ABSS Math Unit Planning Template

Introduction:

Grade/Course: 9_12 **|** Adv Functions and Modeling			**Suggested Unit Pacing (# of days): 6**
Unit Number and Title: Unit 3 - Systems of Linear Equations and Inequalities			**Mathematical Practices** **P1** Make sense of problems and persever in solving them. **P2** Reason abstractly and quantitatively. **P3** Construct viable arguments and critique the reasoning of others. **P4** Model with mathematics. **P5** Use appropriate tools strategically. **P6** Attend to precision. **P7** Look for and make use of structure. **P8** Look for and express regularity in repeated reasoning.
Conceptual Overview	This unit reviews the concepts of solving systems of linear equations and inequalities and operations with matrices.		
Essential Understandings			
CCSS	**Vector and Matrix Quantities**	**CCSS.9_12.MA.N.VM.CL3**	Perform operations on matrices and use matrices in applications.
CCSS	**Vector and Matrix Quantities**	**CCSS.9_12.MA.N.VM.6**	(+) Use matrices to represent and manipulate data, e.g., to represent payoffs or incidence relationships in a network.
CCSS	**Vector and Matrix Quantities**	**CCSS.9_12.MA.N.VM.7**	(+) Multiply matrices by scalars to produce new matrices, e.g., as when all of the payoffs in a game are doubled.
CCSS	**Vector and Matrix Quantities**	**CCSS.9_12.MA.N.VM.8**	(+) Add, subtract, and multiply matrices of appropriate dimensions.
CCSS	**Vector and Matrix Quantities**	**CCSS.9_12.MA.N.VM.9**	(+) Understand that, unlike multiplication of numbers, matrix multiplication for square matrices is not a commutative operation, but still satisfies the associative and distributive properties.
CCSS	**Vector and Matrix Quantities**	**CCSS.9_12.MA.N.VM.10**	(+) Understand that the zero and identity matrices play a role in matrix addition and multiplication similar to the role of 0 and 1 in the real numbers. The determinant of a square matrix is nonzero if and only if the matrix has a multiplicative inverse.
CCSS	**Vector and Matrix Quantities**	**CCSS.9_12.MA.N.VM.11**	(+) Multiply a vector (regarded as a matrix with one column) by a matrix of suitable dimensions to produce another vector. Work with matrices as transformations of vectors.
CCSS	**Vector and Matrix Quantities**	**CCSS.9_12.MA.N.VM.12**	(+) Work with 2 × 2 matrices as transformations of the plane, and interpret the absolute value of the determinant in terms of area.
CCSS	**Reasoning with Equations and Inequalities**	**CCSS.9_12.MA.AL.A.REI.CL3**	Solve systems of equations
	Reasoning with		Prove that, given a system of two equations in two

CCSS	**Equations and Inequalities**	**CCSS.9_12.MA.AL.A.REI.5**	variables, replacing one equation by the sum of that equation and a multiple of the other produces a system with the same solutions.
CCSS	**Reasoning with Equations and Inequalities**	**CCSS.9_12.MA.AL.A.REI.6**	Solve systems of linear equations exactly and approximately (e.g., with graphs), focusing on pairs of linear equations in two variables.
CCSS	**Reasoning with Equations and Inequalities**	**CCSS.9_12.MA.AL.A.REI.7**	Solve a simple system consisting of a linear equation and a quadratic equation in two variables algebraically and graphically. *For example, find the points of intersection between the line y = –3x and the circle x^2 + y^2 = 3.*
CCSS	**Reasoning with Equations and Inequalities**	**CCSS.9_12.MA.AL.A.REI.8**	(+) Represent a system of linear equations as a single matrix equation in a vector variable.
CCSS	**Reasoning with Equations and Inequalities**	**CCSS.9_12.MA.AL.A.REI.9**	(+) Find the inverse of a matrix if it exists and use it to solve systems of linear equations (using technology for matrices of dimension 3 × 3 or greater).
CCSS	**Reasoning with Equations and Inequalities**	**CCSS.9_12.MA.AL.A.REI.CL4**	Represent and solve equations and inequalities graphically
CCSS	**Reasoning with Equations and Inequalities**	**CCSS.9_12.MA.AL.A.REI.10**	Understand that the graph of an equation in two variables is the set of all its solutions plotted in the coordinate plane, often forming a curve (which could be a line).
CCSS	**Reasoning with Equations and Inequalities**	**CCSS.9_12.MA.AL.A.REI.11**	Explain why the x-coordinates of the points where the graphs of the equations *y = f(x)* and *y = g(x)* intersect are the solutions of the equation *f(x) = g(x)*; find the solutions approximately, e.g., using technology to graph the functions, make tables of values, or find successive approximations. Include cases where *f(x)* and/or *g(x)* are linear, polynomial, rational, absolute value, exponential, and logarithmic functions.★
CCSS	**Reasoning with Equations and Inequalities**	**CCSS.9_12.MA.AL.A.REI.12**	Graph the solutions to a linear inequality in two variables as a half-plane (excluding the boundary in the case of a strict inequality), and graph the solution set to a system of linear inequalities in two variables as the intersection of the corresponding half-planes.
CCSS	**Reasoning with Equations and Inequalities**	**CCSS.9_12.MA.AL.A.REI.CL3**	Solve systems of equations
CCSS	**Reasoning with Equations and Inequalities**	**CCSS.9_12.MA.AL.A.REI.5**	Prove that, given a system of two equations in two variables, replacing one equation by the sum of that equation and a multiple of the other produces a system with the same solutions.
	Reasoning		

