

As my students headed to their physical education class, I think they were relieved to take a break from thinking about how incompetent they can sometimes feel. But they were also excited because they were able to talk about these feelings openly. I think that this was an important conversation we had to have because we have all felt this way before. I hope they continue talking about these issues as they come up.

By giving students an opportunity to share their thoughts about what creates a perfect math class, Ms. Cortes allows them to participate in the development of classroom norms to guide how they will successfully work together. As she listens carefully to what the students are saying, she gains a lot of insight about her learners. Her keen attention to their comments allows her to go beneath the surface of their suggestions to understand why they are making them. This discussion not only gives the students an opportunity to develop norms; they also learn that they are in a place where their thoughts matter and they will be heard. As they move forward in their math work, and get to know each other better as individual learners with different needs, their community norms will have to be revisited and revised.

Questions for Discussion

1. What strategies might Ms. Cortes model for the whole class to help students feel safe to express confusions?
2. How can Ms. Cortes create structures to encourage students to help each other in respectful ways?
3. Have there been times when you have shared your own mathematics experiences with your students? What was your goal, and how did your students react?

Incorrect Answers as Learning Opportunities

As Melanie Lloyd begins the school year, she thinks about how to establish the critical thinking skills that support productive discussions about mathematical ideas. Her first step toward creating this type of math community is ensuring that all learners feel safe and encouraging students to participate in mathematical discussions. To this end, Ms. Lloyd starts early in the year to help her students learn the importance of studying incorrect answers as part of mathematical discussions.

Early work to establish a respectful culture of learning is especially crucial for math class. It is during math time that competition interferes with listening to and working with each other. Students tend to devalue the process of working through a problem as they clamor to deliver the right answer. The constant challenge for teachers is to support both the faster and slower problem solvers and to model patience and listening by all students.

During the first few days of math class, I often focus on wrong answers to help establish a respectful, attentive, and inclusive math culture. Almost every day we start math class with a question the students solve in their math journals. The students show how they solved the problem, and we discuss the problem and share our strategies. One math journal assignment that I presented was as follows:

How many different expressions can you make that equal 25?

I informed the students that they could use addition, subtraction, multiplication, division, or any combination of those operations.

In all classrooms, students must at times grapple with their own incorrect responses as well as with those of their peers. Ms. Lloyd knows that by simply asking students to share, incorrect answers are likely to surface. How incorrect responses are managed is critical in developing a sense of safety and risk-taking when students share ideas and strategies. Ms. Lloyd seeks to convey to her students what it means to question and analyze responses in a productive manner. When Andrew offers an answer that is incorrect, Ms. Lloyd uses this opportunity to model possible responses.

Andrew: I have a way to get to 25: $6 \times 4 + 2$.

Teacher: I'll write this one down with the others so we can check it out.

Nadine: I don't know if that equals 25.

I notice that Andrew begins to frown and squirm.

Teacher: So, you have a different answer from Andrew. Andrew, do you want to look at your number sentence again?

Like many students, Andrew is flustered by this approach. He is silent, not sure if he's correct and unsure of what to do next.

Teacher: Let's talk through this together. Is that okay? [Andrew nods.]

Teacher: Where should we start? You say to start at the answer to 6×4 . What is 6×4 ?

Andrew: I think it's 24. Wait, yes. It says so on the times table chart.

Teacher: Then what?

Andrew: I added 2 to 24 to get . . . wait, that equals 26.

Teacher: Can you remember what you were thinking when you first did this sentence?

Andrew: I think I started counting in the wrong place. I think I counted 24, instead of from 24.

Teacher: Who else sometimes counts from the wrong number? [A few hands are raised.]

Kiyanna: Sometimes I get lost, and I have to start the problem all over again.

Sam: I do that, too. Sometimes I write the number on my paper to help keep track.

Teacher: It sounds as if some of you have found a technique for remembering. Thank you, Andrew, for sharing this example with us. It brought up some important points about solving math problems and how we can all learn from discussing our mistakes.

In this short exchange, we see students beginning to discuss their own experiences with incorrect answers or procedures. Ms. Lloyd is careful not to make Andrew the target of the conversation; she uses the example he provides to engage the entire class in a discussion that will help lay the foundation for future mathematical conversations. It is Ms. Lloyd's goal that students become comfortable analyzing incorrect answers so that they are more willing to offer their own solutions as part of the class process. With consistent reinforcement of this idea by the teacher and students alike, all learners can become comfortable participating in discussions, and the class will have the benefit of analyzing many different mathematical strategies.

Questions for Discussion

1. In what ways does Ms. Lloyd turn Andrew's error into a "teachable moment"?
2. How do you build a safe environment in your classroom in which incorrect responses can be used as opportunities for learning and reflection by all students?