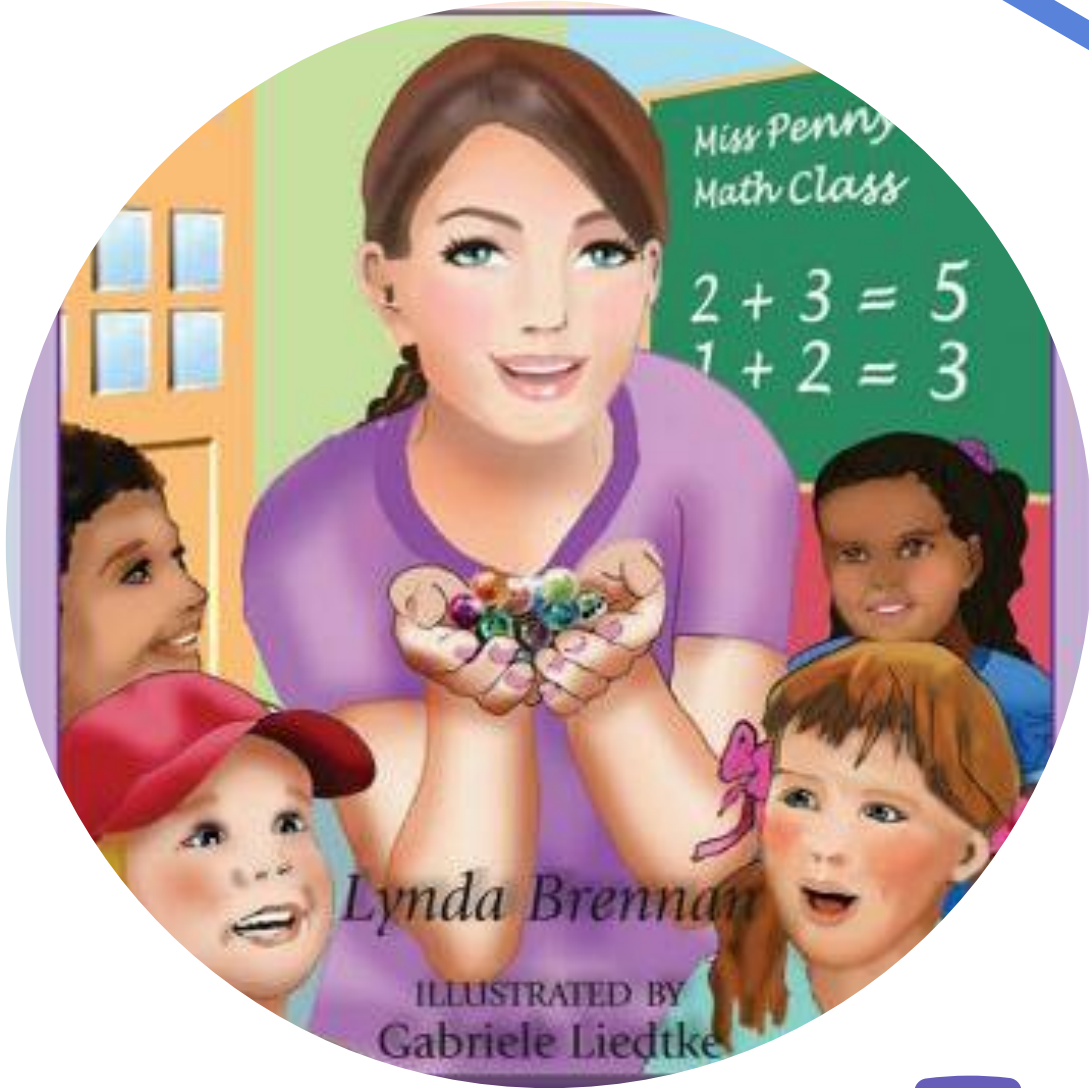




Miss Penny Says Prove It!

