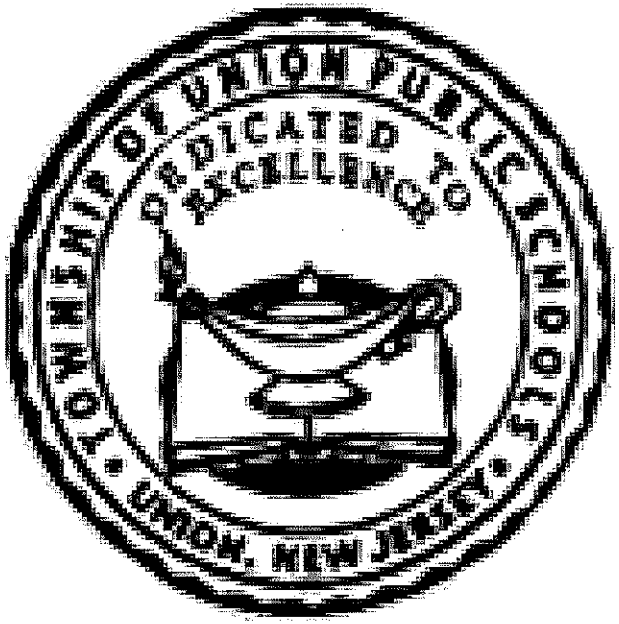
TOWNSHIP OF UNION PUBLIC SCHOOLS



Mathematics Grade 3
Curricular Framework - Units 1-4

Curriculum Guide

Updated December 18, 2018

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

Content	Number of Days
Unit 1	45
Unit 2	45
Unit 3	45
Unit 4	45

Unit 1 Grade 3		
Content & Practice Standards	**Suggested Standards from Mathematical Practice**	**Critical Knowledge & Skills**
• 3.OA.1. Interpret products of whole numbers, e.g., interpret 5 x 7 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 5 x 7.	MP 2 Reason abstractly and quantitatively. MP.4 Model with mathematics.	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. 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.
• 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)	MP.1 Make sense of problems and persevere in solving them. MP.4 Model with mathematics.	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. 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
• 3.OA.4. Determine the unknown whole number in a multiplication or division	MP 2 Reason abstractly and quantitatively.	Concept(s): Equal sign indicates that the value of the numerical expressions on each side

equation relating three whole numbers. For example, determine the unknown number that makes the equation true in each of the equations 8 × ? = 48, 5 = ÷ 3, 6 × 6 = ?.	MP.7 Look for and make use of structure.	are the same. Unknown in an equation (4 x __ = 20 and 20 = ? x 4) 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 multiplication or division equation. Learning Goal 3: Determine the unknown in a division or multiplication equation relating 3 whole numbers (within 100).
• 3.OA.6. Understand division as an unknown-factor problem. For example, find 32 ÷ 8 by finding the number that makes 32 when multiplied by 8.	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.	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. Learning Goal 4: Solve division of whole numbers by representing the problem as an unknown factor problem.
• 3.OA..9. Identify arithmetic patterns (including patterns in the addition table or multiplication table), and explain them using properties of operations. *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.*	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.	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. Learning Goal 5: Recognize arithmetic patterns, including patterns in addition or multiplication tables, and explain the patterns using properties of operations.
• 3.NBT..1. Round whole numbers to the nearest 10 or 100.	MP 2 Reason abstractly and quantitatively.	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. Learning Goal 6: Round whole numbers to the nearest 10 or 100.
• 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. *(benchmarked)	MP 2 Reason abstractly and quantitatively.	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.

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.

NBT.2 Place Value: 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 4+5+6 instead of 400+50+6.
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 to that they represent the number correctly
NBT.2 Mental Math: 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.

OA.1-4 Students think a symbol (? Or n) is always the place for the answer. This is especially true when the problem is written as 15 ÷ 3 =? or 15 = n x 3.
Students also think that 3 ÷ 15 = 5 and 15 ÷ 3 = 5 are the same equations. The use of models is essential in helping students eliminate this understanding.

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.

OA.9 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 17 + 20 = 37, students tend to think that 17 + 20 is the problem and the equal sign means "the answer is next." However, in an equation such as 17 + 20 = 37, it should be thought of as 17 + 20 *is the same as* 37.

Number Fluency (for grades K-5):

Add/Subtract within 1000
Multiply within 100

District/School Tasks	District/School Primary and Supplementary Resources
3.OA.2 Fish Tanks	*GO Math Chapter 1(district provided textbook)*

3.OA.3 Analyzing Word Problems Involving Multiplication 3.OA.4 Finding the unknown in a division equation 3.NBT.1 Rounding to 50 or 500 3.NBT.1 Rounding to the Nearest Ten and Hundred 3.NBT.2 Fluently Add and Subtract Within 1000 3.NBT.1 The Great Round Up Performance Task 3.NBT.1.2 Three Other Ways 3.NBT.2 Arrow Cards 3.NBT.2 Mental Math 3.OA.1,2 PBA 3 Problems 3.OA.9 Skip Counting 3.OA.1,2,3,4 Ice Cream Scoops	*Go Math Chapter 3 (district provided textbook)* *Go Math Chapter 4(district provided textbook)* *Think Central(website for GO Math program)* *I-Ready* ***Suggested supplemental books:*** *The Best of Times by Greg Tang* *Math for All Seasons by Greg Tang* *The Grapes of Math by Greg Tang* *Two of Everything by Lily Toy Hong* *Amanda Bean's Amazing Dream by Cindy Neuschwander*

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 addends 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 and a vertical 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)."

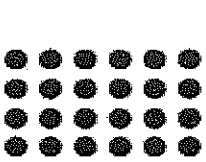
A student writes the equation, 231 + 79 –60 = m and uses rounding (230 + 80 –60) to estimate.
A student writes the equation, 231 + 79 –60 = m and calculates 79 –60 = 19and then calculates 231 + 19 = m.
• The soccer club is going on a trip to the water park. The cost of attending the trip is $63. Included 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.

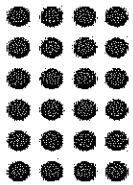
The above diagram helps the student write the equation, w + w + 13 = 63. Using the diagram, a student might think, "I know that the two wristbands cost $50 ($63-$13) so one wristband costs $25." To check for reasonableness, a student might use front end estimation and say 60-10 = 50 and 50 ÷ 2 = 25.

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 x 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 x10. 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 x 6 = ?, 6 x 4 = ?, 24 ÷ 4 = ? and 24 ÷ 6 = ?
Arrays:





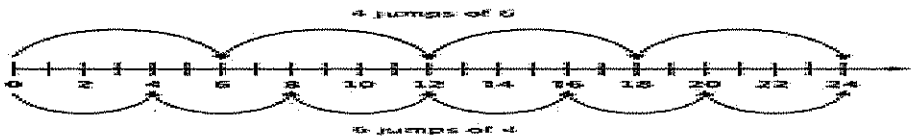
$4 \times 6 = 24$ $6 \times 4 = 24$

Equal groups:

4x6=24

Repeated addition: 4 + 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



Students with Disabilities, English Language Learners, and Gifted & Talented Students:
Differentiating instruction is a flexible process that includes the planning and design of instruction, how that instruction is delivered, and how student progress is measured. Teachers recognize that students can learn in multiple ways. By providing appropriately challenging learning, teachers can maximize success for all students.

