Unit #1: Relationships Between Quantities and Reasoning with Equations

Content Area: **Mathematics**
Course(s): **Algebra 1CP**
Time Period: **Semester 1**
Length: **6 weeks**
Status: **Published**

Transfer Goals

Recognize and solve practical or theoretical problems involving mathematics, including those for which the solution approach is not obvious, by using mathematical reasoning and strategic thinking.

In this unit, students will be able to identify when to use core mechanics to solve problems and the proper implementation of these methods.

Standards

MA.N-RN.A.1	Explain how the definition of the meaning of rational exponents follows from extending the properties of integer exponents to those values, allowing for a notation for radicals in terms of rational exponents.
MA.A-SSE.A.1b	Interpret complicated expressions by viewing one or more of their parts as a single entity.
MA.N-RN.B.3	Explain why the sum or product of two rational numbers is rational; that the sum of a rational number and an irrational number is irrational; and that the product of a nonzero rational number and an irrational number is irrational.
MA.A-SSE.A.2	Use the structure of an expression to identify ways to rewrite it. For example, see $x^4 - y^4$ as $(x^2)^2 - (y^2)^2$, thus recognizing it as a difference of squares that can be factored as $(x^2 - y^2)(x^2 + y^2)$.
MA.A-APR.A.1	Understand that polynomials form a system analogous to the integers, namely, they are closed under the operations of addition, subtraction, and multiplication; add, subtract, and multiply polynomials.
MA.A-CED.A	Create equations that describe numbers or relationships
MA.A-CED.A.1	Create equations and inequalities in one variable and use them to solve problems.
MA.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.
MA.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.
MA.A-CED.A.4	Rearrange formulas to highlight a quantity of interest, using the same reasoning as in solving equations.
MA.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.

MA.A-REI.B.3	Solve linear equations and inequalities in one variable, including equations with coefficients represented by letters.

Enduring Understandings

1. Mathematics is a language consisting of symbols and rules

2. The same mathematical ideas can be represented concretely or symbolically.

3. There can be different strategies to solve a problem, but some are more effective and efficient, and we want to encourage exploration and then decision making.

Essential Questions

1. Which operations and equivalences will simplify and help me solve the problem?

2. How is thinking algebraically different from thinking arithmetically?

3. How does explaining my process help me to understand a problem's solution better

4. What is meant by equality?

Knowledge and Skills

Introduction to Algebra

- Students will learn about the properties of Algebra(commutative, associative, distributive)
- Students will be able to identify the rules and use them to manipulate equations/expressions
- Students will be able to calculate sums and differences with signed numbers
- Students will be able to compute products and quotients with signed numbers
- Students will be able to determine the reciprocal of integers and fractions

Solving Linear Equations

- Students will learn how to identify and work with linear equations
- Students will be able to solve one-step equations
- Students will be able to solve multi-step equations that might include variables on both sides
- Students will be able to use mathematics to model real world problems using linear equations

Word Probelms

- This unit will focus on the development of mathematical reasoning through the practice of classic word problems
- Students will be able to collect descriptions of numbers and use that to find missing values.
- Students will be able to apply Geometric reasoning to solve problems involving area and perimeter
- Students will be able to apply one-step and multi-step solving techniques to problems about age.

Inequalities

- This unit introduces the idea of inequalities to students and they learn about situations that do not always include equality.
- Students will be able to determine the order of two values and correctly place greater than or less than symbols
- Students will be able to algebraicly manipulate expressions using inequalities.
- Students will be able to graph inequalities in one variable
- Students will be able to use the union and intersection operators to determine resulting sets
- Students will be able to determine graphs of absolute values in one variable
- Students will be able to simplify multi-step inequalities in one variable

Resources

Holt Algebra 1, Nichols
Algebra Structure and Method Book 1

Khan Academy

PurpleMath

KutaSoftware

CK-12

Quizlet

Albert I/O

Desmos

Problem-Attic

Classkick