Unit 3
Expressions and Equations

Grade 6
Math

Description:

In Unit 3, students understand variables in mathematical expressions, and how they correspond to given situations. They write and solve expressions, equations, and inequalities. They evaluate expressions and use expressions and formulas to solve real-world problems. Students generate equivalent expressions and solve simple one-step equations or inequalities. Students use values of variables to solve equations and construct and analyze tables and use equations to describe relationships between quantities.

Standards:

Expressions and Equations	
Apply and extend previous understandings of arithmetic to algebraic expressions.	
6.EE.A.1	Write and evaluate numeric expressions involving whole-number exponents.
6.EE.A.2	Write, read, and evaluate expressions in which letters stand for numbers. *a.* Write expressions that record operations with numbers and with letters standing for numbers. *For example, express the calculation "Subtract y from 5" as $5 - y$.* *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. ***For example, describe the expression 2(8 + 7) as a product of two factors; view (8 + 7) as both a single entity and a sum of two terms.*** *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). *For example, use the formulas $V=s^3$ and $AA=6s^2$ to find the volume and surface area of a cube with sides of length $S = \frac{1}{2}$.*
6.EE.A.3	Apply the properties of operations to generate equivalent expressions. *For example, apply the distributive property to the expression $3(2+x)$ to produce the equivalent expression $6+3x$; apply the distributive property to the expression $24x+18y$ to produce the equivalent expression*

	6(4x+3y); apply properties of operations to y+y+y to produce the equivalent expression 3y.
6.EE.A.4	Identify when two expressions are equivalent (when the two expressions name the same number regardless of which value is substituted into them). *For example, the expressions y+y+y and 3y are equivalent because they name the same number regardless of which number y stands for.*
Reason about and solve one-variable equations and inequalities.[3]	
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 and inequalities in the form $x+p=q$ and $px=q$ for cases in which p, q and x are all nonnegative rational numbers. Inequalities will include <, >, ≤, and ≥.
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 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.
Represent and analyze quantitative relationships between dependent and independent variables.	
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. *For example, in a problem involving motion at constant speed, list and graph ordered pairs of distances and times, and write the equation d=65t to represent the relationship between distance and time.*

Enduring Understandings:

- Variables can be used as unique unknown values or as quantities that vary.
- Exponential notation is a way to express repeated products of the same number.
- Expressions can be written with variables to represent real-world problems.

Essential Questions:

- What is the purpose of an exponent?
- What order of operations do I follow when evaluating expressions?
- How do I evaluate expressions with variables?
- How do I know if two or more expressions are equivalent?
- How do I determine which values make an equation or inequality true?

• Properties of operations can be used to generate, simplify and evaluate equivalent expressions. • Two equivalent expressions form an equation.	• How do I represent solutions of inequalities? • What strategies can I use to help me understand and represent real situations using algebraic expressions?