Examples of Strategies and Practices that Support Students with Disabilities:
***Refer to students' IEP for specific modifications and accommodations**

- Use of visual and multisensory formats
- Use of assisted technology
- Use of prompts
- Modification of content and student products
- Testing accommodations
- Authentic assessments

Examples of Strategies and Practices that Support Gifted & Talented Students:

- Adjusting the pace of lessons
- Curriculum compacting
- Inquiry-based instruction
- Independent study
- Higher-order thinking skills
- Interest-based content
- Student-driven instruction

• Real-world problems and scenarios

Examples of Strategies and Practices that Support English Language Learners:
***All WIDA Can Do Descriptors can be found at:** https://wida.wisc.edu/teach/can-do/descriptors
• Pre-teaching of vocabulary and concepts
• Visual learning, including graphic organizers
• Use of cognates to increase comprehension
• Teacher modeling
• Pairing students with beginning English language skills
with students who have more advanced English language skills
• Scaffolding
•Word walls
•Sentence frames
•Think-pair-share
•Cooperative learning groups
•Teacher think-aloud

Interdisciplinary connections are made across grades and content areas to model the integration of knowledge and skills in the real world.

21st Century Themes

- Global Awareness
- Environmental Literacy
- Health Literacy
- Civic Literacy
- Financial, Economic, Business, and Entrepreneurial Literacy

21st Century Skills

- Creativity and Innovation (E)
- Critical Thinking and Problem Solving (T) (A)
- Communication (E)
- Collaboration (E) (T)

Career Ready Practices:

- CRP1: Act as a responsible and contributing citizen and employee.
- CRP2: Apply appropriate academic and technical skills.
- CRP3: Attend to personal health and financial well-being.
- CRP4: Communicate clearly and effectively and with reason.
- CRP5: Consider the environmental, social and economic impacts of decisions.
- CRP6: Demonstrate creativity and innovation.
- CRP7: Employ valid and reliable research strategies.
- CRP8: Utilize critical thinking to make sense of problems and persevere in solving them.
- CRP9: Model integrity, ethical leadership and effective management.
- CRP10: Plan education and career paths aligned to personal goals.
- CRP11: Use technology to enhance productivity.
- CRP12: Work productively in teams while using global competence.

9.1 Personal Financial Literacy

This standard outlines the important fiscal knowledge, habits, and skills that must be mastered in order for students to make informed decisions about personal finance. Financial literacy is an integral component of a student's college and career readiness, enabling students to achieve fulfilling, financially-

secure, and successful careers.

9.2 Career Awareness, Exploration, and Preparation
This standard outlines the importance of being knowledgeable about one's interests and talents, and being well informed about postsecondary and career options, career planning, and career requirements.

9.3 Career and Technical Education
This standard outlines what students should know and be able to do upon completion of a CTE Program of Study

Technology Standards: Technology standards are embedded throughout all curricular units.

8.1 Educational Technology All students will use digital tools to access, manage, evaluate, and synthesize information in order to solve problems individually and collaborate and create and communicate knowledge.

8.2 Technology Education, Engineering, Design and Computational Thinking - Programming
All students will develop an understanding of the nature and impact of technology, engineering, technological design, computational thinking and the designed world as they relate to the individual, global society, and the environment.

Overview	Standards for Mathematical Content	Unit Focus	Standards for Mathematical Practice

Unit 2 **Modeling Multiplication, Division and Fractions**	• 3.OA.A.3* • 3.OA.B.5 • 3.MD.C.7c • 3.MD.C.7d* • 3.OA.C.7* • 3.OA.D.8* • 3.OA.D.9 • 3.NBT.A.2* • 3.NF.A.1 • 3.G.A.2	• Represent and solve problems involving multiplication and division • Understand properties of multiplication and the relationship between multiplication and division • Geometric measurement: understand concepts of area and relate area to multiplication and to addition • Multiply and divide within 100 • Solve problems involving the four operations, and identify and explain patterns in arithmetic • Use place value understanding and properties of operations to perform multi-digit arithmetic • Develop understanding of fractions as numbers. • Reason with shapes and their attributes	MP.1 Make sense of problems and persevere in solving them. MP.2 Reason abstractly and quantitatively. MP.3 Construct viable arguments and critique the reasoning of others. MP.4 Model with mathematics. MP.5 Use appropriate tools strategically. MP.6 Attend to precision. MP.7 Look for and make use of structure. MP.8 Look for and express regularity in repeated reasoning.
Unit 2: ***Suggested Open Educational Resources***	3.OA.A.3 Two Interpretations of Division 3.OA.B.5 Valid Equalities? (Part 2) 3.MD.C.7c Introducing the Distributive Property 3.OA.C.7 Kiri's Multiplication Matching Game 3.OA.D.8 The Class Trip 3.OA.D.9 Addition Patterns 3.NF.A.1 Naming the Whole for a Fraction 3.G.A.2 Representing Half of a Circle		

Unit 2 Grade 3		
Content Standards	**Suggested Standards for Mathematical Practice**	**Critical Knowledge & Skills**

• 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. *(benchmarked)	MP.1 Make sense of problems and persevere in solving them. MP.4 Model with mathematics.	Concept(s): No new concept(s) introduced Students are able to: • multiply to solve word problems involving arrays and measurement quantities (area). • divide to solve word problems involving arrays and measurement quantities (area). • represent a word problem with a drawing or array. • represent a word problem with an equation. Learning Goal 1: Use multiplication and division within 100 to solve word problems involving measurement quantities (area) using drawings.
• 3.OA.B.5. Apply properties of operations as strategies to multiply and divide. *Examples: If $6 \times 4 = 24$ is known, then $4 \times 6 = 24$ is also known. (Commutative property of multiplication.) $3 \times 5 \times 2$ can be found by $3 \times 5 = 15$, then $15 \times 2 = 30$, or by $5 \times 2 = 10$, then $3 \times 10 = 30$. (Associative property of multiplication.) Knowing that $8 \times 5 = 40$ and $8 \times 2 = 16$, one can find 8×7 as $8 \times (5 + 2) = (8 \times 5) + (8 \times 2) = 40 + 16 = 56$. (Distributive property.)* *[Students need not use the formal terms for these properties.] *[Limit to single digit factors and multipliers. 7 x 4 x 5 would exceed grade 3 expectations because it would result in a two-digit multiplier (28 x 5)]	MP.3 Construct viable arguments and critique the reasoning of others. MP.5 Use appropriate tools strategically. MP.6 Attend to precision. MP.7 Look for and make use of structure.	Concept(s): • Properties are rules about relationships between numbers. • Changing the order of factors does not change the result of multiplication. • Changing the order of numbers does change the result of division. • Area of a rectangle with whole-number side lengths a and $b + c$ is the sum of $a \times b$ and $a \times c$. • Area models can be used to represent the distributive property. Students are able to: • multiply whole numbers using the commutative property as a strategy. • multiply whole numbers using the associative property as a strategy. • use tiling to show that the area of a rectangle with whole-number side lengths a and $b + c$ is the sum of $a \times b$ and $a \times c$. • multiply whole numbers using the distributive property as a strategy. Learning Goal 2: Multiply one-digit whole numbers by applying the properties of operations (commutative, associative, and distributive properties). Learning Goal 3: Use tiling and an area model to represent the distributive property.

