

Mathematics Professional Learning Services

IMPROVE THE RIGOR OF MATHEMATICS INSTRUCTION AND IMPROVE RESULTS FOR ALL STUDENTS





Consortium on Reaching Excellence in Education®

www.corelearn.com

Accelerate Math Performance

Professional learning that delivers lasting instructional change

This overview of CORE's professional learning services for mathematics will help you select the offerings and products that align best with the needs of your district or school. If you'd like a free consultation with a CORE Professional Learning Expert about leveraging our expertise and experience to improve outcomes for your students, please call us at 888.249.6155 or email

info@corelearn.com.

Mathematical proficiency is more important than ever for students' success. CORE's professional learning services provide PreK-12 schools with a framework to fully implement evidence-based mathematics instruction for all students. Through on-site workshops, coaching and modeling, educators increase both their subject matter knowledge and their teaching practices so students succeed.

CORE experts emphasize proven instructional techniques that lead to greater engagement and learning for students in the areas of conceptual understanding, fluency, mathematical reasoning, and problem-solving.

CORE also works with school leaders to:

- Employ consistent processes that develop teachers' instructional practices
- Implement Multi-Tiered System of Supports (MTSS) to create a professional learning culture that fosters high achievement for all students

CORE's professional learning services address the learning needs of ALL students including non-native English speakers and those who struggle with math.



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SITE IMPLEMENTATION AND COACHING SUPPORT SERVICES

Site Implementation and Coaching Support Services for Sustainable Improvement in Mathematics

Levels: PreK-12

Audience: Specific services are determined during planning for each visit. The principal or site administrator and other instructional leaders are requested to participate in all visits.

Format: The needs of each school determine the focus of visits. Four to 14 days are recommended.

CORE Site Implementation, Standards Alignment, and Consultation

Research and CORE's own experience have shown that coaching and support are vital for professional development to be effective. CORE's Site Implementation, Standards Alignment, and Consultation are essential components of CORE expert support. Site assistance is provided in tandem with whole district implementation to develop a seamless system that ensures equity across all sites. Specific content is determined in consultation between CORE and the school and/or district leadership. During the site visit, CORE Educational Consultants work informally with small groups of teachers, coaches, and administrators.

Site visits and/or demonstration site visits provide the following important services:

Collaborative Planning

The first CORE site visit is a crucial planning day to identify specific implementation issues and plan for organization, resources, and support needs. A CORE Educational Consultant initiates or reviews your comprehensive school mathematics plan, including organization of instruction, implementation of a multi-tiered model, student grouping, time allocations, materials, personnel usage, and planned staff development. In addition, the Consultant helps you develop a pacing calendar. The Consultant conducts initial walk-through visits to classrooms. This session should include your leadership team.

Classroom Teacher Coaching, Lesson Study, Program Planning

The Consultant provides a number of services directly to classroom teachers. With the local coach, she or he coaches classroom teachers based on direct observation and feedback. The Consultant also conducts collaboratively planned demonstration lessons, using your adopted materials. With the coach, the Consultant works with small groups of teachers to plan grade-level grouping and interventions based on analysis of assessment data. The Consultant also works with small groups of teachers to provide review and deeper understanding of adopted instructional materials, resolve implementation issues, and provide coaching on implementing effective instructional techniques. The number of classrooms and teachers visited during any one day depends on the priorities of the school leadership and the specific issues the Consultant needs to address.

Multi-tiered System of Supports/ Response to Instruction and Intervention

A CORE Consultant can provide support with data analysis, planning for robust materials and appropriate assessments, and goal setting and problem solving.

Executive Coaching

For school administrators, the Consultant provides personal coaching sessions that combine professional development with a discussion of instructional materials and visits to selected classrooms to calibrate observations and monitor program implementation. The Consultant works closely with the building administrator to ensure he or she understands how the instructional program is designed, what effective implementation of a core curriculum and supplemental intervention programs looks like, and how to use data to leverage improved achievement. Through regular classroom walk-throughs and facilitated sessions, the CORE Consultant supports the building leadership to have the knowledge, tools, and confidence to lead sustained mathematics improvement efforts.

