Next Generation Math Standards----Grade 5

Cognitive Complexity/Depth of Knowledge Rating: Low, Moderate, High

BIG IDEAS (5)

BIG IDEA 1: Develop an understanding of and fluency with division of whole numbers.

Benchmark	Description	Clarification	Content Limits
MA.5.A.1.1 Moderate	Describe the process of finding quotients involving multi-digit dividends using models, place value, properties, and the relationship of division to multiplication. MC/GR	**Students will:** • Demonstrate the understanding of the distributive property used in a division problem (e.g., 639 ÷ 3 can be expressed as (600 + 30 + 9) ÷ 3). • Use the standard algorithm to describe one or more steps of a division problem or missing steps of a partially completed division problem. **Example of using models and place value:** A student is representing 639÷3 using base ten blocks by dividing 639 into three equal groups; the student begins by placing 2 flats (2 hundreds blocks) in each group. What does that show about the quotient for 639÷3? The Distributive Property is used when 639÷3 is addressed as (600 + 30 + 9) ÷ 3. **Example of using the relationship of division to multiplication:** • Dividing 38 by 2, a student might notice that 2x20=40, and 38 is close to 40. 38 is 2 less than 40, so 38÷2 is 19. • Another way to solve this division symbolically is as follows. (38÷2) = (40-2) ÷ 2 = 40÷2 - 2÷2 = 20 - 1= 19	**Items may include:** • One-digit or two-digit divisors and dividends of up to four digits. **Items will not include:** • Quotients with remainders.
MA.5.A.1.2 Moderate	Estimate quotients or calculate them mentally depending on the context and numbers involved.	**Example:** An appropriate estimate for the quotient, 286 ÷ 40 is 7 because 286 is close to 280 which is divisible by four and 280 ÷ 40 is 7 since 40 x 7 is 280.	**SEE BELOW: MA.5.A.1.4 (Benchmark not found in spec book)**
MA.5.A.1.3 High	Interpret solutions to division situations including those with remainders depending on the context of the problem.	**Example:** 456 students and teachers are going on a field trip on buses. Buses can carry 52. How many buses do we need to take everyone on the filed trip?	**SEE BELOW: MA.5.A.1.4 (Benchmark not found in spec book)**
MA.5.A.1.4 High	Divide multi-digit whole numbers fluently, including solving real-world problems, demonstrating understanding of the standard algorithm and checking the reasonableness of results. MC/GR	**Students will:** • Interpret solutions to division situations, including those with remainders, depending on the context of the problem. • (May) use estimation strategies in problems involving division and check for reasonableness of results. **Remainders may be expressed as a fraction or a decimal.** **Remark:** Problem solving may include strategies using rounding and working backward. **Example:** Mary's school is going to visit a theme park. Mary is in charge of collecting money to buy tickets for her school. One ticket costs $75. Mary collected $ 33,900, but she does not know how many people gave her money. How many tickets can she buy with this money? **Also assesses MA.5.A.1.2** **Also assesses MA.5.A.1.3**	• Divisors may have up to two digits and dividends may have up to four digits. • Decimals in the context of money may be used only for the dividend or quotient. • Items may require the use of two operations to solve the problem if at least one operation is division.

