2010 ACOS MATHEMATICS/ARMT+ SPECIFICATIONS CORRELATION

GRADE 4

2010 ACOS		ARMT+ Specifications				
CURRENT GRADE 4 CONTENT		**2003 CONTENT STANDARD**	**ITEM TYPE**	**POINTS POSS.**	**ADDITIONAL INFORMATION**	**PAGES IN ITEM SPECS**
4.1	Interpret a multiplication equation as a comparison, e.g., interpret 35 = 5x7 as a statement that 35 is 5 times as many as 7 and 7 times as many as 5. Represent verbal statements of multiplicative comparisons as multiplication equations. [4-OA1]	4.9	Write number sentences for word problems that involve multiplication or division	Multiple-choice	4	• Word problems/real-life situations may be used. • One- or two-digit divisors may be used. • Two-digit multipliers may be used.	pp. 56-59
4.2	Multiply or divide to solve word problems involving multiplicative comparison, e.g., by using drawings and equations with a symbol for the unknown number to represent the problem, distinguishing multiplicative comparison from additive comparison. (See Appendix A, Table 2.) [4-OA2]	4.9	Write number sentences for word problems that involve multiplication or division	Multiple-choice	4	• Word problems/real-life situations may be used. • One- or two-digit divisors may be used. • Two-digit multipliers may be used.	pp. 56-59
4.3	Solve multistep word problems posed with whole numbers and having whole-number answers using the four operations, including problems in which remainders must be interpreted. 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. [4-OA3]	4.6	Solve problems, including word problems that involve addition and subtraction of four-digit numbers with and without regrouping.	Multiple-choice Gridded Open-ended	7	• Word problems/real-life situations may be used. • Tables may be used. • Fractions will not be used. • Multiple steps may be used. • Money values may be used.	pp. 26-39
		4.7	Solve problems, including word problems, involving the basic operations of multiplication and division on whole numbers through two-digit multipliers and one-digit divisors	Multiple-choice Open-ended	7	• Word problems/real-life situations may be used. • Tables may be used. • Fractions will not be used. • Division with remainders will not be used. • Money values may be used.	pp. 40-51
		4.9	Write number sentences for word problems that involve multiplication or division.	Multiple-choice	4	• Word problems/real-life situations may be used. • One- or two-digit divisors may be used. • Two-digit multipliers may be used.	pp. 56-59
		4.10	Complete addition and subtraction number sentences with a missing addend or subtrahend.	Multiple-choice Gridded	4	• Word problems/real-life situations may be used. • Use up to 4-digit numbers. • Money values may be used. • A box may be used.	pp. 60-64

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4.4	Find all factor pairs for a whole number in the range 1-100. Recognize that a whole number is a multiple of each of its factors. Determine whether a given whole number in the range 1-100 is a multiple of a given one-digit number. Determine whether a given whole number in the range 1-100 is prime or composite. [4-OA4]					
4.5	Generate a number or shape pattern that follows a given rule. Identify apparent features of the pattern that were not explicit in the rule itself. [4-OA5]					
4.6	Recognize that in a multi-digit whole number, a digit in one place represents ten times what it represents in the place to its right. [4-NBT1]					
4.7	Read and write multi-digit whole numbers using base-ten numerals, number names, and expanded form. Compare two multi-digit numbers based on meanings of the digits in each place, using >, =, and < symbols to record the results of comparison. [4-NBT2]					
4.8	Use place value understanding to round multi-digit whole numbers to any place. [4-NBT3]	4.5	Round whole numbers to the nearest ten, hundred, or thousand and decimals to the nearest tenth.	Multiple-choice Gridded	4	• Word problems/real-life situations may be used. • Money values may be used.	pp. 22-25
4.9	Fluently add and subtract multi-digit whole numbers using the standard algorithm. [4-NBT4]					
4.10	Multiply a whole number of up to four digits by a one-digit whole number, and multiply two two-digit numbers, using strategies based on place value and the properties of operations. Illustrate and explain the calculation by using equations, rectangular arrays, and/or area models. [4-NBT5]					
4.11	Find whole-number quotients and remainders with up to four-digit dividends and one-digit divisors, using strategies based on place value, the properties of operations, and/or the relationship between multiplication and division. Illustrate and explain the calculation by using equations, rectangular arrays, and/or area models. [4-NBT6]					
4.12	Explain why a fraction a/b is equivalent to a fraction $(n \times a)/(n \times b)$ by using visual fraction models, with attention to how the number and size of the parts differ even though the two fractions themselves are the same size. Use this principle to recognize and generate equivalent fractions. [4-NF1]	4.8	Recognize equivalent forms of commonly used fractions and decimals.	Multiple-choice	4	• Word problems/real-life situations may be used. • Items may give fractions and ask for decimal equivalent. • Items may give decimal and ask for fraction equivalent. • Money equivalents may be used. • Graphics will not be used. • Reducing fractions will be required.	pp. 52-55

