THE SCHOOL DISTRICT OF LEE COUNTY

Curriculum Overview
Mathematics – Grade Five (Course #5012070)

Adopted Instructional Materials: *Houghton Mifflin Harcourt, Go Math!*

Big Idea 1 Place Value, Mult.& Div. Whole Numbers	Big Idea 2 Place Value, Add & Subtract Decimals	Big Idea 3 Multiplication & Division of Decimals	Big Idea 4 Addition & Subtraction of Fractions	Big Idea 5 Multiplication & Division of Fractions	Big Idea 6 Data Analysis	Big Idea 7 Conversion Units of Measure	Big Idea 8 2D Shapes and Volume	Big Idea 9 Mastery of Grade Five
Chapters 1 & 2	Chapter 3	Chapters 4 & 5	Chapter 6	Chapters 7 & 8	Chapter 9	Chapter 10	Chapter 11	Critical Areas
Quarter 1		Quarter 2			Quarter 3			Quarter 4

Big Ideas in red shading denote critical areas for 5th grade. An explanation of the critical areas is provided in the Mathematical Content Standards below.
Big Ideas in blue shading denote supporting areas for 5th grade. These Big Ideas are essential to future critical areas within and across grade levels.

Curriculum Notes:

- Mathematical Content Standards: In Grade 5, instructional time should focus on three critical areas: (1) developing fluency with addition and subtraction of fractions, and developing understanding of the multiplication of fractions and of division of fractions in limited cases (unit fractions divided by whole numbers and whole numbers divided by unit fractions); (2) extending division to 2-digit divisors, integrating decimal fractions into the place value system and developing understanding of operations with decimals to hundredths, and developing fluency with whole number and decimal operations; and (3) developing understanding of volume.
  - (1) Students apply their understanding of fractions and fraction models to represent the addition and subtraction of fractions with unlike denominators as equivalent calculations with like denominators. They develop fluency in calculating sums and differences of fractions, and make reasonable estimates of them. Students also use the meaning of fractions, of multiplication and division, and the relationship between multiplication and division to understand and explain why the procedures for multiplying and dividing fractions make sense. (Note: this is limited to the case of dividing unit fractions by whole numbers and whole numbers by unit fractions.)
  - (2) Students develop understanding of why division procedures work based on the meaning of base-ten numerals and properties of operations. They finalize fluency with multi-digit addition, subtraction, multiplication, and division. They apply their understandings of models for decimals, decimal notation, and properties of operations to add and subtract decimals to hundredths. They develop fluency in these computations, and make reasonable estimates of their results. Students use the relationship between decimals and fractions, as well as the relationship between finite decimals and whole numbers (i.e., a finite decimal multiplied by an appropriate power of 10 is a whole number), to understand and explain why the procedures for multiplying and dividing finite decimals make sense. They compute products and quotients of decimals to hundredths efficiently and accurately.
  - (3) Students recognize volume as an attribute of three-dimensional space. They understand that volume can be measured by finding the total number of same-size units of volume required to fill the space without gaps or overlaps. They understand that a 1-unit by 1-unit by 1-unit

cube is the standard unit for measuring volume. They select appropriate units, strategies, and tools for solving problems that involve estimating and measuring volume. They decompose three-dimensional shapes and find volumes of right rectangular prisms by viewing them as decomposed into layers of arrays of cubes. They measure necessary attributes of shapes in order to determine volumes to solve real world and mathematical problems.

- Standards for Mathematical Practice: The teacher's role in the development of students' proficiency of mathematical practice across all content standards is essential.
  - The teacher creates daily opportunities and establishes classroom norms that allow students to:
    - develop mathematical understanding from prior knowledge
    - build connections
    - foster each student's accountability to think, reason, and explain
  - Students must be shown how to apply the mathematical practices to new content.
  - It is through dialogue and discussion of different strategies that students become knowledgeable, independent learners.
  - While the Standards for Mathematical Practice are woven throughout mathematics instruction, the Grade 5 Academic Plan indicates the focused Standards for Mathematical Practice for each Big Idea of instruction.
  - View the document, Implementing the Mathematical Practice Standards, for additional strategies and examples.

- Additional Resource: Achieve the Core Go Math Guidance Documents
  - **Please use as additional support and guidance keeping in mind this does not address Florida's amended standards. Please use your MAFS when using this resource.**

Big Idea 1
Quarter 1

Academic Plan
Mathematics – Grade Five (Course #5012070)
[5th Grade Math CCE Blueprint]

Suggested Big Idea Length:
25 – 29 days

Adopted Instructional Materials: Houghton Mifflin Harcourt, Go Math!

Big Idea Description: *Place Value, Multiplication, Algebraic Thinking and Division of Whole Numbers*
Students will demonstrate fluency in place value, multiplication and division of one- and two-digit numbers, and algebraic expressions using order of operations. Students will develop a strong understanding of the difference between an expression and an equation. Students will build a strong conceptual understanding of place value through the hundred millions before exploring the relationship between multiplication and division. Division will be performed both with and without remainders.

Manipulatives: Below are some of the manipulatives that should be included in the instruction of Big Idea 1. View the attached document, Grade 5 Big Idea 1 Manipulatives, for a comprehensive list of manipulatives and their suggested usage during Big Idea 1.

- Base-Ten Blocks
- Square Tiles
- Grid Paper
- Two-Color Counters
- Number Line
- $100, $10, and $1 Bills
- Place-Value Charts
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Teacher Note:
Additional time has been included during this Big Idea to allow teachers to establish classroom routines and procedures.

Place Value of Whole Numbers (lesson 1.2) can be taught with Big Idea 2 when introducing standard form, number names, word form, and expanded form with decimals. The Distributive Property of Multiplication is the primary focus for instruction of properties. The Associative Property and Commutative Property are not included within our standards.

Teachers may consider teaching one-digit and two-digit multiplication together. Use caution when instructing the order of operations. Multiplication and division are computed in the order that they appear from left to right; then addition and subtraction as they appear from left to right.

The partial quotients method of division is an effective way to introduce students to the standard algorithm and should be taught to ensure a solid understanding of division.

Consider using the MFAS tasks related to MAFS.5.OA.1.2: Write the Expression , Brayden's Video Game , How Much Greater is the Product? , Comparing Products as linked in the Formative Checkpoint section of the Academic Plan during this time of instruction. Students are not required to evaluate the expressions.

Begin your math journals on day one; students should have math journal writing daily/weekly. Suggest that students keep a math journal for daily/weekly problems that encourage students to justify their thinking, illustrate new math vocabulary, and/or can identify a specific concept in the real-world.

Standards	
Math Content Standards	Cross Content Standards
MAFS.5.NBT.1.1: 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. **MAFS.5.NBT.1.2:** Explain patterns in the number of zeros of the product when multiplying a number by powers of 10, and 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. **MAFS.5.NBT.2.5:** Fluently multiply multi-digit whole numbers using the standard algorithm. **MAFS.5.NBT.2.6:** 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, and/or the relationship between multiplication and division. Illustrate and explain the calculation by using equations, rectangular arrays, and/or area models. **MAFS.5.OA.1.1:** Use parentheses, brackets, or braces in numerical expressions, and evaluate expressions with these symbols. **MAFS.5.OA.1.2:** Write simple expressions that record calculations with numbers, and interpret numerical expressions without evaluating them. *For example, express the calculation "add 8 and 7, then multiply by 2" as 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.*	**LAFS.5.SL.1.1:** Engage effectively in a range of collaborative discussions (one-on-one, in groups, and teacher-led) with diverse partners on *grade 5 topics and texts*, building on others' ideas and expressing their own clearly. a. Come to discussions prepared, having read or studied required material; explicitly draw on that preparation and other information known about the topic to explore ideas under discussion. b. Follow agreed-upon rules for discussions and carry out assigned roles. c. Pose and respond to specific questions by making comments that contribute to the discussion and elaborate on the remarks of others. d. Review the key ideas expressed and draw conclusions in light of information and knowledge gained from the discussions. **LAFS.5.SL.1.2:** Summarize a written text read aloud or information presented in diverse media and formats, including visually, quantitatively, and orally. Suggested Standards for Mathematical Practice **MAFS.K12.MP.1.1:** Make sense of problems and persevere in solving them. • What strategies have you used to place the first digit in the quotient? **MAFS.K12.MP.2.1:** Reason abstractly and quantitatively. • How can you use properties of operation to solve problems? • Can you explain what each of the numbers in the problems means? **MAFS.K12.MP.4.1:** Model with mathematics. • How can you use base-ten blocks to model and understand division of whole numbers. • How can using a diagram help you solve a division problem? **MAFS.K12.MP.7.1:** Look for and make use of structure. • How are multiplication and division related? • How can you find a number that is 10 times as much as 200?
Big Idea(s)	
Multiplication and Division of Whole Numbers	
Essential Outcome Question(s)	
How can you use place value, multiplication, division, and expressions to represent and solve problems?	

Conceptual Understandings	Essential Question(s)
• Understand and is fluent in the words or terms associated with the operations, such as sum, addends, difference, product, factors, quotient, remainder, more than, less than, equal to, etc., will support translation from words to expressions. • Understand the base-ten number system. Each place-value position is 10 times greater than the value to its right and one tenth of the value of the position to its left. • Understand the relationship between multiplication and division. • Order of operations is a convention to clarify the meaning of mathematical expression. • Parentheses are used for emphasis or clarification.	• How can you read, write and represent whole numbers through millions? • How can you use properties and multiplication to solve problems? • How can you use expressions to represent and solve a problem? • How do you know when to use division to solve a problem? • How can you use estimation to help you divide? • What strategies have you used to place the first digit in the quotient? • What strategies can be used to interpret the remainder in a division problem?

Aligned Learning Goals		District Adopted Materials	Supplemental Resources	Strategies for Differentiation
Apply Place Value to Multiplication 4 content	Use models to show the relationship between place value positions *(NBT.1.1)*	Go Math! Chapter 1 Achieve the Core: Go Math! Guidance Document	• Task Card: Solar Powers • CPALMS: Shift the Place, Shift the Value • CPALMS: Understanding Place Value	Reteach & Enrichment Support: Apply Place Value to Multiplication The above document provides opportunities for reteach and enrichment with the current aligned learning goal.
	Identify multiplication patterns using powers of 10 *(NBT.1.2)*			
Algebra & Multiplication 7 content + 1 progress monitoring check	Multiply by one- and two-digit numbers (including powers of ten) (NBT.1.2) with accuracy and check for reasonableness *(NBT.2.5)*	Go Math! Chapter 1 Achieve the Core: Go Math! Guidance Document	• Task Card: Product Shuffle • Task Card: Math Around the Clock • Task Card: Math Bowl • CPALMS: Chance Product	Reteach & Enrichment Support: Algebra & Multiplication The above document provides opportunities for reteach and enrichment with the current aligned learning goal.
	Use properties of addition, multiplication and inverse operations to solve problems with accuracy and check for reasonableness *(NBT.2.6)*			
	Read and write numerical expressions without evaluating them *(OA.1.2)*			
	Evaluate expressions using brackets, braces, and or parentheses *(OA.1.1)*			

Instructional Strategies and Resources

Students' exploration of place value includes extending their understanding that a digit in one place value position is one tenth what it is in the place value position to the left.

- Understanding that an increase or decrease in place value is based on multiplication, NOT addition and subtraction. i.e. $90 \times \frac{1}{10} = 9$
- Using a place value chart will help students understand the value of each digit and explore patterns in numbers.
- Multiplication by a power of ten increases the number's value and moves the decimal to the right.

Students extend their understanding of multiplication by fluently multiplying multi-digit whole numbers using the standard algorithm.

- Understanding the connection between the standard algorithm and different multiplication strategies is essential.
- Using estimation will help students determine the reasonableness of their answers.

For students to be successful with division, they must have a good understanding of the relationship between multiplication and division. Writing terms as shown below may help students see the relationships.

$$\text{factor} \times \text{factor} = \text{product} \qquad \begin{array}{r} \text{factor} \\ \text{factor}\overline{)\text{product}} \end{array}$$

$$\text{dividend} \div \text{divisor} = \text{quotient} \qquad \begin{array}{r} \text{quotient} \\ \text{divisor}\overline{)\text{dividend}} \end{array}$$

Students begin to explore that grouping symbols affects the value of an expression by changing the order in which the operations are performed.

- Understanding that adding parentheses, brackets, or braces to an expression may change the order of operations; therefore causing a possible change in the value of the expression.

Formative Checkpoint: A continuous process used by teachers and students to utilize formal and informal assessments to elicit evidence regarding the degree to which a particular student or class of students has mastered the aligned learning goals. Based on the evidence collected, teachers adjust their ongoing instructional activities.

The following are suggestions teachers may consider as they plan the formative checkpoint they will use for this big idea of instruction.

