FCPS 2023-2024 Math Unit Framework
Kentucky Academic Standards - Math 6-8

Unit 2 Title	Estimated Time Frame
Percents and **Expressions**	**45 days**

Big Idea(s)
Apply and extend previous understandings of operations with fractions to add, subtract, multiply, and divide rational numbers. Analyze proportional relationships and use them to solve real-world and mathematical problems.

Essential Question(s)
How can percentages show proportional relationships between quantities and be used to solve problems? How can you determine the correct operation to use to solve problems? How do models help solve math problems? How does the ongoing use of fractions and decimals apply to real-life situations? How can properties of operations help to generate equivalent expressions used in solving problems? When and how are equations applied to real-world situations? What are some possible real-life situations to which there may be more than one solution?

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.
MP.1. Make sense of problems and persevere in solving them. **MP.2. Reason abstractly and quantitatively.** **MP.3. Construct viable arguments and critique the reasoning of others.** **MP.4. Model with mathematics.** **MP.5. Use appropriate tools strategically.** MP.6. Attend to precision. **MP.7. Look for and make use of structure.** **MP.8. Look for and express regularity in repeated reasoning.**	KILP.1 Recognize that text is anything that communicates a message. KLIP.2 Employ, develop, and refine schema to understand and create text. KILP.3 View literacy experiences as transactional, interdisciplinary and transformational. KILP.4 Utilize receptive & expressive language arts to better understand self, others, and the world. KILP.5 Apply strategic practices, with scaffolding & then independently, to approach new literacy tasks. **KILP.6 Collaborate with others to create new meaning.** **KILP.7 Utilize digital resources to learn and share with others.** **KILP.8 Engage in specialized, discipline specific literacy practices.** **KILP.9 Apply high level cognitive processes to think deeply and critically about text.** KILP.10.Develop a literacy identity that promotes lifelong learning.

Common Preconceptions/Misconceptions
It is common for students to have difficulty in scaffolding from simple problems to more complex, multi-step problems; assistance in this regard is given by the use of estimation strategies to benchmark their work and lend confidence to more accurate solutions. Students apply the properties of rational numbers in order to solve expressions. Students must be precise when defining a variable. It can be helpful for students to use letters closely representing what the variables stand for when assigning variable names. Students must be sure of the order of operations. When students work with several steps in an expression, sometimes they forget about the order of operations such as in the example: 7+2(3x - 5) + 2x. Students may want to add the 7 + 2 first or only multiply the 2 by the 3x and not the -5. A quick review of the order of operations can help.

KAS Standards	Prerequisite Skill, Considerations, and Coherence	Samples of Learning Intentions and Success Criteria
KY.7.RP.3 Use percents to solve mathematical and real-world problems. **MP.2, MP. 5, MP.6** a. Find a percent of a quantity as a rate per 100; solve problems involving finding the whole, a part and a percent, given two of these. b. Use proportional relationships to solve multistep ratio and percent problems. **Grade Level Skills:** ● Use bar diagrams to represent the relationship between the whole and the part and solve percent problems. ● Understand the relationship between fractions, percents, and decimals. ● Use a percent proportion to find an unknown part, whole, or percent. ● Write and use the percent equation to solve problems involving proportional relationships. ● Use bar diagrams and the percent equation (part = percent x whole) to find	**Considerations:** a. For example, 30% of a quantity means 30/100 times the quantity. b. Could include but are not limited to simple interest, tax, markups and markdowns, gratuities and commissions, percent increase and decrease, and percent error. Coherence KY.6.RP.3c → KY.7.RP.3	We are learning to make connections between equivalent ratios, percents, and proportional relationships and use them to solve real-world problems. (**Lesson 3-1**) ● I can understand, find and analyze percentages of numbers. We are learning about the relationship between percents and proportions. (**Lesson 3-2**) ● I can use equivalent ratios to find a percent of a number. ● I can use models (bar diagrams/hundred squares) and equivalent ratios to find the percent of numbers. We are learning how to use the percent equation. (**Lesson 3-3**) ● I can use proportions to solve percent problems. We are learning about percent of change and percent error in real life problems. (**Lesson 3-4**) ● I can represent and solve percent problems using the percent equation (part = percent x whole). ● I can solve problems involving percent change (increase or decrease) and percent

