FCPS 2024-2025 Math Unit Framework

Kentucky Academic Standards - Math 6-8

Unit 1 Title	Estimated Time Frame
The Number System	**45 days**

Big Idea

Apply and extend previous understandings of multiplication and division to divide fractions by fractions.
Compute fluently with multi-digit numbers and find common factors and multiples.
Apply and extend previous understandings of numbers to the system of rational numbers.

Essential Question(s)

How can you fluently add, subtract, multiply and divide decimals?
How can you multiply and divide fractions?
What are integers and rational numbers?
How are absolute values used to describe quantities?
How are points graphed on a coordinate plane?
How can you find the distance between two points on a coordinate plane?

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

Sixth graders may incorrectly model the division of fractions. Some students may think dividing “by” ½ is the same as dividing “in” half. Dividing “by” ½ means to find how many one halves there are in a quantity. Dividing “In” half means to take a quantity and divide it into two equal parts. To address the misconception, ask them to demonstrate two examples, one that shows dividing by ½ and another that shows dividing in half. For example, dividing by ½ equals 18 and 9 divided in half equals 4 ½.

KAS Standards	Prerequisite Skill, Considerations, and Coherence	Samples of Learning Intentions and Success Criteria
Cluster: Compute fluently with multi-digit numbers and find common factors and multiples.		
KY.6.NS.3 Fluently add, subtract, multiply and divide multi-digit decimals using an algorithm for each operation. ❑Conceptual ❑ **Procedural** ❑ Application **MP.2, MP.6, KILP.6, KILP.8**	**Considerations:** Emphasis is on the role of the decimal point in operations and how place value is critical to the overall fluency of the performed operations involving decimals. Coherence KY.5.NBT.7→KY.6.NS.3→KY.7.NS.3	We are learning to perform operations with decimals using an algorithm. ● I can align decimals and accurately add or subtract numbers. ● I can accurately multiply and insert the correct decimal location in the product. ● I can divide with decimals in the dividend and divisor.
KY.6.NS.2 Fluently divide multi-digit numbers using an algorithm. ❑Conceptual ❑ **Procedural** ❑ Application a. Convert a rational number to a decimal using long division. ❑Conceptual ❑ **Procedural** ❑ Application b. Know that the decimal form of a rational number terminates in 0s or eventually repeats. ❑**Conceptual** ❑ Procedural ❑ Application **MP.7, MP.8, KILP.6, KILP.8**	**Considerations:** a. Divide a rational number a/b using long division, making sure to include rational numbers equivalent to terminating decimals and rational numbers equivalent to repeating decimals. b. Students understand and explain when they have a 0 remainder in a long division problem, the quotient (answer) is a terminating decimal; students understand when they notice a pattern in the process of dividing, they conclude they will never reach a 0 remainder and they then notate the part of the quotient that is repeating by marking a bar over those values. Coherence KY.5.NBT.6→KY.6.NS.2	We are learning to write rational numbers in the form a/b as decimals. ● I can use long division to convert a fraction to a decimal. ● I can look for patterns when dividing to determine if a decimal is repeating or terminating. ● I can explain what repeating and terminating decimals are. ● I can use repeating notation to represent a repeating decimal.