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4.13	Compare two fractions with different numerators and different denominators, e.g., by creating common denominators or numerators, or by comparing to a benchmark fraction such as 1/2. Recognize that comparisons are valid only when the two fractions refer to the same whole. Record the results of comparisons with symbols >, =, or <, and justify the conclusions, e.g., by using a visual fraction model. [4-NF2]	4.4	Demonstrate addition and subtraction of fractions with common denominators.	Multiple-choice	4	• Use reasonable denominators less than 100. • Reducing fractions will not be required. • Mixed numbers will not be used.	pp. 19-21
4.14 4.14a 4.14b 4.14c 4.14d	Understand a fraction *a/b* with *a* > 1 as a sum of fractions 1/*b*. [4-NF3] a. Understand addition and subtraction of fractions as joining and separating parts referring to the same whole. [4-NF3a]	4.3	Rename improper fractions as mixed numbers and mixed numbers as improper fractions.	Multiple-choice	3	• Use reasonable denominators less than 100. • Word problems/real-life situations may be used.	pp. 16-18
	b. Decompose a fraction into a sum of fractions with the same denominator in more than one way, recording each decomposition by an equation. Justify decompositions, e.g., by using a visual fraction model. [4-NF3b]	4.4	Demonstrate addition and subtraction of fractions with common denominators.	Multiple-choice	4	• Use reasonable denominators less than 100. • Reducing fractions will not be required. • Mixed numbers will not be used.	pp. 19-21
	c. Add and subtract mixed numbers with like denominators, e.g., by replacing each mixed number with an equivalent fraction, and/or by using properties of operations and the relationship between addition and subtraction. [4-NF3c] d. Solve word problems involving addition and subtraction of fractions referring to the same whole and having like denominators, e.g., by using visual fraction models and equations to represent the problem. [4-NF3d]	4.8	Recognize equivalent forms of commonly used fractions and decimals	Multiple-choice	4	• Word problems/real-life situations may be used. • Items may give fractions and ask for decimal equivalent. • Items may give decimal and ask for fraction equivalent. • Money equivalents may be used. • Graphics will not be used. • Reducing fractions will be required.	pp. 52-55

4.15
4.15a
4.15b
4.15c
	Apply and extend previous understandings of multiplication to multiply a fraction by a whole number. [4-NF4]
	  a. Understand a fraction a/b as a multiple of 1/b. [4-NF4a]
	  b. Understand a multiple of a/b as a multiple of 1/b, and use this understanding to multiply a fraction by a whole number. [4-NF4b]
	  c. Solve word problems involving multiplication of a fraction by a whole number, e.g., by using visual fraction models and equations to represent the problem. [4-NF4c]
		4.3	Rename improper fractions as mixed numbers and mixed numbers as improper fractions.	Multiple-choice	3	• Use reasonable denominators less than 100.
						• Word problems/real-life situations may be used.
							pp. 16-18

4.16	Express a fraction with denominator 10 as an equivalent fraction with denominator 100, and use this technique to add two fractions with respective denominators 10 and 100. (Students who can generate equivalent fractions can develop strategies for adding fractions with unlike denominators in general. But addition and subtraction with unlike denominators in general is not a requirement at this grade.) [4-NF5]						

