractor, a straw, a piece of string and a paper clip, the clinometer was used to measure the height of the Mercury-Atlas D Rocket that was on display outside of the Hall of Science. After measuring our distance from the rocket, which was approximately 123 feet, and the angle of elevation from where we were standing to the tip of the capsule of the rocket, which was around 39 degrees, we were able to set up a right triangle and use basic high school trigonometry to estimate the height of the rocket, the exact height being 119 feet. Although some of our estimates were really close, we were ultimately hindered by our height differences and the inability to get an accurate measurement of the angle.

After our activity with the clinometer, we visited the Mathematica exhibit, which is unlike most of the exhibits at the Hall of Science. Although there is much to learn from the Mathematica exhibit, it is not as interactive as the other exhibits. This does not detract from the wealth of knowledge present in Mathematica, such as a timeline of major mathematical discoveries and mathematicians, an elaborate, physical explanation of the normal distribution and bell curve, and even a large Möbius strip with an arrow that travels along the length of it, illustrating its unique characteristic of having only one side. My favorite display is a proof that hypothesizes that every single number is interesting, based on first assuming that there are a set of uninteresting numbers, of which the smallest has an interesting property of being the smallest. This contradiction proves the hypothesis that every single number is interesting. Our fourth activity involved creating and manipulating loops and Möbius strips. Because of the uniqueness of the Möbius strip, simply cutting down the middle of it does not result in two separate strips, but rather a larger, single loop. Furthermore, cutting through the strip one-third of the way from the edge would actually result in
Teaching Abroad: A Math Teacher in Vietnam

By: Seth Reisner (T-8)

When most people think of teaching abroad, they tend to picture a fresh-faced college graduate traveling somewhere in Asia to teach English. I’m certain that this is a great experience for students who are looking to take a break after graduating and travel the world at someone else’s expense before settling down into a solid career. I love traveling and want to see the world, especially when someone else is paying, but given my extensive background in mathematics and my preparation as a secondary mathematics teacher I felt that teaching English would be a complete waste of my time. After learning about international schools from a family friend, I decided teaching math abroad would be an opportunity for me to continue traveling, to learn about new places, cultures and people, while also continuing along my intended career path.

There are different ways to pursue international teaching. Some people choose a country they love, pack up and just go, worrying about finding a job once they arrive. In contrast, there are others with many years of experience and/or connections who are lucky enough to secure a position teaching from the US Department of Defense Embassy schools located throughout the world. Finally, there are teachers, like me, who register with an online teaching database and wait to be contacted by a school. Most databases probably work in a similar fashion, but I will speak about the one I used called Search Associates. I began by applying on the website, providing my professional information, including resumé and references. Once I was vetted, I set my preferences so that I could receive email updates whenever a school posted an opening for a math teaching position for middle or high school. I could then review the school’s profile, which includes pay scale and benefits such as health insurance, housing, airfare reimbursements and estimated savings. After sending out emails to schools in every corner of the world (most of the schools I contacted didn’t consider hiring me because I lacked international teaching or International Baccalaureate (IB) experience), I eventually received a position at a school in Ho Chi Minh City, Vietnam (formerly known as Saigon).

Although students’ behavior is similar in most parts of the world (i.e., “kids will be kids”), there are significant differences between international schools and schools located in the United States. Within the past two to three years, the school at which I work began hiring qualified teachers using the Search Associates database; however, there are still a number of teachers who are not certified within my school. Because of this, and the small size of most academic departments (the math department has three teachers including myself, two of whom are certified), the entire curriculum, which follows American standards, is organized by the teachers. Despite this, every international school follows a different curriculum. Some might follow American standards, others might follow the IB program, and others might have their own standards to follow. Most of the other schools are taught in English; however, this is a dual language program. Furthermore, there is less paperwork and oversight by administration staff here. I have been observed a few times, but the formal evaluation system that was discussed with us at the start of the year has not been enforced. The freedom of curriculum and lesson planning is wonderful. Although I would like to be observed as a means of getting feedback for improvement, I don’t mind not having the stress of being observed for evaluative purposes.

