MISSOURI MATHEMATICS CORE ACADEMIC STANDARDS CROSSWALK TO MISSOURI GLES/CLES
CONTENT ALIGNMENTS AND SHIFTS – Grade 3 *DRAFT*

Grade 3	
Critical Areas In Grade 3, instructional time should focus on four critical areas: 1. developing understanding of multiplication and division and strategies for multiplication and division within 100; 2. developing understanding of fractions, especially unit fractions (fractions with numerator 1); 3. developing understanding of the structure of rectangular arrays and of area; and 4. describing and analyzing two-dimensional shapes.	**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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Operations and Algebraic Thinking 3.OA			
Represent and solve problems involving multiplication and division.			
3.OA.1	Interpret products of whole numbers, e.g., interpret 5 x 7 as the total number of objects in 5 groups of 7 objects each. *For example, describe a context in which a total number of objects can be expressed as 5 x 7.*	**N2A3 ****represent/model a given situation involving multiplication*** and related division ***using various models including sets, arrays,*** areas, ***repeated addition***/subtraction, sharing and partitioning **A3A3 ****model problem situations, including multiplication with objects or drawings***	

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3.OA.2	Interpret whole-number quotients of whole numbers, e.g., interpret 56 ÷ 8 as the number of objects in each share when 56 objects are partitioned equally into 8 shares, or as a number of shares when 56 objects are partitioned into equal shares of 8 objects each. *For example, describe a context in which a number of shares or a number of groups can be expressed as 56 ÷ 8.*	**N2A3** ****represent/model a given situation involving*** multiplication and related ***division using various models including*** sets, arrays, areas, ***repeated*** addition/***subtraction, sharing and partitioning***	
3.OA.3	Use multiplication and division within 100 to **solve word problems in situations involving** equal groups, arrays, and **measurement quantities**, e.g., by using drawings and equations with a symbol for the unknown number to represent the problem. (See CCSS Glossary p. 89, Table 2.) http://illustrativemathematics.org/illustrations/262 http://illustrativemathematics.org/illustrations/344 http://illustrativemathematics.org/illustrations/365	**N2A3** ****represent/model a given situation involving multiplication and related division using various models including sets, arrays, areas, repeated addition/subtraction, sharing and partitioning*** **A2A3** Using all operations, ***represent a mathematical situation as an expression or number sentence*** **A3A3** ****model problem situations, including multiplication with objects or drawings***	**A2A5** Using all operations, ***represent a mathematical situation as an expression or number sentence using a letter or symbol***
3.OA.4	Determine the unknown whole number in a multiplication or division equation relating three whole numbers. *For example, determine the unknown number that makes the equation true in each of the equations 8 x ? = 48, 5 = □ ÷ 3, 6 x 6 =?.*	**N3B3** ***use strategies to develop fluency with basic number relationships (9x9) of multiplication and division***	
Understand properties of multiplication and the relationship between multiplication and division.			

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3.OA.5	Apply properties of operations as strategies to multiply and divide. (Students need not use formal terms for these properties.) *Examples: If 6 x 4 = 24 is known, then 4 x 6 = 24 is also known. (Commutative property of multiplication.) 3 x 5 x 2 can be found by 3 x 5 = 15, then 15 x 2 = 30, or by 5 x 2 = 10, then 3 x 10 = 30. (Associative property of multiplication.) Knowing that 8 x 5 = 40 and 8 x 2 = 16, one can find 8 x 7 as 8 x (5 + 2) = (8 x 5) + (8 x 2) = 40 + 16 = 56. (Distributive property.)*	**A2B3** ***use the commutative, distributive and associative properties*** for basic facts of whole numbers	
3.OA.6	Understand division as an unknown-factor problem. *For example, find 32 ÷ 8 by finding the number that makes 32 when multiplied by 8.*	**N3B3** ***use strategies to develop fluency with basic number relationships (9x9) of multiplication and division***	**N2B4** ***describe the*** effects of multiplying and dividing whole numbers as well as the ***relationship between the two operations***
Multiply and divide within 100.			
3.OA.7	Fluently multiply and divide within 100, using strategies such as the relationship between multiplication and division (e.g., knowing that 8 x 5 = 40, one knows 40 ÷ 5 = 8) or properties of operations. By the end of Grade 3, know from memory all products of two one-digit numbers.	**N3B3** ***use strategies to develop fluency with basic number relationships (9x9) of multiplication and division*** **A2B3** ***use the commutative, distributive and associative properties for basic facts of whole numbers***	
Solve problems involving the four operations, and identify and explain patterns in arithmetic.			