the percent change (whether it be an increase or decrease). ● Understand and calculate the percent of markup and markdowns. ● Understand what simple interest is and how it is calculated.		error using the percent equation. ● I can solve simple interest problems. We are learning to solve markup and markdown problems. (**Lesson 3-4, 3-5**) ● I can understand the effect a markup or markdown has on the selling price. ● I can calculate a markup. ● I can calculate a markdown. ● I can find the percent of markup. ● I can find the percent of markdown. ● I can find the percent markup and markdown and apply them to determine the selling price. We are learning to solve simple interest problems. (**Lesson 3-6**) ● I can use a simple interest formula to solve problems. ● I can apply percent reasoning to solve simple interest problems.
KY.7.EE.1 Apply properties of operations as strategies to add, subtract, factor, and expand linear expressions with rational coefficients. **MP.2, MP.3**	**Considerations:** Students demonstrate understanding of applying the order of operations to an expression involving multiple operations, including using the distributive property and variables in the expression. Students apply the properties of commutative, associative and distributive fluently. Coherence KY.6.EE.3 → KY.7.EE.1 → KY.8.EE.7	We are learning to generate equivalent expressions. (**Lessons 4-1, 4-2, 4-3, 4-4, 4-5, 4-6, 4-7**) ● I can use the Distributive Property and area models to expand expressions**.** ● I can use the Distributive Property and area models to factor expressions. ● I can use the Commutative and Associative properties to add expressions. ● I can apply the rules for adding integers to the constants and coefficients when combining like terms. ● I can combine like terms and apply the properties of operations to subtract expressions. ● I can write an expression to represent a real-world situation.

KY.7.EE.2 Understand that rewriting an expression in different forms in a problem context can clarify the problem and how the quantities in it are related. **MP.7, MP.8**	**Considerations:** Students apply mathematical properties in order to rewrite expressions and clarify the relationship of quantities in a problem. For Example: If Tom and Jim both get paid a wage of $11 per hour, but Tom was paid an additional $55 for overtime, the expression $11(T + J) + 55$ may be more clearly interpreted as $11T + 55 + 11J$ for purposes of understanding Tom's pay separated from Jim's pay. Coherence KY.6.EE.4 → KY.7.EE.2 → KY.8.EE.8c	We are learning to rewrite expressions in real-world scenarios to better understand how they are related. (**Lesson 4-8**) ● I can write equivalent expressions by combining like terms, using the Distributive Property, and applying properties of operations. ● I can use equivalent expressions to determine relationships between quantities and interpret information in real-world problems.

Supporting Standards

KY.7.RP.1 Compute unit rates associated with ratios of fractions, including ratios of lengths, areas, and other quantities measured in like or different units. **MP.2, MP.6**

KY.7.NS.3 Solve real-world and mathematical problems involving the four operations with rational numbers. **MP.1, MP.2, MP.5**
Emphasis is on **applying** mathematical operations to rational numbers that occur in real world context.

Essential Vocabulary

additive inverse - Two numbers whose sum is 0. Example: 3/4 and -3/4 are additive inverses of one another because they equal 0.
coefficient - A constant that multiplies a variable.
constant - A value that does not change.
distributive property of multiplication over addition - a(b + c) = a * b + a * c
evaluate - To calculate the value of. Evaluate x^2 + 5 when x = 3; Answer 3^2 + 5 = 9 + 5 = 14.
expression - A finite combination of symbols that are well-formed according to the rules applicable in the context.
integers - The set of numbers containing zero, the natural numbers, and all the negatives of the natural numbers.
like terms - Terms whose variables (such as x or y) with any exponents (such as the 2 in the x^2) are the same.
multiplicative inverse - Two numbers whose product is 1.
negative number - A real number that is less than zero.
term - A single number or a variable, or numbers and variables multiplied together. A term is typically separated by addition/subtraction.
unlike terms - When the variables and/or their exponents are different (2x, $2x^2$, 2y, 2xy are all unlike terms).
variable - A letter used to represent a number value in an expression or an equation. EX: "x" in x+2=4.

Common Assessment
Common Assessment Unit 2 Grade 7 Math

Anchor Resources

enVision Topic 3 - Analyze and Solve Percent Problems	enVision Topic 4 - Generate Equivalent Expressions
MILC - MILC Topic 3 resources **MILC percent resources** **3-ACT Math Task:** (one per unit) **The Smart Shopper** **FAL** (one per semester): ● **Increasing and Decreasing Quantities by a Percent** **** Recommended for Semester One FAL **** Toilet Paper Percents, Coupons Teaching Tools: ● Number lines TT8, ● Double Number lines TT9, ● Decimal/Percent Models TT20 **I can** statements for Content Standards- enVision Topics 1-4 (Volume 1) **I can** statements for Math Practices	**MILC -** MILC Topic 4 resources **MILC topic 4 resources** **3-ACT Math Task:** (one per unit) **I've Got You Covered** **I can** statements - enVision Topics 1-4 (Volume 1) **I can** statements for Math Practices

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

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

*** Modeling Standards: Modeling is best interpreted not as a collection of isolated topics but rather in relation to other standards. Making mathematical models is a Standard for Mathematical Practice, and specific modeling standards appear throughout the high school standards indicated by a star symbol (★). The star symbol sometimes appears on the heading for a group of standards; in that case, it should be understood to apply to *all* standards in that group.