

# From Quiet Straight Lines to Noisy Grouped Students: Creating Math Discussions

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## Abstract

Quiet classrooms are not always conducive to learning, especially in a mathematics classroom. Students should have the opportunity to discuss their thinking and work together on complex tasks in order to develop a deeper understanding of the mathematics content. Through the implementation of classroom norms, selection of complex tasks, and establishment of appropriate student groups, teachers can create a space where students have meaningful mathematics discussions that promote learning.

**W**hen I first started teaching, I thought the most successful teachers were the ones that had all their students working silently on their individual mathematics assignments. A supervisor once chastised me because my students were talking too much. I knew the students were talking about their assignment, but I assumed that the supervisor must know best, so I tried to keep the class as silent as possible. I designed worksheets for the students to work on independently while I walked around and helped the ones who had questions. It was exhausting, repeating myself over and over again while answering the same questions. At first, I just assumed that this was how teaching was supposed to be.

Gradually, however, I changed my mind. Experience brought me to realize that my students understood mathematics better when they talked about it, so I started promoting classrooms discussions. How? I set up classroom norms, grouped my students, picked appropriate tasks, and gave the power to students to solve problems with each other. My classroom went from quiet straight lines to noisy grouped students who enthusiastically discussed, and better understood, the mathematics being learned.

## Classroom Norms

My first goal was to develop a set of classroom norms for behavior that would help students work with each other cooperatively, while still maintaining the cognitive demands of the task. I worried that some students would dominate the conversations while others would sit back and agree with whatever the group decided. After searching for a set of norms that would fit my needs, I decided to adapt a list from Chapin's *Classroom Discussions: Using Math Talk to Help Students Learn* (2003). The norms I used are listed below:

1. *You have the right to have your ideas heard and discussed.*
2. *You are obligated to consider other people's ideas.*
3. *You are obligated to listen for understanding.*
4. *You are obligated to explain and justify your thinking.*
5. *Everyone in the group must have the same question in order to ask the teacher for help.*
6. *No one in the group is done until everyone can articulate the reasoning behind their answers.*

*Chapin, O'Connor, & Anderson (2003)*

The norms that I chose were based on what I noticed happening in my classroom. There were some students who thought they were supposed to do all the talking while the other students were supposed to copy what they did. I wanted every student in the class to have a voice and critically analyze their group members' ideas. This meant that they needed to communicate with one another and work together to gain understanding. These norms helped pave the way to those behaviors.

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### Grouping Students

The first step to restructuring my classroom was to move my desks into groups. I wanted students to have a team upon which they would rely during class, which meant that I would have to be very purposeful when grouping my students. I wanted a range of abilities in each group, while I also had to divide certain hierarchies within the classroom social structure. My goal was for every student to feel like they were an important piece of their team.

Some students did not like the fact that they were grouped with someone whom they typically did not work. There was one boy who would say very hurtful things to a girl in his group because he felt that she would hold the group back. Although the girl was slower in her calculations than the rest of her group, she was very good at writing logical explanations of her thinking. It took thoughtful planning to choose tasks that would highlight her skills so that all her group members would see the value of having her in their group.

More than anything, I wanted the students to learn that everyone will have skills that the group needs, but not everyone will have *every* skill. In the end, most students ended up preferring the group setup because they felt that, as a group, they were more successful on the tasks.



### Choosing Appropriate Tasks

I chose tasks which allowed for multiple strategies to be used. This was done so that students could discuss and debate their reasoning about how they solved the problems. One resource that I found particularly helpful was *Good Questions for Math Teaching: Why Ask Them and What to Ask Grades K-6* by Sullivan and Lilburn (2002). This book had example questions that were thought-provoking and fit my criteria for group work. A sample question from this resource is, “*I have drawn a shape on centimeter-square paper with a perimeter of 16cm. What might my shape look like?*” (Sullivan & Liburn, 2002, p. 70). After I became more comfortable with the *types* of questions that should be asked, I was able to modify the questions from my resources to align more closely with my district’s curriculum.

### Giving Power to the Students

The most difficult part of structuring my classroom was getting students used to the fact that they had to rely upon each other when challenging tasks arose. There were times when one student in a group had a question and I would ask another person in the group what the question was. If the other group members did not know what the question was, then I knew that they were not communicating with each other. I would walk away until they talked to each other. On many occasions, the group could answer the question and they would not need my assistance after all.

This process helped to empower the students to take responsibility for their own learning and the learning of the group members. The more students explained their thinking to help one another, the more they learned (Webb et. al, 2008). If everyone in the group had the same question, then I would provide hints that would get them moving in the right direction.

### Conclusion

Creating an environment where students have meaningful mathematical discussions can be hard work. However, math talk helps students to better understand what they are learning. Also, the discussions enable teachers to evaluate student thinking in a way that evaluating procedural skills cannot. This type of change can take time, but the outcome will be worth it.



### References

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