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3. OA.8	Solve two-step word problems using the four operations. 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. (This standard is limited to problems posed with whole numbers and having whole number answers; students should know how to perform operations in the conventional order when there are no parentheses to specify a particular order (Order of Operations).)	**N2A3** ****represent/model a given situation involving multiplication and related division using various models including sets, arrays, areas, repeated addition/subtraction, sharing and partitioning*** **N3A3** *****represent a ***mental strategy used to compute a given multiplication problem up to 9 x 9***	**N3D4** ***estimate and justify products of whole numbers*** **A2A5** ***Using all operations, represent a mathematical situation as*** an expression ***or number sentence using a letter or symbol***
3.OA.9	Identify arithmetic patterns (including patterns in the addition table or multiplication table), and explain them using properties of operations. *For example, observe that 4 times a number is always even, and explain why 4 times a number can be decomposed into two equal addends.*	**A1B3** ***represent patterns using*** words**,** ***tables*** and graphs **A2B3** ***use the commutative, distributive and associative properties for basic facts of whole numbers***	
Number and Operations in Base Ten 3.NBT			
Use place value understanding and properties of operations to perform multi-digit arithmetic. (A range of algorithms may be used.)			
3.NBT.1	**Use place value understanding to round whole numbers to the nearest 10 or 100.**		
3.NBT.2	**Fluently add and subtract** within 1000 using strategies and algorithms based on place value, properties of operations, and/or the relationship between addition and subtraction.	**N3C3** ***apply*** and describe ***the strategy used to compute up to 3-digit addition or subtraction problems*** **A2B3** ***use the commutative, distributive and associative properties for basic facts of whole numbers***	

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3.NBT.3	Multiply one-digit whole numbers by multiples of 10 in the range 10-90 (e.g., 9 x 80, 5 x 60) using strategies based on place value and properties of operations.	**N3B3** ***use strategies to develop fluency with basic number relationships (9x9) of multiplication*** and division	**A2A4** ***use the commutative, distributive and associative properties of addition and multiplication for multi-digit numbers***
Number and Operations-Fractions 3.NF (Grade 3 expectations in this domain are limited to fractions with denominators 2, 3, 4, 6, and 8.)			
Develop understanding of fractions as numbers.			
3.NF.1	**Understand a fraction $\frac{1}{b}$ as the quantity formed by 1 part when a whole is partitioned into *b* equal parts; understand a fraction $\frac{1}{b}$ as the quantity formed by *a* parts of size $\frac{1}{b}$.**	pe equation here1	
3.NF.2	Understand a fraction as a number on the number line; represent fractions on a number line diagram. http://illustrativemathematics.org/illustrations/168 http://illustrativemathematics.org/illustrations/169 http://illustrativemathematics.org/illustrations/170 http://illustrativemathematics.org/illustrations/171 http://illustrativemathematics.org/illustrations/172 http://illustrativemathematics.org/illustrations/173		
3.NF.2.a	Represent a fraction $\frac{1}{b}$ on a number line diagram by defining the interval from 0 to 1 as the whole and partitioning it into *b* equal parts. Recognize that each part has size $\frac{1}{b}$ and that the endpoint of the part based at 0 locates the number $\frac{1}{b}$ on the number line.	**N2A3** ****represent/model a given situation involving*** multiplication and related division using various models including sets, arrays, areas, repeated addition/subtraction, sharing and ***partitioning***	**N1A5** ****read, write and compare*** whole numbers less than 1,000,000, ***unit fractions*** and decimals to hundredths ***(including location on the number line)***

