4th Grade Mathematics
Units of Instruction
2022-2023

BOONE COUNTY SCHOOLS

ACHIEVING EXCELLENCE TOGETHER

4th Grade Mathematics

UNIT 1: Adding and Subtracting Angle Measures 30 Days	UNIT 2: Factors and Multiples 30 Days	UNIT 3: Multiplicative Comparison 25 Days	UNIT 4: Equivalent Fractions (different denominators) 25 Days	UNIT 5: Solving Problems with Fractions 27 Days	Unit 6: Understanding Decimals 20 Days	Unit 7: Solving problems about Plane Figures 15 Days
4.NBT.4 **4.NBT.3** **4.NBT.2** 4.MD.5 4.MD.6 4.MD.7 4.G.1 (angles only)	**4.NBT.5** **4.NBT.6** 4.OA.4 4.OA.5 4.NBT.1 4.MD.3	**4.NBT.5** **4.NBT.6** **4.OA.1** **4.OA.2** **4.OA.3** 4.MD.1 4.NBT.1	**4.NF.1** **4.NF.2** 4.OA.4 4.OA.5	**4.NF.3** **4.NF.4** 4.MD.2 4.MD.3 4.MD.4	**4.NF.6** **4.OA.3** 4.NF.5 4.NF.7 4.NBT.1	**4.OA.3** **4.NBT.4** **4.NBT.5** **4.NBT.6** **4.NF.3** **4.NF.4** 4.NF.5 4.G.1 4.G.2 4.G.3 4.MD.3

*Fluency Standards (taught all year long): 4.NBT.4

Priority: 4.OA.1, 4.OA.2, 4.OA.3, 4.NBT.2, 4.NBT.3, 4.NBT.4, 4.NBT.5, 4.NBT.6, 4.NF.1, 4.NF.2, 4.NF.3, 4.NF.4, 4.NF.6

Revisions from the 2021-2022 curriculum are highlighted.

4th Grade Mathematics

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Unit 1: Adding and Subtracting: Angle Measures

Grade 4 Mathematics
Unit 1: Adding and Subtracting: Angle Measures

This unit extends students' understanding of addition based on place value by connecting it to geometric models - specifically angle addition. Students formalize drawing and naming basic geometric figures, including angles. They use a protractor to measure angles. Students use algorithms to add multi-digit numbers, including numbers that represent angle measures. Please note: the clarification statement for 4.NBT.4 includes many different efficient algorithms for addition and this fluency will be developed across the year.

Duration: 30 Days

Standards for Mathematical Practice	
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.
Priority Standards	
Standards	**Clarifications**
Cluster: Generalize place value understanding for multi-digit whole numbers. **KY.4.NBT.2 Represent and compare multi-digit whole numbers.** **a. Read and write multi-digit whole numbers using base-ten numerals, number names and expanded form.**	a. Students write numbers in three different forms. For example, 435, four hundred thirty-five, 400 + 30 + 5. b. Students use different forms of the number to help compare. For example, when students are comparing numbers, they determine that 453 is greater than 435 because the 5 is worth 50 in 453, while the tens place only has 3 worth 30 in 435. So 453 > 435. **Coherence KY.4.NBT.2→KY.5.NBT.3**

b. Compare two multi-digit numbers based on meanings of the digit in each place, using >, =, and < symbols to record the results of comparisons. MP.2, MP.7	
Cluster: Generalize place value understanding for multi-digit whole numbers. **KY.4.NBT.3 Use place value understanding to round multi-digit whole numbers to any place.** MP.2, MP.6	Students go beyond the application of a procedure when rounding. Students demonstrate a deeper understanding of number sense and place value when they explain and reason about the answers they get when rounding. **KY.4.OA.3** **Coherence KY.3.NBT.1→ KY.4.NBT.3→KY.5.NBT.4**
Cluster: Use place value understanding and properties of operations to perform multi-digit arithmetic. **KY.4.NBT.4 Fluently add and subtract multi-digit whole numbers using an algorithm.** MP.2, MP.8	Students make connections from previous work with addition and subtraction, using models/representations to develop an efficient algorithm to add and subtract multi-digit numbers. These are types of algorithms/strategies one could possibly use (but not limited to) to solve adding and subtracting multi-digit whole numbers. **Coherence KY.3.NBT.2→ KY.4.NBT.4→KY.5.NBT.5**

