

# Math Ventures

**33 Readings for Strengthening Mathematics,  
One Practice at a Time**

**Practice Maps** featuring Math Solutions'  
**Instructional Practices Inventory (IPI)**

**Sue Chapman** and **Mary Mitchell**

Grades  
K-6





# Math Solutions' Instructional Practices Inventory (IPI)

*The Math Ventures process uniquely involves choosing a specific focus from the IPI and then planning, implementing, and evaluating a classroom investigation around this focus.*

<b>LEARNING ENVIRONMENT (LE)</b>
<b>Teacher Practices</b>
<ul style="list-style-type: none"><li>• Providing a respectful, safe, and culturally responsive environment in which mistakes are seen as an opportunity to learn</li><li>• Structuring the class for independent work, pairs, groups, and whole class in a thoughtful and deliberate way</li><li>• Asking high-level questions that both build and reveal new understanding of content and practice</li><li>• Making appropriate tools available and encouraging their use</li></ul>
<b>Student Practices</b>
<ul style="list-style-type: none"><li>• Taking an academic risk and relying on their own thinking and the thinking of other students</li><li>• Listening to and asking questions of each other to clarify information and respectfully challenge ideas</li><li>• Explaining their reasoning; constructing viable arguments and critiquing the reasoning of others</li><li>• Communicating using appropriate mathematical language, both orally and in writing</li><li>• Working productively in a variety of grouping structures</li></ul>
<b>REASONING AND SENSE MAKING (RS)</b>
<b>Teacher Practices</b>
<ul style="list-style-type: none"><li>• Selecting rigorous learning experiences</li><li>• Making learning experiences accessible to all students without compromising the rigor in the problem</li><li>• Expecting students to justify their reasoning for all answers, whether correct or incorrect</li><li>• Selecting learning experiences that represent a balance of conceptual understanding and procedural fluency</li></ul>
<b>Student Practices</b>
<ul style="list-style-type: none"><li>• Persevering in making sense of rigorous problems</li><li>• Seeking out multiple approaches to solving a problem</li><li>• Using multiple representations when solving problems, such as symbols, diagrams, graphs, words, and so on</li><li>• Understanding math concepts and using procedures appropriately</li><li>• Using appropriate tools strategically, including mental calculations, that fit the situation</li><li>• Looking closely to discern a pattern or structure</li></ul>
<b>FOCUS AND COHERENCE (FC)</b>
<b>Teacher Practices</b>
<ul style="list-style-type: none"><li>• Understanding the expectation of the standard to be taught and its connection to previous standards; aligning the lesson to grade-level content and process standards</li><li>• Differentiating instruction based on student needs</li><li>• Selecting problems that provide opportunities for students to contextualize and/or decontextualize</li><li>• Selecting problems that provide opportunities for students to apply math to real-world situations</li></ul>
<b>Student Practices</b>
<ul style="list-style-type: none"><li>• Making connections among mathematical understandings and using those understandings to solve problems</li><li>• Using math to contextualize and/or decontextualize problems</li><li>• Applying the math they know to solve real-world problems</li></ul>
<b>FORMATIVE ASSESSMENT (FA)</b>
<b>Teacher Practices</b>
<ul style="list-style-type: none"><li>• Using data to make instructional decisions based on student needs</li><li>• Providing feedback to students and structuring opportunities for students to provide feedback to each other</li><li>• Establishing and communicating the learning outcome(s) of the lesson</li><li>• Monitoring learning and adjusting teaching during instruction</li></ul>
<b>Student Practices</b>
<ul style="list-style-type: none"><li>• Taking responsibility for their learning by monitoring their progress toward a learning outcome</li><li>• Applying teacher and peer feedback to strengthen and deepen learning</li><li>• Articulating what one is learning and why</li></ul>

## Praise for *MathVentures* . . .

These investigations are filled with wonderful teaching examples and ideas. **If you would like your students to love mathematics, and to embrace struggle and mistakes, *MathVentures* is for you.**