Math MileMarkers® Math-Infused Stories

Curriculum Companion

Presented by Lynda Brennan

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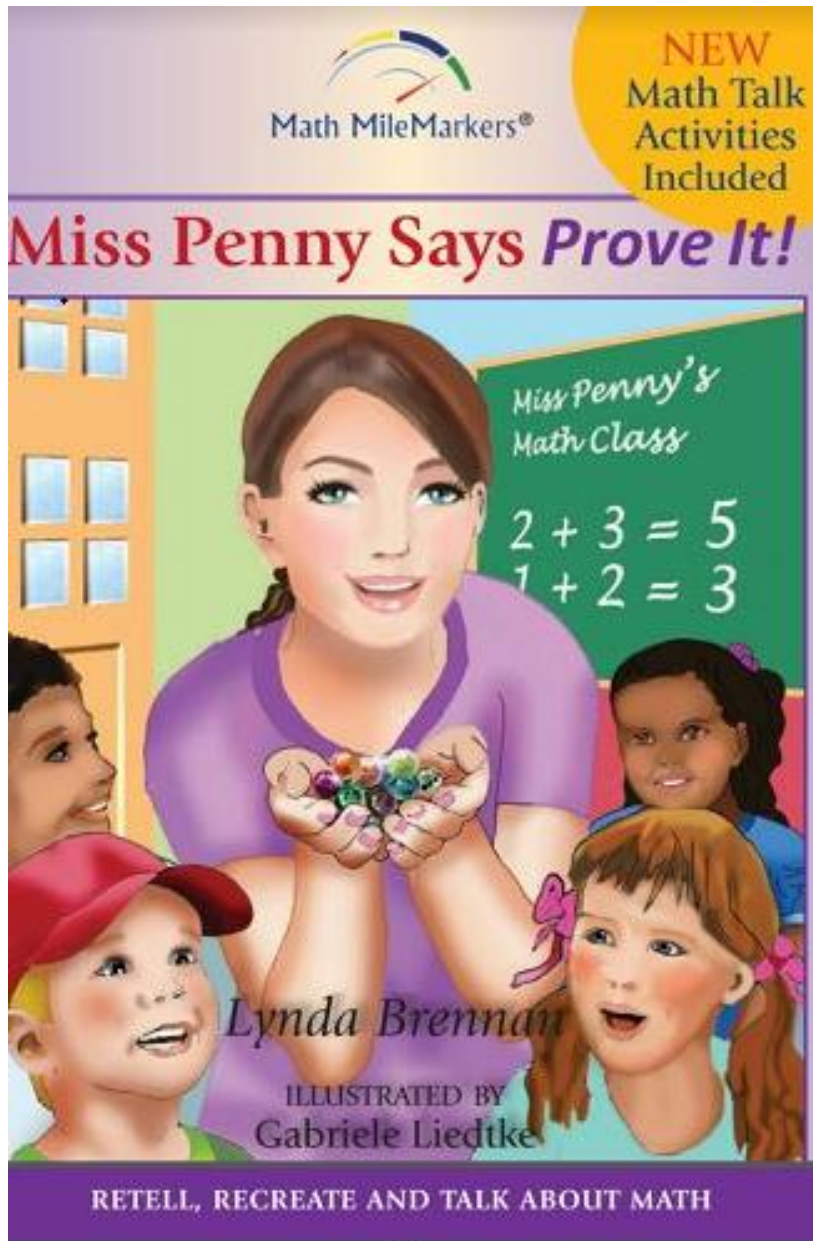
Math MileMarkers® are stories that encourage children to question, explore and talk about math. Jayla and her friends help connect all levels of learners to the standards through a series of purposeful and visually powerful stories.

Stimulate the wonder of math, combat anxiety and energize the math discussions in your home or classroom with math-infused stories.

Invite Math MileMarkers® to be part of your child's mathematical journey.