Resources:	*MFAS Tasks 5.OA.1.1:*	*MFAS Tasks 5.OA.1.2:*	*MFAS Task 5.NBT.1.1:*	*MFAS Tasks 5.NBT.2.5:*
• Chapter 1 Mid-Chapter Checkpoint • Chapter 1 Diagnostic Interview • Math Journal Entries	• Evaluating Expressions • More Expressions • Place the Parentheses • With and Without Parentheses	• Write the Expression • Brayden's Video Game • How Much Greater is the Product? • Comparing Products	• Dylan's Baseball Card Collection *MFAS Tasks 5.NBT.1.2:* • Using Whole Number Exponents • Multiplying by Ten Three Times • How Many Zeros	• Find the Multiplication Error • Multiplying Using the Standard Algorithm • More Multiplication Using the Standard Algorithm • Complete the Multiplication Problem

Division 14 content + 1 progress monitoring check	Use estimation in division problems to check the reasonableness of the quotient *(NBT.2.6)* Divide up to 4 digit dividends using 1 and 2-digit divisors with and without remainders using the standard algorithm *(NBT.2.6)* Use strategies including partial quotients, area models, and rectangular arrays to accurately find quotients. *(NBT.2.6)* Determine if a remainder will be expressed as a whole number, fraction, or not used at all, depending on the nature of the problem *(NF.2.3)*	Go Math! Chapter 2 Achieve the Core: Go Math! Guidance Document	• CPALMS: What Are They Thinking? • CPALMS: Diving Deeper in Division • LearnZillion **Video:** Divide 4-digit dividends by 2-digit divisors by using expanded notation. **Author:** Julie McGough **Video:** Partial quotients to solve division problems **Author:** Dan Steinberg	Reteach & Enrichment Support: Division without Remainders Division with Remainders The above documents provide opportunities for reteach and enrichment with the current aligned learning goal.

Instructional Strategies and Resources

Students extend their knowledge of division by using different methods for dividing a multi-digit number by a two-digit number.

- Using an area model; students can see that the quotient for each section is a partial quotient. Adding the partial quotients will give you the full quotient. i.e. 3,842 ÷ 15

	n
15	3,842

Step 1

	200	
15	3,842 -3,000	842
	842	

Step 2

	200	*50*	
15	3,842 -3,000	842 -750	92
	842	92	

Step 3

	200	*50*	*6*
15	3,842 -3,000	842 -750	92 -90
	842	92	2

Step 1: 15 times what hundreds number gives a product close to 3,842?
15 x 200 = 3,000 then subtract 3,842 - 3,000 = 842

Step 2: 15 times what tens number gives a product close to 842?
15 x 50 = 750 then subtract 842 - 750 = 92

Step 3: 15 times what ones number gives a product close to 92?
15 x 6 = 90 then subtract 92 – 90 = 2. Note: the remainder = 2

Add the partial quotients: 200 + 50 + 6 = 256 and consider the remainder 2
3,842 ÷ 15 = 256 r2

- Breaking apart a multi-digit number into a sum of numbers that can be easily divided by the divisor using place value positions.
- Apply multiplication strategies, such as halving and doubling to division problems.
- Students recognize that multiplication and division are inverse operations and undo each other. Multiplication can be used to check division problems.

Students will have many opportunities to interpret a remainder and decide how best to express it. • Remainders can be expressed as a whole-number, fraction, or not used at all, depending on the nature of the division problem.
Formative Checkpoint: A continuous process used by teachers and students to utilize formal and informal assessments to elicit evidence regarding the degree to which a particular student or class of students has mastered the aligned learning goals. Based on the evidence collected, teachers adjust their ongoing instructional activities.
The following are suggestions teachers may consider as they plan the formative checkpoint they will use for this big idea of instruction. *Resources:* • Chapter 2 Mid-Chapter Checkpoint • Chapter 2 Diagnostic Interview • Math Journal Entries *MFAS Tasks 5.NBT.2.6:* • Driving to Alaska • Analyzing and Applying Division • Dividing Using an Area Model with Larger Divisors • Dividing Using Place Value with Larger Divisors
Sample: Suggested Standards-based Checks – Blueprint • Place Value, Expressions, and Multiplication; Scoring Rubric • Division of Whole Numbers; Scoring Rubric

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Big Idea 2
Quarter 1

Academic Plan
Mathematics – Grade Five (Course #5012070)

Suggested Big Idea Length:
12 – 16 days

Adopted Instructional Materials: Houghton Mifflin Harcourt, Go Math!

Big Idea Description: *Place Value, Addition and Subtraction of Decimals*
Students will add and subtract, decimals to the hundredths place. Students will begin by exploring the place values of decimals and then build to addition and subtraction of decimals.

Manipulatives: Below are some of the manipulatives that should be included in the instruction of Big Idea 2. View the attached document, Grade 5 Big Idea 2 Manipulatives, for a comprehensive list of manipulatives and their suggested usage during Big Idea 2.

- Base-Ten Blocks
- Place Value Chart
- Decimal Shade Models
- $1 Bills, Coins
- Grid Paper
- Number Line

Teacher Note:
Include Lesson 1.2 during the instruction of this Big Idea.

Standards

Math Content Standards	Cross Content Standards
MAFS.5.NBT.1.1: 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. **MAFS.5.NBT.1.3:** Read, write, and compare decimals to thousandths. a. Read and write decimals to thousandths using base-ten numerals, number names, and expanded form, e.g., 347.392 = 3 × 100 + 4 × 10 + 7 × 1 + 3 × (1/10) + 9 × (1/100) + 2 × (1/1000). b. Compare two decimals to thousandths based on meanings of the digits in each place, using >, =, and < symbols to record the results of comparisons. **MAFS.5.NBT.1.4:** Use place value understanding to round decimals to any place. **MAFS.5.NBT.2.7:** Add, subtract, multiply, and divide decimals to hundredths, using concrete models or drawings and strategies based on place value, properties of operations, and/or the relationship between addition and subtraction; relate the strategy to a written method and explain the reasoning used.	**LAFS.5.SL.1.1:** Engage effectively in a range of collaborative discussions (one-on-one, in groups, and teacher-led) with diverse partners on *grade 5 topics and texts*, building on others' ideas and expressing their own clearly. a. Come to discussions prepared, having read or studied required material; explicitly draw on that preparation and other information known about the topic to explore ideas under discussion. b. Follow agreed-upon rules for discussions and carry out assigned roles. c. Pose and respond to specific questions by making comments that contribute to the discussion and elaborate on the remarks of others. d. Review the key ideas expressed and draw conclusions in light of information and knowledge gained from the discussions. **Suggested Standards for Mathematical Practice** **MAFS.K12.MP.3.1:** Construct viable arguments and critique the reasoning of others. • Can you solve using another strategy? • Can you prove to me that 0.3 is equal to 0.30? **MAFS.K12.MP.8.1:** Look for and express regularity in repeated reasoning. • What is the change from one term to the next?

	• How can you write a rule so others could write more terms in this sequence?

Big Idea(s)
Addition and Subtraction of Decimals
Essential Outcome Question(s)
How can you use place value to compare, order, and round decimals? How can you add and subtract decimals?

Conceptual Understandings	**Essential Question(s)**
• Understand the base-ten number system. Each place-value position is 10 times greater than the value to its right and one tenth of the value of the position to its left. • Recognize that zeros written at the end of a decimal change how the decimal is read, but do not change its value. • Use rounding decimals for estimating sums and differences. • Recognize and understand the purpose of decimal place alignment.	• How does using place value help you add and subtract decimals? • What methods can you use to find decimal sums and differences?

Aligned Learning Goals		**District Adopted Materials**	**Supplemental Resources**	**Strategies for Differentiation**
Place Value: Decimals 7 content	Use models to show the relationship between decimal places values to the thousandth *(NBT.1.3)*	Go Math! Chapter 3 Achieve the Core: Go Math! Guidance Document	• CPALMS: Decimals Have a Point! • CPALMS: Building a Better Baseball Team • CPALMS: Battling a Thousand(th)	Reteach & Enrichment Support: Place Value: Decimals The above document provides opportunities for reteach and enrichment with the current aligned learning goal.
	Model, read, and write decimals to thousandths *(NBT.1.3.a)*			
	Compare and order decimals to thousandths *(NBT.1.3.b)*			
	Round decimal to any place *(NBT.1.4)*			
	Model addition and subtraction of decimals using base ten blocks *(NBT.2.7)*			
Addition and Subtraction of Decimals	Make reasonable estimates of decimal sum and differences *(NBT.2.7)*	Go Math! Chapter 3 Achieve the Core: Go Math! Guidance Document	• Task Card: Checking Account • CPALMS: Race to Fill the Whole! • CPALMS: Dividing Decimals	Reteach & Enrichment Support: Addition and Subtraction of Decimals The above document provides opportunities for reteach and
	Add and subtract decimals using place value *(NBT.2.7)*			
	Solve real world problems by identifying, describing, creating patterns, and tables with decimals			

	(NBT.2.7)			enrichment with the current aligned learning goal.

Instructional Strategies and Resources

In Big Idea 2, students extend their understanding of decimal place value to thousandths; take time to relate the decimal places to tenths, hundredths, and thousandths.

- Students need to have a firm understanding of place value to understand operations with decimals.
- Each place have a value 10 times that of the place to its right, and conversely, that each place has a value of one ten that of the place to its left.
- Explain thousandths place is not the last place to the right of the decimal point.
- Have students create a place-value chart and label the places, to the left and right of the decimal point. Discuss any patterns students notice in the values and the names of the three places to the right and left of the decimal point.
- Explain that zeros written at the end of a decimal change how the decimal is read, but do not change its value.
    - Example: 0.2 = 0.20 = 0.200 or 2 tenths = 20 hundredths = 200 thousandths.

Students apply their understanding of rounding and comparing whole numbers, to rounding and comparing decimals.

- Using a place value chart will help students understand how rounding decimals is similar to rounding whole numbers.

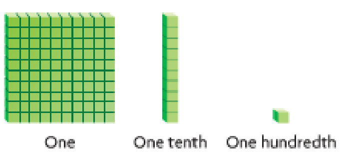
Ones	Tenths	Hundredths	Thousandths
4	5	2	7

Round 4.527 to the nearest hundredth.

Compare the digit in the next place value to the right of 5. If the number is 5 or greater, round up to the next hundredth. If the number is less than 5, keep the hundredth the same.

Make sure students align place value when they are adding and subtracting decimals. "Tell students to 'line up place values' when they compute decimals. Do not tell them to 'line up decimal points' – that is just a result of lining up place values." (Ashlock, 2010, p. 86)

- Using a place value chart or grid paper will help students keep multi-digit decimal numbers aligned properly.
- Base-ten blocks will help students visualize decimal place values.
- Students need to have an understanding that 2.4 is equivalent to 2.40 and be able to explain why they are equivalent.
- Understanding that decimal place values next to each other are ten times as much as, or one tenth as much as the place value next to it.



Note: *To model to the thousandths place, teachers may use the thousand cube to represent one whole, the "flat" hundred block becomes one tenth, the "long" tens block becomes one hundredth, and the unit becomes one thousandth.*

Formative Checkpoint: A continuous process used by teachers and students to utilize formal and informal assessments to elicit evidence regarding the degree to which a particular student or class of students has mastered the aligned learning goals. Based on the evidence collected, teachers adjust their ongoing instructional activities.

The following are suggestions teachers may consider as they plan the formative checkpoint they will use for this big idea of instruction.

Resources:	*MFAS Tasks 5.NBT.1.1:*	*MFAS Tasks 5.NBT.1.3:*	*MFAS Tasks 5.NBT.1.4:*	*MFAS Tasks 5.NBT.2.7*
• Chapter 3 Mid-Chapter Checkpoint • Chapter 3 Diagnostic Interview • Math Journal Entries	• Walking to School • Five Tenths • The Odometer	• Decimals in Number Name • Decimals in Word and Expanded Form • Writing and Reading Decimals • Decimals in Expanded Form • Comparing Decimals	• Rounding to the Nearest Whole Number • Rounding to the Thousandths Place • Rounding to the Tenths Place • Shopping for Produce	• Running a Race • Tony's Lunchbox

Sample: Suggested Standards-based Check – Blueprint

- Place Value, Addition and Subtraction of Decimals; Scoring Rubric

Field Code Changed

Field Code Changed

Big Idea 3
Quarters 1 & 2

Academic Plan
Mathematics – Grade Five (Course #5012070)

Suggested Big Idea Length:
17 – 21 days

Adopted Instructional Materials: Houghton Mifflin Harcourt, Go Math!

Big Idea Description: *Multiplication and Division of Decimals*
Students will identify patterns, develop strategies, and use estimation to multiply and divide decimals. Students will use models to make sense of the procedures for multiplying and dividing decimals.

Manipulatives: Below are some of the manipulatives that should be included in the instruction of Big Idea 3. View the attached document, Grade 5 Big Idea 3 Manipulatives, for a comprehensive list of manipulatives and their suggested usage during Big Idea 3.

- Area Models
- Grid Paper
- Base-Ten Blocks
- Place-Value Chart
- Decimal Shade Models
- $1 bills, Coins

Teacher Note:
This is the first time students will be seeing the concept of multiplication and division of decimals.

