Grade: 4 **FCPS 2023 - 2024 Math Unit 3 Framework** Unit 1 Unit 2 **Unit 3** Unit 4

Unit 3: Understanding Fractions Beginning Addition, Subtraction & Multiplication, Data & Decimals

KY 4th grade Math Standards Unit 3 framework google link 4th grade Math Priority Content & Prerequisite Skills

Unit 3 Title: Understanding Fractions, Addition, Subtraction & Multiplication, Data & Decimals	**Estimated Time Frame: 50 days**
Essential Standards: 4.NF.1, 4.NF.2, 4.NF.3, 4.NF.4, 4.NF.5, 4.NF.6, 4.NF.7, Supporting Standards: 4.MD.2, 4.MD.4	

Big Idea(s) **CRA explanations for 4th grade Unit 3**

- Fractions and decimals are used to describe parts of a whole or set, the result of division, as a ratio, as a measure or as an operator.
- The students will generate equivalent fractions using models, multiplication and division strategies.
- The students will compare fractions using models, multiplication and division strategies.
- Students should use a variety of representations and
- Models used to identify different names for equivalent fractions.
- The student will read, write, represent, and identify decimals expressed through hundredths.
- Students will compare decimals and given a model, write the decimal and fraction equivalents.
- Use line plots to represent real world data including use of fractional amounts.
- Students will multiply fractions with whole numbers.

Fractions Progressions Document Data progressions document

Essential Question(s)	**Common Preconceptions/Misconceptions:**
.- What are some ways to name the same part of the whole? - How can you compare fractions with unlike denominators? - How do I add and subtract fractions and mixed numbers with like denominators? - How can I make and read data on a line plot? - How can you describe a fraction using unit fractions? - How can you multiply a whole number by a mixed	-Students may misunderstand parts of a whole. -Labeling the number line in equal parts can cause misconceptions. -Understanding the difference between multiplying 2 wholes vs. 2/2 (one whole) -When making equivalent fractions not multiplying the numerator and the denominator. -When the numerators are the same the smaller denominator is the larger piece.

number? - How can you write a fraction as a decimal? - How can you locate points on a number line? - How do you compare decimals?	-Adding the denominators instead of keeping them the same. -When modeling, ensure pieces refer to the same whole to compare. The Problem with Key Words	
Standards for Mathematical Practice (**bolded** practices are emphasized in this unit) *Math Practice Standards Posters*	**Kentucky Interdisciplinary Literacy Practices (KILP)**	
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.**	1. Recognize that text is anything that communicates a message. 2. Employ, develop, and refine schema to understand and create text. 3. View literacy experiences as transactional, interdisciplinary and transformational. 4. Utilize receptive and expressive language arts to better understand self, others, and the world. **5. Apply strategic practices, with scaffolding and then independently, to approach new literacy tasks.** **6. Collaborate with others to create new meaning.** **7. Utilize digital resources to learn and share with others.** **8. Engage in specialized, discipline specific literacy practices.** **9. Apply high level cognitive processes to think deeply and critically about text.** 10. Develop a literacy identity that promotes lifelong learning.	
Essential Standards: **KAS Content Standards** CRA explanations for 4th grade Unit 3	**Prerequisite Skills &** **Essential Vocabulary**	**Sample Learning Intentions* &** **Sample Success Criteria***
KY.4.NF.1 Understand and generate equivalent fractions. **a. Use visual fraction models to recognize and generate**	-Explain equivalence of fractions in special cases and	I am learning to use visual fraction models,

