

# Proven Practices



## Math Corps A Focused Approach to Tutoring



**Math Corps** is an AmeriCorps-powered tutoring program that provides K-8 students up to 90 min of weekly tutoring in small groups. Math Corps helps students acquire foundational math skills (National Mathematics Advisory Panel, 2008). As a cost-effective program that has reached significant scale, Math Corps has evidence for its impact from multiple randomized controlled trials and is listed as an effective math tutoring program on several clearinghouses, including those operated by Stanford University, Johns Hopkins University and the US Department of Education's What Works Clearinghouse. School partners and other stakeholders often inquire about the alignment between Math Corps and state and national standards. In addition to clear evidence of the program's impact on grade-level proficiency—a common bottom-line goal for educators and policy-makers alike—it is critical to understand the logic that underpins the content focus of Math Corps and why, as a supplemental tutoring program, it includes a focus on a subset of grade-level standards.

### How does Math Corps Align with State and National Standards?

**Math Corps directly aligns with standards closely tied to a flexible understanding of whole and rational numbers.** These standards are part of strands that compose the majority of state and national standards. For example, in Minnesota, Math Corps directly aligns with standards in *Patterns and Relationships*. At a national level, Math Corps aligns with *Counting and Cardinality*, *Operations & Algebraic Thinking*, *Number & Operations in Base Ten* and *Fractions, Ratios & Proportional Relationships*, *The Number System*, and *Expressions and Equations*.

### Why does Math Corps focus on a subset of standards?

**Math experts understand that there are keystone focal points that should shape the focus of math learning.** Math Corps aligns with unequivocal empirical evidence that all students—particularly those who have begun to fall behind—need to master skills related to whole and rational number understanding (NMAP, 2008). Number skills are directly aligned with the lion's share of grade-level standards, they contribute to performance in other focus areas (e.g., measurement and geometry), and are essential for success with increasingly advanced math concepts (Braithwaite & Siegler, 2024).

From a practical perspective, Math Corps adopts a mastery approach to student learning—students advance from one skill to the next after demonstrating proficiency in the preceding skill. Allowing sufficient time to develop depth of knowledge in foundational number skills is a student-focused approach that takes priority over covering the full range of standards in any given grade. Thus, the theory of change for Math Corps is to develop core number skills that not only help students in the moment, but also strengthen their foundation for engaging with other and more advanced math concepts in their classroom. The evidence for Math Corps' impact—and from programs like it—fully and scientifically validates this approach.

## How does the content focus relative to grade-level standards play out in practice for Math Corps?

In the accompanying tables, we select one grade level (first grade) to outline alignment between the Math Corps intervention sequence and the revised math standards for the state of Minnesota. There are three strands of standards in the new revision, each covering a different share of the total number of standards: *Data and Probability* (11% of the total standards), *Spatial Reasoning* (25% of the total standards), and *Patterns and Relationships* (64% of the total standards). The comparative table operationalizes the guiding principles for Math Corps. By design, the Math Corps scope and sequence aligns with nearly 100% of the *Patterns and Relationships* standards, and indirectly aligns with *Measurement and Spatial Reasoning* standards. Math Corps is designed to build core skills captured in the *Patterns and Relationships* strand so that students develop strong foundational skills that immediately help in class and position students for future success.

MN Standard Strand (First Grade)	Math Corps Alignment
<b>Data and Probability</b> ( <i>Data Science; Chance and Uncertainty</i> ) 11% of total standards are related to Data and Probability.	Math Corps content provides indirect skill-building for Data and Probability
<b>Spatial Reasoning</b> ( <i>Measurement; Geometry</i> ) 25% of total standards are related to Spatial Reasoning	Math Corps provides indirect skill-building Spatial Reasoning
<b>Patterns and Relationships</b> ( <i>Number Relationships, Equivalence and Relational Thinking, Patterns and Relationships</i> ) 64% of total standards are related to Patterns and Relationships	Math Corps directly addresses the foundational skills included in Minnesota's <i>Patterns and Relationships</i> strand.

MN Patterns and Relationships Benchmark Description	Math Corps Unit Alignment	Math Corps Activity Examples
1.3.5.1 Count collections of objects up to 120 using groups of 5s or 10s.	<b>U1:</b> <i>Counting and Representing Numbers</i> <b>U2:</b> <i>Advanced Representation of Numbers and Place Value</i>	Represent and count numbers up to 120 with Base 10 blocks, beginning with any number.
1.3.5.2 Read, write, compare, order and represent whole numbers from 0 to 120. Refer to one, two, three, four, five, six, seven, eight or nine groups of 10s.	<b>U2:</b> <i>Advanced Representation of Numbers and Place Value</i> <b>U3:</b> <i>Comparing Numbers or Objects</i>	Build two-digit numbers with place value blocks; compare two-digit numbers using base ten blocks; compare 2-3 two digit numbers with and without base ten blocks.
1.3.5.3 Count, with or without objects, forward and backward from any given number up to 120.	<b>U1:</b> <i>Counting and Representing Numbers</i>	Verbally count forwards and backwards from 0-20. Skip count by 2s, 5s, 10s, up to 100.
1.3.5.4 Use models, pictures or numbers to recognize and describe the place value of numbers between 10 and 120 as a relationship of n groups of 10 plus an amount represented by a single digit ( $n \times 10 + a$ ).	<b>U2:</b> <i>Advanced Representation of Numbers and Place Value</i>	Use models, drawings, or written numbers in expanded form to describe the place value of numbers between 10 and 120.

