

**TOWNSHIP OF UNION PUBLIC SCHOOLS**



**Mathematics Grade 3  
Curricular Framework - Units 1 and 2  
Curriculum Guide**

**2016**

## **Mission Statement**

The mission of the Township of Union Public Schools is to build on the foundations of honesty, excellence, integrity, strong family, and community partnerships. We promote a supportive learning environment where every student is challenged, inspired, empowered, and respected as diverse learners. Through cultivation of students' intellectual curiosity, skills and knowledge, our students can achieve academically and socially, and contribute as responsible and productive citizens of our global community.

## **Philosophy Statement**

The Township of Union Public School District, as a societal agency, reflects democratic ideals and concepts through its educational practices. It is the belief of the Board of Education that a primary function of the Township of Union Public School System is to formulate a learning climate conducive to the needs of all students in general, providing therein for individual differences. The school operates as a partner with the home and community.

## **Statement of District Goals**

- **Develop reading, writing, speaking, listening, and mathematical skills.**
- **Develop a pride in work and a feeling of self-worth, self-reliance, and self-discipline.**
- **Acquire and use the skills and habits involved in critical and constructive thinking.**
- **Develop a code of behavior based on moral and ethical principles.**
- **Work with others cooperatively.**
- **Acquire a knowledge and appreciation of the historical record of human achievement and failures and current societal issues.**
- **Acquire a knowledge and understanding of the physical and biological sciences.**
- **Participate effectively and efficiently in economic life and the development of skills to enter a specific field of work.**
- **Appreciate and understand literature, art, music, and other cultural activities.**
- **Develop an understanding of the historical and cultural heritage.**
- **Develop a concern for the proper use and/or preservation of natural resources.**
- **Develop basic skills in sports and other forms of recreation.**

## Pacing Guide

<u>Content</u>	Number of Days
Unit 1	45
Unit 2	45
Unit 3	45
Unit 4	45

Overview	Standards for Mathematical Content	Unit Focus	Standards for Mathematical Practice
<p><b>Unit 1</b> Addition, Subtraction, and Multiplication concepts</p>	<ul style="list-style-type: none"> <li>■ 3.OA.1</li> <li>■ 3.OA.3*</li> <li>■ 3.OA.4</li> <li>■ 3.OA.9</li> <li>■ 3.NBT.1</li> <li>■ 3.NBT.2</li> </ul>	<ul style="list-style-type: none"> <li>• Represent and solve problems involving addition, subtraction, and multiplication</li> <li>• Understand properties of multiplication</li> <li>• Round to the nearest tens and hundreds</li> <li>• Use place value understanding and properties of operations to perform multi-digit arithmetic</li> </ul>	<p>MP.1 Make sense of problems and persevere in solving them.</p> <p>MP.2 Reason abstractly and quantitatively.</p> <p>MP.3 Construct viable arguments and critique the reasoning of others.</p>
<p><b>Unit 1:</b> <i>Suggested Open Educational Resources</i></p>	<p>3.OA.A.2 Fish Tanks  3.OA.A.3 Analyzing Word Problems Involving Multiplication  3.OA.A.4 Finding the unknown in a division equation  3.NBT.A.1 Rounding to 50 or 500  3.NBT.A.1 Rounding to the Nearest Ten and Hundred  3.NBT.A.3 How Many Colored Pencils?</p>		<p>MP.4 Model with mathematics.</p> <p>MP.5 Use appropriate tools strategically.</p> <p>MP.6 Attend to precision.</p> <p>MP.7 Look for and make use of structure.</p> <p>MP.8 Look for and express regularity in repeated reasoning.</p>

Content & Practice Standards	Suggested Standards from Mathematical Practice	Critical Knowledge & Skills
<p>3.OA.1. Interpret products of whole numbers, e.g., interpret <math>5 \times 7</math> as the total number of objects in 5 groups of 7 objects each. For example, describe and/or represent a context in which a total number of objects can be expressed as <math>5 \times 7</math>.</p>	<p>MP.2 Reason abstractly and quantitatively. MP.4 Model with mathematics.</p>	<p>Concept(s): Multiplication is a means to determine the total number of objects when there are a specific number of groups with the same number of objects in each group. Multiplication gives the same result as repeated addition. Product of two whole numbers is the total number of objects in a number of equal groups. Students are able to: interpret products of whole numbers as a total number of objects. use repeated addition to find the total number of objects arranged in an array and in equal groups and compare to the result of multiplication. describe a context in which a total number of objects is represented by a product. interpret the product in the context of a real-world problem.</p> <p>Learning Goal 1: Interpret products of whole numbers as repeated addition and as the total number of objects (up to 100) in equal groups or arrays.</p>
<p>3.OA.3. Use multiplication and division within 100 to solve word problems in situations involving equal groups, arrays, and measurement quantities, e.g., by using drawings and equations with a symbol for the unknown number to represent the problem. *(benchmarked)</p>	<p>MP.1 Make sense of problems and persevere in solving them. MP.4 Model with mathematics.</p>	<p>Concept(s): No new concept(s) introduced Students are able to: multiply to solve word problems involving equal groups and arrays. divide to solve word problems involving equal groups and arrays. represent a word problem with a drawing showing equal groups, arrays, equal shares, and/or total objects. represent a word problem with an equation.</p> <p>Learning Goal 2: Use multiplication and division within 100 to solve word problems by modeling equal groups or arrays and by writing equations to represent equal groups or arrays</p>
<p>3.OA.4. Determine the unknown whole number in a multiplication or division equation relating three whole numbers. For example, determine the unknown number that makes the equation true in each of the equations <math>8 \times ? = 48</math>, <math>5 = \div 3</math>, <math>6 \times 6 = ?</math>.</p>	<p>MP.2 Reason abstractly and quantitatively. MP.7 Look for and make use of structure.</p>	<p>Concept(s): Equal sign indicates that the value of the numerical expressions on each side are the same. Unknown in an equation (<math>4 \times \underline{\quad} = 20</math> and <math>20 = ? \times 4</math>) represents a number. Unknown can be in different positions. Letters can represent numbers in equations. Students are able to: determine which operation is needed to find the unknown. multiply or divide, within 100, to find the unknown whole number in a</p>