Supporting Standards	
Standards	**Clarifications**
Cluster: Draw and identify lines and angles, and classify shapes by properties of their lines and angles. **KY.4.G.1 Draw points, lines, line segments, rays, angles (right, acute, obtuse) and perpendicular and parallel lines. Identify these in two-dimensional figures.** MP.5, MP.6	**Coherence KY.3.G.1→KY.4.G.1** ******In this unit, only students only work on angle parts and names in support of 4.G.7. Students will address the remainder of the standard in Unit 7.**
Cluster: Geometric measurement: understand concepts of angle and measure angles. **KY.4.MD.5 Recognize angles as geometric shapes that are formed wherever two rays share a common endpoint and understand concepts of angle measurement.** MP.7	An angle that turns through 360 of a circle is called a "one-degree angle," and can be used to measure angles. An angle that turns through n one-degree angles is said to have an angle measure of n degrees. Angles are measured in reference to a circle with the center at that common point.
Cluster: Geometric measurement: understand concepts of angle and measure angles. **KY.4.MD.6 Measure angles in whole-number degrees using a protractor. Sketch angles of specified measure.**	**KY.4.MD.6 Coherence KY.4.MD.5→KY.4.MD.7**

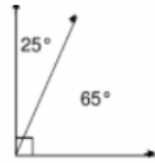|	
MP.5, MP.6	
Cluster: Geometric measurement: understand concepts of angle and measure angles. **KY.4.MD.7 Recognize angle measure as additive. When an angle is decomposed into non-overlapping parts, the angle measure of the whole is the sum of the angle measures of the parts. Solve addition and subtraction problems to find unknown angles on a diagram in real world and mathematical problems.** MP.1, MP.4	For example, students use an equation with a symbol for the unknown angle measure. $$25° + ☐ = 90°$$ **Coherence KY.4.MD.7→KY.7.G.5**

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Unit 2: Factors and Multiples

4th Grade Mathematics
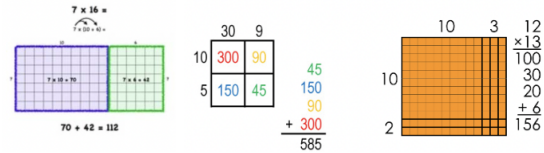## Unit 2: Factors and Multiples

In this unit, students extend their strategies for multiplication and division from 2nd and 3rd grade by exploring patterns and structures within the number system. They consider properties of numbers based on place value, explore factors and multiples, and use this conceptual understanding to develop and practice strategies for multiplication and division. The conceptual understanding in this unit will help support students in the following units, where they will discuss equivalent fractions, measure conversion, and area and volume.

Duration: 30 Days

Standards for Mathematical Practice	
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.
Priority Standards	
Standards	**Clarifications**
Cluster: Use place value understanding and properties of operations to perform multi-digit arithmetic. **KY.4.NBT.5 Multiply whole numbers** **● Up to four digit number by a one-digit number** **● Two-digit number by two-digit number** **Multiply using strategies based on place value**	Students use a variety of models (rectangular arrays and area models) and strategies to represent multi-digit factors times a one-digit factor and a two-digit number by a two-digit number. Students also connect their reasoning to a written equation. Some examples include:

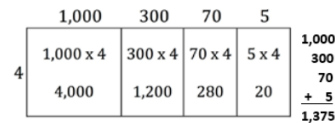|	
and the properties of operations. Illustrate and explain the calculation by using equations, rectangular arrays and/or area models. MP.3, MP.4, MP.8	 **KY.3.OA.5** **Coherence KY.3.NBT.3→ KY.4.NBT.5→KY.5.NBT.5** **KY.3.MD.7**
Cluster: Use place value understanding and properties of operations to perform multi-digit arithmetic. **KY.4.NBT.6 Divide up to four-digit dividends by one-digit divisors. Find whole number quotients and remainders using** **● strategies based on place value** **● the properties of operations** **● the relationship between multiplication and division Illustrate and explain the calculation by using equations, rectangular arrays and/or area models.** MP.3, MP.7, MP.8	Students use a variety of models (rectangular arrays and area models) and strategies to divide up to four-digit dividends by one-digit divisors. 5,500 ÷ 4 = ? Note: By the end of grade 4 students should be able to model, write and explain division by a one-digit divisor. **KY.3.OA.5** **Coherence KY.3.OA.6→KY.4.NBT.6→KY.5.NBT.6** **KY.3.MD.7**