• 3.MD.C.7. Relate area to the operations of multiplication and addition. 3.MD.C.7c. Use tiling to show in a concrete case that the area of a rectangle with whole-number side lengths a and $b + c$ is the sum of $a \times b$ and $a \times c$. Use area models to represent the distributive property in mathematical reasoning.		
• 3.MD.C.7. Relate area to the operations of multiplication and addition. 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.	MP.3 Construct viable arguments and critique the reasoning of others. MP.5 Use appropriate tools strategically. MP.6 Attend to precision. MP.7 Look for and make use of structure.	Concept(s): • 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: • decompose rectilinear figures into non-overlapping rectangles. • find areas of non-overlapping rectangles and add to find the area of the rectilinear figure. • solve real world problems involving area of rectilinear figures. 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.
• 3.OA.C.7. Fluently multiply and divide within 100, using strategies such as the relationship between multiplication and division (e.g., knowing that $8 \times 5 = 40$, one knows $40 \div 5 = 8$) or properties of operations. By the end of Grade 3,	MP 2 Reason abstractly and quantitatively. MP.7 Look for and make use of structure. MP.8 Look for and express regularity in repeated reasoning.	Concept(s): No new concept(s) introduced Students are able to: • multiply and divide within 40 with accuracy and efficiency. Learning Goal 5: Fluently multiply and divide within 40 using strategies such as the

know from memory all products of two one-digit numbers. *(benchmarked)		relationship between multiplication and division.
• 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 mental computation and estimation strategies including rounding. *(benchmarked)	MP.1 Make sense of problems and persevere in solving them. MP 2 Reason abstractly and quantitatively. MP.3 Construct viable arguments and critique the reasoning of others. MP 4. Model with mathematics MP.5 Use appropriate tools strategically. MP.6 Attend to precision.	Concept(s): • Letters or symbols in an equation represent an unknown quantity. Students are able to: • represent the solution to two-step word problems with equations. • use a symbol to represent an unknown in an equation. • use rounding as an estimation strategy. • explain, using an estimation strategy, whether an answer is reasonable. 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.
• 3.OA.D.9. Identify arithmetic patterns (including patterns in the addition table or multiplication table), and explain them using properties of operations. *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.*	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.	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. Learning Goal 7: Recognize arithmetic patterns, including patterns in addition or multiplication tables, and explain the patterns using properties of operations.

• 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)	MP 2 Reason abstractly and quantitatively.	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 8: Fluently add and subtract (with regrouping) two 2-digit whole numbers within 100.

Union Township - Unit 2 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)

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 able. 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 revers 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

District/School Tasks	District/School Primary and Supplementary Resources
3.OA Finding the unknown in a division equation 3.OA Valid Equalities? (Part 2) 3.OA Kiri's Multiplication Matching Game 3.OA The Class Trip	• Go Math Third Grade Teacher and Student Editions • Go Math Enrich, Reteach, and On Level pages • Think Central for school and home/ITools • Math on the Spot Videos • Go Math Grab-and-Go Centers kit • IReady Program

3.OA Addition Patterns 3.OA Patterns in the multiplication table 3.MD, 3.G, 3.NF Halves, thirds, and sixths 3.NF Naming the Whole for a Fraction 3.OA Two Interpretations of Division 3.OA Markers in Boxes 3.OA Gifts from Grandma, Variation 1 3.OA Analyzing Word Problems Involving Multiplication 3.MD Introducing the Distributive Property 3.G Representing Half of a Circle	• Math Journal • Educational games • Math Literature - Party Plans by the Numbers! – (Go Math) - The Homework Table – (Go Math) - The Garden Fence – (Go Math) - Corey's Cookie Caper – (Go Math) - Sports Camp – (Go Math) - On the Menu: Bamboo, Figs, and Other Tasty Treats – (Go Math) - Pizza Parts – (Go Math) - The Whole Picture – (Go Math) • Graphic Organizers **Math Websites and Resources:** - http://www.insidemathematics.org - http://maccss.ncdpi.wikispaces.net/Third+Grade - http://www.noycefdn.org/math.php) - http://nlvm.usu.edu/ - http://mrsgebauer.com/mathsites.html - https://www.teachingchannel.org/videos/third-grade-math-lesson - www.illustrativemathematics.org/ - web/games/StopTheClock/sthec3.html - www.k-5mathteachingresources.com/ - www.multiplication.com - www.georgiastandards.org/Common-Core/Pages/Math-K-

	5.aspx - www.illustrativemathematics.org/ - https://www.app.activateinstruction.org/playlist/resource-sview/id/53c03664f07787db75f1a968/rid/53c08d26f077877f7d[illegible]1a969/bc0/explore/bc1/playlist

Instructional Best Practices and Exemplars

Students with Disabilities, English Language Learners, and Gifted & Talented Students:
Differentiating instruction is a flexible process that includes the planning and design of instruction, how that instruction is delivered, and how student progress is measured. Teachers recognize that students can learn in multiple ways. By providing appropriately challenging learning, teachers can maximize success for all students.

Examples of Strategies and Practices that Support Students with Disabilities:
***Refer to students' IEP for specific modifications and accommodations**
• Use of visual and multisensory formats
• Use of assisted technology
• Use of prompts
• Modification of content and student products
• Testing accommodations
• Authentic assessments

Examples of Strategies and Practices that Support Gifted & Talented Students:
• Adjusting the pace of lessons
• Curriculum compacting
• Inquiry-based instruction

• Independent study
• Higher-order thinking skills
• Interest-based content
• Student-driven instruction
• Real-world problems and scenarios

Examples of Strategies and Practices that Support English Language Learners:
***All WIDA Can Do Descriptors can be found at:** https://wida.wisc.edu/teach/can-do/descriptors
• Pre-teaching of vocabulary and concepts
• Visual learning, including graphic organizers
• Use of cognates to increase comprehension
• Teacher modeling
• Pairing students with beginning English language skills
with students who have more advanced English language skills
• Scaffolding
•Word walls
•Sentence frames
•Think-pair-share
•Cooperative learning groups
•Teacher think-aloud

Interdisciplinary connections are made across grades and content areas to model the integration of knowledge and skills in the real world.

21st Century Themes

- Global Awareness
- Environmental Literacy
- Health Literacy

- Civic Literacy
- Financial, Economic, Business, and Entrepreneurial Literacy

21st Century Skills

- Creativity and Innovation (E)
- Critical Thinking and Problem Solving (T) (A)
- Communication (E)
- Collaboration (E) (T)

Career Ready Practices:

- CRP1: Act as a responsible and contributing citizen and employee.
- CRP2: Apply appropriate academic and technical skills.
- CRP3: Attend to personal health and financial well-being.
- CRP4: Communicate clearly and effectively and with reason.
- CRP5: Consider the environmental, social and economic impacts of decisions.
- CRP6: Demonstrate creativity and innovation.
- CRP7: Employ valid and reliable research strategies.
- CRP8: Utilize critical thinking to make sense of problems and persevere in solving them.
- CRP9: Model integrity, ethical leadership and effective management.
- CRP10: Plan education and career paths aligned to personal goals.
- CRP11: Use technology to enhance productivity.
- CRP12: Work productively in teams while using global competence.

9.1 Personal Financial Literacy
This standard outlines the important fiscal knowledge, habits, and skills that must be mastered in order for students to make informed decisions about personal finance. Financial literacy is an integral component of a student's college and career readiness, enabling students to achieve fulfilling, financially-secure, and successful careers.

