

## Open a World of Possible: Right Book, Right Time NCTM Regionals, 2015

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Spark children's mathematical imaginations with authentic literature! A math and literature program (such as Marilyn Burns, *Math Reads*) helps teachers invite students in Kindergarten through Grade 5 into the world of mathematics through delightful and engaging children's books.

Developed by Marilyn Burns and a team of Math Solutions master teachers, lessons make explicit connections to the College & Career Readiness Standards and help students learn to think, reason, and solve problems. Books can be contemporary or classics. They should address the range of math content at each grade level and support regular math instruction by:

- Introducing off math topics
- Helping students build mental models for abstract concepts
- Deepening conceptual understanding
- Reinforcing topics previously taught

In reading classes, teachers . . .	In math classes, teachers . . .
ask students to make predictions about what might come next when reading a story	ask students to make estimates before solving problems
use writing and oral communication as important aspects of instruction	have students write down and discuss their ideas in order to help them develop, cement, and extend their understanding
do not expect children's writing to be identical, even when writing about the same topic	can encourage different methods for reasoning, solving problems, and presenting solutions
know vocabulary instruction is integral	can start a word chart for math terminology, consistently use correct math vocabulary, and encourage children to do the same
use read-aloud books to provide students with common experiences from which they can learn	use children's books that can provide a stimulus for problem-solving
blend whole-class discussions, small-group instruction, and individualized reading and writing	Employ blended learning such as whole-class discussions, small-group instruction, and individualized reading and writing

Go to [www.mathsolutions.com](http://www.mathsolutions.com), click on Publications, and you'll find a link to the At-a-Glance Chart of Children's Literature.)

### Why Teach With Math Picture Books?

#### Create Real-World Contexts

We have come a long way from giving students long pages of isolated computation problems. Our classroom teaching (and state assessments) focus on word problems and math in context. The mathematical problems and solutions that children encounter in picture books are deeper and more nuanced than most of the word problems they encounter.

#### Entice the Math-Phobic

We all have some students in our classrooms who are lively participants during reading and writing lessons, but during our math period they timidly drift to the back of the room. Their hands are weighted with the fear of making a mistake. By 3rd grade, many students already have negative feelings about math.

Math read-alouds can particularly help these students see math in a new light. A picture book is the perfect low-stress introduction to a new math subject. Reading to your class permits easy discussion of how we are surrounded by math — and by a proliferation of negative ideas about math. When asked, students to work in small groups to quickly make up a fun public service announcement-style commercial to perform for the class that promotes mathematics. My kids loved this chance to be creative and to voice positive messages about math.

### The Three Tiers of Math Picture Books

Read-aloud books used for math lessons fall into three tiers. Use a mixture of all three types of books. **Tier 1:**

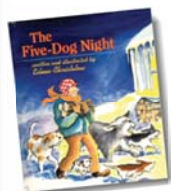
**Tier 1: Fundamental Math Picture Books** — These are books in which the math content is the primary purpose of the book. It either dominates the plotline (for fiction books), or is an informational math text. These books are generally read with the specific purpose of learning math content. When using, *The Coin Counting Book* written by Rozanne Lanczak Williams, children’s eyes light up when they see the realistic images of coins shining like treasure on the pages of this book. Pennies, nickels, dimes, quarters, and half-dollars are identified and then combined in many ways to make one dollar. The rhyming text engages young readers as they learn about the use of money symbols, addition, equivalence, and place value.



**Tier 2: Embedded Math Picture Books** — These are books in which the plot has deliberate connections to math, but the story stands on its own as well. These books feel more natural as read-alouds, but may require the teacher to direct the focus onto the content connections. *Two of Everything* written and Illustrated by Lily Toy Hong is a wonderful book. This Chinese folktale takes place in a simple rural setting. Mr. and Mrs. Haktak are old and very poor, and they only have the food from their garden to eat. But their lives change dramatically when Mr. Haktak unearths an ancient brass pot. It’s a good thing he is so fond of Mrs. Haktak, because after she accidentally falls into the pot, she comes back out of the pot with a very special surprise! This book can deepen children’s understanding of the concept of doubling.

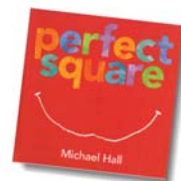


**Tier 3: Connected Math Picture Books** — These books do not have any explicit connections to math, but the teacher can create connections through think-alouds or class discussions. Sometimes, the teacher may challenge students to come up with the connections to math. In *The Five-Dog Night* written and Illustrated by Eileen Christelow Betty tries to give cranky old Ezra blankets for the cold winter nights. He tells her he has his own secret way of keeping warm—he uses his five dogs for extra blankets. He calls Betty a busybody and asks her to stop visiting. By spring Ezra is lonely, makes peace with Betty, and sees that she has found out his secret way of keeping warm by getting five dogs of her own. This humorous tale is a perfect springboard for introducing beginning concepts of multiplication.