equivalent fractions that have different numerators/denominators even though they are the same size. **b. Explain why a fraction $\frac{a}{b}$ is equivalent to a fraction $\frac{(n\ x\ a)}{(n\ x\ b)}$** . **MP.4, MP.7, MP.8** Students draw fractions and see equivalent fractions.  $\frac{1}{2}$ $\frac{2}{4}$ $\frac{4}{8}$ Coherence KY.3.NF.3→ KY.4.NF.1→KY.5.NF.1	compare fractions by reasoning about their size. a. Understand two fractions as equivalent (equal) if they are the same size, or same point on a number line. b. Recognize and generate simple equivalent fractions. Explain why the fractions are equivalent through writing or drawing. c. Express whole numbers as fractions and recognize fractions that are equivalent to whole numbers. Equivalent fractions Fraction Denominator Numerator Common factor	multiplication, and division to recognize and generate equivalent fractions so… • I can recognize and generate equivalent fractions with models and drawings. • I can name the same amount on a number line using equivalent fractions. • I can use multiplication and division to find equivalent fractions.
KY.4.NF.2 Compare two fractions with different numerators and different denominators using the symbols <, =, or >. Recognize comparisons are valid only when the two fractions refer to the same whole. Justify the conclusions. **MP.2, MP.3** Students use a variety of representations to compare	d. Compare two fractions with the same numerator or the same denominator by reasoning about their size. Recognize that comparisons are valid only when the two	I am learning to compare two fractions with different numerators and different denominators using the symbols <,=,> so…

fractions including concrete models, benchmarks, common denominators and common numerators. Note: Students determine which strategy makes the most sense to them, realizing they use different strategies for different situations. Coherence KY.3.NF.3d→ KY.4.NF.2→KY.5.NF.2	fractions refer to the same whole. Record the results of comparisons with the symbols >, =, or <, and justify the conclusions. Benchmark fraction	• I can use benchmarks, area models, and number lines, to compare fractions. • I can use equivalent fractions to compare fractions.

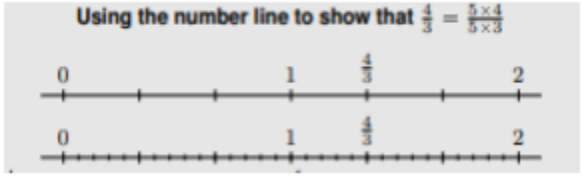
Attending to the Standards for Mathematical Practice

Work in this standard extends the work in grade 3 by using additional denominators (5, 10, 12 and 100). Students use visual models such as area models, number lines, or sets of objects to illustrate how two fractions are equivalent (MP.4).

set model $\frac{6}{8} = \frac{3}{4}$

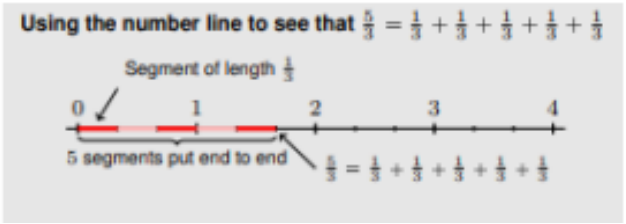
area model $\frac{1}{2} = \frac{4}{8}$

number line $\frac{4}{3} = \frac{20}{15}$



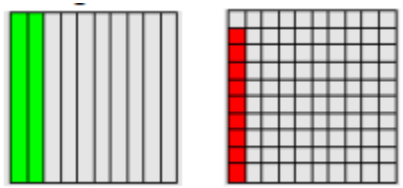
When students are asked to compare two fractions, they do not use a strategy they don't understand, such as the butterfly method, but rather employ reasoning strategies. They first consider whether they can decide which fraction is greater by observation (for example, the fractions have the same numerator or denominator or one fraction is greater than a benchmark and the other is less). If the fractions cannot be compared in this way, students decide whether to find a common denominator or a common numerator and then find the necessary fraction **equivalencies** to compare. For example, to compare $\frac{3}{8}$ and $\frac{5}{12}$, one can see $\frac{5}{12}$ is closer to $\frac{1}{2}$ (only $\frac{1}{12}$ away, while $\frac{3}{8}$ is $\frac{1}{8}$ away) and therefore know that $\frac{5}{12}$ is greater. Another student might not see this relationship, but decide that finding a common numerator is easier (being a basic fact) and multiply $\frac{3}{8}$ by $\frac{5}{5}$ to get $\frac{15}{40}$ and $\frac{5}{12}$ by $\frac{3}{3}$ to get $\frac{15}{36}$. Then recognize and explain that $\frac{15}{36}$ is greater (the pieces are larger) (**MP.2, MP.3**).