	multiplication or division equation.	Learning Goal 3: Determine the unknown in a division or multiplication equation relating 3 whole numbers (within 100).	
<p>■ 3.OA.6. Understand division as an unknown-factor problem. For example, find <math>32 \div 8</math> by finding the number that makes 32 when multiplied by 8.</p>	<p>MP.3 Construct viable arguments and critique the reasoning of others.</p> <p>MP.6 Attend to precision.</p> <p>MP.7 Look for and make use of structure.</p>	<p>Concept(s): Division can be represented as a multiplication problem having an unknown factor. Relationships between factors, products, quotients, divisors and dividends. Students are able to: write division number sentences as unknown factor problems. solve division of whole numbers by finding the unknown factor.</p> <p>Learning Goal 4: Solve division of whole numbers by representing the problem as an unknown factor problem.</p>	
<p>■ 3.OA.9. Identify arithmetic patterns (including patterns in the addition table or multiplication table), and explain them using properties of operations. <i>For example, observe that 4 times a number is always even, and explain why 4 times a number can be decomposed into two equal addends.</i></p>	<p>MP.3 Construct viable arguments and critique the reasoning of others.</p> <p>MP.6 Attend to precision.</p> <p>MP.7 Look for and make use of structure.</p> <p>MP.8 Look for and express regularity in repeated reasoning.</p>	<p>Concept(s): Addition and multiplication tables reveal arithmetic patterns. Patterns may be related to whether a number is even or odd. Patterns exist in rows, columns and diagonals of addition tables and multiplication tables. Decomposing numbers into equal addends may reveal patterns. Students are able to: explain arithmetic patterns using properties of operations.</p> <p>Learning Goal 5: Recognize arithmetic patterns, including patterns in addition or multiplication tables, and explain the patterns using properties of operations.</p>	
<p>■ 3.NBT.1. Round whole numbers to the nearest 10 or 100.</p>	<p>MP.2 Reason abstractly and quantitatively.</p>	<p>Concept(s): Rounding leads to an approximation or estimate. Students are able to: use number lines and a hundreds charts to explain rounding numbers to the nearest 10 and 100. round a whole number to the nearest 10. round a whole number to the nearest 100.</p>	

<p>■ 3.NBT..2. Fluently add and subtract within 1000 using strategies and algorithms based on place value, properties of operations, and/or the relationship between addition and subtraction. *(benchmark)</p>	<p>MP 2 Reason abstractly and quantitatively.</p>	<p>Learning Goal 6: Round whole numbers to the nearest 10 or 100.          Concept(s): No new concept(s) introduced          Students are able to:          add and subtract two 2-digit whole numbers within 100 with accuracy and efficiency.          Learning Goal 7: Fluently add and subtract (with regrouping) two 2-digit whole numbers within 100.</p>
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**Union Township - Unit 1 Grade 3**  
**District/School Formative/Summative Assessment Plan**

Both formative and summative assessments are vital components of effective mathematics curriculum. Formative assessments, (e.g., pre-assessments, observation checklists, discussions of strategies students use to solve problems, etc.) assist in instructional planning and implementation; summative assessments (e.g., unit assessments, quarterly benchmarks, etc.) inform learner growth related to important mathematics concepts. All district-adopted resources contain multiple assessment tools and include online resources that can be used for the purposes delineated above. They include but are not limited to:

- I-Ready Diagnostic(Formative/Summative)*
- Beginning/Middle of the Year Assessment (GO Math Program)*
- GO Math Checkpoints (Formative)*
- Go Math Chapter Tests(Fortmative/Summative)*
- EdConnect district created benchmarks (Summative)*



## Classroom Observation/Checklists (Formative)

### Focus Mathematical Concepts

*Districts should consider listing prerequisites skills. Concepts that include a focus on relationships and representation might be listed as grade level appropriate.*

**Prerequisite skills:** In order to be able to master the standards covered in this unit, (adding and subtracting within 1000, rounding to the nearest tens and hundreds, and understanding multiplication concepts) students must have a grasp on the following concepts:

#### **Adding and Subtracting:**

Recognize the numerals 0, 1, 2, 3, 4, 5, 6, 7, 8, 9.

Basic addition and subtraction facts to 99 without regrouping

Understand place value

#### **Rounding:**

“Counting on” and “counting back”

Counting by ones; “skip counting” by tens

Familiarity with discrete concrete objects and base ten concrete materials

#### **Multiplication Concepts:**

“Skip counting” by 2’s, 5’s, and 10’s

Ability to count and group objects

#### **Common Misconceptions:**

**NBT.1 Rounding:** The use of the terms “round up” or “round down” can confuse many students. For example: if the student is asked to round the number 47. They would say that it rounds to 50 or “rounds up”. The tens place digit changes from a 4 to a 5. This causes a problem when “rounding down”. For example: 42 should be rounded to 40, but when the students use the previous method they will often “round down” the digit in the tens place from 4 to 3 therefore making it 30 instead of 40.

