Unit 1: Relationships Between Quantities and Reasoning with Equations

Content Area: **Math**
Course(s):
Time Period: **Full Year**
Length: **Full Year**
Status: **Published**

Unit Overview

This unit focuses on manipulating expressions, writing, solving, and graphing linear equations. Expressions and equations will be solved algebraically. Functions will be used in a variety of ways to describe real world relationships and patterns. Skills learned from linear equations will be applied to both inequality and absolute value graphs.

Enduring Understandings

Equation solving is working backward and using inverse operations.
Function notation provides instructions to be applied to mathematical expressions.
Solving inequalities is similar to solving equations, working backward and applying inverse operations, the exception being when multiplying or dividing by a negative number.
The solution to an inequality is a set of numbers, not just a single solution.
Absolute value is the distance from zero.

Essential Questions

How can you represent real-life situations into equations and inequalities?
How do you solve equations using algebra and other strategies?
How can linear equations be used to model real world situations?
How can we use linear graphing in order to predict outcomes?
How is function notation used to model real world situations?
How do you solve inequalities using algebra and other strategies?
How can we model real world situations using absolute value?

Learning Objectives

Be able to identify the parts of an expression within the context of the situation.
Be able to solve multi-step equations given a specific variable.
Be able to graph a line given different forms of the equation and recognize the constraints of the equation as well as use appropriate scales.
Be able to describe patterns of change represented in different contexts.
Be able to write the equation of a line given information about it.
Be able to write, solve and graph inequalities in two variables.

Standards: Content

MATH.9-12.N.Q.A	Reason quantitatively and use units to solve problems
MATH.9-12.N.Q.A.1	Use units as a way to understand problems and to guide the solution of multi-step problems; choose and interpret units consistently in formulas; choose and interpret the scale and the origin in graphs and data displays.
MATH.9-12.N.Q.A.2	Define appropriate quantities for the purpose of descriptive modeling.
MATH.9-12.N.Q.A.3	Choose a level of accuracy appropriate to limitations on measurement when reporting quantities.
MATH.9-12.A.CED.A	Create equations that describe numbers or relationships
MATH.9-12.A.CED.A.1	Create equations and inequalities in one variable and use them to solve problems. Include equations arising from linear and quadratic functions, and simple rational and exponential functions.
MATH.9-12.A.CED.A.2	Create equations in two or more variables to represent relationships between quantities; graph equations on coordinate axes with labels and scales.
MATH.9-12.A.CED.A.3	Represent constraints by equations or inequalities, and by systems of equations and/or inequalities, and interpret solutions as viable or nonviable options in a modeling context.
MATH.9-12.A.CED.A.4	Rearrange formulas to highlight a quantity of interest, using the same reasoning as in solving equations.
MATH.9-12.A.REI.A	Understand solving equations as a process of reasoning and explain the reasoning
MATH.9-12.A.REI.A.1	Explain each step in solving a simple equation as following from the equality of numbers asserted at the previous step, starting from the assumption that the original equation has a solution. Construct a viable argument to justify a solution method.
MATH.9-12.A.REI.B	Solve equations and inequalities in one variable
MATH.9-12.A.REI.B.3	Solve linear equations and inequalities in one variable, including equations with coefficients represented by letters.
MATH.8.F.A.3	Interpret the equation $y = mx + b$ as defining a linear function, whose graph is a straight line; give examples of functions that are not linear.
MATH.8.F.B.4	Construct a function to model a linear relationship between two quantities. Determine the rate of change and initial value of the function from a description of a relationship or from two (x, y) values, including reading these from a table or from a graph. Interpret the rate of change and initial value of a linear function in terms of the situation it models, and in terms of its graph or a table of values.
MATH.9-12.A.SSE.A	Interpret the structure of expressions
MATH.9-12.A.SSE.A.1	Interpret expressions that represent a quantity in terms of its context.
MATH.9-12.A.SSE.A.1.a	Interpret parts of an expression, such as terms, factors, and coefficients.

Standards: Interdisciplinary

PFL.9.1.8.CDM.4	Evaluate the application process for different types of loans (e.g., credit card, mortgage, student loans).
PFL.9.1.8.CP.1	Compare prices for the same goods or services.

CS.6-8.8.1.8.AP.1	Design and illustrate algorithms that solve complex problems using flowcharts and/or pseudocode.
CS.6-8.8.1.8.AP.2	Create clearly named variables that represent different data types and perform operations on their values.
CS.6-8.8.1.8.DA.1	Organize and transform data collected using computational tools to make it usable for a specific purpose.
CS.6-8.8.1.8.DA.4	Transform data to remove errors and improve the accuracy of the data for analysis.
CS.6-8.8.1.8.DA.5	Test, analyze, and refine computational models.

Assessment Evidence

Formative	Collaborative Activities, Homework, Classwork, Discussion, Independent Class Assignment, Informal Observations of Students, Games, Exit Slips, Pre-Assessments, Math Message – Warm up, Questioning, Teacher Made Pages, Learning Centers, LinkIt, Problem of the Day, Problem of the Week, Entrance Slips, Pre-Assessments
Summative	LinkIt Benchmark Assessments, Tests, Pre-Assessments, Quizzes, Written Responses
Alternative & Benchmark	Alternative – Reteaching, One on One Conferencing, Learning Centers, Levels Homework, Higher Order Thinking Problems, Additional leveled practice Benchmark - LinkIt Benchmark Assessments, Totowa TPA
Assessment Evidence Resource	

Instructional Resources

Smartboard, Computers, iPads, websites and digital interactives/models, multi-media presentations, video streaming, Brain Pop, Microsoft 365, Primary and Secondary Source Documents, Assorted Manipulatives, Khan Academy, Crosswalk Coach for the Common Core Standards, Ready Common Core Mathematics Instruction and Practice, Common Core Coach, Calculators, Reveal Math Resources.

Instructional Resource List

Curricular Mandates

Below are the curricular requirements as defined in NJ Administrative Code and Statute

	Amistad		Diversity, Equity, and Inclusion
	Holocaust		LGBT and Disabilities (Grades 6-12)
	Climate Change		Asian American & Pacific Islander

Social Emotional Learning (SEL) Competencies

NJ Social and Emotional Learning Competencies & Sub-Competencies

	Self-Awareness	X	Relationship Skills
X	Responsible Decision-Making		Social Awareness
X	Self-Management		

21st Century Skills & Themes

	Global and Cultural Awareness	X	Technology Literacy		Planning and Budgeting
X	Creativity and Innovation		Financial Institutions		Risk Management and Insurance
X	Information and Media Literacy		Digital Citizenship		Economic and Government Influences
	Critical Thinking and Problem Solving		Credit Profile		Career Awareness and Planning
	Civic Financial Responsibility		Financial Psychology		