# Fourth Grade Curriculum

# Mathematics


## Board Approved:
## 04/03/2014

# Francis Howell School District
# Fourth 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 Fourth Grade Math

In Grade 4, instructional time should focus on three critical areas: (1) developing understanding and fluency with multi-digit multiplication, and developing understanding of dividing to find quotients involving multi-digit dividends; (2) developing an understanding of fraction equivalence, addition and subtraction of fractions with like denominators, and multiplication of fractions by whole numbers; (3) understanding that geometric figures can be analyzed and classified based on their properties, such as having parallel sides, perpendicular sides, particular angle measures, and symmetry.

1) Students generalize their understanding of place value to 1,000,000, understanding the relative sizes of numbers in each place. They apply their understanding of models for multiplication (equal-sized groups, arrays, area models), place value, and properties of operations, in particular the distributive property, as they develop, discuss, and use efficient, accurate, and generalizable methods to compute products of multi-digit whole numbers. Depending on the numbers and the context, they select and accurately apply appropriate methods to estimate or mentally calculate products. They develop fluency with efficient procedures for multiplying whole numbers; understand and explain why the procedures work based on place value and properties of operations; and use them to solve problems. Students apply their understanding of models for division, place value, properties of operations, and the relationship of division to multiplication as they develop, discuss, and use efficient, accurate, and generalizable procedures to find quotients involving multi-digit dividends. They select and accurately apply appropriate methods to estimate and mentally calculate quotients, and interpret remainders based upon the context.
2) Students develop understanding of fraction equivalence and operations with fractions. They recognize that two different fractions can be equal (e.g., 15/9 = 5/3), and they develop methods for generating and recognizing equivalent fractions. Students extend previous understandings about how fractions are built from unit fractions, composing fractions from unit fractions, decomposing fractions into unit fractions, and using the meaning of fractions and the meaning of multiplication to multiply a fraction by a whole number.
3) Students describe, analyze, compare, and classify two-dimensional shapes. Through building, drawing, and analyzing two-dimensional shapes, students deepen their understanding of properties of two-dimensional objects and the use of them to solve problems involving symmetry.

# Elementary Math Curriculum Contributors (positions 2013-2014)

| | |
|---|---|
| Susan Bayne, first grade teacher | Harvest Ridge Elementary |
| Christine Brawley, kindergarten teacher | Henderson Elementary |
| Nancy Coacher, first grade teacher | Warren Elementary |
| Tricia Cooper, fifth grade teacher | John Weldon Elementary |
| Stacy Garner, kindergarten teacher | Fairmount Elementary |
| Mary Grosch, third grade teacher | Castlio Elementary |
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| Dr. Tracey McAllister, fourth grade teacher | Harvest Ridge Elementary |
| Kelsey Mueller, fifth grade teacher | Fairmount Elementary |
| Jacque Murphy, second grade teacher | John Weldon Elementary |
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| Jennifer Smith, teacher of ELLs | Becky-David Elementary |
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| Corrine Thomsen, fifth grade teacher | Independence Elementary |
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| **Dr. Pam Sloan** | **Superintendent** |
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| **Dr. Sherri Lorton** | **Elementary Content Leader** |