<p><b>NBT.2 Place Value:</b> It is possible that students may not have a conceptual understanding of place value so when adding or subtracting in expanded form they may believe that 456 would be <math>4+5+6</math> instead of <math>400+50+6</math>. Students with no number line experience may want to put each number on the number line. They may not know how to space the numbers so that they represent the number correctly.</p> <p><b>NBT.2 Mental Math:</b> If students have previously been exposed to the standard algorithm, when they are asked to compute math mentally, they will usually perform the standard algorithm in their head instead of using a different strategy.</p> <p><b>OA.1-4</b> Students think a symbol (<math>?</math> Or <math>n</math>) is always the place for the answer. This is especially true when the problem is written as <math>15 \div 3 = ?</math> or <math>15 = n \times 3</math>. Students also think that <math>3 + 15 = 5</math> and <math>15 \div 3 = 5</math> are the same equations. The use of models is essential in helping students eliminate this understanding.</p> <p>The use of a symbol to represent a number once cannot be used to represent another number in a different problem/situation. Presenting students with multiple situations in which they select the symbol and explain what it represents will counter this misconception.</p> <p><b>OA.9</b> Thinking students should be required to use a specific method when solving a problem, rather than allowing students to freely select from different strategies. Thinking that relying on key words is always an effective strategy in problem solving. In the equation <math>17 + 20 = 37</math>, students tend to think that <math>17 + 20</math> is the problem and the equal sign means "the answer is next." However, in an equation such as <math>17 + 20 = 37</math>, it should be thought of as <math>17 + 20</math> is the same as 37.</p> <p><b>Number Fluency (for grades K-5):</b> Add/Subtract within 1000 Multiply within 100</p>	<p><b>District/School Primary and Supplementary Resources</b></p> <p>GO Math Chapter 1 (district provided textbook) Go Math Chapter 3 (district provided textbook) Go Math Chapter 4 (district provided textbook)</p>
<p><b>District/School Tasks</b></p> <p>3.OA.2 Fish Tanks 3.OA.3 Analyzing Word Problems Involving Multiplication 3.OA.4 Finding the unknown in a division equation</p>	

<p><u>3.NBT.1 Rounding to 50 or 500</u>  <u>3.NBT.1 Rounding to the Nearest Ten and Hundred</u>  <u>3.NBT.2 Fluently Add and Subtract Within 1000</u>  <u>3.NBT.1 The Great Round Up Performance Task</u>  <u>3.NBT.1.2 Three Other Ways</u>  <u>3.NBT.2 Arrow Cards</u>  <u>3.NBT.2 Mental Math</u>  <u>3.OA.1,2 PBA 3 Problems</u>  <u>3.OA.9 Skip Counting</u>  <u>3.OA.1,2,3,4 Ice Cream Scoops</u></p>	<p><i>Think Central(website for GO Math program)</i>  <i>I-Ready</i>  <b>Suggested supplemental books:</b>  <i>The Best of Times by Greg Tang</i>  <i>Math for All Seasons by Greg Tang</i>  <i>The Grapes of Math by Greg Tang</i>  <i>Two of Everything by Lily Toy Hong</i>  <i>Amanda Bean's Amazing Dream by Cindy Neuschwander</i></p>
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**Instructional Best Practices and Exemplars**

*In this unit, educators should consider implementing learning experiences which provide opportunities for students to:*

- 1. Make sense of problems and persevere in solving them.**
  - a. Determine what the problem is asking for: equation to represent the problem; determining the unknown in a given problem, justifying the solution using arithmetic patterns or estimation.
  - b. Determine whether concrete or virtual models, pictures, mental mathematics, or equations are the best tools for solving the problem.
  - c. Check the solution with the problem to verify that it does answer the question asked.
  
- 2. Reason abstractly and quantitatively**
  - a. Compare the equation within the problem using concrete or virtual models.
  - b. Use arithmetic patterns and/or estimation to make sense of the problem and justify the solution.
  
- 3. Construct Viable Arguments and critique the reasoning of others.**
  - a. Compare the equations or models used by others with yours.
  - b. Examine the steps taken that produce an incorrect response and provide a viable argument as to why the process produced an incorrect response.
  - c. Use the calculator to verify the correct solution, when appropriate.

**4. Model with Mathematics**

- a. Construct visual models using concrete or virtual manipulatives, pictures, or equations to justify thinking and display the solution.

**5. Use appropriate tools strategically**

- a. Use Digi-Blocks, base ten blocks, counters, addition or multiplication tables, or other models, as appropriate.
- b. Use the calculator to verify computation.

**6. Attend to precision**

- a. Use mathematics vocabulary such as addend, product, factor, equation, etc. properly when discussing problems.
- b. Demonstrate their understanding of the mathematical processes required to solve a problem by carefully showing all of the steps in the solving process.
- c. Correctly write and read equations.
- d. Use  $<$ ,  $=$ , and  $>$  appropriately to compare expressions.

**7. Look for and make use of structure.**

- a. Use the patterns illustrated in addition and multiplication tables to justify solutions.
- b. Use the relationships demonstrated in the properties of operations to justify solutions.

**8. Look for and express regularity in reasoning**

- a. Use the patterns illustrated in addition and multiplication tables to justify solutions.
- b. Use the relationships demonstrated in the properties of operations to justify solutions.

**3.NBT.1.** Students learn when and why to round numbers. They identify possible answers and halfway points. Then they narrow where the given number falls between the possible answers and halfway points. They also understand that by convention if a number is exactly at the halfway point of the two possible answers, the number is rounded up. **Example:** Round 128 to the nearest 10.

Step 1: The answer is either 120 or 130.

Step 2: The halfway point is 125.