9.2 Career Awareness, Exploration, and Preparation
This standard outlines the importance of being knowledgeable about one's interests and talents, and being well informed about postsecondary and career options, career planning, and career requirements.

9.3 Career and Technical Education
This standard outlines what students should know and be able to do upon completion of a CTE Program of Study

Technology Standards: Technology standards are embedded throughout all curricular units.

8.1 Educational Technology All students will use digital tools to access, manage, evaluate, and synthesize information in order to solve problems individually and collaborate and create and communicate knowledge.

8.2 Technology Education, Engineering, Design and Computational Thinking - Programming
All students will develop an understanding of the nature and impact of technology, engineering, technological design, computational thinking and the designed world as they relate to the individual, global society, and the environment.

- 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 21st 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: 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
- 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

Unit 3 **Fractions as Numbers and Measurement**	• 3.NF.A.2 • 3.NF.A.3 • 3.MD.A.1 • 3.MD.A.2 • 3.G.A.1 • 3.MD.D.8 • 3.OA.C.7*	• Develop understanding of fractions as numbers • Solve problems involving measurement and estimation of intervals of time, liquid volumes, and masses of objects • Reason with shapes and their attributes • Recognize perimeter as an attribute of plane figures and distinguish between linear and area measure • Multiply and divide within 100	MP.1 Make sense of problems and persevere in solving them. MP.2 Reason abstractly and quantitatively. MP.3 Construct viable arguments and critique the reasoning of others. MP.4 Model with mathematics. MP.5 Use appropriate tools strategically.
Unit 3: ***Suggested Open Educational Resources***	3.NF.A.2 Closest to 1/2 3.NF.A.2 Find 1 Starting from 5/3 3.NF.A.2 Locating Fractions Greater than One on the Number Line 3.NF.A.3b, 3.G.A.2, 3.MD.C.6 Halves, thirds, and sixths		

	3.MD.A.1 Dajuana's Homework 3.MD.A.2 How Heavy?	MP.6 Attend to precision. MP.7 Look for and make use of structure.

Unit 3 Grade 3		
Content Standards	**Suggested Standards for Mathematical Practice**	**Critical Knowledge & Skills**
• 3.NF.A.2. Understand a fraction as a number on the number line; represent fractions on a number line diagram. 3.NF.A.2a. Represent a fraction 1/*b* on a number line diagram by defining the interval from 0 to 1 as the whole and partitioning it into *b* equal parts. Recognize that	MP.5 Use appropriate tools strategically.	Concept(s): • Fraction is a number and has its place on the number line. • When placing unit fractions on a number line, the space between 0 and 1 is the whole and must be partitioned into equal parts. • Each part of a whole has the same size (one-half, one-third, one-fourth, one-sixth or one-eighth). • Parts of the whole that begin at 0 and ends at 1/b on the number line is the location of fraction 1/b (one-half, one-third, one-fourth, one-sixth, or one-eighth). Students are able to:

each part has size 1/*b* and that the endpoint of the part based at 0 locates the number 1/*b* on the number line. 3.NF.A.2b. Represent a fraction *a*/*b* on a number line diagram by marking off *a* lengths 1/*b* from 0. Recognize that the resulting interval has size *a*/*b* and that its endpoint locates the number *a*/*b* on the number line. *[Grade 3 expectations in this domain are limited to fractions with denominators 2, 3, 4, 6, and 8.]		• partition a number line into parts of equal sizes between 0 and 1 (halves, thirds, fourths sixths and eighths). • plot unit fractions on the number line. • identify multiple parts (of length 1/b) on the number line. • plot a fraction on the number line by marking off multiple parts of size 1/b. • plot fractions equivalent to whole numbers including 0 and up to 5. Learning Goal 1: Draw a number line depicting the position of 1/b (with b = 2, 3, 4, 6, or 8); represent the unit fraction ¼ on the number line by partitioning the number line between 0 and 1 into 4 equal lengths and name the point at the end of the first length as the position of the unit fraction ¼; apply the same method for placing points 1/2, 1/3, 1/6, and 1/8 on the number line. Learning Goal 2: Draw a number line depicting the position of fraction *a*/*b* (with *b* = 2, 4, 3, 6, or 8, and including whole numbers up to 5).
• 3.NF.A.3. Explain equivalence of fractions in special cases, and compare fractions by reasoning about their size 3.NF.A.3a. Understand two fractions as equivalent (equal) if they are the same size, or the same point on a number line. 3.NF.A.3b. Recognize and generate simple equivalent fractions, e.g., 1/2 = 2/4, 4/6 = 2/3). Explain why the fractions are equivalent, e.g., by using a visual fraction model. 3.NF.A.3c. Express whole numbers as fractions, and	MP 2 Reason abstractly and quantitatively. MP.3 Construct viable arguments and critique the reasoning of others. MP.4 Model with mathematics. MP.5 Use appropriate tools strategically. MP.7 Look for and make use of structure.	Concept(s): • Comparing fractions, each referencing the same *whole*. • Fractions are equivalent if they are the same size. • Fractions are equivalent if they are at the same point on a number line. Students are able to: • find equivalent fractions (limited to fractions with denominators 2, 3, 4, 6, and 8). • explain why two fractions are equivalent; use a visual fraction model to support explanation. • write whole numbers as fractions. • identify fractions that are equivalent to whole numbers. • compare two fractions having the same numerator by reasoning about their size. • compare two fractions having the same denominator by reasoning about their size. • explain why comparing fractions that do not have the same whole is not valid (reason about their size and support reasoning with a model). • use <, =, and > symbols to write comparisons of fractions and justify conclusions with a visual fraction model.

recognize fractions that are equivalent to whole numbers. *Examples: Express 3 in the form 3 = 3/1; recognize that 6/1 = 6; locate 4/4 and 1 at the same point of a number line diagram.* 3.NF.A.3d. Compare two fractions with the same numerator or the same denominator by reasoning about their size. Recognize that comparisons are valid only when the two fractions refer to the same whole. Record the results of comparisons with the symbols >, =, or <, and justify the conclusions, e.g., by using a visual fraction model. *[Grade 3 expectations in this domain are limited to fractions with denominators 2, 3, 4, 6, and 8.]		Learning Goal 3: Generate simple equivalent fractions, explain why they are equivalent, and support the explanation with visual fraction models; locate them on the number line. Learning Goal 4: Express whole numbers as fractions, identify fractions equivalent to whole numbers and locate them on the number line. Learning Goal 5: Compare two fractions having the same numerator; compare two fractions having the same denominator; reason about their size and use the symbols >, =, or < to record the comparison.
• 3.MD.A.1. Tell and write time to the nearest minute and measure time intervals in minutes. Solve word problems involving addition and subtraction of time intervals in minutes. (e.g., by representing the problem on a number line diagram)	MP.1 Make sense of problems and persevere in solving them. MP 2 Reason abstractly and quantitatively. MP.4 Model with mathematics. MP.5 Use appropriate tools strategically.	Concept(s): • Analog clocks represent hours as numbers and minutes are represented as tick marks. Students are able to: • tell time to the nearest minute using digital and analog clocks. • write time to the nearest minute using analog clocks. • choose appropriate strategies to solve real world problems involving time. • use the number line as a visual model to determine intervals of time as *jumps* on a number line. • measure time intervals. Learning Goal 6: Tell and write time to the nearest minute, and solve word problems with

