Third Grade Curriculum

Mathematics

Francis Howell School District

HOME SCHOOL COMMUNITY

LEARNING TOGETHER

Board Approved:

04/03/2014

Francis Howell School District
Third Grade Curriculum – Mathematics

Mission

Francis Howell School District is dedicated to preparing students today for success tomorrow.

Vision

Every student will graduate with college and career readiness skills.

Values

Francis Howell School District is committed to:

- Provide a consistent and comprehensive education that fosters high levels of academic achievement
- Operate a safe learning environment for all students
- Recruit and retain a high-quality staff
- Promote parent, community, student, and business involvement in support of the school district
- Ensure fiscal responsibility
- Develop responsible citizens
- Operate as a professional learning community
- Make appropriate use of technology

Francis Howell School District Graduate Goals

Upon completion of their academic study in the Francis Howell School District, students will be able to:

- gather, analyze and apply information and ideas
- communicate effectively within and beyond the classroom
- recognize and solve problems
- make decisions and act as responsible members of society

Rationale for Elementary Mathematics

Using the Missouri Learning Standards as a base, the Francis Howell K-5 mathematics curriculum emphasizes conceptual understanding, procedural skill and fluency and application of concepts in real-world, problem-solving situations to address rigor as defined in the Missouri Learning Standards. Teachers will emphasize the use of the 8 mathematical practices outlined in the Standards to bring students to a deeper understanding of the focal points for each grade level. These eight mathematical practices, which should be embedded into math daily and are applicable for Grades K-12, are:

1. Make sense of problems and persevere in solving them.
2. Reason abstractly and quantitatively.
3. Construct viable arguments and critique the reasoning of others.
4. Model with mathematics.
5. Use appropriate tools strategically.
6. Attend to precision.
7. Look for and make use of structure.
8. Look for and express regularity in repeated reasoning.

Course Description for Third Grade Math

In Grade 3, instructional time should focus on four critical areas: (1) developing understanding of multiplication and division and strategies for multiplication and division within 100; (2) developing understanding of fractions, especially unit fractions (fractions with numerator 1); (3) developing understanding of the structure of rectangular arrays and of area; and (4) describing and analyzing two-dimensional shapes.

1) Students develop an understanding of the meanings of multiplication and division of whole numbers through activities and problems involving equal-sized groups, arrays, and area models; multiplication is finding an unknown product, and division is finding an unknown factor in these situations. For equal-sized group situations, division can require finding the unknown number of groups or the unknown group size. Students use properties of operations to calculate products of whole numbers, using increasingly sophisticated strategies based on these properties to solve multiplication and division problems involving single-digit factors. By comparing a variety of solution strategies, students learn the relationship between multiplication and division.
2) Students develop an understanding of fractions, beginning with unit fractions. Students view fractions in general as being built out of unit fractions, and they use fractions along with visual fraction models to represent parts of a whole. Students understand that the size of a fractional part is relative to the size of the whole. For example, 1/2 of the paint in a small bucket could be less paint than 1/3 of the paint in a larger bucket, but 1/3 of a ribbon is longer than 1/5 of the same ribbon because when the ribbon is divided into 3 equal parts, the parts are longer than when the ribbon is divided into 5 equal parts. Students are able to use fractions to represent numbers equal to, less than, and greater than one. They solve problems that involve comparing fractions by using visual fraction models and strategies based on noticing equal numerators or denominators.
3) Students recognize area as an attribute of two-dimensional regions. They measure the area of a shape by finding the total number of same size units of area required to cover the shape without gaps or overlaps, a square with sides of unit length being the standard unit for measuring area. Students understand that rectangular arrays can be decomposed into identical rows or into identical columns. By decomposing rectangles into rectangular arrays of squares, students connect area to multiplication, and justify using multiplication to determine the area of a rectangle.
4) Students describe, analyze, and compare properties of two-dimensional shapes. They compare and classify shapes by their sides and angles, and connect these with definitions of shapes. Students also relate their fraction work to geometry by expressing the area of part of a shape as a unit fraction of the whole.

Elementary Math Curriculum Contributors (positions 2013-2014)

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Scope and Sequence for Third Grade Mathematics

Qtr 1: 42 days Qtr 2: 42 days Qtr 3: 42 days Qtr 4: 43 days

Qtr	Lessons	Maximum Days	Topic/Description	Domain
1	7	10 days	Topic 1: Numeration	Numbers and Operations in Base 10
1	7	10 days	Topic 2: Number Sense: Addition and Subtraction	
1	13	17 days	Topic 3: Using Place Value to Add and Subtract	
1-2	5	8 days	Topic 4: Meanings of Multiplication	Operations and Algebraic Thinking
2	7	9 days	Topic 5: Multiplication Facts: Use Patterns	
2	9	12 days	Topic 6: Multiplication Facts: Use Known Facts	
2	6	9 days	Topic 7: Meanings of Division	
2-3	9	14 days	Topic 8: Division Facts	
3	8	12 days	Topic 9: Understanding Fractions	Numbers and Operations - Fractions
3	8	13 days	Topic 10: Fraction Comparison and Equivalence	
3	5	7 days	Topic 11: Two-Dimensional Shapes and Their Attributes	Geometry
3	5	7 days	Topic 13: Perimeter	Measurement and Data
4	11	15 days	Topic 14: Area	
4	5	6 days	Topic 15: Liquid Volume and Mass	
4	6	9 days	Topic 16: Data	
4	4	7 days	Topic 12: Time	
	115	**165 days**		
If time	10	10 days	Step-Up: Step-Up to Grade 4 Lessons	combination

To ensure all grade level standards are met, all topics must be completed. While teachers and PLCs should take into account student progress and make decisions based on their individual classes, the expectation is that all students will be taught all material in the standards/topics. If teams/teachers are struggling with pacing, they should work with their administration and content leader to develop a plan to ensure students are taught all content in their grade level.

Content Area: Math	**Course:** Grade 3	**UNIT:** Operations and Algebraic Thinking
Unit Description: In this topic, students will study three interpretations of multiplication. Multiplication is introduced to students as a simplified way of doing an addition in which all of the addends are the same. Another way to think about multiplication is an array. With an array, a multiplication is visualized as rows of objects, with the same number of objects in each row. Multiplication in third grade is encountered in word problems and can be modeled concretely using either equal groups or arrays. Two strategies are helpful in learning basic multiplication facts; use patterns and use known facts. The lessons in Topic 5 highlight the patterns strategy, developing it as the primary approach to learning the 0s, 1s, 2s, 5s, 9s, and 10s facts. This topic focuses on multiplication facts in which 3, 4, 6, 7, and 8 are factors. These facts usually are more difficult for young students to master, particularly those involving the great factors. A powerful strategy for learning these facts, prior to committing them to memory, is to break them into facts that are already known. This procedure is called the known-facts strategy.		**Unit Timeline:** 7-8 days

DESIRED RESULTS
Transfer Goals: ***Students will be able to…***
● Recognize when to use multiplication and division in unfamiliar situations. ● Use multiplication and division to solve problems. ● Use patterns to find multiples. ● Explain division in own words and draw a picture that shows partitioning objects into equal groups. ● Use understanding of the columns and rows of multiplication table to explore the steps used to find answers to division problems. ● Use drawings to show different ways a number can be divided into equal groups. ● Apply patterns in multiplication and division to suggest ways to solve a difficult division fact. ● Write and solve an equation to represent the situation in a word problem. ● Draw a picture to solve a multiple-step problem, then label and explain their solution. ● Analyze a multiple-step problem to determine the two questions to answer. ● Explain a solution plan and include the operations needed to find the solution. ● Analyze the Associative Properties of Addition and Multiplication to determine similarities. ● Draw and write explanations of arrays and area models that represent the Commutative, Associative and Distributive properties.

- Evaluate a statement and provide examples of Zero Properties of Multiplication and Identity Property of Multiplication.
- Analyze a multi-step problem to determine the hidden question. Then, explain their solution plan, including the operations needed to find the solution.
- Make sense of problems and persevere in solving them.
- Reason abstractly and quantitatively.
- Construct viable arguments and critique the reasoning of others.
- Model with mathematics.
- Use appropriate tools strategically.
- Attend to precision.
- Look for and make use of structure.
- Look for and express regularity in repeated reasoning.

