proficient student performance nationwide. The NAEP objectives identify content that could be included in lessons building toward master of					
the corr	the correlating standards from the 2016 Alabama Course of Study: Mathematics.				
	Grade 3 Alabama Course of Study				
Grade	Standard	NAEP Objective(s) Grade 4	NAEP Objective(s) Grade 8		
3	<b>1. [3.OA.1]</b> Interpret products of whole	4NPO3e Interpret whole-number	8NPO3a Perform computations with		
	numbers, e.g., interpret 5 x 7 as the total	operations and the relationships between	rational numbers.		
	number of objects in 5 groups of 7 objects	them.			
	each Example: Describe a context in				
	which a total number of objects can be				
	expressed as 5 x 7.				
3	2. [3.OA.2] Interpret whole-number	4NPO3e Interpret whole-number	8NPO3a Perform computations with		
	quotients of whole numbers, e.g., interpret	operations and the relationships between	rational numbers.		
	56 & divide; 8 as the number of objects in	them.			
	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. Example:				
	Describe a context in which a number of				
	snares of a number of groups can be				
	expressed as 50 – 8.				
3	<b>3.</b> [ <b>3.OA.3</b> ] Use multiplication and	4NPO3f Solve application problems	8NPO3a Perform computations with		
	division within 100 to solve word	involving numbers and operations.	rational numbers.		
	problems in situations involving equal				
	groups, arrays, and measurement	<b>4A3a</b> Use letters and symbols to represent			
	quantities, e.g., by using drawings and	an unknown quantity in a simple			
	equations with a symbol for the unknown	mathematical expression.			
	number to represent the problem. (See				
2	Appendix A, Table 2.)	<b>ANDOSh</b> Identify factors of whole overland	NDO2 > Douto more account time		
3	4. [3.0A.4] Determine the unknown whole	4111 USD Identify factors of whole numbers.	<b>SINFUSa</b> Perform computations with		
	number in a multiplication or division	<b>ANPOSe</b> Apply basic properties of	rational numbers.		
	Equation relating three whole numbers	operations			
	Example: Determine the unknown number	operations.			
	mat makes the equation true in each of the equations $8 \times 2 = 48 \cdot 5 = -2 \cdot 2 \cdot 6 \times 6 = 2$	<b>4A4a</b> Find the value of the unknown in a			
	equations $\delta x = 4\delta, \delta = -5, \delta x \delta = ?.$	whole-number sentence.			

## Correlation: 2016 Alabama Course of Study, Mathematics standards and NAEP Objectives When teaching Alabama Course of Study content, NAEP objectives and items are useful for identifying a level of rigor which matches

3	<b>5. [3.OA.5]</b> Apply properties of operations as strategies to multiply and divide. Examples: If $6 \ge 4 = 24$ is known, then $4 \ge 6 = 24$ is also known. (Commutative property of multiplication) $3 \ge 5 \ge 2$ can be found by $3 \ge 5 = 15$ , then $15 \ge 2 = 30$ , or by $5 \ge 2 = 10$ , then $3 \ge 10 = 30$ . (Associative property of multiplication) Knowing that $8 \ge 5 = 40$ and $8 \ge 2 = 16$ , one can find $8 \ge 7 \ge 8 \ge (5 \pm 2) = (8 \ge 5) \pm (8 \ge 2) = 40 \pm 16 = 56$ . (Distributive property) (Students need not use formal terms for these properties.)		8NPO3a Perform computations with rational numbers.
3	<b>6. [3.OA.6]</b> Understand division as an unknown-factor problem Example: Find 32 ÷ 8 by finding the number that makes 32 when multiplied by 8.	<b>4NPO3e</b> Interpret whole-number operations and the relationships between them.	<b>8NPO3a</b> Perform computations with rational numbers.
3	7. [3.OA.7] Fluently multiply and divide within 100, using strategies such as the relationship between multiplication and division (e.g., knowing that $8 \ge 40$ , one knows 40 & divide; $5 = 8$ ) or properties of operations. By the end of Grade 3, know from memory all products of two one-digit numbers.	<b>4NPO3c</b> Divide whole numbers: • Up to three digits by one digit with paper-and-pencil computation, or • Up to five digits by two digits with use of calculator.	<ul> <li>8NPO3a Perform computations with rational numbers.</li> <li>8NPO3d Describe the effect of multiplying and dividing by numbers, including the effect of multiplying or dividing a rational number by: • Zero, or • A number less than zero, or • A number between zero and one, • One, or • A number greater than one.</li> </ul>