		addition and subtraction involving time intervals in minutes.
• 3.MD.A.2. Measure and estimate liquid volumes and masses of objects using standard units of grams (g), kilograms (kg), and liters (l). Add, subtract, multiply, or divide to solve one-step word problems involving masses or volumes that are given in the same units.	MP.1 Make sense of problems and persevere in solving them. MP 2 Reason abstractly and quantitatively. MP.4 Model with mathematics. MP.5 Use appropriate tools strategically. MP.6 Attend to precision.	Concept(s): • Mass may be measured in grams and kilograms. • Mass is measured by weighing. • Volume may be measured in liters. • Volume may be measured with instruments such as beakers. Students are able to: • measure and read a scale to estimate volume. • measure and read a scale to estimate mass. • add, subtract, multiply, or divide to solve one-step word problems involving masses or volumes. Learning Goal 7: Solve one step word problems by estimating and measuring volume and mass using appropriate tools and standard units of grams, kilograms, and liters.
• 3.G.A.1. Understand that shapes in different categories (e.g., rhombuses, rectangles, and others) may share attributes (e.g., having four sides), and that the shared attributes can define a larger category (e.g., quadrilaterals). Recognize rhombuses, rectangles, and squares as examples of quadrilaterals, and draw examples of quadrilaterals.	MP.5 Use appropriate tools strategically. MP.6 Attend to precision. MP.7 Look for and make use of structure.	Concept(s): • Shapes in different categories share attributes. • Quadrilaterals are closed figures with four sides. • Rhombuses, rectangles, etc, and other quadrilaterals share attributes. Students are able to: • classify and sort shapes by attributes. • explain why rhombuses, rectangles, and squares are examples of quadrilaterals. • draw examples of quadrilaterals. Learning Goal 9: Recognize rhombuses, rectangles, and squares as examples of quadrilaterals, and draw examples of quadrilaterals that do not belong to any of these subcategories.
• 3.MD.D.8. Solve real world and mathematical problems involving perimeters of polygons, including finding the perimeter given the side lengths, finding an unknown	MP.1 Make sense of problems and persevere in solving them. MP 2 Reason abstractly and quantitatively.	Concept(s): • Perimeter of a figure is equivalent to the sum of the length of all of the sides. • Rectangles that have same perimeter can have different areas. • Rectangles that have same area can have different perimeters.

side length, and exhibiting rectangles with the same perimeter and different areas or with the same area and different perimeters.	MP.4 Model with mathematics. MP.5 Use appropriate tools strategically.	Students are able to: • determine the perimeter of various plane shapes and irregular shapes given the side lengths. • determine the unknown side length give the perimeter and other sides. • show rectangles having the same perimeter and different areas. • show rectangles having different perimeters and the same area. Learning Goal 10: Solve real world and mathematical problems involving perimeters of polygons, including finding the perimeter given the side lengths, finding an unknown side length, and exhibiting rectangles with the same perimeter and different areas or with the same area and different perimeters.
• 3.OA.C.7. Fluently multiply and divide within 100, using strategies such as the relationship between multiplication and division (e.g., knowing that $8 \times 5 = 40$, one knows $40 \div 5 = 8$) or properties of operations. By the end of Grade 3, know from memory all products of two one-digit numbers. *(benchmarked)	MP 2 Reason abstractly and quantitatively. MP.7 Look for and make use of structure. MP.8 Look for and express regularity in repeated reasoning.	Concept(s): No new concept(s) introduced Students are able to: • multiply and divide within 100 with accuracy and efficiency. Learning Goal 8: Fluently multiply and divide within 100 using strategies such as the relationship between multiplication and division.

Union Township - Unit 3 Grade 3

District/School Formative/Summative Assessment Plan

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Classroom Observation/Checklists (Formative)

Focus Mathematical Concepts

In order to be able to master the standards covered in this unit, develop an understanding of fractions as numbers, solve problems involving measurement and estimation of intervals of time, liquid volumes, and masses of objects, reason with shapes and their attributes, recognize perimeter as an attribute of plane figures and distinguish between linear and area measure, and multiply and divide within 100, students must have a grasp on the following concepts:

Prerequisite skills:

Understanding fractions as numbers

Solve problems involving measurement of intervals of time, liquid volumes and masses of objects

In second grade, the students learn to tell time to the nearest 5 minute intervals. This skill will be built upon and expanded by telling time with intervals on both clocks and number lines.

Reason with shapes and their attributes

Solve problems involving perimeter

Students need to be able to add to find the perimeter of an object when the lengths of the sides are given. They also need to be able to subtract when the given shape has a missing side length.

Multiply and divide within 100

Students need to be able to skip count and know their addition facts in order to be able to multiply and in order to divide they need to know their multiplication facts.

Common Misconceptions:

Fractions:

Student writes fraction as part/part instead of part/whole
Student does not understand that when finding fractions of amounts, lengths, or areas, the parts need to be equal in size.
Student does not understand that fractions are numbers as well as portions of a whole
Student has restricted her definition and thinks fractions have to be less than 1.
Student thinks that when finding fractions using area models, the equal-sized pieces must look the same.
Student over generalizes and thinks that "all 1 4 s (for example) are equal"; does not understand that the size of the whole determines the size of the fractional part.
Over generalizes the idea that "the bigger the denominator, the smaller the part" by ignoring numerators when comparing fractions.
Restricts interpretation of fractions inappropriately and does not understand that different fractions that name the same amount are equivalent

Time:

Students cannot count by 5's
Students cannot understand elapsed time

Mass and Volume:

Student lacks "benchmarks" that allows estimation measures

Perimeter:

Students believe that the perimeter is just the "outside" of the object

Number Fluency (for grades K-5):

Multiply and divide with 100

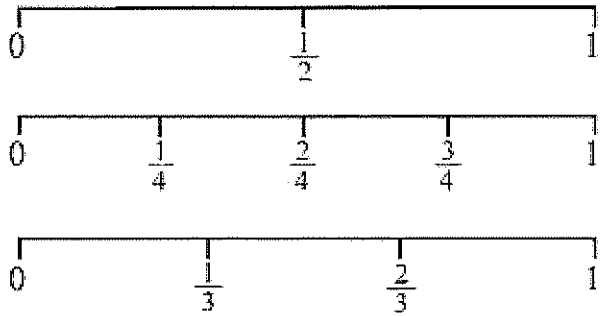
District/School Tasks	District/School Primary and Supplementary Resources
Solve problems involving measurement and estimation of intervals of time, liquid volumes, and masses of objects. (3.MD.1-3.MD.2) Develop understanding of fractions as numbers. (3.NF.1-3.NF.3) Multiply and divide within 100 (3.OA.7) Geometric measurement: recognize perimeter as an attribute of plane figures and distinguish between linear and area measures. (3.MD.8) Reason with shapes and their attributes. (3.G.1-3.G.2) 3.NF.A.2 Closest to 1/2 3.NF.A.2 Find 1 Starting from 5/3 3.NF.A.2 Locating Fractions Greater than One on the Number Line 3.NF.A.3b, 3.G.A.2, 3.MD.C.6 Halves, thirds, and sixths 3.MD.A.1 Dajuana's Homework 3.MD.A.2 How Heavy? 3.MD.D Shapes and their Insides Draw Fun Fractions: http://math.rice.edu/~lanius/Patterns/draw.html Paper Quilts: http://illuminations.nctm.org/LessonDetail.aspx?ID=L307	**District Provided Primary Resources:** • Go Math Third Grade Teacher and Student Editions • Go Math Enrich, Reteach, and On Level pages • Think Central for school and home/ITools • Math on the Spot Videos • Go Math Grab-and-Go Centers kit • IReady Program • Math Journal • Educational games **Supplementary Resources:** **Books** Give Me Half By Stuart Murphy Pizza Counting By Christina Dobson Fractions = Trouble By Claudia Mills Eating Fractions By McMillian The Lions Share By Matthew McElligott Funny and Fabulous Fraction Stories By Dan Greenberg The Greedy Triangle By Marilyn Burns Shape Up By David Adler If You Were a Quadrilateral By Molly Blaisdell **Websites:** Creating equivalent fractions: http://illuminations.nctm.org/ActivityDetail.aspx?ID=80 Perimeter explorer http://www.shodor.org/inter activate/activities/Perimeter Explorer/

