REVISIONS TO STANDARDS BASED REPORT CARD FOR MATHEMATICS 2015-16

Fifth Grade

	MP1	MP2	MP3	MP4
OPERATIONS AND ALGEBRAIC THINKING				
A. Write and interpret numerical expressions.				
B. Analyze patterns and relationships.	▨			
NUMBER AND OPERATIONS IN BASE TEN				
A. Understand place value system.				
B. Perform operations with multi-digit whole numbers and with decimals to hundredths.				
NUMBER AND OPERATIONS—FRACTIONS				
A. Use equivalent fractions as a strategy to add and subtract fractions.	▨			
B. Apply and extend previous understandings of multiplication and division to multiply and divide fractions.	▨			
MEASUREMENT AND DATA				
A. Convert like measurement units within a given measurement system.	▨			
B. Represent and interpret data.	▨			
C. Geometric measurement: understand concepts of volume and relate volume to multiplication and to addition.	▨			
GEOMETRY				
A. Graph points on the coordinate plane to solve real-world and mathematical problems.	▨	▨		
B. Classify two-dimensional figures into categories based on their properties.	▨	▨		

OPERATIONS AND ALGEBRAIC THINKING

A. Write and interpret numerical expressions. (Starting MP1)
1. Use parentheses, brackets, or braces in numerical expressions, and evaluate expressions with these symbols.
2. Write simple expressions that record calculations with numbers, and interpret numerical expressions without evaluating them. *Ex: Express "add 8 and 7, then multiply by 2" as 2 × (8 + 7). Recognize that 3 × (18932 + 921) is three times as large as 18932 + 92, without calculating.*

B. Analyze patterns and relationships. (MP4)
3. Generate two numerical patterns using two given rules. Identify apparent relationships between corresponding terms. Form ordered pairs consisting of corresponding terms from the two patterns, & graph the ordered pairs on a coordinate plane. *Ex: Given the rules "Add 3" starting at 0 & "Add 6" starting at 0, generate terms in the sequences, & observe that the terms in one sequence are twice the corresponding terms in the other. Explain why.*

NUMBER AND OPERATIONS IN BASE TEN (Starting MP1)

A. Understand the place value system.
1. Recognize that in a multi-digit number, a digit in one place represents 10 times as much as it represents in the place to its right and 1/10 of what it represents in the place to its left.
2. Explain patterns in the number of zeros of the product when multiplying a number by powers of 10, and explain patterns in the placement of the decimal point when a decimal is multiplied or divided by a power of 10. Use whole-number exponents to denote powers of 10.
3. Read, write, and compare decimals to thousandths.
   a. Read & write decimals to thousandths using base-ten numerals, number names, & expanded form, *e.g., $307.092 = 3 \times 100 + 7 \times 1 + 9 \times (1/100) + 2 \times (1/1000)$.*
   b. Compare two decimals to thousandths based on meanings of the digits in each place, using >, =, and < symbols to record results of comparisons.
4. Use place value understanding to round decimals to any place.

B. Perform operations with multi-digit whole numbers and with decimals to hundredths.
5. Fluently multiply multi-digit whole numbers using the standard algorithm.
6. Find whole-number quotients of whole #'s with up to 4-digit dividends & 2-digit divisors, using strategies based on place value, the prop. of operations, &/or the relationship between mult. & div. Illustrate & explain the calculation by using equations, rectangular arrays, &/or area models.
7. Add, subtract, multiply, and divide decimals to hundredths, using concrete models or drawings and strategies based on place value, properties of operations, and/or the relationship between addition and subtraction; relate the strategy to a written method and explain the reasoning used.

NUMBER AND OPERATIONS—FRACTIONS (Starting MP3)

A. Use equivalent fractions as a strategy to add and subtract fractions.
1. Add & subtract fractions with unlike denominators (including mixed #'s) by replacing given fractions with equivalent fractions in such a way as to produce an equivalent sum or difference of fractions with like denominators. *Ex: $2/3 + 5/4 = 8/12 + 15/12 = 23/12$ (In general, $a/b + c/d = (ad + bc)/bd$.).*
2. Solve word probs. invol. add/sub of fractions referring to same whole, including unlike denominators, *e.g., use visual models or equations to represent prob.* Use benchmark fractions & number sense to estimate mentally & assess answer reasonableness. *Ex: $2/5 + 1/2 = 3/7$ is incorrect by observing $3/7 < 1/2$.*

