

Setting Up the Mathematical Community

Happy New School Year!

Building a math community involves adults and students working together to create a culture that will enable each person to be productive and become excited about mathematics. In this case, Tara Thompson reflects on her goals for her students as they develop into a classroom community—in particular her goal of creating a safe environment “that encourages the students to be (or become) risk takers.” Ms. Thompson recognizes that to take risks, students must feel safe about expressing their ideas about the mathematics they are working on.

I want my students to know that we *talk* about math. I want to help my students see the importance of discussions—of participating in discussions and valuing the ideas of their classmates. I try very hard to let them know that I am interested in their ideas and that questions are important. I ask students what they think all day long. I model listening intently, and I often restate what I hear them say to provide an example of ways to engage in productive conversations.

Here are some strategies I use to encourage participation.

1. I am always asking questions:

“Does anyone want to tell us what you think the answer might be? Even if you’re not sure or if it feels like a ‘guess’ right now, it’s okay to take a chance and tell us your idea.”

As the year progresses, I want students to show how their ideas and solutions are based on evidence and reasoning. However, at the beginning of the year, I find that giving them permission to say what might feel to them like a “guess” frees up some students who would otherwise be reluctant to speak. Because many of these “guesses” are actually based on good mathematical thinking, I take the opportunity to point out how the idea or answer they expressed was based on what they knew.

2. After a discussion is underway, I ask if there is anyone who has not had a chance to say something out loud yet.

I tell them that I want everyone to have a chance to share their ideas.

3. Sometimes when many students have something to say, I ask the students to turn to their neighbors and share their ideas. Talking in pairs lets everyone have a chance to respond in a nonthreatening manner. It also serves as a kind of rehearsal by giving students a chance to try explaining their thinking to other students. They can practice clarifying their thinking in response to other students’ reactions. In addition, I have an opportunity to eavesdrop on the conversations and identify ideas that can be shared with the whole class.
4. During discussions, I ask someone to say in his or her own words what he or she heard another student say. Asking for a restatement helps the students know that they should be listening, since I might ask for this at any time. In addition, restating can help to slow a discussion down when an important idea is shared that I want to make sure is really heard by all. If an idea cannot be restated, I ask the class if they would like to hear it again. This strategy is also useful when I’m not clear on a student’s thinking! Hearing the idea explained by someone else can often clear it up for everyone.
5. We talk about the role of mistakes in our classroom and about being confused. I encourage students to think of mistakes as opportunities to learn something new. When I sense that confusion is in the air, I congratulate the class and tell them that they have found a really important idea: If it was a simple idea, we wouldn’t be confused. I assure them that we’ll work together to figure it out. We talk about what confusion feels like and how it feels to figure out something hard. It’s important to acknowledge the negative feeling that confusion can bring. At the same time, helping students have a more positive emotional reaction to confusion can turn a situation that could be frustrating and unproductive into something challenging and productive.

Ms. Thompson begins the year aware that students enter her classroom with differing ideas, experiences, and fears related to participating in mathematical discussions. Through careful modeling of her own interest in their thinking and their questions, she helps her students learn to respond thoughtfully to each others' ideas. Through emphasizing that people's guesses can give us great new ideas to think about, that mistakes are opportunities to learn something new, and that confusion is an important part of learning, Ms. Thompson helps create a safe atmosphere for her students in which they can become risk takers in the mathematics classroom.

Questions for Discussion

1. What are some of the issues Ms. Thompson considers as she works with her students to create a safe and productive mathematical community?
2. As the year begins, what ideas, experiences, and fears might your students have about expressing their mathematical ideas? In what ways do you allow students to talk about these issues?
3. What strategies do you use to encourage participation and risk taking in mathematical discussions?

Creating a Culture for Math Class

As the school year begins, students and teachers work together to establish a classroom community that will enable each person to work productively and become excited about mathematics. One aspect of this work is establishing what it means to share ideas in a mathematics classroom. For many students, the risks involved in putting ideas forward to teachers and peers seem daunting.

Jamie Emerson knows that to create a successful math community with her students, she must build a safe environment in which students are willing to take risks and share their thoughts and ideas. Even though the students in Ms. Emerson's class arrive with diverse needs and a variety of mathematical experiences, she

recognizes that all of these students need support in learning how to share their ideas in the mathematics classroom. Here Ms. Emerson reflects on how she works with her students on these issues at the beginning of the year.

We talk about how to share our ideas with a focus on encouraging students to share their complete thinking, with an example to support it. For example, when a student says, "The answer is less than a \$1.00," I always ask, "How do you know?" Sometimes, students who are not used to being asked to support their thinking interpret my question as a sign that their answer is incorrect. I talk to them about how explaining their thinking helps them to understand the mathematics more deeply and to work through areas that they may find confusing. It also lets me know what each student understands about the mathematics we are working on. When they understand my reasons for asking "How do you know?" they eventually begin providing this information themselves.

Sharing ideas means taking risks, and I let my students know that it is not okay to say to someone, "That's not the right answer!" We had a conversation about this topic the other day. It went like this:

Teacher: What if Sarah shares her answer and Sylvan disagrees with her? How can he let her know in a friendly, constructive way? Remember, we want to talk like mathematicians about our work.

Marlee: He could say, "I disagree with you."

Nicole: He could say, "I got a different answer."

Yash: He could ask, "How did you get your answer?"

Teacher: What do we think? Which ones could we write down on our poster to remind us of how we want to work together during math time?

For part of this conversation, we also talked about the importance of receiving feedback gracefully.