# Scope and Sequence for Fourth Grade Mathematics

| Qtr | Lessons | Max Days | Topic/Description | Domain |
|---|---|---|---|---|
| 1 | 6 | 8 days | Topic 3: Place Value | Numbers & Operations - Base 10 |
| 1 | 6 | 9 days | Topic 4: Addition and Subtraction of Whole Numbers | |
| 1 | 10 | 11 days | Topic 1: Multiplication and Division: Meanings and Facts | Operations and Alg Thinking |
| 1 | 6 | 8 days | Topic 2: Generate and Analyze Patterns | |
| 1-2 | 6 | 9 days | Topic 5: Number Sense: Multiplying by One-Digit Numbers | Numbers and Operations - Base 10 |
| 2 | 6 | 9 days | Topic 6: Developing Fluency: Multiplying by One-Digit Numbers | |
| 2 | 5 | 10 days | Topic 7: Number Sense: Multiplying by Two-Digit Numbers | |
| 2 | 5 | 9 days | Topic 8: Developing Fluency: Multiplying by Two-Digit Numbers | |
| 2 | 6 | 10 days | Topic 9: Number Sense: Dividing by One-Digit Numbers | |
| 3 | 7 | 11 days | Topic 10: Developing Fluency: Dividing by One-Digit Numbers | |
| 3 | 8 | 11 days | Topic 11: Fraction Equivalence and Ordering | Numbers and Operations - Fractions |
| 3 | 11 | 14 days | Topic 12: Adding and Subtracting Fractions and Mixed Numbers with Like Denominators | |
| 3-4 | 10 | 13 days | Topic 13: Extending Fraction Concepts | |
| 4 | 6 (Intro line plots) | 8 days | Topic 14: Measurement Units and Conversions | Measurement and Data |
| 4 | 11 (add time for line plots and graphing) | 15 days | Topic 15: Solving Measurement and Data Problems | |
| 4 | 8 (skip lessons 3, 4, & 6) | 10 days | Topic 16: Lines, Angles, and Shapes | Geometry |
| | 120 | 165 days | | |
| If time | | 10 days | Step-Up: Step-Up to Grade 5 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 4 | **UNIT:** Operations and Algebraic Thinking |
|---|---|---|
| **Unit Description**:<br>There are multiple interpretations of addition, subtraction, multiplication and division of rational numbers. In this unit, students will learn different ways to think of multiplication. By using a variety of models, students will further their understanding of multiplication and understand how it is related to division.<br><br>Students are most familiar with the concept of a pattern in relationship to something that occurs over and over again. Relationships can be described and generalizations made for mathematical situations that have numbers or objects that repeat in predictable ways. For some relationships, mathematical expressions and equations can be used to describe how members of one set are related to members of a second set. It is important that students be able not only to recognize patterns, but also to describe them. | | **Unit Timeline:** 16 -20 days |

**DESIRED RESULTS**

**Transfer Goals**

***Students will be able to independently use their learning to…***

- Multiply or divide to find total cost and total amounts of objects.
- Use the distributive property to break apart a problem into simpler parts.
- Understand and use the zero property of multiplication, the identity property of multiplication and the commutative property of multiplication.
- Make a geometric pattern and complete a table showing relationships in their pattern. (they will make a numeric pattern and write the rule.)
- Analyze a given table to determine a rule and the missing numbers and create an additional pair of numbers that fit their rule.
- Apply their understanding of patterns to continue, draw and explain a pattern.
- 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. There are multiple interpretations of addition, subtraction, multiplication and division of rational numbers, and each operation is related to other operations.

2. Relationships can be described and generalizations made for mathematical situations that have numbers or objects that repeat in predictable ways.
3. 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.
4. Some strategies for basic facts use equivalence to transform calculations into simpler ones.
5. Mathematics content and practices can be applied to solve problems.
6. Relationships can be described and generalizations made for mathematical situations that have numbers or objects that repeat in predictable ways. For some relationships, mathematical expressions and equations can be used to describe how members of one set are related to members of a second set.