The most challenging aspect of teaching here is that we are not in contact with parents. Many of the parents do not speak English and many do not live nearby, as there are dormitories on site where students live. This can make discipline difficult at times. Next semester, we are scheduled to use a system called Pearson PowerSchool, which will allow teachers to contact parents and allow the parents to view student performance reports. I hope that this will help improve the communication issue.

Although children in the United States are required to attend school, children in Vietnam may not have this privilege. Families struggle financially to give their children an opportunity for a good education; therefore, many children work with their parents to earn more money to afford an education. In addition, all Vietnamese teenagers must choose between going to college, if they have the money, and joining the army.

I previously enlisted in AmeriCorps for two years, during which time I experienced many feelings of homesickness, such as missing family, friends and food. Those are typical feelings when being away from home for an extended period of time; I think I got a lot of that “out of my system” before moving to Vietnam. I am pretty open-minded about new foods, new cultures and being flexible to new experiences, and I think that has all helped me to have a very easy and smooth transition and life here. I’m not going to lie, though; when I discovered a place selling cinnamon raisin bagels, cream cheese, sliced turkey and hummus, I was in heaven! The hardest part about living here, at times, has been my inability to communicate in the local language and finding where some things are sold. I have learned how to say a lot of words in Vietnamese, and it makes many things much easier.

One of the best decisions I made before moving here was to get myself an unlocked smartphone with extended battery because I have often used it for Google Translate and Google Maps and for internet searches. It also helps that you can use unlimited 3G Data for about $2-$5 (U.S.) per month.

Overall, things are great here. The United States, and more specifically New York City, will always be home to me. I do not plan to live here or travel the world teaching abroad indefinitely, but it is a great lifestyle choice for anyone, young or old, looking for an adventure while learning more about the world.

Questions about international teaching or Vietnam? Contact me at Seth.Reisner@gmail.com!

Save the Date!
TIME 2000 Event
for high school students and teachers
Celebrating Mathematics Teaching
November 21, 2014

If you are interested in writing for this newsletter, contact:
time2000.newslettereditors@gmail.com
When I started attending H.F. Carey High School in grade 7, I was good at mathematics and, although I liked going to math class, I didn't love math and I certainly never thought that I would become a mathematics teacher. When I was in the tenth grade, however, Mrs. Edna Messina was my math teacher for the last year of Math B (which has been replaced by Algebra 2/Trig). She showed my class how mathematics would be helpful in our futures. Most importantly, Mrs. Messina made math fun and I enjoyed going to every class. This was when I realized that I could love mathematics.

At the time, I wanted to major in political science but after listening to Mrs. Messina stress the importance of mathematics while urging us to pursue a career in science or mathematics, I changed my mind. Then, I was fortunate to have her as a teacher for a second year for precalculus. This class taught me about “productive struggle.” Math usually was easy for me but this was the first time I had to work hard and study to succeed in a math class. I started seeing why mathematics was so fascinating. I started to tutor other students. When Mrs. Messina taught her class, I saw how she enjoyed helping her students learn. I shared this same passion when I tutored students and soon realized that I wanted to become a mathematics teacher.

Mrs. Messina was not always a math teacher. Despite the fact that when she was a young child she would ask Santa for teaching supplies so she could play school with her little cousins, as an adult she did not consider teaching as a career and she worked as an actuary. Luckily for me, she eventually followed her childhood dreams. When she tutored friends and family in mathematics, she realized she wanted to teach math. By getting her teaching degree at Queens College (QC), she was able to combine her love for mathematics with teaching. So, when I shared that I wanted to become a math teacher, Mrs. Messina encouraged me to follow my dreams and supported my decision to apply to the TIME 2000 program at QC. As a QC graduate with a mathematics major and computer science and economics minors, she told me about her wonderful professors and how much she learned. As a senior in the TIME 2000 program, I now understand why Mrs. Messina pushed me to attend Queens College.