3	<b>8. [3.OA.8]</b> 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).)	<b>4NPO3f</b> Solve application problems involving numbers and operations.	8NPO3a Perform computations with rational numbers.
3	<b>9. [3.OA.9]</b> Identify arithmetic patterns (including patterns in the addition table or multiplication table), and explain them using properties of operations Example: Observe that 4 times a number is always even, and explain why 4 times a number can be decomposed into two equal addends.	<b>4A1a</b> Recognize, describe, or extend numerical patterns.	<b>8NPO3a</b> Perform computations with rational numbers.
3	<b>10. [3.NBT.1]</b> Use place value understanding to round whole numbers to the nearest 10 or 100.		<b>8NPO3a</b> Perform computations with rational numbers.
3	<b>11. [3.NBT.2]</b> 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.	<b>4NPO3a</b> Add and subtract: • Whole numbers, or • Fractions with like denominators, or • Decimals through hundredths.	<b>8NPO3a</b> Perform computations with rational numbers.

3	<b>12. [3.NBT.3]</b> 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.	<b>4NPO3b</b> Multiply whole numbers: • No larger than two-digit by two-digit with paper-and-pencil computation, or • Larger numbers with use of Calculator	<ul> <li>8NPO3a Perform computations with rational numbers.</li> <li>8NPO3d Describe the effect of multiplying and dividing by numbers, including the effect of multiplying or dividing a rational number by: • Zero, or • A number less than zero, or • A number between zero and one, • One, or • A number greater than one.</li> </ul>
3	<b>13. [3.NF.1]</b> Understand a fraction $1/b$ as the quantity formed by 1 part when a whole is partitioned into <i>b</i> equal parts; understand a fraction $a/b$ as the quantity formed by <i>a</i> parts of size $1/b$ .		<ul> <li>8NPO1h Order or compare rational numbers (fractions, decimals, percents, or integers) using various models and representations (e.g., number line).</li> <li>8NPO3a Perform computations with rational numbers.</li> </ul>
3	<ul> <li>14. [3.NF.2] Understand a fraction as a number on the number line; represent fractions on a number line diagram.</li> <li>a. Represent a fraction 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 1/b and that the endpoint of the part based at 0 locates the number 1/b on the number line.</li> <li>b. Represent a fraction a/b on a number line diagram by marking off a lengths 1/b from 0. Recognize that the resulting interval has size a/b and that its endpoint locates the number line.</li> </ul>	<ul> <li>4NPO1e Connect model, number word, or number using various models and representations for whole numbers, fractions, and decimals.</li> <li>4NPO3d Describe the effect of operations on size (whole numbers).</li> </ul>	<ul> <li>8NPO1b Model or describe rational numbers or numerical relationships using number lines and diagrams.</li> <li>8NPO3a Perform computations with rational numbers.</li> <li>8NPO1h Order or compare rational numbers (fractions, decimals, percents, or integers) using various models and representations (e.g., number line).</li> </ul>

3	15. [3.NF.3] Explain equivalence of	4NPO3d Describe the effect of operations	8NPO1d Write or rename rational
	fractions in special cases, and compare	on size (whole numbers).	numbers.
	fractions by reasoning about their size.		
	a. Understand two fractions as equivalent	4NPO6a Explain or justify a mathematical	8NPO1h Order or compare rational
	(equal) if they are the same size or the	concept or relationship (e.g., explain why	numbers (fractions, decimals, percents, or
	same point on a number line.	15 is an odd number or why $7-3$ is not the	integers) using various models and
	b. Recognize and generate simple	same as 3–7).	representations (e.g., number line).
	equivalent fractions, e.g., $1/2 = 2/4$ , $4/6 =$		
	2/3). Explain why the fractions are		
	equivalent, e.g., by using a visual fraction		
	model.		
	c. Express whole numbers as fractions, and		
	recognize fractions that are equivalent to		
	whole numbers Examples: Express 3 in		
	the form $3 = 3/1$ ; recognize that $6/1 = 6$ ;		
	locate 4/4 and 1 at the same point of a		
	number line diagram.		
	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 >, =, or <, and justify the		
	conclusions, e.g., by using a visual fraction		
	model.		
3	16. [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.		