Supporting Standards	
Standards	**Clarifications**
Cluster: Generalize place value understanding for multi-digit whole numbers. **KY.4.NBT.1 Recognize in a multi-digit whole number, a**	Students recognize the relationship of same digits located in different places in a whole number. For example, in the number 435, the digit 5 in the ones place, while the digit 5 in 652 is in the tens place. The

digit in one place represents ten times what it represents in the place to its right. MP.7	five in 652 is ten times greater than the five in 435. **Coherence KY.2.NBT.1→ KY.4.NBT.1→KY.5.NBT.1**
Cluster: Gain familiarity with factors and multiples. **KY.4.OA.4 Find factors and multiples of numbers in the range 1-100.** **a. Find all factor pairs for a given whole number.** **b. Recognize that a whole number is a multiple of each of its factors.** **c. Determine whether a given whole number is a multiple of a given one-digit number.** **d. Determine whether a given whole number is prime or composite.** MP.5, MP.7	Students extend their knowledge of multiplication and division facts by exploring patterns they have found by building conceptual understanding of prime numbers (numbers with exactly two factors) and composite numbers (numbers with more than two factors). Patterns include: · Numbers that end in 0 have 10 as a factor. These are multiples of 10. · Numbers that end in 0 or 5 as a factor. These are multiples of 5. · Even numbers have 2 as a factor. These numbers are multiples of 2. · Numbers that can be halved twice have 4 as a factor. These numbers are multiples of 4. **Coherence KY.3.OA.7→ KY.4.OA.4→KY.6.NS.4**
Cluster: Generate and analyze patterns. **KY.4.OA.5 Generate a number or shape pattern that follows a given rule. Identify apparent features of the pattern not explicit in the rule itself.** MP.2, MP.3	For example, given the rule "Add 3" and the starting number 1, generate terms in the resulting sequence and observe the terms appear to alternate between odd and even numbers. Explain informally why the numbers will continue to alternate in this way. **Coherence KY.3.OA.9→ KY.4.OA.5→KY.5.OA.3**

| **Cluster: Solve problems involving measurement and conversion of measurements from a larger unit to a smaller unit.**

KY.4.MD.3 Apply the area and perimeter formulas for rectangles in real world and mathematical problems.

MP.1, MP.3 | Students apply the area and perimeter formulas to real world problems with an unknown factor:
Area = length x width (A = l x w)

perimeter=length+width+length+width
(p= l+w+l+w OR p=2l+ 2w)

KY.3.MD.8
Coherence KY.3.MD.7→KY.4.MD.3→KY.5.MD.5 |

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Unit 3: Multiplicative Comparison

4th Grade Mathematics
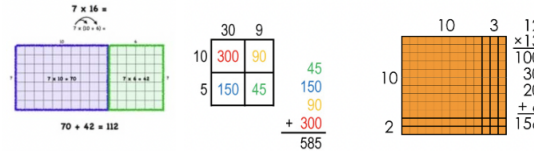# Unit 3: Multiplicative Comparison

In this unit, students continue to extend their understanding of and strategies for multiplication. They consider multiplication as comparison and apply this to a variety of problem solving situations, including the relationships between measurement units (a foot is 12 times as large as an inch).