Standards

Math Content Standards	Cross Content Standards
MAFS.5.NBT.1.2: Explain patterns in the number of zeros of the product when multiplying a number by powers of 10, and 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. **MAFS.5.NBT.2.7:** Add, subtract, multiply, and divide decimals to hundredths, using concrete models or drawings and strategies based on place value, properties of operations, and/or the relationship between addition and subtraction; relate the strategy to a written method and explain the reasoning used.	**LAFS.5.W.2.4:** Produce clear and coherent writing in which the development and organization are appropriate to task, purpose, and audience. (Grade-specific expectations for writing types are defined in standards 1–3 above.) **Suggested Standards for Mathematical Practice** **MAFS.K12.MP.4.1:** Model with mathematics. • How would you change your model if you were dividing decimals? **MAFS.K12.MP.7.1:** Look for and make use of structure. • How did you discover the pattern when multiplying decimals? • What pattern can you find when dividing decimals? **MAFS.K12.MP.8.1:** Look for and express regularity in repeated reasoning. • What happens to the product when you multiply decimals?

Big Idea(s)

Multiplication and Division of Decimals

Essential Outcome Question(s)

How do you multiply and divide decimals?

Conceptual Understandings	Essential Question(s)
• Understand place value and the connection between fractions and decimals. • Identify and explain patterns in the placement of decimals when multiplying and dividing. • Use rounding decimals for estimating products and quotients. • Use strategies for multiplication and division of decimals and explain why the strategies work.	• How can understanding patterns in place value help place the decimal point in a product? • How can you use models to multiply decimals? • What strategies can help when multiplying a decimal by a whole number? • How can understanding patterns in place value help to place the decimal point in a quotient? • How can you use a model to divide a decimal by a whole number? • How can you use models to divide a decimal by a decimal?

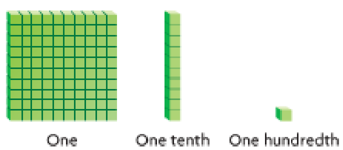
Aligned Learning Goals		District Adopted Materials	Supplemental Resources	Strategies for Differentiation
Multiplying Decimals 8 content + 1 progress monitoring check	Multiply whole numbers and decimals using patterns, models, drawings, place value, and expanded form *(NBT.2.7)*	Go Math! Chapter 4 Achieve the Core: Go Math! Guidance Document	• Task Card: Add It Up Café • CPALMS: Intro to Multiplying Decimals by 10, 100, 1000 • CPALMS: What happens when you multiply by powers of 10? • Menu Math • Read and Solve	Reteach & Enrichment Support: Multiplying Decimals The above document provides opportunities for reteach and enrichment with the current aligned learning goal.
	Model multiplication by decimals and determine correct placement of the decimal in the product *(NBT.1.2, NBT.2.7)*			
	Multiply decimals with zeros in the product *(NBT.1.2, NBT.2.7)*			

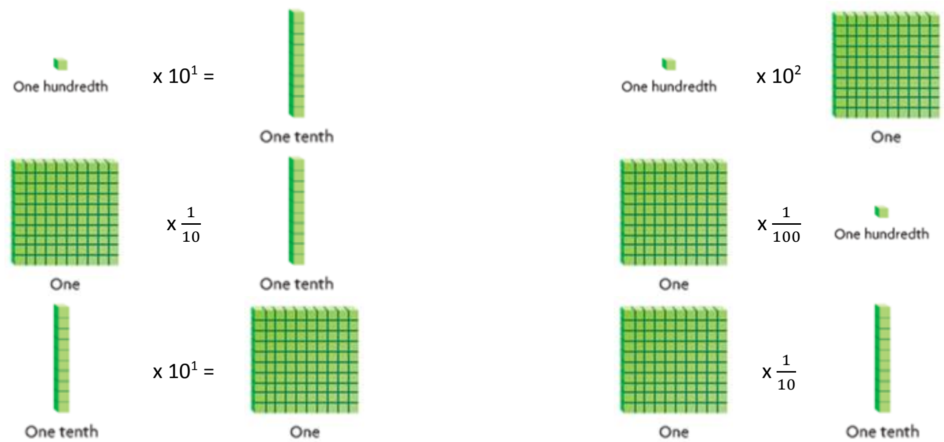
Instruction Strategies and Resources

In Big Idea 3, students will build on their mastery of standards presented in Big Ideas 1 and 2. Students should have gained an understanding of how the value of a number changes when multiplied or divided by a power of ten in Big Idea 1. This concept will be extended to include multiplying and dividing decimals by powers of ten.

When beginning to teach this concept it is tempting to jump directly to the abstract application and have students simply move the decimal to the right or left depending on the power of ten; however, it is essential to explore why this takes place. To model this process using place value blocks, first, a unit must be decided to represent one whole, and then break down each decimal place value as the next corresponding place value block.

Modeling for Understanding



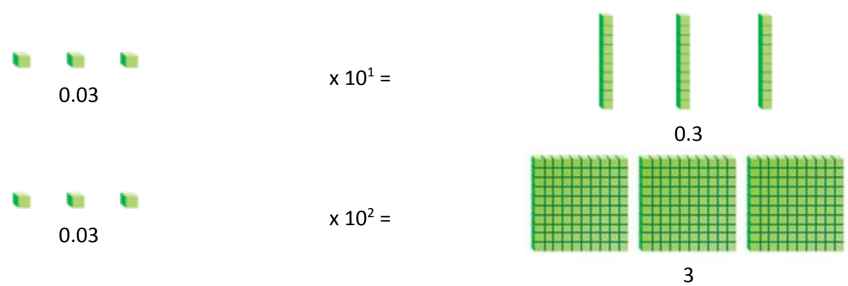


Once values have been determined for each place value (see the model to the left), students may begin to explore how multiplying by powers of ten "effects" decimals.

Expanding Conceptual understanding

Ex. 0.03 x 10^2 = n

Once students have formed an initial understanding of this concept and the effect of multiplying by powers of ten by decimals place values, basic applications that can still be modeled effectively may be applied.

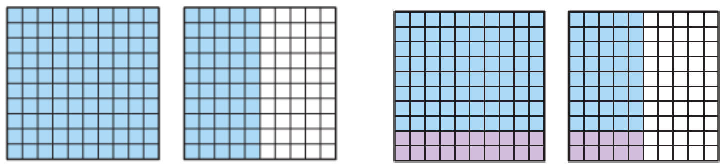


In Big Idea 2, students will have begun exploring decimals with the operations of addition and subtraction. During Big Idea 3, students will build upon this understanding and apply the operations of multiplication and division to decimals.

When multiplying decimals, an area model serves as an effective strategy to help students understand what is actually taking place when multiplying decimals. This leads to a more solid understanding of the concept and gives students a representation of why the product seems to decrease when multiplying decimals.

Ex. 0.2 x 1.5

Using a 10 x 10 grid (hundred chart) to represent 1, each square in the grid will represent 0.01.



This results in 30 hundredths shaded purple.

0.2 x 1.5 = 0.30

Formative Checkpoint: A continuous process used by teachers and students to utilize formal and informal assessments to elicit evidence regarding the degree to which a particular student or class of students has mastered the aligned learning goals. Based on the evidence collected, teachers adjust their ongoing instructional activities.

The following are suggestions teachers may consider as they plan the formative checkpoint they will use for this big idea of instruction.

Resources:

- Chapter 4 Mid-Chapter Checkpoint
- Chapter 4 Diagnostic Interview
- Math Journal Entries

MFAS Tasks 5.NBT.1.2:

- Multiplying By Ten Three Times
- How Many Zeros
- Using Whole Number Exponents

MFAS Task 5.NBT.2.7

- Buying Candy Bars

Dividing Decimals 9 content + 1 progress monitoring check	Divide whole numbers and decimals using patterns, models, drawings, places value, and expanded form *(NBT.2.7)*	Go Math! Chapter 5 Achieve the Core: Go Math! Guidance Document	• CPALMS: Dividing Decimals Investigations • CPALMS: Currency Craze • CPALMS: Deft Drawings for Decimal Division • CPALMS – MEA: Oak Tree Engineers • CPALMS – MEA: New Snack Shack Snack	Reteach & Enrichment Support: Dividing Decimals The above document provides opportunities for reteach and enrichment with the current aligned learning goal.
	Estimate decimal quotients *(NBT.2.7)*			
	Model division by decimals and determine correct placement of the decimal in the quotient *(NBT.1.2, NBT.2.7)*			
	Write a zero in the dividend to help find the quotient *(NBT.1.2, NBT.2.7)*			

Commented [GP1]:

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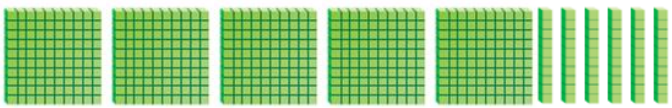
Instructional Strategies and Resources

When dividing decimals by whole numbers, build models to help students “see” what is happening during this process. Building a concrete foundational understanding of the concept will aid as students begin to apply estimation to the operation and determining the reasonableness of their answer.

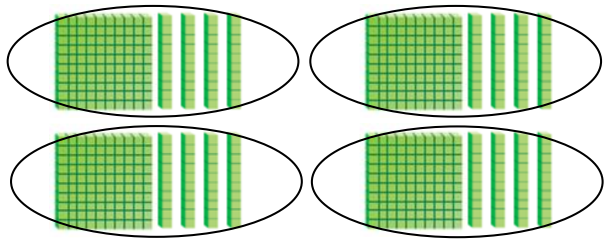
- Dividing decimals by whole numbers may be modeled using sharing (partitive) division. In partitive division, the total number (dividend) is shared among a number of groups (divisor).
- Students create a decimal model to represent the dividend using place value blocks and the share them out into the given number of groups, regrouping as necessary.
- The quotient is represented by the equal number of objects shared in each group.

A baker bought 5.6 pounds of flour to share equally among 4 wedding cakes. How much flour will he use in each cake?



Note: Each “flat” represents 1 whole. Each “long” represents one tenth.

Model the dividend using place value blocks.



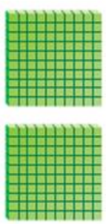
Each wedding cake will use 1.4 pounds of flower.

Share the dividend equally into the given number of groups (divisor).

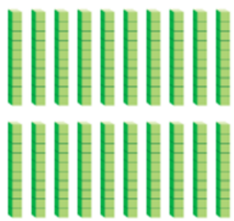
Models should also be used when dividing decimals by decimals before students attempt to use the standard algorithm.

- Students model dividing decimals by decimals using measurement (quotitive) division. In measurement division, the total number (dividend) and the number in each group (divisor) are both known.
- The quotient represents the number of groups.

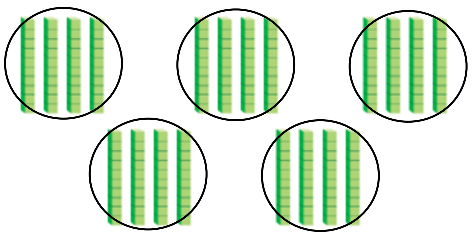
Troy has a 2 liter bottle of soda to share equally among his friends. If each glass holds 0.4 liter of soda, how many glasses can he fill?



Model the 2 wholes (liters) using two flats.



Regroup the 2 wholes as 20 longs



Determine how many groups of 4 tenths can be created.

As students continue working with decimal computations, forming accurate estimations can help students continue to build upon their conceptual understanding. (Van de Walle, 2004) • Estimation helps students to think about what is actually taking place, not on simply counting decimal places. • When focusing on just the paper and pencil computations, students do not always think about the actual values. • To help students see the effects of multiplying by decimals, multiply two know values (2 x 5 = 10). Then add a decimal point to one of the numbers and show the students the "new" product (2 x 0.5 = 1.0). Reasonable estimates can often be made by rounding decimals to whole numbers.
Formative Checkpoint: A continuous process used by teachers and students to utilize formal and informal assessments to elicit evidence regarding the degree to which a particular student or class of students has mastered the aligned learning goals. Based on the evidence collected, teachers adjust their ongoing instructional activities.
The following are suggestions teachers may consider as they plan the formative checkpoint they will use for this big idea of instruction. *Resources:* • Chapter 5 Mid-Chapter Checkpoint • Chapter 5 Diagnostic Interview • Math Journal Entries *MFAS Task 5.NBT.1.2:* • The Error *MFAS Task 5.NBT.2.7:* • Running
Sample: Suggested Standards-based Checks – Blueprint • Multiplication of Decimals; Scoring Rubric • Division of Decimals; Scoring Rubric

Field Code Changed

Field Code Changed

Big Idea 4
Quarter 2

Academic Plan
Mathematics – Grade Five (Course #5012070)

Suggested Big Idea Length:
15 – 19 days

Adopted Instructional Materials: Houghton Mifflin Harcourt, Go Math!

Big Idea Description: *Addition and Subtraction of Fractions*
Students will be able to add and subtract fractions and mixed numbers with like and unlike denominators. Students will use models to add and subtract fractions. Students will identify benchmark fractions to add or subtract. Students will rename equivalent fractions. Students will use problem solving strategies to solve real world problems involving fractions and mixed numbers.

