Unit 3: Expressions, Equations, Inequalities

Content Area: **Mathematics**
Course(s): **Math 6**
Time Period: **January**
Length: **9 weeks**
Status: **Published**

Unit Summary

The goal for this unit is to develop students' understanding of expressions, equations, and inequalities and their applications to real life problem solving. Students will use their prior understanding to develop algebraic understanding, specifically the use of variables in mathematical expressions and equations. In addition, students will be able to represent percents as proportions.

Standards

MA.K-12.1	Make sense of problems and persevere in solving them.
MA.K-12.2	Reason abstractly and quantitatively.
MA.K-12.3	Construct viable arguments and critique the reasoning of others.
MA.K-12.4	Model with mathematics.
MA.K-12.5	Use appropriate tools strategically.
MA.K-12.6	Attend to precision.
MA.6.RP.A.3c	Find a percent of a quantity as a rate per 100 (e.g., 30% of a quantity means 30/100 times the quantity); solve problems involving finding the whole, given a part and the percent.
MA.K-12.7	Look for and make use of structure.
MA.K-12.8	Look for and express regularity in repeated reasoning.
MA.7.EE.A	Use properties of operations to generate equivalent expressions.
MA.6.NS.C.7a	Interpret statements of inequality as statements about the relative position of two numbers on a number line diagram.
MA.7.EE.A.1	Apply properties of operations as strategies to add, subtract, factor, and expand linear expressions with rational coefficients.
MA.6.EE	Expressions and Equations
MA.6.EE.A	Apply and extend previous understandings of arithmetic to algebraic expressions.
MA.6.EE.A.1	Write and evaluate numerical expressions involving whole-number exponents.
MA.6.EE.A.2	Write, read, and evaluate expressions in which letters stand for numbers.
MA.6.EE.A.2a	Write expressions that record operations with numbers and with letters standing for numbers.
MA.6.EE.A.2b	Identify parts of an expression using mathematical terms (sum, term, product, factor, quotient, coefficient); view one or more parts of an expression as a single entity.
MA.6.EE.A.2c	Evaluate expressions at specific values of their variables. Include expressions that arise from formulas used in real-world problems. Perform arithmetic operations, including those involving whole number exponents, in the conventional order when there are no parentheses to specify a particular order (Order of Operations).
MA.6.EE.A.3	Apply the properties of operations to generate equivalent expressions.