**Essential Questions:**

***Students will keep considering…***

- How can patterns and properties be used to find some multiplication facts?
- How can unknown multiplication facts be found by breaking them into known facts?
- How can unknown division facts be found by thinking about a related multiplication fact?
- How can patterns be used to describe how two quantities are related?
- How can a relationship between two quantities be shown using a table?

| Students Will Know… | Students Will Be Able to … | Standard |
|---|---|---|
| ● **Array:** objects arranged in equal rows.<br>● **Product:** the answer to a multiplication problem.<br>● **Factors:** the numbers multiplied together to find the product.<br>● **Multiple:** the product of a number and any whole number.<br>● **Commutative Property of Multiplication:** when two numbers can be multiplied in any order and the product will be the same.<br>● **Zero Property of Multiplication:** the product of any number and zero is zero.<br>● **Identity Property of Multiplication:** the product of any number and one is that number.<br>● **Distributive Property of Multiplication:** to break apart a problem into two simpler problems.<br>● **Inverse Operations:** the operation that reverses the effect of another operation. (Addition and subtraction are inverse operations.)<br>● **Fact Family:** a group or set of numbers that are related, in that the addition, subtraction, division or multiplication of two numbers.<br>● **Repeating Pattern:** made up of shapes or numbers that form a part that repeats | *1.* Interpret a multiplication equation as a comparison, e.g., interpret 35 = 5 x 7 as a statement that 35 is 5 times as many as 7 and 7 times as many as 5. Represent verbal statements of multiplicative comparisons as multiplication equations. *The wording "times as many" and "times as much" is critical to understanding ratios and proportional reasoning in 6th grade and should be solidly developed within 4th and 5th grades.*<br>2. Multiply or divide to solve world problems involving multiplicative comparison, e.g., by using drawings and equations with a symbol for the unknown number to represent the problem, distinguishing multiplicative comparison from additive comparison.<br>3. Solve multistep word problems posed with whole numbers and having whole number answers using the four operations including problems in which remainder must be interpreted. Represent these problems sing equations with a letter standing for the unknown quantity. Assess the reasonableness of answers using mental computation and estimation strategies including rounding.<br>4. Generate a number or shape pattern that follows a given rule. Identify apparent features of the pattern that were not explicit in the rule itself. | 4.OA.A.1<br>4.OA.A.2<br>4.OA.A.3<br>4.OA.C.5 |

| EVIDENCE of LEARNING | | | |
|---|---|---|---|
| Understanding | Standards | **Unit Performance Assessment**: | **R/R Quadrant** |
| 1, 2, 5, 6 | 4.OA.A.3, 4.OA.C.5 | **Summative: Topic 2 Performance Task-**<br><br>**Scoring Guide**: see 3-point scoring rubric on page 62 of Envisions TE | B |
| 1, 2 | 4.OA.A.2, 4.OA.A.3, 4.OA.C.5 | ● **Formative #1: Topic 1 Performance Task**<br>○ **Scoring Guide**: see 3-point scoring rubric on page 36 of Envisions TE | B |

| | | | |
|---|---|---|---|
| 1, 2, 5, 6 | 4.OA.A.3, 4.OA.C.5 | ● **Formative #2:** Quick Check 2-5, Exercise 2<br>○ **Scoring Guide**: see 3-point scoring rubric on page 53A of Envisions TE | C |

