5th Grade Mathematics
Units of Instruction
2022-2023

BOONE COUNTY SCHOOLS

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5th Grade Mathematics

Unit 1 Decimals and Place value 5 Weeks	Unit 2 Multiply and Divide Whole Numbers 5 Weeks	Unit 3 Operations with Decimals 4 Weeks	Unit 4: Solving Problems involving Volume 4 Weeks	Unit 5: Add and Subtract Fractions 5 Weeks	Unit 6 Multiply and Divide with Fractions 5 Weeks	Unit 7 Shapes on the coordinate plane 4 Weeks	Unit 8 Drawing conclusions from Graphs 4 Weeks
5.NBT.1 5.NBT.3 5.NBT.2 5.NBT.4	5.NBT.5 5.NBT.6 5.OA.1 5.OA.2	5.NBT.7 5.OA.1 5.NBT.2 5.NBT.4 5.OA.2	5.MD.5 5.NBT.5 5.NBT.6 5.OA.1 5.OA.2 5.MD.1 5.MD.3 5.MD.4	5.NF.1 5.NF.2 5.NBT.5 5.OA.1 5.MD.1	5.NF.4 5.NF.6 5.NF.7 5.OA.1 5.NF.3 5.NF.5 5.OA.2	5.G.2 5.G.1 5.G.3 5.G.4 5.OA.3	5.G.2 5.NBT.5 5.G.1 5.OA.3 5.MD.2
*Fluency Standards (taught all year long): 5.NBT.5							

Priority Standards: 5.NBT.1, 5.NBT.3, 5.NBT.5, 5.NBT.6, 5.NBT.7, 5.NF.1, 5.NF.2, 5.NF.4, 5.NF.6, 5.NF.7, 5.MD.5, 5.OA.1, 5.G.2

5th Grade Mathematics

BOONE COUNTY SCHOOLS

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Unit 1: Decimals and Place Value

Grade 5 Mathematics
Unit 1: Decimals and Place Value

This unit builds on students' understanding of decimal notation from 4th grade. They explore patterns based on place value to read, write, compare and round decimals. The students' multiply decimals by ten to understand the patterns that emerge and understand the benefits and uses of decimal notation.
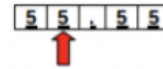
Duration: 25 Days

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**

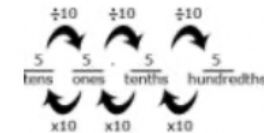|	
Cluster: Understand the place value system. **KY.5.NBT.1 Recognize that in a multi-digit number, a digit in one place represents 10 times as much as it represents in the place to its right and 1/10 of what it represents in the place to its left.** MP.2, MP.7	In the number 55.55, each digit is 5, but the value of each digit is different because of the placement. The arrow points to is 1/10 of the 5 to the left and 10 times greater than the 5 to the right. The 5 in the ones place is 1/10 of 50 and 10 times greater than five tenths. Note: grade 5 expectations in this domain are limited to decimals through the thousandths place. **Coherence KY.4.NBT.1→KY.5.NBT.1**

Cluster: Understand the place value system.
 	
KY.5.NBT.3 Read, write and compare decimals to thousandths.
a. Read and write decimals to thousandths using base-ten numerals, number names and expanded form.
b. Compare two decimals to thousandths based on meanings of the digits in each place, using >, =, and < symbols to record the results of comparisons.
 	
MP.2, MP.5, MP.7
	a. For the number 347.392…
	    • number name: three hundred forty-seven and three hundred ninety-two thousandths
	    • expanded form: $347.392 = 3 \times 100 + 4 \times 10 + 7 \times 1 + 3 \times (\frac{1}{10}) + 9 \times (\frac{1}{100}) + 2 \times (\frac{1}{1000})$
	Students relate numbers they are comparing back to common benchmarks of $0, \frac{1}{2}$ (0.5, 0.50 and 0.500) and 1.
	When comparing numbers, 0.35 and 0.12, students make the connection 0.35 > 0.12, but also see the relationship of 0.12 < 0.35. Note: grade 5 expectations in this domain are limited to decimals through the thousandths place.
	