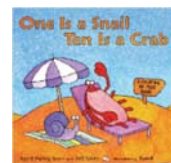


### Four Ways to Use Math Picture Books

**Introduce a New Topic:** Have you ever just taught a unit about addition and are now talking about shapes? Students build deeper understandings when their learning is connected, and the “jumping around” inherent in many of our math curriculum doesn’t provide the logical connections. A picture book is often the perfect bridge. Front-load units with several read-alouds; it allows the students to work their way up to thinking about a new topic through plenty of accessible conversations about the books you are reading. *Perfect Square* by Michael Hall book is an excellent springboard for comparing the attributes of shapes and introducing geometric vocabulary.



**Pose a Problem:** Launch an activity or problem-solving experience. Most of the time, you will read the entire book and go back to particular pages to pose the problem. At other times you might just read the first half of a book until the problem is revealed, and then ask the students to go off and work on possible solutions for the math scenario. After the students share out their

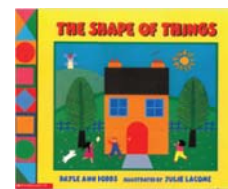


work, finish reading the book together. *One Is a Snail, Ten Is a Crab* written by April Pulley Sayre and Jeff Sayre is a charming book that counts by groups of feet—1 is a snail, 2 is a person, 3 is a person and a snail, and so on. After showing that 10 is a crab, the counting continues by multiples of 10 up to 100. Children delight in the humorous illustrations and predicting how numbers are represented. Pose the problem by asking students to represent numerical relationships with equations.

**Use in Independent Learning Centers:** Create math centers by selecting a few math picture books that tie into the current math unit and create a math picture book center. Use a task, graphic organizer, or writing prompt for each book, and the students read the books independently and complete the accompanying work. *Bean Thirteen* written and illustrated by Matthew McElligott In this wonderfully illustrated story, readers will join Ralph and Flora, two hardworking grasshoppers, as they harvest beans for dinner. Ralph becomes deeply concerned that they have picked an unlucky number of beans and doesn't want to eat the 13th bean. Flora works to solve the problem by inviting a delightful array of guests to dinner. This book is an excellent springboard for investigating odd and even numbers.



**Use as Writing Models:** Children LOVE to personify shapes and numbers. After reading *The Shape of Things* by Dayle Ann Dodds, students are eager to write or tell their own stories with shapes as the characters. This delightful rhyming book helps children see how a few simple shapes can make up many things in the world. Borders of repeating patterns created with squares, triangles, ovals, and circles surround compelling scenes that engage readers with detail, color, and geometric shapes. The bold and interesting illustrations invite conversations about pattern, symmetry, and shape identification. Students will amaze you with both their creativity and their grasp of geometry!



### Building Academic Language with Discourse

The use of discourse in the mathematics classroom can be tough to implement, manage and accomplish. When the same students contribute in every discussion while others participate only when called on, and even then their contributions are sparse. Some students make comments that relate to procedure but never reach the deeper-level mathematical concepts. Multiple learning strategies provide the scaffolding students need to gradually build and use essential academic language. Establishing productive discourse and using consistent routines structures student collaboration and encourages communication. Discourse allows students to learn from one another, misconceptions, apply mathematical thinking, and discuss sound reasoning and

correct

problem solving strategies. *Even Steven and Odd Todd* is written by Kathryn Cristaldi and illustrated by Henry B. Morehouse. Even Steven only likes even numbers. His cousin Odd Todd only likes odd numbers. When Todd comes to visit Steven, the cousins are in conflict until they win a garden contest together. This book provides a humorous context for learning about odd and even numbers, giving children many opportunities to explore mathematical patterns.



Vocabulary	
Math Vocabulary	
ENGLISH	SPANISH*
even	par
odd	impar
pattern	patrón
sum	suma
Context Vocabulary	
ENGLISH	SPANISH*
double-dip	de doble cañita
knock	golpear

### Who Has Time for Math Stories?

Many of you have at most 90 minutes of math instructional time each day with your students – and you cherish every minute. You feel like don't have time for extra "stuff." So can make time to squeeze in math picture books into your already crammed schedule? Don't view math read-alouds as an *extra* component of my math lessons – the math read-aloud with accompanying class discussion *is* your math lesson!