Thinking About Making Connections in Mathematics: One Student Teacher's Story

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The students at the school where I taught my Phase 2 practicum were eager to use anything they were taught. During the course work I often overheard them saying "When am I ever going to use this in the real world?" I believe it is important for students to see the applicability in the real world of what they are learning in math class. These same students were very excited when their social studies teacher talked about a formula to calculate interest. He also related this topic to world banks and global economies. I think that we teachers should strive to make subjects in school more connected.

A colleague in a secondary education course told me that some teachers with whom she was working thought that the material presented in the new Grade 9 textbook was too abstract. This teacher decided not to use the new text. I, however, think the text is great. The text tries to make connections between math and other subjects, for example, between card games and algebra, or exponents and distances between planets. While I was doing my practicum I saw some old textbooks that I used for high school math. The texts were mostly black and white. To jazz up the pages a bit, the authors put different colors on the top of the pages (usually to indicate a new topic). Graphs made up the entire art selection in these texts. Why not make these text more fun and interesting to look at? Maybe if a student picks up the text to look at the pictures then he or she might also look at the words. Why should a math text be boring? I think we should try to encourage students to learn math every way we can.

There are many negative feelings associated with math. In our secondary education course, a guest speaker spoke about some aspects of teaching high school math. She told us that math is a subject that people are proud to say they "suck" at. This attitude was apparent at parent-teacher interviews. Parents would tell their children that they had difficulties with math, too, suggesting to the child that it was okay for them to "suck" at math. People have a preconceived notion that math is hard and therefore they cannot do it. Maybe if we could show them that they use math every day in their lives to solve problems and evaluate situations, then they would have fewer problems understanding concepts.

So how do I see working with students to make connections? One possible way to start a conversation in math is to ask students, "When is the first time you use any aspect of math during your day?" Most will probably respond, "In math class." Ask them the following questions:

- ✓ "How many times do you let your alarm clock ring in the morning before you get up?"
- ✓ "Do you eat breakfast and then brush your teeth or the other way around?"
- ✓ "When you brush your teeth how many times do you brush each tooth?" "Do you count each stroke or do you estimate?"
- ✓ "How do you decide how much milk you will put on your cereal?" "Do you estimate or measure?"
- ✓ "How long do you let your bread toast?" "Do you estimate or have an exact time?"
- ✓ "When you get dressed, how do you determine what you are going to wear?" "Do you figure out each combination and choose one of your many combinations?"

Most students may look at you as if you are weird, but they will probably get your point. This conversation might encourage students to think about ways they use math in their lives.

Math is used in social studies. Determining interest, global economy and trade requires math. There is a long history associated with math; perhaps this can be incorporated into a social studies program. If we could incorporate math into areas that students enjoy, it might help them enjoy math as well. Rhythm in poetry and steps in a dance could not be accomplished without basic math. Math plays an important role in engineering, chemistry, physics and biology.

In science, math is used all the time. Do you use math when driving your car? (The engineers who built it definitely did.) Most things that are built use math in some way or another. Math is also used when looking at the distances between planets. Did you ever wonder how scientists know how far apart the planets were when no one has ever traveled between them? Rockets and other spacecraft use forms of math to take off and land. Without math how would the pilot of an airplane know where he or she was flying, especially if a gust of wind came up? The pilot uses vectors and coordinates to get back on track. In chemistry, it is important to be able to balance reaction equations. If you did not know how to solve mathematical equations, how would it be possible to solve chemical equations? If you could not measure and calculate the proper mixture of chemicals, we would not have batteries and many other chemicals that we use daily in our homes.

In biology, math is involved in many cellular processes. When I was working on my M.Sc., I choose to look at the uptake of nutrients (specifically Ca^{2+}) into cells. The methods of uptake are diffusion, facilitated transport and active transport. My study involved the uptake of Ca^{2+} into *Zea mays* L. sperm cells. Ca^{2+} uptake occurred in a time-dependent manner. The K_m and V_{max} values of 213 μM and 3.759 nmol/μl cell H_20 respectively, which suggests the presence of an active transporter in maize sperm cells. By the use of a few mathematical equations, we discovered the presence of a Ca^{2+} transporter on the maize sperm cell.

Math teachers fight against a lot of misconceptions surrounding math. I believe that if we can help students to make connections and to help them see how math is used every day in life, it will make the subject more interesting.

Triangles

There are 3*n* points (*n* is a natural number) in the plane, of which no three points are collinear. Using the points as vertices, is it possible to draw *n* triangles, which neither touch nor overlap each other?