Cluster: Apply and extend previous understandings of multiplication and division to divide fractions by fractions.		
KY.6.NS.1 Interpret and compute quotients of fractions and solve word problems involving the division of fractions by fractions. ☐ **Conceptual** ☐ **Procedural** ☐ **Application** **MP.1, MP.2, MP.3, KILP.1, KILP.2, KILP.6**	**Considerations:** For example, create a story context for (2/3) ÷ (3/4) and use a visual fraction model to show the quotient: How much chocolate will each person get if 3 people share 1/2 lb. of chocolate equally? How many 1/4-cup servings are in 2/3 of a cup of yogurt? How wide is a rectangular strip of land with a length of 3/4 mi and an area of 1/2 square mile? Students use concrete representations when understanding the meaning of division and apply it to the division of fractions. Students use pictorial representations such as area models, array models, number lines, and drawings to conceptualize and solve problems. Coherence KY.5.NF.7→KY.6.NS.1→KY.7.NS.2	We are learning to compute the quotients of fractions to solve word problems. ● I can use models to represent fraction division. ● I can rewrite a fraction division equation as a multiplication problem using the reciprocal of the divisor. ● I can interpret the quotients of fractions when solving real-world problems.
Cluster: Apply and extend previous understanding of numbers to the system of rational numbers.		
KY.6.NS.5 Understand that positive and negative numbers are used together to describe quantities having opposite directions or values; use positive and negative numbers to represent quantities in real-world contexts, explaining the meaning of 0 in each situation. ☐ **Conceptual** ❑ Procedural ❑ Application **MP.1. MP.2, MP.4, KILP.1, KILP.3, KILP.9**	**Considerations:** For example, positive and negative temperatures or elevations, with the understanding that zero means the freezing point Celsius of water or sea level. Coherence KY.6.NS.5→KY.7.NS.1	We are learning to understand how integers are used to describe quantities. ● I can read and write positive and negative numbers in real-world contexts. ● I can identify the opposite of a given integer. ● I can explain the meaning of 0 in real-world situations.

KY.6.NS.6 Understand a rational number as a point on the number line. Extend number line diagrams and coordinate axes, using appropriate range and intervals, to represent points on the line and in the plane, that include negative numbers and coordinates. ☐ **Conceptual** ❑ Procedural ❑ Application a. Recognize opposite signs of numbers as indicating locations on opposite sides of 0 on the number line; recognize 0 is its own opposite and the opposite of a negative number is a positive, and the opposite of a negative number is a positive, such as−(−3) = 3. ❑Conceptual ☐ **Procedural** ❑ Application b. Find and position integers and other rational numbers on a horizontal or vertical number line diagram; find and position pairs of integers and other rational numbers on a coordinate plane. ❑Conceptual ☐ **Procedural** ❑ Application c. Understand signs of numbers in ordered pairs as indicating locations in quadrants of the coordinate plane; recognize the similarity between whole numbers, their negative opposites, and their positions on a number line; ordered pairs differ only by signs and their locations on one or both axes. ☐ **Conceptual** ☐ **Procedural** ❑ Application **MP.2, MP.4, KILP.6, KILP.8**	**Considerations:** a. Emphasis is on students understanding that every positive location on a number line has an opposite the same distance from zero in the negative direction and vice versa. Logically following from this is the fact that zero, as it has no positive or negative sign, is its own opposite. b. Emphasis is on generalizing patterns about where coordinates are located on a coordinate plane. c. The intent is for students to see a coordinate axis is the combination of a vertical number line and a horizontal number line. Coherence KY.5.G.1→KY.6.NS.6→KY.7.NS.1	We are learning to represent rational numbers as points on a number line. ● I can identify the position of an integer on a number line. ● I can plot rational numbers on a number line. ● I can recognize 0 is its own opposite. ● I can describe where opposites would be on number lines. ● I can compare and order rational numbers using a number line. ● I can compare and order rational numbers by comparing decimals. We are learning how to represent rational numbers on a coordinate plane. ● I can understand that a coordinate plane is the combination of a vertical number line and horizontal number line. ● I can tell the location of a number based on the signs of numbers in ordered pairs. ● I can graph a point with rational coordinates on a coordinate plane.