Available at
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Calm, Command and Conquer the Curriculum®

Learning Intentions

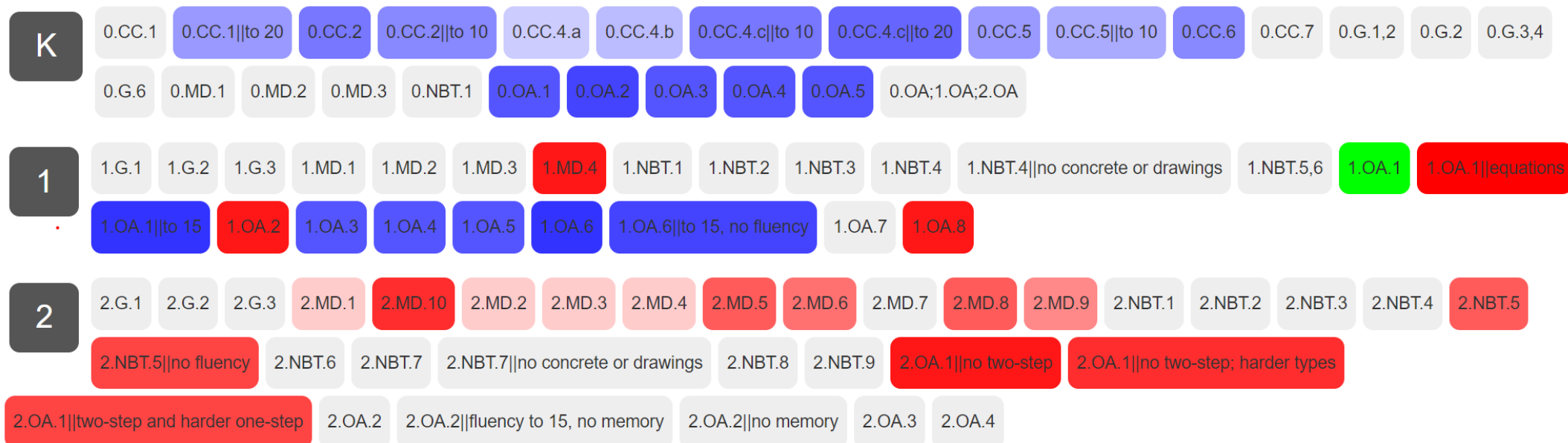
Math Storytelling as a Curriculum Companion

Exploring the “CALM”

This deck explores effective ways to design lessons using Math-Infused Stories.

Flow View

Hover over a standard to see what it depends on (blue) and what depends on it (red). The colors fade as the dependency chain to the standard becomes longer. Click on a standard for more detail on the standard and its prerequisites and dependent standards. The dependencies are derived from a [shared spreadsheet](#), referenced from a [document](#) by Jason Zimba. © [Kitware Inc.](#)



Math Storytelling: Calm, Command and Conquer the Curriculum®
Miss Penny Says Prove It!
Written by: Lynda Brennan