Understandings: ***Students will understand that…***

1. Repeated addition involves joining equal groups and is one way to think about multiplication.
2. An array involves joining equal groups and is one way to think about multiplication.
3. Some real-world problems involving joining or separating equal groups or comparison can be solved using multiplication.
4. Two numbers can be multiplied in any order and the product remains the same.
5. Mathematical explanations can be given using words, pictures, numbers, or symbols. A good explanation should be correct, simple, complete, and easy to understand.
6. There are patterns in the products for multiplication facts with many factors.
7. Sometimes the answer to one problem / question is needed to find the answer to another problem / question.
8. The Distributive Property can be used to break a large array into two smaller arrays.
9. Three or more numbers can be grouped and multiplied in any order.
10. Patterns and known facts can be used to find unknown multiplication facts.
11. Some problems can be solved by first finding and solving a sub-problem(s) and then using that answer(s) to solve the original problem.
12. Any division problem can be thought of as a multiplication fact with a missing factor. Then, an answer can be found using a multiplication table.
13. Sharing and repeated subtraction both involve separating equal groups and are two ways think about division.
14. Information in a problem can often be shown by using objects to act it out or by using a picture or diagram in order to understand and solve the problem.
15. Multiplication and division have an inverse relationship. This inverse relationship can be used to find division facts; every division fact has a related multiplication fact.
16. An equation shows a balance between what is on the right side and what is on the left side of the equal sign.

Essential Questions: ***Students will keep considering…***

- What are different meanings of multiplication? (Revisit the question throughout the topic.)
- How are addition and multiplication related? (Revisit the question throughout the topic.)

- How can you find the total number of objects in equal groups?
- What are the arrays, and how do they show multiplication?
- What happens when you multiply two numbers and then switch the order of the factors?
- How can you write a story to describe a multiplication fact?
- How do you write a good mathematical explanation?
- What patterns can be used to find certain multiplication facts? (Revisit the question throughout the topic.
- How can you use patterns to multiply by 2 and 5?
- How can patterns be used to find 9's facts?
- What are the patterns in multiples of 1 and 0?
- What patterns can help you remember multiplication facts for 2s and 5s?
- What are the patterns in multiples of 10?
- How can basic facts help us when we multiply a single-digit number by a multiple of 10?
- How can you tell when you need to answer more than one question to solve a problem?
- How can unknown multiplication facts be found using known facts? (Revisit the question throughout the topic.
- How can the Distributive Property help you break apart an array to multiply with other facts?
- How can you break apart arrays to multiply by 3?
- How can you break apart arrays to multiply by 4?
- How can you break apart arrays to multiply with 6 and 7 as factors?
- How can you break apart arrays and use known facts to multiply with 8?
- How can you multiply three numbers?
- How can you use strategies to multiply?
- How can you find all the possible combinations?
- How can you figure out what question needs to be answered first in a multiple-step problem?
- What are different meanings of division? (Revisit the question throughout the topic.
- How can you think of division as sharing?
- How can you think of division as repeated addition?
- How can you use a multiplication table to solve division problems?
- How can you describe a problem situation using an equation?
- What kinds of stories involve division situations?
- How can you use objects and draw a picture to solve a problem?
- How can an unknown division fact be found by thinking of a related multiplication fact? (Revisit the question throughout the topic.
- How are multiplication and division facts related?
- How can you use multiplication to help you divide by 2, 3, 4, and 5?
- How can you use multiplication to help you divide by 6 and 7?
- How can you use multiplication to help you divide by 8 and 9?
- How can you write equations with variables to solve two-question problems?

- How can a pan balance help you think about multiplication and division equations?
- What happens when you divide by 0 and 1?
- How can you use multiplication and division facts to solve problems?
- How can you solve word problems by drawing and writing a number sentence?

Students Will Know…	Students Will Be Able to …	Standard
multiplication – a quick way to add the same quantity many times **factors –** numbers that are multiplied together **product –** the answer in multiplication **array –** shows items arranged in equal rows **commutative property –** when you multiply numbers in any order and the product is the same **multiples -** a number that can be divided by another number without a remainder **Identity property of multiplication -** If you multiply a number by one, the product is the same as that number. Example: 20 x 1= 20. **zero property of multiplication –** if you multiply a number and zero, the product is zero **distributive property -** multiply a sum by multiplying each addend separately and then add the products **associative (grouping) property of multiplication –** The property that states that when multiplying three or more real numbers, the product is always the same regardless of their grouping. **division –** an operation you can use to find how many groups and how many there are in each group **dividend** – the number of objects to be divided **divisor –** the number by which another number is divided **quotient –** the answer to a division problem **variable** – a letter or symbol that you can use to represent an unknown amount	1. Interpret products of whole numbers, e.g., interpret 5 × 7 as the total number of objects in 5 groups of 7 objects each. For example, describe a context in which a total number of objects can be expressed as 5 × 7. 2. Interpret whole-number quotients of whole numbers, e.g., interpret 56 ÷ 8 as the number of objects in each share when 56 objects are partitioned equally into 8 shares, or as a number of shares when 56 objects are partitioned into equal shares of 8 objects each. For example, describe a context in which a number of shares or a number of groups can be expressed as 56 ÷ 8. 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 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 8 × ? = 48, 5 = □ ÷ 3, 6 × 6 = ?. 5. Apply properties of operations as strategies to multiply and divide.2 Examples: If 6 × 4 = 24 is known, then 4 × 6 = 24 is also known. (Commutative property of multiplication.) 3 × 5 × 2 can be found by 3 × 5 = 15, then 15 × 2 = 30, or by 5 × 2 = 10, then 3 × 10 = 30. (Associative property of multiplication.) Knowing that 8 × 5 = 40 and 8 × 2 = 16, one can find 8 × 7 as 8 × (5 + 2) = (8 × 5) + (8 × 2) = 40 + 16 = 56. (Distributive property.) 6. Understand division as an unknown-factor problem. For example, find 32 ÷ 8 by finding the number that makes 32 when multiplied by 8. 7. Fluently multiply and divide within 100, using strategies such as the relationship between multiplication and division (e.g., knowing that 8 × 5 = 40, one knows 40 ÷ 5 = 8) or properties of operations. By the end of Grade 3, know from memory all products of two one-digit numbers.	3.OA.1 3.OA.2 3.OA.3 3.OA.4 3.OA.5 3.OA.6 3.OA.7

	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.	3.OA.8
	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.	3.OA.9

EVIDENCE of LEARNING			
Understanding	Standards	**Unit Performance Assessment**:	**R/R Quadrant**
11, 12, 13, 15	3.OA.5; 3.OA.7; 3.OA.8	● **Summative:** Topic 8 Performance Task: ***REQUIRED FOR DATA ENTRY*** **Scoring Guide:** See district protocol posted on MC, Schoology, or HowellNET	B
4, 8, 9	3.OA.5	● **Formative: Quick Check 4-2** **Scoring Guide:** page 101A of Envisions TE	A
3, 11	3.OA.8	● **Formative: Quick Check 5-2** **Scoring Guide:** page 121A of Envisions TE	A
16	3.OA.8	● **Formative: Topic 6 Performance Task** **Scoring Guide:** See district protocol posted on MC, Schoology, or HowellNET	B
12, 13	3.OA.4	● **Formative: Quick Check 7-2** **Scoring Guide:** page 173A of Envisions TE	A

SAMPLE LEARNING PLAN				
Pre-assessment: Use "Review What you Know" to diagnose students' readiness by assessing prerequisite content.				
Understanding	**Standards**	**Major Learning Activities:**	**Instructional Strategy:**	**R/R Quadrant**
1, 2, 3	3.OA.1 3.OA.3 3.OA.5	1. Set the purpose for by telling the students that today they will learn how multiplication is like repeated addition. Today we will learn how to use multiplication to solve problems. Show intro problem on Pearson Realize 2. Connect by asking students to name some items that come in packages that have more than 1 item in a package. (Answers will vary) 3. Pose the Problem: Ms. Witt bought 3 boxes of finger paints with 5 jars of paint in each box. Ask, "How can you use counters to find the total number of jars?" (Students work in pairs to solve the problem, then discuss their methods.) 4. Link to Prior Knowledge: Point out that the problem can be solved using repeated addition. Ask, "How can you add to find the total?" (5+5+5=15) 5. Say, "The problem is about equal groups so you can use multiplication to find the total. Multiplication is a quick way to add the same quantity many times." 6. Model and demonstrate on the board. Write 3 x 5 = 15 and say, "The 3 and 5 are called factors. Factors are the numbers that are multiplied together. The 15 is called the product, or the answer, in multiplication." Once students have found and discussed their solutions, work through the problem as a class. Ask, "How can you model the jars of paint using counters?" (Make 3 groups of 5 counters.) Have students work in pairs to model with counters. To multiply, write the number of groups times the number in each group. Ask, "How can you show this multiplication?" (3 x 5) "How many counters are there in all?"(15) Have students record their answers by drawing circles and writing the multiplication sentence. 7. Have students work in pairs and use counters to complete this problem: There are 4 jars of paint in each of 3 boxes. Use counters to find the total numbers of jars. Draw a picture and write an addition sentence and a multiplication sentence to solve. (Check students' work.) 8. As students work on pages 98 and 99, assist or work with small groups as necessary.	Cooperative Learning	A

