

EDUCATION COLUMN

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by Erica Dakin Voolich

Back in January 2001, I was honored to be included on the AWM panel in New Orleans discussing “K–8 Education: What Should We Do?” As the only classroom teacher on the panel, I was the “view from the trenches” and chose to interpret the title literally: What *should* we do in support of K–8 mathematics education? I spoke first about what mathematicians *shouldn't* do and then gave a list of possible activities.

In the March–April issue of the *AWM Newsletter*, Virginia Warfield printed a list of my suggestions and then challenged her readers of the column to carry out any one of my suggestions. So, as a service to my readers, I've reprinted the list here: 1) Volunteer time at your local school.... 2) Talk to middle school teachers about your specialty in mathematics, and volunteer to come as a guest speaker when the class is studying a topic you are expert on.... 3) Offer an after-school or lunch-time mathematics club. 4) Provide monthly family math problem-solving questions for the school newsletter.... 5) Organize monthly family mathematics nights. 6) Organize a day at your university for middle school girls to see what is happening in mathematics and science.... 7) Work with teachers to offer a family project day. What follows is a description of what I have done since then to follow my own suggestions.

I teach in a Jewish parochial school, but I live in a much different place, Somerville, MA. The city of Somerville is a blue-collar immigrant community near Boston, built on 4.1 square miles of land with a population density of 18,543 people per square mile. Only 30.6% of the housing is owner-occupied. At Somerville High School, 64.7% of the students receive free or reduced price lunches, 52.3% are minorities, 17% have limited English skills, 36% of the graduates attend a four-year college, and 32% of the graduates attend a two-year vocational school or junior college.

I was inspired to give back to the community in which I live by sharing my joy and passion for mathematics. Using the funds from some teaching awards I

received as seed money and with the help of my family and friends, I started The Somerville Mathematics Fund (a 501(c)(3) charity) in the fall of 2000 with the purpose of celebrating and encouraging mathematics achievement. When I spoke in January 2001, this charity was in its infancy, so I only spoke of things people could do based on my experience as a classroom teacher and not about what I hoped to do. Now, I want to talk about The Somerville Mathematics Fund (SMF) in hopes that it will encourage others to start a similar organization in their own community or to at least try some of the activities.

The SMF was chartered by Dollars for Scholars in September 2000 as a scholarship organization in a community where most parents are not college educated. We are proud to say that as of June 2004, we have awarded a total of \$40,000 in mathematics scholarships to ten students (five to women, five to men). Our scholarships go to outstanding mathematics students who live in Somerville while in high school. The scholarships are for \$1,000 a year, renewable for up to four years of college as long as the student continues to take mathematics or science courses and maintains a B average. We are pleased that all seven of our previous scholarship winners had their scholarships renewed this spring.

Scholarships are great for deserving students, but there is much work to be done in this blue-collar town to prepare students to qualify for careers in the years to come. So, the other focus of the SMF involves creating enthusiasm for mathematics; as our mission says, we celebrate and encourage mathematics achievement; and we do this by awarding teacher grants, sponsoring family mathematics nights, and writing mathematics problems for families to solve in the local newspaper.

When I spoke in New Orleans, before making suggestions about what we should do, I was very specific about what we should *not* do. All of the examples I gave can be summarized as: Do not tell people how they should be teaching when you offer to help them—the adage “Before criticizing someone, walk a mile in the other person's moccasins” definitely applies here. I take this approach very seriously as I try to find ways to support and work with the teachers and students in Somerville.

The SMF awards grants of up to \$500 each to teachers to fund exciting projects in their classrooms. We pay for materials, not salaries, for teacher-designed activities. So far we have funded fourteen classroom projects,

totaling \$6,313 over three years. Among the projects have been classroom resource libraries, backpacks filled with math activities for kindergarten and first graders to take home to do with their parents, family mathematics nights, algebra manipulatives, and art materials for a geometric transformation project. I am convinced that when teachers are excited about what they are doing and feel supported, their students will catch their passion. We try to empower the teachers by supporting their creative ideas.

