

Unit 2 Title	Estimated Time Frame
Expressions, Equations, and Inequalities	50 days (35 days prior to winter break to include <u>expressions</u> and 15 days after winter break to include <u>equations</u> and <u>inequalities</u>)
Big Idea	
Apply and extend previous understandings of arithmetic to algebraic expressions. Reason about and solve one-variable equations and inequalities. Represent and analyze quantitative relationships between dependent and independent variables.	
Essential Question(s)	
What are expressions, and how can they be evaluated? What procedures can be used to write and solve equations and inequalities? How can I write an equation to express the relationship between one quantity in terms of another quantity? How can I analyze the relationship between two quantities using tables and graphs? How can I interpret graphical and numerical data in tables in terms of the relationship between two quantities?	
Standards for Mathematical Practice (MP.) - The practice standards in bold describe expertise to be intentionally developed in this unit.	Kentucky Interdisciplinary Literacy Practices (KILP) - The practice standards in bold describe expertise to be intentionally developed in Mathematics.
<p>MP.1. Make sense of problems and persevere in solving them.</p> <p>MP.2. Reason abstractly and quantitatively.</p> <p>MP.3. Construct viable arguments and critique the reasoning of others.</p> <p>MP.4. Model with mathematics.</p> <p>MP.5. Use appropriate tools strategically.</p> <p>MP.6. Attend to precision.</p> <p>MP.7. Look for and make use of structure.</p> <p>MP.8. Look for and express regularity in repeated reasoning.</p>	<p>KILP.1 Recognize that text is anything that communicates a message.</p> <p>KILP.2 Employ, develop, and refine schema to understand and create text.</p> <p>KILP.3 View literacy experiences as transactional, interdisciplinary and transformational.</p> <p>KILP.4 Utilize receptive & expressive language arts to better understand self, others, and the world.</p> <p>KILP.5 Apply strategic practices, with scaffolding & then independently, to approach new literacy tasks.</p> <p>KILP.6 Collaborate with others to create new meaning.</p> <p>KILP.7 Utilize digital resources to learn and share with others.</p> <p>KILP.8 Engage in specialized, discipline specific literacy practices.</p> <p>KILP.9 Apply high level cognitive processes to think deeply and critically about text.</p> <p>KILP.10 Develop a literacy identity that promotes lifelong learning.</p>

Common Preconceptions/Misconceptions

When using the distributive property, some students may multiply the first term in the parentheses but forget to do the same to the second term. Using Algeblocks or Algebra Tiles for a 15-minute mini-lesson is helpful in modeling the distributive property. Many students have difficulty understanding that an inequality can have more than one solution. The best way to work on this concept is to use real-world examples familiar to students.

Essential skills to clarify:

- 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.
- Algebraic expressions may be used to represent and generalize mathematical problems, and real-life situations.
- Properties of numbers can be used to simplify and evaluate expressions.
- Algebraic properties can create equivalent expressions.
- Two equivalent expressions form an equation.
- Graphs can be used to represent all of the possible solutions to a given situation.
- Many problems encountered in everyday life can be solved using proportions, equations, or inequalities.
- An inequality can have more than one solution.

KAS Standards	Prerequisite Skill, Considerations, and Coherence	Samples of Learning Intentions and Success Criteria
Cluster: Apply and extend previous understandings of arithmetic to algebraic expressions.		
<p>KY.6.EE.2 Write, read, and evaluate expressions in which letters stand for numbers.</p> <p><input type="checkbox"/> Conceptual <input type="checkbox"/> Procedural <input type="checkbox"/> Application</p> <p>a. Write expressions that record operations with numbers and with letters standing for numbers.</p> <p><input type="checkbox"/> Conceptual <input type="checkbox"/> Procedural <input type="checkbox"/> Application</p> <p>b. Identify parts of an expression using mathematical terms (sums, term, product, factor, quotient, coefficient); view one or more parts of an expression in a single entity.</p> <p><input type="checkbox"/> Conceptual <input type="checkbox"/> Procedural <input type="checkbox"/> Application</p>	<p>Considerations: For example,</p> <p>a. Express the calculation “y less than 5” as $5 - y$.</p> <p>b. 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.</p>	<p>We are learning to write and read algebraic expressions.</p> <ul style="list-style-type: none"> • I can use variables and operations to write an algebraic expression to represent a given situation. • I can identify and read the parts of an expression, including sum, difference, term, product, factor, coefficient, or quotient. • I can identify terms with grouping symbols as a single term and more than one term.