3	17. [3.MD.2] Measure and estimate liquid	4M1c Estimate the size of an object with	8M1c Estimate the size of an object with
	volumes and masses of objects using	respect to a given measurement attribute	respect to a given measurement attribute
	standard units of grams (g), kilograms	(e.g., length, perimeter, or area using a	(e.g., area).
	(kg), and liters (l). (Excludes compound	grid).	
	units such as cm <sup>3</sup> 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		
	Appendix A, Table 2.)		
3	18. [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. Example:		
	Draw a bar graph in which each square in		
	the bar graph might represent 5 pets.		
3	19. [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.		

3	<b>20.</b> [3.MD.5] Recognize area as an	4M1g Solve problems involving area of	8M1e Select or use appropriate
	attribute of plane figures, and understand	squares and rectangles.	measurement instrument to determine or
	concepts of area measurement.		create a given length, area, column, angle,
	a. A square with side length 1 unit called		weight, or mass.
	"a unit square," is said to have "one square		
	unit" of area and can be used to measure		
	area.		
	b. A plane figure which can be covered		
	without gaps or overlaps by <i>n</i> unit squares		
	is said to have an area of <i>n</i> square units.		
3	<b>21.</b> [3.MD.6] Measure areas by counting	4M1g Solve problems involving area of	8M1e Select or use appropriate
	unit squares (square cm, square m, square	squares and rectangles.	measurement instrument to determine or
	in, square ft, and improvised units).		create a given length, area, column, angle,
			weight, or mass.
	1		1

3	<b>22. [3.MD.7]</b> Relate area to the operations of multiplication and addition. 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. 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. c. Use tiling to show in a concrete case that the area of a rectangle with whole-number side lengths <i>a</i> and <i>b</i> + <i>c</i> is the sum of <i>a</i> x <i>b</i> and <i>a</i> x <i>c</i> . Use area models to represent the distributive property in mathematical reasoning. d. Recognize area as additive. Find areas of rectilinear figures by decomposing them into nonoverlapping rectangles and adding the areas of the nonoverlapping parts, applying this technique to solve real-world problems.	<ul> <li>4NPO3f Solve application problems involving numbers and operations.</li> <li>4M1g Solve problems involving area of squares and rectangles.</li> </ul>	
3	<b>23. [3.MD.8]</b> 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.	<ul> <li>4NPO3f Solve application problems involving numbers and operations.</li> <li>4M1f Solve problems involving perimeter of plane figures.</li> </ul>	<b>8M1f</b> Solve mathematical or real-world problems involving perimeter or area of plane figures, such as triangles, rectangles, circles, or composite figures.

3	<b>24.</b> [3.G.1] Understand that shapes in	4G1f Describe attributes of two- and three-	<b>8G1b</b> Identify a geometric object given a
	different categories (e.g., rhombuses,	dimensional shapes.	written description of its properties.
	rectangles, and others) may share attributes		
	(e.g., having four sides), and that the	4G3a Analyze or describe patterns of	<b>8G3f</b> Describe or analyze simple
	shared attributes can define a larger	geometric figures by increasing number of	properties of, or relationships between,
	category (e.g., quadrilaterals). Recognize	sides, changing size or orientation (e.g.,	triangles, quadrilaterals, and other
	rhombuses, rectangles, and squares as	polygons with more and more sides).	polygonal plane figures.
	examples of quadrilaterals, and draw		
	examples of quadrilaterals that do not		
	belong to any of these subcategories.		
3	25. [3.G.2] Partition shapes into parts with		
	equal areas. Express the area of each part		
	as a unit fraction of the whole Example:		
	Partition a shape into 4 parts with equal		
	area, and describe the area of each part as		
	1/4 of the area of the shape.		