KY.4.NF.3 Understand a fraction $\frac{a}{b}$ with a > 1 as a sum of	-Understand a fraction $\frac{1}{b}$ as	I am learning to use models

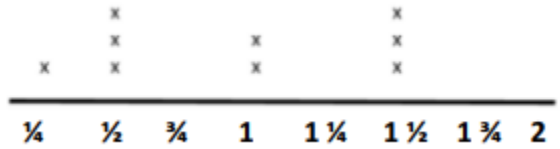
fractions $\frac{1}{b}$. **a. Understand addition and subtraction of fractions as joining and separating parts referring to the same whole. b. Decomposing a fraction into a sum of fractions with the same denominator in more than one way, recording each decomposition by an equation. Justify decompositions.** **c. Add and subtract mixed numbers with like denominators.** **d. Solve word problems involving addition and subtraction of fractions referring to the same whole and having like denominators. MP.1, MP.5, MP.7** b. $\frac{3}{5}=\frac{1}{5}+\frac{1}{5}+\frac{1}{5}$ OR $\frac{3}{5}=\frac{2}{5}+\frac{1}{5}$ $3\frac{1}{4}=1+1+1+\frac{1}{4}$ OR $3\frac{1}{4}=\frac{4}{4}+\frac{4}{4}+\frac{4}{4}+\frac{1}{4}$ **c/d. Adding and subtracting using visual fraction models and/or equations to represent the problem**  Coherence KY.3.NF.1→ KY.4.NF.3→KY.5.NF.1 KY.5.NF.2	the quantity formed by 1 part when a whole is partitioned into b equal parts; understand a fraction $\frac{a}{b}$ as the quantity formed by a parts of size $\frac{1}{b}$. Decompose Compose Mixed number	and tools, and properties to add and subtract fractions with like denominators and mixed numbers with like denominators so… • I can use tools such as fractions strips, number lines, or area models to add and subtract fractions with like denominators. • I can use models, equivalent fractions, benchmark fractions, and properties of operations to add and subtract mixed numbers with like denominators. • I can use equivalent fractions, properties of operations and the relationship between addition and subtraction to subtract mixed numbers with like denominators.

KY.4.NF.4 Apply and extend previous understandings of multiplication to multiply a fraction by a whole number. **a. Understand a fraction $a\ b$ as a multiple of $\frac{1}{b}$.** **b. Understand a multiple of $a\ b$ as a multiple of $\frac{1}{b}$ and use this understanding to multiply a fraction by a whole number.** **c. Solve word problems involving multiplication of a fraction by a whole number. MP.5, MP.8** Students refer this standard to n groups of a fraction (where n is a whole number) for example 3 groups of $\frac{1}{4}$, which can be seen as repeated addition. In grade 5 students will multiply a fraction by a whole number. a. Students use visual fraction models to represent $\frac{7}{5} = 7 \times \frac{1}{5}$ b. Students use the same thinking to see $3 \times \frac{2}{5}$ as $\frac{2}{5} + \frac{2}{5} + \frac{2}{5} = 3 \times \frac{2}{5} = \frac{6}{5}$ Coherence KY.3.NF.1→KY.4.OA.2 KY.4.NF.4→KY.5.NF.4	Unit fraction	I am learning to use tools, models, patterns and equations to multiply fractions and mixed numbers by whole numbers so… • I can use fraction strips or number lines to understand a fraction as a multiple of a unit fraction. • I can use drawings, area models, or number lines to multiply fractions by whole numbers. • I can use patterns and equations to multiply a fraction by a whole number. • I can use area models, drawings, and equations to represent and solve problems involving multiplying a whole number and a mixed number.
Attending to the Standards for Mathematical Practice		