MA.6.EE.A.4	Identify when two expressions are equivalent (i.e., when the two expressions name the same number regardless of which value is substituted into them).
MA.6.EE.B	Reason about and solve one-variable equations and inequalities.
MA.6.EE.B.5	Understand solving an equation or inequality as a process of answering a question: which values from a specified set, if any, make the equation or inequality true? Use substitution to determine whether a given number in a specified set makes an equation or inequality true.
MA.6.EE.B.6	Use variables to represent numbers and write expressions when solving a real-world or mathematical problem; understand that a variable can represent an unknown number, or, depending on the purpose at hand, any number in a specified set.
MA.6.EE.B.7	Solve real-world and mathematical problems by writing and solving equations of the form $x + p = q$ and $px = q$ for cases in which p, q and x are all nonnegative rational numbers.
MA.6.EE.B.8	Write an inequality of the form $x > c$ or $x < c$ to represent a constraint or condition in a real- world or mathematical problem. Recognize that inequalities of the form $x > c$ or $x < c$ have infinitely many solutions; represent solutions of such inequalities on number line diagrams.
MA.6.EE.C	Represent and analyze quantitative relationships between dependent and independent variables.
MA.6.EE.C.9	Use variables to represent two quantities in a real-world problem that change in relationship to one another; write an equation to express one quantity, thought of as the dependent variable, in terms of the other quantity, thought of as the independent variable. Analyze the relationship between the dependent and independent variables using graphs and tables, and relate these to the equation.
MA.6.4.5.6 F.1	Use technology to gather, analyze, and communicate mathematical information.
MA.6.4.5.6 F.4	Use calculators as problem-solving tools (e.g., to explore patterns, to validate solutions).
CAEP.9.2.8.B.3	Evaluate communication, collaboration, and leadership skills that can be developed through school, home, work, and extracurricular activities for use in a career.
TECH.8.1.8	Educational Technology: All students will use digital tools to access, manage, evaluate, and synthesize information in order to solve problems individually and collaborate and to create and communicate knowledge.
TECH.8.1.8.A	Technology Operations and Concepts: Students demonstrate a sound understanding of technology concepts, systems and operations.
TECH.8.1.8.A.1	Demonstrate knowledge of a real world problem using digital tools.
TECH.8.1.8.A.CS1	Understand and use technology systems.
TECH.8.1.8.A.CS2	Select and use applications effectively and productively.
TECH.8.1.8.B.CS2	Create original works as a means of personal or group expression.
TECH.8.1.8.C	Communication and Collaboration: Students use digital media and environments to communicate and work collaboratively, including at a distance, to support individual learning and contribute to the learning of others.
TECH.8.1.8.C.CS4	Contribute to project teams to produce original works or solve problems.
TECH.8.1.8.D	Digital Citizenship: Students understand human, cultural, and societal issues related to technology and practice legal and ethical behavior.
TECH.8.1.8.D.1	Understand and model appropriate online behaviors related to cyber safety, cyber bullying, cyber security, and cyber ethics including appropriate use of social media.
TECH.8.1.8.D.CS1	Advocate and practice safe, legal, and responsible use of information and technology.
TECH.8.1.8.D.CS2	Demonstrate personal responsibility for lifelong learning.
TECH.8.1.8.D.CS3	Exhibit leadership for digital citizenship.

TECH.8.1.8.E	Research and Information Fluency: Students apply digital tools to gather, evaluate, and use information.
TECH.8.1.8.F	Critical thinking, problem solving, and decision making: Students use critical thinking skills to plan and conduct research, manage projects, solve problems, and make informed decisions using appropriate digital tools and resources.
TECH.8.1.8.F.CS2	Plan and manage activities to develop a solution or complete a project.
TECH.8.2.8.D.CS2	Use and maintain technological products and systems.

Student Learning Objectives

- Students will learn the components of algebraic expressions, equations, and inequalities.
- Students will learn proper mathematical vocabulary.
- Students will learn the process associated with evaluating algebraic expressions.
- Students will learn about equivalent expressions.
- Students will learn that word/real life problems can be translated into algebraic expressions, equations, and inequalities.
- Students will learn mathematical properties.
- Students will learn that algebraic expressions can be simplified by combining like terms.
- Students will learn that they can use mathematical properties and order of operation to systemically solve algebraic equations and inequalities.
- Students will learn the manner in which to graph solution set for inequality statements.
- Students will learn to use proportions to solve percent problems.
- Students will learn to analyze functions and determine the relationships.

Essential Questions

- How can algebraic expressions, equations, and inequalities be used to model and analyze our world?

Enduring Understandings

- Students will understand that algebra allows us to make sense of quantitative relationships and patterns.
- Students will understand that algebraic expressions and equations are used to model real life situations and to help solve problems.

Application

- Students will be able to independently use their learning to solve and evaluate algebraic equations and expressions.
- Students will be able to independently use their learning to recognize, graph, and write an equation for constant rate functions.

Skills

Students will be skilled at:

- Translating real life problems to algebraic expressions or equations or inequalities.
- Simplifying and solving expressions and equations and inequalities using order of operations.
- Evaluating and using expressions, equations, and formulas to solve problems.
- Identifying like terms.
- Combining like terms to simplify algebraic expressions and equations.
- Identifying and using mathematical properties to solve algebraic expressions and equations.
- Calculating a percent of a quantity as a rate per 100.
- Solving problems involving finding the whole, given portion, and the percent.
- Representing relationships between dependent and independent variables.