

A New Model for Family Math: Let Students Be the Leaders!

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Family Math is a school-based event that brings parents, students, and teachers together to do mathematics and build support for mathematics learning in the classroom. It was a common parent outreach program in many elementary and middle schools from the 1970s through the 1990s but, due to increased pressures on teachers, an emphasis on test scores, and decreased school budgets in recent years, fewer and fewer schools are hosting Family Math events. However, the need to bring parents and schools together over the critically important subject of mathematics education has not decreased. In fact the need for parents to understand and support school mathematics learning has greatly increased with the introduction of the new Common Core Standards.

Students are the leaders and hosts during the event for families in their schools.



Margaret Goldberg was a 4th grade teacher at the Ocean View School in Albany, California and I was a classroom volunteer in her classroom. We collaborated to form an after-school Math Student Leaders club for 4th grade students that would lead to a new model for Family Math. Beginning in February, the group met after school every two weeks in Ms. Goldberg's classroom for a total of twelve sessions that each lasted an hour and 15 minutes. Our ultimate plan was to have these Math Student Leaders, not their teachers, be the hosts for their school's Family Math event in the spring!

We hoped to select a few Math Student Leaders from each of the school's 4th grade classes. In order to gain the support of the other 4th grade teachers, we assured them that we would not ask any extra work or extra hours of them. We did ask, however, that they support the Math Student Leaders from their class by giving these students time to present the activities to the other students in their own classrooms. We asked each of the 4th grade teachers to promote this opportunity to their own students, and made it clear that we sought students who were well-behaved, responsible, verbal and outgoing, willing to attend all the after-school sessions, and willing to promote the



In many schools, it is difficult to ask teachers to devote the extra time that planning and hosting a Family Math event requires. This article presents a new model for Family Math—one in which stu-

mathematics they would learn to families. We did not require that they be strong math students!

We asked students who were interested to briefly write down why they wanted to be a Math Student Leader. While some students wrote that they loved mathematics or thought the program sounded like fun, others indicated that they felt the program would be good for them because of their discomfort in math.

The sixteen students who volunteered to participate in the Math Student Leaders club all met the criteria and were very interested and motivated. Each of the after-school meetings and the final family event proved that any hardworking student, even those who struggle with mathematics, can become a math student leader!



At the first Math Student Leaders meeting, Margaret and I carefully explained the overall plan and purpose for the after-school meetings and Family Math event so the students would understand what we were asking of them. After answering questions, we then introduced the Math Student Leaders to the first hands-on mathematics activity that they would need to teach to their classmates before the next Math Student Leader meeting.

We carefully chose the hands-on activity for this first meeting (and for each of the next nine meetings) with the following criteria in mind:

- It focused on some aspect of geometry since we had decided that geometry would be the focus of the family event.
- It had to be hands-on and fun. Since we wanted to keep the Math Student Leaders coming after school, we knew we had to make a major part of each meeting active, interesting, and enjoyable

for them, for their classmates whom they would be teaching, and eventually for the families.

- It must be relatively easy to teach and complete in approximately 30 to 40 minutes. We wanted the students to have successful teaching experiences back in their own classrooms without a huge learning curve for each activity.
- It used readily available school materials and manipulatives. We wanted to make sure the Math Student Leaders found what they needed in their own classroom for teaching the activity without placing an added burden on their teachers.
- It required few prerequisite mathematics skills. Our Math Student Leaders had mixed mathematics abilities, just as would the students they would be teaching in their own classrooms.
- It had broad appeal to the families and to children of different ages.

After one of us taught the Student Leaders the new activity, we made sure they had ample time to complete the activity, either individually, in partners, or in small groups. Margaret and I helped the students as needed so that everyone was successful. Observing the students doing the activity gave us the feedback we needed to choose future activities and how best to help the students take the activity back to their own classrooms.