As students begin to work with fractions greater than unit fractions such as $\frac{2}{3} + \frac{2}{3} =$ ___, they recognize, like whole numbers, they can decompose the non-unit fraction solve problems (Example: $\frac{2}{3} + \frac{2}{3} = \frac{2}{3} + \frac{1}{3} + \frac{1}{3} = \frac{11}{3}$) (MP.7). Students apply this knowledge make sense of word problems and persevere in solving them (MP.1). By using tools and situations, students notice a pattern and generalize how to multiply a fraction by a whole number (for example, problems in the form n x $a\ b$). For example, they use pattern blocks or Cuisenaire Rods to determine the answer to a set of tasks: 4 x $\frac{1}{2}$, 5 x $\frac{1}{3}$, 6 x $\frac{1}{3}$, 5 x $\frac{2}{3}$, 6 x $\frac{2}{3}$ and notice they multiply to find how many parts and thereby multiplying the whole number by the numerator (MP.5, MP.8). Note: Following a rote process of "putting a one under the whole number" or other rules not understood work against building understanding of 4.NF.4 and the development of mathematical practices.		
KY.4.NF.5 Convert and add fractions with denominators of 10 and 100. a. Convert a fraction with a denominator of 10 to an equivalent fraction with a denominator of 100. b. Add two fractions with respective denominators 10 and 100. MP.5, MP.7 For example, students express $\frac{3}{10}$ as $\frac{30}{100}$ and add $\frac{3}{10} + \frac{4}{100} = \frac{34}{100}$ Note: Students who generate equivalent fractions develop strategies for adding fractions with unlike denominators in general. Addition and subtraction with unlike denominators in general is not a requirement at grade 4. Coherence KY.3.NF.3→ KY.4.NF.5→KY.5.NBT.7	Equivalent Equivalence	I am learning to convert and add fractions with denominators of 10 and 100 so… • I can use equivalence to add fractions with denominators of 10 and 100.
KY.4.NF.6 Use decimal notation for fractions with denominators 10 or 100. MP.4, MP.7 For example, students rewrite 0.62 as $\frac{62}{100}$; describe a length as 0.62 meters; locate 0.62 on a number line. Coherence KY.4.NF.6→KY.5.NBT.3	Tenth Hundredth Decimal	I am learning to show and represent a fraction as a decimal. • I can relate fractions and decimals. • I can locate and

	Decimal point	describe fractions and decimals on number lines.
KY.4.NF.7 Compare two decimals to hundredths. **a. Compare two decimals to hundredths by reasoning about their size.** **b. Recognize that comparisons are valid only when the two decimals refer to the same whole.** **c. Record the results of comparisons with the symbols >, =, or < and justify the conclusions. MP.2, MP.3, MP.5** Students recognize comparisons are valid only when the two decimals refer to the same whole. For example, students use a visual model: seeing 0.2 > 0.09  Coherence KY.4.NF.7→KY.5.NBT.3		I am learning to compare decimals by reasoning about their size and by justifying my conclusion so… • I can compare decimals to hundredths using base-10 blocks, 10x10 grids, drawings and representations showing their size. • I can recognize that comparisons of decimals are valid only when the decimals refer to the same whole. • I can record results of comparisons with the symbols >,<, or = and justify the conclusions.
Attending to the Standards for Mathematical Practice Students consider available tools and choose to use base ten blocks, graph paper, place value charts, number lines and		

other place value models to explore the relationships between fractions with denominators of 10 and denominators of 100 (MP.5). By using these tools, students begin to make abstract and quantitative connections to the relationship between fractions with denominators of 10 and 100 (MP.2). Through these experiences and work with fraction models, they build the understanding comparisons between fractions and decimals are only valid when the 90 whole is the same for both cases (hundredths or tenths) (MP.7). Students use base ten blocks, 10 by 10 geoboards and 10 by 10 grids to illustrate and compare decimal fractions and justify their conclusions (MP.3, MP.5).		
Supporting Standards:		
KY.4.MD.2 Use the four operations to solve word problems involving distances, intervals of time, liquid volumes, masses of objects and money. a. Solve measurement problems involving whole numbers, simple fractions or decimals. b. Solve problems that require converting a given measurement from a larger unit to a smaller unit within a common measurement system, such as 2 km = 2,000 m. c. Visually display measurement quantities using representations such as number lines that feature a measurement scale. MP.1, MP.4 Note: grade 4 expectations are limited to fractions with denominators 2, 3, 4, 5, 6, 8, 10, 12 and 100 Coherence KY.3.MD.2→KY.4.MD.2	-Measure and solve problems involving mass and liquid volume. a. Measure and estimate masses and liquid volumes of objects using standard units of grams (g), kilograms (kg) and liters (L). b. Add, subtract, multiply, or divide to solve one-step word problems involving masses or volumes that are given in the same units. Number lines with a measurement scale	I am learning to solve word problems involving money and time using various operations including fractions and decimals so… • I can use fractions or decimals to solve word problems involving money and measurement. • I can use addition, subtraction, multiplication or division to solve problems involving time and other measurements.
KY.4.MD.4 Use dot plots to analyze data to a statistical question.	-Investigate questions involving numerical data. a.	I am learning to represent