Duration: 30 Days

Standards for Mathematical Practice	
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.
Priority Standards	
Standards	**Clarifications**
Cluster: Use place value understanding and properties of operations to perform multi-digit arithmetic. **KY.4.NBT.5 Multiply whole numbers** ● **Up to four digit number by a one-digit number** ● **Two-digit number by two-digit number** **Multiply using strategies based on place value and the properties of operations. Illustrate and**	Students use a variety of models (rectangular arrays and area models) and strategies to represent multi-digit factors times a one-digit factor and a two-digit number by a two-digit number. Students also connect their reasoning to a written equation. Some examples include:

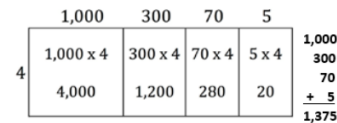|	
explain the calculation by using equations, rectangular arrays and/or area models. MP.3, MP.4, MP.8	 **KY.3.OA.5** **Coherence KY.3.NBT.3→ KY.4.NBT.5→KY.5.NBT.5** **KY.3.MD.7**
Cluster: Use place value understanding and properties of operations to perform multi-digit arithmetic. **KY.4.NBT.6 Divide up to four-digit dividends by one-digit divisors. Find whole number quotients and remainders using** ● **strategies based on place value** ● **the properties of operations** ● **the relationship between multiplication and division Illustrate and explain the calculation by using equations, rectangular arrays and/or area models.** MP.3, MP.7, MP.8	Students use a variety of models (rectangular arrays and area models) and strategies to divide up to four-digit dividends by one-digit divisors. 5,500 ÷ 4 = ? Note: By the end of grade 4 students should be able to model, write and explain division by a one-digit divisor. **KY.3.OA.5** **Coherence KY.3.OA.6→KY.4.NBT.6→KY.5.NBT.6** **KY.3.MD.7**
Cluster: Use the four operations with whole numbers to solve problems. **KY.4.OA.1 Interpret a multiplication equation as a comparison. Represent verbal statements of multiplicative comparisons as multiplication equations.**	Students interpret 35 = 5 × 7 as a statement that 35 is 5 times as many as 7 and 7 times as many as 5. **Coherence KY.3.OA.1→ KY.4.OA.1→KY.5.NF.5**

MP.2, MP.4	
Cluster: Use the four operations with whole numbers to solve problems. **KY.4.OA.2 Multiply or divide to solve word problems involving multiplicative comparisons by using drawings and equations with a symbol for the unknown number to represent the problem, distinguishing multiplicative comparison from additive comparison.** MP.1, MP.2, MP.3	Students solve multiplicative comparison problems using drawings and equations to determine situations like the ones below (Table 2 in Appendix A) on which quantity is being multiplied and which factor is telling how many times. **Coherence KY.3.OA.3→ KY.4.OA.2→KY.5.NF.3**
Cluster: Use the four operations with whole numbers to solve problems. **KY.4.OA.3 Solve multistep problems.** **a. Perform operations in the conventional order when there are no parentheses to specify a particular order.** **b. Solve multistep word problems posed with whole numbers and having whole number answers using the four operations, including problems in which remainders must be interpreted. Represent these problems using equations with a letter standing for the unknown**	a. Students use their knowledge of order of operations even when there are no parentheses or brackets. 31 + 3 8 - 20 = b. For example, Mr. May's grade four class is collecting canned goods for a food drive. Their goal is to bring in 50 cans of food by Friday. So far, the students have brought in 10 on Monday and Tuesday, 14 cans on Wednesday and 13 on Thursday. How many more cans will the class need to bring in to reach their goal? 50 = 2 x 10 + 14 + 13 + c 50 = 20 + 14 + 13 + c 50 = 47 + c 3=c

quantity. Assess the reasonableness of answers using mental computations and estimation strategies including rounding. MP.1, MP.4	Note: Estimation skills include identifying when estimation is appropriate, determining method of estimation and verifying solutions or determining the reasonableness of situations using various estimation strategies. The skill of estimating within context allows students to further develop their number sense. **Coherence KY.3.OA.8→ KY.4.OA.3→KY.7.NS.3**

Supporting Standards

Standards	Clarifications
Cluster: Solve problems involving measurement and conversion of measurements from a larger unit to a smaller unit. **KY.4.MD.1 Know relative size of measurement units (mass, weight, liquid volume, length, time) within one system of units (metric system, U.S. standard system and time).** **a. Understand the relationship of measurement units within any given measurement system.** **b. Within any given measurement system, express measurements in a larger unit in terms of a smaller unit.** **c. Record measurement equivalents in a two-column table.** MP.5, MP.6	c. Two- column tables may include: | kg	g
1	1000
2	2000
3	3000 | | ft	in
1	12
2	24
3	36 | | lb	oz
1	16
2	32
3	48 | **Coherence KY.4.MD.1→KY.5.MD.1**