Mentored Practice for Coaches

Part of the site visit allocation is devoted to building expertise of coaches and teacher leaders. The Consultant mentors the coaches as they model lessons, observe and debrief teachers, conduct data study sessions, and analyze test data. The Consultant assists the coaches to facilitate on-site collaborative conversations and develop solutions to implementation challenges.

Alignment of Instruction to Standards

The CORE Consultant will work with staff to map instruction and your curriculum materials to ensure tight alignment of instruction to your state standards.

Assessment Support

Regular use of screening and progress-monitoring data can make intervention planning dramatically more effective. The Consultant provides assistance in the use of assessment instruments, including diagnostic data, screening and progress-monitoring instruments, both CBM and curriculum-embedded assessments. The Consultant works closely with teachers, the principal, curriculum specialists, and coaches to show them how to analyze the data to plan student groupings and specific interventions. Teachers who have learned to incorporate such data into their teaching practice frequently respond positively to the growth they see in their own students' mathematics proficiency.

Implementation of Scientifically-based Instructional Materials

The Consultant can provide, if needed, help with an analysis of your program needs and your choice of the optimal program. Since CORE does not publish instructional materials and is not aligned with any one textbook publisher, the Consultant can provide impartial advice. The CORE Consultant team is familiar with many comprehensive, intervention, and supplemental materials supported by scientific research.

Specialized Program Review Sessions for Preschool, Elementary School, or Middle/High School Intervention or Core Programs

The Consultant can provide a two-day customized review and refresher for teachers new to a program. A third day can focus on setting up the classrooms. Following initial publisher training, the CORE Consultant will work for two days with elementary or middle/high school staffs by grade level or team to review routines as follows:

Day 1: Preschool, K, and grade 1, each for three hours

Day 2: Grades 2-3 and 4-6, each for three hours

For middle/high school intervention programs, teachers may be supported in

Demonstration Site Implementation and Practice

When CORE is supporting the implementation of a comprehensive, district-wide mathematics approach, selected sites are identified by the district to serve as the venues for district math specialist, coach, and site and district administrator practice. During visits to demonstration sites, district leadership will practice their observation skills, calibrate observations, observe model lessons, and observe data study. Coaches will practice their coaching skills together and also calibrate observations and practice model lessons.

Off-site Continued Support

Through a combination of on-site, phone and email support, reports, and development of client resources (agendas, planning templates) the Consultant manages the CORE program of services closely with site administrators and teacher leaders, and serves as the liaison to CORE.

Participant Outcomes

- Identify specific implementation issues and plan for organization, resources, and support needs.
- Deepen the expertise of school leaders through training on instructional materials and assessment, as well as visits to selected classrooms to observe instruction and practice coaching and feedback.
- Improve classroom instruction as the CORE Consultant models lessons in classrooms and conducts classroom observations and coaching
- Help teachers more deeply understand adopted instructional materials and resolve implementation-related issues.
- Enable all instructional staff to use data to plan student groupings and interventions.
- Help coaches learn to analyze test data, facilitate on-site collaborative conversations, and develop solutions to implementation challenges.
- Alignment of instruction to standards.

Designing and Implementing Multi-Tiered Systems of Support (MTSS)

Levels: PreK-12

Audience: District and site leadership teams, including special education leadership

Format: Three days, consecutive or separate, depending on the situation

Materials: Participant Resource Guide; Internet access will be necessary The MTSS course will support administrators and key school leadership to implement MTSS as a coordinated K-12 system of academic and behavior support interventions which are designed to facilitate early and appropriately intensive research-based interventions for students at risk. Beginning with key yet compact background knowledge that differentiates MTSS from RTI, including 10 of the most important lessons learned in decades of school-based implementation, the MTSS course systematically details:

- Key roles of school leaders, including principals and teachers;
- Which school-based teams perform which roles and functions;
- Comprehensive and proactive design of coordinated reading/language arts and mathematics research-based interventions across tiers of increasing intensity, including strategies to increase intensity;
- How to use scientifically-sound and efficient reading/language arts and mathematics assessments for benchmarking K-6 students to promote adequate yearly progress and support universal screening, and once per year universal and/or individual screening for middle and high school students;
- How to use scientifically-sound and efficient reading/language arts and mathematics assessments more frequently for appropriately intensive progress monitoring of students by tiered service;
- Special education decision-making including eligibility determination for students with specific learning disabilities (SLD), and creating better, more scientifically sound IEP goals that lend themselves to progress monitoring, and annual and 3-year re-evaluations; and,
- How to ensure success by providing strategies for evaluating fidelity of MTSS implementation.