a. Identify a statistical question focused on numerical data. b. Make a dot plot to display a data set of measurements in fractions of a unit ($\frac{1}{2}$, $\frac{1}{4}$, $\frac{1}{8}$). c. Solve problems involving addition and subtraction of fractions by using information presented in dot plots. MP.1, MP.6 Students create dot plots to show a data set of objects with fractional measurements.  Coherence KY.3.MD.4→KY.4.MD.4→KY.5.MD.2	Identify a statistical question focused on numerical data; b. Generate measurement data by measuring lengths using rulers marked with halves and fourths of an inch. c. Show the data by making a dot plot where the horizontal scale is marked off in appropriate units – whole numbers, halves, or quarters. d. Make observations from the graph about the question posed, including questions about the shape of the data and compare responses Line plot Outlier	and interpret data using line plots in order to solve problems involving fractions so… • I can represent and interpret data using line plots. • I can use line plots to solve problems involving fractions.

Attending to the Standards for Mathematical Practice
Students recognize a statistical question is one that has variability in the answer and create such a question of interest to them and for which there are numerical responses (MP.1). After gathering data on a question of interest, students recognize they have many data points and therefore creating a graph helps to analyze the data. In creating the dot plot, students create a scale from 0 to 1 and label the scale to include intervals of $\frac{1}{2}$, $\frac{1}{4}$, $\frac{1}{8}$ (MP.6). As they solve problems related to the graph, they stay focused on the reason they created the graph - to provide insights into the question they first posed, so responses focus on the statistical question posed (MP.1).

*****Disclaimer: Success Criteria is the evidence students must produce to demonstrate learning. These examples are not comprehensive.

Practice Standards and Number Sense Resources:	
Mathematics Practice Standards, Games and Routines *(Introduced in the first weeks and used throughout the year)* -**Math Practices & Problem Solving Handbook** Problem Solving Organizer The Problem with Key Words Numberless Word Problem Example Three Reads Strategy **4th grade number sense routines slides** (VA) *(use number routines 5-10 minutes daily all year in addition to math class time)* **Math Routines & Resources** Additional: Number Routines used 5-10 minutes daily all year (MD) **51 Esti-Mysteries** **Splat**	***2nd Semester Take-Home Games*** -TheresaWills Games -EnVisionMathGames -Investigations Math Games -Investigations Math Words and Ideas -*KDE Family Math Games* Word Wall Cards -*4th grade HomeLetters* *4th grade additional practice* **4th grade Anchor charts** ***-2nd Semester Teaching Tools*** **4th grade Math FCPS Google Site of Resources**
Anchor Resources by enVision Topic	**Supplemental Resources by Standard**

enVision Topic Topic 8 – Extend Understanding of Fraction Equivalence and Ordering & two lessons from Topic 11 Data & Line Plots 4.NF.1 4.NF.2 4.MD.4 *11-1 & 11-2 only with this topic (May need to review 3.NF.1 & 3.NF.2 meaning of fractions & number line)* *(approximately three weeks)* *Use Hands-On or Online Manipulatives:* ***Variety of Fraction Pieces, Fraction Strips & Circles*** *TT* *13-14, Measure items around room & make line plot of lengths* -Topics 8, 9 & 10 Vocabulary Cards -Topic 8 Review What You Know Prerequisite Skills Focus on Fractions number routines slides **Understanding Fractions Card Sort Lesson Mathigon FractionBars	Kendall Hunt Illustrative Fraction Equivalence MathLearnCenterFractions 4th grade fractions games folder GA Fractions Equivalence Unit **4.NF.1** Build a Fraction Wall Equivalent Fractions: Dominoes Tangram Explorations Q-T Explaining Fraction Equivalence with Pictures Fractions and Rectangles Money in the piggy bank Running Laps Making Fraction Strips Fractions on a Number Line Roll a Fraction Equivalent Fractions on a Geoboard **4.NF.2** Birthday Fractions Snack Time Using Benchmarks to Compare Fractions Comparing Fractions Using Benchmarks Game Compare Fractions of a Whole Doubling Numerators and Denominators Listing fractions in increasing size Compare Fractions -Representing Fractions on a Number Line Slides -Understanding Fractions Card sort Slides -Interpreting Fractions Concept Card sort Slides