Step 3: 128 is between 125 and 130.

Step 4: Therefore, the rounded number is 180

### 3.NBT.2.

Problems should include both vertical and horizontal forms, including opportunities for students to apply the commutative and associative properties. Adding and subtracting fluently refers to knowledge of procedures, knowledge of when and how to use them appropriately, and skill in performing them flexibly, accurately, and efficiently. Students explain their thinking and show their work by using strategies and algorithms, and verify that their answer is reasonable.

#### Example:

• Mary read 573 pages during her summer reading challenge. She was only required to read 399 pages. How many extra pages did Mary read beyond the challenge requirements?

Students may use several approaches to solve the problem including the traditional algorithm. Examples of other methods students may use are listed below:

- $399 + 1 = 400$ ,  $400 + 100 = 500$ ,  $500 + 73 = 573$ , therefore  $1 + 100 + 73 = 174$  pages (Adding up strategy)
- $400 + 100$  is 500;  $500 + 73$  is 573;  $100 + 73$  is 173 plus 1 (for 399, not 400) is 174 (Compensating strategy)
- Take away 73 from 573 to get to 500, take away 100 to get to 400, and take away 1 to get to 399.  
Then  $73 + 100 + 1 = 174$  (Subtracting to count down strategy)
- $399 + 1$  is 400, 500 (that's 100 more). 510, 520, 530, 540, 550, 560, 570, (that's 70 more), 571, 572, 573 (that's 3 more) so the total is  $1 + 100 + 70 + 3 = 174$  (Adding by tens or hundreds strategy)

### 3.OA.9.

Students need ample opportunities to observe and identify important numerical patterns related to operations. They should build on their previous experiences with properties related to addition and subtraction

. Students investigate addition and multiplication tables in search of patterns and explain why these patterns make sense mathematically.

#### For example:

- Any sum of two even numbers is even.
- Any sum of two odd numbers is even.
- Any sum of an even number and an odd number is odd.
- The multiples of 4, 6, 8, and 10 are all even because they can all be decomposed into two equal groups.
- The doubles (2 adds the same) in an addition table fall on a diagonal while the doubles (multiples of 2) in a multiplication table fall on

horizontal and vertical lines.

- The multiples of any number fall on a horizontal line due to the commutative property.
- All the multiples of 5 end in a 0 or 5 while all the multiples of 10 end with 0. Every other multiple of 5 is a multiple of 10. Students also investigate a hundreds chart in search of addition and subtraction patterns. They record and organize all the different possible sums of a number and explain why the pattern makes sense.

### 3.OA.8.

Students should be exposed to multiple problem-solving strategies (using any combination of words, numbers, diagrams, physical objects or symbols) and be able to choose which ones to use.

#### Examples:

- Jerry earned 231 points at school last week. This week he earned 79 points. If he uses 60 points to earn free time on a computer, how many points will he have left?  
A student may use the number line above to describe his/her thinking, "231 + 9 = 240 so now I need to add 70 more. 240, 250 (10 more), 260 (20 more), 270, 280, 290, 300, 310 (70 more). Now I need to count back 60. 310, 300 (back 10), 290 (back 20), 280, 270, 260, 250 (back 60)."

A student writes the equation,  $231 + 79 - 60 = m$  and uses rounding ( $230 + 80 - 60$ ) to estimate.

A student writes the equation,  $231 + 79 - 60 = m$  and calculates  $79 - 60 = 19$  and then calculates  $231 + 19 = m$ .

- The soccer club is going on a trip to the water park. The cost of attending the trip is \$63. Included in that price is \$13 for lunch and the cost of 2 wristbands, one for the morning and one for the afternoon. Write an equation representing the cost of the field trip and determine the price of one wristband.

The above diagram helps the student write the equation,  $w + w + 13 = 63$ . Using the diagram, a student might think, "I know that the two wristbands cost \$50 ( $\$63 - \$13$ ) so one wristband costs \$25." To check for reasonableness, a student might use front end estimation and say  $60 - 10 = 50$  and  $50 \div 2 = 25$ .

When students solve word problems, they use various estimation skills which include identifying when estimation is appropriate, determining the level of accuracy needed, selecting the appropriate method of estimation, and verifying solutions or determining the reasonableness of solutions. Estimation strategies include, but are not limited to:

- using benchmark numbers that are easy to compute

- front-end estimation with adjusting (using the highest place value and estimating from the front end making adjustments to the estimate by taking into account the remaining amounts)
- rounding and adjusting (students round down or round up and then adjust their estimate depending on how much the rounding changed the original values)

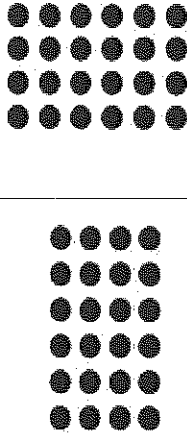
**3.OA.1** This standard requires students to think in terms of groups of things rather than individual things. Students learn that the multiplication symbol 'x' means "groups of" and problems such as  $5 \times 7$  refer to 5 groups of 7. Students should be exposed to appropriate terminology. (equal groups, factor, product)

**3.OA.3\*** Students use a variety of representations for creating and solving one step word problems, i.e., numbers, words, pictures, physical objects, or equations. They use multiplication and division of whole numbers up to  $10 \times 10$ . Students explain their thinking, show their work by using at least one representation, and verify that their answer is reasonable.