	KY.4.NBT.2
	Coherence KY.4.NF.7→ KY.5.NBT.3

Supporting Standards	
Standards	**Clarifications**

Cluster: Understand the place value system. **KY.5.NBT.2 Multiply and divide by powers of 10.** **● Explain patterns in the number of zeros of the product when multiplying a number by powers of 10.** **● Explain patterns in the placement of the decimal point when a decimal is multiplied or divided by a power of 10.** **● Use whole-number exponents to denote powers of 10.** MP.3, MP.8	Students recognize when a number is multiplied by 10, a zero is added to the end because each digit's value became 10 times larger. Students use the same reasoning to explain in the problem. 3 places. ● $523 \times 10^3 = 523{,}000$ The place value of 523 is increased by 3 places. ● $5.223 \times 10^2 = 522.3$ The place value of 5.223 is increased by 2 places. ● $52.3 \div 10^1 = 5.23$ The place value of 52.3 is decreased by one place. Note: grade 5 expectations in this domain are limited to decimals through the thousandths place. **Coherence KY.5.NBT.2→ KY.6.EE.1**
Cluster: Understand the place value system. **KY.5.NBT.4 Use place value understanding to round decimals to any place.** MP.5, MP.7	Students go beyond application of an algorithm or procedure when rounding. Students demonstrate a deeper understanding of number sense and place value and explain and reason about the answers they get when they round. Note: grade 5 expectations in this domain are limited to decimals through the thousandths place. **Coherence KY.4.NBT.3→ KY.5.NBT.4**

5th Grade Mathematics

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Unit 2: Multiply and Divide Whole Numbers

5th Grade Mathematics
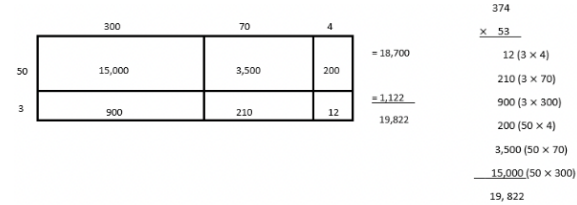## Unit 2: Multiply and Divide Whole Numbers

In this unit, students consider the structure of numerical expressions. The students learn the conventions of using parentheses and brackets. They interpret expressions by seeing the parts and how they relate to the whole expression. They evaluate expressions, deepening the fluency in the four operations with whole numbers that they will continue to build over the course of the year.

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: Perform operations with multi-digit whole numbers and with decimals to hundredths. **KY.5.NBT.5 Fluently multiply multi-digit whole numbers (not to exceed four-digit by two-digit multiplication) using an algorithm.**	Students make connections from previous work with multiplication, using models/representations to develop an efficient algorithm to multiply multi-digit whole numbers.

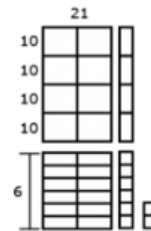| MP.7, MP.8	
	374 × 53 12 (3 × 4) 210 (3 × 70) 900 (3 × 300) 200 (50 × 4) 3,500 (50 × 70) 15,000 (50 × 300) 19,822
	Coherence KY.4.NBT.5→KY.5.NBT.5→KY.6.NS.3
Cluster: Perform operations with multi-digit whole numbers and with decimals to hundredths. **KY.5.NBT.6 Divide up to four-digit dividends by two-digit divisors.** **a. Find whole-number quotients of whole numbers with up to four-digit dividends and two-digit divisors using…** **● strategies based on place value** **● the properties of operations** **● the relationship between multiplication and division** **b. Illustrate and explain the calculation by using equations, rectangular arrays and/or area models.** **MP.2, MP.3, MP.4**	Students build upon the knowledge of division they gained in grades 3 and 4. Students connect previous understanding of partitive and measurement models for division to an algorithm, including partial quotients. Some examples include: 968 ÷ 21 = Students use base ten models by representing 962 and use the model to make an array with one dimension of 21. Student continues to make the array until no more groups of 21 can be made. Remainders are not part of the array. Students use an area model for division shown below. As the student uses the area model, s/he keeps track of how much of the 9,984 is left to divide.

Students use expanded notation 2682 ÷ 25 = (2000 + 600 +80 + 2) ÷ 25. Students use his or her understanding of the relationship between 100 and 25, to think "I know 100 divided by 25 is 4 so 200 divided by 25 is 8 and 2000 divided by 25 is 80. Then 600 divided by 25 has to be 24. Since 3 × 25 is 75, I know that 80 divided by 25 is 3 with a remainder of 5. I can't divide 2 by 25 so 2 plus the 5 leaves a remainder of 7. 80 + 24 + 3 =107. So the answer is 107 with a remainder of 7."

Students use an equation that relates division to multiplication, 25 × n = 2682, a student might estimate the answer to be slightly larger than 100 because s/he recognizes that 25 × 100 =2500.