BIG IDEA 2: Develop an understanding of and fluency with addition and subtraction of fractions and decimals.			
Benchmark	**Description**	**Clarification**	**Content Limits**
MA.5.A.2.1 Moderate	Represent addition and subtraction of decimals and fractions with like and unlike denominators using models, place value, or properties. MC/GR	**Students will:** • Add and subtract fractions or decimals using graphic representations, place value, or the commutative or associative properties. **Example:** Joe and Anabel ordered pizza. Joe ate ½ of the pizza and Anabel ate 1/3 of the pizza. How much of the pizza was eaten and how much is left over? **Remark:** Fraction circles make a good model for this. To determine how much pizza was eaten altogether, a student may explain that the halves would each need to be split into 3 equal pieces (so that there would be 6 pieces all together) and the thirds would each need to be split into 2 equal pieces (so that there would be 6 pieces all together). Then 3/6 and 2/6 could be combined to see that altogether, 5/6 of the pizza was eaten. **Remark:** When students add 1.45 + 3.24, they should be encouraged to say "five hundredths and 4 hundredths are added to give 9 hundredths, etc." rather than "five plus 4 is 9, etc." **Remark:** Models for adding and subtracting decimals may include base ten blocks and ten and hundred grids.	**Items may:** • Include graphic representations of models. • Include decimals through the thousandths place or in the context of money. • Assess the commutative and/or associative properties. • Include mixed numbers and/or fractions. • Include fractions represented as parts of sets (e.g. ½ dozen + ⅓ dozen). • Include regrouping in subtraction problems or finding a mixed number. **Items will not include:** • More than three addends. **Denominators of fractions** in the stimulus must be less than or equal to 12. **Students may be required to** apply concepts from MA.5.A.6.1, but this benchmark will not be assessed in isolation.
MA.5.A.2.2 Moderate	Add and subtract fractions and decimals fluently, and verify the reasonableness of results, including in problem situations. MC/GR(decimals only)	Students may apply the mathematical properties to facilitate computation. **Example:** Two friends share a candy bar that is divided into 12 equal sections. The first friend ate 1/2 of the candy bar. The second friend ate 1/3 of the candy bar. How much of the candy bar left? This is very similar to the situation in MA.5.A.2.1, but a rectangular model might be more appropriate. **Remark:** Students may use inverse operations to self-check sum/difference. **Also assesses MA.5.A.2.3**	**Items may include:** • Up to two mixed numbers. • Up to three fractions, which may contain unlike denominators. • Decimals through the thousandths place or in money. • Denominators of fractions 1–12, 14, 15, 16, 18, 21, 24, 25, 32, 36, 35, 45, 75, or any multiple of 10 through 100.
MA.5.A.2.3 Moderate	Make reasonable estimates of fraction and decimal sums and differences, and use techniques for rounding.	**Remark:** Use benchmark fractions and decimals in making estimates. For example, students know that 7/8 + 11/12 is close to 2 because 7/8 and 11/12 are each close to 1.	**SEE ABOVE: MA.5.A.2.2 (Benchmark not found in spec book)**
MA.5.A.2.4 Moderate	Determine the prime factorization of numbers. MC	**Students will:** • Factor composite numbers and express them as the product of prime factors. • Identify reasons why a number is prime or composite or identify numbers that are prime or composite. **Remark:** Finding the least common multiple (LCM) and the greatest common factor (GCF) of two numbers is related to prime factorization. **Remark:** Divisibility rules for numbers such as 2, 3, 4, 5, 6, 9, and 10 may be explored. **Also assesses MA.5.A.6.1**	**Items will not:** • Include factoring numbers greater than 100. **Expressions with a base of 2, 3, or 4** may have exponents up to 5, 4, or 3 respectively. **Expressions with a base of 5 through 10** may be raised to the second power.