—**Jo Boaler**, Professor, Stanford University and cofounder of [www.youcubed.org](http://www.youcubed.org)

Sue Chapman and Mary Mitchell have come up with a powerful tool for improving mathematics teaching and learning. What I love most is that *MathVentures* is all about collaboration in the most professional sense of the word—tapping into the expertise not only of coaches but also of the teachers they work with. ***MathVentures* uses cutting-edge research to get straight to the heart of how teachers can fine-tune their instruction to help every student become a powerful mathematical thinker.**

—**Cathy Seeley**, NCTM Past President and former Senior Fellow, Charles A. Dana Center, The University of Texas at Austin; author, *Faster Isn't Smarter and Smarter Than We Think*

Love this resource! ***MathVentures* is a big win for every mathematics program—it can easily be integrated into existing curriculum, whether face-to-face or virtual.** It's a friendly, essential guide for teacher-coach collaborations resulting in equitable access to rigorous mathematics for every student.

—**Janice Bradley**, Assistant Director, Utah Education Policy Center, The University of Utah; coauthor, *Give Me Five! Five Coach-Teacher-Principal Collaborations That Promote Mathematics Success*

From its clear, engaging layout to color-coded adventure routes, this guide is the perfect path for every educator. **Authors Sue and Mary share research-based practices, compelling videos, and Google Maps-worthy direction, all focused on student growth.** As a kindergarten teacher *MathVentures* helps me to think not only about “What lesson should I teach?” but “How should I teach it?”

—**Cheryl Nowak**, kindergarten teacher, Forest Hills School District, Cincinnati, Ohio

Sue and Mary's *MathVentures* takes coaches and educational leaders on an exciting adventure that is sure to improve mathematics teaching and learning through compelling vignettes as well as videos. **This publication is the number one professional learning resource you'll want to get your hands on this year!**

—**Jennifer Lempp**, educator and author of *Math Workshop: Five Steps to Implementing Guided Math, Learning Stations, Reflection, and More*

(continued)

(endorsements continued)

Successfully engaging students can appear effortless in the hands of a skilled educator. In reality, it is an intentional and methodical process, thoughtfully shared in *MathVentures*. **Authors Chapman and Mitchell spotlight the most impactful teaching practices that lead to student achievement, making this a must in every coach's toolbox.**

—**Tonya Clarke**, Master Teacher and Coordinator of K-12 Mathematics, Clayton County Schools, Georgia

***MathVentures* engages coaches and teachers in data-driven, action research that transforms instructional practice.** Anchored in adult learning principles, this investigation process gives teachers the opportunity to exercise choice in student-focused learning opportunities.

—**Elita Driskill**, Director of Professional Learning, Arlington ISD, Arlington, Texas

Reflecting on our practice can be uncomfortable; however, professional growth requires it. ***MathVentures* provides targeted reflective applications of Math Solutions' Instructional Practices Inventory (IPI)** and pilots mathematics instructional coaches as supporters of teachers' growth and improvement. The destination is math success!

—**Carrie Cutler**, Clinical Assistant Professor of Elementary Mathematics Education, University of Houston; author, *Math-Positive Mindsets: Growing a Child's Mind without Losing Yours*

In my school district, much of my focus is on developing and strengthening coaching relationships with teachers. **The educators I partner with want research-based practices to improve their mathematical instruction; *MathVentures* meets this need.** If you're an educator seeking to personalize the mathematical growth of your students, try *MathVentures*!

—**Ericka Thompson**, Learning Design Specialist, Forest Hills School District, Cincinnati, Ohio

**What an amazing resource for teachers and coaches to use as a road map for planning student success in mathematics.** *MathVentures* helps teachers and coaches frame a mindset of promoting student success in mathematics.

