



MATH SENSE

How WSMS Instills a Lifelong Love of Math

Here's a pop quiz:

It's a typical weekday morning in a classroom at WSMS. Most of the children are lined up by the door, coats on, waiting to head upstairs to the roof playground. Two children are kneeling on the floor by a work mat, counting and sorting small colored beads to correspond to a row of numbered cards.

QUESTION: How many children in this classroom are learning math?

ANSWER: All of them. Okay, it was a trick question: you were not told that the waiting children are doing more than just standing in line. Then again, WSMS children are always doing more than just standing in line. In this case they have lined up in a pattern devised by a child, and they are trying to figure out what that pattern is.



The traditional Montessori math materials neatly displayed in the classrooms at WSMS are justly renowned for the way in which they provide three-dimensional, hands-on opportunities for children to master mathematical concepts. But just as crucial to our kids' math education, if less obvious, are the myriad ways in which math is seamlessly incorporated into just about everything the children do during their day at school.

Natalia Fisher and Yayoi Kobayashi, two teachers in 3E, share a particular passion for math. They will be the first to tell you that at WSMS the goal is not for children to be able to rattle off mathematical equations; rather, it is for children to come to truly understand, and thereby love, math—to develop their “math sense.” And at WSMS, this sense can be developed at any time during the school day, in any part of—or even outside—the classroom.

“Math is everywhere,” Yayoi asserts. “Practical life, language, culture...all the sensorial materials are pre-math materials, so it really is everywhere you look.”

“When we're setting up lunch, that's math,” Natalia points out. “That's the first concept our kids need to have down: one-to-one



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correspondence. Setting the table with one placemat per person, one table setting per person. A lot of the practical life work is about one-to-one correspondence.”

“Another thing we do a lot is voting,” Yayoi adds. “After we vote we show the children different ways to chart the information we’ve gathered: Venn diagrams, bar graphs, pie charts.” The teachers also describe their geometric “hunts” in the park, in which children seek out geometrical shapes occurring in nature, the results of which are subsequently charted in the classroom.

Not only are these activities enjoyable for the students, they are developmentally appropriate. Natalia explains:

“We really try to address the way the child’s brain is developing. Our kids are in that period of order, and that’s why the foundations of math speak so easily to them, because that’s the way they’re trying to organize their brain. When parents come to us and say, ‘They’re not doing math,’ we say, ‘Actually, they are.’ You see it in their patterning, their sequencing, their ability to tell a story in the correct order...And then when they start actually working with numbers they enjoy it, because there’s an order to it, and a safety in that order.”

Natalia remembers loving math as a child, going so far as to scribble “I ♥ math” all over her notebook in fourth grade. By sixth grade, however, the emphasis had shifted toward rapid rote memorization of abstract concepts, and she began to comprehend less and less of what she was doing. Consequently she began not to enjoy math class. Now, as a teacher at WSMS, she insists it’s never too late to change one’s approach to learning—and teaching—math for the better.

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“You’re always going to encounter rote memorization to some extent,” Natalia concedes. “Some kids can count straight up to 100, but do they really understand the concept of quantity? For this age group we really want to give hands-on experiences so kids can get a sense of what 100 looks like, what it feels like. And just because they might get it in the first presentation doesn’t mean we stop presenting it. We repeat, repeat, repeat, and that repetition builds brain

I ♥ math

The notion of mastering mathematical concepts through repeated hands-on experience is firmly supported by the Montessori community at large. In his book *Math Works: Montessori Math and the Developing Brain*, Michael Duffy, an elementary teacher trainer for the Center for Montessori Teacher Education/New York, refers repeatedly to the importance of learning new ideas through the handling of concrete materials: “No matter how good the teacher and how clearly she explains new concepts, your child will not really understand until he puts his hands on the materials and manipulates them himself. (This is true even for adults...)”*

*Duffy, Michael, *Math Works: Montessori Math and the Developing Brain* (Parent Child Press, 2008)



strength so they can really internalize and remember it. We might dress it up to look different, but it's the same concept over and over again!” She laughs. “The kids think it's something new, but it's not!”

Children aren't the only ones to benefit from WSMS's approach to math education. Yayoi's experience at the school has given her a new understanding of the math she uses on a daily basis in her own life. “Even as an adult, having worked with these materials, I can now visualize what the math looks like rather than just reciting it by rote, without any real comprehension,” she marvels. “Now, when I'm cooking or baking, or measuring something, I have a clear picture of what I'm doing. I can understand the math.”

As far as advice for parents, Natalia and Yayoi beseech us not to rush our children. They ask that we try to recognize the value of what our kids are doing now and to acknowledge that they're developing their math skills even if it doesn't always look as though they are. Instead of worrying about when our kids will get to addition and subtraction, we would do better to focus on what needs to come first so that they really understand what they're doing.

At WSMS, the dual approach of offering hands-on work with traditional Montessori math materials and incorporating math into everyday activities has a wonderful effect on our children. Math comes to feel like second nature to them; it is both fun and easy to grasp. In keeping with the school's mission to help our kids become flexible thinkers and creative problem solvers, the math program at WSMS gives our kids the tools to approach math with confidence, enthusiasm, and a genuine desire to figure things out for the rest of their lives.

I ♥ math indeed.