The MTSS course includes selected key readings, polling to assess beliefs about current implementation status, and tools to evaluate fidelity of implementation.

Program Planning: Connecting Objectives, Assessments, and Key Topics

Levels: K-12

Audience: Administrators, all content-area teachers, coaches, and specialists

Format: One day

Materials: Participant Resource Guide This content may be part of site visits or may be presented as a workshop depending on district/school need. It is designed to prepare teachers for coherent and effective instruction by focusing on the connections between objectives, assessments, and key learning topics for nine or more weeks of instruction.

The service emphasizes the following:

- Identifying key concepts and skills
- Articulating clear, measurable objectives
- Connecting objectives to standards
- Identifying or developing assessments to match objectives
- Understanding the development of concepts and skills within the course curriculum
- Planning to address areas of weakness if needed in the curriculum
- Anticipating and preparing for common misconceptions and issues

Participant Outcomes

- Develop an outline or plan for instruction based on your curriculum.
- Describe objectives that are aligned with standards.
- Identify assessments that are aligned with objectives.
- Prepare for teaching by understanding the key concepts and skills that must be learned, the common misconceptions to be addressed, and how assessments will be used to evaluate and guide instruction.

FOUNDATIONAL AND TOPICAL MATHEMATICS OFFERINGS

CORE Math® Academy for Elementary Schools

Levels: K-6

Audience: District and school leadership, math coaches, classroom teachers, and specialists

Format: Sessions may be selected based on identified needs. It is recommended that schools select the entire five-day Math Academy to be completed over time in 1-2 day chunks in combination with other CORE Math workshops, or as a summer 5 day institute.

Materials: Participant Resource Guide containing participant worksheets and note-taking sections with slides. Two professional books: Principles to Actions Ensuring Mathematical Success for All from NCTM (2014), and Spend Some Time with 1 to 9, K-8

CORE's Math Academy for Elementary Schools is designed to increase mathematical content understanding and best practices to enable students to become mathematically proficient and meet state standards. Based on the current research and findings from the National Mathematics Advisory Panel, the National Research Council, and other prominent mathematics researchers, the CORE Math Academy focuses on the critical topics that pose challenges for many students, particularly those who are behind in mathematics achievement. While each Math Academy session is dedicated to a discrete topic, it is recommended, but not required, that all five sessions be included in a robust professional development plan. Each topic below requires a full-day session but may be taken in half-day increments.

Topical Outline

Numbers and Operations

- Overview, Number Concepts, and Counting
- Addition and Subtraction
- Problem Types and Problem-Solving
- Number Facts and Number Properties

Place Value and Multidigit Operations

- Place Value
- Multidigit Addition/Subtraction
- Multidigit Multiplication/Division
- Common Misconceptions

Fractions

- Fractions and Equivalence
- Addition and Subtraction
- Multiplication and Division
- Common Misconceptions

Multiplicative Thinking and Equivalence

- Equality
- Fractions, Decimals, and Percents
- Ratio and Multiplicative Thinking
- Mathematical Discourse

Geometry and Measurement

- Measurement
- Shapes
- Applications

Participant Outcomes

- Understand best practices for improving student proficiency in selected topics.
- Understand math concepts and the connections between concepts and procedures.
- Recognize and resolve student misconceptions.
- Identify mathematical language and how to develop its use in students.
- Understand the use of mathematical discourse to promote engagement and deep processing.
- Learn effective strategies for connecting visual models to numerical representations through student engagement, mathematical reasoning, and making mathematics explicit.

CORE Math® Academy for Middle Schools

Levels: 5-8

Audience: District and school leadership, math coaches, math chairs, classroom teachers, and specialists

Format: Sessions may be selected based on identified needs. It is recommended that schools select the entire five-day Math Academy to be completed over time in 1-2 day chunks in combination with other CORE Math workshops, or as a summer 5 day institute.

