TIME 2000 Celebrates Mathematics Teaching!

On Friday, November 20, 2009, TIME 2000 held its eighth annual conference, Celebrating Mathematics Teaching, to celebrate the wonderful mathematics teachers in our neighboring schools and to interest high school students in a career in mathematics education. During the conference, high school and college mathematics instructors taught engaging math lessons to high school students from schools in NYC and Long Island. An old proverb states: Tell me and I’ll forget; show me and I may remember; involve me and I’ll understand. This proverb is the epitome of the conference. The workshops were not only informative and hands-on, but enjoyable! Guests also learned about the TIME 2000 program during a Question & Answer session with a panel of TIME 2000 students.

The keynote featured Jim Matthews of Siena College who astonished the audience with counter-intuitive mathematics problems. Among the eighteen presenters were four TIME 2000 graduates: Kendal Askins (T-6), Eric Glatz (T-1), Julio Penagos (T-5) and Ana Mojocoa (T-4). More than 300 students from 25 high schools attended the conference. The conference ran smoothly due, in large part, to the TIME 2000 students who worked to make sure the guests had a good experience. TIME 2000 students reflect on the conference:

Jared Stoler (T-9)
This year’s conference was a great experience for me. I thought the keynote was outstanding, Jim Matthews really knows how to get a rise out of a crowd. I had the privilege of having two unique jobs. I was an equipment manager for the two sessions and then I was part of the student panel. The lesson I observed for the two sessions was a lesson that combined math with physical education and science. The goal of the lesson was to see if there was a correlation between exercise, heart rate, and carbon dioxide output. There were three presenters for the session (one math, one gym and one science teacher). The students seemed to really enjoy the activity after they got over the fact that they had to sweat a little bit. Being a student-athlete myself, I shared with the prospective students my experiences being in a rigorous program as well as competing on a college sports team. I wanted to reassure the high school students that there is nothing to worry about if they plan on becoming a TIME 2000 student and continuing a career in sports. Over all, the conference brought together all of the things I love.

Alia Shameer (T-11)
The annual TIME2000 “Celebrating Mathematics Teaching” Conference was a great and enjoyable experience. This was the second time I have had the chance to take part in such a wonderful event. The keynote speaker, Jim Matthews, had everyone on the edges of their seats and entertained throughout the opening program. I was even shocked by some of the outcomes. My job for the day was being escort and a teacher’s assistant. From the start until the end of the day, I felt more and more a part of the TIME family. The conference not only allows high school students and teachers to enjoy a day filled with mathematics but also brings all that makes TIME 2000 together.

Greg Hyams (T-11)
I enjoyed the conference very much this year. I became the “tech guy” in Powdermaker Hall. I was trained in how to use all of the equipment in the classrooms. I felt as though I was an intricate part of ensuring that the conference went smoothly. My job was to help everyone with the equipment. I found myself staying in one classroom so that I could assist the teacher and the students with the laptop. I also got to be on the student panel and was one of Jim Matthew’s assistants. To be Jim’s assistant, I had to learn his card trick. This was a very difficult task because I had never seen it before, while the other assistants had learned it the prior year. It took a little time, but I got the hang of it! Before I knew it, I was on stage doing the hardest trick of them all. It was a conference to remember!

Maria Valladares (T-11)
During the conference I was given the opportunity to escort high school students around the Queens College campus. Being an escort might seem very straightforward, but it involves a lot more than escorting students around. I also got to participate in the lessons and see firsthand how these students react to the new material they are being taught. It’s entertaining to see how little by little they become interested. It’s as if they go in very skeptical and come out true math advocates, which of course depends on how interesting the lesson actually was. Participating in the lessons also gave me the opportunity to learn math in different ways, and of course to gather information for those “awesome” portfolios that have to be written at the end of EVERY year.

Amy Lee (T-12)
Matthews proved using mathematics that

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Have you met Marylin Cano? By: Michelle Yacoub (T-10)

Ms. Marylin Cano will be honored at Dr. Arzt’s Annual Mathematics Teachers’ Reunion on January 25, 2010, for inspiring a TIME 2000 student to become a mathematics teacher.

I was fortunate enough to be Ms. Cano’s student for the first two years of my high school career as well as have the opportunity to build a relationship with her throughout the rest of my time spent at the Queens High School of Teaching. I nominated Ms. Cano to receive the TIME 2000 Teacher Award because when I look back at all the teachers whom I have had the opportunity of learning from and interacting with, Ms. Cano has been the one who has influenced me overall. Ms. Cano is an amazing teacher; her impact on my life was long-lasting and affected not only the decision for my future career but the person I am today. She acknowledged the potential I had in high school and helped me develop it by encouraging me to become a tutor. I tutored for her starting when I was a freshman until I graduated. I more fully understand the responsibilities of being a teacher because she would allow me to assist her with paperwork as well as teach her classes when she was absent. When I take a moment to imagine the teacher that I want to become, Ms. Cano is the person who has truly inspired me.

A recent interview with Ms. Cano follows.

