ASOL MATHEMATICS SCOPE AND SEQUENCE MATRIX: HIGH SCHOOL

***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	HIGH SCHOOL ASOL BLUEPRINT	UNDERSTANDING THE STANDARD
Expressions and Operations	HSM-EO 1 (SOL A.1)	• Algebra is a tool for reasoning about quantitative situations so that relationships become apparent. • Algebra is a tool for describing and representing patterns and relationships. • Mathematical modeling involves creating algebraic representations of quantitative real-world situations. • The numerical value of an expression is dependent upon the values of the replacement set for the variables. • There are a variety of ways to compute the value of a numerical expression and evaluate an algebraic expression. • The operations and the magnitude of the numbers in an expression impact the choice of an appropriate computational technique. • An appropriate computational technique could be mental mathematics, calculator, or paper and pencil.
	HSM-EO 2 (SOL A.2)	• The laws of exponents can be investigated using inductive reasoning. • A relationship exists between the laws of exponents and scientific notation. • Operations with polynomials can be represented concretely, pictorially, and symbolically. • Polynomial expressions can be used to model real-world situations. • The distributive property is the unifying concept for polynomial operations. • Factoring reverses polynomial multiplication. • Some polynomials are prime polynomials and cannot be factored over the set of real numbers. • Polynomial expressions can be used to define functions and these functions can be represented graphically. • There is a relationship between the factors of any polynomial and the *x*-intercepts of the graph of its related function.
Equations and Inequalities	HSM-EI 1 (SOL A.4)	• A solution to an equation is the value or set of values that can be substituted to make the equation true. • The solution of an equation in one variable can be found by graphing the expression on each side of the equation separately and finding the *x*-coordinate of the point of intersection. • Real-world problems can be interpreted, represented, and solved using linear and quadratic equations. • The process of solving linear and quadratic equations can be modeled in a variety of ways, using concrete, pictorial, and symbolic representations. • Properties of real numbers and properties of equality can be used to justify equation solutions and expression simplification. • The zeros or the *x*-intercepts of the quadratic function are the real root(s) or solution(s) of the quadratic equation that is formed by setting the given quadratic expression equal to zero. • A system of linear equations with exactly one solution is characterized by the graphs of two lines whose intersection is a single point, and the coordinates of this point satisfy both equations. • A system of two linear equations with no solution is characterized by the graphs of two lines that are parallel. • A system of two linear equations having infinite solutions is characterized by two graphs that coincide (the graphs will appear to be the graph of one line), and the coordinates of all points on the line satisfy both equations. • Systems of two linear equations can be used to model two real-world conditions that must be satisfied simultaneously. • Equations and systems of equations can be used as mathematical models for real world situations.

		• Set builder notation may be used to represent solution sets of equations.
	HSM-EI 2 (SOL A.5)	• A solution to an inequality is the value or set of values that can be substituted to make the inequality true. • Real-world problems can be modeled and solved using linear inequalities. • Properties of inequality and order can be used to solve inequalities. • Set builder notation may be used to represent solution sets of inequalities.
	HSM-EI 3 (SOL A.6)	• Changes in slope may be described by dilations or reflections or both. • Changes in the y-intercept may be described by translations. • Linear equations can be graphed using slope, *x*- and *y*-intercepts, and/or transformations of the parent function. • The slope of a line represents a constant rate of change in the dependent variable when the independent variable changes by a constant amount. • The equation of a line defines the relationship between two variables. • The graph of a line represents the set of points that satisfies the equation of a line. • A line can be represented by its graph or by an equation. • The graph of the solutions of a linear inequality is a half-plane bounded by the graph of its related linear equation. Points on the boundary are included unless it is a strict inequality. • Parallel lines have equal slopes. • The product of the slopes of perpendicular lines is -1 unless one of the lines has an undefined slope.
Functions and Statistics	HSM-FS 1 (SOL A.7)	• A set of data may be characterized by patterns, and those patterns can be represented in multiple ways. • Graphs can be used as visual representations to investigate relationships between quantitative data. • Inductive reasoning may be used to make conjectures about characteristics of function families. • Each element in the domain of a relation is the abscissa of a point of the graph of the relation. • Each element in the range of a relation is the ordinate of a point of the graph of the relation. • A relation is a function if and only if each element in the domain is paired with a unique element of the range. • The values of $f(x)$ are the ordinates of the points of the graph of f. • The object $f(x)$ is the unique object in the range of the function f that is associated with the object x in the domain of f. • For each x in the domain of f, x is a member of the input of the function f, $f(x)$ is a member of the output of f, and the ordered pair $[x, f(x)]$ is a member of f. • An object x in the domain of f is an x-intercept or a zero of a function f if and only if $f(x) = 0$. • Set builder notation may be used to represent domain and range of a relation.
	HSM-FS 2 (SOL A.9)	• Descriptive statistics may include measures of center and dispersion. • Variance, standard deviation, and mean absolute deviation measure the dispersion of the data. • The sum of the deviations of data points from the mean of a data set is 0. • Standard deviation is expressed in the original units of measurement of the data. • Standard deviation addresses the dispersion of data about the mean. • Standard deviation is calculated by taking the square root of the variance. • The greater the value of the standard deviation, the further the data tend to be dispersed from the mean. • For a data distribution with outliers, the mean absolute deviation may be a better measure of dispersion than the standard deviation or variance.

		• A z-score (standard score) is a measure of position derived from the mean and standard deviation of data. • A z-score derived from a particular data value tells how many standard deviations that data value is above or below the mean of the data set. It is positive if the data value lies above the mean and negative if the data value lies below the mean.
	HSM-FS 3 (SOL A.10)	• Statistical techniques can be used to organize, display, and compare sets of data. • Box-and-whisker plots can be used to analyze data.
	HSM-FS 4 (SOL A.11)	• The graphing calculator can be used to determine the equation of a curve of best fit for a set of data. • The curve of best fit for the relationship among a set of data points can be used to make predictions where appropriate. • Many problems can be solved by using a mathematical model as an interpretation of a real-world situation. The solution must then refer to the original real-world situation. • Considerations such as sample size, randomness, and bias should affect experimental design.