<p>c. Evaluate expressions for specific values of their variables, including values that are non-negative rational numbers. Include expressions that arise from formulas used in real-world problems. Perform arithmetic operations, including whole-number exponents, in the conventional order when there are no parentheses to specify a particular order (Order of Operations).</p> <p><input type="checkbox"/> Conceptual <input checked="" type="checkbox"/> Procedural <input type="checkbox"/> Application</p> <p>MP.1, MP.3, MP.4, KILP.1, KILP.2, KILP.9</p> <p><i>Supporting Standard:</i> KY.6.EE.1 & KY.6.EE.4</p>	<p>c. Use the formulas $V = s^3$ and $SA = 6s^2$ to find the volume and surface area of a cube with sides of length $s = 1/2$ meter.</p> <p>Coherence KY.5.OA.2→KY.6.EE.2</p>	<p>We are learning to evaluate algebraic expressions.</p> <ul style="list-style-type: none"> ● I can evaluate an algebraic expression by substituting the variable with a number. ● I can evaluate an algebraic expression with non-negative rational numbers. ● I can apply the order of operations when evaluating algebraic expressions, including whole number exponents. ● I can evaluate expressions from formulas used in real-world problems.
<p>KY.6.EE.3 Apply the properties of operations to generate equivalent expressions.</p> <p><input type="checkbox"/> Conceptual <input type="checkbox"/> Procedural <input type="checkbox"/> Application</p> <p>MP.7, MP.8, KILP.6, KILP.7</p> <p><i>Supporting Standards:</i> KY.6.NS.4 & KY.6.EE.4</p>	<p>Considerations: Using Associative, Commutative and Distributive properties to generate equivalent expressions.</p> <p>Coherence KY.5.OA.2→KY.6.EE.3→KY.7.EE.1</p>	<p>We are learning to generate equivalent expressions using the properties of operations..</p> <ul style="list-style-type: none"> ● I can use the associative property to write equivalent expressions. ● I can use the commutative property to write equivalent expressions. ● I can use the distributive property to write equivalent expressions. ● I can combine like terms to write equivalent expressions.
<p>Cluster: Reason about and solve one-variable equations and inequalities.</p>		
<p>KY.6.EE.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.</p> <p><input type="checkbox"/> Conceptual <input type="checkbox"/> Procedural <input type="checkbox"/> Application</p> <p>MP.1, MP.2, MP.7, KILP.6, KILP.8</p>	<p>Considerations: From a set of numbers, substitute values to choose which satisfies a given equation or inequality. An equation or inequality with no solutions from the list may be described as having no solutions or an empty set of solutions, given the possible values.</p> <p>Coherence KY.6.EE.5→KY.8.EE.8</p>	<p>We are learning to use substitution to determine the solution to an equation.</p> <ul style="list-style-type: none"> ● I can substitute a given number into an equation to see if it makes the statement true. ● I can tell which numbers in a specified set make an equation true. <p>We are learning to use substitution to solve inequalities.</p> <ul style="list-style-type: none"> ● I can substitute a given number into an inequality to see if the statement is true. ● I can tell which numbers in a specified set make an inequality true.

<p>KY.6.EE.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.</p> <p><input type="checkbox"/> Conceptual <input type="checkbox"/> Procedural <input type="checkbox"/> Application</p> <p>MP.2, MP.6, KILP.2, KILP.3</p> <p><i>Supporting Standards: KY.6.EE.4 & KY.6.EE.9</i></p>	<p>Considerations: Represent an unknown quantity in a real-world context appropriately with a variable and write an expression to show this.</p> <p>Coherence KY.6.EE.6→KY.7.EE.4</p>	<p>We are learning to write algebraic expressions.</p> <ul style="list-style-type: none"> ● I can understand that a variable represents an unknown number. ● I can identify a variable to represent an unknown quantity in a real-world situation. ● I can use variables and operations to write an algebraic expression to represent a given situation.
<p>KY.6.EE.7 Solve real-world and mathematical problems by writing and solving equations of form $x + p = q$ and $px = q$ for cases in which p, q, and x are all nonnegative rational numbers.</p> <p><input type="checkbox"/> Conceptual <input type="checkbox"/> Procedural <input type="checkbox"/> Application</p> <p>MP.1, MP.2, MP.3, MP.4, KILP.1, KILP.2</p>	<p>Considerations: Emphasis is on understanding equations can be solved by using subtraction as an opposite operation of addition and division as an opposite operation of multiplication. Additionally, emphasis is on the importance of keeping the equations balanced when solving.</p> <p>Coherence KY.6.EE.7→KY.7.EE.4</p>	<p>We are learning how to use properties of equality to solve equations represented by mathematical or real-world situations.</p> <ul style="list-style-type: none"> ● I can explain inverse operations. ● I can understand how inverse operations are used to balance equations when solving. ● I can write and solve addition and subtraction equations. ● I can write and solve multiplication and division equations. ● I can write and solve equations with non-negative rational numbers.
<p>KY.6.EE.8 Write an inequality of the form $x > c$, $x < c$, $x \geq c$, or $x \leq c$ to represent a constraint or condition in a real-world or mathematical problem. Recognize that inequalities of these forms have infinitely many solutions; represent solutions of such inequalities on vertical and horizontal number lines.</p> <p><input type="checkbox"/> Conceptual <input type="checkbox"/> Procedural <input type="checkbox"/> Application</p> <p>MP.3, MP.7, KILP.1, KILP.2</p>	<p>Considerations: Emphasis is on students understanding the phrases “more than”, “less than”, “at least,” and “at most” represent constraints and conditions and are therefore associated with the operators listed in real-world problems. Students also understand an inequality does not yield a specific value, but rather an infinite range of values. Students also appropriately represent solutions to inequalities using both open and closed circles, along with direction, on vertical and horizontal number lines.</p> <p>Coherence KY.6.EE.8→KY.7.EE.4</p>	<p>We are learning to write inequalities from mathematical or real-world problems.</p> <ul style="list-style-type: none"> ● I can understand the phrases more than, less than, at least, and at most. ● I can write inequalities using the symbols $>$, $<$, \geq, \leq. <p>We are learning to represent solutions of inequalities.</p> <ul style="list-style-type: none"> ● I can represent inequality solutions on vertical and horizontal number lines. ● I can represent inequality solutions using open and closed circles, along with direction. ● I can explain what the solution of an inequality means on a number line.