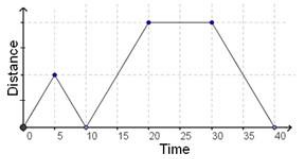
BIG IDEA 3: Describe three-dimensional shapes and analyze their properties, including volume and surface area.			
Benchmark	**Description**	**Clarification**	**Content Limits**
MA.5.G.3.1 High	Analyze and compare the properties of two-dimensional figures and three-dimensional solids (polyhedra), including the number of edges, faces, vertices, and types of faces. MC	**Students will:** • Analyze the properties of three-dimensional solids. • Determine the two-dimensional figure, or net, which can be used to form a three-dimensional solid or determine the three-dimensional solid that can be formed from a two-dimensional net. • Identify and determine the types of faces and the numbers of edges, faces, and vertices in three-dimensional solids. **Example:** Students use a geometric solid to see that a triangular prism is formed by congruent triangles on parallel planes connected by rectangles. Students draw nets, describe faces, count edges and count vertices and use this data as clues to name solids. **Example:** Students build or draw models of 3-dimensional solids, and identify the characteristics and 2-dimensional components of 3-dimensional solids.	**Items may include:** • The following terms: pyramid, prism, solid, face, edge, vertex, net, right, polyhedron, and vocabulary from previous grades. **Items will not:** • Include assessing properties of two-dimensional figures in isolation; items must include a three-dimensional figure. • Assess vocabulary or properties of oblique polyhedrons, spheres, cones, or cylinders. **Polyhedra used in items** must be prisms or pyramids with bases having no more than eight sides or composite three-dimensional figures constructed from only cubes. **Items dealing with composite three-dimensional solids** will not require students to determine the number of edges, sides, or faces; however, they may be asked to identify different views of the solid or the number of cubes used to build the solid.
MA.5.G.3.2 High	Describe, define, and determine surface area and volume of prisms by using appropriate units and selecting strategies and tools. MC	**Students will:** • Find the volume and/or surface area of rectangular prisms and cubes. **Remark:** Teachers should develop definitions by interpreting surface area as "covering all surfaces" or "wrapping with no gaps or overlaps" and volume as "filling". **Example:** Students find the total number of same-sized units of volume needed to fill a prism. **Example:** Students recognize that the surface area of a cube is the sum of the areas of 6 square regions.	**Items will not include**: Volume and surface areas of nonrectangular prisms (e.g., triangular prisms). **Dimensions of prisms** must be whole numbers no larger than 12, and the surface area or calculated volume must be less than 1000. **Items involving surface area** must include a net or a graphic of the assessed three-dimensional shape.

SUPPORTING IDEAS (5)

SUPPORTING IDEA 4: Algebra

Benchmark	Description	Clarification	Content Limits
MA.5.A.4.1 Moderate	Use the properties of equality to solve numerical and real world situations. MC	**For SR items,** students may translate a written description or graphic to an equation. **Remark:** The properties of equality include: a) If you have a balanced situation, you can add, subtract, multiply or divide by the same number on both sides and the equality stays the same. b) If you have one quantity equal to another, you can substitute that quantity for the other in an equation. **Example:** How much does a piece of cake weigh? How much does a coin weigh? Explain how you used properties of equality to **determine your answer.**  **Example:** Explain how to determine the answer to: 2+__=5+6 **Example:** Explain how to solve this equation for x: 3x + 5= 22	**Problems may involve** equalities that have no more than two operations. **Properties of equality may include** substituting a quantity of equal value for another quantity within a situation. **Equations may have up to two variables.** When a two-variable equation is given in the stem, the value of one of the variables must be provided. (Students are not expected to solve for two variables.) **Coefficients of variables** must be whole numbers. **Multiplication will be shown** by use of parentheses or a multiplication sign (the dot or x). **Items will not include:** • Naming the property of equality. **Numbers used in situations, and their solutions must** be whole numbers less than or equal to 150.
MA.5.A.4.2 High	Construct and describe a graph showing continuous data, such as a graph of a quantity that changes over time.	**Remark:** In the 2007 Sunshine State Standards for mathematics, continuous line graphs are introduced for the first time in fifth grade. Students relate graphic displays to scenarios involving change over time and vice versa. **Example:** A bicycle rider starts riding and steadily increases his speed until he is riding 10 mph after 5 minutes. This means that he was riding 0 mph at 0 minutes, 2 mph after 1 minute, 4 mph after 2 minutes, and so forth. After he reaches 10mph, he rides at that rate for 8 minutes. Then he hits a tree and stops suddenly. Draw a graph of the rider's speed versus time during his ride.	**SEE BELOW: MA.5.S.7.1 & MA.5.S.7.2** **(Benchmark not found in spec book)**