Manipulatives: Below are some of the manipulatives that should be included in the instruction of Big Idea 4. View the attached document, Grade 5 Big Idea 4 Manipulatives, for a comprehensive list of manipulatives and their suggested usage during Big Idea 4.

- Fraction Circles
- Grid Paper
- Fraction Strips
- Number Line

Teacher Note:
Fractions with numerators larger than denominators are referred to as 'fractions greater than one'. Also, it is no longer in the 5th grade standard to reduce or simplify fractions, however, students must be able to identify and find equivalent fractions. Please omit Lesson 6.10 properties, this is not included in the 5th grade standards.

Standards	
Math Content Standards	Cross Content Standards
MAFS.5.NF.1.1: Add and subtract fractions with unlike denominators (including mixed numbers) by replacing given fractions with equivalent fractions in such a way as to produce an equivalent sum or difference of fractions with like denominators. *For example, 2/3 + 5/4 = 8/12 + 15/12 = 23/12. (In general, a/b + c/d = (ad + bc)/bd.)* **MAFS.5.NF.1.2:** Solve word problems involving addition and subtraction of fractions referring to the same whole, including cases of unlike denominators, e.g., by using visual fraction models or equations to represent the problem. Use benchmark fractions and number sense of fractions to estimate mentally and assess the reasonableness of answers. *For example, recognize an incorrect result 2/5 + 1/2 = 3/7, by observing that 3/7 < 1/2.*	**LAFS.5.SL.1.1:** Engage effectively in a range of collaborative discussions (one-on-one, in groups, and teacher-led) with diverse partners on *grade 5 topics and texts*, building on others' ideas and expressing their own clearly. a. Come to discussions prepared, having read or studied required material; explicitly draw on that preparation and other information known about the topic to explore ideas under discussion. b. Follow agreed-upon rules for discussions and carry out assigned roles. c. Pose and respond to specific questions by making comments that contribute to the discussion and elaborate on the remarks of others. d. Review the key ideas expressed and draw conclusions in light of information and knowledge gained from the discussions.
	Suggested Standards for Mathematical Practice
	MAFS.K12.MP.2.1: Reason abstractly and quantitatively. • How can you use properties of operation to solve problems?

	• Can you explain what each of the numbers in the problems means? **MAFS.K12.MP.4.1:** Model with mathematics. • How do you use fraction strips to model subtraction with unlike denominators? • Why do you use fraction strips to model with the same denominator? • What model can you make to represent finding the difference? • How is modeling subtraction different from modeling addition?

Big Idea(s)
Addition and Subtraction of Fractions
Essential Outcome Question(s)
How can you add or subtract fractions with like or unlike fractions?

Conceptual Understandings	**Essential Question(s)**
• Understand the representation of fractions using concrete models to move into solving fractions abstractly. • Reason about estimates using benchmarks. • Utilize properties to support mental math to find sums. • Understand a common denominator allows fractions to be expressed as fractions that name the same part of a whole.	• How do models help you find sums and differences of fractions? • When you add and subtract fractions, why do you need a common denominator? • How can you use renaming to find the difference of two mixed numbers?

	Aligned Learning Goals	**District Adopted Materials**	**Supplemental Resources**	**Strategies for Differentiation**
Addition and Subtraction of Fractions with Unlike Denominators 16 content + 1 progress monitoring check	Use models to add and subtract with unlike denominators *(NF.1.1, NF.1.2)*	Go Math! Chapter 6 Achieve the Core: Go Math! Guidance Document	• Task Card: Eating Pie • CPALMS: Using Models to Add Fractions with Unlike Denominators • CPALMS: Discovering Common Denominators • CPALMS: Aaron and Anya's Discovery • CPALMS: Estimating Fractions Using Benchmark Fractions	Reteach & Enrichment Support: Addition and Subtraction of Fractions The above document provides opportunities for reteach and enrichment with the current aligned learning goal.
	Make reasonable estimates of fraction sums and differences *(NF.1.1, NF.1.2)*			
	Find common denominators to create equivalent fractions *(NF.1.1)*			
	Use equivalent fractions to add and subtract fractions and mixed numbers *(NF.1.1)*			
	Rename to find the difference of mixed numbers *(NF.1.1)*			

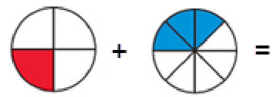
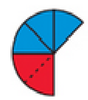
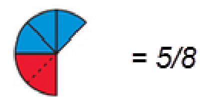
	Solve word problems involving addition and subtraction of fractions with unlike denominators *(NF.1.2)*			

Instructional Strategies and Resources

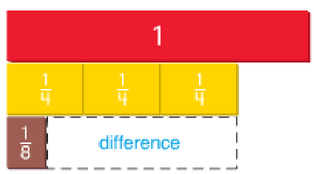
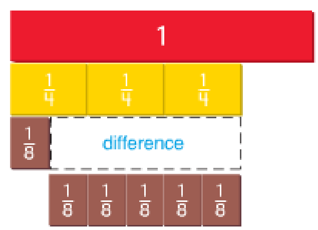
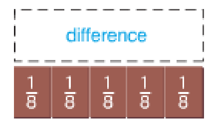
In Big Idea 4, students will build upon their knowledge of adding and subtracting fractions with like denominators from fourth grade. Students will now begin to explore addition and subtraction of fractions with unlike denominators.

- When deciding upon problems to introduce this concept, use problems in a context that students can relate with, in order to promote the use of models to support student thinking.

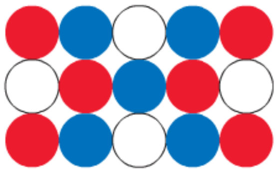
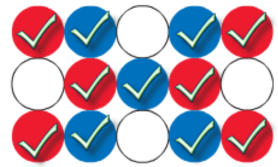
- Contexts such as pizza, pie, and cookies promote the use of circles, which represent the area model

Example: Sam ate 1/4 of a small pizza. Tori ate 3/8 of a same size pizza. How much pizza did Sam and Tori eat altogether?			
	Model the addition scenario using fraction circles/paper plates.	*By comparing/overlaying the fractions, students determine that 1/4 = 2/8*	*Students then count to determine the number of eights or add 2/8 = 3/8 = 5/8*

- Situations that use length of string, rope, ribbon or distance in a race correspond to the use of fraction strips or number lines, which represent the linear model

Example: Carl has 3/4 of a candy bar left over. He takes a bite equal to 1/8 of the entire candy bar. How much of the candy bar is still remaining?			
	Model the subtraction scenario using fraction strips	*Students then find fraction strips all with the same denominator to fit the difference exactly.*	*Students determine that 5/8 is the difference.*

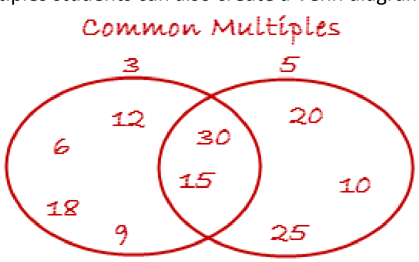
- Groups of objects/people (candy/students) provide contexts for which the set model represents the situation.

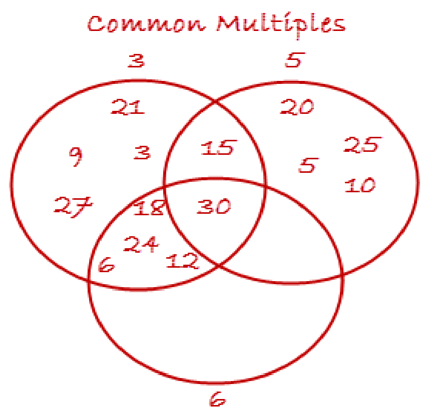
Example: Sally has chosen a tile pattern for her bedroom. How many of the tiles are either blue or red? 	 Each tile represents 1/15 of the total pattern.	 There are 11 blue and red tiles combined.	*Students determine that 11/15 of the tiles are blue or red.*
	Use the model to determine the unit fraction of each tile.	*Students determine the number of blue and red tiles.*	

- By using problems in context, students can relate to the situation and determine meaning allowing them to better evaluate the reasonableness of their answer.

It is essential for students to create both concrete and representational understandings of what is taking place in each of these addition and subtraction models before beginning to explore the process of using common denominators to add and subtract fractions with unlike denominators. Once this understanding has been established, the connection of what took place in each of these models and how common denominators *could* have been used should be explained to help students continue to form connections between their stages of understanding.

During the transitions from concrete to representational and finally to forming an abstract understanding, students will begin to explore identifying common multiples, as a strategy to find common denominators. One strategy is to list the multiples of each number and then look for those that are repeated in both lists or "common." From these lists of multiples students can also create a Venn diagram to determine which multiples are in common.





Estimating fraction sums and differences plays an important role in students' development of conceptual understanding . In order to make rational estimations, students must have a strong understanding of creating representartions of fractions; therefore halping them to visualize the approximate size of fractions and their comparison to benchmark fractions. Estimation connects students' understanding of fractions with fraction operations and can prevent common errors.

- When students estimate, they are more likely you see that they made errors.
- Using benchmarks to compare fraction sums and differences is one strategy.

Formative Checkpoint: A continuous process used by teachers and students to utilize formal and informal assessments to elicit evidence regarding the degree to which a particular student or class of students has mastered the aligned learning goals. Based on the evidence collected, teachers adjust their ongoing instructional activities.

The following are suggestions teachers may consider as they plan the formative checkpoint they will use for this big idea of instruction.

Resources:

- Chapter 6 Mid-Chapter Checkpoint
- Chapter 6 Diagnostic Interview
- Math Journal Entries

MFAS Tasks 5.NF.1.1:

- Adding Fractions with Unlike Denominators
- Subtracting Fractions
- Subtracting More Fractions
- Adding More Fractions with Unlike Denominators

MFAS Tasks 5.NF.1.2:

- Baking Cakes
- Sarah's Hike
- Maris Has a Party
- Just Run

Sample: Suggested Standards-based Check – Blueprint

- Addition and Subtraction of Fractions; Scoring Rubric

Field Code Changed

Field Code Changed

Big Idea 5
Quarters 2 & 3

Academic Plan
Mathematics – Grade Five (Course #5012070)

Suggested Big Idea Length:
23 – 27 days

Adopted Instructional Materials: Houghton Mifflin Harcourt, Go Math!

Big Idea Description: *Multiplication and Division of Fractions*
Students will develop an understanding of the multiplication of fractions by applying and extending previous understanding of multiplication of whole numbers. Students will divide fractions in limited cases (whole numbers divided by a unit fraction and a unit fraction divided by a whole number) by applying and extending previous understandings of division of whole numbers.

Manipulatives: Below are some of the manipulatives that should be included in the instruction of Big Idea 5. View the attached document, Grade 5 Big Idea 5 Manipulatives, for a comprehensive list of manipulatives and their suggested usage during Big Idea 5.

- Area Models
- Grid Paper
- Fraction Circles
- Number Lines
- Fraction Strips

Teacher Note:
Give students multiple opportunities to practice word problems involving fractions to determine whether to choose multiplication or division.

Standards	
Math Content Standards	Cross Content Standards
MAFS.5.NF.2.3: 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, e.g., by using visual fraction models or equations to represent the problem. **MAFS.5.NF.2.4:** Apply and extend previous understandings of multiplication to multiply a fraction or whole number by a fraction. a. Interpret the product *(a/b)* × *q* as *a* parts of a partition of *q* into *b* equal parts; equivalently, as the result of a sequence of operations *a* × *q* ÷ *b*. *For example, use a visual fraction model to show (2/3) × 4 = 8/3, and create a story context for this equation. Do the same with (2/3) × (4/5) = 8/15. (In general, (a/b) × (c/d) = ac/bd.)* b. Find the area of a rectangle with fractional side lengths by tiling it with unit 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.	**LAFS.5.SL.1.1**: Engage effectively in a range of collaborative discussions (one-on-one, in groups, and teacher-led) with diverse partners on *grade 5 topics and texts*, building on others' ideas and expressing their own clearly. a. Come to discussions prepared, having read or studied required material; explicitly draw on that preparation and other information known about the topic to explore ideas under discussion. b. Follow agreed-upon rules for discussions and carry out assigned roles. c. Pose and respond to specific questions by making comments that contribute to the discussion and elaborate on the remarks of others. d. Review the key ideas expressed and draw conclusions in light of information and knowledge gained from the discussions.

MAFS.5.NF.2.5:

Interpret multiplication as scaling (resizing), by:

a. Comparing the size of a product to the size of one factor on the basis of the size of the other factor, without performing the indicated multiplication.
b. Explaining why multiplying a given number by a fraction greater than 1 results in a product greater than the given number (recognizing multiplication by whole numbers greater than 1 as a familiar case); explaining why multiplying a given number by a fraction less than 1 results in a product smaller than the given number; and relating the principle of fraction equivalence $a/b = (n \times a)/(n \times b)$ to the effect of multiplying a/b by 1.

MAFS.5.NF.2.6:

Solve real world problems involving multiplication of fractions and mixed numbers, e.g., by using visual fraction models or equations to represent the problem.

