ASOL MATHEMATICS SCOPE AND SEQUENCE MATRIX: GRADE 6

***MATHEMATICS* ASOL SUMMARY MATRIX** **Based on the 2009 *Mathematics* Standards of Learning**							
Reporting Category	**Grade 3**	**Grade 4**	**Grade 5**	**Grade 6**	**Grade 7**	**Grade 8**	**High School**
Number, Number Sense, Computation and Estimation	3M-NSCE 1 3M-NSCE 2 3M-NSCE 3 3M-NSCE 4 3M-NSCE 5 3M-NSCE 6 3M-NSCE 7	4M-NSCE 1 4M-NSCE 2 4M-NSCE 3 4M-NSCE 4 4M-NSCE 5	5M-NSCE 1 5M-NSCE 2 5M-NSCE 3 5M-NSCE 4	6M-NSCE 1 6M-NSCE 2 6M-NSCE 3 6M-NSCE 4 6M-NSCE 5	7M-NSCE 1 7M-NSCE 2 7M-NSCE 3	8M-NSCE 1 8M-NSCE 2 8M-NSCE 3	
Measurement and Geometry	3M-MG 1 3M-MG 2 3M-MG 3 3M-MG 4	4M-MG 1 4M-MG 2 4M-MG 3	5M-MG 1	6M-MG 1	7M-MG 1 7M-MG 2	8M-MG 1 8M-MG 2 8M-MG 3	
Probability, Statistics, Patterns, Functions, and Algebra	3M-PSPFA 1 3M-PSPFA 2 3M-PSPFA 3	4M-PSPFA 1	5M-PSPFA 1 5M-PSPFA 2	6M-PSPFA 1 6M-PSPFA 2 6M-PSPFA 3	7M-PSPFA 1 7M-PSPFA 2 7M-PSPFA 3	8M-PSPFA 1 8M-PSPFA 2 8M-PSPFA 3 8M-PSPFA 4	
Expressions and Operations							HSM-EO 1 HSM-EO 2
Equations and Inequalities							HSM-EI 1 HSM-EI 2 HSM-EI 3
Functions and Statistics							HSM-FS 1 HSM-FS 2 HSM-FS 3 HSM-FS 4

REPORTING CATEGORIES	GRADE 6 ASOL BLUEPRINT	UNDERSTANDING THE STANDARD
Number, Number Sense,	6M-NSCE 1 (SOL 6.1)	• A ratio is a comparison of any two quantities. A ratio is used to represent relationships within and between sets. • A ratio can compare part of a set to the entire set (part-whole comparison). • A ratio can compare part of a set to another part of the same set (part-part comparison). • A ratio can compare part of a set to a corresponding part of another set (part-part comparison). • A ratio can compare all of a set to all of another set (whole-whole comparison). • The order of the quantities in a ratio is directly related to the order of the quantities expressed in the relationship. For example, if asked for the ratio of the number of cats to dogs in a park, the ratio must be expressed as the number of cats to the number of dogs, in that order. • A ratio is a multiplicative comparison of two numbers, measures, or quantities. • All fractions are ratios and vice versa. • Ratios may or may not be written in simplest form. • Ratios can compare two parts of a whole. • Rates can be expressed as ratios.
	6M-NSCE 2 (SOL 6.3)	• Integers are the set of whole numbers, their opposites, and zero. • Positive integers are greater than zero. • Negative integers are less than zero. • Zero is an integer that is neither positive nor negative. • A negative integer is always less than a positive integer. • When comparing two negative integers, the negative integer that is closer to zero is greater. • An integer and its opposite are the same distance from zero on a number line. For example, the opposite of 3 is -3. • The absolute value of a number is the distance of a number from zero on the number line regardless of direction. Absolute value is represented a $\lvert -6 \rvert = 6$. • On a conventional number line, a smaller number is always located to the left of a larger number (e.g., –7 lies to the left of –3, thus –7 < –3; 5 lies to the left of 8 thus 5 is less than 8).
	6M-NSCE 3 (SOL 6.4)	• Using manipulatives to build conceptual understanding and using pictures and sketches to link concrete examples to the symbolic enhance students' understanding of operations with fractions and help students connect the meaning of whole number computation to fraction computation. • Multiplication and division of fractions can be represented with arrays, paper folding, repeated addition, repeated subtraction, fraction strips, pattern blocks and area models. • When multiplying a whole by a fraction such as 3 x $\frac{1}{2}$, the meaning is the same as with multiplication of whole numbers: 3 groups the size of $\frac{1}{2}$ of the whole. • When multiplying a fraction by a fraction such as $\frac{2}{3} \cdot \frac{3}{4}$, we are asking for part of a part.