Using Storytelling to support the Progression of Number Knowledge

Identify your **Learning Intention(s)**

Curriculum Standards		Mathematical Practice Standards	Teaching Practices
PK.CC.1 Standard: Count to 20	PK.CC.3 Standard: Understand the relationship between numbers and quantities to 10; connect counting to cardinality.	PK.CC.4 Standard: Count to answer “how many?” questions about as many as 10 things arranged in a line, a rectangular array, or a circle, or as many as 5 things in a scattered configuration; given a number from 1–10, count out that many objects.	
K.CC.1 —Count to 100 by ones and by tens	K.OA.3 Standard: Decompose numbers less than or equal to 10 into pairs in more than one way, e.g., by using objects or drawings, and record each decomposition by a drawing or equation (e.g., $5 = 2 + 3$ and $5 = 4 + 1$).	K.CC.5: Count to answer “how many?” questions about as many as 20 things arranged in a line, a rectangular array, or a circle, or as many as 10 things in a scattered configuration; given a number from 1– 20, count out that many objects.	K.NBT.1: Compose and decompose numbers from 11 to 19 into ten ones and some further ones, e.g., by using objects or drawings, and record each composition or decomposition by a drawing or equation (e.g., $18 = 10 + 8$)*; understand that these numbers are composed of ten ones and one, two, three, four, five, six, seven, eight, or nine ones
1.OA.1: Use addition and subtraction within 20 to solve word problems involving situations of adding to, taking from, putting together, taking apart, and comparing, with unknowns in all positions, e.g., by using objects, drawings, and equations with a symbol for the unknown number to represent the problem.	1.OA.3: Apply properties of operations as strategies to add and subtract. • Examples: If $8 + 3 = 11$ is known, then $3 + 8 = 11$ is also known. (Commutative property of addition.) • To add $2 + 6 + 4$, the second two numbers can be added to make a ten, so $2 + 6 + 4 = 2 + 10 = 12$. (Associative property of addition.) . Students need not use formal terms for these properties	1.NBT.2: Understand that the two digits of a two-digit number represent amounts of tens and ones. Understand the following as special cases: a 10 can be thought of as a bundle of ten ones—called a “ten.”	
2.OA.2: Add and subtract within 20. Fluently add and subtract within 20 using mental strategies. By end of grade 2, know from memory all sums of two one-digit numbers.			*This is only a sample of connected standards along the k-5 learning trajectory. Teachers have identified other connections that worked with this book.

comparing, with unknowns in all positions, e.g., by using objects, drawings, and equations with a symbol for the unknown number to represent the problem.

Prerequisites

Immediate link

1.OA.1||to 15

Use addition and subtraction within 20 to solve word problems involving situations of adding to, taking from, putting together, taking apart, and comparing, with unknowns in all positions, e.g., by using objects, drawings, and equations with a symbol for the unknown number to represent the problem.

1.OA.6

Add and subtract within 20, demonstrating fluency for addition and subtraction within 10. Use strategies such as counting on; making ten (e.g., $8 + 6 = 8 + 2 + 4 = 10 + 4 = 14$); decomposing a number leading to a ten (e.g., $13 - 4 = 13 - 3 - 1 = 10 - 1 = 9$); using the relationship between addition and subtraction (e.g., knowing that $8 + 4 = 12$, one knows $12 - 8 = 4$); and creating equivalent but easier or known sums (e.g., adding $6 + 7$ by creating the known equivalent $6 + 6 + 1 = 12 + 1 = 13$).

2 steps away

0.OA.2

Solve addition and subtraction word problems, and add and subtract within 10, e.g., by using objects or drawings to represent the problem.

1.OA.6||to 15, no fluency

Add and subtract within 20, demonstrating fluency for addition and subtraction within 10. Use strategies such as counting on; making ten (e.g., $8 + 6 = 8 + 2 + 4 = 10 + 4 = 14$); decomposing a number leading to a ten (e.g., $13 - 4 = 13 - 3 - 1 = 10 - 1 = 9$); using the relationship between addition and subtraction (e.g., knowing that $8 + 4 = 12$, one knows $12 - 8 = 4$); and creating equivalent but easier or known sums (e.g., adding $6 + 7$ by creating the known equivalent $6 + 6 + 1 = 12 + 1 = 13$).

3 steps away

1.OA.5

Relate counting to addition and subtraction (e.g., by counting on 2 to add 2).

0.OA.1

Represent addition and subtraction with objects, fingers, mental images, drawings, sounds (e.g., claps), acting out situations, verbal explanations, expressions, or equations.

0.OA.3

Decompose numbers less than or equal to 10 into pairs in more than one way, e.g., by using objects or drawings, and record each decomposition by a drawing or equation (e.g., $5 = 2 + 3$ and $5 = 4 + 1$).

1.OA.3

Apply properties of operations as strategies to add and subtract. Examples: If $8 + 3 = 11$ is known, then $3 + 8 = 11$ is also known. (Commutative property of addition.) To add $2 + 6 + 4$, the second two numbers can be added to make a ten, so $2 + 6 + 4 = 2 + 10 = 12$. (Associative property of addition.)