Q: Where are you currently teaching?
A: I am currently teaching at the Queens High School of Teaching and have been since the school first opened in Fall 2003.

Q: What are you teaching?
A: I teach the juniors and seniors Algebra 2, Math B and Calculus.

Q: How long have you been teaching?
A: I have been teaching for 27 years and loved every single one of those years.

Q: What made you decide to go into teaching mathematics as a profession?
A: Even though I didn’t know what subject I wanted to teach, I knew that I wanted to be a teacher since I was seven years old. My family wanted me to become a doctor, which was not in my plans at all. I ended up settling on Biochemistry as my major. After only one term at the University in Colombia, I came to New York with my limited knowledge of the English language. I started school here at Laguardia Community College in New York, taking a chemistry class. It was very frustrating because I did not know the language. Fortunately enough, I met Juan Izarra, a college advisor at Laguardia Community College. He guided me and helped me to better assimilate to the college life in New York. I saw that there was a need for Bilingual Math teachers and the rest is history.

Q: What is the most rewarding part of teaching high school mathematics?
A: I love teaching! The daily interactions with the students have to be by far the most rewarding part of teaching high school mathematics. These interactions include the things that the students bring into the classroom and the look of understanding after the completion of a frustrating problem. The most satisfactory of all the interactions with my students has to be comparison between the look on their faces when they first enter my classroom and the look of their faces when I see them after they have left me a year, two or twenty later. This all gives me the satisfaction of a job well done. It encourages me to continue what I am doing and is the reason I see the sun shine every day even through the clouds.

Q: What frustrates you most about teaching high school?
A: I love everything about teaching. I wouldn’t say that anything really frustrates me. There are always going to be difficult times and you just have to take it step by step and get through it.

Q: What was the hardest college math course you took and why? How did you get through it?
A: There has been more than one college course that was difficult for me. The most important thing is to find out why it is difficult and address that specific issue.

Q: Was there anyone in your life who influenced your decision to teach math?
A: I had the fortune of having Dr. Mendelson at Queens College as a professor for most of my mathematics college courses. Whenever I had a problem he was always available to give that extra tutoring time I needed.

Q: What advice do you have for the TIME 2000 students on how to deal with their struggles in any math courses they may take?
A: The best advice I can give is talk to the professors. Most of the time they can help you see where your problem lies. Ask for help the moment you do not understand something. In math, more than any other subject, it is very important to understand the current lesson before moving on to the next.

Thank you, Marylin Cano, for being a great teacher, role model, and friend!

Math Midway Madness! By: Maria Leon Chu (T-9)

Would you like to ride a tricycle with square wheels? Or challenge the Ring of Fire? Or try your luck at the Universal Wheel of Fortune? Sounds like we’re headed for a carnival, right? WRONG! These are actually a few of the cool activities at the Math Midway, a traveling exhibition organized by the Math Factory which is a group that is trying to bring math to the public in a hands-on, interactive way. Along the way, they’re also hoping to raise enough funds to start America’s only permanent museum of mathematics.

The Math Midway made its debut at the World Science Festival Street Fair on June 14, 2009, in New York City. Its popularity led to a second installation at the Urban Academy in Manhattan in August.

Both exhibitions opened to the public free-of-charge. Because it doesn’t require an entrance fee, the Math Midway relies on volunteers. I experienced the exhibition first-hand as a volunteer at both exhibitions. I was in charge of explaining instructions and the mathematics behind the activities to visitors. In one of the exhibits I was responsible for, visitors had to plant a giant daisy that was over ten feet tall. The only rule was that you had to hold it at a specified spot with one hand. Sounds simple, right? I thought so, too, until I actually tried it. The daisy wobbled so much, it almost fell over and hit someone on the head. Now, you may be wondering, “What’s so mathematical about planting a daisy?” Well, it all has to do with trigonometry! In a sine or cosine curve, the nodes are located at the points of no amplitude. The daisy has natural vibrational motion that travels like a sinusoidal curve through the plant. The spot at which the daisy must be held is a node of that curve. At the node, the plant is harder to control. But if you hold the daisy in the middle, where the maximum amplitude is located, you can plant the daisy much more easily. There were many more exhibits like this one at the Math Midway. Participants who won a challenge received a collectible Math Midway coin. Each coin featured a math symbol, including π, e, and x > !

The best part of the events was meeting other people who share my enthusiasm for math and transferring this enthusiasm to the public. Of course, I also got a few ideas for new and exciting ways to teach math. The next installation of the Math Midway will take place in 2010 at the New York Hall of Science in Queens. If you’re interested in volunteering or learning more about the Math Midway, visit their website at www.mathmidway.org.
Are you tired of being told that “math is everywhere” and expected to believe it? Often, people believe only what they see and, even then, are sometimes still skeptical. I am sure we have all heard that every tile we step on, every room we sit in, and any building we step into is a work of art using mathematics. It is hard to illustrate how every kind of building or sculpture in architecture relates to mathematics in a single article. However, below you can find an illustration of how mathematics is used in creating arches for churches and other high-ceilinged buildings as well as an interview with an architect who experienced firsthand being told “math is everywhere” but not fully believing it until he had to use math in his work.