The SMF also sponsors Family Mathematics Nights for middle school students and their families. We work with teachers to plan and run the mathematical theme evenings. So far we have celebrated Pi Night, Metric Mania, and Pattern Party. Starting about three months prior to each event, I meet with interested teachers outside of school, since I am unavailable during school hours. We all share ideas and suggest potential activities for the multiple stations in the lunchroom. What is finally used comes from these very fruitful discussions. The evenings are not in any way a predetermined “packaged” program that is supplied by us and imposed upon the school community. Rather, what I provide is a potential theme, some beginning ideas, a husband who loves to solicit some donations once we identify what we need, and the willingness to plan and work that evening.

We would not be able to do what we did without the enthusiasm of the three wonderful, participating teachers who not only donate many hours outside of school to do planning and purchase (or beg donations of) some of the materials for the evening, but excite their middle school students to come to school on a Friday night with their parents (whom middle school students usually do not want to be seen with)—for an event at a school in a neighborhood possibly different from their own. We also could not have done this project without the wonderful assistance of the high school volunteers from the Mathematics Team, Computer Club, and French Honor Society at Somerville High School, all of whom ran each of the activities the night of each event. In fact, two high school students from Pi Night joined us over the summer to plan the metric activities and recruited the other volunteers for the metric and pattern events. The teachers had activities in their classrooms leading up to the evenings: for Pi Night and Metric Mania, students wrote songs to be performed; for Pi Night, students made posters and tee-shirts; for Pattern Party, students wrote dance and drumming routines of number patterns to perform;

for Pattern Party, students made tessellation posters. Each of our evenings were held at different schools. Students from the other two schools came to the one where the event was held. We told teachers from all of the Somerville schools about the event; however, in order for students to participate, a teacher from their school needed to be involved. For each evening, we had numerous volunteers, mainly from the high school, but also from The SMF board and the wider community. Since the participants were from the poorest neighborhoods in town, we served dinner (pizza one night and hot dogs the other two) along with the mathematics. We also received support from local businesses with generous in-kind donations, so we were able to keep our costs to a minimum.

When planning activities, we needed to remember that they had to be self-contained, related to the theme, interesting to middle schoolers, doable while challenging, quickly teachable to the volunteers, and in at least some cases be somewhat competitive—all this and mathematical. Pi Night included computing π by dropping tooth picks, estimating circumference by feeling the size of an object in a mystery box, Pi facts quiz, predicting how far a bicycle tire would roll in one revolution, solving math problems in order to putt in miniature golf, and predicting and testing which had a better chance: tossing a chip into a circle inscribed in a square or into a square inscribed in a circle. Metric Mania included estimating the size of Bill Rodger’s shoe print and Joan Benoit Samuelson’s shoe print to the nearest square centimeter, estimating the weight of a handful of marbles, estimating the volume of water squeezed from a sponge, estimating how far a cotton “shot-put” and a drinking straw “javelin” were thrown in centimeters. Pattern Party included solving mirror puzzles, completing words using mathematical transformations, building toothpick polyhedra, drawing the next picture in a geometric pattern, naming the next number in a sequence and giving the rule, completing a pattern quiz, finding multiple patterns in Pascal’s Triangle, solving tangram puzzles with Fibonacci-design pieces, and talking to the football coach about patterns in football.

Finally, the other thing the SMF is doing to encourage mathematics in Somerville is writing problems for the *Somerville Journal*. I am writing problems quarterly. The paper publishes the problems one week and then the problems with the answers the next week. I have had a couple of folks tell me they were working on the

problems—one a grandmother with her grandson, and another who emailed me when her colleagues at work wanted to check their solution. My hope is that parents and children will try the problems together, although I have no way of assessing whether or not anyone beyond these people are even reading the column.

I hope that other members of AWM will take the leap and reach out to their community. What I have provided here are some of my ideas and experiences. I am definitely learning as I go along. I would reiterate what I said in New Orleans, that if you are going to reach out and do something, be sure to start by offering to help, and not by telling the teachers what they ought to be doing.

For additional information about The Somerville Mathematics Fund, go to www.Somervillemathematicsfund.org. I can be contacted at voolich@aol.com and would love to hear others' experiences working in the community.