enVision Topic Topic 9 – Understand Addition and Subtraction of Fractions and one lesson from Topic 11 Data & Line Plots 4.NF.3 4.MD.4 *Possibly omit lessons 9-7 & 9-11 May need 2 days for lessons 9-2 & 9-8 Add lesson 11-3 (approximately three weeks)* *Use Hands-On or Online Manipulatives:* ***Variety of Fraction Pieces, Strips & Circles*** *TT 13-14* -Topic 9 Review What You Know Prerequisite Skills -Topic 11 Review What You Know Prerequisite Skills **Mathigon FractionBars	-MathLearnCenter AddSubtractFractions Unit Kendall Hunt Illustrative Fraction Operations GA Fractions Operations Unit **4.NF.3** Adding Like Fractions Subtracting Like Fractions Literature Link: Picture Pie Decompose a Fraction Pizza Share Add and Compare: Mixed Numbers Subtract and Compare Comparing two different pizzas Writing a Mixed Number as an Equivalent Fraction Comparing Sums of Unit Fractions Making 22 Seventeenths in Different Ways Cynthia's Perfect Punch Peaches Plastic Building Blocks Writing a Mixed Number as an Equivalent Fraction **4.MD.4** Button Diameters Objects in My Desk Line Plot
enVision Topic Topic 10 – Extend Multiplication concepts to Fractions 4.NF.3 4.NF.4 4.MD.2 *Possibly omit lessons 10-4 & 10-6 Supplement 10-5 (approximately two weeks)* *Use Hands-On or Online Manipulatives:* **Fraction Pieces, Strips & Circles** T13-14 -Topic 10 Review What You Know Prerequisite Skills Where are the Cookies? – Lesson with Student Work ***Do the Dew*** *3 act math task* ***Drip Drop*** *3 act math task* ***The Juicer*** *3 act math task*	Kendall Hunt Illustrative Fraction Operations GA Fractions Operations Unit **4.NF.4** Extending Multiplication From Whole Numbers to Fractions Sugar in six cans of soda Multiply a Unit Fraction by a Whole Number Multiply a Fraction by a Whole Number Word Problems: Whole Number x Mixed Number **4.MD.2** Margie Buys Apples Word Problems: Measurement Conversions

enVision Topic Topic 12 – Understand and Compare Decimals 4.NF.5 4.NF.6 4.NF.7 4.MD.2 *May need two days: 12-1, 12-2, & 12-5* *(approximately two weeks)* *Use Hands-On or Online Manipulatives:* ***Base-10 Blocks, 10x10grids, Decimal place value pieces*** *& chart TT 6* -Topic 12 Review What You Know Prerequisite Skills -Topics 11, 12 & 14 Vocabulary Cards **Relating Fraction Equivalencies to Decimals Lesson Mathigon Base10 for Decimals	*Kendall Hunt Illustrative Decimals* Decimals games folder GA Decimals Unit **4.NF.5** Sums of One Adding Tenths and Hundredths Fraction Equivalence **4.NF.6** Fractions and Decimals Dimes and Pennies Expanded Fractions and Decimals How Many Tenths and Hundredths? **4.NF.7** Comparing Decimals Using Place Value -FractionDecimalRelationships Card Sort Slides
Summative Assessment	
(Common Unit Assessment in ADAM) This unit assessment will focus on conceptual models of fractions and equivalence as well as models for addition and subtraction with the same denominator and seeing multiplication as repeated unit fractions. The focus will also be on modeling fractions as decimals and showing conceptual understanding of decimal place value.	