	Edible Fractions Lesson http://mathforum.org/paths/fractions/edible.fractions.html

Instructional Best Practices and Exemplars

3.NF.2. The students will be solving problems that involve creating locating a fraction on a number line and dividing a number line into fractions. They may do this by:

- Students transfer their understanding of parts of a whole to partition a number line into equal parts. There are two new concepts addressed in this standard which students should have time to develop. 1. On a number line from 0 to 1, students can partition (divide) it into equal parts and recognize that each segmented part represents the same length.

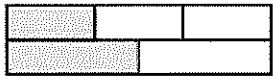


3.NF.3. The students will be comparing fractions with the same denominators and different denominators. They will be doing this by:

- looking at the size of the parts and the number of the parts. For example, 1/6 is smaller than ½ because when 1 whole is cut into 6 pieces, the pieces are much smaller than when 1 whole of the same size is cut into 2 pieces.
- using fraction bars to compare.

Examples of Fraction Bar Modeling:

Fraction Comparisons



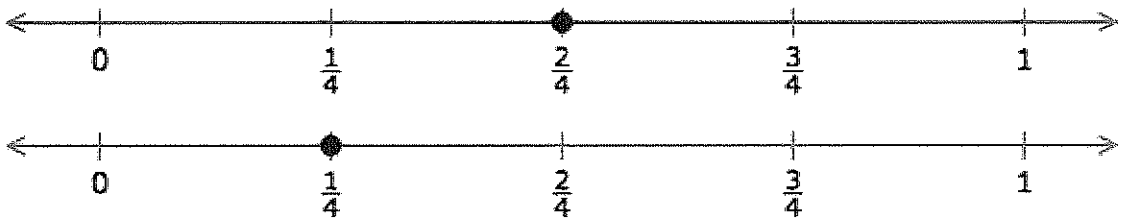
$\frac{1}{3} < \frac{1}{2}$

Equivalent Fractions

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

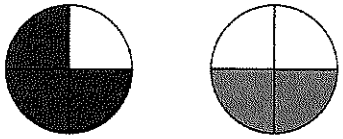
- Using a number line to compare.

  Which fraction is **less**?



- recognizing that when examining fractions with common denominators, the wholes have been divided into the same number of equal parts. So the fraction with the larger numerator has the larger number of equal parts.

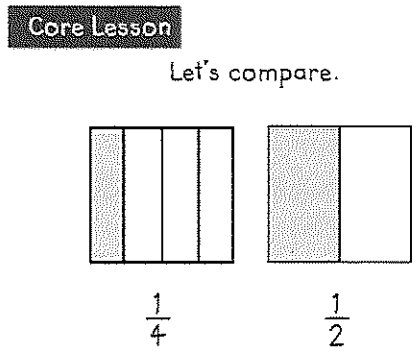
Compare Fractions 1



$\frac{3}{4} \square \frac{2}{4}$

The fractions $^3/_4$ and $^2/_4$ have the same denominator. Fractions with the same denominators are *like fractions.*

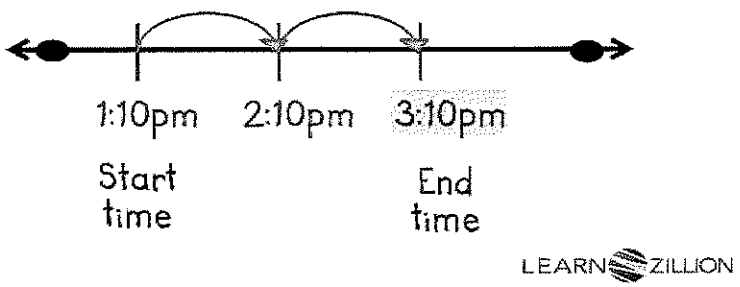
- recognizing that comparing fractions that have the same numerator but different denominators, they understand that each fraction has the same number of equal parts but the size of the parts are different. They can infer that the same number of smaller pieces is less than the same number of bigger pieces.



3.MD.1. The students will be building on the skill of telling time to the nearest five minutes. In third grade, they will extend telling time and measuring elapsed time both in and out of context using clocks and number lines. Students may use an interactive whiteboard to demonstrate understanding and justify their thinking. The students will also benefit from using hand held clocks and performing various "time checks" throughout the day.

- Example:

Core Lesson



3.MD.2. The best way to go about working on this standard is to give students as many opportunities as possible to weigh classroom objects and fill containers with liquid to help them develop a basic understanding of the size and weight of a liter, a gram, and a kilogram. Milliliters may also be used to show amounts that are less than a liter.

- Example: Students identify 10 things that weigh about five grams. They record their findings with words and pictures. (Students can repeat this for 1 gram and 10 grams.) This activity helps develop gram benchmarks. One large paperclip weighs about one gram. A box of large paperclips (100 clips) weighs about 100 grams so 10 boxes would weigh one kilogram.

3.MD.8 The students will be solving problems involving all aspects of perimeter, including real world problems, problems with missing sides, and comparing shapes with the same area and different perimeter and same perimeter different area. This may be done by:

- walking around the perimeter of a room and or fenced in area, or tracing around a shape on an interactive whiteboard. They may also find the perimeter of objects in the classroom; use addition to find perimeters; and recognize the patterns that exist when finding the sum of the lengths and widths of rectangles.
- using tiles and graph paper to find all the possible shapes that have a given perimeter (e.g., find the rectangles with a perimeter of 16 cm.) They can record all the possibilities using graph paper, compile the possibilities into an organized table, and determine whether they have all the possible rectangles.