1.OA.4

Understand subtraction as an unknown-addend problem. For example, subtract $10 - 8$ by finding the number that makes 10 when added to 8.

0.OA.4

For any number from 1 to 9, find the number that makes 10 when added to the given number, e.g., by using objects or drawings, and record the answer with a drawing or equation.

0.OA.5

Fluently add and subtract within 5.

4 steps away

Dependent Standards

Immediate link

1.OA.1||equations

Use addition and subtraction within 20 to solve word problems involving situations of adding to, taking from, putting together, taking apart, and comparing, with unknowns in all positions, e.g., by using objects, drawings, and equations with a symbol for the unknown number to represent the problem.

2 steps away

1.MD.4

Organize, represent, and interpret data with up to three categories; ask and answer questions about the total number of data points, how many in each category, and how many more or less are in one category than in another.

2.OA.1||no two-step

Use addition and subtraction within 100 to solve one- and two-step word problems involving situations of adding to, taking from, putting together, taking apart, and comparing, with unknowns in all positions, e.g., by using drawings and equations with a symbol for the unknown number to represent the problem.

1.OA.2

Solve word problems that call for addition of three whole numbers whose sum is less than or equal to 20, e.g., by using objects, drawings, and equations with a symbol for the unknown number to represent the problem.

1.OA.8

Determine the unknown whole number in an addition or subtraction equation relating three whole numbers. For example, determine the unknown number that makes the equation true in each of the equations $8 + \diamond = 11$, $5 = \diamond - 3$, $6 + 6 = \diamond$.

3 steps away

2.MD.10

Draw a picture graph and a bar graph (with single-unit scale) to represent a data set with up to four categories. Solve simple put-together, take-apart, and compare problems using information presented in a bar graph.

4.MD.7

Recognize angle measure as additive. When an angle is decomposed into non-overlapping parts, the angle measure of the whole is the sum of the angle measures of the parts. Solve addition and subtraction problems to find unknown angles on a diagram in real world and mathematical problems, e.g., by using an equation with a symbol for the unknown angle measure.

4.NF.3.d

Solve word problems involving addition and subtraction of fractions referring to the same whole and having like denominators, e.g., by using visual fraction models and equations to represent the problem.

2.OA.1||no two-step; harder types

Use addition and subtraction within 100 to solve one- and two-step word problems involving situations of adding to, taking from, putting together, taking apart, and comparing, with unknowns in all positions, e.g., by using drawings and equations with a symbol for the unknown number to represent the problem.

4 steps away

2.NBT.5||no fluency

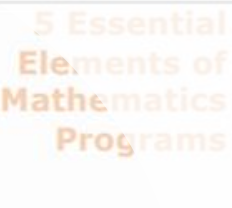
Fluently add and subtract within 100 using strategies based on place value, properties of operations, and/or the relationship between addition and subtraction.

Good Math Stories connected all levels of learners in a visually, emotionally compelling and academically appropriate way. Every child can bring something to the conversation and connect to the conversations that naturally unfold.

- Where is each child along the learning trajectory?
- How does their current understanding and growth become evident in the conversations in your class?
- What follow-up work makes the most sense for this child?

- RETELL, RECREATE AND TALK ABOUT MATH

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5 NCTM Process Standards	8 CCSS Mathematical Practices	5 Strands of Mathematical Proficiency	5 Practices for Effective Inquiry-Oriented Classrooms	Guiding Principles for School Mathematics	
					