Computation and Estimation		• When multiplying a fraction by a whole number such as $\frac{1}{2}$ x 6, we are trying to find a part of the whole. • For measurement division, the divisor is the number of groups. You want to know how many are in each of those groups. Division of fractions can be explained as how many of a given divisor are needed to equal the given dividend. In other words, for $\frac{1}{4} \div \frac{2}{3}$, the question is, "How many $\frac{2}{3}$ make $\frac{1}{4}$?" • For partition division the divisor is the size of the group, so the quotient answers the question, "How much is the whole?" or "How much for one?"
	6M-NSCE 4 (SOL 6.7)	• Different strategies can be used to estimate the result of computations and judge the reasonableness of the result. For example: What is an approximate answer for 2.19 ÷ 0.8? The answer is around 2 because 2 ÷ 1 = 2. • Understanding the placement of the decimal point is very important when finding quotients of decimals. Examining patterns with successive decimals provides meaning, such as dividing the dividend by 6, by 0.6, by 0.06, and by 0.006. • Solving multistep problems in the context of real-life situations enhances interconnectedness and proficiency with estimation strategies. • Examples of practical situations solved by using estimation strategies include shopping for groceries, buying school supplies, budgeting an allowance, deciding what time to leave for school or the movies, and sharing a pizza or the prize money from a contest.
	6M-NSCE 5 (SOL 6.8)	• The order of operations is a convention that defines the computation order to follow in simplifying an expression. • The order of operations is as follows: – First, complete all operations within grouping symbols*. If there are grouping symbols within other grouping symbols, do the innermost operation first. – Second, evaluate all exponential expressions. – Third, multiply and/or divide in order from left to right. – Fourth, add and/or subtract in order from left to right. * Parentheses ( ), brackets [ ], braces {}, and the division bar – as in $\frac{3+4}{5+6}$ should be treated as grouping symbols. • The power of a number represents repeated multiplication of the number (e.g., $8^3 = 8 \cdot 8 \cdot 8$). The base is the number that is multiplied, and the exponent represents the number of times the base is used as a factor. In the example, 8 is the base, and 3 is the exponent. • Any number, except 0, raised to the zero power is 1. Zero to the zero power is undefined.
Measurement and Geometry	6M-MG 1 (SOL 6.10)	• Experiences in deriving the formulas for area, perimeter, and volume using manipulatives such as tiles, one-inch cubes, adding machine tape, graph paper, geoboards, or tracing paper, promote an understanding of the formulas and facility in their use. † • The perimeter of a polygon is the measure of the distance around the polygon. • Circumference is the distance around or perimeter of a circle. • The area of a closed curve is the number of nonoverlapping square units required to fill the region enclosed by the curve. • The perimeter of a square whose side measures *s* is 4 times *s* ($P = 4s$), and its area is side times side ($A = s^2$).

		• The perimeter of a rectangle is the sum of twice the length and twice the width [$P = 2l + 2w$, or $P = 2(l + w)$], and its area is the product of the length and the width ($A = lw$). • The value of pi (π) is the ratio of the circumference of a circle to its diameter. • The ratio of the circumference to the diameter of a circle is a constant value, pi (π), which can be approximated by measuring various sizes of circles. • The fractional approximation of pi generally used is $\frac{22}{7}$. • The decimal approximation of pi generally used is 3.14. • The circumference of a circle is computed using $C = \pi d$ or $C = 2\pi r$, where d is the diameter and r is the radius of the circle. • The area of a circle is computed using the formula $A = \pi r^2$, where r is the radius of the circle. • The surface area of a rectangular prism is the sum of the areas of all six faces ($SA = 2lw + 2lh + 2wh$). • The volume of a rectangular prism is computed by multiplying the area of the base, B, (length x width) by the height of the prism ($V = lwh = Bh$). †Revised March 2011
Probability, Statistics, Patterns, Functions, and Algebra	6M-PSPFA 1 (SOL 6.18)	• A one-step linear equation is an equation that requires one operation to solve. • A mathematical expression contains a variable or a combination of variables, numbers, and/or operation symbols and represents a mathematical relationship. An expression cannot be solved. • A term is a number, variable, product, or quotient in an expression of sums and/or differences. In $7x^2 + 5x - 3$, there are three terms, $7x^2$, $5x$, and 3. • A coefficient is the numerical factor in a term. For example, in the term $3xy^2$, 3 is the coefficient; in the term z, 1 is the coefficient. • Positive rational solutions are limited to whole numbers and positive fractions and decimals. • An equation is a mathematical sentence stating that two expressions are equal. • A variable is a symbol (placeholder) used to represent an unspecified member of a set.
	6M-PSPFA 2 (SOL 6.19)	• Identity elements are numbers that combine with other numbers without changing the other numbers. The additive identity is zero (0). The multiplicative identity is one (1). There are no identity elements for subtraction and division. • The additive identity property states that the sum of any real number and zero is equal to the given real number (e.g., $5 + 0 = 5$). • The multiplicative identity property states that the product of any real number and one is equal to the given real number (e.g., $8 \cdot 1 = 8$). • Inverses are numbers that combine with other numbers and result in identity elements. • The multiplicative inverse property states that the product of a number and its multiplicative inverse (or reciprocal) always equals one (e.g., $4 \cdot \frac{1}{4} = 1$). • Zero has no multiplicative inverse. • The multiplicative property of zero states that the product of any real number and zero is zero. • Division by zero is not a possible arithmetic operation. Division by zero is undefined.