In the last segment of the meeting, the students

processed the activity in order to help them teach it without a great deal of help from their teachers. Even though we provided the other teachers with copies of the activity handouts and a list of materials, the activity would still be new to the other teachers as well as the Student Leaders' classmates; it was important that the Student Leaders were ready. To ensure that the Student Leaders were well-prepared, we had them keep journals that included their own sample work to share with classmates, the handouts for the activity, and their notes about everything they learned that would be useful in teaching the activity. While we made a list on the whiteboard, students took notes in their journals of the important things about the activity they needed to remember:

- The title of the activity. We wanted the students to introduce the activity just as a teacher would.
- The objective and concepts. It was important that the students understand not only how to do the activity but also its purpose.
- A list of materials. The students needed to know ahead of time exactly what handouts and materials they would need from their teacher.
- The necessary vocabulary and skills. Classmates sometimes needed to have new terms defined and a few skills reviewed prior to doing the activity.
- Step-by-step instructions. This helped the students to not forget the order they needed to do things when teaching the activity.
- How to demonstrate the activity. We had students role-play by demonstrating the activity on the overhead or whiteboard just as they would do later to their classmates.



- Lesson timing. This suggested to the Student Leaders the amount of time parts of the activity would take and the total time needed from start to finish. We also discussed what their role might be while their classmates worked on the activity.



This final part of each meeting was important because it gave the Student Leaders the confidence and information they needed to teach each new activity without us.

At each of the next nine Math Student Leaders meetings, we followed these same procedures: we introduced a new geometry activity, allowed students ample time to do the activity, and thoroughly processed the information needed to teach it. However, we added one new dynamic piece to each of these meetings: at the beginning of the meeting students debriefed how their teaching of the previous activity went in their classrooms!

When the Student Leaders talked about lessons they learned while teaching the activities, it became clear to us that they were gradually becoming teachers and learning their craft in the same way we teachers had learned ours! When the Student

Leaders shared their experiences, some of the things they shared included:

- Since not all the classmates understood their directions, the Student Leaders sometimes had to repeat instructions, often using different words.
- Although most classmates liked doing the activity, the Student Leaders sometimes had to deal with one or two students who had trouble staying on task and distracted others.
- The activity took more (or less) time than they had planned and they had to adapt.
- Since not all students finished the activity at the same time, the Student Leaders learned that they needed a plan to occupy those who finished ahead of others.
- Some activities worked better with the whole class and some worked better with small groups of students.
- It was hard helping students without doing the activity for them or giving them the answer.
- If they had to do it over again, they would do it differently. (We heard this from many Student Leaders.)

There were also wonderfully positive comments from the Math Student Leaders:

- Their classmates really enjoyed doing the new activity; it was a nice change of pace from their regular mathematics program.
- In succeeding weeks, their classmates began to look forward to the new activities and pay closer attention.
- The Student Leaders felt more and more comfortable teaching each new activity.
- Their classmates began to respect them and seek them out to ask questions, not just when they were teaching a new activity, but also at other times.
- Their teachers complimented them on how they taught an activity.
- They understood more about the hard job that teachers have.
- They actually enjoyed being a teacher!

Margaret checked in weekly with the other 4th grade teachers to see how well the Math Student

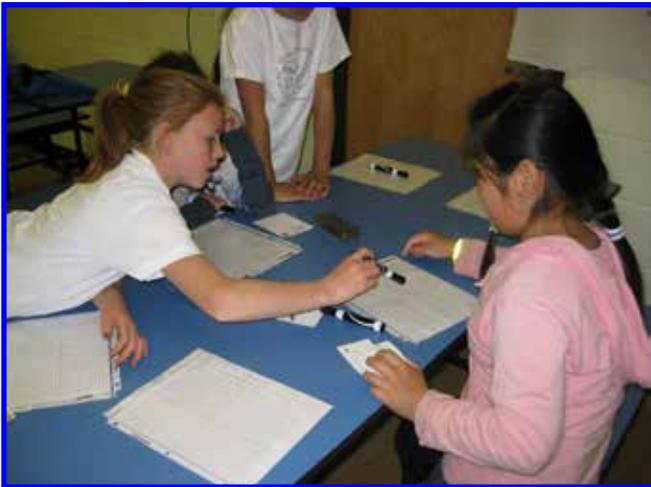
Leaders had done and how the lessons had gone. The teachers unanimously agreed that these lessons were a great addition to their mathematics programs and that the Student Leaders were showing progress week by week. Several teachers commented that teaching the weekly lessons seemed to build the confidence of their Math Student Leaders. One teacher noticed that one of her Student Leaders who had not been that attentive during the math period was now paying more attention and doing better!