One important application of geometry in architecture is the use of the golden section when creating blunt arches. The golden section is defined as a line segment divided according to the golden ratio (phi). The total length a + b is to the longer segment a as a is to the shorter segment b. This means that there are measurements affiliated with blunt arches that correspond to the golden ratio. In the diagram shown, these measurements are the width of the base of the arch (AB) and the lengths from the highest point on the arch (E) to the points A and B, such that (AE+EB)/AB approximates the golden ratio.

\[ \frac{a}{b} = \frac{a+b}{a} \]

This type of architectural style can be found in many churches built during the middle ages. It is a characteristic of Gothic Art and can be found in the Principal Dome of Sainte-Marie de Bayonne Cathedral in Aquitaine, France.

Architect Daniel Mirzakandov was interviewed to further explore the mathematics and architecture connection.

**Q:** How long have you been working in this field?
**A:** I have been working in this field for about two years.

**Q:** How has your perspective of using math in the real world changed compared to when you were a student?
**A:** When I was a student, I looked at calculus, in particular, as a waste of time. I told myself, “I am not going to use this in the real world.” Of course, it caught up to me, and now I’m kicking myself for not learning the material better. We use math when it comes to the beams and the columns, using various formulas determined by structural engineers.

**Q:** What kind of formulas do you use at work?
**A:** We mostly try to use basic algebra. There are times when the structural engineers take over and work on the calculations for our design using a computer-based program that measures distances, weights of columns and beams, as well as hurricane and wind speeds for tall buildings. The beams and the columns provide structural support and, therefore, required to be certain weights and distances apart from one another. The measurements provide insight into the structure, such as whether or not the floor will be stable.

**Q:** What kind of software do you use at work?
**A:** We use AutoCAD (Automated Computer Aided Drafting Design) and other 3D software that help design most, if not all, projects. With the software, we can design sections, plans and elevations for the structure of a building. We can also add color and other materials to the building, such as floor tiles, bricks, and windows.

**Q:** When drafting and creating buildings, what kind of shapes or designs do you prefer to employ?
**A:** We try to use both common shapes, such as squares and rectangles, and weird shapes that do not fall under the typical geometric interpretation of shapes. Architecture is a creative field and playing with shapes and sizes is our specialty. Some architect like Frank Gehry and Norman Foster love to use different shapes when designing commercial buildings. Examples of their work are the famous Fred and Ginger building (below, left) and Foster’s torpedo-like building (right).

As you can see architecture is not only a form of art, it is also a part of our daily life that involves mathematics. Hopefully these small examples are enough proof that mathematics is everywhere!

**Conference (Continued from page 1)**

250 rips of a newspaper would pile up past the sun. The rips were based on powers of two, so each rip would increase the unit from inches to feet to miles, etc. Dwayne Screen (T-12)

I’ve lived in Queens all my life but having gone to school for the past 13 years in Manhattan, the TIME Conference was something I’d never heard of before. Many of my TIME friends had attended the conference in past years [as high school students] and were excited about now being “behind the scenes.” I was just excited to spend a leisure day with my fellow T-12’s. My first job, and definitely my favorite, was working at the VIP/Presenter Check-in table. I was nervous at first because the job description included so many steps, but it turned out well. The best part about the conference overall was being able to spend the day with other TIME students, especially those who I never previously met or talked to. Rachel Wessel (T-12)

I enjoyed the conference very much. This was my first conference and I was proud to take part in it because I was important in the same way that everyone else was. This gave me a privileged feeling because I was participating in something that gave back to a program. I was on the student panel and it was a great experience. I felt honored to be able to tell my story to people who might join this program.

Visit the Events page at time2000.qc.cuny.edu to see pictures of the conference!
**Rules:**

- **Player One:** Place an X in any spot in any one of the nine small tic-tac-toe boards.
- **Rule:** This move determines which small tic-tac-toe board the next player must use. The next player must use the small tic-tac-toe board that is in the same position relative to the large tic-tac-toe board that the X is positioned in the small board.
- **Player Two:** Locate the next appropriate small tic-tac-toe board based on the above rule. Place an O in any open space on that small board.
- **Player One:** Similarly, the location of the O determines which small tic-tac-toe board is used next. Place an X in any open space in the appropriate board.
- Play continues in this manner until a player wins by being the first person to get “3 in a row” in one of the small tic-tac-toe boards.

**Example shown below:** Player One chooses any spot on any small board. In this example, Player One places an X in the upper left position of the board in Section E. So, Player Two must use section A (which is the upper left position of the large board), and chooses to place an O in the middle position of the bottom row of that board. Therefore, X must now use section H, and places a mark in any open space in that section.
To construct a blunt arch, consider span AB as pictured below.

Divide Line segment AB in three equal parts, \( AC=CD=DB=(AB/3) \)

Draw the arc with C as center and CB as radius

Draw the arc with D as center and DA as radius.

These two arcs intersect at E

AEB is a blunt arch

Calculations show: \( (AE+EB)/AB=\phi \)