Word problems may be represented in multiple ways:

**Equations:**  $4 \times 6 = ?$ ,  $6 \times 4 = ?$ ,  $24 \div 4 = ?$  and  $24 \div 6 = ?$

**Arrays:**



$$4 \times 6 = 24$$

$$6 \times 4 = 24$$

**Equal groups:**

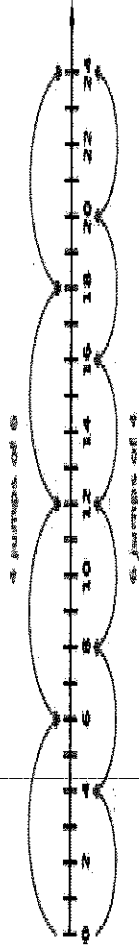


$$4 \times 6 = 24$$

**Repeated addition:**  $4 + 4 + 4 + 4 + 4$

**Repeated subtraction:**  $24-4=20$ ,  $20-4=16$ ,  $16-4=12$ ,  $12-4=8$ ,  $8-4=4$ ,  $4-4=0$

**Number line:** Four equal jumps forward from 0 on the number line to 24  
Six equal jumps forward from 0 on the number line to 24





Overview	Standards for Mathematical Content	Unit Focus	Standards for Mathematical Practice
<b>Unit 2</b>  <b>Modeling Multiplication, Division and Fractions</b>	<ul style="list-style-type: none"> <li>■ 3.OA.A.3*</li> <li>■ 3.OA.B.5</li> <li>■ 3.MD.C.7c</li> <li>■ 3.MD.C.7d*</li> <li>■ 3.OA.C.7*</li> <li>■ 3.OA.D.8*</li> <li>■ 3.OA.D.9</li> <li>◎ 3.NBT.A.2*</li> <li>■ 3.NF.A.1</li> <li>□ 3.G.A.2</li> </ul>	<ul style="list-style-type: none"> <li>• Represent and solve problems involving multiplication and division</li> <li>• Understand properties of multiplication and the relationship between multiplication and division</li> <li>• Geometric measurement: understand concepts of area and relate area to multiplication and to addition</li> <li>• Multiply and divide within 100</li> <li>• Solve problems involving the four operations, and identify and explain patterns in arithmetic</li> <li>• Use place value understanding and properties of operations to perform multi-digit arithmetic</li> <li>• Develop understanding of fractions as numbers.</li> <li>• Reason with shapes and their attributes</li> </ul>	<p>MP.1 Make sense of problems and persevere in solving them.</p> <p>MP.2 Reason abstractly and quantitatively.</p> <p>MP.3 Construct viable arguments and critique the reasoning of others.</p> <p>MP.4 Model with mathematics.</p> <p>MP.5 Use appropriate tools strategically.</p> <p>MP.6 Attend to precision.</p> <p>MP.7 Look for and make use of structure.</p> <p>MP.8 Look for and express regularity in repeated reasoning.</p>
<b>Unit 2:</b>  <b>Suggested Open Educational Resources</b>	<ul style="list-style-type: none"> <li>3.OA.A.3 <a href="#">Two Interpretations of Division</a></li> <li>3.OA.B.5 <a href="#">Valid Equalities? (Part 2)</a></li> <li>3.MD.C.7c <a href="#">Introducing the Distributive Property</a></li> <li>3.OA.C.7 <a href="#">Kiri's Multiplication Matching Game</a></li> <li>3.OA.D.8 <a href="#">The Class Trip</a></li> <li>3.OA.D.9 <a href="#">Addition Patterns</a></li> <li>3.NF.A.1 <a href="#">Naming the Whole for a Fraction</a></li> <li>3.G.A.2 <a href="#">Representing Half of a Circle</a></li> </ul>		

**Unit 2 Grade 3**

Content Standards	Suggested Standards for Mathematical Practice	Critical Knowledge & Skills
<p>■ 3.OA.A.3. Use multiplication and division within 100 to solve word problems in situations involving equal groups, arrays, and measurement quantities, e.g., by using drawings and equations with a symbol for the unknown number to represent the problem. *(benchmark)</p>	<p>MP.1 Make sense of problems and persevere in solving them.</p> <p>MP.4 Model with mathematics.</p>	<p>Concept(s): No new concept(s) introduced</p> <p>Students are able to:</p> <ul style="list-style-type: none"> <li>multiply to solve word problems involving arrays and measurement quantities (area).</li> <li>divide to solve word problems involving arrays and measurement quantities (area).</li> <li>represent a word problem with a drawing or array.</li> <li>represent a word problem with an equation.</li> </ul> <p>Learning Goal 1: Use multiplication and division within 100 to solve word problems involving measurement quantities (area) using drawings.</p>
<p>■ 3.OA.B.5. Apply properties of operations as strategies to multiply and divide.  <i>Examples: If <math>6 \times 4 = 24</math> is known, then <math>4 \times 6 = 24</math> is also known. (Commutative property of multiplication.) <math>3 \times 5 \times 2</math> can be found by <math>3 \times 5 = 15</math>, then <math>15 \times 2 = 30</math>, or by <math>5 \times 2 = 10</math>, then <math>3 \times 10 = 30</math>. (Associative property of multiplication.) Knowing that <math>8 \times 5 = 40</math> and <math>8 \times 2 = 16</math>, one can find <math>8 \times 7</math> as <math>8 \times (5 + 2) = (8 \times 5) + (8 \times 2) = 40 + 16 = 56</math>. (Distributive property.)</i>                      *[Students need not use the formal</p>	<p>MP.3 Construct viable arguments and critique the reasoning of others.</p> <p>MP.5 Use appropriate tools strategically.</p> <p>MP.6 Attend to precision.</p> <p>MP.7 Look for and make use of structure.</p>	<p>Concept(s):</p> <ul style="list-style-type: none"> <li>Properties are rules about relationships between numbers.</li> <li>Changing the order of factors does not change the result of multiplication.</li> <li>Changing the order of numbers does change the result of division.</li> <li>Area of a rectangle with whole-number side lengths <math>a</math> and <math>b + c</math> is the sum of <math>a \times b</math> and <math>a \times c</math>.</li> <li>Area models can be used to represent the distributive property.</li> </ul> <p>Students are able to:</p> <ul style="list-style-type: none"> <li>multiply whole numbers using the commutative property as a strategy.</li> <li>multiply whole numbers using the associative property as a strategy.</li> <li>use tiling to show that the area of a rectangle with whole-number side lengths <math>a</math> and <math>b + c</math> is the sum of <math>a \times b</math> and <math>a \times c</math>.</li> <li>multiply whole numbers using the distributive property as a strategy.</li> </ul>