MAFS.5.NF.2.7:

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. *For example, create a story context for (1/3) ÷ 4, and use a visual fraction model to show the quotient. Use the relationship between multiplication and division to explain that (1/3) ÷ 4 = 1/12 because (1/12) × 4 = 1/3.*
b. Interpret division of a whole number by a unit fraction, and compute such quotients. *For example, create a story context for 4 ÷ (1/5), and use a visual fraction model to show the quotient. Use the relationship between multiplication and division to explain that 4 ÷ (1/5) = 20 because 20 × (1/5) = 4.*
c. Solve real world problems involving division of unit fractions by non-zero whole numbers and division of whole numbers by unit fractions, e.g., by using visual fraction models and equations to represent the problem. *For example, how much chocolate will each person get if 3 people share 1/2 lb of chocolate equally? How many 1/3-cup servings are in 2 cups of raisins?*

Suggested Standards for Mathematical Practice

MAFS.K12.MP.2.1:

Reason abstractly and quantitatively.

- What operation should you use to solve the problem?
- Describe the relationship between multiplication and division.
- Why should you use multiplication or division to solve the problem?

MAFS.K12.MP.3.1:

Construct viable arguments and critique the reasoning of others.

- Will the method of using an array to find the fractional part of a group always work?
- How do you know how many parts to shade?

MAFS.K12.MP.4.1:

Model with mathematics.

- How many equal-size fraction strips will you use to solve the problem?
- Which model do you prefer to use to find the product?
- Which model do you prefer to use to find the quotient?

MAFS.K12.MP.5.1

Use appropriate tools strategically.

- Explain how you can use color counters to represent ½ of 10.
- How can you use a number line to find 4 x 2/3?

Big Idea(s)

Multiplication and Division of Fractions

Essential Outcome Question(s)

How can you relate multiplication and division of whole numbers to multiplication and decision of fractions?

Conceptual Understandings	Essential Question(s)
• Relate models to multiplying fractions. • Use real world context to make sense of fraction multiplication. • Connect whole number division to fraction division. • Understand how a fraction represents division. • Use models to represent division of fractions.	• How can you use models to show the product of fractions and a whole number? • How can you use models to show the product of two fractions? • How do you multiply mixed numbers?

- What strategies can you use to solve division problems involving fractions?
- How can you divide fractions by using related facts?
- How can you use diagrams to represent division of fractions?

	Aligned Learning Goals	District Adopted Materials	Supplemental Resources	Strategies for Differentiation
Multiplication of Fractions 14 content + 1 progress monitoring check	Use models to find the fractional part of a group *(NF.2.4.a)*	Go Math! Chapter 7 Achieve the Core: Go Math Guidance Document	• CPALMS: Modeling Fraction Multiplication • CPALMS: Multiplying a Fraction by a Fraction • CPALMS: Area Models: Multiplying a Fractions • CPALMS: Painting a Wall • CPALMS: Garden Variety Fractions • CPALMS: To Multiply or Not to Multiply • CPALMS: Making Cookies	Reteach & Enrichment Support: Multiplication of Fractions The above document provides opportunities for reteach and enrichment with the current aligned learning goal.
	Use models to multiply a fraction and a whole number *(NF.2.4.a)*			
	Multiply a fraction by a fraction *(NF.2.4)*			
	Compare fraction factors and products by reasoning about their size *(NF.2.5)*			
	Use visual fraction models or equations to solve problems involving multiplication of fractions and mixed numbers *(NF.2.6)*			
	Multiply mixed numbers using visual fraction models, regrouping, and the distributive property *(NF.2.6)*			
	Find the area of a rectangle with sides that are fractional or mixed numbers in length *(NF.2.4.b)*			

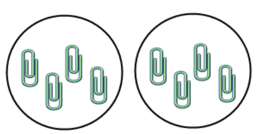
Instructional Strategies and Resources

In Big Idea 5, students will build upon their knowledge of operations with fractions from Big Idea 4 to now include multiplication and division of fractions.

As students begin to explore fraction multiplication, they are essentially building upon their understanding of multiplication of whole numbers. Reminding students of looking at multiplication as "groups of" can help to connect this learning to their prior understanding of multiplication.

Example:

2 x 4



There are 8 total objects in 2 groups of 4.

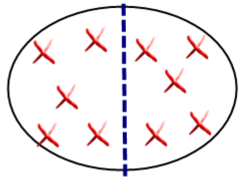
2 x 4 may also be read as: How many objects are in 2 groups of 4.

Students translate this understanding of multiplication of whole numbers using “groups of” to situations using fractions.

Multiplying a Fraction by a Whole Number

$\frac{1}{2}$ x 10

$\frac{1}{2}$ x 10 may also be read as: How many are in half of a group of ten?

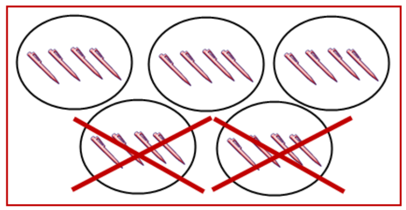


There are 5 objects in half of a group of ten.

Multiplying a Fraction by a Whole Number

$\frac{3}{5}$ x 20

$\frac{3}{5}$ x 20 may also be read as: How many are in $\frac{3}{5}$ of a group of twenty?



The group of twenty is first separated into 5 (derived from the denominator) equal groups.

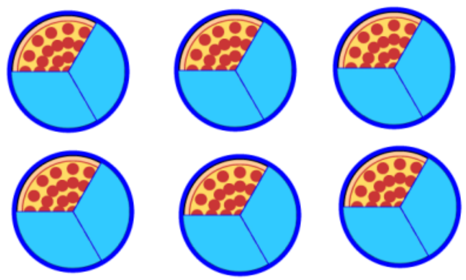
There are 12 objects in $\frac{3}{5}$ of a group of twenty.

The number of objects in three of the five groups is 12.

Multiplying a Whole Number by a Fraction

6 x $\frac{1}{3}$

6 x $\frac{1}{3}$ may also be read as: How many are in 6 groups each containin one third of an object?

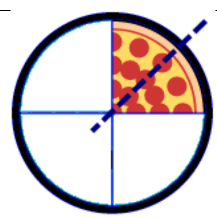


There are 2 wholes in 6 groups each containin one third of an object.

Multiplying a Fraction by a Fraction

$\frac{1}{2}$ x $\frac{1}{4}$

$\frac{1}{2}$ x $\frac{1}{4}$ *may also be read as: How much is $\frac{1}{2}$ of a group of $\frac{1}{4}$ of the whole?*



One half of one fourth of a whole is one eighth.

Formative Checkpoint: A continuous process used by teachers and students to utilize formal and informal assessments to elicit evidence regarding the degree to which a particular student or class of students has mastered the aligned learning goals. Based on the evidence collected, teachers adjust their ongoing instructional activities.

The following are suggestions teachers may consider as they plan the formative checkpoint they will use for this big idea of instruction.

Resources:
- Chapter 7 Mid-Chapter Checkpoint
- Chapter 7 Diagnostic Interview
- Math Journal Entries

MFAS Tasks 5.NF.2.4:
- Multiplying Fractions by Whole Numbers
- Multiplying Fractions by Fractions
- Using Visual Fraction Models
- The Rectangle

MFAS Tasks 5.NF.2.5:
- Estimating Products
- More Than or Less Than Two Miles
- Multiplying by a Fraction Less Than One
- Multiplying by a Fraction Greater Than One

MFAS Tasks 5.NF.2.6:
- Pizza Party
- Box Factory
- Half of a Recipe
- Candy at the Party

Aligned Learning Goals		District Adopted Materials	Supplemental Resources	Strategies for Differentiation
Division of Fractions 8 content + 1 progress monitoring check	Represent a fraction as a division problem *(NF.2.3)*	Go Math! Chapter 8 Achieve the Core: Go Math! Guidance Document	• CPALMS: Picture This! Fractions as Division • CPALMS: Fraction Frenzy! • https://learnzillion.com/ Video: Fractions as Division Author: Niki Reina-Guerra • CPALMS: Painting a Room • CPALMS: Origami Stars • https://learnzillion.com/ Video: Divide a Unit Fraction by a Whole Number Video: Divide a Whole Number by a Unit Fraction Author: Becky Halsey	Reteach & Enrichment Support: Division of Fractions The above document provides opportunities for reteach and enrichment with the current aligned learning goal.
	Solve word problems with answers in fraction form *(NF.2.3)*			
	Solve word problems with answers in mixed number form *(NF.2.3)*			
	Divide a unit fraction by a whole number *(NF.2.7.a)*			
	Divide a whole number by a unit fraction *(NF.2.7.b)*			
	Solve word problems using division of unit fractions and whole number *(NF.2.7.c)*			

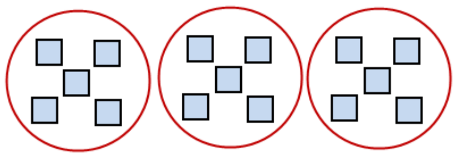
Instructional Strategies and Resources

Getting students comfortable with reading and creating models that show multiplication of fractions helps students transition to using the standard algorithm and explains the process of multiplying the numerator and denominators of the factors. After students have gained comfort using the algorithm and transition away from using models, they must <u>be careful to check the reasonableness of their answer.</u> It is helpful if students can look at a problem and accurately determine if the product will be greater than, less than, or equal to the factors in order to gauge the reasonableness of their answer.

As students begin to explore fraction division, it is important to help students build upon their understanding of division of whole numbers. Reminding students to looking at division as having two different methods of determining a solution.

Partitive Method (sharing):

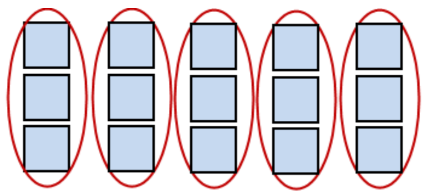
If 15 things are shared equally among 3 groups, how many will be in each group?



There are five objects in each of the three equal groups.

Quotitive Method (repeated subtraction):

How many groups of 3 are in 15?

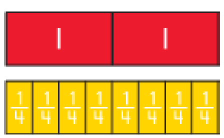


There are five groups of three in 15.

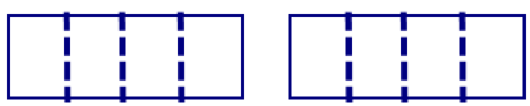
When students attempt to apply these two methods of division to fractions they find that the both methods may not make sense depending on the position of the fraction in the division sentence.

- Considering the problem $2 \div \frac{1}{4}$, the partitive method does not apply because 2 items cannot be shared among $\frac{1}{4}$ of a group. However, the quotitive method does apply, 2 wholes divided into groups of $\frac{1}{4}$ equals how many groups?

Concrete Model



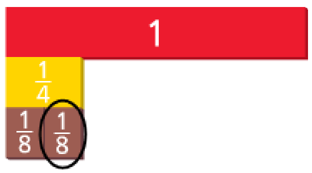
Representation



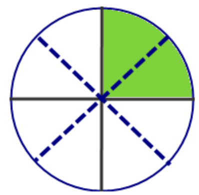
2 wholes divided into groups of $\frac{1}{4}$ equals 8 groups.

- Considering the expression $\frac{1}{4} \div 2$, can be interpreted as sharing how much will be in each groups if $\frac{1}{4}$ of a whole is divided equally between 2 groups.

Concrete Model



Representation



$\frac{1}{4}$ of a whole divided into 2 equal groups equals $\frac{1}{8}$ of a whole.

- **Remainder as a fraction:**
  Joe has a length of rope that is 26 inches long. If it is divided into 5 equal lengths, how long will each length be?

  $26 \div 5 = 5 \text{ r } 1 = 5\frac{1}{5}$ inches

Students need to build on this conceptual undestanding of division to include fractions. Simply teaching students to "invert and multiply" does not provide them with an understanding of **why** this method works, **what** is actually taking place, or **how** to check for their answer for reasonableness.

Formative Checkpoint: A continuous process used by teachers and students to utilize formal and informal assessments to elicit evidence regarding the degree to which a particular student or class of students has mastered the aligned learning goals. Based on the evidence collected, teachers adjust their ongoing instructional activities.

The following are suggestions teachers may consider as they plan the formative checkpoint they will use for this big idea of instruction.

Resources:
- Chapter 8 Mid-Chapter Checkpoint
- Chapter 8 Diagnostic Interview
- Math Journal Entries

MFAS Tasks 5.NF.2.3:
- Sharing Pizzas
- Sharing Brownies
- Two Thirds
- Five Thirds

MFAS Tasks 5.NF.2.7:
- Whole Numbers Divided by Fractions
- Fractions Divided by Whole Numbers
- Bags of Fudge
- Relay Race

Sample: Suggested Standards-based Checks – Blueprint
- Multiplication of Fractions; Scoring Rubric
- Division of Fractions; Scoring Rubric

Field Code Changed
Field Code Changed
Field Code Changed

THE SCHOOL DISTRICT OF LEE COUNTY

Big Idea 6
Quarter 3

Academic Plan
Mathematics – Grade Five (Course #5012070)

Suggested Big Idea Length:
10 – 14 days

Adopted Instructional Materials: Houghton Mifflin Harcourt, Go Math!

