

MATH MCS MYP UNIT PLANNER

Teacher(s)	M. McQueen	Subject group and discipline	Honors Algebra 1		
Unit title	Unit 2: Reasoning with Linear Equations and Inequalities	MYP year	Year 4	Unit duration (hrs)	30 hours

Inquiry: Establishing the purpose of the unit

Key concept	Related concept(s)	Global context
Form	Change, Generalization, Pattern, Representation	Scientific and Technical Innovation - Systems, models, methods; Products, processes, solutions
Statement of inquiry		
The way relationships change causes generalizations and patterns.		
Inquiry questions		
<p>Factual</p> <ul style="list-style-type: none"> How do equations and expressions differ? How do you evaluate an expression? What is a solution? <p>Conceptual</p> <ul style="list-style-type: none"> How can a formula be rearranged? Why is rearranging a formula helpful? How do you solve equations using algebraic properties of equality? What are the similarities and differences between the <p>Debatable</p> <ul style="list-style-type: none"> What is the best way to solve a linear equation in one-variable equation? What is the best way to solve a linear system of equations? 		
MYP Objectives	Assessments	
Objective A: Knowing and Understanding Objective B: Investigating Patterns	MYP Assessments: MYP A – Solving Equations in One Variable, MYP B – Sequences Formative Assessment: CFA Slope Intercept Form & CFA Linear Systems	

Approaches to learning (ATL)

- Understand and use mathematical notation
- Take effective notes in class
- Consider ideas from multiple perspectives
- Present information in a variety of formats and platforms

Action: Teaching and learning through inquiry**Content Standards****Unit 2 Georgia Standards of Excellence:****Create equations that describe numbers or relationships**

MGSE9-12.A.CED.1 Create equations and inequalities in one variable and use them to solve problems. Include equations arising from linear, ~~quadratic, simple rational, and exponential functions (integer inputs only).~~

MGSE9-12.A.CED.2 Create linear, ~~quadratic, and exponential~~ equations in two or more variables to represent relationships between quantities; graph equations on coordinate axes with labels and scales. (The phrase “in two or more variables” refers to formulas like the compound interest formula, in which $A = P(1 + r/n)^{nt}$ has multiple variables.)

MGSE9-12.A.CED.3 Represent constraints by equations or inequalities, and by systems of equations and/or inequalities, and interpret data points as possible (i.e. a solution) or not possible (i.e. a non-solution) under the established constraints.

MGSE9-12.A.CED.4 Rearrange formulas to highlight a quantity of interest using the same reasoning as in solving equations. *Examples: Rearrange Ohm’s law $V = IR$ to highlight resistance R ; Rearrange area of a circle formula $A = \pi r^2$ to highlight the radius r .*

Understand solving equations as a process of reasoning and explain the reasoning

MGSE9-12.A.REI.1 Using algebraic properties and the properties of real numbers, justify the steps of a simple, one-solution equation. Students should justify their own steps, or if given two or more steps of an equation, explain the progression from one-step to the next using properties.

Solve equations and inequalities in one variable

MGSE9-12.A.REI.3 Solve linear equations and inequalities in one variable including equations with coefficients represented by letters. *For example, given $ax + 3 = 7$, solve for x .*

Solve systems of equations

MGSE9-12.A.REI.5 Show and explain why the elimination method works to solve a system of two-variable equations.

MGSE9-12.A.REI.6 Solve systems of linear equations exactly and approximately (e.g., with graphs), focusing on pairs of linear equations in two variables.

Represent and solve equations and inequalities graphically

MGSE9-12.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.

MGSE9-12.A.REI.11 Using graphs, tables, or successive approximations, show that the solution to the equation $f(x) = g(x)$ is the x -value where the y -values of $f(x)$ and $g(x)$ are the same.

MGSE9-12.A.REI.12 Graph the solution set to a linear inequality in two variables.

Build a function that models a relationship between two quantities

MGSE9-12.F.BF.1 Write a function that describes a relationship between two quantities.

MGSE9-12.F.BF.1a Determine an explicit expression and the recursive process (steps for calculation) from context. *For example, if Jimmy starts out with \$15 and earns \$2 a day, the explicit expression “ $2x+15$ ” can be described recursively (either in writing or verbally) as “to find out how much money Jimmy will have tomorrow, you add \$2 to his total today.”* $J_n = J_{n-1} + 2, J_0 = 15$

MGSE9-12.F.BF.2 Write arithmetic and geometric sequences recursively and explicitly, use them to model situations, and translate between the two forms. Connect arithmetic sequences to linear functions and geometric sequences to exponential functions.

Understand the concept of a function and use function notation

MGSE9-12.F.IF.1 Understand that a function from one set (the input, called the domain) to another set (the output, called the range) assigns to each element of the domain exactly one element of the range, i.e. each input value maps to exactly one output value. If f is a function, x is the input (an element of the domain), and $f(x)$ is the output (an element of the range). Graphically, the graph is $y = f(x)$.

MGSE9-12.F.IF.2 Use function notation, evaluate functions for inputs in their domains, and interpret statements that use function notation in terms of a context.