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3.NF.2.b	Represent a fraction $\frac{a}{b}$ on a number line diagram by marking off *a* lengths $\frac{1}{b}$ from 0. Recognize that the resulting interval has size $\frac{1}{b}$ and that its endpoint locates the number $\frac{a}{b}$ on the number line.		**N1A5** ****read, write and compare*** whole numbers less than 1,000,000, ***unit fractions*** and decimals to hundredths ***(including location on the number line)***
3.NF.3	Explain equivalence of fractions in special cases, and compare fractions by reasoning about their size. http://illustrativemathematics.org/illustrations/460		
3.NF.3.a	Understand two fractions as equivalent (equal) if they are the same size, or the same point on a number line.	**N1C3** ***recognize equivalent representations for the same number*** and generate them by decomposing and composing numbers included expanded notation	**N1A5** *read, write and ***compare*** whole numbers less than 1,000,000, unit ***fractions*** and decimals to hundredths ***(including location on the number line)*** **N1B4** ****use models***, benchmarks (0, $\frac{1}{2}$ and 1) ***and equivalent forms to judge the size of fractions***
3.NF.3.b	Recognize and generate simple equivalent fractions, e.g., $\frac{1}{2} = \frac{2}{4}$, $\frac{4}{6} = \frac{2}{3}$. **Explain why the fractions are equivalent, e.g., by using a visual fraction model.**	**N1C3** ***recognize equivalent representations for the same number*** and generate them by decomposing and composing numbers including expanded notation	**N1B5** ***recognize and generate equivalent forms of commonly used fractions*** and decimals
3.NF.3.c	Express whole numbers as fractions, and recognize fractions that are equivalent to whole numbers. *Examples: Express 3 in the form 3 = $\frac{3}{1}$; recognize that $\frac{6}{1}$ = 6; locate $\frac{4}{1}$ and 1 at the same point of a number line diagram.*	**N1C3** ***recognize equivalent representations for the same number*** and generate them by decomposing and composing numbers included expanded notation	

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3.NF.3.d	Compare two fractions with the same numerator or the same denominator by reasoning about their size. Recognize that comparisons are valid only when the two fractions refer to the same whole. Record the results of comparisons with the symbols >1 and justify the conclusions, e.g., by using a visual fraction model.		**N1A5** *read, write and ***compare*** whole numbers less than 1,000,000, ***unit fractions*** and decimals to hundredths (including location on the number line)
Measurement and Data 3.MD			
Solve problems involving measurement and estimation of intervals of time, liquid volumes, and masses of objects.			
3.MD.1	Tell and write time to the nearest minute and measure time intervals in minutes. Solve word problems involving addition and subtraction of time intervals in minutes, e.g., by representing the problem on a number line diagram.	**M1C3** ***tell time to the nearest*** five ***minutes***	**M1C4** ***tell time to the nearest minute*** **M1C7** ****solve problems involving addition and subtraction of time*** (hours***, minutes*** and seconds)
3.MD.2	**Measure** and estimate liquid volumes and **masses of objects using standard units of grams (g), kilograms (kg), and liters (l).** (Excludes compound units such as 3^1 and finding the geometric volume of a container.) **Add, subtract, multiply, or divide to** solve one-step word problems involving **masses or** volumes that are given in the same units, e.g., by using drawings (such as a beaker with a measurement scale) to represent the problem. (Excludes multiplicative comparison problems (problems involving notions of "times as much"; see CCSS Glossary p. 89, Table 2).		**M2A4** *select and use benchmarks to ***estimate measurements*** (linear, ***capacity***, weight) **G4B6** Draw ***or use visual models*** to represent and ***solve problems***
Represent and interpret data.			

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3.MD.3	Draw a scaled picture graph and a scaled bar graph to represent a data set with several categories. Solve one- and two-step "how many more" and "how many less" problems using information presented in scaled bar graphs. *For example, draw a bar graph in which each square in the bar graph might represent 5 pets.*	**D1C3** ***read and interpret information from*** line plots and ***graphs*** (***bar***, line, ***pictorial***)	**D1C2** ****represent*** one-to-many ***correspondence data using pictures and bar graphs***
3.MD.4	Generate measurement data by measuring lengths using rulers marked with halves and fourths of an inch. Show the data by making a line plot, where the horizontal scale is marked off in appropriate units - whole numbers, halves, or quarters.	**N1B3** *represents ***halves***, thirds, and ***fourths*** **M1A3** ****identify***, justify and ***use the appropriate unit of measure*** (***linear***, time, weight)	**D1C4** ***create*** tables or ***graphs to represent*** categorical and ***numerical data (including line plots)***
Geometric measurement: understand concepts of area and relate area to multiplication and to addition.			
3.MD.5	Recognize area as an attribute of plane figures and understand concepts of area measurement. http://illustrativemathematics.org/illustrations/516		
3.MD.5.a	A square with side length 1 unit, called "a unit square," is said to have "one square unit" of area, and can be used to measure area.		**M2C4** ***determine*** and justify ***areas of polygons*** and non-polygonal regions imposed on a rectangular grid
3.MD.5.b	A plane figure which can be covered without gaps or overlaps by *n* unit squares is said to have an area of *n* square units.		**M2C4** ***determine*** and justify ***areas of polygons*** and non-polygonal regions imposed on a rectangular grid
3.MD.6	Measure areas by counting unit squares (square cm, square m, square in, square ft, and improvised units). http://illustrativemathematics.org/illustrations/516		**M2C4** ***determine*** and justify ***areas of polygons*** and non-polygonal regions imposed on a rectangular grid