Big Idea Description: *Data Analysis*
Students will make and use line plots, coordinate grids, line graphs, and patterns to help them graph and interpret data. Students will analyze multiple forms of data, identify relationships, and determine the best representation to display the data.

Manipulatives: Below are some of the manipulatives that should be included in the instruction of Big Idea 6. View the attached document, Grade 5 Big Idea 6 Manipulatives, for a comprehensive list of manipulatives and their suggested usage during Big Idea 6.

- Connect Cubes
- Square Tiles
- Masking Tape
- Two-Color Counters
- Number Lines

Teacher Note:
Introduce appropriate vocabulary that refers to parts of graphs: origin, x-axis, y-axis, ordered pair, x-coordinate, y-coordinate, coordinate plane. The word redistribute (MD.2.2) is used instead of the word average.

Standards

Math Content Standards	Cross Content Standards
MAFS.5.MD.2.2: Make a line plot to display a data set of measurements in fractions of a unit (1/2, 1/4, 1/8). Use operations on fractions for this grade to solve problems involving information presented in line plots. *For example, given different measurements of liquid in identical beakers, find the amount of liquid each beaker would contain if the total amount in all the beakers were redistributed equally.* **MAFS.5.G.1.1:** Use a pair of 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 axis, with the convention that the names of the two axes and the coordinates correspond (e.g., x-axis and x-coordinate, y-axis and y-coordinate). **MAFS.5.G.1.2:** 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.	**LAFS.5.W.1.2:** Write informative/explanatory texts to examine a topic and convey ideas and information clearly. a. Introduce a topic clearly, provide a general observation and focus, and group related information logically; include formatting (e.g., headings), illustrations, and multimedia when useful to aiding comprehension. b. Develop the topic with facts, definitions, concrete details, quotations, or other information and examples related to the topic. c. Link ideas within and across categories of information using words, phrases, and clauses (e.g., in contrast, especially). d. Use precise language and domain-specific vocabulary to inform about or explain the topic. e. Provide a concluding statement or section related to the information or explanation presented. Suggested Standards for Mathematical Practice **MAFS.K12.MP.4.1:** Model with mathematics. • What do you notice about the coordinates of two points that are on the same horizontal line?

MAFS.5.OA.2.3: Generate two numerical patterns using two given rules. Identify apparent relationships between corresponding terms. Form ordered pairs consisting of corresponding terms from the two patterns, and graph the ordered pairs on a coordinate plane. *For example, given the rule "Add 3" and the starting number 0, and given the rule "Add 6" and the starting number 0, generate terms in the resulting sequences, and observe that the terms in one sequence are twice the corresponding terms in the other sequence. Explain informally why this is so.*	• What are some ways you can find the distance between two points on the same vertical line on a coordinate grid? **MAFS.K12.MP.8.1:** Look for and express regularity in repeated reasoning. • How can you identify a relationship between two numerical patterns? • Describe the relationship for each number pair.

Big Idea(s)
Data Analysis

Essential Outcome Question(s)
How can you use line plots, coordinate grids and patterns to help you graph and interpret data? How can you use, analyze, and create multiple representations of data?

Conceptual Understandings	**Essential Question(s)**
• Understand how to create and interpret information on a line plot. • Understand how to redistribute quantities. • Determine the relationship between the x- and y- coordinates. • Identify relationships between two numerical patterns. • Understand how to create graphs, which display numerical patterns.	• How can you analyze data from multiple representations? • How can you determine which data representation is most appropriate for a data set? • How can a coordinate grid help you interpret experimental and real-world data? • How can you write and graph ordered pairs on a coordinate grid using two numerical patterns?

Aligned Learning Goals		**District Adopted Materials**	**Supplemental Resources**	**Strategies for Differentiation**
Construct and Analyze Data in Multiple Representations 11 content + 1 progress monitoring	Use line plots with to solve problems *(MD.2.2)* Identify and plot points on a coordinate grid *(G.1.1)* Graph data and name points on a coordinate grid *(G.1.1)* Define the components of the coordinate system *(G.1.2)* Construct and analyze line graphs *(G.1.2)* Describe the relationship between numerical patterns *(OA.2.3)*	Go Math! Chapter 9 Achieve the Core: Go Math! Guidance Document	• Task Card: Family Vacation • Task Card: Data Tables • Task Card: Jabberwocky Growth • CPALMS: Human Ordered Pairs • CPALMS: Plotting for Treasure • CPALMS: Describe the Graph	Reteach & Enrichment Support: Construct and Analyze Data The above document provides opportunities for reteach and enrichment with the current aligned learning goal.

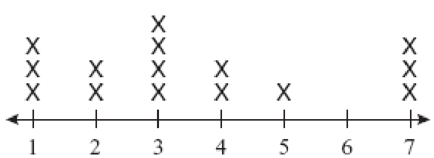
	Graph the relationship between two numerical patterns on a coordinate grid *(OA.2.3)*		• [CPALMS: Dig that Grid] • [CPALMS: Cool School]	

Instructional Strategies and Resources

In Big Idea 6, students will build upon their understanding of patterns and graphing. Students will have built the bulk of their understanding for these standards in grades K-3, with a lapse in instruction of graphing during fourth grade. Because of this, a general review of the different types of graphical representations may be necessary.

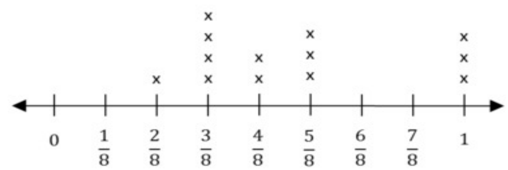
As students begin to explore line plots, it is important to first create line plots using whole numbers. This will help students to build upon their prior knowledge and apply this to the fifth grade standard of creating a line plot using a set of fraction values.

Line Plot Representing a Set of Whole Number Values



Data Set: 1, 7, 1 , 4, 1, 2, 7, 2, 3, 3, 4, 3, 7, 3, 5

Line Plot Representing a Set of Fraction Values

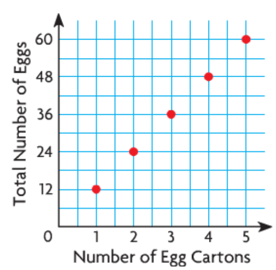


Data Set: $\frac{4}{8}$, *1*, $\frac{5}{8}$, $\frac{3}{8}$, $\frac{2}{8}$, $\frac{4}{8}$, *1*, $\frac{5}{8}$, $\frac{3}{8}$, $\frac{3}{8}$, $\frac{5}{8}$, $\frac{3}{8}$, *1*

Students will next begin to analyze multiple data sets in which corresponding data points may be graphed on a coordinate grid. To help students understand a coordinate grid, use the image of two number lines that run perpendicular to each other intersecting at zero.

Students will typically use data organized in a two collumn/row table and graph the corresponding points as ordered pairs. The final product will appear as a set of points on the coordinate grid that allow's students to gain a mental image of this data. Pairing both the data and the graph help students to understand what the data "means" and visualize what relationships exist between each data point.

Number of Egg Cartons	Total Number of Eggs
1	12
2	24
3	36
4	48
5	60



As students continue to build on their understanding of graphing ordered pairs, this will translate in to the development of line graphs. Line graphs are most often used in elementary math to analyze change over a period of time. As students look for patterns and make generalizations based on line graphs they begin to informally analyze the rise and fall of the line. This helps students to determine if the data is increasing or decreasing, as well, as tell them how drastic this change is taking place. This analysis leads to more formal explorations in algebra such as the slope of a line.
Formative Checkpoint: A continuous process used by teachers and students to utilize formal and informal assessments to elicit evidence regarding the degree to which a particular student or class of students has mastered the aligned learning goals. Based on the evidence collected, teachers adjust their ongoing instructional activities.
The following are suggestions teachers may consider as they plan the formative checkpoint they will use for this big idea of instruction.

Resources:	*MFAS Tasks 5.MD.2.2*	*MFAS Tasks 5.G.1.1*	*MFAS Tasks 5.G.1.2*	*MFAS Tasks 5.OA.2.3*
• Chapter 9 Mid-Chapter Checkpoint • Chapter 9 Diagnostic Interview • Math Journal Entries	• Rock Measurements Part One • Rock Measurements Part Two • Bulk Candy Part One • Bulk Candy Part Two	• Properties of Coordinate Planes • What Do the Coordinates Mean? • Coordinates • Understanding Coordinates	• Name the Ordered Pair • Mowing the Lawn • Making Bracelets • On the Coordinate Plane	• Exploring Related Patterns • Comic Books

Sample: Suggested Standards-based Check – Blueprint • Data Analysis; Scoring Rubric

Field Code Changed

Field Code Changed

Big Idea 7
Quarter 3

Academic Plan
Mathematics – Grade Five (Course #5012070)

Suggested Big Idea Length:
12 – 16 days

Adopted Instructional Materials: Houghton Mifflin Harcourt, Go Math!

Big Idea Description: *Conversion of Units of Measure*
Students will convert among different-sized standard measurement units within a given measurement system. Students will apply these skills in solving multi-step real-world problems.

Manipulatives: Below are some of the manipulatives that should be included in the instruction of Big Idea 7. View the attached document, Grade 5 Big Idea 7 Manipulatives, for a comprehensive list of manipulatives and their suggested usage during Big Idea 7.

- Base-Ten Blocks
- Inch Ruler, Yardstick
- Centimeter Ruler, Meter Stick
- Spring Scale
- Cup, Pint, Quart, & Gallon Containers

Teacher Note:
For Standard MAFS.5.MD.1.1 provide students with access to the FSA Reference Sheet. Metric conversion provides a natural tie to the relationship between place values (ten times as much as, and one tenth of).

Standards	
Math Content Standards	Cross Content Standards
MAFS.5.MD.1.1: Convert among different-sized standard measurement units (i.e., km, m, cm; kg, g; lb, oz.; l, ml; hr, min, sec) within a given measurement system (e.g., convert 5 cm to 0.05 m), and use these conversions in solving multi-step, real world problems.	 Suggested Standards for Mathematical Practice **MAFS.K12.MP.1.1**: Make sense of problems and persevere in solving them. • How can you find the number of seconds in 6 weeks? • Why did you choose to divide when converting the measurement? **MAFS.K12.MP.7.1:** Look for and make use of structure. • How did you discover the pattern when converting measurement standards? • What pattern can you find when converting customary measurements?

Big Idea(s)
Conversion of Units of Measure

Essential Outcome Question(s)

<table>
<tr><td colspan="5">What strategies can you use to compare and convert measurements?</td></tr>
<tr><th colspan="3">Conceptual Understandings</th><th colspan="2">Essential Question(s)</th></tr>
<tr><td colspan="3">Understand how to order units by size and compare the units.
Relate measurement conversion to multiplication and division problems.
Multiply or divide by a power of ten to convert metric measurement.</td><td colspan="2">How can you decide whether to multiply or divide when you are converting measurements?
How can you organize your solution when you are solving a multistep measurement problem?
How is converting metric measurements different from converting customary measurements?</td></tr>
<tr><th colspan="2">Aligned Learning Goals</th><th>District Adopted Materials</th><th>Supplemental Resources</th><th>Strategies for Differentiation</th></tr>
<tr><td rowspan="4">Measurement
13 content + 1 progress monitoring check</td><td>Compare, contrast, and convert customary units of length, capacity and weight
(MD.1.1)</td><td rowspan="4">Go Math!
Chapter 10

Achieve the Core: Go Math! Guidance Document</td><td rowspan="4">CPALMS: Conversion Excursion
CPALMS: Where on Earth is (teacher name)?
CPALMS: Minutes and Days</td><td rowspan="4">Reteach & Enrichment Support: Measurement

The above document provides opportunities for reteach and enrichment with the current aligned learning goal.</td></tr>
<tr><td>Compare, contrast, and convert metric units of length, capacity, and mass
(MD.1.1)</td></tr>
<tr><td>Solve multi-step problems using measurement conversions
(MD.1.1)</td></tr>
<tr><td>Convert units of time to solve elapsed time problems
(MD.1.1)</td></tr>
<tr><th colspan="5">Instructional Strategies and Resources</th></tr>
<tr><td colspan="5">In Big Idea 7, students build upon their understanding of converting customary and metric units of measure that was established in fourth grade. When exploring this concept, it is essential to help students think logically and use common sense. For example, when converting from yards to inches, the answer will be a larger number because it takes 36 inches to make one yard. Students need to establish an understanding of what each unit of measure “looks like” by practicing measuring the same object with multiple units of measure. In the example below, students have multiple opportunities to build a concrete understanding of what each measurement looks like before solving the problem.

