Gwinnett County Public Schools Mathematics Academic Knowledge and Skills (AKS)

Grade Level: 5th Grade

Implementation Fall 2023

Big Idea: Numerical Reasoning (NR)

place value, multiplying by powers of 10, multiplication and division of multi-digit numbers, fractions, decimal numbers, numerical expressions

AKS: 5MA.A.1	use place value understanding to solve real-life, mathematical problems (5.NR.1)
1.a	explain 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 (up to 100 times greater) and 1/10 of what it represents in the place to its left (up to 1/1000 of the value) (5.NR.1.1)
1.b	explain patterns in the placement of digits when multiplied or divided by a power of 10; use whole-number exponents to denote powers of 10, up to 10^3 (5.NR1.2)

AKS: 5MA.A.2	multiply and divide multi-digit whole numbers to solve relevant, mathematical problems (5.NR.2)
2.a	multiply multi-digit (up to three-digit by two-digit) whole numbers fluently to solve authentic problems (5.NR.2.1)
2.b	divide multi-digit whole numbers (up to four-digit dividends and two-digit divisors no greater than 25) fluently to solve practical problems (5.NR.2.2)
2.c	create multiple representations that demonstrate an understanding of multiplication and division **(Extension)**
2.d	create a product, based on an authentic student topic of interest, to demonstrate the relationship between multiplication and division **(Extension)**
2.e	apply understanding of multiplication and division concepts to critique the reasoning of others (e.g., after analyzing a scenario-based error analysis, plan a list of questions you would ask others to support their understanding and correct the error) **(Extension)**

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AKS: 5MA.A.3	describe fractions and perform operations with fractions to solve relevant, mathematical problems using part-whole strategies and visual models (5.NR.3)
3.a	explain the meaning of a fraction as division of the numerator by the denominator (a/b = a ÷ b); solve problems involving division of whole numbers leading to answers in the form of fractions or mixed numbers (e.g., 3 pizzas divided among 5 friends is 3 shared by 5, 3/5 = 3 ÷ 5) (5.NR.3.1)
3.b	compare and order up to three fractions with different numerators and/or different denominators by flexibly using a variety of tools and strategies; record comparisons with >, =, and < symbols and justify conclusions (5.NR.3.2)
3.c	model and solve problems involving addition and subtraction of fractions and mixed numbers with unlike denominators (5.NR.3.3)
3.d	model and solve problems involving multiplication of a fraction and a whole number (5.NR.3.4)
3.e	explain why multiplying a whole number by a fraction greater than one results in a product greater than the whole number, and why multiplying a whole number by a fraction less than one results in a product less than the whole number, and multiplying a whole number by a fraction equal to one results in a product equal to the whole number (5.NR.3.5)
3.f	model and solve authentic problems involving division of a unit fraction by a whole number and a whole number by a unit fraction (5.NR.3.6)
3.g	create relevant story contexts involving division of a unit fraction by a whole number and a whole number by a unit fraction **(Extension)**
3.h	find, share, and justify how fractions are used in everyday life **(Extension)**
3.i	apply understanding of fraction concepts to critique the reasoning of others (e.g., after analyzing a scenario-based error analysis, plan a list of questions you would ask others to support their understanding and correct the error) **(Extension)**

3.j	create a product, based on an authentic student topic of interest, to demonstrate an understanding of fraction concepts **(Extension)**

AKS: 5MA.A.4	**read, write, and compare decimal numbers to the thousandths place; round decimal numbers to the hundredths place; add and subtract with decimal numbers to the hundredths place to solve relevant, mathematical problems (5.NR.4)**
4.a	read and write decimal numbers to the thousandths place using base-ten numerals written in standard form and expanded form (e.g., 347.392 = 3 x 100 + 4 x 10 + 7 x 1 + 3 x (1/10) + 9 x (1/100) + 2 x (1/1000) and 347.392 = 300 + 40 + 7 + .3 + .09 +. 002) (5.NR.4.1)
4.b	represent, compare, and order decimal numbers to the thousandths place based on the meanings of the digits in each place, using >, =, and < symbols to record the results of comparisons (5.NR.4.2)
4.c	use place value understanding to round decimal numbers to the hundredths place (5.NR.4.3)
4.d	solve authentic problems involving addition and subtraction of decimal numbers to the hundredths place using a variety of strategies (5.NR.4.4)
4.e	create real-life mathematical problems involving decimal computation **(Extension)**
4.f	create a product, based on an authentic student topic of interest, to demonstrate an understanding of addition and subtraction of decimals **(Extension)**