| **SAMPLE LEARNING PLAN** | | | | |
|---|---|---|---|---|
| **Pre-assessment:** Use "Review What you Know" to diagnose students' readiness by assessing prerequisite content. (Page 3 in Student Book) | | | | |
| **Understanding** | **Standards** | **Major Learning Activities:** | **Instructional Strategy:** | **R/R Quadrant** |
| 1, 2, 3, 5 | 4.OA.A.3 | **Multiplication Properties** – Page 12A – 13A of Envisions TE<br>1. **Set the Purpose:** *You have learned about properties for addition. Today you will learn about properties for multiplication.* Show intro problem on Pearson Realize<br>**2. Connect:** *What does it mean to commute from home to school?* [To travel back and forth from home and school] *If you commute do you switch places?* [Yes]<br>**3. Pose the Problem:** *Find two ways to arrange 10 desks in equal rows. Then write number sentences for each arrangement and describe how these number sentences are similar.* For students who are stuck, suggest they draw pictures of the rows. Have students share how they found their answers. [2 rows of 5 desks, 5 rows of 2 desks; 2 x 5 = 10; 5 x 2 = 10; same factors, same product]<br>**4. Academic Vocabulary:** Write on the board: "3 + 4 = __; 4 + 3 = __." *Find each sum.* [7 and 7]. *What property of addition does this show?* [The Commutative Property of Addition] *In the desk problem you saw a similar property for multiplication. What do you think it is called?* [The Commutative Property for Multiplication] Write on the board: Commutative Property of Multiplication: Two numbers can be multiplied in any order and the answer is the same. *What number added to 5 equals 5?* [0] *What is this property called?* [The Identity Property of Addition.] *What number multiplied by 5 equals 5?* [1] *What do you think this property is called?* [The Identity Property of Multiplication.] Write on the board: Identity Property of Multiplication: The product of any number and 1 is that number. Write on the board: 3 x 0 =__; 0 x 8 = __; 19 x 0 = __. *Find each* | Homework and Practice<br><br>Nonlinguistic Representation<br><br>Setting Objectives and Providing Feedback<br><br>Summarizing and Notetaking<br><br>Reinforcing Effort and Providing Recognition<br><br>Similarities and Differences | B |

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| | | *product and describe the pattern.* [The answer is always 0] *This is the Zero Property of Multiplication*. Write one the board: Zero Property of Multiplication: The product of any number and zero is zero.<br>5. **Visual Learning:** Call the students' attention to the Visual Learning Bridge at the top of page 12 in the student book. *In this lesson, you will use the Zero, Identity, and Commutative Properties of Multiplication.* You could also use the Animated Glossary on Pearson Realize.<br>6. **Guided Practice:** Call the students' attention to the Guided Practice on page 12 in the student book. Ask students to name the properties used in Exercises 1-8.<br>7. **Independent Practice:** As students work on page 12 and 13, assist or work with small groups as necessary.<br>8. **Close/Essential Understanding:** Two numbers can be multiplied in any order. The product of any number and 0 is zero. The product of any number and 1 is that number. *In this lesson, we learned how to use the Zero Property of Multiplication, the Identity Property of Multiplication and the Commutative Property of Multiplication.*<br>9. **Assessment:** Have the students complete the Quick Check Master 1-3. Use the 3-point scoring rubric on page 13A of Envisions TE to grade the assessment. Then, use student work on the Quick Check to prescribe differentiated instruction. | | |
| 1, 2, 3, 5, 6 | 4.OA.A.3, 4.OA.C.5 | **Writing Rules for Situations** – Page 46A – 49A of Envisions TE<br>1. **Set the Purpose:** *You have learned how to find number pairs that fit a pattern and a rule. Today, you will learn how to find a rule for a table that already had some pairs of numbers.*<br>2. **Connect:** *What happens when you put a coin in a vending machine and make a selection?* [The item you select comes out.] *What do you think happened in the machine for you to get the item?* [Wheels turn or levers move.]<br>3. **Pose the Problem:** *What is a rule for the first table on our recording sheet? Think about how Nelson's age is related to Pam's age.* Give students a chance to work in pairs to find a rule using any method. Then invite them to share their thinking and rules.<br>4. **Expand Student Responses:** Discuss students' solutions. *What rule did you find for the table?* [Subtract 2 from Nelson's age to get Pam's age.] Students may say that Pam's age is Nelson's age divided by 2. Ask: *Does your rule work for every pair?* [No] Tell students the rule must work for every pair. | Homework and Practice<br><br>Nonlinguistic Representation<br><br>Setting Objectives and Providing Feedback<br><br>Summarizing and Notetaking | B |

