Foreword

Why did you become a math teacher?

Perhaps you loved math. Perhaps you were good at math; good, at least, at the thing you called math then. Friends and family would come to you for help with their homework or studying, and you prided yourself not just on explaining the *how* of math's operations but also the *why* and the *when*, helping others see the purpose and application behind the math.

Helping other people understand and love the math *you* understood and loved—perhaps that sounded like a good way to spend a few decades.

Or perhaps you loved kids. Perhaps even at a young age you were an effective caregiver, and you knew how to care for more than just another person's tangible needs. You listened, and you made people feel *listened to*. You had an eye for a person's value and power. You understood where people were in their lives, and you understood how the right kind of question or observation could propel them to where they were going to *be*.

Spending a few decades helping people feel heard, helping them unleash and use their tremendous capacity—perhaps you thought that was a worthwhile way to spend what you thought would be the hours between 7AM and 4PM every day.

Or perhaps you loved both math and kids. It's possible of course that neither of the two previous exemplar teachers will speak fully to the path that brought you to math teaching, although one of them speaks fully to mine. Yet, in my work with math teachers, I find they often draw their professional energy from one source or the other, from math's ideas or its people.

It took me several frustrated years of math teaching—and years of work with other teachers—to realize that each of those energy sources is vital. Neither source is renewable without the other.

If you draw your energy from mathematics, your students can become abstractions and interchangeable. You can convince yourself it's possible to influence *what they know* without care for *who they are*, that it's possible to treat their *knowledge* as deficient and in need of fixing without risking negative consequences for their *identity*. But students know better. Most of them know what it feels like when the adult in the room positions himself or herself as all-knowing and the students in the room as all-unknowing. A teacher's love and understanding of mathematics won't help when students have decided their teacher cares less about them than about numbers and variables, bar models and graphs, precise definitions, and deductive arguments.

If you draw your energy only from students, then the day's mathematics can become interchangeable with any other day's. Some days, it may feel like an act of care to skip students past mathematics they find frustrating or to skip mathematics altogether. But the math you skip one day is foundational for the math another day or another year. Students will have to pay down their frustration later, only then with compound interest. Your love and care for students cannot protect them from the frustration that is often fundamental to learning.

I could tell you that the only solution to this problem of practice is to develop a love of students *and* a love of mathematics. I could relate any number of maxims and slogans that testify to that truth. I could perhaps convince some of you to believe me.

But the maxim I hold most closely right now is that we act ourselves into belief more often than we believe our way into action. So I encourage you more than anything right now to adopt a series of productive *actions* that can reshape your *beliefs*.

Here are five such actions: anticipate, monitor, select, sequence, and connect.

Those actions, initially proposed by Smith and Stein in 2011, and ably illustrated here with classroom videos, teacher testimony, and student work samples, can convert a teacher's love for math into a love for students and vice versa, to act her way into a belief that math and students both matter.

For teachers who are motivated by a love of students, those five practices invite the teacher to learn more mathematics. The more math teachers know, the easier it is for them to find value in the ways their students think. Their mathematical knowledge enables them to monitor that thinking less for *correctness* and more for *interest*. Would presenting this student's thinking provoke an *interesting* conversation with the class, whether the circled answer is correct or not? A teacher's mathematical knowledge enables her to connect one student's interesting idea to another's. Her math knowledge helps her connect student thinking together and illustrate for the students the enormous value in their ideas.

For the teachers like me who are motivated by a love of mathematics, teachers who want students to love mathematics as well, those five practices give them a rationale for understanding their students as people. Students are not a blank screen onto which teachers can project and trace out their own knowledge. Meaning is *made* by the student. It isn't *transferred* by the teacher. The more teachers love and want to protect interesting mathematical ideas, the more they should want to know the meaning students are making of those ideas. Those five practices have helped me connect student ideas to canonical mathematical ideas, helping students see the value of both.

Neither a love of students nor a love of mathematics can sustain the work of math education on its own. We work with *math students*, a composite of their mathematical ideas and their identities as people. The five practices for orchestrating productive mathematical discussions, and these ideas for putting those practices into practice, offer the actions that can develop and sustain the belief that both math and students matter.

You might think your path into teaching emanated from a love of mathematics or from a love of students. But it's the same path. It's a wider path than you might have thought, one that offers passage to more people and more ideas than you originally thought possible. This book will help you and your students learn to walk it.

—Dan Meyer
Chief Academic Officer, Desmos