GRADE FOUR MATH OVERVIEW

Operations and Algebraic Thinking, OA

- Use the four operations with whole numbers to solve problems.
- Gain familiarity with factors and multiples.
- Generate and analyze patterns.

Number and Operations in Base Ten, NBT

- Generalize place value understanding for multi-digit whole numbers.
- Use place value understanding and properties of operations to perform multi-digit arithmetic.

Number and Operations—Fractions, NF

- Extend understanding of fraction equivalence and ordering.
- Build fractions from unit fractions by applying and extending previous understandings of operations on whole numbers.
- Understand decimal notation for fractions, and compare decimal fractions.

Measurement and Data, MD

- Solve problems involving measurement and conversion of measurements from a larger unit to a smaller unit.
- Represent and interpret data.
- Geometric measurement: understand concepts of angle and measure angles.

Geometry, G

- Draw and identify lines and angles, and classify shapes by properties of their lines and angles.

Mathematical Practices

1. Make sense of problems and persevere in solving them.
2. Reason abstractly and quantitatively.
3. Construct viable arguments and critique the reasoning of others.
4. Model with mathematics.
5. Use appropriate tools strategically.
6. Attend to precision.
7. Look for and make use of structure.
8. Look for and express regularity in repeated reasoning.

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YEAR AT A GLANCE

Trimester 1 (Aug-Oct) Inspirational Math Week from Stanford's YouCubed	**Trimester 2** (Nov-Jan)	**Trimester 3** (Feb-May)
• Place Value 1,000,000 to 1/100 and rounding multi-digit numbers; • Whole number addition and subtraction; • Factors, Multiples, Prime, Composite; • Models of properties of operations in multiplication and division; • Estimate and mentally compute • Develop fluency with efficient procedures; • Apply Area and Perimeter formulas in real world My Math: Ch. 1, 2, 3, 4, 6, 13	• Relationship to multiplication multi-digit division; • Using x and ÷ strategies with large numbers; • Estimate and mentally compute quotients; • Rewrite problem situations using variables and function tables • Decimal-Fraction comparison and notation • Fraction equivalence and comparison; • Decompose/Compose fractions; My Math: Ch. 5, 7, 8, 10 ECM: Ch. 1, 2, 3	• Addition and subtraction of fractions and mixed numbers • Analyzing, comparing and classifying 2-D shapes; • Angle measurement and angle parts are additive; Symmetry • Measurement and Conversions; Interpret data—line plots • Multiplication of larger numbers and decimals; • Multi-digit divisors My Math: Ch. 9, 14, 11, 12

Structures to Support CA Content Standards/CGI/Problem Solving: Real World Math, Problem Analysis "Think Time", Partner Collaboration, Productive Struggle, Whole Group Student Share

CRITICAL AREAS

Grade 4

In grade 4, instructional time should focus on three critical areas: (1) developing understanding and fluency with multi-digit multiplication, and developing understanding of dividing to find quotients involving multi-digit dividends; (2) developing an understanding of fraction equivalence, addition and subtraction of fractions with like denominators, and multiplication of fractions by whole numbers; (3) understanding that geometric figures can be analyzed and classified based on their properties, such as having parallel sides, perpendicular sides, particular angle measures, and symmetry.

(1) Students generalize their understanding of place value to 1,000,000, understanding the relative sizes of numbers in each place. They apply their understanding of models for multiplication (equal-sized groups, arrays, area models), place value, and properties of operations, in particular the distributive property, as they develop, discuss, and use efficient, accurate, and generalizable methods to compute products of multi-digit whole numbers. Depending on the numbers and the context, they select and accurately apply appropriate methods to estimate or mentally calculate products. They develop fluency with efficient procedures for multiplying whole numbers; understand and explain why the procedures work based on place value and properties of operations; and use them to solve problems. Students apply their understanding of models for division, place value, properties of operations, and the relationship of division to multiplication as they develop, discuss, and use efficient, accurate, and generalizable procedures to find quotients involving multi-digit dividends. They select and accurately apply appropriate methods to estimate and mentally calculate quotients, and interpret remainders based upon the context.