CCSS	**with Equations and Inequalities**	**CCSS.9_12.MA.AL.A.REI.6**	Solve systems of linear equations exactly and approximately (e.g., with graphs), focusing on pairs of linear equations in two variables.
CCSS	**Reasoning with Equations and Inequalities**	**CCSS.9_12.MA.AL.A.REI.7**	Solve a simple system consisting of a linear equation and a quadratic equation in two variables algebraically and graphically. *For example, find the points of intersection between the line y = –3x and the circle x^2 + y^2 = 3.*
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SCS	**The learner will use functions to solve problems.**	**SCS.9_12.MA.2.04.a**	Solve using tables, graphs, and algebraic properties.
SCS	**The learner will use functions to solve problems.**	**SCS.9_12.MA.2.03.b**	Interpret the constants, coefficients, and bases in the context of the problem.
SCS	**The learner will use functions to solve problems.**	**SCS.9_12.MA.2.03.a**	Solve using tables, graphs, and algebraic properties.

SCS	**The learner will use functions to solve problems.**	**SCS.9_12.MA.2.02.b**	Interpret the constants, coefficients, and bases in the context of the problem.
SCS	**The learner will use functions to solve problems.**	**SCS.9_12.MA.2.02.a**	Solve using tables, graphs, and algebraic properties.
SCS	**The learner will use functions to solve problems.**	**SCS.9_12.MA.2.02**	Use piecewise-defined functions to model and solve problems; justify results.
SCS	**The learner will use functions to solve problems.**	**SCS.9_12.MA.2.01.b**	Interpret the constants, coefficients, and bases in the context of the problem.
SCS	**The learner will use functions to solve problems.**	**SCS.9_12.MA.2.01.a**	Solve using tables, graphs, and algebraic properties.

Learning Targets	• Solve systems of equations and inequalities • Define matrices • Add, subtract, and multiply matrices • Find determinants and inverses of matrices
Essential Terminology	• system of equations • independent • dependent • consistent • inconsistent • elimination method • substitution method • matrix • elements • rows • columns • dimension • square matrix • nth order • zero matrix • additive identity matrix • scalar • determinant • minor • identity matrix for multiplication • inverse matrix • system of linear inequalities • Vertex theorem

Literacy Integration	**Literacy Standards**	Level	Standard	Standard Name
	Literature Connections			
Technology Integration	**Technology Standards**	Level	Standard	Standard Name
	Websites			

Assessment	**Formative**	
	Performance Tasks	
	Summative	
Resources		
Learning Plan	**Instructional Sequence**	• **Solving Systems of Equations in Two Variables (2-1)** • **Modeling Real-World Data with Matrices (2-3)** • **Determinants and Multiplicative Inverses of Matrices (2-5)** • **Solving Systems Of Linear Inequalities (2-6)** • **Review** • **Assessment**
Differentiation	**Remediation**	
	Enrichment	