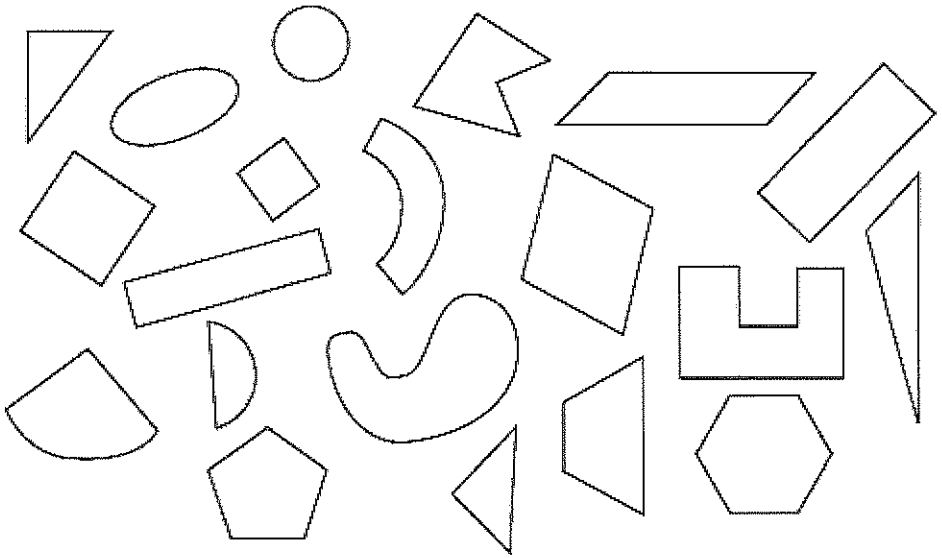
- using objects or pictures to find the missing length or width, when given a perimeter or length or width. They will record their solutions using words, diagrams, pictures, numbers, and an interactive whiteboard.
- using tiles, graph paper, or technology to find all the possible rectangles with a given area (e.g. find the rectangles that have an area of 24 square units.) They may then document all the possibilities on graph paper, compile the possibilities into a table, and determine whether they have all the possible rectangles. Students then investigate the perimeter of the rectangles with an area of 24.

Area	Length	Width	Perimeter
24 sq. in.	1 in.	24 in.	50 in.
24 sq. in.	2 in.	12 in.	28 in.
24 sq. in.	3 in.	8 in.	22 in.
24 sq. in	4 in.	6 in.	20 in.

3.G.1. The students will be expanding on identifying and drawing triangles, quadrilaterals, pentagons, and hexagons. They will do this by:

- building on this experience and further investigating quadrilaterals (technology may be used during this exploration). Students will recognize shapes that are and are not quadrilaterals by examining the properties of the geometric figures. They will conceptualize that a quadrilateral must be a closed figure with four straight sides and will begin to notice characteristics of the angles and the relationship between opposite sides. They should be sorting

geometric figures according to their attributes, such as open/closed shapes, polygons, squares, rectangles, and rhombuses as quadrilaterals.



3.OA.7 Fluently multiply and divide within 100

Common Multiplication and Division Situations

Unknown Product	Group Size Unknown	Number of Groups Unknown

	4x5=?	**(How many in each group?)** **4x?=20 or 20÷4=?**	**(How many groups are there?)** **?x5=20 or 20÷5=?**
Equal Groups	There are 4 bags with 5 plums in each bag. How many plums are there in all? **Measurement example:** You need 4 lengths of string, each 5 inches long. How much string will you need altogether?	If 20 plums are shared equally into 4 bags, then how many plums will be in each bag? **Measurement example:** You have 20 inches of string, which you will cut into 4 equal pieces. How long will each piece of string be?	If 20 plums are to be packed 5 to a bag, then how many bags are needed? **Measurement example:** You have 20 inches of string, which you will cut into pieces that are 5 inches long. How many pieces of string will you have?
Area/Arrays	There are 4 rows of apples with 5 apples in each row. How many apples are there? **Area example:** What is the area of a 4 cm by 5 cm rectangle?	If 20 apples are arranged into 4 equal rows, how many apples will be in each row? **Area example:** A rectangle has area 20 square centimeters. If one side is 4 cm long, how long is a side next to it?	If 20 apples are arranged into equal rows of 5 apples, how many rows will there be? **Area example:** A rectangle has area 20 square centimeters. If one side is 5 cm long, how long is a side next to it?
Compare	A blue hat costs $4. A red hat costs 5 times as much as the blue hat. How much does the red hat cost? **Measurement example:** A rubber band is 4 cm long. How long will the rubber band be when it is stretched to be 5 times as long?	A red hat costs $20 and that is 4 times as much as a blue hat costs. How much does a blue hat cost? **Measurement example:** A rubber band is stretched to be 20 cm long and that is 4 times as long as it was at first. How long was the rubber band at first?	A red hat costs $20 and a blue hat costs $5. How many times as much does the red hat cost as the blue hat? **Measurement example:** A rubber band was 5 cm long at first. Now it is stretched to be 20 cm long. How many times as long is the rubber band now as it was at first?
General	a x b = ?	a x ? = p, and p ÷ a = ?	? x b = p, and p ÷ b = ?

The first examples in each cell are examples of discrete things. These are easier for students and should be given before the measurement examples.
The language in the array examples shows the easiest form of array problems. A harder form is to use the terms rows and columns: The apples in the grocery window are in 3 rows and 6 columns. How many apples are in there? Both forms are valuable.
Area involves arrays of squares that have been pushed together so that there are no gaps or overlaps, so array problems include these especially important measurement situations

Adapted from The Leadership and Learning Center "Rigorous Curriculum Design" model. *Adapted from the Connecticut Standards for Mathematics.

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• Independent study
• Higher-order thinking skills
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• Student-driven instruction
• Real-world problems and scenarios

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• Teacher modeling
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•Sentence frames
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Content Standards	Suggested Standards for Mathematical Practice	Critical Knowledge & Skills
• 3.MD.B.3. Draw a scaled picture graph and a scaled bar graph to represent a data set with several categories. Solve one- and two-step "how many more" and "how many less" problems using information presented in scaled bar graphs. *For example, draw a bar graph in which each square in the bar graph might represent 5 pets.*	MP.1 Make sense of problems and persevere in solving them. MP 2 Reason abstractly and quantitatively. MP.4 Model with mathematics.	Concept(s): • Graphs organize information and contain labels. • Pictures and bars can represent numbers in graphs. • Different graphs may display different scales. Students are able to: • draw scaled picture graphs. • draw scaled bar graphs. • analyze, interpret and create bar graphs and pictographs in real world situations. • solve "how many more" and "how many less" problems using scaled bar graphs. Learning Goal 1: Draw scaled picture and scaled bar graphs to represent data with several categories. Solve one and two-step word problems using scaled bar graphs.
• 3.MD.B.4. Generate measurement data by measuring lengths using rulers marked with halves and fourths of an inch. Show the data by making a line plot, where the horizontal scale is marked off in appropriate units— whole numbers, halves, or quarters.	MP 2 Reason abstractly and quantitatively. MP.5 Use appropriate tools strategically.	Concept(s): • Show measurements on a line plot displays the information in an organized way Students are able to: • measure length using rulers marked with inch, quarter inch and half inch • generate measurement data by measuring length and create a line plot of the data • accurately measure several small objects using a standard ruler and display findings on a line plot • display data on line plots with horizontal scales in whole numbers, halves, and quarters Learning Goal 2: Depict data measured in fourths and halves of an inch with a line plot with scales marked with appropriate units
• 3.OA.C.7. Fluently multiply and divide within 100, using strategies such as the relationship between multiplication and division (e.g., knowing that $8 \times 5 = 40$, one knows $40 \div 5 = 8$) or properties of	MP 2 Reason abstractly and quantitatively. MP.7 Look for and make use of structure. MP.8 Look for and express regularity in	Concept(s): No new concept(s) introduced Students are able to: • multiply and divide within 100 with accuracy and efficiency.

