MKS Elementary Math Curriculum

The MKS Elementary mathematics curriculum is framed around the American AERO standards. Within these standards, American curriculum schools work towards internationally recognized standards to ensure that the critical areas of the curriculum are targeted in depth with students over the course of the year.

Each grade level is focused on Critical Areas and supporting areas that allow teachers to target core standards. Successful mastery of these critical areas ensure students are ready for the coming grade, and develop the necessary skills to achieve their next steps in learning.

This guide is intended to help parents develop an understanding of the critical standards students are expected to grasp by the end of the school year.

Grade 1

Critical Area One: Adding and Subtracting

- Develop strategies for adding and subtracting whole numbers based on their work in kindergarten with small numbers.
- Model addition and subtraction strategies such as add-to, take-from and put-together, take apart with objects and length based models (e.g., cubes connected to form lengths), and compare situations to understand the operations of addition and subtraction.
- Develop strategies to solve arithmetic problems with addition and subtraction. Understand the connection between counting and addition and subtraction.
- Use properties of addition (commutative and associative) to add whole numbers and to create and use strategies to solve problems within 20. Students do not need to use the names of the properties at this point. Build their understanding of the relationship between addition and subtraction.

Critical Area 2: Understanding Place Value

- Use efficient and accurate methods to add within 100 and subtract multiples of ten.
- Be able to compare numbers (e.g., greater than, less than, equal to, more, less) and solve problems using that comparison.
- Understand whole numbers between 10 and 100 as tens and ones, especially recognizing numbers between 11 and 19 as a ten and some ones.

Critical Area 3: Measurement

- Understand the meaning of measurement.
- Know and use methods of measurement, such as comparing objects to estimate their size.
- Measure the length of an object using smaller objects of equal size lying end to end with no overlaps or gaps.

Critical Area Four: Geometry

- Be able to compose (put together) and decompose (take apart) shapes.
- Build their understanding of part-whole relationships through composing and decomposing shapes. Recognize newly composed shapes from different orientations and perspectives.
- Describe the shapes geometrically. Determine how the shapes are alike and different

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Grade ②

Critical Area One: Extending Understanding of Base-Ten Notations
- Count by fives, tens, and hundreds.
- Understand the value of each digit in a four-digit number (e.g., 432 is 4 hundreds + 3 tens + 2 ones). Compare three-digit numbers using the, and = symbols.

Critical Area Two: Building Fluency with Addition and Subtraction
- Become fluent with addition and subtraction within 100.
- Solve problems within 1,000.
  - Use models.
  - Develop and use efficient, generalizable (can be used in many problems) and accurate methods.
  - Use their understanding of place value and properties of operations.
- Apply appropriate methods to mentally calculate sums and differences for numbers with only 10s or only 100s.

Critical Area 3: Measurement
- Recognize the need for standard units of measurement (e.g., centimeter and inch).
- Use measurement tools like rulers, yardsticks, and meter sticks.
- Understand that measuring length (linear measure) may require using measurement tools iteratively (over and over until the entire object is measured).
- The smaller the unit of measure (centimeter versus inch) the more times the unit must be used to cover a given length.

Critical Area Four: Geometry
- Describe and analyze shapes by examining their sides and angles.
- Investigate, describe, and reason about decomposing (taking apart) and combining shapes to make other shapes.
- Build, draw and analyze two- and three-dimensional shapes in order to gain a foundation for understanding area, volume, congruence, similarity, and symmetry in later grades.

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Grade **3**

Critical Area One: Developing an Understanding of Multiplication and Division and Strategies within 100

- Understand the meaning of multiplication and division.
- Work through activities and problems involving equal-sized groups, arrays, and area models.
- Understand the relationship between multiplication and division

Critical Area Two: Developing Understanding of Fraction Equivalence, Addition and Subtraction of Fractions with Like Denominators, and Multiplication of Fractions by Whole Numbers

- Develop understanding of fractions with denominators limited to 2, 3, 4, 6, 8.
- Start with unit fractions.
- Non-unit fractions are built of unit fractions.
- Use fractions and visual models to represent parts of a whole.
- Understand that the size of a fractional part is related to the size of the whole.
- Use fractions to represent numbers equal to, less than, and greater than one.
- Be able to solve problems comparing fractions.

