Math Solutions
FOUNDED BY MARILYN BURNS

Math Solutions Professional Learning

AGENDA
Geometry and Measurement
Grades K-5

OVERVIEW

This course focuses on content from the strand of Geometry and Measurement. Participants gain an understanding of the levels of geometric thinking, the important measurement decisions students need opportunities to make, and types of learning experiences that promote rigorous thinking.

OUTCOMES

After the course, participants will be able to:

- Articulate the progression of content in the strand of Geometry and Measurement
- Formulate questions that promote rigorous thinking
- Select problem-solving activities that develop students' skills in geometry and geometric measurement
- Explain how students learn to measure and describe the measurement decisions they need opportunities to make
- Incorporate effective strategies for teaching mathematics vocabulary into lessons
- Implement instructional strategies including the use of classroom discussions, small-group work, and the use of concrete materials to support students' learning

Day One

Opening

This introduction includes the course goals, an overview of current state standards, and pertinent logistical information.

Internalizing the Language of Math

The purpose of learning the language of mathematics is to communicate about mathematical ideas. Teaching knowledge of mathematical ideas and relationships must precede teaching vocabulary. Participants investigate a geometry task to consider content, vocabulary, and language demands.

BREAK

Composing and Classifying Polygons

Participants find all possible shapes composed with six Pattern Block triangles. This experience illustrates the importance of using numerous examples of shapes and providing examples and non-examples. They learn the three phases of a lesson focused on reasoning and problem solving and consider the teacher's role during each phase.

LUNCH

Tangram Puzzle
The tasks teachers provide are the foundation for mathematics instruction that supports thinking, reasoning, and problem solving. Significant classroom discourse occurs when teachers choose mathematical tasks that engage their students in thinking, problem solving, and communication. During this session, participants compose and decompose shapes.

BREAK

Reasoning with Shapes
In learning about shapes, it is important to vary the examples in many ways so that students do not learn limited concepts. In this experience, participants provide many variations that are then sorted by properties such as lines and angles. They also consider how a strategy such as the Frayer Model fosters vocabulary development.

Closing
Participants take time to reflect on the experiences of the day and ways that these experiences will positively impact their classroom instruction.

Day Two

Opening
This introduction includes the course goals and provides an opportunity to connect the learning and experiences from the first day of the course to current state standards.

Folding Shapes
During this session, participants fold rectangles and circles to identify and label halves, thirds, fourths, quarters, a half of, a third of, and a fourth of equal shares and recognize that equal shares of identical wholes need not have the same shape.

BREAK

Building Referents for Angle Measurements
During this session participants consider how to develop students' understanding of measuring angles. Estimation is key to building a good foundation of benchmarks related to measurement. Building referent angles is an important aspect of student experiences with angle

measurement. Building the bank of referent angles takes multiple experiences and time.

LUNCH

Investigating Volume
This session focuses on a view of learning in which people create, or construct their own understanding of, mathematical concepts and relationships through interactions between their mind and concrete experiences in the real world. Participants gather data about the volume of several rectangular prisms and consider how this experience with volume compares to their previous learning about volume.

BREAK

Constructing Understanding of Area and Spatial Structuring
In this experience, participants deepen their understanding about spatial structuring and discuss the role that it plays in making sense of the quantities in area problems. They then explore an area problem and examine the learning progression of area in current state standards.

Final Closing
This session connects back to the course outcomes so that participants are prepared to move forward as they go back into classrooms and implement both the instructional strategies and content lessons 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 help students make sense of and solve problems