Unit 2 Grade 3

Content Standards	Suggested Standards for Mathematical Practice	Critical Knowledge & Skills
<p>terms for these properties.]</p> <p>*[Limit to single digit factors and multipliers. <math>7 \times 4 \times 5</math> would exceed grade 3 expectations because it would result in a two-digit multiplier (<math>28 \times 5</math>)]</p> <p>■ 3.MD.C.7. Relate area to the operations of multiplication and addition.</p> <p>3.MD.C.7c. Use tiling to show in a concrete case that the area of a rectangle with whole-number side lengths <math>a</math> and <math>b + c</math> is the sum of <math>a \times b</math> and <math>a \times c</math>. Use area models to represent the distributive property in mathematical reasoning.</p>		<p>Learning Goal 2: Multiply one-digit whole numbers by applying the properties of operations (commutative, associative, and distributive properties).</p> <p>Learning Goal 3: Use tiling and an area model to represent the distributive property.</p>

**Unit 2 Grade 3**

Content Standards	Suggested Standards for Mathematical Practice	Critical Knowledge & Skills
<p>■ 3.MD.C.7. Relate area to the operations of multiplication and addition.</p> <p>3.MD.C.7d. Recognize area as additive. Find areas of rectilinear figures by decomposing them into non-overlapping rectangles and adding the areas of the non-overlapping parts, applying this technique to solve real world problems.</p>	<p>MP.3 Construct viable arguments and critique the reasoning of others.</p> <p>MP.5 Use appropriate tools strategically.</p> <p>MP.6 Attend to precision.</p> <p>MP.7 Look for and make use of structure.</p>	<p>Concept(s):</p> <ul style="list-style-type: none"> <li>• Areas of rectilinear figures can be determined by decomposing them into non-overlapping rectangles and adding the areas of the parts. Students are able to:</li> <li>• decompose rectilinear figures into non-overlapping rectangles.</li> <li>• find areas of non-overlapping rectangles and add to find the area of the rectilinear figure.</li> <li>• solve real world problems involving area of rectilinear figures.</li> </ul> <p>Learning Goal 4: Solve real-world problems involving finding areas of rectilinear figures by decomposing them into non-overlapping rectangles and adding the areas of the non-overlapping parts.</p>
<p>■ 3.OA.C.7. Fluently multiply and divide within 100, using strategies such as the relationship between multiplication and division (e.g., knowing that <math>8 \times 5 = 40</math>, one knows <math>40 \div 5 = 8</math>) or properties of operations. By the end of Grade 3, know from memory all products of two one-digit numbers. *(benchmark)</p>	<p>MP.2 Reason abstractly and quantitatively.</p> <p>MP.7 Look for and make use of structure.</p> <p>MP.8 Look for and express regularity in repeated reasoning.</p>	<p>Concept(s): No new concept(s) introduced</p> <p>Students are able to:</p> <ul style="list-style-type: none"> <li>• multiply and divide within 40 with accuracy and efficiency.</li> </ul> <p>Learning Goal 5: Fluently multiply and divide within 40 using strategies such as the relationship between multiplication and division.</p>
<p>■ 3.OA.D.8. Solve two-step word problems using the four operations. Represent these problems using equations with a letter standing for the unknown quantity. Assess the reasonableness of answers using</p>	<p>MP.1 Make sense of problems and persevere in solving them.</p> <p>MP.2 Reason abstractly and quantitatively.</p>	<p>Concept(s):</p> <ul style="list-style-type: none"> <li>• Letters or symbols in an equation represent an unknown quantity. Students are able to:</li> <li>• represent the solution to two-step word problems with equations.</li> </ul>

**Unit 2 Grade 3**

Content Standards	Suggested Standards for Mathematical Practice	Critical Knowledge & Skills
<p>mental computation and estimation strategies including rounding. *(benchmarked)</p>	<p>MP.3 Construct viable arguments and critique the reasoning of others. MP.4. Model with mathematics MP.5 Use appropriate tools strategically. MP.6 Attend to precision.</p>	<ul style="list-style-type: none"> <li>• use a symbol to represent an unknown in an equation.</li> <li>• use rounding as an estimation strategy.</li> <li>• explain, using an estimation strategy, whether an answer is reasonable.</li> </ul> <p>Learning Goal 6: Write equations when solving two-step word problems, using a symbol for an unknown; find the value of an unknown in an equation involving any of the four operations and use estimation strategies to assess the reasonableness of answers.</p>
<p>3.OA.D.9. Identify arithmetic patterns (including patterns in the addition table or multiplication table), and explain them using properties of operations. <i>For example, observe that 4 times a number is always even, and explain why 4 times a number can be decomposed into two equal addends.</i></p>	<p>MP.3 Construct viable arguments and critique the reasoning of others. MP.6 Attend to precision. MP.7 Look for and make use of structure. MP.8 Look for and express regularity in repeated reasoning.</p>	<p>Concept(s):</p> <ul style="list-style-type: none"> <li>• Addition and multiplication tables reveal arithmetic patterns.</li> <li>• Patterns may be related to whether a number is even or odd.</li> <li>• Patterns exist in rows, columns and diagonals of addition tables and multiplication tables.</li> <li>• Decomposing numbers into equal addends may reveal patterns.</li> </ul> <p>Students are able to:</p> <ul style="list-style-type: none"> <li>• explain arithmetic patterns using properties of operations.</li> </ul> <p>Learning Goal 7: Recognize arithmetic patterns, including patterns in addition or multiplication tables, and explain the patterns using properties of operations.</p>