Cluster: Generalize place value understanding for multi-digit whole numbers. **KY.4.NBT.1 Recognize in a multi-digit whole number, a digit in one place represents ten times what it represents in the place to its right.** MP.7	Students recognize the relationship of same digits located in different places in a whole number. For example, in the number 435, the digit 5 in the ones place, while the digit 5 in 652 is in the tens place. The five in 652 is ten times greater than the five in 435. **Coherence KY.2.NBT.1→ KY.4.NBT.1→KY.5.NBT.1**

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Unit 4: Equivalent Fractions

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Unit 4: Equivalent Fractions

This unit builds on previous units conceptual understanding. Students use visual models to generate equivalent fractions. Then they use number patterns to develop, test, and explain a common rule for determining if fractions are equivalent. They compare fraction values.

Duration: 25 days

Standards for Mathematical Practice	
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.

Priority Standards	
Standards	**Clarifications**
Cluster: Extend understanding of fraction equivalence and ordering. **KY.4.NF.1 Understand and generate equivalent fractions.** **a. Use visual fraction models to recognize and generate equivalent fractions that have different numerators/denominators even though they are the same size.** **b. Explain why a fraction a/b is equivalent to a fraction (n*a)/(n*b).**	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**

MP.4, MP.7, MP.8	
Cluster: Extend understanding of fraction equivalence and ordering. **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 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**

<table>
<tr><td colspan="2" align="center">Supporting Standards</td></tr>
<tr><td align="center">Standards</td><td align="center">Clarifications</td></tr>
<tr><td>Cluster: Gain familiarity with factors and multiples.

KY.4.OA.4 Find factors and multiples of numbers in the range 1-100.
a. Find all factor pairs for a given whole number.
b. Recognize that a whole number is a multiple of each of its factors.
c. Determine whether a given whole number is a multiple of a given one-digit number.
d. Determine whether a given whole number is prime or composite.

MP.5, MP.7</td><td>Students extend their knowledge of multiplication and division facts by exploring patterns they have found by building conceptual understanding of prime numbers (numbers with exactly two factors) and composite numbers (numbers with more than two factors).
Patterns include:
· Numbers that end in 0 have 10 as a factor. These are multiples of 10.
· Numbers that end in 0 or 5 as a factor. These are multiples of 5.
· Even numbers have 2 as a factor. These numbers are multiples of 2.
· Numbers that can be halved twice have 4 as a factor. These numbers are multiples of 4.

Coherence KY.3.OA.7→ KY.4.OA.4→KY.6.NS.4</td></tr>
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| **Cluster: Generate and analyze patterns.**

KY.4.OA.5 Generate a number or shape pattern that follows a given rule. Identify apparent features of the pattern not explicit in the rule itself.

MP.2, MP.3 | For example, given the rule "Add 3" and the starting number 1, generate terms in the resulting sequence and observe the terms appear to alternate between odd and even numbers. Explain informally why the numbers will continue to alternate in this way.

Coherence KY.3.OA.9→ KY.4.OA.5→KY.5.OA.3 |

4th Grade Mathematics

Unit 5: Solving Problems with Fractions

4th Grade Mathematics
Unit 5: Solving Problems with Fractions

This unit continues to develop students procedural fluency in working with fractions. Students consider problems where fractions are important models including measuring with fractional units, representing data with fractional values, determining area and volume, etc. As students work with concrete models of fractions, they deepen their conceptual understanding of fractions as values and move towards fluency in operations with fractions.

Duration: 30 Days

Standards for Mathematical Practice	
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.