6, 10	3.OA.D.9 3.OA.A.3	1. Set the purpose and tell students that they have learned how to skip count by 2's and 5s. Today you are going to learn how to use skip-counting patterns to complete multiplication tables. 2. Connect by asking students, "What are some things that come in pairs, or sets of 2?" (gloves, shoes, legs, feet) 3. Pose the problem: "How can you find how many legs there are all together in a group of 9 chickens?" (Possible response: skip count by 2.) Allow students time to solve the problem, and then have them share their methods and solutions with the class. 4. Link to Prior Knowledge: "How do you skip count by 2s? (2, 4, 6, …). How do you skip count by 5s?" (5, 10, 15, …) Have students skip count by 2s to 18 and by 5s to 45. 5. Distribute Teaching Tool 36. Say, "You can use skip counting patterns to find the 2s multiplication facts. Look at the first row of the first column in Teaching Tool 36. What is 0 times 2?" (0) Record the factor and the product in the spaces. "Now think about the Commutative Property. What does it tell you?" (Changing the order of the factors does not change the product.) Ask, "So how can you use the Commutative Property to find what to write in the first row of the second column?" (Change the order of the factors in the first column, 0 x 2 to 2 x 10. The product is still 0). 6. Small –Group Instruction: Say, "Work with your partner to complete the rest of the table for the 2s facts. Where on this table does it show how you can find how many legs are on 9 chickens?" (The last row: 9 x 2 or 2 x 9) Have students complete the 5s facts. 7. Remind students: "Every answer, or product, in your table for the 2s fact is 2 times something. These numbers are called multiples of 2. Which number do the multiples of 2 always end with?" (0, 2, 4, 6, 8) Help students recognize the reporting pattern. Then discuss the patterns in the 5's facts tables. 8. As students work on page 116 – 117, assist or with small group as necessary.	Cooperative Learning	A
10, 11	3.OA.5 3.OA.3	1. Set the purpose of the lesson by telling the students that they have already learned how to use arrays to model multiplication facts. Today you will learn how to break apart an array that represents a multiplication fact into two smaller arrays that represent two other multiplication facts. Show intro problem on Pearson Realize 2. Connect by asking students to think about what is an example of an array of objects in our classroom?	Cooperative Learning	A

		3. Pose the Problem: On the board, show an array model of 5 x 4 with circles to represent counters. Ask, "Do you see any other arrays in the array shown on the board? Could you break apart that array into two other arrays?" Discuss students' observations. 4. Distribute counters to pairs of students. Ask them to model 5 x4 with an array. Then have students discuss the problem. Ask, "Do you see any other arrays in this array? Can you break it apart into two smaller arrays?" (Students may mention different possible pairs of smaller arrays. Lead them to see that one way to answer the question, though, is just to move the top 2 rows away from the bottom 3 rows.) Help students label the two new arrays. Ask, "What two facts have we shown that can be added together to make 5 x 4? (2 x 4 and 3 x 4) Say, "You have learned that 5 x 4 = (2 x 4) + (3 x 4). The Distributive Property lets you break up arrays like this to create the sum of two smaller arrays." 5. As students work on pages 140 - 141, assist or work with small groups as necessary.		
11, 13	3.OA.1 3.OA.2	1. Set the purpose for the lesson and tell the students that they already know that when you want to combine equal groups you multiply. Today you will be learning that when you want to share equally you divide. 2. Connect by asking students to name some things that they can share with friends. (toys, pencils, stickers) Ask, "How do you share equally?" (Accept student responses.) 3. Pose the Problem: Four friends picked 20 apples. They want to share them equally. How many apples should each person get? Give students a chance to work in pairs, using counters to help if needed. Then invite them to share their work and solutions. 4. Say, "When you share things equally, you separate or divide them into equal groups. Division is an operation you can use to find how many groups and how many there are in each group. How many groups of apples will need to make?" (4) "Why?" (There are four friends.) 5. Model: Draw a diagram and the line about it as shown on the recording sheet. Say, "You can draw a picture to show a division problem." Ask, "How many apples are there in all?" (20) Label the line 20. Say, "this bar stands for all 20 apples." Ask, "How many parts does the bar have?" (4) "Now you can draw the apples in each part." Alternate drawing one circle in each part, counting as you draw, until you have drawn 20 circles. Ask, "How many	Cooperative Learning	A

		apples are in each part?" (5) Write 20 divided by 4 = 5 below the bar diagram. Point to the parts of the division sentence.		
2, 16	3.OA.2 3.OA.3 3.OA.4	1. Set the purpose for the lesson and tell the students you know how to relate multiplication sentences to describe arrays. Today, you will be learning to write related multiplication and division sentences to describe your array. Show intro problem on Pearson Realize. 2. Connect: Arrange 6 students in an array of 2 rows of 3 at the front of the classroom. Ask, "Is this an array? Explain your answer." (Yes. They are standing in equal rows.) 3. Pose the Problem: Have the students use 24 counters to make an array with 3 equal rows. Tell them to write as many multiplication and division sentences as you can to describe the array. Students can work in pairs to complete this task. As they work, make sure their arrays have 3 rows of 8 counters. When they are finished, invite them to share their work. 4. Link to Prior Knowledge: The array shows 3 rows of 8 counters. Ask, "What multiplication sentence describes your array?" ((3 x 8 = 24) Write the sentence on the board. Ask, "What is a related multiplication sentence? (8 x 3 = 24) Write it on the board. 5. Instruct in Small Steps: How does the array also show division? To write a division sentences to describe an array, think of the rows as equal groups. What division sentence can be used to show the number of counters in each row? What division sentence can be used to show the number of rows? How do you know? Write the answer on the board. 6. Whole-Class Participation: These sentences make up a multiplication and division fact family because they are all related. Ask, "How are the sentences alike? How are they different?" Discuss. 7. Small- Group Instruction: Work with your partner. Use your 24 counters to make a different array. Have the students write a multiplication and division fact family for their array. Have pairs who made the same array compare the fact families they wrote.	Cooperative Learning	A

UNIT RESOURCES
Teacher Resources: ● Envisions Teacher Manual ● Pearson Realize ● Manipulative kit
Student Resources: ● Envisions Student Book ● Two-color counters (Teaching Tool 17) use for 4.1, 4.2, 4.3 ● Math Journal
Vocabulary **multiplication –** a quick way to add the same quantity many times **factors –** numbers that are multiplied together **product –** the answer in multiplication **array –** shows items arranged in equal rows **commutative property –** when you multiply numbers in any order and the product is the same **multiples -** a number that can be divided by another number without a remainder **Identity property of multiplication -** If you multiply a number by one, the product is the same as that number. Example: 20 x 1= 20. **zero property of multiplication –** if you multiply a number and zero, the product is zero **distributive property -** multiply a sum by multiplying each addend separately and then add the products **associative (grouping) property of multiplication –** The property that states that when multiplying three or more real numbers, the product is always the same regardless of their grouping. **division –** an operation you can use to find how many groups and how many there are in each group **dividend** – the number of objects to be divided **divisor –** the number by which another number is divided **quotient –** the answer to a division problem **variable** – a letter or symbol that you can use to represent an unknown amount

Content Area: Math	**Course: Grade 3**	**UNIT: Numbers & Operations in Base Ten**
Unit Description: This unit will continue to develop understanding of the base-ten numeration system. Students will recognize that numbers can be approximated by numbers that are close and that using these estimations can help them compute mentally. The four major operations in math include addition, subtractions, multiplication, and division, and each operation is related to other operations. There is more than one method (algorithm) for each of the operations. Most algorithms for operations with rational numbers, both mental math and paper and pencil, use equivalence to transform calculations into simpler ones.		**Unit Timeline:** 27-30 days

DESIRED RESULTS

Transfer Goals- ***Students will be able to independently use their learning to…***

- Show a thorough understanding of place-value concepts and use appropriate math vocabulary when explaining his or her reasoning.
- Use data to represent some addition & subtraction situations with drawings, to use mental math to subtract, & to estimate sums & differences.
- Use place-value blocks and diagrams to model subtraction situations. Also, review 2-digit and 3-digit subtraction.
- Make sense of problems and persevere in solving them.
- Reason abstractly and quantitatively.
- Construct viable arguments and critique the reasoning of others.
- Model with mathematics.
- Use appropriate tools strategically.
- Attend to precision.
- Look for and make use of structure.
- Look for and express regularity in repeated reasoning.

Understandings: ***Students will understand that…***

1. Our number system is based on groups of ten. A **ten** in one place value is equivalent to a **one** in the next greater place value.
2. Each whole number can be associated with a unique point on the number line. Zero is the least whole number on the number line and there is no greatest number. The distance between any two consecutive whole numbers on a given number line is the same.
3. Equal distances on the number line must correspond to equal differences in the numbers. The scale on some graphs is a number line.
4. The rounding process is based on knowing the number halfway between multiples of 10, 100, and so on.
5. Rounding is a process for finding the multiple of 10, 100, and so on, closest to a given number.