Problem Solving (1) Make sense of problems and persevere in solving them. (5) Model with mathematics. Reasoning & Proof (2) Reason abstractly and quantitatively. (3) Construct viable arguments and critique the reasoning of others. (8) Look for and express regularity in repeated reasoning. Communications (3) Construct viable arguments and critique the reasoning of others. Connections	1. Make sense of problems and persevere in solving them. 2. Reason abstractly and quantitatively. 3. Construct viable arguments and critique the reasoning of others. 4. Model with mathematics. 5. Use appropriate tools strategically. 6. Attend to precision. 7. Look for and make use of structure.	Conceptual Understanding The comprehension of mathematical concepts, operations, & relations Procedural Fluency The meaningful & flexible use of procedures to solve problems Strategic Competence The ability to formulate, represent, and solve mathematical problems Adaptive Reasoning The capacity to think logically and to justify one's thinking Productive Disposition The tendency to see sense in mathematics, to perceive it as both useful and worthwhile, to believe that steady effort in	Anticipating what students will know what strategies they will use in solving problems Monitoring their work as they approach the problem-solving process Selecting students whose strategies are worth discussing in class Sequencing those students' presentations to maximize their potential to increase students' learning Connecting the strategies and ideas in a way that helps students understand the mathematics learned	Teaching & Learning Engage students in meaningful learning through individual and collaborative experiences Establish Mathematics Goals to Facilitate Learning 1) Establish Mathematics Goals to Facilitate Learning 2) Implement Tasks that Promote Reasoning & Problem-Solving 3) Use & Connect Mathematical Representations 4) Facilitate Meaningful Mathematical Discourse (see also 5 Practices) 5) Pose Purposeful Question	1. Access & Equity Access to high-quality mathematics curriculum, effective teaching & learning, high expectations, support & resources 2. Curriculum Develops important mathematics along coherent learning progressions and develops connections to the real world 3. Tools & Technology Integrates tools & technology to help students learn and make sense of mathematical ideas 4. Assessment Provides evidence of proficiency with mathematical content includes a variety of student data, informs feedback & instructional adjustments

Storytelling Guidance from NCTM:
How do we use Math-Infused stories to impact student growth and promote positive learning experiences?

NCTM Principles to Actions

Mathematical Practice Standards

Practice	Practice Standards
Make	Make sense of problems & persevere in solving them
Reason	Reason abstractly & quantitatively
Construct	Construct viable arguments & critique the reasoning of others
Model	Model with mathematics
Use	Use appropriate tools strategically
Attend	Attend to precision
Look	Look for & make use of structure
Look	Look for & express regularity in repeated reasoning

Mathematical Teaching Practices

Effective Mathematics Teaching Practices
Establish mathematics goals to focus learning. Effective teaching of mathematics establishes clear goals for the mathematics that students are learning, situates goals within learning progressions, and uses the goals to guide instructional decisions.
Implement tasks that promote reasoning and problem solving. Effective teaching of mathematics engages students in solving and discussing tasks that promote mathematical reasoning and problem solving and allow multiple entry points and varied solution strategies.
Use and connect mathematical representations. Effective teaching of mathematics engages students in making connections among mathematical representations to deepen understanding of mathematics concepts and procedures and as tools for problem solving.
Facilitate meaningful mathematical discourse. Effective teaching of mathematics facilitates discourse among students to build shared understanding of mathematical ideas by analyzing and comparing student approaches and arguments.
Pose purposeful questions. Effective teaching of mathematics uses purposeful questions to assess and advance students' reasoning and sense making about important mathematical ideas and relationships.
Build procedural fluency from conceptual understanding. Effective teaching of mathematics builds fluency with procedures on a foundation of conceptual understanding so that students, over time, become skillful in using procedures flexibly as they solve contextual and mathematical problems.
Support productive struggle in learning mathematics. Effective teaching of mathematics consistently provides students, individually and collectively, with opportunities and supports to engage in productive struggle as they grapple with mathematical ideas and relationships.
Elicit and use evidence of student thinking. Effective teaching of mathematics uses evidence of student thinking to assess progress toward mathematical understanding and to adjust instruction continually in ways that support and extend learning.