Materials: Participant Resource Guide containing participant worksheets and note-taking sections with slides. Two professional books: Principles to Actions Ensuring Mathematical Success for All from NCTM (2014), and Spend Some Time with 1 to 9, adolescent level

CORE's Math Academy for Middle Schools is designed to increase mathematical content understanding and best practices to enable students to become mathematically proficient and meet rigorous state standards. Based on the current research and findings from the National Mathematics Advisory Panel, the National Research Council, and other prominent mathematics researchers, the CORE Math Academy focuses on the critical topics that pose challenges for many students, particularly those who are behind in mathematics achievement. While each Math Academy session is dedicated to a discrete topic, it is recommended, but not required, that all five sessions be included in a robust professional development plan. Each topic below requires a full-day session but may be taken in half-day increments.

Topical Outline

Number Sense and Operations

- Thinking Deeply about Mathematics
- Understanding Numbers
- Mental Math
- Intervention with Multidigit Operations

Fractions

- Fractions and Equivalence
- Addition and Subtraction
- Multiplication and Division
- Common Misconceptions

Multiplicative Thinking

- Percents
- Ratio and Multiplicative Thinking
- Proportions
- Applications and Word Problems

Geometry and Measurement

- Geometric Thinking
- Measurement
- Properties of Shapes
- Transformations

Topic: Entering Algebra

- Integers
- Solving Equations
- Patterns to Functions
- Mathematical Discourse

Participant Outcomes

- Understand best practices for improving student proficiency in selected topics.
- Understand math concepts and the connections between concepts and procedures.
- Recognize and resolve student misconceptions.
- Identify mathematical language and how to develop its use in students.
- Understand the use of mathematical discourse to promote engagement and deep processing.
- Learn effective strategies for connecting visual models to numerical representations through student engagement, mathematical reasoning, and making mathematics explicit.

CORE Math® Academy for High Schools

Levels: 9-12

Audience: District and school leadership, math coaches, math chairs, classroom teachers, and specialists

Format: Sessions may be selected based on identified needs. It is recommended that schools select the entire five-day Math Academy to be completed over time in 1-2 day chunks in combination with other CORE Math workshops, or as a summer 5 day institute.

Materials: Participant Resource Guide containing participant worksheets and note-taking sections with slides. Two professional books: Principles to Actions Ensuring Mathematical Success for All from NCTM (2014), and Spend Some Time with 1 to 9, adolescent level

CORE's Math Academy for High Schools is designed to increase mathematical content understanding and best practices to enable students to meet state standards. Based on the current research and findings from the National Mathematics Advisory Panel, the National Research Council, and other prominent mathematics researchers, the CORE Math Academy focuses on the critical topics that pose challenges for many students, particularly those who are behind in mathematics achievement. Each Math Academy session is dedicated to a discrete topic, it is recommended, but not required, that all five sessions be included in a robust professional development plan. Each topic below requires a full-day session but may be taught in half-day increments.

Topical Outline

Fractions and Rational Numbers

- Number Sets and Fractions
- Connecting Representations
- Understanding Procedures
- Applications and Problem Solving

Ratio, Proportion, and Percent

- Ratio, Rates, and Proportions
- Percent
- Proportional Thinking
- Applications and Problem Solving

Algebra and Solving Equations

- Integers
- Variables and Expressions
- Solving Equations
- Applications and Problem Solving

Algebra and Functions

- Patterns and Functions
- Connecting Multiple Representations
- Properties of Functions
- Applications and Problem Solving

Geometry

- Geometric Thinking
- Properties of Shapes
- From Conjecture to Proof
- Applications and Problem Solving

Participant Outcomes

- Understand best practices for improving student proficiency in selected topics.
- Understand math concepts and the connections between concepts and procedures.
- Recognize and resolve student misconceptions.
- Identify mathematical language and how to develop its use in students.
- Understand the use of mathematical discourse to promote engagement and deep processing.
- Learn effective strategies for connecting visual models to numerical representations through student engagement, mathematical reasoning, and making mathematics explicit.