SUPPORTING IDEA 5: Geometry and Measurement

Benchmark	Description	Clarification	Content Limits
MA.5.G.5.1 Low	Identify and plot ordered pairs on the first quadrant of the coordinate plane. MC	**Students will:** • Identify the ordered pair that describes the location of a point on a coordinate plane • Identify the point on a coordinate plane that corresponds to a given ordered pair. • (May) identify the location of a point on a coordinate plane that is equidistant from two points. • Describe the horizontal and vertical movements necessary to get from one point to another on a coordinate plane. **Example:** The graph below describes a trip to the store.  Write a story that fits the graph. Explain what happens at each highlighted point.	**Items may include:** • The following terms: coordinates, coordinate plane, ordered pairs, midpoint, x-axis and y-axis, but items will not assess the vocabulary of these terms. **Items will not:** • Include finding a specific distance between points.
MA.5.G.5.2 Moderate	Compare, contrast, and convert units of measure within the same dimension (length, mass, or time) to solve problems. MC/GR	**Example:** Convert 96 inches to the equivalent length measured in yards. 96 inches = ____ yards **Example:** Convert 12.5 centimeters to millimeters. 12.5 centimeters = ____ millimeters **Remark:** Students at this level are not expected to convert between different measurement systems.	**Items may include:** • Linear measure, weight/mass, time, or elapsed time(to the nearest minute). • Either analog or digital clocks but not both within the same item. • Up to two conversions within the same system of measurement. • Multiplying or dividing by multiples of ten. • (Require) students to add and subtract measurements. **Items will not include:** • Time zones. • The use of proportions or equivalent ratios to convert between different measurement systems.
MA.5.G.5.3 High	Solve problems requiring attention to approximation, selection of appropriate measuring tools, and precision of measurement. MC	**Students will:** • Determine when an approximate measure or a more precise measure is more appropriate. • Select the appropriate unit of measure or tool needed for measures of weight/mass, capacity/volume, length, area, temperature, and time. **Remark:** Students recognize that a smaller unit provides a more precise measure and that precision is determined by the measure being used (for example, if using inches, you can measure to fractional parts of inches). **Example:** Find the measure of an angle using a protractor. **Example:** A student measures a table to the nearest foot and then measures the same table to the nearest inch to get a more precise measure.	**Items may include:** • Measurement tools such as: scales, rulers, yardsticks, tape measures, meter sticks, measuring cups, analog and digital clocks, thermometers, and their related units of measure. For a complete list of units for items involving measurement, see the Grade 5 Reference Sheet located in Appendix H. **Items dealing with length** should focus on precision, not on the tool used to measure length. **Metric measures of mass** may be to the nearest milligram. **Linear metric measures** may be to the nearest millimeter. **Capacity metric measures** may be to the nearest milliliter. **Elapsed time** may be to the nearest minute. **Linear measures in inches** may be to the nearest 1/16 inch.

MA.5.G.5.4 High	Derive and apply formulas for areas of parallelograms, triangles, and trapezoids from the area of a rectangle. MC	**Students will:** • Justify the area formulas for parallelograms, triangles, and trapezoids using the area formula for rectangles. **Remark:** The formula for the area of a rectangle, "base x height", can be applied to develop formulas for the area of parallelograms, triangles, and trapezoids. Triangles can be constructed from diagonals of parallelograms to explore the formula "base x height divided by 2".	**Items assessing areas of trapezoids** must use only isosceles trapezoids. **Areas must include** whole numbers with three or fewer significant digits and up to a maximum of five digits.