Edna Messina is my inspiration for becoming a mathematics teacher. I could tell from the first day in her class that she loved what she was doing. She would come to class every day with a huge smile and genuinely wanted to know what was on our minds. When asked, Mrs. Messina stated that there were three reasons why she loves teaching mathematics. The first reason is that she loves discussing, thinking, questioning, sharing, and learning anything about math, which is evident in her teaching style. The second reason is that she loves meeting 125 new students each year. She enjoys all of their different talents and personalities. Lastly, she thinks that her students help her to become a better person because she learns so much from them; usually involving topics other than math but, sometimes, a little math, too. She has changed my life and made a huge impact on my future. If it wasn’t for Mrs. Messina, I would not be a TIME 2000 student. That is why I nominated her to receive the Modeling Excellence in Mathematics Teaching Award, which she will receive at Dr. Artz’s annual reunion on January 22, 2014. She taught me many valuable lessons and showed me, through her teaching, how to become a great teacher. I want to inspire my future students to share their passion for mathematics and to pursue their dreams, just as Mrs. Messina did for me.

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one normal loop connected to a single, new Möbius strip. This was my favorite activity, as seeing how experimenting with the strip caused us to learn about the properties and various figures that can result from manipulation of the strip.

Our final activity involved observing minimal surface area through bubbles. After forming various shapes with pipe cleaners or jelly beans and toothpicks, we dipped them in bubble solution and saw how the bubbles formed shapes with the smallest surface area, only constrained by the size of the three-dimensional shape formed by the pipe cleaners and toothpicks.

As math educators, we should be able to instill in our future students to not just accept things as they are, but to learn more from experimentation, tinkering with what is given, just as we did with the Möbius strips and the 4x6 index card. We should be able to give practical scenarios to allow students to connect with the real world, just as we used the clinometer to measure the height of the rocket. We should be able to make learning fun, just as we did with the minimal surface bubbles and the bird’s eye puzzles. This workshop not only taught us that we are not too old to play with pipe cleaners, or that Möbius strips have mind-blowing properties; this workshop also taught us there is no excuse for a student to be bored in our classrooms.

This trip was even more personal for me because it was my first TIME 2000 field trip. As a freshman, it was nice being with the other cohorts and interacting with them as well. Here are some reflections of other students who attended the trip:

“1 enjoyed the experiment with the clinometer because we were able to apply very simple trigonometry to solve a more complex problem. Our explainer was knowledgeable and presented the lesson with clarity and poise. I enjoyed the Mathematica exhibit, especially the timeline of math because I got to learn about mathematicians I’ve never even heard of before.” – Alan Hsu (T-15)

“The trip was amazing! I got to learn some really cool things, e.g., “When do two circles equal a square? When you have two loops taped together and cut down the middle of both!” It was interesting to be able to see Mathematics and learn about some of the history of math that I didn’t know.” – Amanda Koppel (T-16)

“The trip was an excellent experience! It was really wonderful to see ways to apply concepts we learn in math to real life situations/scenarios. Not only that, but what we learned was not taught to us like we were students, we were taught these things as if we were teachers, learning new things to use to teach our students (when we become teachers) which, overall, made this trip amazing!” – Daniel De Sousa (T-16)
This was my third year attending the TIME 2000 Conference. It means a lot to me to see new keynote speakers every year since I never attended when I was in high school. I learn something new and it helps me grow tremendously. I also love working with the students in the workshops. It's a great way to practice for my future career. – Ladan (T-14)

I can't believe this is my last conference! Being part of the TIME 2000 conference was such a great joy and I've found that each year it means more and more to me. Freshman year, I participated in the conference and loved it, but I've realized that I valued it more and more as I got older. The closer I've gotten to becoming a teacher, the more I value all of the great aspects of the conference. My mindset has changed because these days I'm looking for great math techniques and ideas that I can use in future lessons. I hope in the future, I will be able to bring my students to the conference so that they too can be inspired by the beauty of mathematics! - Nerline (T-13)

Last year, I came to the conference as a high school student and now this year I was helping to run it. It was an amazing feeling. I felt very happy to be part of such a big family; helping the high school students realize that math can be fun and that to become a teacher is a great way to give back to our community. – Joseline (T-16)