MGSE9-12.F.IF.3 Recognize that sequences are functions, sometimes-defined recursively, whose domain is a subset of the integers. (Generally, the scope of high school math defines this subset as the set of natural numbers 1,2,3,4...) By graphing or calculating terms, students should be able to show how the recursive sequence $a_1 = 7, a_n = a_{n-1} + 2$; the sequence $s_n = 2(n-1) + 7$; and the function $f(x) = 2x + 5$ (when x is a natural number) all define the same sequence.

Interpret functions that arise in applications in terms of the context

MGSE9-12.F.IF.4 Using tables, graphs, and verbal descriptions, interpret the key characteristics of a function which models the relationship between two quantities. Sketch a graph showing key features including: intercepts; interval where the function is increasing, decreasing, positive, or negative; relative maximums and minimums; symmetries; end behavior; and periodicity.

MGSE9-12.F.IF.5 Relate the domain of a function to its graph and, where applicable, to the quantitative relationship it describes. *For example, if the function $h(n)$ gives the number of person-hours it takes to assemble n engines in a factory, then the positive integers would be an appropriate domain for the function.*

MGSE9-12.F.IF.6 Calculate and interpret the average rate of change of a function (presented symbolically or as a table) over a specified interval. Estimate the rate of change from a graph.

Analyze functions using different representations

MGSE9-12.F.IF.7 Graph functions expressed algebraically and show key features of the graph both by hand and by using technology.

MGSE9-12.F.IF.7a Graph linear and quadratic functions and show intercepts, maxima, and minima (as determined by the function or by context).

MGSE9-12.F.IF.9 Compare properties of two functions each represented in a different way (algebraically, graphically, numerically in tables, or by verbal descriptions). *For example, given a graph of one function and an algebraic expression for another, say which has the larger maximum.*

Learning Activities and Experiences

Topic	Resource	Content Covered	Standards Addressed
Solving Equations and Inequalities	1-2 Solving Linear Equations Guided Notes w/Graphic Organizer Pearson enVision: pg. 11 - 17	<ul style="list-style-type: none"> Create and solve linear equations in one variable 	MGSE9-12.A.CED.1 MGSE9-12.A.REI.1 MGSE9-12.A.REI.3
	1-3 Solving Equations with Variables on Both Sides Guided Notes w/Graphic Organizer Pearson enVision: pg. 18 - 23	<ul style="list-style-type: none"> Write and solve equations with a variable on both sides to solve the problem 	MGSE9-12.N.Q.2 MGSE9-12.A.CED.1 MGSE9-12.A.REI.1 MGSE9-12.A.REI.3
	1-4 Literal Equations and Formulas Guided Notes w/Graphic Organizer Pearson enVision: pg. 24 - 29	<ul style="list-style-type: none"> Rewrite and use literal equations to solve problems 	MGSE9-12.N.Q.1 MGSE9-12.A.CED.1 MGSE9-12.A.CED.4
	1-5 Solving Inequalities in One Variable Guided Notes w/Graphic Organizer Pearson enVision: pg. 30 - 35	<ul style="list-style-type: none"> Solve and graph inequalities 	MGSE9-12.A.CED.1 MGSE9-12.A.CED.3 MGSE9-12.A.REI.3
	Lucy's Linear Equations & Inequalities (DOE – Practice Task)	<ul style="list-style-type: none"> Solve a series of linear equations and inequality word problems 	MGSE9-12.A.CED.1 MGSE9-12.A.SSE.1 MGSE9-12.A.SSE.1a MGSE9-12.A.SSE.1b
	Additional Resources: <ul style="list-style-type: none"> 1-2 / 1-3 Solving Equations Lecture Outline Literal Equations and Formulas Lecture Outline 1-5 / 1-6 Solving Inequalities in One Variable Lecture Outline Smallest Solution (Desmos) 		
Graphing Linear Equations and Inequalities	2-1 Slope-Intercept Form Guided Notes w/Graphic Organizer Pearson enVision: pg. 57 - 62	<ul style="list-style-type: none"> Write and graph linear equations using slope-intercept form 	MGSE9-12.A.CED.2 MGSE9-12.S.ID.7
	4-4 Linear Inequalities in Two Variables Guided Notes w/Graphic Organizer Pearson enVision: pg. 164 - 169	<ul style="list-style-type: none"> Graph solutions to linear inequalities in two variables 	MGSE9-12.A.CED.3 MGSE9-12.A.REI.12
	2-2 Point-Slope Form Guided Notes w/Graphic Organizer Pearson enVision: pg. 63 - 68	<ul style="list-style-type: none"> Write and graph linear equations in point-slope form 	MGSE9-12.A.CED.2 MGSE9-12.S.ID.7 MGSE9-12.F.LE.2
	2-3 Standard Form Guided Notes w/Graphic Organizer Pearson enVision: pg. 69 - 74	<ul style="list-style-type: none"> Write and graph linear equations in standard form 	MGSE9-12.A.CED.2 MGSE9-12.A.CED.3 MGSE9-12.S.ID.7