SUPPORTING IDEA 6: Number and Operations

Benchmark	Description	Clarification	Content Limits
MA.5.A.6.1 Moderate	Identify and relate prime and composite numbers, factors, and multiples within the context of fractions.		**SEE ABOVE: MA.5.A.2.4 (Benchmark not found in spec book)**
MA.5.A.6.2 Moderate	Use the order of operations to simplify expressions which include exponents and parentheses. MC/GR	**Remark:** Students look for ( ) first, exponents second, multiplication and division from left to right third, and addition and subtraction from left to right fourth to simplify expressions.	**Items will include:** • No more than five whole numbers (including exponents) within the expression. **Numbers raised to a power** must be single-digit numbers. **Exponents may not** be applied to the entire quantity within parentheses. **Exponents used on numbers** must be either 2 or 3. **Multiplication will be shown** by use of parentheses or a multiplication sign (the dot or x). **Division will not** be shown as a fraction.
MA.5.A.6.3 Moderate	Describe real-world situations using positive and negative numbers. MC	**Remark:** Students may describe situations such as owing money or measuring elevations above and below sea level to explore negative numbers.	**Items may include:** • (But are not limited to) situations of owing money, measuring elevations above and below sea level, riding elevators up and down, temperature, ascending and descending mountains, football yardage, etc. • Integers from -500 through 500.
MA.5.A.6.4 Moderate	Compare, order, and graph integers, including integers shown on a number line. MC	**Students will:** • Compare or order integers. • Compare or order integers using inequalities. • Compare and order or identify integers on a number line. **Remark:** Students may explore negative and positive integers in science class through the following benchmarks: SC.5.P.8.1 and SC.5.P.9.1	**Items may include:** • (But are not limited to) rocket countdowns, elevations, temperatures, etc. • Integers -500 through 500. • The inequality symbols (<, >, ≥, ≤, ≠) **Items will not include:** • Timelines (years).
MA.5.A.6.5 High	Solve non-routine problems using various strategies including "solving a simpler problem" and "guess, check, and revise. MC/GR	**Students will** • Solve nonroutine problems using strategies including, but not limited to, drawing diagrams, making tables or lists, looking for patterns, using models, estimating, solving a simpler problem, and/or guess, check, and revise strategies. **Example:** Give each student or pair 36 color tiles. Ask them how many different rectangles they can produce by using all the tiles. Students can use a small number of color tiles to find a pattern (finding the possible factors for the given number) and then apply that knowledge to 36 tiles. **Example:** Write all the whole numbers from 1 to 25 as addition of consecutive counting numbers. What observations do you have? Can you write every number this way? Be prepared to explain your strategy. [Some students might start with a number and look for consecutive counting numbers; others might start with combinations of consecutive counting numbers to add.]	**Items may include:** • Multi-step problems with no more than three operations. • Concepts from other benchmarks within the Number and Operations strands. **Students should be able to choose their own strategies to solve the problems.**

SUPPORTING IDEA 7: Data Analysis			
Benchmark	**Description**	**Clarification**	**Content Limits**
MA.5.S.7.1 High	Construct and analyze line graphs and double bar graphs. MC	**Students will:** • Construct line graphs or double bar graphs to represent a given set of data. • Interpret, analyze, and compare data represented on line graphs or double bar graphs. • Identify, interpret, or describe a graph that shows a quantity that changes over time. **Example:** Students collect, display and analyze data based on their own investigations (for example, the amount of rainfall in a given month at a single or multiple locations). **Also assesses MA.5.A.4.2**	**Items should not:** • Include both constructing and analyzing a graph within the same item. • Require students to determine the type of graph to use. **Items may require students** to predict if the line graph represents data that is increasing or decreasing. (Students at grade 5 are NOT expected to use the word trend.) **Analysis may include** making and stating conclusions and predictions based on data, comparing data, determining appropriate scale increments dependent upon the range of the data, or identifying different parts of a graph. **Items should contain** no more than 20 items of raw data that must be categorized or displayed. **In items where students construct a graph**, the number of data points should not exceed ten. **Students may be expected to perform** addition, subtraction, multiplication, or division when constructing and/or analyzing graphs.
MA.5.S.7.2 Moderate	Differentiate between continuous and discrete data, and determine ways to represent those using graphs and diagrams. MC	**Students will:** • Identify the appropriate graph to represent a set of continuous or discrete data. • Identify a set of discrete or continuous data. • Identify reasons why a set of data is discrete or continuous. **Remark:** For instance, if growth of a plant over time is measured, the data is continuous because time is measured continuously and a line graph is appropriate. However, if the number of students present in the classroom per day is recorded, these data are discrete (countable) and a bar graph is appropriate. **Remark:** Students may use a Venn Diagram to represent a data set. **Also assesses MA.5.A.4.2**	**Items may include:** • Only the first quadrant in a graph. • The terms continuous and discrete. • Frequency tables, single bar graphs, double bar graphs, pictographs, line plots, line graphs, and/or Venn diagrams.