Mathematical Discourse, Writing and Academic Vocabulary

Levels: K-12

Audience: Classroom teachers, math coaches. district and school leadership, and specialists

Format: One day, usually combined with other training events or site visits

Materials: Participant Resource Guide containing participant worksheets and note-taking sections with slides

This one-day workshop focuses on strategies to effectively learn math vocabulary and use reading, writing, and discourse to help all students, particularly English learners, become more proficient in math. Research shows math texts are the densest of all types of textbooks, and many students do not know how to read and use math texts as resources. Writing about math helps students develop thinking and understanding, and provides opportunities for assessing understanding and identifying misconceptions. Talking about math, or student discourse, on a regular basis develops and clarifies thinking, provides opportunities to speak and hear math language, and offers additional opportunities to assess understanding and identify misconceptions. Central to reading, writing, and talking about math is vocabulary. Mathematical vocabulary presents several types of challenges, including specific and specialized mathematical terminology, words with multiple meanings, homophones, and small words in confusing contexts. Participants in this workshop will work through these challenges and explore strategies for learning and using vocabulary, reading and understanding math texts and math word problems, writing about math, and developing mathematical discourse.

Participant Outcomes

- Use reading, writing, and discourse to help students become more proficient in math.
- Learn about challenges with math vocabulary and strategies for addressing these challenges.
- Identify the unique challenges with math texts and math word problems, and learn strategies for addressing these challenges.
- Recognize levels of discourse and how to develop and promote meaningful discourse.
- Learn strategies for incorporating meaningful writing activities that promote learning mathematics.

Teaching Problem Solving Through Mathematical Modeling and Other Math Applications

Levels: K-12

Audience: Classroom teachers, math coaches, district and school leadership, and specialists

Format: One day, usually combined with other trainings or site visits

Materials: Participant Resource Guide In this one-day working session participants will learn about the various uses for problem solving and the types of modeling required in all state standards. Participants will examine how problem solving is used to apply or model with mathematics and used to deepen, extend, or add to mathematical knowledge. This session focuses on strategies for teaching students to become adept at reasoning and applying critical thinking in mathematics while solving routine and nonroutine problems. The session addresses methods for processing student thinking through effective mathematical discourse and making mathematical connections explicit by the end of the lesson. The CORE facilitator will highlight expert instructional strategies designed to keep students focused on the math in order to accomplish the learning objectives. Participants will recognize the importance of using math to model real-world phenomena and identify key places in the standards for doing so. Participants will complete activities that demonstrate problems at multiple levels of rigor, using appropriate examples for their grade level/course.

Participant Outcomes

- Recognize problem solving as both a tool for learning and a goal of learning.
- Learn methods for making mathematical connections explicit within a problemsolving framework.
- Learn how to provide facilitated and focused problem-solving activities ranging from quick problems to extended problems.
- Understand how problem solving relates to applying mathematics to the real world (modeling) and applying mathematics to purely mathematical contexts to extend learning.

Intensive Lesson Study: Learning About Teaching Through Intensive Study of Selected Key Lessons

Levels: K-12

Audience: Administrators. all content-area teachers, coaches, and specialists

Format: One day, usually combined with other training events or site visits

Materials: Participant Resource Guide

Intensive lesson study leads educators to systematically analyze their teaching practice in order to understand what aspects best influence learning. Teachers and other educators work in small groups to plan, observe, critique, and revise a lesson. This is typically part of site visits or may be a workshop based on school/ district need. This work initiates an ongoing process that is continued through site implementation.

The lesson study process includes the following six steps:

- 1. Set goals.
- 2. Plan the lesson.
- 3. Plan for lesson teaching and observation.
- 4. Observe and collect data on the lesson.
- 5. Analyze the data and revise the lesson.
- 6. Share the findings.

The Intensive Lesson Study workshop provides a focused day to familiarize teachers and school leaders with the lesson study process and begin work on the six steps listed above. These steps establish a strong professional learning community centered on instruction and begin a sustainable process for ongoing internal professional development. Prior to and during follow-up site implementation, the CORE consultant will facilitate completion of the six-step process.

The Intensive Lesson Study workshop is offered in conjunction with other CORE services such as academies, Program Planning, and/or Site Implementation.

Participant Outcomes

- Increase knowledge of mathematics.
- Increase knowledge of how to effectively teach mathematics.
- Develop a stronger professional learning community.
- Connect daily practice/lessons with long-term learning goals.
- Instill mutual accountability with peers to provide high-quality instruction.
- Improve the quality of lesson plans to promote student learning.