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3.MD.7	Relate area to the operations of multiplication and addition. http://illustrativemathematics.org/illustrations/516		
3.MD.7.a	Find the area of a rectangle with whole-number side lengths by tiling it, **and show that the area is the same as would be found by multiplying the side lengths.**		**M2C4** ***determine and justify areas of polygons*** and non-polygonal regions ***imposed on a rectangular grid***
3.MD.7.b	Multiply side lengths to find areas of rectangles with whole-number side lengths in the context of solving real world and mathematical problems, and represent whole-number products as rectangular areas in mathematical reasoning.	**N2A3** ****represent/model a given situation involving multiplication*** and related division ***using various models including*** sets, arrays**,** ***areas,*** repeated addition/subtraction, sharing and partitioning	**M2C6** ***solve problems involving the area*** or perimeter ***of polygons***
3.MD.7.c	Use tiling to show in a concrete case that the area of a rectangle with whole-number side lengths *a* and *b* *c* is the sum of *a* x *b* and *a* x *c*. Use area models to represent the distributive property in mathematical reasoning.	**N2A3** ****represent/model a given situation*** involving multiplication and related division ***using various models including*** sets, arrays**,** ***areas,*** repeated addition/subtraction, sharing and partitioning **A2B3** ***use the*** commutative, ***distributive*** and associative ***properties for*** basic facts of ***whole numbers***	**M2C4** ***determine and justify areas of polygons*** and non-polygonal regions ***imposed on a rectangular grid***
3.MD.7.d	Recognize area as additive. Find areas of rectilinear figures by decomposing them into non-overlapping rectangles and adding the areas of the non-overlapping parts, **applying this technique to solve real world problems.**		**G1C4** ****describe the results of subdividing,*** combining and transforming ***shapes***
Geometric measurement: recognize perimeter as an attribute of plane figures and distinguish between linear and area measures.			

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3.MD.8	Solve real world and mathematical problems involving perimeters of polygons, including finding the perimeter given the side lengths, finding an unknown side length, and exhibiting rectangles with the same perimeter and different areas or with the same area and different perimeters.	**M2C3** ***determine the perimeter of polygons***	**M2C6** ***solve problems involving the area or perimeter of polygons***
Geometry 3.G			
Reason with shapes and their attributes.			
3.G.1	**Understand** that shapes in different categories (e.g., rhombuses, rectangles, and others) may share attributes (e.g., having four sides), and **that the shared attributes can define a larger category (e.g., quadrilaterals). Recognize rhombuses, rectangles, and squares as examples of quadrilaterals, and draw examples of quadrilaterals that do not belong to any of these subcategories.**	**G1A3** ***compare and analyze 2-deminsional shapes by describing their attributes*** (circle, rectangle, rhombus, trapezoid, triangle)	
3.G.2	Partition shapes into parts with equal areas. Express the area of each part as a unit fraction of the whole. *For example, partition a shape into 4 parts with equal area, and describe the area of each part as ¼ of the area of the shape.*	**N1B3** ****represents halves, thirds, and fourths***	**G1C4** ****describe the results of subdividing, combining*** and transforming shapes
Grade 3 GLEs not included in Grade 3 CAS			

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N1A3 **r**ead, write and compare whole numbers up to 10,000 **N1D3** ***c**lassify numbers by their characteristics, including odd and even **N2B3** ***describe the effects of adding and subtracting whole numbers as well as the relationship between the two operations **N3D3** estimate and justify sums and differences of whole numbers **A1A3** extend geometric (shapes) and numeric patterns to find the next term **A4A3** ***describe quantitative change, such as students growing two inches in a year **G1C3** ***predict the results of putting together or taking apart 2- and 3-dimensional shapes **G2A3** ***describe location using common language and geometric vocabulary (forward, back, left, right, north, south, east, west) **G3A3** determine if two objects are congruent through a slide, flip or turn **G3C3** identify lines of symmetry in polygons **M1D3** determine change from $5.00 and add and subtract money values to $5.00 **M2A3** ***use a referent for measures to make comparisons and estimates **D1A3** ***design investigations to address a given question **D2A3** ***describe the shape of data and analyze it for patterns **D3A3** ***discuss events related to students' experiences as likely or unlikely		