Math Solutions
FOUNDED BY MARILYN BURNS

GO MATH!

Math Solutions Professional Learning Aligned with *GO Math!*

AGENDA
Number and Operations (Grades K-2)
Three Day course

OVERVIEW

This three-day course focuses on the strands of number and operations and algebraic reasoning for students in Grades K–2. The emphasis of the course is on building understanding of the role of place value, strategies for addition and subtraction, and properties of operations in the primary grades as well as the focus on coherence across the grades that is an integral aspect of current standards. Experiences and discussions support teachers using *GO Math!* with strategies to help make the standards accessible to all students.

COURSE OUTCOMES

This course will enable participants to:

- Articulate key aspects of the standards for number and operations and algebraic reasoning for Grades K-2
- Consider instructional shifts needed to foster the depth of understanding communicated in current standards
- Describe the interconnectedness of place value and the base-ten number system to operations and algebraic thinking
- Characterize teaching strategies that exemplify mathematical processes
- Implement instructional strategies including the use of classroom discussions, small-group work, and the use of concrete materials and contexts to support students' learning in *GO Math!* lessons.

Day One

Opening

This introduction includes the course goals, an overview of the mathematical process standards, and pertinent logistical information. Participants review a set of questions they will use throughout the day to help consider how to transfer their learning to the decisions they make in their *GO Math!* classrooms.

Perspective on Addition and Subtraction

In this session, participants analyze student strategies to uncover what students need to understand in order to utilize specific strategies based on place value, the properties of operations, and/or the relationship between addition and subtraction.

BREAK

The Power of Ten
Participants follow a progression of working with smaller numbers up to the strategy of making ten to add two numbers. The session uses games and routines to illustrate how to foster students' understanding of decomposition and developing "ten-ness." After processing the mathematical focus, participants analyze an *Advanced Learner* box from a *GO Math!* lesson and consider how it positively impacts students' learning.

LUNCH

How Students Learn: Spill and Compare
This session focuses on a view of learning in which people construct their own understanding of mathematical concepts and relationships through interactions between their minds and concrete experiences. Participants reflect on including problem solving opportunities in their *GO Math!* instruction and consider components of *GO Math!* that offer more open tasks.

BREAK

Using Appropriate Tools Strategically: Hundred Charts
The games and routines modeled in this session highlight how the hundreds chart can strengthen students' understanding of place value and develop computation strategies by providing a conceptual framework for students to think about our base-ten number system, and to build a mental model of the mathematical structure of our number system. Participants discuss the value of increasing the use of tools in *GO Math!* lessons.

Day One Closing
Participants take time to reflect on the experiences of the day and implications for their classroom instruction.

Day Two

Opening
This introduction recaps mathematical content from day one, and extends ideas to lead into the progression of content in day two.

Using Appropriate Tools Strategically: Number Lines
In this session, participants explore the use of the open number line as an efficient tool for representing computation strategies. Participants see firsthand how number lines encourage the use of benchmark numbers, knowledge of tens and/or hundreds, and flexible approaches to addition and subtraction. They also learn how the tool helps students keep track of the different steps they used, and how it allows them to efficiently communicate their strategy to others. When considering the use of tools in *GO Math!* lessons, participants recognize the value in highlighting connections between tools and symbols.

BREAK

True, False, and Open Sentences

Current standards call for students to perform computation using strategies based on place value, the properties of operations, and/or the relationships between operations. In this session, participants use mathematical sentences as a context for conversation about important mathematical ideas such as equivalence, number sense, and properties. They discuss opportunities in *GO Math!* lessons to bolster students' understanding of the equal sign.

LUNCH

Analyzing Types of Word Problems: Addition and Subtraction

During this part of the day, participants have the opportunity to experience various types of addition and subtraction math stories. As they identify the types that are commonly used in instruction, they recognize the importance of exposing children to a wider variety of problem situations. Participants consider how to maximize problem solving opportunities in *GO Math!.*

BREAK

Addition and Subtraction Strategies

This session focuses on addition and subtraction strategies and highlights the importance of strategies that are based on mathematical connections. At the primary grades, students use concrete materials and drawings that support them in developing strategies based on mathematical understanding. Participants reflect on how instructional decisions with *GO Math!* can increase students' proficiency with flexible computation strategies.

Day Three

Opening

This introduction reviews mathematical content from the first two days of the course and gives participants an opportunity to share unresolved questions.

Linking Assessment and Instruction

Making assessment an integral part of instruction is essential for improving the effectiveness of math instruction. The use of student work samples, vignettes of classroom discussions, and videotaped interviews provide participants the opportunity to discuss assessing conceptual understanding through observation, discussions, and work samples. Participants discuss with each other what the assessments indicate about a student's mathematical understanding. Participants recognize the importance of crafting questions during lesson planning to increase students' productive math talk during *GO Math!* lessons.

BREAK

Introducing Routines

Participants are introduced to the routine of Quick Surveys. Experiences and discussions focus on instructional decisions that impact the mathematical learning opportunities. Participants reflect on the importance of integrating student Math Talk into their *GO Math!* lessons and discuss the best opportunities in lessons to do foster discourse.

LUNCH

Implementing Routines

This session introduces several mathematical routines that involve the students and are relevant to the class in order to emphasize the mathematics that surrounds us every day. All of the experiences can be revisited throughout the year to maintain skills and provide familiar contexts for extending learning. Revisiting the experiences over time will help deepen students' understanding of mathematics and apply what they've learned to new problem situations. A break is included in this session. Participants examine a *GO Math!* activity and related standard and discuss how the expectations in the standard should impact implementation of the activity.

Final Closing

In this session, participants create a mind map in order to visualize, generate, structure, and classify the ideas assimilated throughout the course. Through this activity, participants reflect on the experiences of the course and the ways that these experiences will impact their classroom instruction. This session connects back to the course outcomes so that participants are prepared to move forward as they go back to their *GO Math!* classrooms and implement the instructional strategies and ideas modeled throughout the course.

MATH SOLUTIONS GUIDING PRINCIPLES

Drawing upon academic work and our own classroom-grounded research and experience, Math Solutions has identified the following four instructional needs as absolutely essential to improving instruction and student outcomes:

- Robust Content Knowledge
- Understanding of How Students Learn
- Insight into Individual Learners through Formative Assessment
- Effective Instructional Strategies

These four instructional needs drive the design of all Math Solutions courses, consulting, and coaching. We consider them our guiding principles and strive to ensure that all educators:

- Know the math they need to teach—know it deeply and flexibly enough to understand various solution paths and students' reasoning.
- Understand the conditions necessary for learning, what they need to provide, and what students must make sense of for themselves.
- Recognize each student's strengths and weaknesses, content knowledge, reasoning strategies, and misconceptions.
- Have the expertise to make math accessible for all students, to ask questions that reveal and build understanding, and to help students make sense of and solve problems.