Coherence KY.4.NBT.6→ KY.5.NBT.6→KY.6.NS.2

Cluster: Write and interpret numerical expressions. **KY.5.OA.1 Use parentheses, brackets or braces in numerical expressions and evaluate expressions that include symbols.** MP.1, MP.3	Students work with the order of first evaluating terms in parentheses, then brackets, [] and then braces, {}. **Coherence KY.5.OA.1→ KY.6.EE.2**

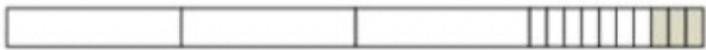| Supporting Standards	
Standards	**Clarifications**
Cluster: Write and interpret numerical expressions. **KY.5.OA.2 Write simple expressions with numbers and interpret numerical expressions without evaluating them.** MP.2, MP.7	Students translate from words "add 8 and 7, then multiply by 2" to 2 × (8 + 7). Recognize that 3 × (18932 + 921) is three times as large as 18932 + 921, without having to calculate the indicated sum or product. **KY.6.EE.2** **Coherence KY.4.OA.1→ KY.5.OA.2→KY.6.EE.3** **KY.6.EE.4**

5th Grade Mathematics

Unit 3: Operations with Decimals

5th Grade Mathematics
Unit 3: Operations with Decimals

In this unit, students extend their understanding of place value and properties of operations to perform operations with decimals (to the hundredths). They use a variety of strategies. Students are not expected to use algorithms with decimals until middle school.
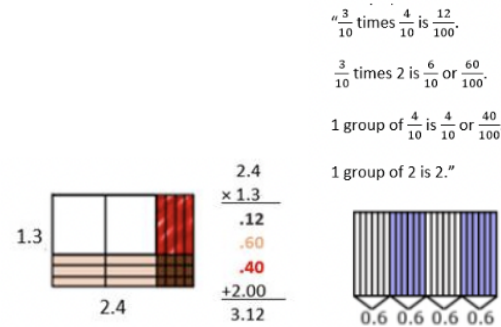
Duration: 20 Days

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: Perform operations with multi-digit whole numbers and with decimals to hundredths. **KY.5.NBT.7 Operations with decimals to hundredths.** **a. Add, subtract, multiply and divide decimals to hundredths using…** **● concrete models or drawings**	Students connect previous experiences with the meaning of multiplication and division of whole numbers to multiplication and division of decimals using estimation, models and place value structure. For example: 3 tenths subtracted from 4 wholes. The wholes must be divided into tenths. The answer is 3 and 170 or 3.7

• **strategies based on place value** • **properties of operations** • **the relationship between addition and subtraction** **b. Relate the strategy to a written method and explain the reasoning used.** MP.2, MP.3, MP.5	An area model can be used for illustrating products. Students describe the partial products displayed by the area model. For example, Students dividing decimals for example could find the number in each group or share by applying the fair sharing model or separating decimals in to equal parts such as 2.4 ÷ 4 = 0.6 **Coherence KY.4.NBT.6→ KY.5.NBT.7→KY.6.NS.3**
Cluster: Write and interpret numerical expressions. **KY.5.OA.1 Use parentheses, brackets or braces in numerical expressions and evaluate expressions that include symbols.** MP.1, MP.3	Students work with the order of first evaluating terms in parentheses, then brackets, [] and then braces, {}. **Coherence KY.5.OA.1→ KY.6.EE.2**
Supporting Standards	
Standards	**Clarifications**

Cluster: Understand the place value system. **KY.5.NBT.2 Multiply and divide by powers of 10.** ● **Explain patterns in the number of zeros of the product when multiplying a number by powers of 10.** ● **Explain patterns in the placement of the decimal point when a decimal is multiplied or divided by a power of 10.** ● **Use whole-number exponents to denote powers of 10.** MP.3, MP.8	Students recognize when a number is multiplied by 10, a zero is added to the end because each digit's value became 10 times larger. Students use the same reasoning to explain in the problem. 3 places. ● $523 \times 10^3 = 523{,}000$ The place value of 523 is increased by 3 places. ● $5.223 \times 10^2 = 522.3$ The place value of 5.223 is increased by 2 places. ● $52.3 \div 10^1 = 5.23$ The place value of 52.3 is decreased by one place. Note: grade 5 expectations in this domain are limited to decimals through the thousandths place. **Coherence KY.5.NBT.2→ KY.6.EE.1**
Cluster: Understand the place value system. **KY.5.NBT.4 Use place value understanding to round decimals to any place.** MP.5, MP.7	Students go beyond application of an algorithm or procedure when rounding. Students demonstrate a deeper understanding of number sense and place value and explain and reason about the answers they get when they round. Note: grade 5 expectations in this domain are limited to decimals through the thousandths place. **Coherence KY.4.NBT.3→ KY.5.NBT.4**
Cluster: Write and interpret numerical expressions. **KY.5.OA.2 Write simple expressions with numbers and interpret numerical expressions without evaluating them.**	Students translate from words "add 8 and 7, then multiply by 2" to $2 \times (8 + 7)$. Recognize that $3 \times (18932 + 921)$ is three times as large as $18932 + 921$, without having to calculate the indicated sum or product.