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4.17	Use decimal notation for fractions with denominators 10 or 100. [4-NF6]						
4.18	Compare two decimals to hundredths by reasoning about their size. Recognize that comparisons are valid only when the two decimals refer to the same whole. Record the results of comparisons with the symbols >, =, or <, and justify the conclusions, e.g., by using a visual model.[4-NF7]	4.1	Demonstrate number sense by comparing and ordering decimals to hundredths and whole numbers to 999,999.	Multiple-choice	4	• In comparing numbers, *larger, smaller, greater than, less than*, or *equal to* may be used. • In ordering numbers, *first, second, third*, etc., may be used. • In ordering numbers, *greatest* to *least, least to greatest, longest* to *shortest,* or *shortest to longest* may be used. • In ordering numbers, arranging numbers may be used. • Tables and charts may be used. • Word problems/real-life situations may be used. • Money values may be used. • Inequality symbols may be used.		pp. 6-11
4.19	Know relative sizes of measurement units within one system of units including km, m, cm; kg, g; lb, oz.; l, ml; hr, min, sec. Within a single system of measurement, express measurements in a larger unit in terms of a smaller unit. Record measurement equivalents in a two-column table.[4-MD1]	4.14	Measure length, width, weight, and capacity, using metric and customary units, and temperature in degrees Fahrenheit and degrees Celsius.	Multiple-choice	6	• Thermometers will not have both Celsius and Fahrenheit scales. • Measure length to the nearer whole unit, half unit, quarter unit. • Word problems/real-life situations may be used. • Measurements of mass may be used.		pp. 79-85
4.20	Use the four operations to solve word problems involving distances, intervals of time, liquid volumes, masses of objects, and money, including problems involving simple fractions or decimals, and problems that require expressing measurements given in a larger unit in terms of a smaller unit. Represent measurement quantities using diagrams such as number line diagrams that feature a measurement scale. [4-MD2]	4.2	Write money amounts in words and dollar-and-cent notation.	Multiple-choice Gridded	3	• Word problems/real-life situations may be used. • Symbols for dollars and cents will be used.		pp. 12-15
4.21	Measure areas by counting unit squares (square cm, square m, square in, square ft, and improvised units). [3-MD6]						
4.22	Make a line plot to display a data set of measurements in fractions of a unit (1/2, 1/4, 1/8). Solve problems involving addition and subtraction of fractions by using information presented in line plots. [4-MD4]	4.15	Represent categorical data using tables and graphs, including bar graphs, line graphs, and line plots.	Multiple-choice Open-ended	4	• Data in graphs, tables, etc., limited to no more than 5 items. • Word problems/real-life situations may be used.		pp. 86-104
		4.17	Represent numerical data using tables and graphs, including bar graphs and line graphs.	Multiple-choice Open-ended	4	• Data in graphs, tables, etc., limited to no more than 5 items. • Word problems/real-life situations may be used.		pp. 86-104

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4.23 4.23a 4.23b	**Recognize angles as shapes that are formed wherever two rays share a common endpoint, and understand concepts of angle measurement. [4-MD5]** a. **An angle is measured with reference to a circle with its center at the common endpoint of the rays, by considering the fraction of the circular arc between the points where the two rays intersect the circle. An angle that turns through 1/360 of a circle is called a 'one-degree angle,' and can be used to measure angles. [4-MD5a]** b. **An angle that turns through *n* one-degree angles is said to have an angle measure of *n* degrees. [4-MD5b]**	4.11	**Identify triangle quadrilaterals, pentagons, hexagons, octagons based on the number of sides, angles, and vertices.**	**Multiple-choice**	**4**	• **Graphics may be used.** • **Word problems/real-life situations will be used.** • **Heptagons may be used.**	**pp. 65-70**
4.24	**Measure angles in whole-number degrees using a protractor. Sketch angles of specified measure. [4-MD6]**					
4.25	**Recognize angle measure as additive. When an angle is decomposed into non-overlapping parts, the angle measure of the whole is the sum of the angle measures of the parts. Solve addition and subtraction problems to find unknown angles on a diagram in real world or mathematical problems, e.g., by using an equation with a symbol for the unknown angle measure. [4-MD7]**					
4.26	**Draw points, lines, line segments, rays, angles (right, acute, obtuse), and perpendicular and parallel lines. Identify these in two-dimensional figures. [4-G1]**	4.11	**Identify triangle quadrilaterals, pentagons, hexagons, octagons based on the number of sides, angles, and vertices.**	**Multiple-choice**	**4**	• **Graphics may be used.** • **Word problems/real-life situations will be used.** • **Heptagons may be used.**	**pp. 65-70**
4.27	**Classify two-dimensional figures based on the presence or absence of parallel or perpendicular lines, or the presence or absence of angles of a specified size. Recognize right triangles as a category, and identify right triangles. [4-G2]**	4.11	**Identify triangle quadrilaterals, pentagons, hexagons, octagons based on the number of sides, angles, and vertices.**	**Multiple-choice**	**4**	• **Graphics may be used.** • **Word problems/real-life situations will be used.** • **Heptagons may be used.**	**pp. 65-70**
4.28	**Recognize a line of symmetry for a two-dimensional figure as a line across the figure such that the figure can be folded along the line into matching parts. Identify line-symmetric figures and draw lines of symmetry. [4-G3]**					

Additional Standards that Must Be Addressed for ARMT+

	2003 CONTENT STANDARD		ITEM TYPE	POINTS POSS.	ADDITIONAL INFORMATION	PAGES IN ITEM SPECS
	4.12	Find locations on a map or grid using ordered pairs.	Multiple-choice	4	• Word problems/real-life situations may be used.	pp. 71-75
	4.13	Calculate elapsed time in hours and minutes.	Multiple-choice	3	• Word problems/real-life situations may be used. • Will include a start time and an end time.	pp. 76-78
	4.16	Determine if outcomes of simple events are likely, unlikely, certain, equally likely, or impossible	Multiple-choice	3	• Use only the choices mentioned in content standard. • Word problems/real-life situations may be used.	pp. 105-109