**Unit 2 Grade 3**

Content Standards	Suggested Standards for Mathematical Practice	Critical Knowledge & Skills
<p>3.NBT.A.2. Fluently add and subtract within 1000 using strategies and algorithms based on place value, properties of operations, and/or the relationship between addition and subtraction. *(benchmarked)</p>	<p>MP 2 Reason abstractly and quantitatively.</p>	<p>Concept(s): No new concept(s) introduced</p> <p>Students are able to:</p> <ul style="list-style-type: none"> <li>add and subtract two 2-digit whole numbers within 100 with accuracy and efficiency.</li> </ul> <p>Learning Goal 8: Fluently add and subtract (with regrouping) two 2-digit whole numbers within 100.</p>

**Unit 2 Grade 3 What This May Look Like**

**District/School Formative/Summative Assessment Plan**

Both formative and summative assessments are vital components of effective mathematics curriculum. Formative assessments, (e.g., pre-assessments, observation checklists, discussions of strategies students use to solve problems, etc.) assist in instructional planning and implementation; summative assessments (e.g., unit assessments, quarterly benchmarks, etc.) inform learner growth related to important mathematics concepts. All district-adopted resources contain multiple assessment tools and include online resources that can be used for the purposes delineated above. They include but are not limited to:

***I-Ready Diagnostic (Formative/Summative)***  
***Beginning/Middle of the Year Assessment (GO Math Program)***  
*GO Math Checkpoints (Formative)*

*Go Math Chapter Tests (Formative/Summative)*

***EdConnect district created benchmarks (Summative)***

***Classroom Observation/Checklists (Formative)***

Unit 2 Grade 3

Content Standards	Suggested Standards for Mathematical Practice	Critical Knowledge & Skills
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**Extended Constructed Response (ECR)- Summative**

**Focus Mathematical Concepts**

Prerequisite skills:

- Adding tens
- Regrouping tens as hundreds
- Multiplication facts through 9
- Counting back to subtract
- Counting equal groups
- Combining plane shapes

Common Misconceptions:

**Multiplication** – When using patterns to complete a function table, students use a pattern without testing it on all the numbers in the table. When using a multiplication table, students may not follow the row or column of the product back to the other factor.

**Division** – Students may incorrectly divide a number into equal groups. When using the measurement model of division, students may get confused and use the number in equal groups instead of the number in groups. For example: Students may divide 15 shells into groups of 3 correctly, but give 3 as the number of boxes needed instead of 5. Students may also reverse the order of the divided and the divisor when writing a division equation.

**Fractions** – Students might confuse the numerator and denominator. Students may have difficulty recognizing equal parts or making equal shares when there is a part left over. When naming unit fractions of a whole, students may only count the unshaded parts as the denominator. Students might have difficulty identifying the denominator for fractions greater than 1.

Number Fluency (for grades K-5):

**Multiply and Divide within 100**

Unit 2 Grade 3

Content Standards	Suggested Standards for Mathematical Practice	Critical Knowledge & Skills
<b>District/School Primary and Supplementary Resources</b>		
3.OA Finding the unknown in a division equation		<ul style="list-style-type: none"> <li>Go Math Third Grade Teacher and Student Editions</li> </ul>
3.OA Valid Equalities? (Part 2)		<ul style="list-style-type: none"> <li>Go Math Enrich, Reteach, and On Level pages</li> <li>Think Central for school and home/ITools</li> </ul>
3.OA Kiri's Multiplication Matching Game		<ul style="list-style-type: none"> <li>Math on the Spot Videos</li> </ul>
3.OA The Class Trip		<ul style="list-style-type: none"> <li>Go Math Grab-and-Go Centers kit</li> </ul>
3.OA Addition Patterns		<ul style="list-style-type: none"> <li>IReady Program</li> </ul>
3.OA Patterns in the multiplication table		<ul style="list-style-type: none"> <li>Math Journal</li> </ul>
3.MD, 3.G, 3.NF Halves, thirds, and sixths		<ul style="list-style-type: none"> <li>Educational games</li> </ul>
3.NF Naming the Whole for a Fraction		<ul style="list-style-type: none"> <li>Math Literature</li> </ul>
3.OA Two Interpretations of Division		<ul style="list-style-type: none"> <li>- Party Plans by the Numbers! – (Go Math)</li> </ul>
3.OA Markers in Boxes		<ul style="list-style-type: none"> <li>- The Homework Table – (Go Math)</li> </ul>
3.OA Gifts from Grandma, Variation 1		<ul style="list-style-type: none"> <li>- The Garden Fence – (Go Math)</li> </ul>
3.OA Analyzing Word Problems Involving Multiplication		<ul style="list-style-type: none"> <li>- Corey's Cookie Caper – (Go Math)</li> </ul>
		<ul style="list-style-type: none"> <li>- Sports Camp – (Go Math)</li> </ul>
		<ul style="list-style-type: none"> <li>- On the Menu: Bamboo, Figs, and Other Tasty Treats – (Go Math)</li> </ul>
		<ul style="list-style-type: none"> <li>- Pizza Parts – (Go Math)</li> </ul>
		<ul style="list-style-type: none"> <li>- The Whole Picture – (Go Math)</li> </ul>
		<ul style="list-style-type: none"> <li>Graphic Organizers</li> </ul>