MP.2, MP.7	**KY.6.EE.2** **Coherence KY.4.OA.1→ KY.5.OA.2→KY.6.EE.3** **KY.6.EE.4**

5th Grade Mathematics
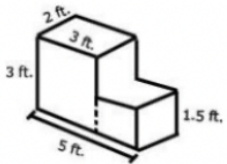

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Unit 4: Solving Problems involving Volume

5th Grade Mathematics

Unit 4: Solving Problems involving Volume

This unit focuses on volume as a context for multiplication and division. Students deepen their conceptual understanding of volume by starting with concrete and counting models and then relating volume to multiplication. They use the context to develop algorithms for multiplying and strategies for dividing whole numbers. They solve problems involving volume and converting measurements.

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: Geometric measurement: understand concepts of volume and relate volume to multiplication and to addition. **KY.5.MD.5 Relate volume to the operations of multiplication and addition and solve real world and mathematical problems involving volume.** **a. Find the volume of a right rectangular prism with whole- number side lengths by packing it with unit cubes and show that the volume is the same as would be found by multiplying the edge lengths, equivalently by multiplying the height**	For example, students determine the volume of concrete needed to build the steps in the diagram below. Coherence **KY.4.MD.3→KY.5.MD.5→KY.6.G.2**

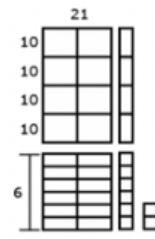|	
by the area of the base. Represent threefold whole-number products as volumes. **b.Apply the formulasV=lxwxh and V=Bxh for rectangular prisms with whole-number edge lengths in the context of solving real world and mathematical problems.** **c. Recognize volume as additive. Find volumes of solid figures composed of two non-overlapping right rectangular prisms by adding the volumes of the non-overlapping parts, applying this technique to solve real world problems.** MP.1, MP.4, MP.8	
Cluster: Perform operations with multi-digit whole numbers and with decimals to hundredths. **KY.5.NBT.5 Fluently multiply multi-digit whole numbers (not to exceed four-digit by two-digit multiplication) using an algorithm.** MP.7, MP.8	Students make connections from previous work with multiplication, using models/representations to develop an efficient algorithm to multiply multi-digit whole numbers. $$\begin{array}{c|c|c|c|} & 300 & 70 & 4 \\ \hline 50 & 15,000 & 3,500 & 200 \\ \hline 3 & 900 & 210 & 12 \\ \end{array}$$ = 18,700 = 1,122 19,822 374 × 53 12 (3 × 4) 210 (3 × 70) 900 (3 × 300) 200 (50 × 4) 3,500 (50 × 70) 15,000 (50 × 300) 19, 822 **Coherence KY.4.NBT.5→KY.5.NBT.5→KY.6.NS.3**
Cluster: Perform operations with multi-digit whole numbers and with decimals to hundredths. **KY.5.NBT.6 Divide up to four-digit dividends by two-digit divisors.** **a. Find whole-number quotients of whole numbers with up to four-digit dividends and**	Students build upon the knowledge of division they gained in grades 3 and 4. Students connect previous understanding of partitive and measurement models for division to an algorithm, including partial quotients. Some examples include: 968 ÷ 21 = Students use base ten models by representing 962 and

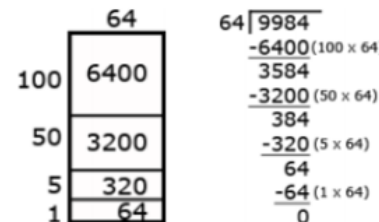|	
two-digit divisors using... **● strategies based on place value** **● the properties of operations** **● the relationship between multiplication and division** **b. Illustrate and explain the calculation by using equations, rectangular arrays and/or area models.** **MP.2, MP.3, MP.4**	use the model to make an array with one dimension of 21. Student continues to make the array until no more groups of 21 can be made. Remainders are not part of the array. Students use an area model for division shown below. As the student uses the area model, s/he keeps track of how much of the 9,984 is left to divide. Students use expanded notation 2682 ÷ 25 = (2000 + 600 +80 + 2) ÷ 25. Students use his or her understanding of the relationship between 100 and 25, to think "I know 100 divided by 25 is 4 so 200 divided by 25 is 8 and 2000 divided by 25 is 80. Then 600 divided by 25 has to be 24. Since 3 × 25 is 75, I know that 80 divided by 25 is 3 with a remainder of 5. I can't divide 2 by 25 so 2 plus the 5 leaves a remainder of 7. 80 + 24 + 3 =107. So the answer is 107 with a remainder of 7." Students use an equation that relates division to multiplication, 25 × n = 2682, a student might estimate

	the answer to be slightly larger than 100 because s/he recognizes that 25 × 100 =2500. **Coherence KY.4.NBT.6→ KY.5.NBT.6→KY.6.NS.2**
Cluster: Write and interpret numerical expressions. **KY.5.OA.1 Use parentheses, brackets or braces in numerical expressions and evaluate expressions that include symbols.** MP.1, MP.3	Students work with the order of first evaluating terms in parentheses, then brackets, [] and then braces, {}. **Coherence KY.5.OA.1→ KY.6.EE.2**

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<tr><td colspan="2" align="center">*Supporting Standards*</td></tr>
<tr><td align="center">Standards</td><td align="center">Clarifications</td></tr>
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Cluster: Write and interpret numerical expressions.