Critical Area Three: Developing Understanding of the Structure of Rectangular Arrays and of Area

- Recognize area as an attribute of two- dimensional shapes.
- Measure the area of a shape:
  - Find the total number of same-sized square units e.g., inches, centimeters, needed to cover the shape with no gaps or overlaps.
  - One square unit is the standard unit of measure.
- Understand that rectangular arrays (organized patterns like rows and columns) can be decomposed (taken apart) into identical rows or columns.
- Use decomposition of arrays

Critical Area Four: Describing and Analyzing Two-Dimensional Shapes

- Describe, analyze and compare properties of two-dimensional shapes.
- Compare and classify shapes by their sides and angle.
- Relate the fractions they are learning to geometry by expressing the area of part of a shape as a unit fraction of the whole shape.

Grade

3

Addition Progression Standards (To be addressed once the above is mastered)
- Represent and interpret data.
- Solve problems involving measurement and estimation of intervals of time, liquid volumes, and masses of
- objects.

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Grade 4

Critical Area One: Develop an understanding and fluency with multi-digit multiplication and developing understanding of dividing to find quotients involving multi-digit dividends

- Understand place value up to 1,000,000 and know the value of each number in each place.
- Be able to compute products (answers to multiplication problems) and quotients (answers to division problems) of whole numbers with multiple digits ay applying what they learned in previous grades.
- Understand that multiplication and division are opposite operations; that is, multiplication and division reverse each other.
- Estimate and mentally calculate products and quotients.
- Become fluent with procedures for multiplying and dividing whole numbers efficiently.
- Understand and explain why multiplication and division procedures work.
- Solve problems using multiplication and division procedures

Critical Area Two: Developing Understanding of Fraction Equivalence, Addition and Subtraction of Fractions with Like Denominators, and Multiplication of Fractions by Whole Numbers

- Understand how different fractions can be equivalent. They will develop ways of recognizing and generating equivalent fractions.
- Understand that fractions can be compared, added, subtracted and multiplied, and perform those operations.
- Be able to use and understanding of unit fractions (e.g. ¼, 1/6) to compose (build) fractions from unit fractions, and to decompose (break into parts) fraction into unit fractions.
- Be able to multiply a fraction by a whole number.

Critical Area Three: Understand that geometric figures can be analyzed and classified based ont heir properties, such as having parallel sides, perpendicular sides, particular angle measures, and symmetry.

- Describe, analyze, compare and classify-two-dimensional shapes
- Deepen their understanding of two-dimensional shapes and their characteristics (properties).
- Use two-dimensional shapes to solve problems involving line symmetry (the shape is the same on both sides of the line).

Grade 4

Additional Areas (once the standards above have been addressed)

- Gain familiarity with factors and multiples.
- Generate and analyze patterns.
- Solve problems involving measurement and conversion of measurements from a larger unit to a smaller unit.
- Represent and interpret data.

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Grade 5

Critical Area One: Developing Fluency with addition and subtraction of fractions

- Represent addition and subtraction of fractions with unlike denominators as equivalent problems with like denominators.
- BE able to fluently add and subtract fractions with unlike denominators.
- Bes able to estimate sums and differences of fractions
- Be able to represent multiplication and division of fractions in model form. (this is limited to division of unit fractions, e.g. 1/8, 1/5, or 1/3 by whole numbers and whole numbers by unit fractions)
- BE able to explain why the procedures for multiplying and dividing fractions makes sense.

Critical Area Two: Extend division to 2-digit divisors, integrating decimal fractions into the place value system and developing understanding of operations with decimals to hundredths, and developing fluency with whole number and decimal operations.

- Use the meaning of base-ten numbers and properties of operations to explain why division procedures work
- Fluently compute multi-digit numbers in all operations.
- Fluently add and subtract decimals to the hundredth place
- Estimate sums and differences of decimal numbers to the hundredths place.
- Understand and explain the procedures for multiplying and dividing decimal numbers.
- Accurately and fluently multiply and divide decimal numbers (to the hundredths place).

Critical Area Three: Developing understanding of volume

- Recognize that three-dimensional shapes have volume.
- Understand that volume can be measured by finding the total number of the same size units (cubes)
- Select appropriate units of measure.
- Select appropriate tools and strategies for measuring and/or estimating volume.
- Be able to decompose (break apart) three-dimensional shapes into layers of arrays of cubes and use the volume of the smaller shapes to calculate total volume.
- Determine and measure the parts of three dimensional shapes in order to find the volumes and solve rea-world and mathematical problems.

Grade

5

Critical Areas: Additional Standards

- Write and interpret numerical expressions
- Analyze patterns and relationships
- Convert like measurements within a given measurement system.
- Represent and interpret data.
- Graph points on a coordinate plane to solve real-world and mathematical problems.

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