Priority Standards	
Standards	**Clarifications**
Cluster: Build fractions from unit fractions by applying and extending previous understandings of operations on whole numbers. **KY.4.NF.3 Understand a fraction a/b with a > 1 as a sum of fractions 1/b.** **a. Understand addition and subtraction of fractions as joining and separating parts referring to the same whole.**	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. Using the number line to see that $\frac{5}{3} = \frac{1}{3} + \frac{1}{3} + \frac{1}{3} + \frac{1}{3} + \frac{1}{3}$ Segment of length $\frac{1}{3}$ 5 segments put end to end $\frac{5}{3} = \frac{1}{3} + \frac{1}{3} + \frac{1}{3} + \frac{1}{3} + \frac{1}{3}$ **KY.5.NF.1**

|	
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	**Coherence KY.3.NF.1→ KY.4.NF.3→KY.5.NF.2**
Cluster: Build fractions from unit fractions by applying and extending previous understandings of operations on whole numbers. **KY.4.NF.4 Apply and extend previous understandings of multiplication to multiply a fraction by a whole number.** **1 a. Understand a fraction a/b as a multiple of 1/b.** **b. Understand a multiple of a/b as a multiple of 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 $\frac{2}{5} + \frac{2}{5} + \frac{2}{5} = 3 \times \frac{2}{5} = \frac{6}{5}$ **KY.4.OA.2** **Coherence KY.3.NF.1→ KY.4.NF.4→KY.5.NF.4**
Supporting Standards	
Standards	**Clarifications**

Cluster: Solve problems involving measurement and conversion of measurements from a larger unit to a smaller unit. **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 number, 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**
Cluster: Solve problems involving measurement and conversion of measurements from a larger unit to a smaller unit. **KY.4.MD.3 Apply the area and perimeter formulas for rectangles in real world and mathematical problems.** MP.1, MP.3	Students apply the area and perimeter formulas to real world problems with an unknown factor: Area = length x width (A = l x w) perimeter=length+width+length+width (p= l+w+l+w OR p=2l+ 2w) **KY.3.MD.8** **Coherence KY.3.MD.7→KY.4.MD.3→KY.5.MD.5**
Cluster: Understand and apply the statistics process.	Students create dot plots to show a data set of objects with fractional measurements.

KY.4.MD.4 Use dot plots to analyze data to a statistical question.
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 (1/2, 1/4, 1/8).
c. Solve problems involving addition and subtraction of fractions by using information presented in dot plots.

MP.1, MP.6

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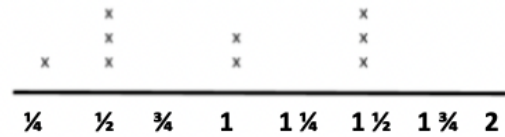
Coherence KY.3.MD.4→KY.4.MD.4→KY.5.MD.2

4th Grade Mathematics

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Unit 6: Understanding Decimals

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Unit 6: Understanding Decimals

This unit builds students' understanding of place value and fractions to work with fractions with denominators of 10 and 100. They are introduced to decimal notation for these fractions and use visual models to compare decimals. They use operations with decimals to solve problems.

Duration: 20 Days

Standards for Mathematical Practice	
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.
Priority Standards	
Standards	**Clarifications**
Cluster: Understand decimal notation for fractions and compare decimal fractions. **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 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**
Cluster: Use the four operations with whole numbers to solve problems.	a. Students use their knowledge of order of operations even when there are no parentheses or brackets. 31 + 3 8 - 20 = b. For example, Mr. May's grade four class is collecting

KY.4.OA.3 Solve multistep problems. **a. Perform operations in the conventional order when there are no parentheses to specify a particular order.** **b. Solve multistep word problems posed with whole numbers and having whole number answers using the four operations, including problems in which remainders must be interpreted. Represent these problems using equations with a letter standing for the unknown quantity. Assess the reasonableness of answers using mental computations and estimation strategies including rounding.** MP.1, MP.4	canned goods for a food drive. Their goal is to bring in 50 cans of food by Friday. So far, the students have brought in 10 on Monday and Tuesday, 14 cans on Wednesday and 13 on Thursday. How many more cans will the class need to bring in to reach their goal? 50 = 2 x 10 + 14 + 13 + c 50 = 20 + 14 + 13 + c 50 = 47 + c 3=c Note: Estimation skills include identifying when estimation is appropriate, determining method of estimation and verifying solutions or determining the reasonableness of situations using various estimation strategies. The skill of estimating within context allows students to further develop their number sense. **Coherence KY.3.OA.8→ KY.4.OA.3→KY.7.NS.3**