We devoted the last two after-school meetings to the preparation and promotion of the Family Math event. At the first preparation meeting, we began by debriefing the final activity that the Student Leaders had taught in their classrooms and then moved on to planning how to promote the event to get the best turnout possible. We decided to create a flyer to send home with students and the Student Leaders brainstormed what information the flyer needed: a title, the location, the starting and ending times, the purpose of the event, and a brief description of the event. Even though Margaret and I could have created the flyer in less time, we wanted the students to take a leadership role and turned the task over to them, discussing with the whole

group what each part should say.

The Student Leaders then broke into small groups with each one assigned ONE of the above event descriptors to write on an appropriate-sized piece of paper with colored pens, so that when all were collected, they could be pasted into a complete poster-sized flyer. One group also had the task of creating a mathematics illustration to make the flyer more visually interesting. When we collected the separate pieces and pasted them together into a single poster at the end of the meeting, it did appear that it had been designed by a committee! Since that was our intent, the whole group was happy with the communal result—everyone had contributed and had ownership.



We held our final Math Student Leaders meeting one week before the Family Math date. Once again we broke the Student Leaders into small groups and had each group create a poster containing directions for the activity they would be assisting with at the Family Math event. The whole group brainstormed what important elements should be included on each poster. Since we had decided beforehand that two Math Student Leaders—for mutual support and encouragement—would work together at a table’s activity, we then let the students pair themselves up. They chose wisely: partners they could both work well with and count on! We gave each pair a large poster-size piece of paper, a meter stick, and a set of colored pens. We suggested they lightly pencil in what they wanted to write, so that if they made a mistake or changed their minds they could erase and change it easily and neatly. When their pencil “draft” was ready,

Margaret and I had a quick look and helped them where needed. Using the pens, the pairs then made their posters permanent and colorful. We used the time that was left in the meeting to review the logistics of the Family Math event, such as timing, set up, and what would be expected of each of them.



Since we felt we could use some help with the set-up and with supporting the Math Student Leaders during the event, we put out the word to the Math Student Leaders’ families and got some parent volunteers to come early, help us set up, and stay to help where needed during the event. While the parent volunteers were a great help, the Math Student Leaders were in charge.

On the day of the Family Math event, Margaret and I, the parent volunteers, and the Math Student Leaders arrived early. Together with the parent volunteers, the pairs of Math Student Leaders took about 30 minutes to set up their respective mathematics activities on separate cafeteria tables and get ready for the first families.

For the next hour and a half, parents and children of different ages visited the Family Math event. They circulated freely between the tables, choosing which to visit and how long to do that mathematics activity. The Math Student Leaders welcomed and assisted everyone who came to their table, without a break. They did it all; Margaret and I simply made sure the students had a ready supply of the materials they needed for their activities.

The ease and pride with which the Math Student Leaders worked with parents and students, displaying great confidence and knowledge of their activ-

ity, proved that all that we had done in the weeks leading up to the Family Math event was worthwhile. Some of the teachers from the school who visited the Family Math event were amazed by the Math Student Leaders ability to help at their tables. Several teachers suggested that this should be a yearly event at their school.

A week after the event we had a lunch-time party for the Math Student Leaders to celebrate a job well done. We led the Student Leaders in one last brainstorm: What had they personally gained from the Math Student Leaders club? We heard the following phrases over and over:

- a fun math experience
- a chance to learn new math activities
- an opportunity to enjoy math
- a mathematics experience where everyone was successful
- a new understanding of what mathematics is
- a chance to be a teacher
- a better relationship with the classroom teacher
- greater responsibility

- more empathy for students they were trying to teach
- a chance to practice math
- an opportunity to make new friends
- respect earned from their classmates.

Asked them if they would want to be a Math Student Leader again, every student said, “Yes!” and asked if they could do it again as 5th graders!

Even though working with the Math Student Leaders had involved a lot of extra time and work for Margaret and me, it was one of the most enriching extra-curricular experiences either of us has ever had. We witnessed both average and below average students become competent teachers with their classmates and families, while gaining a new view of mathematics and teaching.



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