	<p>Additional Resources:</p> <ul style="list-style-type: none"> ● 2-1 Slope Intercept Form Lecture Outline ● 2-1 / 4-4 Slope Intercept Form Continued Lecture Outline ● Point Slope and Standard Form Lecture Outline ● Forget the Formula (DOE Scaffolding Task) ● 3-Act Task How Tall is Tall? (Pearson enVision: pg. 75) 		
Linear Functions	<p>3-1 Relations and Functions Guided Notes w/Graphic Organizer Pearson enVision: pg. 89 – 94</p>	<ul style="list-style-type: none"> ● Understand relations and functions 	MGSE9-12.F.IF.1
	<p>3-2 Linear Functions Guided Notes w/Graphic Organizer Pearson enVision: pg. 95 - 101</p>	<ul style="list-style-type: none"> ● Linear functions can be represented in many ways including function notation 	MGSE9-12.F.IF.1 MGSE9-12.F.IF.2 MGSE9-12.F.IF.5 MGSE9-12.F.LE.2
	<p>3-3 Transforming Linear Functions Guided Notes w/Graphic Organizer Pearson enVision: pg. 102 - 108</p>	<ul style="list-style-type: none"> ● Graph and interpret transformations of linear functions 	MGSE9-12.F.BF.1 MGSE9-12.F.BF.3 MGSE9-12.F.IF.5 MGSE9-12.F.IF.7
	<p>Additional Resources:</p> <ul style="list-style-type: none"> ● 3-1 / 3-2 Intro to Functions Lecture Outline ● 3-2 Linear Functions Lecture Outline ● 3-3 Linear Functions Lecture Outline ● Cara’s Candles Revisited (DOE – Scaffolding Task) 		
Arithmetic Sequences	<p>3-4 Arithmetic Sequences Guided Notes w/Graphic Organizer Pearson enVision: pg. 110 - 117</p>	<ul style="list-style-type: none"> ● Write recursive and explicit formulas for arithmetic sequences 	MGSE9-12.F.IF.3 MGSE9-12.F.BF.1 MGSE9-12.F.BF.2 MGSE9-12.F.LE.2
	<p>Additional Resources:</p> <ul style="list-style-type: none"> ● 3-4 Arithmetic Sequences Lecture Outline 		
Systems of Equations and Inequalities	<p>4-1 Solving Systems of Equations by Graphing Guided Notes w/Graphic Organizer Pearson enVision: pg. 143 - 149</p>	<ul style="list-style-type: none"> ● Graph systems of linear equations to find approximate solution 	MGSE9-12.A.REI.6
	<p>4-2 Solving Systems of Equations by Substitution Guided Notes w/Graphic Organizer Pearson enVision: pg. 150 - 156</p>	<ul style="list-style-type: none"> ● Use the substitution method to solve systems of linear equations 	MGSE9-12.A.CED.3 MGSE9-12.A.REI.6
	<p>4-3 Solving Systems of Equations by Elimination Guided Notes w/Graphic Organizer</p>	<ul style="list-style-type: none"> ● Use the elimination method to solve systems of linear equations 	MGSE9-12.A.CED.3 MGSE9-12.A.REI.5

	Pearson enVision: pg. 157 - 163		
	4-5 Systems of Linear Inequalities Guided Notes w/Graphic Organizer Pearson enVision: pg. 171 - 176	<ul style="list-style-type: none"> Graph the solution set of a system of linear inequalities and interpret solutions 	MGSE9-12.A.CED.3 MGSE9-12.A.REI.12
	Additional Resources: <ul style="list-style-type: none"> 4-1 Solving Systems of Equations by Graphing Lecture Outline 4-2 Solving Systems of Equations by Substitution Lecture Notes 4-3 Solving Systems by Elimination Lecture Outline 4-5 Solving Systems of Inequalities Lecture Outline Putting the 'Fun' in Functions (DOE – Culminating Task) Solving Systems of Equations Algebraically (DOE – Scaffolding Task) 		
	3-Act Task Get Up There! Pearson enVision: pg. 170	<ul style="list-style-type: none"> Use mathematical modelling to represent a problem situation and propose a solution 	MGSE9-12.A.CED.2 MGSE9-12.A.CED.3
Personalized Learning and Differentiation			
<p>Teachers differentiate by providing examples (work samples or task-specific clarifications of assessment criteria); structuring support (advance organizers, flexible grouping, peer relationships); establishing flexible deadlines, and adjusting the pace.</p> <ul style="list-style-type: none"> -SWD/504- Accommodations provided -ELL- Five Principle ELL Curriculum Framework and Vocabulary Supports -Intervention Support- Re-teaching Activities in Small Groups with Progress Monitoring -Extensions- Enrichment Tasks and Projects <p><u>Intervention Resources</u></p>			
Resources			
Unit Web Links			
Nearpod	Kahoot!		
Delta Math	Quizizz		
Khan Academy	WootMath		
WordWall	Jeopardy Labs		
EdPuzzle			
Gimkit			
DOE Alg. 1 Unit 2 Framework			