(2) Students develop understanding of fraction equivalence and operations with fractions. They recognize that two different fractions can be equal (e.g., 15/9 = 5/3), and they develop methods for generating and recognizing equivalent fractions. Students extend previous understandings about how fractions are built from unit fractions, composing fractions from unit fractions, decomposing fractions into unit fractions, and using the meaning of fractions and the meaning of multiplication to multiply a fraction by a whole number.

(3) Students describe, analyze, compare, and classify two-dimensional shapes. Through building, drawing, and analyzing two-dimensional shapes, students deepen their understanding of properties of two-dimensional objects and the use of them to solve problems involving symmetry.

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Mathematical Practice	Explanation and Examples
MP.1 Make sense of problems and persevere in solving them.	In grade four students know that doing mathematics involves solving problems and discussing how they solved them. Students explain to themselves the meaning of a problem and look for ways to solve it. Students might use an equation strategy to solve the word problem. For example, students could solve the problem "Chris bought clothes for school. She bought 3 shirts for $12 each and a skirt for $15. How much money did Chris spend on her new school clothes?" with the equation 3 x $12 + $15 = *a.* Fourth graders may use concrete objects or pictures to help them conceptualize and solve problems. They may check their thinking by asking themselves, "Does this make sense?" They listen to the strategies of others and will try different approaches. They often will use another method to check their answers
MP.2 Reason Abstractly and quantitatively	Fourth graders recognize that a number represents a specific quantity. They connect the quantity to written symbols and create a logical representation of the problem at hand, considering both the appropriate units involved and the meaning of quantities. They extend this understanding from whole numbers to their work with fractions and decimals. Students write simple expressions, record calculations with numbers, and represent or round numbers using place value concepts. Students might use base 10 blocks or drawings to demonstrate 154 x 6, as 154 added six times, and develop an understanding of the distributive property. For example, 154 X 6 = (100 + 50 + 4) x 6 = (100 x 6) + (50 X 6) + (4 X 6) = 600 + 300 + 24 = 924.
MP.3 Construct viable arguments and critique the reasoning of others	Fourth graders may construct arguments using concrete referents, such as objects, pictures, drawings, and actions. They practice their mathematical communication skills as they participate in mathematical discussions involving questions like "How did you get that?", "Explain your thinking," and "Why is that true?" They not only explain their own thinking, but listen to others' explanations. Students explain and defend their answers and solution strategies as they answer question that require an explanation. For example, "List all the different two-topping pizzas that a customer can order from a pizza shop that only offers the following four toppings: pepperoni, sausage, mushrooms, and onion." Students decide if explanations make sense and they ask appropriate questions.
MP.4 Model with mathematics	Students experiment with representing problem situations in multiple ways including numbers, words (mathematical language), drawing pictures, using objects, making a chart, list, or graph, and creating equations. Students need opportunities to connect the different representations and explain the connections. They should be able to use all of these representations as needed. Fourth graders evaluate their results in the context of the situation and reflect on whether the results make sense. For example, a student may use base 10 blocks to solve the following problem: A fourth grade teacher bought 4 new pencil boxes. She has 260 pencils. She wants to put the pencils in the boxes so that each box has the same number of pencils. How many pencils will there be in each box?

MP.5 Use appropriate tools strategically	In grade four students consider the available tools (including estimation) when solving a mathematical problem and decide when certain tools might be helpful. For instance, they may use graph paper or a number line to represent and compare decimals and protractors to measure angles. They use other measurement tools to understand the relative size of units within a system and express measurements given in larger units in terms of smaller units.
MP.6 Attend to precision	As fourth graders develop their mathematical communication skills, they try to use clear and precise language in their discussions with others and in their own reasoning. They are careful about specifying units of measure and state the meaning of the symbols they choose. For instance, they use appropriate labels when creating a line plot.
MP.7 Look for and make use of structure	In fourth grade, students look closely to discover a pattern or structure. For instance, students use properties of operations to explain calculations (partial products model). They relate representations of counting problems such as tree diagrams and arrays to the multiplication principal of counting. They generate number or shape patterns that follow a given rule.
MP.8 Look for and express regularity in repeated reasoning	In grade four students notice repetitive actions in computation to make generalizations. Students use models to explain calculations and understand how algorithms work. Students examine patterns and generate their own algorithms. For example, students use visual fraction models to write equivalent fractions.