KY.5.OA.2 Write simple expressions with numbers and interpret numerical expressions without evaluating them.

MP.2, MP.7
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Students translate from words "add 8 and 7, then multiply by 2" to 2 × (8 + 7).
Recognize that 3 × (18932 + 921) is three times as large as 18932 + 921, without having to calculate the indicated sum or product.

KY.6.EE.2
Coherence KY.4.OA.1→ KY.5.OA.2→KY.6.EE.3
KY.6.EE.4
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Cluster: Convert like measurement units within a given measurement system.

KY.5.MD.1 Convert among different size
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Within the same system convert measurements in a larger unit in terms of a smaller unit and a smaller unit in terms of a larger unit. Use these conversions in solving multi-step, real world problems.
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measurement units (mass, weight, liquid volume, length, time) within one system of units (metric system, U.S. standard system and time). MP.3, MP.8	**Coherence KY.4.MD.1→ KY.5.MD.1→KY.6.RP.3**
Cluster: Geometric measurement: understand concepts of volume and relate volume to multiplication and to addition. **KY.5.MD.3 Recognize volume as an attribute of solid figures and understand concepts of volume measurement.** **a. A cube with side length 1 unit, called a "unit cube," is said to have "one cubic unit" of volume and can be used to measure volume.** **b. A solid figure which can be packed without gaps or overlaps using n unit cubes is said to have a volume of n cubic units.** MP.6	a. one cubic unit b. **Coherence KY.3.MD.5→ KY.5.MD.3**
Cluster: Geometric measurement: understand concepts of volume and relate volume to multiplication and to addition. **KY.5.MD.4 Measure volumes by counting unit cubic cm, cubic in, cubic ft. and improvised units.** MP.5, MP.6	**Coherence KY.3.MD.6→ KY.5.MD.4**

5th Grade Mathematics

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Unit 5: Add and Subtract Fractions

5th Grade Mathematics
Unit 5: Add and Subtract Fractions

In this unit, students extend their conceptual understanding of equivalent fractions to develop strategies for adding and subtracting fractions with unlike denominators. They write and evaluate expressions with fractions and solve problems involving converting measurement units.

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: Use equivalent fractions as a strategy to add and subtract fractions. **KY.5.NF.1 Efficiently add and subtract fractions with unlike denominators (including mixed numbers) by...** **• using reasoning strategies, such as counting up on a number line or creating visual fraction models** **• finding common denominators**	Using common denominator $\frac{2}{3} + \frac{5}{4} = \frac{8}{12} + \frac{15}{12} = \frac{23}{12}$ In general, $\frac{a}{b} + \frac{c}{d} = \frac{(ad+bc)}{bd}$ **KY.4.NF.1** **Coherence KY.4.NF.3→ KY.5.NF.1→KY.6.EE.7**

MP.2, MP.3	

Cluster:
Use equivalent fractions as a strategy to add and subtract fractions.
 	
KY.5.NF.2 Solve word problems involving addition and subtraction of fractions.
a. Solve word problems involving addition and subtraction of fractions referring to the same whole, including cases of unlike denominators.
b. Use benchmark fractions and number sense of fractions to estimate mentally and assess the reasonableness of answers.
 	
MP.1, MP.4
	a. For example: Mary ate 1/3 of the pizza. Tommy ate 2/5 of the pizza. How much of the total pizza did they eat together?
	● making equivalent fractions to add/subtract fractions ● using visual representations to add/subtract fractions
	     ○ AreaModel
	     ○ LinearModel
	b. Recognize an incorrect result $2/5 + \frac{1}{2} = 3/7$, by observing that $3/7 < 1/2$.
	