Supporting Standards

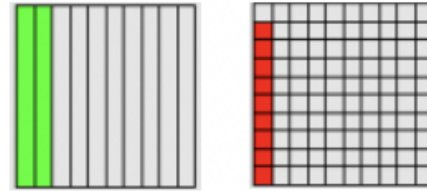| Standards	Clarifications
Cluster: Understand decimal notation for fractions and compare decimal fractions. **KY.4.NF.5 Convert and add fractions with denominators of 10 and 100.** **a. Convert a fraction with a denominator of 10 to an equivalent fraction with a denominator of 100.** **b. Add two fractions 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**

Cluster: Understand decimal notation for fractions and compare decimal fractions. **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**
Cluster: Generalize place value understanding for multi-digit whole numbers. **KY.4.NBT.1 Recognize in a multi-digit whole number, a digit in one place represents ten times what it represents in the place to its right.** MP.7	Students recognize the relationship of same digits located in different places in a whole number. For example, in the number 435, the digit 5 in the ones place, while the digit 5 in 652 is in the tens place. The five in 652 is ten times greater than the five in 435. **Coherence KY.2.NBT.1→ KY.4.NBT.1→KY.5.NBT.1**

4th Grade Mathematics

ACHIEVING EXCELLENCE TOGETHER

Unit 7: Solving Problems about Plane Figures

4th Grade Mathematics
Unit 7: Solving Problems about Plane Figures

This unit brings everything together for 4th grade. Students classify geometric figures based on their attributes. They consider problems about these figures involving perimeter and area. This problem solving context provides students an opportunity to solve problems using all four operations.

Duration: 15 Days

Standards for Mathematical Practice	
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.
Priority Standards	
Standards	**Clarifications**
Cluster: Use the four operations with whole numbers to solve problems. **KY.4.OA.3 Solve multistep problems.** **a. Perform operations in the conventional order when there are no parentheses to specify a particular order.** **b. Solve multistep word problems posed with whole numbers and having whole number answers using the four operations, including problems in which remainders must be**	a. Students use their knowledge of order of operations even when there are no parentheses or brackets. 31 + 3 8 - 20 = b. For example, Mr. May's grade four class is collecting canned goods for a food drive. Their goal is to bring in 50 cans of food by Friday. So far, the students have brought in 10 on Monday and Tuesday, 14 cans on Wednesday and 13 on Thursday. How many more cans will the class need to bring in to reach their goal? $50 = 2 \times 10 + 14 + 13 + c$ $50 = 20 + 14 + 13 + c$

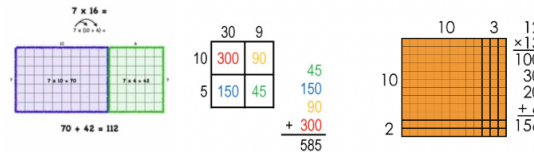|	
interpreted. Represent these problems using equations with a letter standing for the unknown quantity. Assess the reasonableness of answers using mental computations and estimation strategies including rounding. MP.1, MP.4	50 = 47 + c 3=c Note: Estimation skills include identifying when estimation is appropriate, determining method of estimation and verifying solutions or determining the reasonableness of situations using various estimation strategies. The skill of estimating within context allows students to further develop their number sense. **Coherence KY.3.OA.8→ KY.4.OA.3→KY.7.NS.3**
Cluster: Use place value understanding and properties of operations to perform multi-digit arithmetic. **KY.4.NBT.4 Fluently add and subtract multi-digit whole numbers using an algorithm.** MP.2, MP.8	Students make connections from previous work with addition and subtraction, using models/representations to develop an efficient algorithm to add and subtract multi-digit numbers. These are types of algorithms/strategies one could possibly use (but not limited to) to solve adding and subtracting multi-digit whole numbers. **Coherence KY.3.NBT.2→ KY.4.NBT.4→KY.5.NBT.5**
Cluster: Use place value understanding and properties of operations to perform multi-digit arithmetic. **KY.4.NBT.5 Multiply whole numbers**	Students use a variety of models (rectangular arrays and area models) and strategies to represent multi-digit factors times a one-digit factor and a two-digit number by a two-digit number. Students also connect their

