07: Expressions, Equations, & Inequalities

Content Area: **Math**
Course(s):
Time Period: **Full Year**
Length: **4 weeks**
Status: **Published**

General Overview, Course Description or Course Philosophy

In this unit, students will use variables to write expressions, equations and inequalities to represent real-world situations. Students will also determine if two expressions are equivalent by combining like terms and applying the Distributive Property.

OBJECTIVES, ESSENTIAL QUESTIONS, ENDURING UNDERSTANDINGS

Objectives:

- Write equivalent algebraic expressions using the properties of operations
- Identify parts of an expression: terms, constants, coefficients, variables
- Determine if expressions are equivalent
- Solve one, two, and multi-step equations
- Write and solve one-step inequalities
- Graph the solutions to inequalities on a number line

Essential Questions:

- How can an equation or inequality can be used to represent a given situation?
- How can you determine if two expressions are equivalent?

Essential Understandings:

- Algebra is used to model real situations and answer questions about them
- Writing an equivalent expression in a problem context can shed light on how quantities in the problem are related.

CONTENT AREA STANDARDS

6.RP

A. Understand ratio concepts and use ratio reasoning to solve problems

6.NS

A. Apply and extend previous understandings of multiplication and division to divide fractions by fractions

B. Compute fluently with multi-digit numbers & find common factors & multiples

C. Apply and extend previous understandings of numbers to the system of rational numbers

6.EE

A. Apply and extend previous understandings of arithmetic to algebraic expressions

B. Reason about and solve one-variable equations and inequalities

C. Represent and analyze quantitative relationships between dependent and independent variables

6.G

A. Solve real-world and mathematical problems involving area, surface area, and volume

6.SP

A. Develop understanding of statistical variability

B. Summarize and describe distributions

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.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.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.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.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.K-12.7	Look for and make use of structure.
MA.K-12.8	Look for and express regularity in repeated reasoning.

RELATED STANDARDS (Technology, 21st Century Life & Careers, ELA Companion Standards are Required)

9.1.8.FP.4: Analyze how familial and cultural values influence savings rates, spending, and other financial decisions

CS.K-12.3	Recognizing and Defining Computational Problems
CS.K-12.3.a	Identify complex, interdisciplinary, real-world problems that can be solved computationally.
CS.K-12.3.b	Decompose complex real-world problems into manageable sub-problems that could integrate existing solutions or procedures.
CS.K-12.3.c	Evaluate whether it is appropriate and feasible to solve a problem computationally.
LA.K-12.NJSLSA.R10	Read and comprehend complex literary and informational texts independently and proficiently with scaffolding as needed.
LA.K-12.NJSLSA.SL1	Prepare for and participate effectively in a range of conversations and collaborations with diverse partners, building on others' ideas and expressing their own clearly and persuasively.
WRK.K-12.P.4	Demonstrate creativity and innovation.
WRK.K-12.P.5	Utilize critical thinking to make sense of problems and persevere in solving them.

STUDENT LEARNING TARGETS

Refer to the 'Declarative Knowledge' and 'Procedural Knowledge sections.

Declarative Knowledge

Students will understand that:

- Content-specific vocabulary: coefficient, equation, equivalent expressions, expression, solution of an equation, solve an equation, term, variable
- 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?
- Variables are letters that represent numbers.
- Mathematical terms, such as sum, term, product, factor, quotient, coefficient, constant.
- Algebraic expressions can represent real-world situations.
- Inequalities of the form x>c or x<c have infinitely many solutions.

Procedural Knowledge

Students will be able to:

- Evaluate numerical expressions involving whole-number exponents.
- Write numerical expressions involving whole-number exponents.
- Write expressions that record operations with numbers and with letters standing for numbers.
- View one or more parts of an expression as a single entity.
- Identify parts of an expression using mathematical terms.
- Evaluate expressions at specific values of their variables.
- Apply the properties of operations to generate equivalent expressions.
- Identify when two expressions are equivalent.
- Use variables to represent numbers and write expressions when solving a real-world or mathematical problem.
- 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 non-negative rational numbers.
- Write an inequality of the form x>c or x<c.
- Represent solutions of inequalities on number line diagrams.
- Analyze the relationship between the dependent and independent variables using graphs and tables, and relate them to the equation.
- 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.

EVIDENCE OF LEARNING

Refer to the 'Formative Assessments' and 'Summative Assessments' sections.

Benchmark Assessments

- BOY Diagnostic Snapshot Assessment
- MP1 Quarterly Assessment
- MP2 Quarterly Assessment
- MP3 Quarterly Assessment
- MP4 Quarterly Assessment
- EOY Diagnostic Snapshot Assessment

Alternate Assessments

- Portfolios
- Verbal Assessment (instead of written)
- Multiple choice
- Modified Rubrics
- Performance Based Assessments

Formative Assessments

- Observations
- Classwork
- Homework Assignments
- Do Now Questions
- Exit Tickets
- Self Assessment Questions
- Proficiency Scale

Summative Assessments

- Quizzes
- Unit Assessments
- Graded Assignments

- Projects

RESOURCES (Instructional, Supplemental, Intervention Materials)

Core Instructional Materials

- *CMP3 Variables & Patterns (Investigations 3-4)*
- Savvas Realize (teacher and student resources)

Supplemental Instructional Materials

- Additional Resources linked HERE
- Math 6 Enriched Variables & Patterns folder linked HERE
- Khan Academy
- Delta Math
- Illustrative Math Performance Tasks:
    - .EE.A.2 Rectangular Perimeter 1
    - 6.EE.A.4 Rectangular Perimeter 2
    - 6.EE.B.6 and 6.EE.B.7 Firefighter Allocation
    - 6.EE.B.8 Fishing Adventures 1
    - 6.EE.A.1 Seven to the What?!?
    - 6.RP.A.3, 6.EE.B.7 Fruit Salad
    - 6.EE.B.5, 6.EE.A.1 Exponent Experimentation 3
    - 6.EE.A.3, 6.EE.B.7, 7.RP.A.3, 7.EE.B.3, 6.RP.A.3.c Anna in DC
    - 6.EE.A.4 Equivalent Expressions
    - 6.EE.B.5 Log Ride
    - 6.EE.B.5 Make Use of Structure
    - 6.EE.B.8 Height Requirements
- Desmos Activities:
    - Point Collector
    - Inequalities on the Number Line
- IXL - Recommended Skills Practice
    - Expressions- Evaluating & Identifying Equivalent Expressions
        - Y.1 Write Variable Expressions: One Operation
        - Y.2 Write Variable Expressions: Two Operations
        - Y.4 Evaluate Variable Expressions with Whole Numbers
        - Y.8 Identify Terms and Coefficients
        - Y.14 Multiply Using the Distributive Property
        - Y.18 Add and Subtract Like Terms
        - Y.19 Identify Equivalent Expressions I

        - Y.20 Identify Equivalent Expressions II
    - Equations
        - Z.1 Does x statisfy an equation?
        - Z.2 Which x statisfies an equation?
        - Z.3 Write an Equation from Words
        - Z.9 Solve Equations with Whole Numbers
        - Z.15 Solve One-Step Equations: Word Problems
    - Inequalities
        - AA.1 Solutions to Inequalities
        - AA.2 Graph Inequalities on Number Lines
        - AA.3 Write Inequalities from Number Lines
        - AA.4 Write and Graph Inequalities: Word Problems

INTERDISCIPLINARY CONNECTIONS

- Computations
- Financial/Economic/Business/Entrepreneurial Literacy

ACCOMMODATIONS & MODIFICATIONS FOR SUBGROUPS

See link to Accommodations & Modifications document in course folder.