Example: *Our classroom is 7 yards across in length. How many feet will this be? How many inches? Use appropriate tools to find your answer.*

In this example students will find that although it takes only 7 yard sticks to measure across the room, it will take 21 one-foot rulers, or 252 one-inch tiles. Many students get lost in the use of abstract conversion charts because they have not yet formed a conceptual understanding of what is actually taking place when completing conversions. Once students have actually measured to find a solution, they can be challenged to solve the same, or a similar question without having to use all three tools. For example, a student might measure the width of the room as 10 yards and then multiply the 10 yards by 3 to find the number of feet and then multiply the product by 12 to find the equivalent length in inches.</td></tr>
</table>

Allowing students to have meaningful experience working with each of the different units of measure before applying the algebraic steps for conversions, helps with the development of a strong conceptual understanding. This understanding aids students as they use estimation to check their answers for reasonableness and when formulating explanations for conversions.

When exploring conversions within the metric system, students have the benefit of pulling from their understanding of the decimal place value system. Helping students to find this connection and continuing build on their past experiences leads to a deeper understanding. Two methods are listed below to harness this connection (Van de Walle, 2004).

- The use of a place value chart naming the metric units. Students begin by writing the unit to be converted in the appropriate place and then move to the right by multiplying by 10 for each place value or dividing by ten as you move each place value to the left.

kilo-	hecto-	deka-	meter liter gram	deci-	centi-	milli-

- Another similar method is to multiply or divide by a power of ten, representative of the number of place values away for the target place value.

As students explore within the customary system, particular care should be taken when using the word ounces. Ounces appear in the customary system as a measure of capacity and weight. When measuring capacity, ounces should be referred to as "*fluid ounces*;" when measuring weight, the term remains as *ounces*.

Formative Checkpoint: A continuous process used by teachers and students to utilize formal and informal assessments to elicit evidence regarding the degree to which a particular student or class of students has mastered the aligned learning goals. Based on the evidence collected, teachers adjust their ongoing instructional activities.

The following are suggestions teachers may consider as they plan the formative checkpoint they will use for this big idea of instruction.

Resources:
- Chapter 10 Mid-Chapter Checkpoint
- Chapter 10 Diagnostic Interview
- Math Journal Entries

MFAS Tasks 5.MD.1.1:
- Party Planning
- Candy and Ribbon
- Converting Customary Measurement Units
- Converting Metric Measurement Units

Sample: Suggested Standards-based Check – Blueprint
- Conversion of Measurement Units; Scoring Rubric

Field Code Changed

Field Code Changed

THE SCHOOL DISTRICT OF LEE COUNTY

Big Idea 8
Quarters 3 & 4

Academic Plan
Mathematics – Grade Five (Course #5012070)

Suggested Big Idea Length:
17 – 21 days

Adopted Instructional Materials: Houghton Mifflin Harcourt, Go Math!

Big Idea Description: *Two-Dimensional Shapes and Volume*
Students will classify two-dimensional figures into categories based on their properties. Students will understand concepts of volume and related volume to multiplication and addition.

Manipulatives: Below are some of the manipulatives that should be included in the instruction of Big Idea 8. View the attached document, Grade 5 Big Idea 8 Manipulatives, for a comprehensive list of manipulatives and their suggested usage during Big Idea 8.

- Centimeter Cubes
- Dot Paper
- Pattern Blocks
- Paper Polygons

Teacher Note:
Lesson 11.2 is a 4th grade standard focusing on identifying and classifying triangles by name. It will be important to assess students' background knowledge of triangles. If students can identify and classify, then please omit lesson 11.2, otherwise this content should be utilized to build knowledge of triangles.

Lesson 11.5 should be omitted as 5th grade is no longer responsible for all 3D shapes. 5th grade is only responsible for 3D shapes with regards to volume.

Standards

Math Content Standards	Cross Content Standards
MAFS.5.G.2.3: Understand that attributes belonging to a category of two-dimensional figures also belong to all subcategories of that category. *For example, all rectangles have four right angles and squares are rectangles, so all squares have four right angles.* **MAFS.5.G.2.4**: Classify and organize two-dimensional figures into Venn diagrams based on the attributes of the figures. **MAFS.5.MD.3.3**: 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. **MAFS.5.MD.3.4**:	 **Suggested Standards for Mathematical Practice** **MAFS.K12.MP.4.1:** Model with mathematics. • How would you change your model to find the volume if there was one more layer added? • How can you use a simpler problem to find the volume of the composite figure? **MAFS.K12.MP.5.1** Use appropriate tools strategically. • Why do you need to find the height of a rectangular prism in unit cubes AND the number of unit cubes in a layer to determine the volume? • How can you use unit cubes to find the volume of a rectangular prism?

Measure volumes by counting unit cubes, using cubic cm, cubic in, cubic ft, and improvised units. **MAFS.5.MD.3.5**: 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 by the area of the base. Represent threefold whole-number products as volumes, e.g., to represent the associative property of multiplication. b. Apply the formulas $V = l \times w \times h$ and $V = B \times h$ for rectangular prisms to find volumes of right 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.	
Big Idea(s)	
Two-Dimensional Shapes and Volume	
Essential Outcome Question(s)	
• How do you classify and categorize two-dimensional shapes? • How can you determine the volume of rectangular prisms?	
Conceptual Understandings	**Essential Question(s)**
• Identify two-dimensional figures and classify based on attributes. • Recognize volume as an attribute of solid figures. • Understand concepts of volume and relate volume to multiplication concepts. • Measure volume by counting unit cubes.	• How can you classify two-dimension figures based upon their attributes? • How can you use unit cubes to build a solid figure? • How can you use unit cubes to fill a solid rectangular prism? • How can you find the volume of a rectangular prism?

		Aligned Learning Goals	District Adopted Materials	Supplemental Resources	Strategies for Differentiation
Two-D Geometry 8 content	Place polygons in a hierarchy based on their attributes *(G.2.3)*	Go Math! Chapter 11 Achieve the Core: Go Math! Guidance Document	• Task Card: Rolling Prisms • Task Card: Double The Volume • CPALMS: Shape Up • CPALMS: Calling Up Quads • CPALMS: Where in the Venn are the Quadrilaterals?	Reteach & Enrichment Support: Two-Dimensional Geometry The above document provides opportunities for reteach and enrichment with the current aligned learning goal.
	Identify and classify polygons based on their properties using a Venn Diagram *(G.2.4)*			

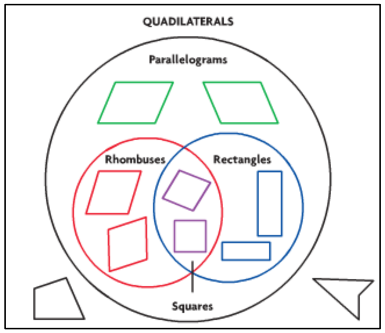
Instructional Strategies and Resources

In Big Idea 8, students will build upon their understanding of two-dimensional figures and explore the third critical area of fifth grade, volume. As students begin exploring polygons, especially quadrilaterals, their knowledge of how to define each figure must have a greater level of precision than was required in previous grades. A student's ability to apply this definition is evidence of a strong conceptual understanding of two-dimensional figures. To help students reach this level of understanding, it is important to have students create definitions in their own words for each polygon based on their own observations. Pairing this with an activity leading students through classification activities will help students to check the accuracy of their definitions. Although it may seem much easier to simply give students the definition, writing their own and checking its accuracy leads to students taking ownership of this process and yields a higher level of understanding.

Example: *Using the Venn Diagram to the right, what makes the definition of a square different from that of a rhombus? A rectangle?*

A square has four equal sides and four equal angles. A rhombus has four equal sides and two sets of opposite angles that are equal.

A rectangle has two sets of sides that are equal, but both sets are not necessarily equal like a square.



Another similar use of this activity involves placing figures in an incorrect category and having students classify them correctly and justify their new, correct position.

Formative Checkpoint: A continuous process used by teachers and students to utilize formal and informal assessments to elicit evidence regarding the degree to which a particular student or class of students has mastered the aligned learning goals. Based on the evidence collected, teachers adjust their ongoing instructional activities.

The following are suggestions teachers may consider as they plan the formative checkpoint they will use for this big idea of instruction.

Resources:
- Chapter 11 Mid-Chapter Checkpoint
- Chapter 11 Diagnostic Interview
- Math Journal Entries

MFAS Tasks 5.G.2.3:
- Classifying Squares
- What Do You Know About Rectangles?
- Guess My Shape

MFAS Tasks 5.G.2.4:
- Classifying Quadrilaterals
- Trapezoids
- Where Do They Belong

		• [Shape Clues]	• [Classifying Shapes]	
Volume 10 content + 1 progress monitoring check	Define a unit cube as the standard unit when measuring volume *(MD.3.3a)*	Go Math! Chapter 11 [Achieve the Core: Go Math! Guidance Document]	• [CPALMS: Finding Volume] • [CPALMS: Manipulating Cubic Units] • [CPALMS: Houses with Height Numbers] • [CPALMS: Volume: Let's Be Efficient] • [CPALMS: Formulating Volume]	[Reteach & Enrichment Support: Volume] The above document provides opportunities for reteach and enrichment with the current aligned learning goal.
	Use unit cubes to build solid figures without gaps or overlaps and determine volume *(MD.3.3b)*			
	Apply the formulas for volume of right rectangular prisms *(MD.3.3b)*			
	Use and understand a formula to find the volume of two combined rectangular prisms *(MD.3.5)*			

Instructional Strategies and Resources

As students tackle the concept of volume, it is imperative that they begin by building figures using manipulatives, such as pop cubes, blocks, etc. During this initial stage, students may count the number of cubes used to create the overall figure. As patterns are recognized, students will begin to use multiplication to speed up their counting, especially of the base area and then the overall figure. Typically students will build the area of the base and then create multiple layers of this area to represent the height. This process represents the formula V = Bh. Students should be lead to discover the formulas on their own rather than just giving them to the students and asking them to apply. Upon further investigation and breaking down the processes of finding volume, students may be asked to share their solution path for calculating volume, and in the process create the two formulas for finding the volume of a rectangular prism: V=Bh or V=lwh. Students may be asked to draw visual representations of rectangular prisms to prove the validity of the formulas that they created.

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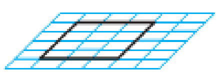
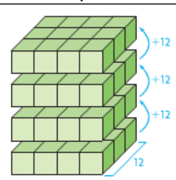
V=Bh



The base is made up of 12 blocks.



There are 4 layers of 12 blocks.
V = 12 x 4 = 48 blocks

Students first determine how many blocks are needed to create the area of the base (B) and then repeat this area in multiple layers (h) to find the volume of the figure.

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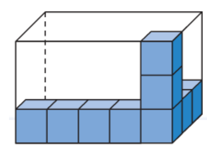
V = lwh



Students determine that the volume of any rectangular prism can be determined by multiplying the three dimensions of length width and height. This typically follows the justification of B = l x w and the realization that if V = B x h, then V = l x w x h.

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Formative Checkpoint: A continuous process used by teachers and students to utilize formal and informal assessments to elicit evidence regarding the degree to which a particular student or class of students has mastered the aligned learning goals. Based on the evidence collected, teachers adjust their ongoing instructional activities.			
The following are suggestions teachers may consider as they plan the formative checkpoint they will use for this big idea of instruction.			
Resources: • Chapter 11 Mid-Chapter Checkpoint • Chapter 11 Diagnostic Interview • Math Journal Entries	*MFAS Tasks 5.MD.3.3*: • How Do We Determine Volume? • Determining Volume? • How Do You Find the Volume??	*MFAS Tasks 5.MD.3.4*: • Find the Volume • Volume With Improved Units • Volume in Cubic Units • Measuring Volumes	*MFAS Tasks 5.MD.3.5*: • Using Additive Reasoning When Finding Volume • Determining Dimensions • Volume Two Ways • Determining and Interpreting Volume
Sample: Suggested Standards-based Check – Blueprint • 2D Figures and Volume; Scoring Rubric			

Big Idea 9: Mastery of Grade Five
Quarter 4

Academic Plan
Mathematics – Grade Five (Course #5012070)

Adopted Instructional Materials: Houghton Mifflin Harcourt, Go Math!

Big Idea Description: *Mastery of Grade Five*

Before beginning material in Mastery of Grade Five, please make sure all Big Ideas prior have been completed, this includes all Standards-base Check.

In Quarter 4, instructional time should focus on mastery of the three critical areas for Fifth Grade:

1. developing fluency with addition and subtraction of fractions, and developing understanding of the multiplication of fractions and of division of fractions in limited cases (unit fractions divided by whole numbers and whole numbers divided by unit fractions)
2. extending division to 2-digit divisors, integrating decimal fractions into the place value system and developing understanding of operations with decimals to hundredths, and developing fluency with whole number and decimal operations
3. developing understanding of volume

Teachers are encouraged to use Mastery of Grade Five in one of two ways.

Option 1. Select the Critical Area that your students' data shows that they need more time or support with. The data to be reviewed should include, but isn't limited to: Standards-base Check data, Formative Checkpoint data, CCE data, and classroom observation.

a. Utilize Model Eliciting Activities (MEAs)[1] to support the instruction in those areas that the students need more support with.
   i. 2 MEAs take approximately one week to complete.
b. Utilize task cards, reteach/enrich documents, along with any additional materials from Go Math! to support instruction.
c. Use Formative Checkpoints (MFAS Tasks or Performance Tasks) to assess progress of student mastery within the Critical Area or to support instruction.
d. Once students show mastery within a Critical Area move to another Critical Area based upon data in option 1.

