

AGENDA**Problem Solving: Developing Disposition, Competence, Confidence
Grades K–12****OUTCOMES**

This course is designed to help teachers:

- Describe the features of a classroom environment that support student learning and promote confidence and perseverance in students
- Engage students in constructive struggle that develops mathematical habits of mind
- Structure lessons in ways that require critical thinking and sense making

Opening

In this session, participants solve a problem that introduces them to the notion of perseverance and confidence in problem solving—along with the role of the teacher in supporting and nurturing these qualities in students. They are introduced to the course learning outcomes, and they review the habits of mathematical thinkers to be addressed during the day.

Examining the Nature of Tasks

Both task selection and lesson facilitation promote a positive disposition in all students toward mathematics, competence in doing mathematics, and feelings of confidence in their ability to do mathematics. In this session, participants experience firsthand an example of a task that is rigorous yet accessible to all students.

BREAK**Problem Solving and Constructive Struggle**

This session highlights the importance of constructive struggle in classroom environments that support students' practice of making sense of mathematical problems and persevering in solving them. Participants solve a problem that is an example of a problem that is accessible for all students yet maintains the rigor called for in current state standards. The task provides participants an opportunity to communicate orally about their solutions and write to explain their thinking. In processing this experience, participants discuss important ideas about the role that constructive struggle plays in developing problem-solving skills in students.

LUNCH**Aspects of Learning**

The intent of current state standards is to move toward greater focus and coherence in teaching and learning math. In this session, participants identify mathematical concepts that students need to experience in a specific way so that these concepts make sense to them. After

engaging in mathematical investigations, participants identify mathematical ideas around which students need to reason and make sense.

BREAK

The Problem-Solving Lesson

This session focuses on structuring lessons to maximize students' opportunities to make sense of important mathematical ideas. During this session, the participants engage in a task and use the experience to make explicit connections between the role of the teacher and each phase of the lesson.

Closing

Teachers need opportunities to translate professional learning experiences to practical classroom application. During this session, participants reflect on the types of work students need to be engaged in to be mathematically proficient, and they plan what they will do differently in their classrooms as a result of their new or deepened understanding.

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, ask questions that reveal and build understanding, and help students make sense of and solve problems.