	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.4.NF.3→KY.5.NF.2

Cluster: Perform operations with multi-digit whole numbers and with decimals to hundredths. **KY.5.NBT.5 Fluently multiply multi-digit whole numbers (not to exceed four-digit by two-digit multiplication) using an algorithm.** MP.7, MP.8	Students make connections from previous work with multiplication, using models/representations to develop an efficient algorithm to multiply multi-digit whole numbers. **Coherence KY.4.NBT.5→KY.5.NBT.5→KY.6.NS.3**

Cluster: Write and interpret numerical expressions. **KY.5.OA.1 Use parentheses, brackets or braces in numerical expressions and evaluate expressions that include symbols.** MP.1, MP.3	Students work with the order of first evaluating terms in parentheses, then brackets, [] and then braces, {}. **Coherence KY.5.OA.1→ KY.6.EE.2**

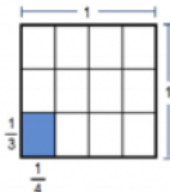| *Supporting Standards*	
Standards	**Clarifications**
Cluster: Convert like measurement units within a given measurement system. **KY.5.MD.1 Convert among different size measurement units (mass, weight, liquid volume, length, time) within one system of units (metric system, U.S. standard system and time).** MP.3, MP.8	Within the same system convert measurements in a larger unit in terms of a smaller unit and a smaller unit in terms of a larger unit. Use these conversions in solving multi-step, real world problems. **Coherence KY.4.MD.1→ KY.5.MD.1→KY.6.RP.3**

5th Grade Mathematics

Unit 6: Multiply and Divide with Fractions

5th Grade Mathematics
Unit 6: Multiply and Divide with Fractions

In this unit, students develop strategies for multiplying and dividing with fractions. Students understand that fractions are numbers, but can also be interpreted as division of the numerator by the denominator. They develop strategies to multiply and divide fractions including area models and use the strategies to solve problems.
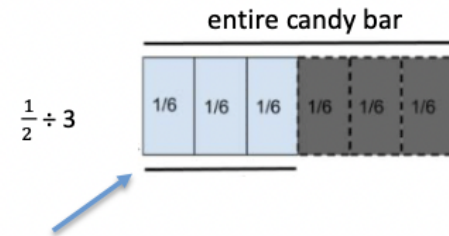
Duration: 25 Days

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: Apply and extend previous understandings of multiplication and division to multiply and divide fractions. **KY.5.NF.4 Apply and extend previous understanding of multiplication to multiply a fraction or whole number by a fraction.** **a. Interpret the product (a/b) x q as a parts of a partition of q into b equal parts; equivalently, as the result of a sequence of operations a x q ÷ b.**	a. Students use a visual fraction model to show $\left(\frac{2}{3}\right)$ x 4 = $\frac{8}{3}$ and create a story context for this equation. Do the same with $\left(\frac{2}{3}\right)$ x $\left(\frac{4}{5}\right)$ = $\frac{8}{15}$. (In general, $\left(\frac{a}{b}\right)$ x $\left(\frac{c}{d}\right)$ = $\frac{ac}{bd}$.) b. For example the shaded portion shows the rectangle with the appropriate unit fraction side lengths. Coherence KY.4.NF.4→ KY.5.NF.4→KY.6.G.1

b. Find the area of a rectangle with fractional side lengths by tiling it with squares of the appropriate unit fraction side lengths and show that the area is the same as would be found by multiplying the side lengths. Multiply fractional side lengths to find areas of rectangles and represent fraction products as rectangular areas. MP.1	
Cluster: Apply and extend previous understandings of multiplication and division to multiply and divide fractions. **KY.5.NF.6 Solve real world problems involving multiplication of fractions and mixed numbers.** MP.4, MP.5	**KY.5.MD.2** **Coherence KY.4.NF.4→KY.5.NF.6**
Cluster: Apply and extend previous understandings of multiplication and division to multiply and divide fractions. **KY.5.NF.7 Apply and extend previous understandings of division to divide unit fractions by whole numbers and whole numbers by unit fractions.** **a. Interpret division of a unit fraction by a non-zero whole number and compute such quotients.** **b. Interpret division of a whole number by a unit**	Students build upon the knowledge of division they gained in grades 3 and 4. Students connect previous understanding of division of whole numbers to divide whole numbers by unit fractions and unit fractions by whole numbers. Division of a fraction by a fraction is not a requirement at grade 5.

fraction and compute such quotients. **c. Solve real world problems involving division of unit fractions by non-zero whole numbers and division of whole numbers by unit fractions.** MP.1, MP.4, MP.8	a. Create a story context for $\left(\frac{1}{3}\right) \div 4$ and use a visual fraction model to show the quotient. Use the relationship between multiplication and division to explain that $\left(\frac{1}{3}\right) \div 4 = \frac{1}{12}$ because $\left(\frac{1}{12}\right) \times 4 = \frac{1}{3}$. b. Create a story context for $4 \div \left(\frac{1}{5}\right)$ and use a visual fraction model to show the quotient. Use the relationship between multiplication and division to explain that $4 \div \left(\frac{1}{5}\right) = 20$, because $20 \times \left(\frac{1}{5}\right) = 4$. c. By using visual fraction models and equations to represent the problem. entire candy bar $\frac{1}{2} \div 3$ 1/6 1/6 1/6 1/6 1/6 1/6 Each child will get one piece. Half to be shared with 3 students. **Coherence KY.4.NF.4→ KY.5.NF.7→KY.6.NS.1**
Cluster: Write and interpret numerical expressions. **KY.5.OA.1 Use parentheses, brackets or braces in numerical expressions and evaluate expressions that include symbols.** MP.1, MP.3	Students work with the order of first evaluating terms in parentheses, then brackets, [] and then braces, {}. **Coherence KY.5.OA.1→ KY.6.EE.2**
Supporting Standards	
Standards	**Clarifications**