Supporting Standards

[KY.6.NS.4](#) 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. **MP.8, Coherence KY.4.OA.4→KY.6.NS.4**

Conceptual **Procedural** Application

[KY.6.EE.1](#) Write and evaluate numerical expressions involving whole-number exponents. **MP.2, MP.6**
Interpret an exponent of size n as a repetitive multiplication expression of the base multiplied by itself n times; use the standard order of operations using exponents to evaluate numerical expressions. **Coherence KY.5.NBT.2→KY.6.EE.1→KY.8.EE.1**

Conceptual **Procedural** Application

[KY.6.EE.4](#) Identify when two expressions are equivalent when the two expressions name the same number regardless of which value is substituted into them. **MP.2, MP.3, MP.7**

Conceptual Procedural Application

[KY.6.EE.9](#) Use variables to represent two quantities in a real-world problem that changes in relationship to one another;

Conceptual **Procedural** Application

a. Appropriately recognize one quantity as the dependent variable and the other as the independent variable.

Conceptual Procedural Application

b. 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.

Conceptual **Procedural** Application

c. Analyze the relationship between the dependent and independent variables using graphs and tables and relate these to the question. **MP.3, MP.4, MP.7**

Conceptual **Procedural** Application

Considerations:

- Students understand in real-world problems, one quantity dependently changes relative to another independent quantity at a constant rate; understand, at times, the quantities given may not have a clear independent/dependent relationship.
- To help students with confusion about what a graph represents, have them explain in their own words what the graph means.

Coherence KY.5.OA.3→KY.6.EE.9→KY.8.EE.5

Essential Vocabulary

equation – An equation is a mathematical sentence that includes an equals sign to compare two expressions.

expression - a finite combination of symbols well-formed according to the rules applicable in the context at the end.

variable - a letter used to represent a number value in an expression or an equation. EX: "x" in $x+2=4$

algebraic expression - an algebraic expression is made up of the signs and symbols of algebra. These symbols include Arabic numerals, literal numbers, signs of operation, and so forth. Such an expression represents one number or one quantity.

numeric expression - an expression that represents a numeric value and is built with arithmetic operators; it is evaluated by performing a sequence of arithmetic operations to obtain a numeric value, which replaces the expression.

independent - a variable that stands alone and isn't changed by the other variables you are trying to measure

dependent - variable dependent on another variable: the independent variable

coordinate - one or more numbers that uniquely determine the position of a point or other geometric element on a line, graph, or map

formula - an equation that states a rule or a fact.

coefficient - a constant that multiplies a variable

table – an organization of data into rows and columns

Benchmark Assessment**Resources**

Standard Resource Pages Hyperlinked to Each Standard

[enVision Crosswalk Unit 2](#)

enVision Language Support Handbook

[Three Reads Routine](#)

[Notice and Wonder Routine](#)

[MILC Resources](#)

*Disclaimer: Success Criteria is the evidence students must produce to demonstrate learning. This example is not comprehensive.

** Mathematical Practices (MP.1- 8) should be evidenced at some point throughout.