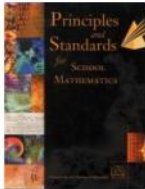


National Council of Teachers of Mathematics. (2014). *Principles to actions: Ensuring mathematical success for all*. Reston, VA: Author.

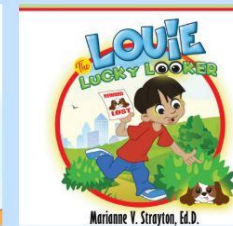
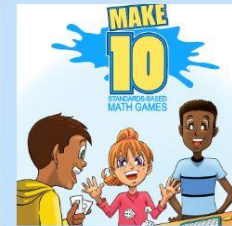
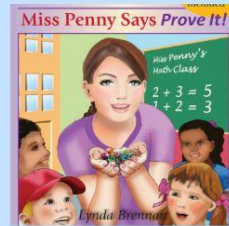
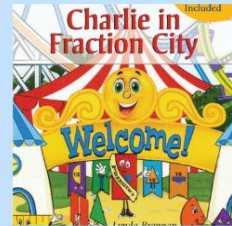
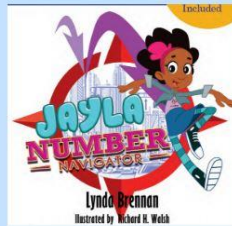
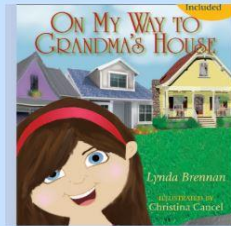
Writing Team: Steve Leinwand, Daniel J. Brahier, DeAnn Huinker, Robert Q. Berry III, Frederick L. Dillon, Matthew R. Larson, Miriam A. Leiva, W. Gary Martin, and Margaret S. Smith.

www.nctm.org/principlesactions



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Math-Infused stories that help you Calm, Command and Conquer the Curriculum®



Math MileMarkers® is Proud to be part of the Tumble Math Library!
FREE Educator Subscription available through August 31st!

The Math MileMarkers® Picture Books encourage children to question, explore and engage in meaningful conversations about math.

