CAISL
Carlucci American International School of Lisbon

GRADE 4 MATH FRAMEWORK

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EXPECTATIONS

MATH TOOLS

To support curriculum implementation, the Common Core recommends the use of certain math tools at each grade level. CAISL implements these recommendations. See link below:
https://www.caislisbon.org/uploaded/Curriculum_links/Math/Manipulatives_3-5.pdf

MENTAL MATH

To reinforce computational fluency, students are expected to practice mental math calculations based on grade level content on a weekly basis.

INFORMATION TECHNOLOGY EXPECTATIONS

Students will be expected to use a variety of digital tools according to grade level expectations stated in CAISL's Research and Information Technology Integration Scope and Sequence.
See link below:
https://www.caislisbon.org/uploaded/Curriculum_links/2019-2020/IT_Skills_Scope_and_Sequence_by_Grade.pdf

PERFORMANCE INDICATORS

MATH PRACTICES

Explanations of Math Practices: By the end of the year students will be expected to problem solve, reason mathematically, and communicate efficiently according to grade level expectations. See link below:
https://www.caislisbon.org/uploaded/Curriculum_links/Math/Math_Practice_Progressions_K-5.pdf

PROBLEM SOLVING

Make sense of problems and persevere in solving them
Look for and make use of structure (Deductive Reasoning)
Look for and express regularity in repeated reasoning (Inductive Reasoning)

MATHEMATICAL REASONING, COMMUNICATION AND MODELING

Reason abstractly and quantitatively
Construct viable arguments and critique the reasoning of others
Model with mathematics
Use appropriate tools strategically
Attend to precision

MATH CONCEPTS

OPERATIONS AND ALGEBRAIC THINKING

Interpret a multiplication equation as a comparison. Represent verbal statements of multiplicative comparisons as multiplication equations. DOK 1, 2 E
Multiply or divide to solve word problems involving multiplicative comparison. DOK 1, 2 E
Solve multistep word problems posed with whole numbers and having whole-number answers using the four operations, including problems in which remainders must be interpreted. Represent these problems using equations with a letter standing for the unknown quantity. Assess the reasonableness of answers using mental computation and estimation strategies including rounding. DOK 1, 2, 3 E
Find all factor pairs for a whole number in the range 1-100. Recognize that a whole number is a multiple of each of its factors. Determine whether a given whole number in the range 1-100 is a multiple of a given one-digit number. Determine whether a given whole number in the range 1-100 is prime or composite. DOK 1 E

Generate a number or shape pattern that follows a given rule. Identify apparent features of the pattern that were not explicit in the rule itself. DOK 1, 2

NUMBER AND OPERATIONS IN BASE TEN

Recognize that in a multi-digit whole number, a digit in one place represents ten times what it represents in the place to its right. DOK 1 E
Read and write multi-digit whole numbers using base-ten numerals, number names, and expanded form. Compare two multi-digit numbers based on meanings of the digits in each place, using >, =, and < symbols to record the results of comparisons. DOK 1 E
Use place value understanding to round multi-digit whole numbers to any place. DOK 1 E
Fluently add and subtract multi-digit whole numbers using the standard algorithm. DOK 1 E
Multiply a whole number of up to four digits by a one-digit whole number, and multiply two two-digit numbers, using strategies based on place value and the properties of operations. Illustrate and explain the calculation by using equations, rectangular arrays, and/or area models. DOK 1, 2 E
Find whole-number quotients and remainders with up to four-digit dividends and one-digit divisors, using strategies based on place value, the properties of operations, and/or the relationship between multiplication and division. Illustrate and explain the calculation by using equations, rectangular arrays, and/or area models. DOK 1, 2 E

NUMBERS AND OPERATIONS - FRACTIONS

Explain why a fraction a/b is equivalent to a fraction $(n \times a)/(n \times b)$ by using visual fraction models, with attention to how the number and size of the parts differ even though the two fractions themselves are the same size. Use this principle to recognize and generate equivalent fractions. DOK 1, 2, 3 E
Compare two fractions with different numerators and different denominators. Recognize that comparisons are valid only when the two fractions refer to the same whole. Record the results of comparisons with symbols >, =, or <, and justify the conclusions. DOK 1, 2, 3 E
Understand a fraction a/b with $a > 1$ as a sum of fractions $1/b$. DOK 1, 2, 3 E
Apply and extend previous understandings of multiplication to multiply a fraction by a whole number. DOK 1, 2 E
Express a fraction with denominator 10 as an equivalent fraction with denominator 100, and use this technique to add two fractions with respective denominators 10 and 100.[2] DOK 1 E
Use decimal notation for fractions with denominators 10 or 100. DOK 1
Compare two decimals to hundredths by reasoning about their size. Recognize that comparisons are valid only when the two decimals refer to the same whole. Record the results of comparisons with the symbols >, =, or <, and justify the conclusions. DOK 1, 2, 3