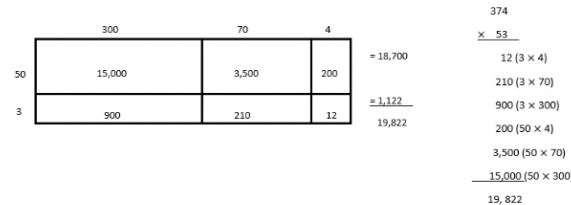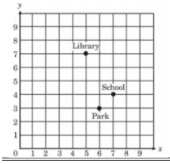|	
Cluster: Apply and extend previous understandings of multiplication and division to multiply and divide fractions. **KY.5.NF.3 Interpret a fraction as division of the numerator by the denominator (a/b = a ÷ b). Solve word problems involving division of whole numbers leading to answers in the form of fractions or mixed numbers by using visual fraction models or equations to represent the problem.** MP.4, MP.8	For example students interpret ¾ as the result of dividing 3 by 4, noting 3/4 multiplied by 4 equals 3 and when 3 wholes are shared equally That among 4 people each person has a share of size 3/4. **Coherence KY.5.NF.3→KY.6.RP.2**
Cluster: Perform operations with multi-digit whole numbers and with decimals to hundredths. **KY.5.NBT.5 Fluently multiply multi-digit whole numbers (not to exceed four-digit by two-digit multiplication) using an algorithm.** MP.7, MP.8	Students make connections from previous work with multiplication, using models/representations to develop an efficient algorithm to multiply multi-digit whole numbers. **Coherence KY.4.NBT.5→KY.5.NBT.5→KY.6.NS.3**
Cluster: Write and interpret numerical expressions. **KY.5.OA.2 Write simple expressions with numbers and interpret numerical expressions without evaluating them.** MP.2, MP.7	Students translate from words "add 8 and 7, then multiply by 2" to 2 × (8 + 7). Recognize that 3 × (18932 + 921) is three times as large as 18932 + 921, without having to calculate the indicated sum or product. **KY.6.EE.2** **Coherence KY.4.OA.1→ KY.5.OA.2→KY.6.EE.3** **KY.6.EE.4**

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5th Grade Mathematics

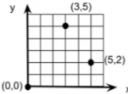## Unit 7: Shapes on the Coordinate Plane

5th Grade Mathematics
Unit 7: Shapes on the Coordinate Plane

In this unit, students extend their understanding of number lines to use the coordinate plane. They represent ordered pairs in the first quadrant in order to understand and answer problems. They use ordered pairs as vertices of plane figures and to discuss their properties.

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: Graph points on the coordinate plane to solve real-world and mathematical problems. **KY.5.G.2 Represent real world and mathematical problems by graphing points in the first quadrant of the coordinate plane and interpret coordinate values of points in the context of the situation.** MP.1, MP.6	For example, students use the coordinate grid, which ordered pair represents locations of places or objects. **KY.6.NS.8** **Coherence KY.5.G.2→KY.6.G.3**

Supporting Standards	
Standards	**Clarifications**
Cluster: Graph points on the coordinate plane to solve real-world and mathematical problems. **KY.5.G.1 Use a pair perpendicular number lines, called axes, to define a coordinate system, with the intersection of the lines (the origin) arranged to coincide with the 0 on each line and a given point in the plane located by using an ordered pair of numbers, called its coordinates. Understand that the first number indicates how far to travel from the origin in the direction of one axis and the second number indicates how far to travel in the direction of the second.** MP.4, MP.7	This standard pertains to the first quadrant only which limits to positive ordered pairs only. **Coherence KY.5.G.1→KY.6.NS.6**
Cluster: Classify two-dimensional figures into categories based on their properties. **KY.5.G.3 Understand that attributes belonging to a category of two- dimensional figures also belong to all subcategories of that category.** MP.3, MP.6	For example, all rectangles have four right angles and squares are rectangles, so all squares have four right angles. **Coherence KY.4.G.2→ KY.5.G.3**
Cluster: Classify two-dimensional figures into categories based on their properties. **KY.5.G.4 Classify two-dimensional figures in a hierarchy based on properties.**	Figures from previous grades: polygons, rhombus/rhombi, rectangle, square, triangle quadrilateral, pentagon, hexagon, cube, trapezoid, half/quarter, circle. For example:

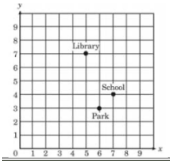|	
MP.1, MP.7	· Polygon - a closed plane figure formed from line segments that meet only at their endpoints. · Quadrilateral - a four-sided polygon · Rectangle - a quadrilateral with two pairs of congruent parallel sides and four right angles. · Rhombus - a parallelogram with all four sides equal in length · Square - a parallelogram with four congruent sides and four right angles. **Coherence KY.4.G.2→ KY.5.G.4**
Cluster: Analyze patterns and relationships. **KY.5.OA.3 Generate numerical patterns for situations.** **a. Generate a rule for growing patterns, identifying the relationship between corresponding terms (x, y).** **b. Generate patterns using one or two given rules (x, y).** **c. Use tables, ordered pairs and graphs to represent the relationship between the quantities.** MP.2, MP.4	Given the rule "Add 3" and the starting number 0, and given the rule "Add 6" and the starting number 0, students generate terms in the resulting sequences (creating ordered pairs). Students observe the terms in one sequence are twice the corresponding terms in the other sequence. Explain informally why this is so. Graph the ordered pairs on a coordinate plane. **Coherence KY.4.OA.5→ KY.5.OA.3→KY.6.EE.9**

5th Grade Mathematics

Unit 8: Drawing Conclusions from Graphs

5th Grade Mathematics
Unit 8: Drawing Conclusions from Graphs

This unit extends students' skills with the coordinate plane to display and interpret data arising from a statistical question. They create data displays on the coordinate plane and look for patterns to help them draw conclusions about their question. This unit is a critical beginning to help students make connections between numerical, contextual, and graphical representations of quantities.

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: Graph points on the coordinate plane to solve real-world and mathematical problems. **KY.5.G.2 Represent real world and mathematical problems by graphing points in the first quadrant of the coordinate plane and interpret coordinate values of points in the context of the situation.**	For example, students use the coordinate grid, which ordered pair represents locations of places or objects.

MP.1, MP.6	**KY.6.NS.8** **Coherence KY.5.G.2→KY.6.G.3**
Cluster: Perform operations with multi-digit whole numbers and with decimals to hundredths. **KY.5.NBT.5 Fluently multiply multi-digit whole numbers (not to exceed four-digit by two-digit multiplication) using an algorithm.** MP.7, MP.8	Students make connections from previous work with multiplication, using models/representations to develop an efficient algorithm to multiply multi-digit whole numbers. **Coherence KY.4.NBT.5→KY.5.NBT.5→KY.6.NS.3**

Supporting Standards

Standards	**Clarifications**
Cluster: Graph points on the coordinate plane to solve real-world and mathematical problems. **KY.5.G.1 Use a pair perpendicular number lines, called axes, to define a coordinate system, with the intersection of the lines (the origin) arranged to coincide with the 0 on each line and a given point in the plane located by using an ordered pair of numbers, called its coordinates. Understand that the first number indicates how far to travel from the origin in the direction of one axis and the second number indicates how far to travel in the direction of the second.**	This standard pertains to the first quadrant only which limits to positive ordered pairs only. **Coherence KY.5.G.1→KY.6.NS.6**

MP.4, MP.7	
Cluster: Analyze patterns and relationships. **KY.5.OA.3 Generate numerical patterns for situations.** **a. Generate a rule for growing patterns, identifying the relationship between corresponding terms (x, y).** **b. Generate patterns using one or two given rules (x, y).** **c. Use tables, ordered pairs and graphs to represent the relationship between the quantities.** MP.2, MP.4	Given the rule "Add 3" and the starting number 0, and given the rule "Add 6" and the starting number 0, students generate terms in the resulting sequences (creating ordered pairs). Students observe the terms in one sequence are twice the corresponding terms in the other sequence. Explain informally why this is so. Graph the ordered pairs on a coordinate plane. **Coherence KY.4.OA.5→ KY.5.OA.3→KY.6.EE.9**
Cluster: Understand and apply the statistics process. **KY.5.MD.2 Identify and gather data for statistical questions focused on both categorical and numerical data. Select an appropriate data display (bar graph, pictograph, dot plot). Make observations from the graph about the questions posed.** MP.4, MP.5, MP.6	Generate questions for which data can be gathered and sort questions that are categorical (Possible question: What is your favorite after- school activity?) and questions that are numerical (Possible question: How many times can you say/write your name in one minute?). After gathering data on a question, students discuss which graphs are possible and which ones are not possible, and why. Students select one type of graph that fits the data gathered and create the graph, by hand or by using technology. **KY.6.SP.2** **Coherence KY.4.MD.4→ KY.5.MD.2→KY.6.SP.4**