Expressions, Equations, and Inequalities

Content Area: **Math**
Course(s): **Math Grade 6**
Time Period: **MP2**
Length: **45**
Status: **Published**

Unit Overview

Unit Summary	Unit Rationale
In Unit 2, students will apply and extend previous understandings of arithmetic to algebraic expressions. Students will reason about and solve one-variable equations and inequalities. They will also represent and analyze quantitative relationships.	Being able to represent a real-world situation is essential to applying Algebra to students' everyday lives. Using bar diagrams helps students to visually represent unknowns and constants. Models can also help students to conceptually understand the meaning of a solution or analyze how an inequality has an infinite number of solutions. Using expressions, equations, and inequalities to model real world situations are foundational skills that are vital for Algebra I as well as real life application.

NJSLS

6.NS.B.4	Find the greatest common factor of two whole numbers less than or equal to 100 and the least common multiple of two whole numbers less than or equal to 12. Use the distributive property to express a sum of two whole numbers 1–100 with a common factor as a multiple of a sum of two whole numbers with no common factor.
6.EE.A.1	Write and evaluate numerical expressions involving whole-number exponents.
6.EE.A.2.a	Write expressions that record operations with numbers and with letters standing for numbers.
6.EE.A.2.b	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.
6.EE.A.2.c	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).
6.EE.A.3	Apply the properties of operations to generate equivalent expressions.
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).
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.
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.
6.EE.B.7	Solve real-world and mathematical problems by writing and solving equations of the form □ + □ = □ and □□ = □ for cases in which □, □ and □ are all nonnegative rational numbers.
6.EE.B.8	Write an inequality of the form □ > □ or □ < □ to represent a constraint or condition in a real-world or mathematical problem. Recognize that inequalities of the form □ > □ or □ < □ have infinitely many solutions; represent solutions of such inequalities on number line diagrams.
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.

Standards for Mathematical Practice

1	Make sense of problems and persevere in solving them
2	Reason abstractly and quantitatively
3	Construct viable arguments and critique the reasoning of others
4	Model with mathematics
5	Use appropriate tools strategically
6	Attend to precision
7	Look for and make use of structure
8	Look for and express regularity in repeated reasoning

Unit Focus

Enduring Understandings	Essential Questions
• A whole number exponent can be used to represent repeated multiplication of a number. • Any number can be written as its prime factorization. • GCF & LCM -There is an agreed-upon order in which operations are carried out. • Algebraic expressions use variables for unknown quantities. • Algebraic expressions can be simplified using properties. • A solution of an equation is a value that makes the equation true. • An equation is true when the expressions or numbers on both sides of the equal sign have the same value. • Adding, subtracting, multiplying or dividing both sides of an equation by the same number maintains equality.	• How can you use a number line to represent solutions of an inequality? • How can you use add, subtraction, multiplication or division to solve an inequality? • How can you use an inequality to describe the dimensions of a figure? • How does rewriting a word problem help you solve the word problems? • How can you use addition or subtraction to solve an equation? • How can you use multiplication or division to solve an equation? • How can you write an equation in two variables? • How can you use addition or subtraction to solve an inequality? • How can you use multiplication or division to

• A problem situation can be represented by an equation with a variable. -Equations are solved by using the inverse operation and a property of equality. • An inequality is a mathematical sentence that contains the inequality symbol.	solve an inequality?

Instructional Focus

Learning Targets
● Write and evaluate expressions using whole number exponents to represent real- world and mathematical problems ● Find the prime factorization of a whole number Find the GCF & LCM of two whole numbers Use GCF and the Distributive property to add ● Evaluate expressions using the order of operations Insert grouping symbols in a numerical expression to affect the value of the expression ● Write an algebraic expression to model a pattern or from a word phrase Use precise mathematical language when identifying parts of an expression ● Evaluate algebraic expressions, including those with whole numbers, decimals, and fractions ● Write and identify equivalent algebraic expressions Justify whether two expressions are equivalent ● Use properties of operations to simplify algebraic expressions by combining like terms ● Identify equations and variables Use substitution to find solutions to equations ● Use properties of equality to keep both sides of an equation equal. Identify which properties of equality are used to write equivalent expressions ● Write one-variable addition and subtraction equations Use inverse relationships and properties of equality to solve one- step addition and subtraction equations ● Write one - variable multiplication and division equations Use inverse relationships and properties of equality to solve one- step addition and subtraction equations ● Write and solve equations that involve fractions, decimals, and mixed numbers ● Understand the symbols required to write an inequality Write inequalities to describe mathematical or real-world situations

● Describe solutions to an inequality Represent solutions to an inequality on a number line ● Identify dependent and independent variables ● Analyze the relationships between variables by using tables Write equations to represent the relationship between variables ● Analyze the relationships between dependent and independent variables using tables, graphs , and equations.
Prerequisite Skills
• Perimeter and area • Multiples and factors operations • Write and interpret numerical expressions • Graph points on the coordinate plane • Understanding of algebraic expressions , including evaluating algebraic expressions , generating equivalent expressions, and simplifying algebraic expressions • Graph rational numbers on the coordinate plane
Common Misconceptions
The idea of an inverse and “undoing” an operation to solve can be confusing without a model. Students fail to see juxtaposition (side by side) as indicating multiplication. For example, evaluating 3x as 35 when x = 5 instead of 3 times 5 = 15. Students attempt to solve expressions instead of simplifying. Students may miss the understood “1” in front of a variable like a or x or p. Students may misinterpret exponents as multiplication instead of repeated multiplication. When using distributive property, students may not multiply all terms by the outside term.

Spiraling For Mastery

Current Unit Content/Skills	Spiral Focus	Activity
• Expressions • Equivalent Expressions • Equations • Inequalities • Evaluate Models	• patterns with exponents and powers • evaluate, write, and interpret numerical expressions • graph points on the coordinate plane (first quadrant)	Math Diagnostic and Intervention System Activities

Assessment

Formative Assessment	Summative Assessment
• Homework • Lesson Checks • MathXL • Quizzes • Exit Tickets • Lesson Reflections • Performance Tasks	• Topic Tests (Common Assessments) • Unit 2 Benchmark (Link-It)

Resources

Key Resources	Supplemental Resources
Savvas EnVision Math 6 Pacing Guide	• IXL • Delta Math • Desmos • Khan Academy • Manuevering the Middle

Career Readiness, Life Literacies, and Key Skills

9.4.8.CI.3	Examine challenges that may exist in the adoption of new ideas (e.g., 2.1.8.SSH, 6.1.8.CivicsPD.2).
9.4.8.GCA.2	Demonstrate openness to diverse ideas and perspectives through active discussions to achieve a group goal.
9.4.8.TL.2	Gather data and digitally represent information to communicate a real-world problem (e.g., MS-ESS3-4, 6.1.8.EconET.1, 6.1.8.CivicsPR.4).

Interdisciplinary Connections

SL.PE.6.1.A	Come to discussions prepared, having read or studied required material; explicitly draw on that preparation by referring to evidence on the topic, text, or issue to probe and reflect on ideas under discussion.
SL.PE.6.1.C	Pose and respond to specific questions with elaboration and detail by making comments that contribute to the topic, text, or issue under discussion.
SL.PE.6.1.D	Review the key ideas expressed and demonstrate understanding of multiple perspectives through reflection and paraphrasing.
6-8.MS-ETS1-3.4	Analyzing and Interpreting Data

6-8.MS-ETS1-3.ETS1.B.1	There are systematic processes for evaluating solutions with respect to how well they meet the criteria and constraints of a problem.