Unit 2 Grade 3

Content Standards	Suggested Standards for Mathematical Practice	Critical Knowledge & Skills
<p>3_MD Introducing the Distributive Property</p> <p>3_G Representing Half of a Circle</p>		<p><b>Math Websites and Resources:</b></p> <ul style="list-style-type: none"> <li>- <a href="http://www.insidemathematics.org">http://www.insidemathematics.org</a></li> <li>- <a href="http://maccess.ncdpi.wikispaces.net/Third+Grade">http://maccess.ncdpi.wikispaces.net/Third+Grade</a></li> <li>- <a href="http://www.noycefdn.org/math.php">http://www.noycefdn.org/math.php</a></li> <li>- <a href="http://nlvm.usu.edu/">http://nlvm.usu.edu/</a></li> <li>- <a href="http://mrsgebauer.com/mathsites.html">http://mrsgebauer.com/mathsites.html</a></li> <li>- <a href="https://www.teachingchannel.org/videos/third-grade-math-lesson">https://www.teachingchannel.org/videos/third-grade-math-lesson</a></li> <li>- <a href="http://www.illustrativemathematics.org/web/games/StopTheClock/sthec3.html">www.illustrativemathematics.org/web/games/StopTheClock/sthec3.html</a></li> <li>- <a href="http://www.k-5mathteachingresources.com/">www.k-5mathteachingresources.com/</a></li> <li>- <a href="http://www.multiplication.com">www.multiplication.com</a></li> <li>- <a href="http://www.georgiastandards.org/Common-Core/Pages/Math-K-5.aspx">www.georgiastandards.org/Common-Core/Pages/Math-K-5.aspx</a></li> <li>- <a href="http://www.illustrativemathematics.org/">www.illustrativemathematics.org/</a></li> <li>- <a href="https://www.app.activateinstruction.org/playlist/resource-sview/id/53c03664f07787db75f1a968/rid/53c08d26f077877f7df1a969/bc0/explore/bc1/playlist">https://www.app.activateinstruction.org/playlist/resource-sview/id/53c03664f07787db75f1a968/rid/53c08d26f077877f7df1a969/bc0/explore/bc1/playlist</a></li> </ul>
<p><b>Instructional Best Practices and Exemplars</b></p>		
<ul style="list-style-type: none"> <li>• Students will be assessed on formative questions and tiered accordingly each day. Students will work in collaborative groups and explain how they arrived at their answers. This will help students develop reasoning skills and make real world connections to mathematics.</li> </ul>		

**Unit 2 Grade 3**

Content Standards	Suggested Standards for Mathematical Practice	Critical Knowledge & Skills
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- Students will work in their groups to complete daily problem solving applications. This will help students use collaborative skills and provide them with opportunity to explain their mathematical processes, as well as share and model test-taking strategies.
- Teacher and student modeling will be utilized daily with usage of technology to promote problem solving, communication, and 21<sup>st</sup> century skills. At the close of each lesson, a student volunteer will restate the lesson and explain how to complete the objective, allowing students to take on leadership roles and work on speaking and listening skills.
- Students will participate with various Math Journal activities, which will reinforce the lesson. It will also provide students with the opportunity to explain mathematical processes in written form.
- Students will play Multiplication Bingo and Division Bingo – Students practice facts through 10
- Students will read “Sports Camp” to find out how teams are divided during sports
- Students will play “Division Match” by matching a quotient to a given fact
- Students will read “Corey’s Cookie Caper” and find out how Corey and Carly divide cookies equally among friends
- Students will read “The Garden Fence” to find how much wood they would need to build a fence
- Students will read “The Homework Table” and see how multiplication and division are related on a multiplication table
- Students will play “All in the Family” where students write sets of related facts using numbers from the gameboard and number cards
- Students will find Patterns in Multiplication Charts
- Students will practice by working in groups or pairs to challenge each other in interactive multiplication and division games
- Students will skip count on number lines to create multiplication equations and counting back for division
- Students will use two sided counters to create arrays
- Students will create/Use flash cards to work with partners and practice facts
- Students will present their reasoning for ECR questions to the class to practice speaking and listening skills
- Students will create Fraction Avenue – Students follow directions to draw houses on Fraction Avenue – For Example:  $\frac{2}{3}$  of house have a red roof
- Students will play Fraction BINGO – Students will match fraction pictures to the fractions on a game board
- Lucky Charms Fractions – Students will form fractions using cereal pieces – advanced learners can calculate decimals and percentages
- Fraction Scavenger Hunt – Students search the classroom to find fraction cards and write answers on Response Form
- Read Pizza Parts – Students will read about how to find equal parts to write fractions

**Unit 2 Grade 3**

**Content Standards**

**Suggested Standards for Mathematical Practice**

**Critical Knowledge & Skills**

- Play “Fish for Fractions” – Students play game of Go Fish in which they match fraction symbols, words, and symbols
- Read “The Whole Picture” – Students read the book and model fractional parts
- Play “Fraction Action” Students find fractional parts of a group of pattern blocks
- Play “Who’s the Greatest?” – Students will use fraction tiles to compare and order fractions
- Read “Eating Fractions” – Students learn how everyday foods can be divided equally among friends
-