AKS: 5MA.A.5	**write, interpret, and evaluate numerical expressions within authentic problems (5.NR.5)**
5.a	write, interpret, and evaluate simple (up to two operations) numerical expressions involving whole numbers with or without grouping symbols to represent actual situations (5.NR.5.1)

5.b	write, interpret, and evaluate expressions that represent multi-step scenarios with the use of grouping symbols (e.g. On Monday, Peter baked 10 cookies and then he baked 12 cookies each day for the next 6 days. He dropped 3 cookies. Write an expression to interpret this situation.) **(Extension)**

Big Idea: Patterning & Algebraic Reasoning (PAR)

generating patterns, plotting ordered pairs in the first quadrant

AKS: 5MA.B.6	**solve relevant problems by creating and analyzing numerical patterns using the given rule(s) (5.PAR.6)**
6.a	generate two numerical patterns involving whole numbers using two given rules; identify apparent relationships between corresponding terms by completing a table (5.PAR.6.1)
6.b	represent problems by plotting ordered pairs and explain coordinate values of points in the first quadrant of the coordinate plane (5.PAR.6.2)
6.c	find/create, share, and justify examples of numerical patterns in real life **(Extension)**

Big Idea: Measurement & Data Reasoning (MDR)

measurements within the metric system, measurement conversions and time as a unit of measurement

AKS: 5MA.C.7	**solve problems involving customary measurements, metric measurements, and time and analyze graphical displays of data to answer relevant questions (5.MDR.7)**
7.a	explore realistic problems involving different units of measurement, including distance, mass, weight, volume, and time (5.MDR.7.1)

7.b	ask questions and answer them based on gathered information, observations, and appropriate graphical displays to solve problems relevant to everyday life (5.MDR.7.2)
7.c	convert among units within the metric system and then apply these conversions to solve multi- step, practical problems (5.MDR.7.3)
7.d	convert among units within relative sizes of measurement units within the customary measurement system (5.MDR.7.4)
7.e	solve multi-step problems involving interpreting graphical displays **(Extension)**
7.f	compare and contrast the use of the metric and customary systems in real-life **(Extension)**
7.g	create a product, based on an authentic student topic of interest, to demonstrate an understanding of measurement and data reasoning **(Extension)**

Big Idea: Geometric & Spatial Reasoning (GSR)

properties of polygons and rectangular prisms, classify polygons

AKS: 5MA.D.8	**examine properties of polygons (e.g., triangles, quadrilaterals including kites, trapezoids, rectangles, squares, rhombuses, other parallelograms, pentagons, hexagons, octagons) and rectangular prisms; classify polygons by their properties; discover volume of right rectangular prisms (5.GSR.8)**
8.a	classify, compare, and contrast polygons based on properties (5.GSR.8.1)
8.b	determine, through exploration and investigation, that attributes belonging to a category of two-dimensional figures also belong to all subcategories of that category (5.GSR.8.2)
8.c	investigate volume of right rectangular prisms by packing them with unit cubes without gaps or overlaps; determine the total volume to solve problems (5.GSR.8.3)

8.d	discover and explain how the volume of a right rectangular prism can be found by multiplying the area of the base times the height to solve authentic, mathematical problems (5.GSR.8.4)
8.e	describe the impact of increasing or decreasing a side length in volume calculations (e.g.; if the height of a prism is increased by 2 units, what impact does that have on the volume of the rectangular prism?) **(Extension)**
8.f	apply understanding of two-dimensional figures to critique the reasoning of others (e.g., after analyzing an error analysis, plan a list of questions you would ask others to support their understanding and correct the error) **(Extension)**
8.g	create a product, based on an authentic student topic of interest, to demonstrate an understanding of volume concepts **(Extension)**