Option 2. Instruct within each Critical Area.

a. Choose 2-3 MEAs to complete with students.
   i. 2 MEAs take approximately one week to complete.
b. Utilize task cards, reteach/enrich documents, along with any additional materials from Go Math! to support instruction.
c. Spending instructional time in each Critical Area will ensure that all Critical Areas have been reviewed and revisited prior to the end of the school year.

[1]Model Eliciting Activities (MEAs): MEAs are open ended, interdisciplinary problem-solving activities that are meant to reveal students' thinking about the concepts embedded in the realistic activities.

Teacher Note: During this time of year, it is vital for fifth grade students to master fluently multiplying multi-digit whole numbers using the standard algorithm. It is our recommendation to continue with daily fluency instruction to help students become fluent with multi-digit multiplication.

Critical Area 1

Developing fluency with addition and subtraction of fractions, and developing understanding of the multiplication and division of fractions in limited cases.	
Math Content Standards	MEA Cross Content Standards
MAFS.5.NF.1.1: Add and subtract fractions with unlike denominators. **MAFS.5.NF.1.2:** Solve word problems involving addition and subtraction of fractions referring to the same whole, including cases of unlike denominators. **MAFS.5.NF.2.3:** 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. **MAFS.5.NF.2.4:** Apply and extend previous understandings of multiplication to multiply a fraction or whole number by a fraction. **MAFS.5.NF.2.5:** Interpret multiplication as scaling (resizing). **MAFS.5.NF.2.6:** Solve real world problems involving multiplication of fractions and mixed numbers. **MAFS.5.NF.2.7:** Apply and extend previous understandings of division to divide unit fractions by whole numbers and whole numbers by unit fractions.	**LAFS.L.1.1** **SC.L.15.1** **LAFS.RI.1.3** **SC.N.1.1** **LAFS.RI.2.5** **SS.C.3.5** **LAFS.RI.3.9** **LAFS.SL.1.1** **LAFS.W.2.4** Standards for Mathematical Practice **MAFS.K12.MP.1.1**: Make sense of problems and persevere in solving them. **MAFS.K12.MP.2.1**: Reason abstractly and quantitatively. **MAFS.K12.MP.3.1**: Construct viable arguments and critique the reasoning of others. **MAFS.K12.MP.4.1**: Model with mathematics. **MAFS.K12.MP.5.1**: Use appropriate tools strategically. **MAFS.K12.MP.6.1**: Attend to precision. **MAFS.K12.MP.7.1**: Look for and make use of structure. **MAFS.K12.MP.8.1**: Look for and express regularity in repeated reasoning.

MEAs	**District Adopted Materials**	**Supplemental Resources**	**Strategies for Differentiation**
Babysitter's Club Fun with Fractions **NF.1.1:** In this MEA, students will apply their knowledge of adding, subtracting, and comparing fractions with like and unlike denominators. Babysitters 'R Us will require students to analyze data in the form of fractional units of time in order to select the best babysitter for the Cryin' Ryan family.	Go Math! Chapters 6-8 Big Idea 4 Big Idea 5	• Task Card: Eating Pie	• Reteach & Enrichment Support: Addition and Subtraction of Fractions • Reteach & Enrichment Support: Multiplication of Fractions • Reteach & Enrichment Support: Division of Fractions The above documents provide opportunities for reteach and enrichment for Mastery of Grade Five.
Bill of Rights Billboard **NF.2.6**: This MEA will deepen students' knowledge of the Bill of Rights through collaborative problem solving. Students are required to analyze data in order to recommend three Amendments to display on billboards in their community.			
Wildlife Refuge Feeding the Animals **NF.2.3**: Students use mathematical practices to recommend food packages for the Wildlife Refuge of North America to order.			
Birds Now			

NF.2.3: The Birds Now Pet Store is increasing the size of its bird department. By increasing the number and types of birds, they need to purchase more bird food and the type of food needs to be one that different types of birds can eat. The students need to rank the companies that sell bird food base on the basic requirements out lined in the client's letter			
Wazzup Charter Schools Playground Dilemma **NF.2.6**: The Wazzup Charter School MEA provides students with an engineering problem in which they must work as a team to design a procedure to select the best type of surface for a playground at a charter school.			

Formative Checkpoint: A continuous process used by teachers and students to utilize formal and informal assessments to elicit evidence regarding the degree to which a particular student or class of students has mastered the aligned learning goals. Based on the evidence collected, teachers adjust their ongoing instructional activities.

The following are suggestions teachers may consider as they plan the formative checkpoint they will use for this big idea of instruction.

Resources:

- Chapter 6 Performance Task: Sugar and Spice TE; Sugar and Spice Task
- Chapter 7 Performance Task: Hours of Sound TE; Hours of Sound Task
- Chapter 8 Performance Task: Trail Teamwork TE; Trail Teamwork Task
- Critical Area Performance Task: Alberto's Fish Tank TE; Alberto's Fish Tank Task

Critical Area 2 Extending division to 2-digit divisors, integrating decimal fractions into the place value system and developing understanding of operations with decimals to hundredths, and developing fluency with whole number and decimal operations.	
Math Content Standards	Cross Content Standards
MAFS.5.NBT.1.1: 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. **MAFS.5.NBT.1.2:** Explain patterns in the number of zeros of the product when multiplying a number by powers of 10, and 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. **MAFS.5.NBT.1.3:** Read, write, and compare decimals to thousandths. **MAFS.5.NBT.1.4:** Use place value understanding to round decimals to any place. **MAFS.5.NBT.2.5:** Fluently multiply multi-digit whole numbers using the standard algorithm. **MAFS.5.NBT.2.6:** Find whole-number quotients of whole numbers with up to four-digit dividends and two-digit divisors. **MAFS.5.NBT.2.7:** Add, subtract, multiply, and divide decimals to hundredths.	**LAFS.L.1.1** **LAFS.SL.1.1** **LAFS.RI.1.2** **LAFS.W.2.4** **LAFS.RI.3.7** **LAFS.W.3.7** Suggested Standards for Mathematical Practice **MAFS.K12.MP.1.1**: Make sense of problems and persevere in solving them. **MAFS.K12.MP.2.1**: Reason abstractly and quantitatively. **MAFS.K12.MP.3.1**: Construct viable arguments and critique the reasoning of others. **MAFS.K12.MP.4.1**: Model with mathematics. **MAFS.K12.MP.5.1**: Use appropriate tools strategically. **MAFS.K12.MP.6.1**: Attend to precision. **MAFS.K12.MP.7.1**: Look for and make use of structure. **MAFS.K12.MP.8.1**: Look for and express regularity in repeated reasoning.

MEAs	District Adopted Materials	Supplemental Resources	Strategies for Differentiation
The Dazzling Painting Co. **NBT.1.1, NBT.2.6**: Students work in teams to determine and rank paint sprayers based on GPM (gallon per minute). Students must use a data table and calculate the gallons per 100 minutes and gallons per minute. Vending Machine Snacks **NBT.1.3, NBT.2.7**: In this MEA, students are challenged to choose the snacks that will be in a vending machine in a school. Students will need to multiply and divide whole numbers and decimal numbers as well as compare fractions and decimal numbers. Students will work in groups to solve the problem and write a letter to the client explaining their thinking. Which Sweets for the Bakery? **NBT.1.4, NBT.2.5, NBT.2.6**: This MEA gives students the opportunity to use real world data to rank proposed product lines from most likely to be profitable to least likely to be profitable. There are two sequential tasks; the second task adds a component of complexity to the original task. Students will apply multiplication and division skills in problem solving, write a procedure with grade-appropriate organization and conventions, and participate in group collaboration to complete this task.	Go Math! Chapters 2-5 Big Idea 1 Big Idea 2 Big Idea 3	• Task Card: Field Day • Task Card: Rollercoaster Remainders • Task Card: Checking Account • Task Card: Add It Up Café	• Reteach & Enrichment Support: Division without Remainders • Reteach & Enrichment Support: Division with Remainders • Reteach & Enrichment Support: Place Value: Decimals • Reteach & Enrichment Support: Addition and Subtraction of Decimals • Reteach & Enrichment Support: Multiplying Decimals • Reteach & Enrichment Support: Dividing Decimals

Beach on a Budget **NBT.1.4, NBT.2.5**: Students work in teams to determine from which store they will buy beach equipment for a new beach rental business, after considering several criteria. After the students have created a proposal based on given data, a twist is added which may vary their results.			The above documents provide opportunities for reteach and enrichment for Mastery of Grade Five.
Are You Ready for a Hurricane? **NBT.2.5, NBT.2.6, NBT.2.7**: This activity allows students to determine the types of items that should be in a hurricane survival kit, use a budget and calculations to determine the items to include in the kit and gain an understanding of hurricanes and the need to prepare for them.			
Formative Checkpoint: A continuous process used by teachers and students to utilize formal and informal assessments to elicit evidence regarding the degree to which a particular student or class of students has mastered the aligned learning goals. Based on the evidence collected, teachers adjust their ongoing instructional activities.			
The following are suggestions teachers may consider as they plan the formative checkpoint they will use for this big idea of instruction. *Resources:* • Chapter 2 Performance Task: Feature Presentation TE; Feature Presentation Task • Chapter 3 Performance Task: Behind the Scenes TE; Behind the Scenes Task • Chapter 4 Performance Task: Earning a Bicycle TE; Earning a Bicycle Task • Chapter 5 Performance Task: Prize Painting TE; Prize Painting Task • Critical Area Performance Task: Party Planning TE; Party Planning Task			

Critical Area 3 Developing understanding of volume.	
Math Content Standards	Cross Content Standards
MAFS.5.MD.3.3: Recognize volume as an attribute of solid figures and understand concepts of volume measurement. **MAFS.5.MD.3.4:** Measure volumes by counting unit cubes, using cubic cm, cubic in, cubic ft, and improvised units. **MAFS.5.MD.3.5:** Relate volume to the operations of multiplication and addition and solve real world and mathematical problems involving volume.	**LAFS.L.1.1** **LAFS.L.1.2** **LAFS.L.2.3** **LAFS.SL.1.1** **LAFS.W.1.1** Suggested Standards for Mathematical Practice **MAFS.K12.MP.1.1:** Make sense of problems and persevere in solving them. **MAFS.K12.MP.2.1:** Reason abstractly and quantitatively. **MAFS.K12.MP.3.1:** Construct viable arguments and critique the reasoning of others. **MAFS.K12.MP.4.1:** Model with mathematics. **MAFS.K12.MP.5.1:** Use appropriate tools strategically. **MAFS.K12.MP.6.1:** Attend to precision. **MAFS.K12.MP.7.1:** Look for and make use of structure. **MAFS.K12.MP.8.1:** Look for and express regularity in repeated reasoning.

MEAs	**District Adopted Materials**	**Supplemental Resources**	**Strategies for Differentiation**
Bakery Boxes in the Mail **MD.3.5, NBT.2.7**: Students need to make decisions about the correct bakery box to send cookies through the mail to fill orders. Students need to consider the capacity, dimensions, and volume of the boxes in terms of how many cookies each box will hold. Building Pools **MD.3.5**: In this open-ended problem, students will work in teams to determine a procedure for ranking pools to help a customer purchase. Students will need to calculate the size and volume of the pool, make decisions based on a table of data, and write a letter to the customer providing evidence for their decisions. Students will need to tradeoff between the size of the pool, the customer service ranking, the type of pool and the warranty of the pool. The students will have to research on the internet the differences and benefits of a salt water pool versus a chlorinated one.	Go Math! Chapter 11 Big Idea 8	• Task Card: Double The Volume	Reteach & Enrichment Support: Volume The above document provides opportunities for reteach and enrichment for Mastery of Grade Five.

Cereal Box Volume Varying Predicament **MD.3.5**: Students will review rectangular prisms and the formula for finding the volume of rectangular prisms. Once students have determined the volume of a number of rectangular prisms (cereal boxes), the students will use that information to help a fictitious company in determining which cereal box they should use for their new product.			
Bait Shop Baffle **MD.3.5**: Students will first review rectangular prisms and the formula for finding the volume of rectangular prisms. After students have determined the volume of a given set of rectangular prisms (aquariums), the students will use that information to help Seymour Phish in determining which aquarium he should purchase for his minnows.			

Formative Checkpoint: Formative Checkpoint is a continuous process used by teachers and students to utilize formal and informal assessments to elicit evidence regarding the degree to which a particular student or class of students has mastered the aligned learning goals. Based on the evidence collected, teachers adjust their ongoing instructional activities.

The following are suggestions teachers may consider as they plan the Formative Checkpoint they will use for this big idea of instruction.

Resources:

- Chapter 11 Performance Task: Box Factory TE; Box Factory Task
- Critical Area Performance Task: Water Rush TE; Water Rush Task