6. Some problems can be solved by generating a list of outcomes and organizing that list in a systematic way so all outcomes are accounted for.
7. Some real-world problems involving joining, separating, part-part-whole, or comparison can be solved using addition or subtraction. Fact families show addition and subtraction relationships.
8. For a given set of numbers there are relationships that are always true called properties, and these are the rules that govern arithmetic and algebra.
9. There is more than one way to do a mental calculation. Techniques for doing addition or subtraction calculations mentally involve changing the numbers or the expressions so the calculation is easy to do mentally.
10. There is more than one way to estimate a sum or difference. Rounding and substituting compatible numbers are two ways to estimate sums and differences.
11. Answers to problems should always be checked for reasonableness, and this can be done in different ways. Two ways are to use estimation when appropriate and to check the answer against the question and conditions in the problem.
12. The expanded algorithm for adding 3-digit numbers breaks the addition problem into a series of easier problems based on the place value. Answers to the simpler problems are added together to determine the final sum.
13. Models and the standard algorithm for adding 3-digit numbers are just an extension to the hundreds place of models and standard algorithm for adding 2-digit numbers.
14. The expanded algorithm for subtracting 3-digit numbers breaks the subtraction problem into a series of easier problems based on place value. Answers to the simpler problems are used to find the final difference.
15. Models and the standard algorithm for subtracting 3-digit numbers are just an extension to the hundreds place of the models and standard algorithm for subtracting 2-digit numbers.
16. Place-value relationships can help simplify subtracting across zero.
17. Sums and differences can be estimated and calculated using a variety of procedures.
18. Three or more whole numbers can be grouped and added in any order.
19. An equation shows a balance between what is on the right side and what is on the left side of the equal sign.
20. Information in a problem can often be shown using a picture or diagram and used to understand and solve the problem. Some problem can be solved by writing and completing a number sentence or equation.

Essential Questions: ***Students will keep considering…***

- How are numbers read and written?
- How can whole numbers be rounded?
- How can you read and write 3-digit numbers?
- How can you locate and write numbers on a number line?
- How can you complete the pattern on a number line?
- How can you find the number halfway between two numbers?

- How can you round numbers?
- How can you round 4-digit numbers to the nearest ten and hundred?
- How can you solve problems by making an organized list?
- How can sums and differences be found mentally?
- How can sum and differences be estimated?
- How can the addition properties be used to show relationships that always hold true?
- When do you subtract?
- How can you break apart numbers or make a ten to add 2-digit numbers using mental math?
- When do you subtract with mental math?
- How can you estimate sums?
- How can you estimate differences?
- How can you use reasonableness to justify an answer?
- What are standard procedures for adding and subtracting whole numbers?
- How can you break a large addition problem into smaller ones?
- How can you add 3-digit numbers?
- How can you use addition to solve problems?
- How can you solve a problem by drawing a picture?
- How can you break a large subtraction problem into smaller, simpler ones?
- How can you use models to subtract 3-digit numbers with regrouping?
- How can you subtract 3-digit numbers using paper and pencil?
- How can you subtract from a 3-digit number with zeros?
- How can a pan balance help you think about addition equations?
- How can a pan balance help you think about subtraction equations?
- How can you use addition to check subtraction?
- How can a picture help you write a number sentence?

Students Will Know…	Students Will Be Able to …	Standard
● Digits: a single number. For example: 0,1,2,3,4,5,6,7,8, and 9. ● Place value: tells you the value of each digit in a number according to its position in the number ● Standard form: a number written in a way that shows all its digits. For example: 350 ● Expanded form: a number written as the sum of the values of its digits. For example: 300+50+0 ● Word form: a number written in words. For example: three hundred fifty ● Round: to replace a number that tells about how many ● Addends: numbers being added together ● Sum: answer when adding ● Commutative (Order) Property of Addition: ● Associative (Grouping) Property of Addition: when you group addends differently the sum will remain the same ● Identify (Zero) Property of Addition: the sum of any number plus zero is the number itself ● Difference: the answer when subtracting two numbers ● Fact family: a group of related facts using the same numbers ● Estimate: find out about how much ● Compatible Numbers: numbers that are close to the addends, but easy to add mentally. ● Equation: a number sentence that uses an equal sign (=) to show that the value to its left is the same as the value to its right ● Inverse Operations: operations that undo each other	1. Use place value understanding to round whole numbers to the nearest 10 or 100. 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	3.NBT.A.1 3.NBT.A.2

EVIDENCE of LEARNING			
Understanding	Standards	**Unit Performance Assessment**:	**R/R Quadrant**
7, 12, 13, 14, 15, 16, 20	3.NBT.A.2	● **Summative**: **Topic 3 Performance Task:** ***REQUIRED FOR DATA ENTRY*** **Scoring Guide:** See district protocol posted on MC, Schoology, or HowellNET	C
7, 14, 15, 16	3.NBT.A.2	**Formative #1: Topic 1 Performance Task:** Students will plan a vacation trip between two cities. ● **Scoring Guide:** See district protocol posted on MC, Schoology, or HowellNET	C
7, 13, 20	3.NBT.A.2	**Formative #2:** Topic 2 Performance Task: Students use data from a shopping list to represent some addition and subtraction situations with drawings, to use mental math to subtract, and to estimate differences. ● **Scoring Guide:** See district protocol posted on MC, Schoology, or HowellNET	C

SAMPLE LEARNING PLAN				
Pre-assessment: Use "Review What you Know" to diagnose students' readiness by assessing prerequisite content.				
Understanding	**Standards**	**Major Learning Activities:**	**Instructional Strategy:**	**R/R Quadrant**
1,2	3.NBT.A.1	Representing Numbers (1-1) 1. Set the purpose by telling students, you know how to read 2-digit numbers. Today, you will learn how to read and write 3-digit numbers. 2. Connect by asking students to think about our school library. It has more than 500 books. Can you name some other collections that have more than 500 items? 3. Pose the problem: How can you use place-value blocks to show 274? How many ways can you write that number? 4. Introduce vocabulary word: place value. How is the tens place related to the ones place? What place has a value 10 times as great as the tens place? You could also use the Animated Glossary on Pearson Realize. 5. Model the number 274 with place-value blocks using 2 hundreds blocks, 7 tens, and 4 ones. Tell students; let's write this in expanded form. On the board write 200+70+4 6. Have students work in groups of 3. One student announces a 3-digit number. Another student models the number using place-value blocks. The third student writes the number in standard form. Students change roles and repeat with other numbers. 7. As students work on pages 6 and 7, assist or work with small groups as necessary.	Cooperative Learning	B
1,2	3.NBT.A.1	Understanding Number Lines (1-2) 1. Set the purpose by telling students that they have already used a number line to model addition and subtraction. Today you will be learning some features of number lines. Show intro problem on Pearson Realize	Cooperative Learning	A

		2. Connect by asking students to think about where you can see numbers in order in a line or row? 3. Pose the Problem: (Draw a number line on the board with 5 evenly spaced tick marks. Label the first mark 2 and the third mark 4. Have students use Teaching Tool 10 as their recording sheet.) Find the numbers missing from this number line. Write all the numbers on number line B of your recording sheet. Explain how you know what numbers to write. 4. Expand the student response by completing the number line on the board as the students share their responses. Then use questioning to help students identify features of a number line. How are the numbers arranged on this number line? How are the marks arranged on this number line? Are there more numbers you could write on the number line? Explain. 5. Have students work in groups. Use number line C on your recording sheet. Start with a number from 1 and 50. Write another number that is on the line if the numbers increase by 1. Trade number lines with your partner. Complete each other's number lines. 6. As students work on pages 8 and 9, assist or work with small groups as necessary.		
1,3	3.NBT.A.2	Addition Meaning and Properties (2-1) 1. Set the purpose by telling students that they know how to add two 1-digit numbers. Today, you will use what you know to explore addition properties that are always true. 2. Connect by asking, when might you need to add two 1-digit numbers? 3. Pose the problem: (Put a different mark on each of three paper cups. Choose two of the cups. So students cannot see, place 4 counters in one cup and 6 counters in the other cup.) I have some counters in this cup and a different number of counters in the other cup. What could I do to find the total number of counters in these cups? Now watch as I change the order of these cups. Is the total number of counters in these two cups the same? Use your counters and make up numbers to decide.	Identifying Similarities and Differences	C