MEASUREMENT AND DATA

Know relative sizes of measurement units within one system of units including km, m, cm; kg, g; lb, oz.; l, ml; hr, min, sec. Within a single system of measurement, express measurements in a larger unit in terms of a smaller unit. Record measurement equivalents in a two-column table. DOK 1
Use the four operations to solve word problems involving distances, intervals of time, liquid volumes, masses of objects, and money, including problems involving simple fractions or decimals, and problems that require expressing measurements given in a larger unit in terms of a smaller unit. Represent measurement quantities using diagrams such as number line diagrams that feature a measurement scale. DOK 1, 2

Apply the area and perimeter formulas for rectangles in real world and mathematical problems. DOK 1, 2
Make a line plot to display a data set of measurements in fractions of a unit (1/2, 1/4, 1/8). Solve problems involving addition and subtraction of fractions by using information presented in line plots. DOK 1, 2
Recognize angles as geometric shapes that are formed wherever two rays share a common endpoint and understand concepts of angle measurement. DOK 1
Measure angles in whole-number degrees using a protractor. Sketch angles of specified measure. DOK 1
Recognize angle measure as additive. When an angle is decomposed into non-overlapping parts, the angle measure of the whole is the sum of the angle measures of the parts. Solve addition and subtraction problems to find unknown angles on a diagram in real world and mathematical problems. DOK 1, 2

GEOMETRY

Draw points, lines, line segments, rays, angles (right, acute, obtuse), and perpendicular and parallel lines. Identify these in two-dimensional figures. DOK 1 E
Classify two-dimensional figures based on the presence or absence of parallel or perpendicular lines, or the presence or absence of angles of a specified size. Recognize right triangles as a category and identify right triangles. DOK 1, 2 E
Recognize a line of symmetry for a two-dimensional figure as a line across the figure such that the figure can be folded along the line into matching parts. Identify line-symmetric figures and draw lines of symmetry. DOK 1 E

<u>FURTHER CURRICULAR EXPECTATIONS</u>

For the Performance Indicator (Number and Operations - Fractions):
Understand a fraction a/b with $a > 1$ as a sum of fractions $1/b$.

- Understand addition and subtraction of fractions as joining and separating parts referring to the same whole.
- Decompose a fraction into a sum of fractions with the same denominator in more than one way, recording each decomposition by an equation. Justify decompositions, e.g., by using a visual fraction model. *Examples: 3/8 = 1/8 + 1/8 + 1/8 ; 3/8 = 1/8 + 2/8 ; 2 1/8 = 1 + 1 + 1/8 = 8/8 + 8/8 + 1/8*.
- Add and subtract mixed numbers with like denominators, e.g., by replacing each mixed number with an equivalent fraction, and/or by using properties of operations and the relationship between addition and subtraction.
- Solve word problems involving addition and subtraction of fractions referring to the same whole and having like denominators, e.g., by using visual fraction models and equations to represent the problem.

Apply and extend previous understandings of multiplication to multiply a fraction by a whole number.

- Understand a fraction a/b as a multiple of $1/b$. *For example, use a visual fraction model to represent 5/4 as the product 5 × (1/4), recording the conclusion by the equation 5/4 = 5 × (1/4)*.
- Understand a multiple of a/b as a multiple of 1/b and use this understanding to multiply a fraction by a whole number. *For example, use a visual fraction model to express 3 × (2/5) as 6 × (1/5), recognizing this product as 6/5. (In general, n × (a/b) = (n × a)/b.)*
- Solve word problems involving multiplication of a fraction by a whole number, e.g., by using visual fraction models and equations to represent the problem. *For example, if each person at a*

party will eat 3/8 of a pound of roast beef, and there will be 5 people at the party, how many pounds of roast beef will be needed? Between what two whole numbers does your answer lie?

For the Performance Indicator (Measurement and Data):
Recognize angles as geometric shapes that are formed wherever two rays share a common endpoint and understand concepts of angle measurement.

- An angle is measured with reference to a circle with its center at the common endpoint of the rays, by considering the fraction of the circular arc between the points where the two rays intersect the circle. An angle that turns through 1/360 of a circle is called a "one-degree angle," and can be used to measure angles.
- An angle that turns through *n* one-degree angles is said to have an angle measure of *n* degrees.