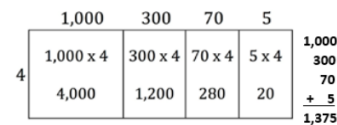|	
● **Up to four digit number by a one-digit number** ● **Two-digit number by two-digit number** **Multiply using strategies based on place value and the properties of operations. Illustrate and explain the calculation by using equations, rectangular arrays and/or area models.** MP.3, MP.4, MP.8	reasoning to a written equation. Some examples include: **KY.3.OA.5** **Coherence KY.3.NBT.3→ KY.4.NBT.5→KY.5.NBT.5** **KY.3.MD.7**
Cluster: Use place value understanding and properties of operations to perform multi-digit arithmetic. **KY.4.NBT.6 Divide up to four-digit dividends by one-digit divisors. Find whole number quotients and remainders using** ● **strategies based on place value** ● **the properties of operations** ● **the relationship between multiplication and division Illustrate and explain the calculation by using equations, rectangular arrays and/or area models.** MP.3, MP.7, MP.8	Students use a variety of models (rectangular arrays and area models) and strategies to divide up to four-digit dividends by one-digit divisors. 5,500 ÷ 4 = ? Note: By the end of grade 4 students should be able to model, write and explain division by a one-digit divisor. **KY.3.OA.5** **Coherence KY.3.OA.6→KY.4.NBT.6→KY.5.NBT.6** **KY.3.MD.7**

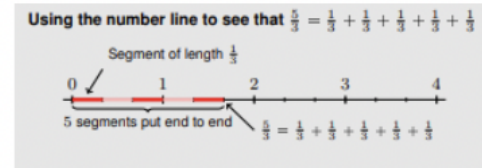|	
Cluster: Build fractions from unit fractions by applying and extending previous understandings of operations on whole numbers. **KY.4.NF.3 Understand a fraction a/b with a > 1 as a sum of fractions 1/b.** **a. Understand addition and subtraction of fractions as joining and separating parts referring 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. **KY.5.NF.1** **Coherence KY.3.NF.1→ KY.4.NF.3→KY.5.NF.2**
Cluster: Build fractions from unit fractions by applying and extending previous understandings of operations on whole numbers. **KY.4.NF.4 Apply and extend previous understandings of multiplication to multiply a fraction by a whole number.** **1 a. Understand a fraction a/b as a multiple of 1/b.** **b. Understand a multiple of a/b as a multiple of 1/b and use this understanding to multiply a fraction by a whole number.** **c. Solve word problems involving multiplication**	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 $\frac{2}{5} + \frac{2}{5} + \frac{2}{5} = 3 \times \frac{2}{5} = \frac{6}{5}$ **KY.4.OA.2**

of a fraction by a whole number. MP.5, MP.8	**Coherence KY.3.NF.1→ KY.4.NF.4→KY.5.NF.4**

Supporting Standards	
Standards	**Clarifications**
Cluster: Understand decimal notation for fractions and compare decimal fractions. **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**
Cluster: Draw and identify lines and angles, and classify shapes by properties of their lines and angles. **KY.4.G.2 Classify two-dimensional figures based on the presence or absence of parallel or perpendicular lines, or the presence of absence of angles of a specified size. Recognize right triangles as a category and identify right triangles.** MP.7	**Coherence KY.3.G.1→KY.4.G.2→KY.5.G.3**

Cluster: Draw and identify lines and angles, and classify shapes by properties of their lines and angles. **KY.4.G.3 Identify lines of symmetry.** **a. Recognize a line of symmetry for a two-dimensional figure. b. Identify line-symmetric figures and draw lines of symmetry.** MP. 5, MP.7	
Cluster: Solve problems involving measurement and conversion of measurements from a larger unit to a smaller unit. **KY.4.MD.3 Apply the area and perimeter formulas for rectangles in real world and mathematical problems.** MP.1, MP.3	Students apply the area and perimeter formulas to real world problems with an unknown factor: Area = length x width (A = l x w) perimeter=length+width+length+width (p= l+w+l+w OR p=2l+ 2w) **KY.3.MD.8** **Coherence KY.3.MD.7→KY.4.MD.3→KY.5.MD.5**