		4. Model and demonstrate to the class. Write the number sentence (8+4=4+8) on the board. Say to the students, if I put the correct number of counters under each number, what can you say about the total number of counters to the left of the equal sign and the total to the right of it? Do you think the two totals would always be the same no matter what numbers I used as long as all I did was change the order? Tell the students that this is called the Commutative Property of Addition. Write this on the board: (3+1) +6=3+(1+6). Use the cups again to show why this is true. 5. Introduce vocabulary: When you group addends differently the sum will remain the same. This is called the Associate or Grouping Property of Addition. One more property that we will learn is the Identity Property. It states that the sum of any number plus zero is the number itself. 6. As students work on pages 30 and 31, assist or work with small groups as necessary.		
1,2	3.NBT.A.2	Subtraction Meanings (2-2) 1. Set the purpose by telling your students that they know how to add numbers. Today, you will use addition to help you to subtract. Show intro problem on Pearson Realize 2. Connect by asking students, what are some situations in which you might need to subtract? 3. Pose the problem: Ling made 14 hats to sell at the fair. She sold 6 of them. How could you draw pictures or use models to find how many hats Ling has now? Work with a partner. 4. Model and demonstrate to the class. Which number is the whole? How do you know? Which number is a part of the whole? How can you solve the problem? How can you use addition to help you subtract? 5. Have students work in small groups. Give pairs another subtraction problem such as the following: Jamie made 18 hats. 7 hats had stripes and the rest had polka dots. How many hats had polka dots? Work	Cooperative Learning	A

		with your partner to model the problem. Then write 2 number sentences, one using subtraction and another using addition. 6. As students work on pages 32 and 33, assist or work with small groups as necessary.		
1,2	3.NBT.A.2	Adding with an Expanded Algorithm (3-1) 1. Set the purpose by telling students that they have learned how to add 1-digit and 2-digit numbers. Today, you are going to use what you know about place value to help you add greater numbers. 2. Connect by writing the number 247 on the board. Ask students, what are some numbers you could add to 247? Invite students to the board to add their number to 247. 3. Pose the problem: (Write the addition problem 327+241 on the board.) How can you find the sum of 327 and 241 by breaking the problem into several smaller addition problems? Give students time to work in pairs to solve the problem. 4. Link to prior knowledge: You know how to add 1-digit or 2-digit numbers. Today, you will learn to begin adding greater numbers so that you will be able to add any numbers, no matter how many digits they have. 5. Model and demonstrate to students. Ask students, what do you notice about the numbers you have to add? Ask students to name the digits in each number and the value of each digit, based on its position. In 327, what digit is in the hundreds place? What is its value? What is the value of the 2 in 327? What is the value of the 2 in 241? Why do the 2s have different values? Write these three problems on the board and have students complete them: 300+200, 20+40, and 7+1. What is the sum of 300 and 200? What is the sum of 20 and 40? What is the sum of 7 and 1? As the last step, set up a problem in which the sums from the three problems are added (500+60+8). What is the sum of 500, 50, and 8? What is the sum of 327 and 241? Repeat the process with other examples such as 457+333 and 635+274.	Cooperative Learning	C

		6. As students work on pages 58 and 59, assist or work with small groups as necessary.		
1,3	3.NBT.A.2	Models for Adding 3-Digit Numbers (3-2) 1. Set the purpose by telling students that they know how to add 2-digit numbers. Today you are going to learn how to add 3-digit numbers. Show intro problem on Pearson Realize. 2. Connect by describing a situation in which you might need to add 3-digit numbers. 3. Pose the problem: How can we use place-value blocks to add 3-digit numbers such as 146 and 247? Give students time to work in pairs to solve the problem, using place-value blocks. 4. Link to prior knowledge: Show me how to regroup 16 ones. Show me how to regroup 16 tens. 5. Model and demonstrate to students. (Have students use the place-value blocks to model each addend.) Draw a picture of the blocks you used for each addend. Show 247 below 147. Use squares to show hundreds, lines to show tens, and dots to show ones. Now let's begin adding ones. How many ones are there? How should we regroup 13 ones? Record the regrouping on your paper by drawing a circle around 10 ones and drawing a new ten. Now let's add tens. How many tens are there? Do you need to regroup tens? Now let's add hundreds. How many hundreds are there? Do you need to regroup hundreds? What is the sum? 6. Have students work in groups. Write 346+445 and 145+283 on the board. Work with a partner to find these sums using place-value blocks. Record your work on a sheet of paper. Draw pictures to show the place-value blocks you used and any regrouping that you did. When the students are finished, have them share and discuss their work. 7. As students work on page 60 and 61, assist or work with small groups as necessary.	Cooperative Learning	B

UNIT RESOURCES
Teacher Resources: ● **Envisions Teacher Manual** ● **Pearson Realize** ● **Manipulative kit**
Student Resources: ● Envisions Student Book
Vocabulary: ● Digits: a single number. For example: 0,1,2,3,4,5,6,7,8, and 9. ● Place value: tells you the value of each digit in a number according to its position in the number ● Standard form: a number written in a way that shows on its digits. For example: 350 ● Expanded form: a number written as the sum of the values of its digits. For example: 300+50+0 ● Word form: a number written in words. For example: three hundred fifty ● Round: to replace a number that tells about how many ● Addends: numbers being added together ● Sum: answer when adding ● Commutative (Order) Property of Addition: ● Associative (Grouping) Property of Addition: when you group addends differently the sum will remain the same ● Identify (Zero) Property of Addition: the sum of any number plus zero is the number itself ● Difference: the answer when subtracting two numbers ● Fact family: a group of related facts using the same numbers ● Estimate: find out about how much ● Compatible Numbers: numbers that are close to the addends, but easy to add mentally. ● Equation: a number sentence that uses an equal sign (=) to show that the value to its left is the same as the value to its right ● Inverse Operations: operations that undo each other

Content Area: Math	**Course: Grade 3**	**UNIT: Numbers and Operations - Fractions**
Unit Description: Fractions are used extensively throughout all areas of mathematics. Application of fractions occurs in measurement, geometry, probability and statistics, and fractions extend through the most complex analysis performed by scientists and engineers. Understanding fractions is one of the most important outcomes of a student's mathematical education.		**Unit Timeline:** 20-22 days

DESIRED RESULTS

Transfer Goals: ***Students will be able to…***

- Complete a number line by writing missing fractions, whole numbers, and mixed numbers and identify points on the same number line.
- Draw fractional parts, name them, and identify the unit fraction that represents an equal part of a design.
- Draw and label number lines, order and compare fractions.
- Identify equivalent fractions.
- Solve problems involving fractions.
- Make sense of problems and persevere in solving them.
- Reason abstractly and quantitatively.
- Construct viable arguments and critique the reasoning of others.
- Model with mathematics.
- Use appropriate tools strategically.
- Attend to precision.
- Look for and make use of structure.
- Look for and express regularity in repeated reasoning.

Understandings : ***Students will understand that…***

1. A region can be divided into equal-sized parts in different ways. Equal-sized parts have the same area but not necessarily the same shape.
2. A fraction describes the division of a whole (region, set, segment) into equal parts. A fraction is relative to size of the whole.
3. The denominator (bottom number) in a fraction tells how many equal parts in the whole. The numerator (top number) in a fraction tells how many of those parts we have.
4. Finding the unit fractional part of a whole is the same as dividing the whole by the denominator of the fraction.

5. Points between whole numbers on a number line can be labeled with fractions or mixed numbers. The denominator can be determined by counting the number of equal parts between 2 consecutive whole numbers.
6. If two fractions have the same denominator, the fraction with the greatest numerator is the greatest fraction.
7. If two fractions have the same numerator, the fraction with the lesser denominator is the greatest fraction.
8. A fraction is relative to a whole. Models can be used to compare fractions.
9. Number lines can be used to compare fractions with like denominators or like numerators.
10. Equivalent fractions name the same point on a number line.
11. If a fraction aligns with a whole number on a number line, or to a whole number fraction strip, the whole number is equivalent.
12. The same fractional amount can be represented by an infinite set of different but equivalent fractions.

Essential Questions: ***Students will keep considering…***

- What are different interpretations of a fraction?
- How can you divide a region into equal parts?
- How can you write a fraction to name part of a whole?
- How can you write a fraction to name a part of a set?
- How can you find a fraction of a set?
- How can you locate and write fractions on a number line?
- How can you find fractions on a number line?
- How can you write a fraction to name part of a length?
- What are different ways to compare fractions?
- How can you compare fractions with the same denominator?
- How can you compare fractions with the same numerator?
- How can we compare and order fractions?
- How can we compare fractions on a number line?
- How can different fractions name the same number?
- What do equivalent fractions look like on a number line?
- How can whole numbers be described using a fraction?
- How do you write a good math explanation?
- How can you solve a problem by drawing a picture?