Purpose and Power of Math Storytelling

Hosted by Lynda Brennan

Math Specialist/Founder of Math MileMarkers® Series



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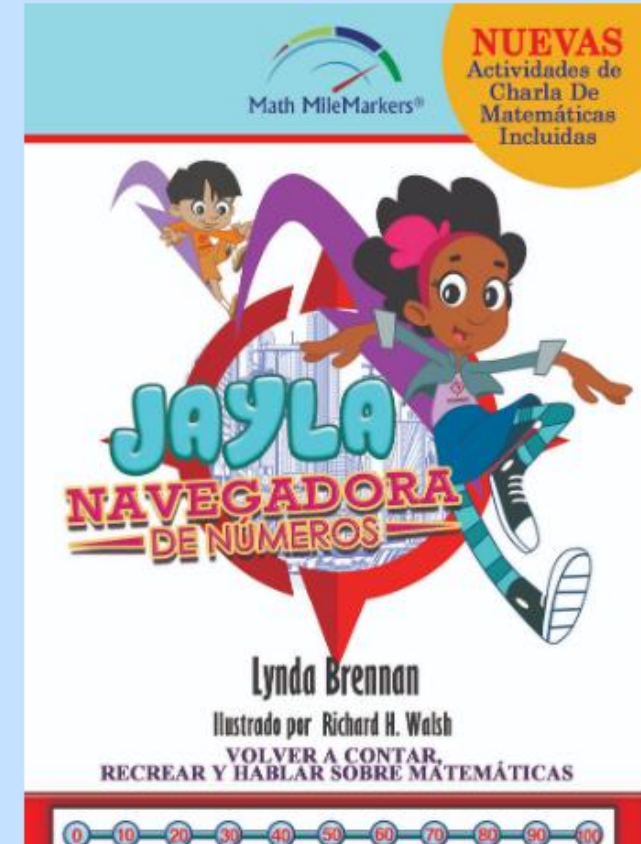
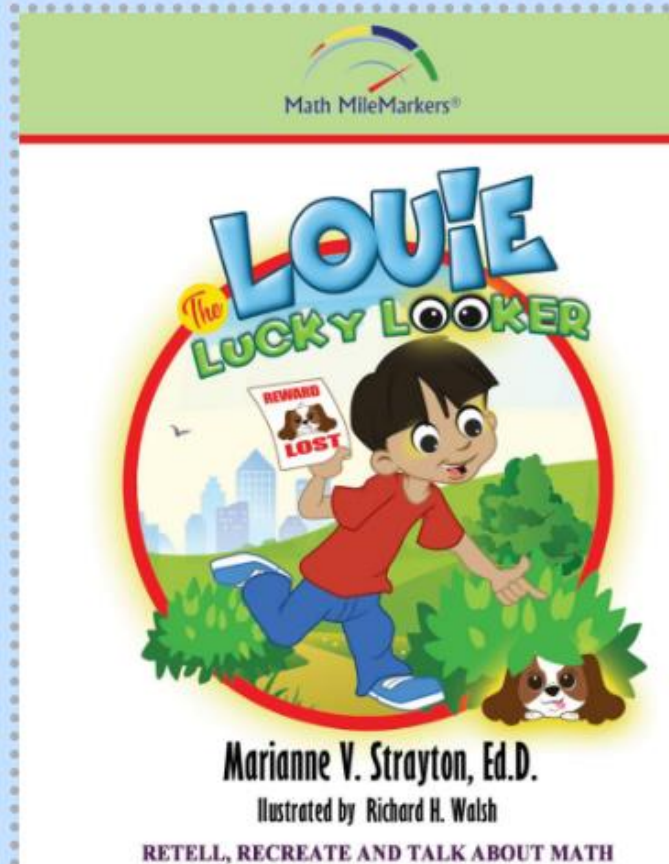
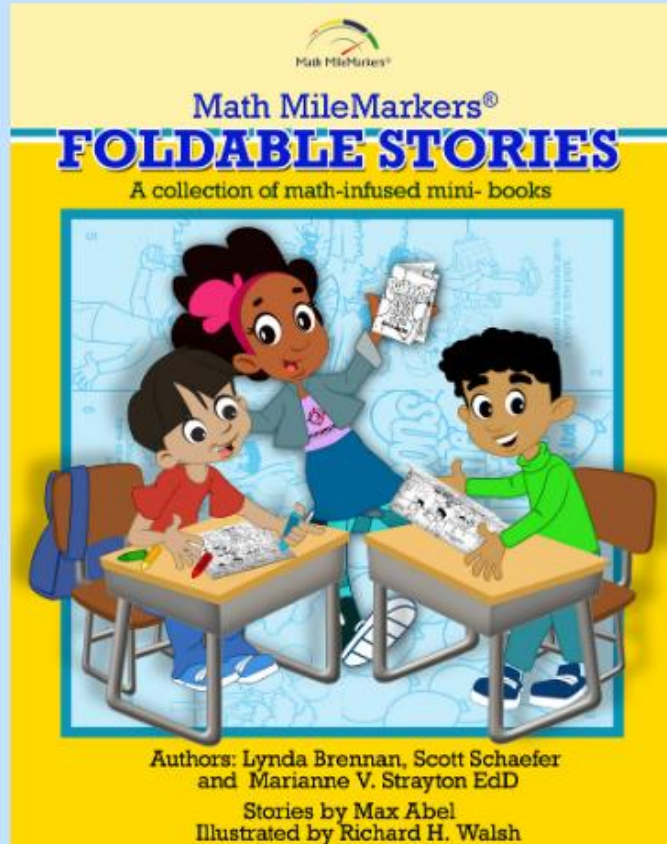
August 11th at 7 pm es

FREE registration is open now.

<http://mathstorytelling.eventbrite.com?s=123468580>

FREE REGISTRATION

New Releases Coming Fall 2020!!!



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