04 - Algebraic Expressions, Equations, and Inequalities

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

General Overview, Course Description or Course Philosophy

Pre-Algebra 7A units were created and organized in line with the areas of focus as identified by the New Jersey Student Learning Standards. Each unit consists of standards that are considered major content along with standards that are supporting and/or additional content. The expectation is that students will have many opportunities to develop fluency with rational number arithmetic and solving multi-step problems (including those involving positive and negative rational numbers and word problems leading to one variable equations) throughout the school year. This course prepares students to take Algebra 1 in Grade 8 by addressing a combination of Grade 7 and Grade 8 standards in one school year.

In this unit, students will draw on their knowledge of operations with algebraic expressions, greatest common factors, and the distributive property from Grade 6 to gain an understanding of simplifying algebraic expressions, which includes distributing integers across algebraic expressions, adding and subtracting algebraic expressions, combining like terms, and factoring algebraic expressions. Students will also draw on their knowledge of solving one-step equations from Grade 6 to develop an understanding of solving equations and inequalities. They will use this understanding to gain fluency in writing and solving equations and inequalities and apply their understanding to solve real-world problems.

OBJECTIVES, ESSENTIAL QUESTIONS, ENDURING UNDERSTANDINGS

Objectives:

- Understand that the equality sign indicates that two expressions are equivalent
- Recognize that a linear inequality in one unknown is associated with a linear equation
- Solve linear inequalities using graphs or symbolic reasoning
- Show that two expressions are equivalent
- Write and interpret equivalent expressions

Essential Questions:

- Why would one need to find equivalent forms of an expression?
- What real-world problems could be represented by equations?

- What real-world problems could be represented by inequalities?

Enduring Understanding:

- Properties of equality can be used to maintain equivalent expressions on each side of the equation when finding a solution.

CONTENT AREA STANDARDS

7.EE

A. Use properties of operations to generate equivalent expressions

B. Solve real-life and mathematical problems using numerical and algebraic expressions and equations

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.
MA.8.EE.C.7	Solve linear equations in one variable.
MA.8.EE.C.7a	Give examples of linear equations in one variable with one solution, infinitely many solutions, or no solutions. Show which of these possibilities is the case by successively transforming the given equation into simpler forms, until an equivalent equation of the form $x = a$, $a = a$, or $a = b$ results (where a and b are different numbers).
MA.8.EE.C.7b	Solve linear equations with rational number coefficients, including equations whose solutions require expanding expressions using the distributive property and collecting like terms.
MA.7.EE.A.1	Apply properties of operations as strategies to add, subtract, factor, and expand linear expressions with rational coefficients.
MA.7.EE.A.2	Understand that rewriting an expression in different forms in a problem context can shed light on the problem and how the quantities in it are related.
MA.7.EE.B.4	Use variables to represent quantities in a real-world or mathematical problem, and construct simple equations and inequalities to solve problems by reasoning about the quantities.
MA.7.EE.B.4a	Solve word problems leading to equations of the form $px + q = r$ and $p(x + q) = r$, where p, q, and r are specific rational numbers. Solve equations of these forms fluently. Compare an algebraic solution to an arithmetic solution, identifying the sequence of the operations used in each approach.
MA.7.EE.B.4b	Solve word problems leading to inequalities of the form $px + q > r$ or $px + q < r$, where p,

q, and *r* are specific rational numbers. Graph the solution set of the inequality and interpret it in the context of the problem.

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

9.1.8.PB.6: Construct a budget to save for short-term, long term, and charitable goals. There are strategies to decrease and manage expenses. 9.1.8.PB.7: Brainstorm techniques that will help decrease expenses including comparison shopping, negotiating, and day-to-day expense management.

LA.RST.9-10.3	Follow precisely a complex multistep procedure when carrying out experiments, taking measurements, or performing technical tasks, attending to special cases or exceptions defined in the text.
LA.RST.9-10.7	Translate quantitative or technical information expressed in words in a text into visual form (e.g., a table or chart) and translate information expressed visually or mathematically (e.g., in an equation) into words.
WRK.K-12.P.4	Demonstrate creativity and innovation.
WRK.K-12.P.7	Plan education and career paths aligned to personal goals.
WRK.K-12.P.8	Use technology to enhance productivity increase collaboration and communicate effectively.

STUDENT LEARNING TARGETS

Declarative Knowledge

Students will:

- Understand that rewriting an expression in different forms in a problem context can shed light on the problem and how the quantities in it are related.

Procedural Knowledge

Students will be able to:

- Apply properties of operations as strategies to add, subtract, factor, and expand linear expressions with rational coefficients.
- Solve linear equations in one variable, including equations with coefficients represented by letters.
- Write and solve two-step equations of the form px + q = r and p(x + q) = r.
- Write and solve equations with variables on each side.
- Write and solve multi-step equations.

- Determine the number of solutions to an equation.
- Solve word problems leading to equations of the form $px + q = r$ and $p(x + q) = r$, where p, q, and r are specific rational numbers
- Compare an algebraic solution to an arithmetic solution, identifying the sequence of the operations in each approach.
- Write and solve one-step inequalities.
- Write and solve two-step inequalities.
- Interpret the graph of the inequality of a word problem in the context of the problem.
- Solve word problems leading to inequalities of the form $px + q > r$ or $px + q < r$, where p, q, and r are specific rational numbers.
- Graph the solution set of the inequality in a word problem.

EVIDENCE OF LEARNING

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

- Delta Math Assignments
- Algebraic Expressions, Equations, and Inequality Proficiency Scale
- Do Now Check ins
- Formative Assessments - exit tickets, student-friendly proficiency scales, skill checklists ([Google Drive Folder](#))

Summative Assessments

- Summative Assessment [Google Drive Folder](#)
- OnCourse Assessments
- Teacher created assessments (both test generator and teacher generated questions)
- Delta Math - Teacher generated assessments

RESOURCES (Instructional, Supplemental, Intervention Materials)

Instructional Materials:

- Reveal Math Accelerated - Algebraic Expressions, Equations, Inequalities (Module 6 & 7) ([Online link](#) - teacher and student resources)
- Resources for Unit 4 [Google Drive Folder](#)

Supplemental/Intervention Materials:

- Desmos - [Lego Prices](#), [Turtle Time Trials](#), [Equation Solving](#), [Solving Equations Review](#)
- [Delta Math](#)
- [Khan Academy](#)
- [NCTM Illuminations](#)
- [Illustrative Math](#)
- [Illustrative Math Tasks](#)

INTERDISCIPLINARY CONNECTIONS

- Computations

ACCOMMODATIONS & MODIFICATIONS FOR SUBGROUPS

See link to Accommodations & Modifications document in course folder.