B. Apply and extend previous understandings of multiplication and division to multiply and divide fractions.
3. Interpret a fraction as division of the numerator by the denominator ($a/b = a \div b$). Solve word problems involving division of whole numbers leading to answers in the form of fractions or mixed numbers, e.g., by using visual models or equations to represent problem. *Ex: Interpret 3/4 as the result of dividing 3 by 4, noting that 3/4 multiplied by 4 equals 3, & that when 3 wholes are shared equally among 4 people ea. person has a share of size 3/4. If 9 people want to share a 50-pound sack of rice equally by weight, how many pounds of rice should each person get? Between what two whole numbers does your answer lie?*
4. Apply and extend previous understandings of multiplication to multiply a fraction or whole number by a fraction.
   a. Interpret the product $(a/b) \times q$ as a parts of a partition of q into b equal parts; equivalently, as the result of a sequence of operations $a \times q \div b$. *Ex: use a visual model to show $(2/3) \times 4 = 8/3$, & create a story context for this equation. Do the same with $(2/3) \times (4/5) = 8/15$. (In general, $(a/b) \times (c/d) = ac/bd$..)*
   b. Find area of a rectangle w' fractional side lengths by tiling it w' unit squares of appropriate unit fraction side lengths & show the area is the same as would be found by multiplying side lengths. Mult. fractional side lengths to find rectangle areas, & represent fraction products as rectangular areas.
5. Interpret multiplication as scaling (resizing), by:
   a. Comparing the size of a product to the size of one factor on the basis of the size of the other factor, w'out performing the indicated multiplication.
   b. Explaining why multiplying a given number by a fraction greater than 1 results in a product greater than the given number (recognizing multiplication by whole numbers greater than 1 as a familiar case); explaining why multiplying a given number by a fraction less than 1 results in a product smaller than the given number; and relating the principle of fraction equivalence $a/b = (n \times a)/(n \times b)$ to the effect of multiplying a/b by 1.
6. Solve real world problems involving multiplication of fractions & mixed numbers, e.g., by using visual models or equations to represent the problem.
7. Apply and extend previous understandings of division to divide unit fractions by whole numbers and whole numbers by unit fractions. *(Students able to multiply fractions in general can develop strategies to divide fractions in general, by reasoning about the relationship between mult. & div. But dividing a fraction by a fraction is not a gr.5 requirement.)*
   a. Interpret division of a unit fraction by a non-zero whole number, and compute such quotients. *Ex: Create a story context for $(1/3) \div 4$, & use a visual fraction model to show the quotient. Use the relationship between multiplication and division to explain that $(1/3) \div 4 = 1/12$ because $(1/12) \times 4 = 1/3$.*
   b. Interpret division of a whole number by a unit fraction, and compute such quotients. *For example, create a story context for $4 \div (1/5)$, and use a visual fraction model to show the quotient. Use the relationship between multiplication and division to explain that $4 \div (1/5) = 20$ because $20 \times (1/5) = 4$.*
   c. Solve real world probs involving division of unit fractions by non-zero whole #'s & division of whole #'s by unit fractions, e.g., by using visual models & equations to represent prob. *Ex: How much will ea. person get if 3 people share ½ lb of chocolate equally? How many ⅓-cup servings are in 2 cups?*

MEASUREMENT AND DATA

A. Convert like measurement units within a given measurement system. (MP4)
1. Convert among different-sized standard measurement units within a given measurement system (e.g., convert 5 cm to 0.05 m), and use these conversions in solving multi-step, real world problems.

B. Represent and interpret data. (MP4)
2. Make a line plot to display a data set of measurements in fractions of a unit (½,¼,⅛). Use operations on fractions to solve probs involving info from line plots. *Ex: Given different measurements of liquid in identical beakers, find the amount ea. beaker would contain if the total amount in all the beakers were redistributed equally.*

C. Geometric measurement: understand concepts of volume and relate volume to multiplication and to addition. (MP4)
3. Recognize volume as an attribute of solid figures and understand concepts of volume measurement.
   a. A cube with side length 1 unit, called a "unit cube," is said to have "one cubic unit" of volume, and can be used to measure volume.
   b. A solid figure which can be packed without gaps or overlaps using n unit cubes is said to have a volume of n cubic units.
4. Measure volumes by counting unit cubes, using cubic cm, cubic in, cubic ft, and improvised units.
5. Relate volume to the operations of multiplication and addition and solve real world and mathematical problems involving volume.
   a. Find the volume of a right rectangular prism with whole-number side lengths by packing it with unit cubes, and show that the volume is the same as would be found by multiplying the edge lengths, equivalently by multiplying the height by the area of the base. Represent threefold whole-number products as volumes, e.g., to represent the associative property of multiplication.
   b. Apply formulas $V = l \times w \times h$ & $V = b \times h$ to find volumes of right rectangular prisms with whole # edge lengths in the context of solving real world/math probs.
   c. Recognize volume as additive. Find volumes of solid figures composed of two non-overlapping right rectangular prisms by adding the volumes of the non-overlapping parts, applying this technique to solve real world problems.

GEOMETRY

A. Graph points on the coordinate plane to solve real-world and mathematical problems. (MP4)
1. Use a pair of perpendicular number lines, called axes, to define a coordinate system, with the intersection of the lines (the origin) arranged to coincide with the 0 on each line and a given point in the plane located by using an ordered pair of numbers, called its coordinates. Understand the 1st number indicates how far to travel from the origin in the direction of one axis, and the 2nd number indicates how far to travel in the direction of the 2nd axis, with the convention that the names of the two axes and the coordinates correspond *(e.g., x-axis and x-coordinate, y-axis and y-coordinate).*
2. Represent real world/ math probs by graphing pts. in 1st quadrant of coordinate plane, & interpret coordinate values of pts. in context of the situation.

B. Classify two-dimensional figures into categories based on their properties. (Starting MP3)
3. Understand that attributes belonging to a category of 2-dimensional figures also belong to all subcategories of that category. *Ex: All rectangles have four right angles and squares are rectangles, so all squares have four right angles.*
4. Classify 2-dimensional figures in a hierarchy based on properties.

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