<b>MN Patterns and Relationships Benchmark Description</b>		<b>Math Corps Unit Alignment</b>	<b>Math Corps Activity Examples</b>
1.3.5.5	Estimate amounts up to 120 using benchmarks of 5s and 10s.	<b>U1:</b> <i>Counting and Representing Numbers</i>	Identify patterns and missing numbers when skip counting forward by 2s, 5s, and 10s and counting backward by 1s.
1.3.5.6	Solve contextual situations, up to and including 20, using addition and subtraction strategies of adding to, taking from, part-part-whole, difference between and comparing. Solve for unknowns in contextual situations using objects, drawings and equations with unknowns represented by a symbol in all positions (result, change, start).	<b>U4:</b> <i>Addition and Subtraction</i> <b>U5:</b> <i>Addition and Subtraction Word Problem Solving</i>	Identify and solve change, compare, and part-part-whole problems; create contextual applications of change, compare, and part-part-whole problems; solve for unknowns using symbols.
1.3.5.7	Add within 100, including adding a two-digit number with a one-digit number and adding a two-digit number with a multiple of 10 using concrete models, place value language and properties of operations. Understand that in adding two-digit numbers, sometimes it is necessary to compose a new ten.	<b>U4:</b> <i>Addition and Subtraction</i>	Add within 100 using base 10 blocks and drawings, inclusive of decomposition; Add within 100 with numerals within 100, inclusive of decomposition.
1.3.5.8	Decompose numbers less than or equal to 10 into pairs, in more than one way, using objects or drawings. Record each decomposition with a drawing or equation.	<b>U4:</b> <i>Addition and Subtraction</i> <b>U5:</b> <i>Addition and Subtraction Word Problem Solving</i>	Solve addition and subtraction equations within 10 using objects and numerals.
1.3.5.9	Add and subtract within 20, demonstrating fluency for addition and subtraction within 10. Use strategies such as counting on, making ten, decomposing a number leading to a ten using the relationship between addition and subtraction and creating equivalent but easier or known sums.	<b>U4:</b> <i>Addition and Subtraction</i> <b>U5:</b> <i>Addition and Subtraction Word Problem Solving</i>	Solve addition and subtraction equations within 20 using objects and numerals; Develop fluency with addition and subtraction via tailored and adaptive tech-based math fact practice
1.3.5.10	Use combinations of 10 to add to the next decade through 100.	<b>U4:</b> <i>Addition and Subtraction</i> <b>U5:</b> <i>Addition and Subtraction Word Problem Solving</i>	Add within 100 using base 10 blocks and drawings, inclusive of decomposition; Add within 100 with numerals within 100, inclusive of decomposition.
1.3.5.11	Determine the double of any single-digit number.	<b>U4:</b> <b>Addition and Subtraction</b>	Use doubling as a strategy for solving addition problems where identical single digit numbers are summed.
1.3.5.12	Represent and solve contextual equal sharing situations where a whole number of items is shared equally among 2 groups. Name the fractional amount using the word "half."	-	-
1.3.6.1	Compare two two-digit numbers based on the meaning of the tens and ones	<b>U2:</b> <i>Advanced Representation of</i>	Build two-digit numbers with place value blocks; compare two-digit numbers using base

<b>MN Patterns and Relationships Benchmark Description</b>	<b>Math Corps Unit Alignment</b>	<b>Math Corps Activity Examples</b>
digits.	<i>Numbers and Place Value</i> <b>U3: Comparing Numbers or Objects</b>	ten blocks; compare 2-3 two digit numbers with and without base ten blocks; Use models, drawings, or written numbers in expanded form to describe the place value of two-digit numbers.
1.3.6.2 Determine if equations involving addition and subtraction are true or false, including those with operations on both sides.	<b>U4: Addition and Subtraction</b>	Develop understanding of the meaning of the equal sign by determining the unknown number in an equation that makes the equation true and determine if equations are true or false.
1.3.6.3 Determine the unknown whole number in an addition or subtraction equation relating three whole numbers.	<b>U4: Addition and Subtraction</b> <b>U5: Addition and Subtraction Word Problem Solving</b>	Determine the unknown number in an equation that makes the equation true and determine if equations are true or false.
1.3.7.1 Create simple patterns using objects, pictures, numbers and rules. Identify possible rules to complete or extend patterns. Patterns may be repeating, growing or shrinking. Calculators can be used to create and explore patterns.	<b>U1: Counting and Representing Numbers</b>	Identify the pattern and missing numbers when skip counting forwards by 2s, 5s, and 10s and counting forwards and backwards by 1s.
1.3.7.2 Recognize patterns in counting. Skip count by 2s and 5s starting at zero up to 120. Skip count by 10s up to 120 starting at a non-zero number.	<b>U1: Counting and Representing Numbers</b>	Identify the pattern and missing numbers when skip counting forwards by 2s, 5s, and 10s (at any number) and counting forwards and backwards by 1s.
1.3.7.3 Describe what is changing and what is staying the same in a visual growing pattern.	-	-