Students Will Know…	Students Will Be Able to …	Standard
Vocabulary: **Halves -** When something is divided into 2 equal parts. **Thirds -** When something is divided into 3 equal parts. **Fourths -** When something is divided into 4 equal parts. **Fifths -** When something is divided into 5 equal parts. **Sixths** When something is divided into 6 equal parts. **Eights -** When something is divided into 8 equal parts. **Tenths -** When something is divided into 10 equal parts. **Twelfths -** When something is divided into 12 equal parts. **Fraction –** tells equal part of a whole **Unit Fraction –** A fraction with a numerator of 1. **Numerator –** Shows how many equal parts are described. **Denominator –** Shows the total of equal parts in a whole. **Mixed Numbers –** Numbers that have a whole number part and a fraction part**.** **Equivalent Fractions –** Fractions that name the same part of a fraction. **Simplest Form –** A fraction with a numerator and denominator that cannot be divided by the same divisor, except 1.	1. Understand a fraction 1/*b* as the quantity formed by 1 part when *a* whole is portioned into *b* equal parts of size 1/*b.* 2. Understand a fraction as a number on the number line; represent fractions on a number line diagram. 3. 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 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. 4. Represent a fraction *a*/*b* on a number line diagram by marking off a length 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. 5. Explain equivalence of fractions in special cases, and compare fractions by reasoning about their size. 6. Understand two fractions as equivalent (equal) if they are the same size, or the same point on a number line. 7. 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.1 3.NF.2 3.NF.2a 3NF.2b 3.NF.A.3 3.NF.3a 3.NF.3b

	8. Express whole numbers as fractions, and recognize fractions that are equivalent to whole numbers.	3.NF.3c
	9. 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.	3.NF.3d

EVIDENCE of LEARNING			
Understanding	**Standards**	**Unit Performance Assessment**:	**R/R Quadrant**
5, 10 9, 10	3.NF.3.1, 3.NF.2a 3.NF.3a, 3NF.3b	● **Formative: Topic 9 Performance Task** (page 240 of student book) **Scoring Guide:** See district protocol posted on MC, Schoology, or HowellNET ● **Summative: Topic 10 Performance** Task: ***REQUIRED FOR DATA ENTRY*** **Scoring Guide:** See district protocol posted on MC, Schoology, or HowellNET	C C

SAMPLE LEARNING PLAN				
Pre-assessment: Use "Review What you Know" to diagnose students' readiness by assessing prerequisite content.				
Understanding	**Standards**	**Major Learning Activities:**	**Instructional Strategy:**	**R/R Quadrant**
1,2	3.NF.1	Dividing Regions into Equal Parts 1. Set the purpose by telling students they have learned how to divide a set of objects into equal groups. Today, we will learn to divide regions into equal parts and name the parts. Show intro problem on Pearson Realize 2. Connect by asking students to name something they have divided into 2 equal parts to share with a friend. 3. Pose the problem: How many ways can you divide a 4x4 region into 2 equal parts? 4. Model solutions #3, explaining 2 equal parts is called halves. 5. Have students work in groups to find 2 different ways to divide a 6x6 region into four equal parts, or fourths. 6. Share outcomes with class. 7. Assign pages 220-221 in the student book. While students work, assist or work with small groups as necessary.	Nonlinguistic Representations Homework and Practice	A
3,4	3.NF.2b	Fractions and Length 1. Set the purpose – You already know how to write a fraction to describe part of a whole and a part of a set. Today you will learn to write a fraction to describe part of a length. 2. Connect by asking students, "If I asked you to find the length of a ribbon, what information would I be asking for?" 3. Pose the problem – Find the fraction strip that has ¼ in one of the parts. Label the other parts of the strip. Then color 3 parts of the strip you colored. 4. Model – Write a fraction to describe the part of the strip length that is shaded. What is the numerator, or top number, of the fraction? Why? What is the denominator? Why? What part of the length is shaded?	Cues and Questions Homework and Practice	A

		5. Work with a partner – each group chooses 3 strips (TT22) Label the parts of each strip. Then color part of the length of each strip. Write a fraction next to the strip that tells the fraction of the strip length you colored. 6. Share outcome with class 7. Assign pages 232 – 233 in the student book. While students work, assist or work with small groups as necessary.		
6	3.NF3d	Using Models to Compare Fractions: same Denominator 1. Set the purpose – You already know how to compare whole numbers. Today you will compare pairs of fractions with the same denominator. Show intro problem on Pearson Realize 2. Connect by asking students, "How are the fractions 2/6 and 4/6 the same? How are they different? 3. Pose the problem – Jo and Dan both walk to school. Jo lives 5/8 of a mile from school. Dan lives 2/8 of a mile from school. Who walks the shortest distance? Write a number sentence that compares the distances. 4. Guided instruction–Using TT 22 - What fraction strip can you use to show the part of the mile that each person walks? How can you use these strips to compare the 2 distances? 5. Model writing a number sentence using > or <. 6. Work with a partner – use fraction strips to compare each pair of fractions. Use > or < to write a complete number sentence. 7. Assign pages 244-245 in the student book. While students work, assist or work with small groups as necessary.	Cues and Questions Cooperative Learning	A

UNIT RESOURCES
<u>Teacher Resources</u>: ● **Envisions Teacher Manual topic 9 & 10** ● **Teacher tools –** 1, 45, 17, 11, 10, 22, ● **Pearson Realize** ● **Manipulative kit -**
<u>Student Resources</u>:

- Envisions Student Book

Vocabulary:

- **Halves -** When something is divided into 2 equal parts.
- **Thirds -** When something is divided into 3 equal parts.
- **Fourths -** When something is divided into 4 equal parts.
- **Fifths -** When something is divided into 5 equal parts.
- **Sixths** When something is divided into 6 equal parts.
- **Eights -** When something is divided into 8 equal parts.
- **Tenths -** When something is divided into 10 equal parts.
- **Twelfths -** When something is divided into 12 equal parts.
- **Fraction –** tells equal part of a whole
- **Unit Fraction –** A fraction with a numerator of 1.
- **Numerator –** Shows how many equal parts are described.
- **Denominator –** Shows the total of equal parts in a whole.
- **Mixed Numbers –** Numbers that have a whole number part and a fraction part**.**
- **Equivalent Fractions –** Fractions that name the same part of a fraction.
- **Simplest Form –** A fraction with a numerator and denominator that cannot be divided by the same divisor, except 1.

Content Area: Math	**Course: Grade 3**	**UNIT: Measurement and Data**
Unit Description: Some attributes of objects are measurable and can be qualified using amounts. Mathematics content and practice can be applied to solve problems. Some questions can be answered by collecting and analyzing data, and the question to be answered determines the data that needs to be collected and how best to collect it. Data can be represented visually using tables, charts, and graphs. The type of data determines the best choice of visual representation.		**Unit Timeline:** 40-45 days

DESIRED RESULTS

Transfer Goals: ***Students will be able to…***

- Work backwards from the end time to find start times. Also, to find elapsed time.
- Calculate perimeter using the measured length. Use reasoning to decide which tools and units to use to measure.
- Determine measurements and calculate the area.
- Measure using metric units. Use reasoning to decide which unit to use.
- Carry out a survey, record response using tally marks, and make a bar graph, and a line plot.
- Make sense of problems and persevere in solving them.
- Reason abstractly and quantitatively.
- Construct viable arguments and critique the reasoning of others.
- Model with mathematics.
- Use appropriate tools strategically.
- Attend to precision.
- Look for and make use of structure.
- Look for and express regularity in repeated reasoning.

Understandings: ***Students will understand that…***

1. Time can be expressed using different units that are related to each other, A.M. and P.M are used to designate certain time periods.
2. The minute hand takes 5 minutes to move from one number to the next on a typical clock face. The minute hand takes 1 minute to move from one mark to the next on a typical clock face.
3. Elapsed time can be found by finding the total amount of time that passes between a starting time and an ending time.
4. Some problems with the initial data point unknown can be solved by starting with the end result, reversing the step and process and working backwards to find the initial data point.
5. The distance around a figure is its perimeter. To find the perimeter of a polygon, add the lengths of the sides.
6. To find the perimeter of a polygon, add the lengths of the side.
7. Shapes can be made with a given perimeter. Different shapes can have the same perimeter.

8. Some problems can be solved by breaking apart or changing the problem into simpler ones, solving simpler ones, and using the original problem.
9. The amount of space inside a shape is its area, and the area can be estimated or found using square units.
10. Square units can be used to create shapes with given areas?
11. Standard measurement units are used for consistency in finding and communicating measurement.
12. Formulas exist to find the area of some polygons.
13. The area of a rectangle can be used to model the Distributive Property.
14. Some problems can be solved by breaking apart or changing the problem into simpler ones, solving the simpler ones, and using those solutions to solve the original problem.
15. The area of some irregular shapes can be found by breaking apart the original shape into other shapes for which the area can be found. Area can be estimated in square units.
16. There are relationships between the perimeter and area of a polygon.
17. There are relationships between perimeter and area of a polygon.
18. The area of a figure is the number of the square units that cover the figure. Equal-area parts of a figure can be used to model unit fractions.
19. In a given measurement situation, the type of measuring tool and the measurement units it contains determined the appropriateness of the tool.
20. Capacity is a measure of the amount of liquid a container can hold.
21. Mass is a measure of the quantity of matter in an object. Weight and mass are different.
22. Information in a problem can often be shown using a picture or diagram and used to understand and solve the problem. Some problems can be solved by writing and completing a number sentence or equation.
23. Line plots allow data to be compared more easily than in a list or a table.
24. Line plots can be used to organize and represent data generated by measuring lengths.
25. Each type of graph is most appropriate for certain kinds of data.
26. Pictographs and bar graphs make it easy to compare data.
27. The key to a pictograph determines the number of pictures needed to represent each number in a set of data.
28. In a bar graph, the scale determines how long the bar needs to be to represent each number in a set.
29. Some problems can be solved by making, reading and analyzing a graph.

