



FRONT PORCH SERIES BROADCAST CALLS

MATHEMATIZING CHILDREN'S BOOKS: THE JOY AND WONDER OF MATHEMATICS IN FAVORITE STORIES

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- Q:** Mathematizing—what do teachers find most difficult?
- A: Hintz:** I think the teachers I've worked with have felt tremendous mindfulness for anything they choose to do. These teachers think carefully about selecting the books. They tend to select books that the mathematics in them supports the mathematics that they're working on with their children in their classroom. So I think that can be a little challenging. Whereas Tony and I are finding you can just kind of pick any book off the shelf and find rich opportunities to find joy and wonder for mathematics, these teachers are finding it just something to be mindful of. And another thing is that they're wanting to be able to maintain the literacy experience while also pursuing the mathematics. And so, finding their way through how to read a lot to support children and the literacy they're working on, but also to find and enjoy the mathematics. Some solutions for that have been to read through with a focus on literacy and then re-read the book, say, the next day with a focus on mathematics.
- A: Smith:** I would add that what you said about the need to have the math concepts aligned with what's being taught in math is particularly true for the text-dependent books, because the math is a large and prominent part of the instruction in the shared reading experience and part of the discussion. Whereas with the illustration exploring, that can be any book that is shared with the class for any one of a number of reasons, including just enjoying reading aloud a really good story. In that case, it might be a way to either pause in the moment briefly and say look at this math or, like with *The Snowy Day*, (which doesn't have too many other pictures in it) that show things counted by twos, for example. So that's the opportunity to bring math into what is fundamentally a literature experience. They're the kind of the difficult levels of time commitment to the math that would be in the mathematized shared reading experience. And I think teachers do sometimes logically choose to read through and enjoy the story and then to revisit. So to revisit where the boy has jumped and has the footprints by twos—maybe not in the moment, but then afterwards as a way of revisiting and reflecting on the story. That way it preserves the read aloud experience because reading aloud should always be a fun and enjoyable experience where the momentum of the story is kept intact.

- Q:** What do parents need to know so that they also can support children’s development of mathematical skills as they read books?
- A: Hintz:** As parents imagine taking up this work in a home setting, one of the broader messages we want to consider is just helping our children find a joy and wonder for mathematics in their world, especially in books, because that’s a common and well-loved activity with very small children. We want to help children develop a positive disposition towards mathematics and see mathematics as alive, interesting, and relevant. As a parent at home tries on mathematizing—if you’re a grandparent or anyone working with a small child—as you cuddle up and enjoy a story, just take a try at some easy entryways into mathematizing. You could count the items on a page. For example, you remember the page that showed 4 in *Double Those Wheels*. There are many things on that page that show 4, so you could just pause and say “I’m noticing this page is about 4. What are all the places you see 4 on this page?” And there are 4 flowers and there are a variety of other things that come in 4. I think it’s easy to just try a quick noticing and start to have mathematics become a larger part of your reading. Now I’m noticing children starting to mathematize on their own without the invitation to do it, to start counting things, for example.
- A: Smith:** I would agree. The idea of noticing is a good place to start, particularly with the illustration exploring types of books where you could talk about math in the illustrations. And that brings interest to the reading experience, but you don’t have to understand the story. So it’s an opportunity to bring discussion of math into discussion of literature, which is a really good mix. I think from there, then as children get used to talking about math concepts in what they read or see, then eventually you could bring in a story like *Two of Everything*, which is another book about doubling. It’s sort of written as a folk tale. The couple, they have a magic jar, and they put things in it, and two come out, and so everything gets doubled. Of course, in that book that concept of doubling is crucial to understanding the story itself. I think that after children have become used to talking about mathematical ideas in pictures, then with a more advanced book conceptually in terms of the math, that would be a logical next step.
- Q:** Are there any books that, as early childhood educators, our teachers should be careful to think about? Maybe not the best one for an early childhood audience?
- A: Smith:** Well, two things. One is that if there happens to be a book that is overly heavy on the math—so that the story doesn’t make any sense or isn’t interesting—then that might not be a book to use with mathematizing. Because what we really want to do is to keep all the good features of a shared reading experience intact, and that it’s a fun and engaging story that children want to hear and be part of in terms of discussion. If it’s kind of like a set of worksheets disguised as a picture book, it’s probably not a good idea to try to mathematize. The other caution, which does not have to do with math, is that I always am on lookout for books that portray people in racist or stereotypical ways. And it doesn’t necessarily make the book bad, and my example is one book that is very popular. My student teachers are normally irate with me for bringing this up, but one book that is an example of something you might pause and think about is the series of books about Skippy John Jones. Because that in some ways puts a certain group into a stereotypical box, you know, with a Siamese cat wanting to be a Chihuahua. So that’s an example, not to ban such books, of course, but to be aware of the different, sometimes subtle issues that can come up in children’s books and portray a message that we may not necessarily want to promote.



- Q:** Are there particular growth areas that you've seen children achieve as a result of your work and/or things you've seen teachers gain as a result of your work?
- A: Smith:** Our work, in particular with mathematizing, is continuing. So it's research in progress, and it is part of a larger study that Allison has been working on for some years now. I think she can talk about the larger study and its impact on the teachers, the school, and the students.
- A: Hintz:** For teacher outcomes, when we co-plan a mathematizing experience and kneel down together and co-facilitate it, we're working on certain pieces of practice—such as eliciting students thinking and engaging children in lively mathematical discussion that's productive mathematically and supportive socially. There are certain teachers' outcomes that we're able to work on together as we mathematize. When I think of student outcomes, I think of the ways that these children are supporting their ideas in early numeracy through the exploration of the stories. I had mentioned earlier that these teachers are being really mindful of selecting stories where the context of the story or the illustration support the mathematics that their children are working on. So, for example, when we peruse through their school library together and pick books, we often pay attention to the illustrations and how illustrations support mathematical thinking. And I have—and the teachers have—been noticing the ways that children's ideas in early numeracy are being supported through mathematizing. When we were reading *Pete the Cat and His Four Groovy Buttons* that Tony was talking about earlier, we were really working on combinations of 4, which is an important skill—to know that numbers can be decomposed and that 4 is made up of many things. Then we moved from that book into a different instructional activity that was about combinations of 4. The teacher and I felt that from previous experiences the use of the mathematizing as a launching into the lesson about fours really supported students in flexibly thinking about 4 being made up of 1, 2, 3, 4—or, 3 and 1, or 1 and 3, or 2 and 2, 4 and 0, and 0 and 4. Those are just some examples from practice where I think that mathematizing is supporting both teachers' practice and students' learning of early numeracy.
- A: Smith:** And, the larger study is tracking student achievement in those areas.



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