Fluency and Coherence

Levels: K-12

Audience: Classroom teachers, math coaches, district and school leadership, and specialists

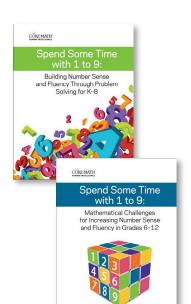
Format: One day, usually combined with other trainings or site visits

Materials: Participant Resource Guide, *Spend Some Time with 1 to 9* Focus and coherence in state content standards, combined with the standards for mathematical practice require rigorous conceptual understanding and fluency with math. This workshop will identify topics for mathematical fluency at the participant's grade level and address processes leading to it. Participants will connect fluencies to their state standards so that they can demonstrate how the standards provide a road map or progression of learning that leads to that fluency. Participants will complete a series of activities applicable to their grade level/course to highlight the links between fluency with facts, fluency with related concepts, and building number sense. They will also analyze units of instruction and identify the fluencies students need to reach.

Participant Outcomes

- Identify the fluencies required at the participant's grade level/course.
- Explain fluencies both in terms of skills and applications, and the processes leading to these fluencies.
- Learn how to use fluency activities to help build robust number sense.
- Plan instruction that addresses and leads to the required fluencies.

INSTRUCTIONAL RESOURCES



Spend Some Time With 1 to 9

Spend Some Time with 1 to 9 provides teachers with sets of problems that build fluency and number sense while requiring students to think about mathematical relationships. As they work through these problem-solving activities, students reason about the mathematics at the same time they are constantly putting numbers together and taking them apart.

Features of Spend Some Time with 1 to 9:

- Links to the CCSSM: The specific content standards from the Common Core State Standards for Mathematics (CCSSM) that connect to each activity are identified and listed.
- Differentiated instruction: Activities have built-in multiple entry and exit points that allow for learners of varying levels to access and solve problems.
- Flexible activities: Although the activities target specific grade levels or standards, you can use them with other grade levels.
- **Extension activities:** Each activity includes ideas for prompts, questions, or extensions to further engage students.
- **Solutions provided:** The final section of the book provides solutions for each activity, including sample solutions for activities that have multiple correct
- **Online prep quizzes:** These web-based quizzes lay a foundation for each challenge activity and are available through multiple devices (computer, smartphone, and tablet).

The K-8 edition consists of 25 activities working with whole numbers, rational numbers, and geometric figures. The 6-12 edition consists of 20 activities that include building fluency with fractions, proportions, algebraic expressions, and geometric concepts. These activities provide additional tools to create a vigorous and engaging mathematics classroom and deepen students' understanding of essential math concepts and number relationships. With these fun and challenging supplemental math activities, you and your students are sure to enjoy spending time with 1 to 9!

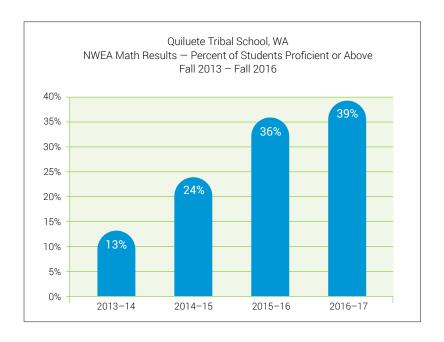
SUCCESS STORIES

Educator Professional Learning that Leads to Sustained Improvement in Student Achievement

CORE has helped elementary, middle and high schools across the country build their instructional practices and improve math results by equipping administrators and teachers with the knowledge and skills they need to implement effective, research-based classroom practices that result in sustainable academic excellence.

"Our teachers benefit so much from CORE's expertise. They provide support and assistance in a non-threatening, non-evaluative way. They're helping our teachers gain confidence in what they're doing in the classroom and give them ideas on how to continue to improve. Thanks to CORE, our teachers our learning and growing in ways that measurably benefit our students."

Mark Jacobson, Superintendent and Principal, Quileute Tribal School, WA



Visit www.corelearn.com/success-stories to learn more about the successes the schools we've worked with have had. We're here to support your district or school achieve similar positive results. Schedule a free consultation with a CORE Instructional Implementation Expert to review your current instructional practices and professional learning program. Call 888.249.6155 or email info@corelearn.com.