Essential Questions: ***Students will keep considering…***

- How can lengths of time be measured?
- How do you tell time to the nearest quarter hour or half?
- How do you tell time to the nearest minute?
- How can you find elapsed time?
- How can you work backwards to solve a problem?
- How can perimeter be measured and found?
- How do you find the perimeter of a shape?
- How can you find the perimeter of a common shape?

- How can you use the perimeter of a polygon to find the length of an unknown shape?
- What shapes can you make when you know the perimeter?
- How can you solve a simpler problem and make a table?
- What does area mean? What are different ways to find the area of a shape?
- How can you measure the area?
- What type of unit describes an area?
- How can you measure an area using standard units?
- How do you measure the amount of space a figure covers?
- How can you break apart rectangles to represent the Distributive Property?
- How can you solve simpler problems to solve a problem?
- How can you find the area of an irregular shape?
- How can rectangles with different areas have the same perimeter?
- How can rectangles with the same area have different perimeters?
- How can you use equal areas to model unit fractions?
- How can you select appropriate measurement units and tools?
- What are metric units for measuring capacity and mass?
- What metric unit describes how much a container holds?
- How do you measure capacity?
- What metric unit describes mass?
- How do you measure mass?
- How can you solve a problem by drawing a picture?
- How can data be represented, interpreted and analyzed?
- How can you make line plots to organize and represent data you have collected?
- How can you read a graph?
- How can you determine how much a symbol in a pictograph represents?
- How can you choose a scale to make a bar graph?
- What conclusions can you draw from tables and graphs?

Students Will Know…	Students Will Be Able to …	Standard
Hour – 60 minutes Half-hour – 30 minutes Quarter hour – 15 minutes Minute – 60 seconds Seconds – a unit of time. 60 seconds equals 1 minute. A.M. - the hours between midnight and noon P.M. – the hours between noon and midnight Elapsed time - the total amount of time that passes from beginning time to the ending time. Perimeter – the distance around a figure Area – the number of square units needed to cover a region. Square Unit – a square with sides that are each 1 unit long. Capacity – the measurement of what a container holds. Milliliter – thousandth of liter Liter – a unit of capacity Mass – the measurement of matter in an object Gram – a unit of weight Kilogram – 1000 grams Line plot – when you record the results by making an x above each number as it is drawn Pictograph – a graph using pictures or symbols to show data. Key – explains what the pictures or symbols stand for.	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. 2. 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. Measure areas by counting unit squares (square cm, square m, square in, square ft, and improvised units). 4. Relate area to the operations of multiplication and addition. Find the area of a rectangle with whole-number side lengths by tiling it, and show that the area is the same as would be found by multiplying the side lengths. 5. Multiply side lengths to find areas of rectangles with whole-number side lengths in the context of solving real world and mathematical problems, and represent whole-number products as rectangular areas in mathematical reasoning. 6. 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. 7. 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. 8. Recognize area as an attribute of plane figures and understand concepts of area measurement. 9. A square with side length 1 unit, called “a unit square,” is said to have “one square unit” of area, and can be used to measure area. 10. A plane figure which can be covered without gaps or overlaps by n unit squares is said to have an area of n square units. 11. Measure and estimate liquid volumes and masses of objects using standard units of grams (g), kilograms (kg), and liters (l).[1] Add, subtract, multiply, or divide to solve one-step word problems involving masses or volumes that are given in the same units, e.g., by using drawings (such as a beaker with a measurement scale) to represent the problem. 12. 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	3.MD.1 3.MD.8 3.MD.6 3.MD.7a 3.MD.7b 3.MD.7c 3.MD.7d 3.MD.5 3.MD.5a 3.MD.5b 3.MD.2 3.MD.3

Bar graph – uses bars to compare information Scale – shows the units used	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*. 13. 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.	3.MD.4

EVIDENCE of LEARNING			
Understanding	**Standards**	**Unit Performance Assessment**:	**R/R Quadrant**
3	3.MD.1	**Topic 12:** ● **Suggested Formative: QC 12-3**, 3-point scoring guide on TE page 299A **Summative 1**: Topic 12 Performance Task -**Scoring Guide:** See district protocol posted on MC, Schoology, or HowellNET	A C
5,6,7	3.MD.8	**Topic 13** ● **Suggested Formative**: **QC 13-3**, 3-point scoring guide on TE page 315A **Summative 2:** Topic 13 Performance Task -**Scoring Guide:** See district protocol posted on MC, Schoology, or HowellNET	A C
12, 13, 14, 15	3MD.5a 3.MD.6 3.MD.7b 3.MD.8	**Topic 14** ● **Suggested Formative: QC 14-3**, 3-point scoring guide on TE page 3335A **Summative 3:** Topic 14 Performance Task -**Scoring Guide:** See district protocol posted on MC, Schoology, or HowellNET	A C
21	3.MD.8 3.MD.2	**Topic 15** ● **Suggested Formative: QC 15-3**, 3-point scoring guide on TE page 369A **Summative 4:** Topic 15 Performance Task -**Scoring Guide:** See district protocol posted on MC, Schoology, or HowellNET	A C
25, 26, 27, 28, 29	3.MD.3 3.MD.4	**Topic 16** ● **Suggested Formative: QC 15-3**, 3-point scoring guide on TE page 369A ● **Summative 5**: Topic 16 Performance Task -**Scoring Guide:** See district protocol posted on MC, Schoology, or HowellNET	A C

SAMPLE LEARNING PLAN				
Pre-assessment: Use "Review What you Know" to diagnose students' readiness by assessing prerequisite content.				
Understanding	**Standards**	**Major Learning Activities:**	**Instructional Strategy:**	**R/R Quadrant**
1,2,3	3.MD.1	1. Set the Purpose by telling students they know how to tell time to the hour. They know how to count by 1s and 5s. Today they will use those skills to tell time. Show intro problem on Pearson Realize 2. Connect by asking students when is reading a clock or giving time important? 3. Pose the problem: Alana needs to call her friend at 7:15. Then she needs to leave for school at 7:30. How can you use a clock face to show these times so she will be on time? 4. Whole Class Discussion: Where is the minute hand? Where is the hour hand? Why is fifteen minutes a quarter hour? Where is the minute hand at 7:30? Where is the hour hand? If 12 shows the beginning of the hour, what does 6 represent? Why? 5. Small Group interaction: Partners says a time quarter past or half past the hour. Partner 2 draws the hands, and writes the time in 2 ways. Switch roles 6. Ask students to work on page 292 – 293, assist or work with small groups as necessary	Cooperative Learning	A
5,6	3.MD.8	Understanding Perimeter 1. Set the Purpose by telling students they have learned how to identify different geometric shapes. Today you will learn how to find the distance around a shape. Use the Animated Glossary on Pearson Realize to introduce perimeter. 2. Connect by asking students if you want to put a fence around a garden, how would you find out how much fence you need? 3. Pose the problem: Troy made this drawing of his garden. Each square in the grid has a side length of 1 foot. What is the distance around Troy's garden. 4. Model how to count unit segments around the figure, marking each segment as it is counted. Have students complete the count aloud as the segments are marked off. Then label the length of each side. Add the side lengths of each side. 5. Ask students to work on page 310-311, assist or work with small groups as necessary.	Nonlinguistic Representations	A

9	3.MD.5a	Covering Regions 1. Set the purpose by telling students they have learned to measure perimeter, or the number of units around the edge of a shape. Today you will learn how to measure the number of square units needed to cover a shape. Show intro problem on Pearson Realize 2. Connect by asking students when they might need to find the number of square units needed to cover a shape? 3. Pose the problem: On your grid paper, draw a rectangle. Use the grid lines from the sides of the rectangle. Also, trace the circle on your grid paper. Work with your partner to find the number of square units inside each shape. 4. Expand – Ask students how can we measure the area of a rectangle? What is the area of the rectangle in square units? Is the area exact or an estimate? How can we measure the area of this circle? What is the area of the circle in square units? Is this area exact or an estimate? Why? 5. Ask students to work on page 330 -331, assist or work with small groups as necessary.	Cooperative Learning	A
20	3.MD.2	Metric Units of Capacity 1. Set the purpose by telling students they have learned how to measure the length of objects. Today you will learn how to measure how much a container holds. 2. Connect by asking students to name something that has capacity about the same as this bottle? You could also use the Animated Glossary on Pearson Realize. 3. Pose the Problem: This water bottle has the capacity of about 1 unit. How can you use this to estimate the capacity of the larger container? How can you check your estimate? 4. Model: Tell students the bottle has the capacity of 1 liter. Compare the larger container to the bottle. It is about 4 times larger than the bottle, so estimate it holds 4 liters. Fill the bottle with water and pour into the larger container. Have students count how many times you fill and empty. 5. Small Groups: Have students work in pairs to estimate the capacity of another container. Then have the group measure the capacity using the water bottle and sand. 6. Ask students to work on page 364-365, assist or work with small groups as necessary	Cooperative Learning	A