operations. By the end of Grade 3, know from memory all products of two one-digit numbers. *(benchmarked)	repeated reasoning.	Learning Goal 3: Fluently multiply and divide within 100 using strategies such as the relationship between multiplication and division.
• 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 mental computation and estimation strategies including rounding. *(benchmarked)	MP.1 Make sense of problems and persevere in solving them. MP 2 Reason abstractly and quantitatively. MP.3 Construct viable arguments and critique the reasoning of others. MP 4. Model with mathematics MP.5 Use appropriate tools strategically. MP.6 Attend to precision.	Concept(s): • A letter or variable in an equation represents an unknown quantity. Students are able to: • represent two-step word problems with equation(s) containing unknowns. • perform operations in the conventional order (no parentheses). • use rounding as an estimation strategy. • explain, using an estimation strategy, whether an answer is reasonable. Learning Goal 4: Write equation(s) containing an unknown and find the value of an unknown in an equation that is a representation of a two-step word problem (with any four operations); use estimation strategies to assess the reasonableness of answers.
• 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)	MP 2 Reason abstractly and quantitatively.	Concept(s): No new concept(s) introduced Students are able to: • add and subtract within 1000 with accuracy and efficiency. Learning Goal 5: 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.
• 3.MD.C.7. Relate area to the operations of multiplication and addition. 3.MD.C.7d. Recognize area as	MP.3 Construct viable arguments and critique the reasoning of others.	Concept(s): • Areas of rectilinear figures can be determined decomposing the them into non-overlapping rectangles and adding the areas of the parts.

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. *(benchmarked)	MP.5 Use appropriate tools strategically. MP.6 Attend to precision. MP.7 Look for and make use of structure.	Students are able to: • decompose rectilinear figures into non-overlapping rectangles. • find areas of non-overlapping rectangles and add to find the area of the rectilinear figure. • solve real world problems involving area of rectilinear figures. Learning Goal 6: 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.

Union Township - Unit 4 Grade 3	
District/School Formative Assessment Plan	**District/School 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)

Extended Constructed Response (ECR)- Summative

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:

It is expected that students will have prior knowledge/experience related to the concepts and skills identified below.
It may be necessary to pre-assess in order to determine if time needs to be spent on conceptual activities that help students develop a deeper understanding of these ideas.

- Represent and solve problems involving multiplication and division
- Understand properties of multiplication and the relationship between multiplication and division
- Multiply and divide within 100
- Solve problems involving the four operations, and identify and explain patterns in arithmetic
- Use place value
- Recognize basic geometric figures and spatial relationshipsof triangle, quadrilateral (squares, rectangles, and trapezoids), pentagon, hexagon, cube, trapezoid, half/quarter circle, circle, cone,cylinder, sphere

Common Misconceptions:

The following terms are often misunderstood. These concepts are not an inclusive list and should not be taught in isolation. However, due to evidence of frequent difficulty and misunderstanding associated with these concepts, instructors should pay particular attention to them and how their students are able to explain and apply them.
. Teachers should present these concepts to students with models and real life examples
. Students should understand the concepts involved and be able to recognize and/or demonstrate them with words, models, pictures, or numbers.

- 2- dimensional
- 3- dimensional
- acute angle

- attributes
- closed figure
- congruent
- cubes, cones, cylinders and rectangular prisms (as subcategories of 3-dimensional figures)
- polygon
- line plot
- obtuse angle
- open figure
- parallel
- parallelogram
- partition
- polygon
- properties
- quadrilateral
- rectangle
- rhombi, rectangles, and squares (as subcategories of quadrilaterals)
- rhombus/rhombi
- right angle
- square
- three-sided
- unit fraction
- area
- overlap
- plane figure
- side length
- square centimeter
- square foot
- square inch
- square meter
- square unit
- tiling

Number Fluency (for grades K-5):

Multiply and Divide within 100

District/School Tasks	District/School Primary and Supplementary Resources
Exemplar tasks or illustrative models could be provided. Geometric Pictures of One Half Representing Half of a Circle Halves, Thirds, and Sixths Show What You Know Move it Around Shape Sorter Properties of Quadrilaterals Can You Find It? Score It! Quadrilateral Riddles What's The Connection Picture Pie Rectangles Rule Pattern Block Fractions	• Go Math Third Grade Teacher and Student Editions • Go Math Enrich, Reteach, and On Level pages • Think Central for school and home/ITools • Math on the Spot Videos • Go Math Grab-and-Go Centers kit • IReady Program • Math Journal • Educational games • Math Literature: - *Spaghetti and Meatballs for All – By: Marilyn Burns* - *The Greedy Triangle – By: Marilyn Burns* - *If You Were a Polygon – By: Marcie Abof* - *Triangles – By: David A. Adler* - *Shape Up! – By: David A. Adler* - *If You Were a Quadrilateral – By: Molly Blaisdell* - *The Whole Picture – Go Math Literature* • Graphic Organizers **Math Websites and Resources:** - http://www.insidemathematics.org - http://maccss.ncdpi.wikispaces.net/Third+Grade - http://www.noycefdn.org/math.php) - http://nlvm.usu.edu/ - http://mrsgebauer.com/mathsites.html

I Have, Who Has?	- https://www.teachingchannel.org/videos/third-grade-math-lesson - www.illustrativemathematics.org/ - web/games/StopTheClock/sthec3.html - www.k-5mathteachingresources.com/ - www.multiplication.com - www.georgiastandards.org/Common-Core/Pages/Math-K-5.aspx - www.illustrativemathematics.org/ - https://www.app.activateinstruction.org/playlist/resource-sview/id/53c03664f07787db75f1a968/rid/53c08d26f077877f7df1a969/bc0/explore/bc1/playlist - http://www.sheppardsoftware.com/mathgames/geometry/shapeshoot/PolygonShapesShoot.htm

Instructional Best Practices and Exemplars

This is a place to capture examples of standards integration and instructional best practices.

3.G.1.
In second grade, students identify and draw triangles, quadrilaterals, pentagons, and hexagons. Third graders build on this experience and further investigate quadrilaterals (technology may be used during this exploration). Students recognize shapes that are and are not quadrilaterals by examining the properties of the geometric figures. They conceptualize that a quadrilateral must be a closed figure with four straight sides and begin to notice characteristics of the angles and the relationship between opposite sides. Students should be encouraged to provide details and use proper vocabulary when describing the properties of quadrilaterals. They sort geometric figures) and identify squares, rectangles, and rhombuses as quadrilaterals.

3.G.2.
Given a shape, students partition it into equal parts, recognizing that these parts all have the same area. They identify the fractional name of each part and are able to partition a shape into parts with equal areas in several different ways.

In addition to the exemplar tasks above, students can complete the following activities:

- **Read "The Greedy Triangle" by Marilyn Burns and use marshmallows and toothpicks to create each shape as the triangle visits the Shape Shifter. Name the shape, how many sides of each shape, how many angles, and how many vertices.**
- **"What Does the SHAPE Say?" have each student make a poster with shapes from the unit and have the shapes define themselves using speech bubble.**
- **Classify shapes – have students classify two-dimensional shapes based on their attributes.**
- **Make a Mosaic Project – students work with a partner to draw and cut out 1 inch shapes shapes such as rectangles, squares, and triangles using different colored paper. Draw a simple picture on a piece of paper such as a star or flower and glue the cut out shapes into the pattern. Make sure to leave a little pace between each shape to create a mosaic effect. Students can describe and compare the shapes they used to make their mosaic.**
- **Read Go Math Literature "The Whole Picture" and model fractional parts**
- **"Fish for Fractions" (Go Math Activity Card 11)**

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