KY.6.NS.7 Understand the ordering and absolute value of rational numbers. ☐ **Conceptual** ☐ **Procedural** ❑ Application a. Interpret statements of inequality as statements about the relative position of two numbers on a number line diagram. ☐ **Conceptual** ❑ Procedural ❑ Application b. Write, interpret and explain statements of order for rational numbers in real-world contexts. ☐ **Conceptual** ☐ **Procedural** ❑ Application c. Understand the absolute value of a rational number as its distance from 0 on the number line; interpret absolute value as magnitude for a positive or negative quantity in a real-world situation. *The intent is for students to see a coordinate axis is the combination of a vertical number line and a horizontal number line.* ☐ **Conceptual** ❑ Procedural ❑ Application d. Distinguish comparisons of absolute value from statements about order. ☐ **Conceptual** ☐ **Procedural** ❑ Application **MP.1. MP.2, MP.4, KILP.1, KILP.6, KILP.8**	**Considerations:** a. Interpret two numbers, including two negatives, as one is to the left or right (or above or below) the other on a number line diagram. b. Understand, as with 6.NS.7a, positive and negative rational numbers represent real-life situations and can be compared. c. Interpret a positive or negative direction from zero as an absolute value, or magnitude, to describe a real-life situation. d. Recognize a number's distance from zero can be compared to another number's distance from zero with a "less than" or "greater than" distinction. Coherence KY.5.NBT.3→KY.6.NS.7→KY.7.NS.1	We are learning how to describe the position of numbers on a number line. ● I can interpret statements of inequality. ● I can describe inequality statements of two numbers using words such as left, right, above, or below on a number line. We are learning how to order rational numbers in real-world contexts. ● I can write rational numbers in order. ● I can interpret and explain the context of ordering rational numbers in the real-world. We are learning about the absolute value of rational numbers. ● I can explain what absolute value is. ● I can interpret the absolute value in real-world situations. ● I can use the absolute value of a number to describe its distance from 0. ● I can find absolute value using a number line. ● I can recognize that a number's distance from zero can be compared to another number's distance from zero with a "less than" or "greater than" distinction. ● I can compare absolute values. ● I can order numbers including absolute value.

KY.6.NS.8 Solve real-world and mathematical problems by graphing points in all four quadrants of the coordinate plane. Include the use of coordinates and absolute value to find distances between points with the same first coordinate or the same second coordinate. ☐ **Conceptual** ☐ **Procedural** ☐ **Application** **MP.5, MP.7, KILP.1, KILP.6, KILP.8** *Supporting Standard: KY.6.G.3*	**Considerations:** For example, represent the vertices of a rectangle in the coordinate plane and find distances between horizontal and vertical vertices accurately. Given a vertex of (-2, 3), a length of 5 and a width of 11, locate the other three vertices of the rectangle. Coherence KY.5.G.2→KY.6.NS.8	We are learning to solve mathematical and real-world problems by graphing in all four quadrants of the coordinate plane. ● I can graph ordered pairs in all four quadrants. ● I can label a point on a graph with rational coordinates. ● I can use absolute value to find the distance between points on a coordinate plane. ● I can solve problems using the distance between points on a coordinate plane.

Supporting Standards

KY.6.G.3 Draw polygons in the coordinate plane given coordinates for the vertices; use coordinates to find the length of a side joining points with the same first coordinate or the same second coordinate. Apply these techniques in the context of solving real-world and mathematical problems.

☐ **Conceptual** ☐ **Procedural** ☐ **Application**

MP.4, MP.5, MP.6

Essential Vocabulary

absolute value - The distance of a number from zero.
coordinate plane - The plane determined by a horizontal number line, called the x-axis, and a vertical number line, called the y-axis, intersecting at a point called the origin. Each point in the coordinate plane can be specified by an ordered pair of numbers, (x, y), which gives its location relative to each axis.
equivalent - The same in amount, value or importance EX: 2/3 is equivalent to 4/6; 2+3 is equivalent to 5.
fraction - Made up of a numerator and denominator. The numerator is shown on top of the fraction bar and is the number of parts of the whole. The denominator is the number below the fraction bar and is the number of parts by which the whole has been divided.
integers - Integers are the set of positive whole numbers, their opposites, and 0.
opposites - Numbers located on opposite sides of 0 on the number line and are the same distance from 0.
rational number - Any number that can be written as the quotient of two integers.
reciprocal - Two numbers whose product is 1.
quadrant - One of the quarters of the plane of the Cartesian coordinate system.
quantities - a property which exists as magnitude or multitude; a specified or indefinite number or amount.

Benchmark Assessment

Resources
Standard Resource Pages Hyperlinked to Each Standard **enVision Crosswalk Unit 1** **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 (A.MP.1- 8) should be evidenced at some point throughout each unit, depending on the explored tasks. It is important to note that MP. 2 should support learning in every lesson.
******* 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.