23, 24	3.MD.4	Line Plots 1. Set the Purpose by telling students they have learned to record experiment results in a tally chart. Today, you will learn how to record results on a number line. 2. Connect by asking students what a number line is for? When do you use a number line? 3. Pose the problem: In this bag are 10 pieces of paper, each with the numbers 1-4. I will pick a piece of paper and read the number, return the paper to the bag, and repeat for a total of 20 times. Use the number line on your recording sheet to keep track of each number I draw by making a mark above the number. After 20 times, use the data you've recorded to help answer the following questions. Which number was most often picked from the bag? Which number was picked the least often from the bag? 4. Ask students to work on page 382 - 383, assist or work with small groups as necessary	Nonlinguistic Representations	A

UNIT RESOURCES
Teacher Resources: ● **Envisions Teacher Manual** ● **Pearson Realize** ● **Manipulative kit**
Student Resources: ● Envisions Student Book
Vocabulary Hour – 60 minutes Half-hour – 30 minutes Quarter hour – 15 minutes Minute – 60 seconds Seconds – a unit of time. 60 seconds equals 1 minute. A.M. - the hours between midnight and noon P.M. – the hours between noon and midnight Elapsed time - the total amount of time that passes from beginning time to the ending time. Perimeter – the distance around a figure Area – the number of square units needed to cover a region.

Square Unit – a square with sides that are each 1 unit long.
Capacity – the measurement of what a container holds.
Milliliter – thousandth of liter
Liter – a unit of capacity
Mass – the measurement of matter in an object
Gram – a unit of weight
Kilogram – 1000 grams
Line plot – when you record the results by making an x above each number as it is drawn
Pictograph – a graph using pictures or symbols to show data.
Key – explains what the pictures or symbols stand for.
Bar graph – uses bars to compare information
Scale – shows the units used

Content Area: Math	**Course: Grade 3**	**UNIT: Geometry**
Students will categorize and create two-dimensional shapes based on attributes. They will understand that shapes in different categories (e.g., rhombus, rectangles, and others) may sometimes have the same attributes (e.g., having 4 sides). Students will develop the concept of area by first counting unit squares, then tiling a ship to find the area. They will learn that the area can be found by multiplying the side lengths and solve problems involving the area of rectangles and perimeter of polygons. Students will recognize fractional parts of a whole shape.		**Unit Timeline:** 8-10 days

DESIRED RESULTS

Transfer Goals: ***Students will be able to…***

- Draw polygons on a grid and show an understanding of how shapes can be combined and separated.
- Know a right angle can be an isosceles
- Identify the new shape they created.
- Make sense of problems and persevere in solving them.
- Reason abstractly and quantitatively.
- Construct viable arguments and critique the reasoning of others.
- Model with mathematics.
- Use appropriate tools strategically.
- Attend to precision.
- Look for and make use of structure.
- Look for and express regularity in repeated reasoning.

Understandings: ***Students will understand that…***

1. Plane shapes have many properties that make them different from one another.
2. Polygons can be described and classified by their sides and angles.
3. Commonalities in attributes of objects or situations can be found and used to make and test generations about relationships.
4. Some problems can be solved by breaking apart or changing the problem into simpler ones, solving the simpler ones, and using those solutions to solve the original problem.

Essential Questions: ***Students will keep considering…***

- How can 2 dimensional shapes be described, analyzed, and classified?
- What is the polygon?
- How can you describe a quadrilateral?
- What are some ways to describe groups of polygons?
- What generalizations can be made from a group of polygons?
- How can you solve a simpler problem in order to solve a give problem?

Students Will Know…	Students Will Be Able to …	Standard
Polygon: a closed shape made of line segments Side: line segment of a polygon Diagonal: a line segment other than a side that connects 2 vertices of a polygon Triangle: a polygon with 3 sides Quadrilateral: a polygon with 4 sides Pentagon: a polygon with 5 sides Hexagon: a Polygon with 6 sides Octagon: a polygon with 8 sides Decagon: a polygon with 10 sides Trapezoid: A quadrilateral with only 1 pair of parallel sides. Parallelogram: A quadrilateral which opposite sides are parallel Rectangle: a quadrilateral with 4 right angles Square: A quadrilateral with 4 right angles and all sides are the same length. Rhombus: A Quadrilateral with opposite sides parallel and all sides are the same length Vertex: a point at which 2 sides meet Parallel sides: sides that never touch and are the same distance apart. Right Angles: an angle that forms an "L" shape	1. Understand that shapes in different categories (e.g., rhombus, rectangles, and others) may share attributes (e.g., having 4 sides), and that the shared attribute can define a larger category (e.g., quadrilaterals). Recognize rhombus, rectangles, and squares as examples of quadrilaterals that do not belong to any of the subcategories 2. Relate area by counting unit squares (squares cm, square m, square in, square feet and improvise unites). Find the area of a rectangle with whole-number side lengths by tiling it, and show that the area is the same as would be found by multiplying the side lengths. 3. Recognize area as additive. Find areas of rectilinear figures by decomposing them into non-overlapping parts, applying this technique to solve real world problems.	3.G. 1 3.MD.7a 3.MD.7d

EVIDENCE of LEARNING			
<u>Understanding</u>	<u>Standards</u>	**<u>Unit Performance Assessment</u>**:	**<u>R/R Quadrant</u>**
1,2,3	3.G.1	● **Summative: Topic 11 Performance Task** **Scoring Guide:** See district protocol posted on MC, Schoology, or HowellNET	A
2,3	3.G.1	● **Formative #1: Quick Check 11-2** **Scoring Guide:** page 277A	C

SAMPLE LEARNING PLAN				
Pre-assessment: Use "Review What you Know" to diagnose students' readiness by assessing prerequisite content.				
Understanding	**Standards**	**Major Learning Activities:**	**Instructional Strategy:**	**R/R Quadrant**
1	3.G.A.1	1. Set the purpose for the lesson and tell the students that today they are going to distinguish among different shapes. 2. Connect: Ask, "Name some shapes you know? What are some important characteristics of each shape?" (Sample Answers: A square has 4 equal sides; a triangle has 3 sides.) You could also use the Animated Glossary on Pearson Realize. 3. Pose the Problem: Have students draw a shape on their dot paper to solve each riddle. First riddle: I have 3 sides and 3 vertices. Two of my sides are the same length. Second riddle: I have 4 sides. None of my sides is the same as any other. (Provide dot paper on which students can draw the shapes. Ask them to circle the shapes that answer each riddle. Discuss similarities and differences between the shapes.) 4. Tell the students that both shapes are polygons. A polygon is a closed shape made up of line segments. Each line segment is a side of the polygon. The point at which two sides meet is a vertex of the polygon. 5. Whole- Class Discussion: Post student drawings and compare solutions. Ask, "Do all the shapes with 3 sides solve the first riddle? Why or why not?" (Check students' drawings and answers.) Repeat for the second riddle. "How are the polygons that solve each riddle alike? How are they different?" (Possible Answer: They are both made with line segments and angles. The number of line segments and angles is different.) 6. As students work on pages 272 and 273, assist or work with small groups as necessary.	Cooperative Learning	A
		1. Set the purpose for the lesson and tell the students that today they are going to learn to draw different triangles. Show intro problem on Pearson Realize 2. Connect: Ask, "How can you draw a triangle? Describe the steps." (Sample Answers: Draw a line segment. Draw a second line segment to make an angle		A

		with the first line segment. Draw a third line segment that connects the ends of the first two.) 3. Pose the Problem: Distribute recording sheets (Teaching Tool 43). Ask students to look at all of the triangles on the sheet. How can you sort these into groups? Have students cut the triangles out and sort them. 4. Whole- Class Discussion: Encourage students to share their groups and how they determined the groups. 5. As students work on pages 284-285, assist or work with small groups as necessary.		

UNIT RESOURCES
Teacher Resources: ● **Envisions Teacher Manual** ● **Pearson Realize** ● **Manipulative kit**
Student Resources: ● Envisions Student Book
Vocabulary: ● Plane shape: a flat shape having two dimensions (length and width) ● Circle: a plan shape with a continuous line that is always one distance from the center ● Square: a quadrilateral with four equal size sides and four right angles ● Triangle: a polygon with three angles and three sides ● Rectangle: a quadrilateral with four right angles and two pair of opposite equal parallel sides ● Polygon: a plane shape having three or more straight sides