—**Nora Lugo**, Mathematics Coordinator, Harlandale ISD, San Antonio, Texas

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One Practice at a Time**

**Practice Maps** featuring Math Solutions'  
**Instructional Practices Inventory (IPI)**

**Sue Chapman** and **Mary Mitchell**

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—Math Solutions Publications (permissions@mathsolutions.com)

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## A Message from Math Solutions

We at Math Solutions believe that teaching math well calls for increasing our understanding of the math we teach, seeking deeper insights into how students learn mathematics, and refining our lessons to best promote students' learning.

Math Solutions shares classroom-tested lessons and teaching expertise from our faculty of professional learning consultants as well as from other respected math educators. Our publications are part of the nationwide effort we've made since 1984 that now includes:

- more than five hundred professional learning programs each year for teachers and administrators in districts across the country;
- professional learning books that span all math topics taught in kindergarten through high school;
- videos for teachers and for parents that show math lessons taught in actual classrooms;
- on-site visits to schools to help refine teaching strategies and assess student learning; and
- free online support, including grade-level lessons, webinars, and blog articles.

For information about all of the products and services we have available, please visit our website at [www.mathsolutions.com](http://www.mathsolutions.com). You can also contact us to discuss math professional learning needs by calling (877) 234-7323 or by sending an email to [info@mathsolutions.com](mailto:info@mathsolutions.com).

We're always eager for your feedback and interested in learning about your particular needs. We look forward to hearing from you.



**Math Solutions.**  
FOUNDED BY MARILYN BURNS

From Houghton Mifflin Harcourt.





To our three treasured granddaughters . . .

May your math learning journeys allow you to cross paths with teachers who see themselves as math learners and know that we are all math people.

PREVIEW



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# WHAT ARE PRACTICE MAPS?

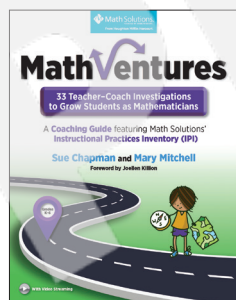
Practice Maps are short readings that help you strengthen mathematics teaching and learning at the classroom, team, school, or system level. Consider them roadmaps to help you reach your destination, that of math classrooms where:

- all students thrive,
- students see themselves as mathematically capable, and
- students know that mathematics will empower and enrich their lives.

Imagine that you are asked to guide a group of novice explorers through an unfamiliar land. The scenery is splendid and fascinating but very different from what you're used to. You are expected to help the explorers feel at home in this new place and learn to navigate the terrain on their own. Although the pathways and landmarks of this new territory feel strange and at times uncomfortable, you can already see how this journey is equipping you and your travel companions with valuable new perspectives, understandings, and skills.

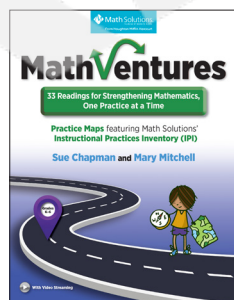
This is the journey many of us experience as we strive to coach and teach mathematics through a problem-solving approach aligned with current curriculum standards and research-based instructional practices. For most of us, our own math learning experiences in elementary and secondary school were vastly different than the learning experiences we are expected to provide for our students today. We're grateful that our students are learning to make sense of mathematics rather than simply applying rote memorization, and that they're experiencing math as an interesting and joyful pursuit rather than as drudgery or with anxiety. As we venture into this new landscape of mathematics education and explore new instructional practices and expectations for students' learning behaviors, it helps to have a set of navigational tools to stay oriented.

The Practice Maps are an integral part of this set of navigational tools. They can be used on their own or with the investigations featured in the companion book, *MathVentures: 33 Teacher–Coach Investigations to Grow Students as Mathematicians*.



**Coaching Guide**  
978-1-935099-91-8

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**Practice Maps**  
978-1-328039-34-7

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**Math teaching and learning success.**

Each Practice Map is reproducible and intended to be referred to again and again as a quick guide for understanding and growing the corresponding practice. Each map:

- starts with a concise explanation as to why the practice is important;
- features a brief classroom story showing the practice in action;
- lists exemplars that articulate the key facets and features of the practice; and
- offers additional resources for deeper study of the practice.