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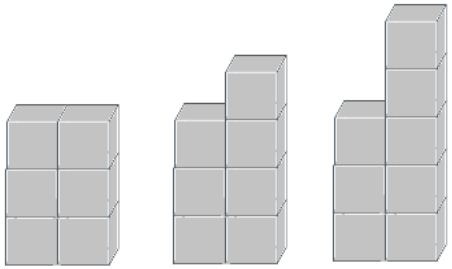
| | | 5. **Link to Prior Knowledge:** Discuss the idea of a "number machine." *A number machine takes in one number and puts out another number.* Add the labels "In" and "Out" to the table. *If Nelson's number goes into the machine, what should the machine do to make Pam's number?* [Subtract 2.] Extend the table: *If Nelson's number is 11, what is Pam's number?* [9] *If Nelson's number is 7, what is Pam's number?* [5]<br>6. **Small Group Instruction:** Have students work in pairs to complete the other tables on the recording sheet and write a rule for each table.<br>7. **Visual Learning:** Call the students' attention to the Visual Learning Bridge at the top of page 46 in the student book. *In this lesson, you will learn to write a math rule for a table of number pairs, and then you will use your rule to complete the table. You could also use the Animated Glossary on Pearson Realize*<br>8. **Another Example:** Call the students' attention to the Another Example section on page 46 in the student book. Ask: *What is the problem about?* [The amount of money Nell earns and the amount she saves] *What are you asked to find?* [A rule for the table and the missing numbers in the table] *How is the rule in Step 1 different from the rule for the table about Alex's and Andy's ages?* [This rule uses subtraction. The rule for Alex and Andy's ages used addition.] *In step 2, the rule is "subtract 15¢," so why do you add 15¢ to 25¢?* [Sample Answer: 25¢is in the bottom row, so it is 15¢ less than the amount above it. To find the amount in the top row, you have to work backward and find the amount that is 15¢ more than 25¢.]<br>9. **Guided Practice:** Call the students' attention to the Guided Practice on page 47 in the student book. Remind students to check that their rule works for all number pairs in the table.<br>10. **Independent Practice:** As students work on page 47 and 48, assist or work with small groups as necessary.<br>11. **Close/Essential Understanding:** Some real-world quantities have a mathematical relationship; the value of one quantity can be found if the value of the other quantity is known. Patterns can be used to identify some relationships. *In this lesson, you learned how to use patterns to write a rule for a table of number pairs and then use that rule to complete the table.*<br>12. **Assessment:** Have the students complete the Quick Check Master 2-4. Use the 3-point scoring rubric on page 49A of Envisions TE to grade the assessment. Then, use student work on the Quick Check to prescribe differentiated instruction. | Reinforcing Effort and Providing Recognition<br><br>Similarities and Differences<br><br>Cooperative Learning | |

<table>
<tr>
<td>1, 2, 3, 4, 5, 6</td>
<td>4.OA.A.3,<br>4.OA.C.5</td>
<td>
Geometric Patterns– Page 50A – 53A of Envisions TE<br>
1. Set the Purpose: You have learned that shapes can form a unit that repeats to make a pattern. Today, you will learn how some shapes can also show growing patterns. Show intro problem on Pearson Realize<br>
2. Connect: Have you ever made towers with blocks? How do you make stories? [Stack blocks on top of other blocks]<br>
3. Pose the Problem: Build the tower pattern shown below. Look at the towers of cubes. Do you see a pattern in the number of cubes in each tower? What would the next two towers look like? Have students work in pairs to model the towers, using cubes, to build the next two towers, and draw their towers on grid paper. Then invite them to share their solutions.<br>
 <br>
4. Expand Student Responses: What pattern did you see in the towers? [When there is 1 more story, there is 1 more cube.] What would the next tower look like? [Like the 3rd tower with 1 cube added to make a 6th story] How can you predict the number of cubes in a tower with 10 stories? [Add 1 more cube for each story. You can add 3 to the number of stories.]<br>
5. Small Group Interaction: Have students work in pairs. Make a table that shoes the number of stories and the number of cubes for the towers you just made. Use the pattern you found. [9, 10, 11, 12, 13, 103]<br>
<table>
<tr><td>Number of stories</td><td>3</td><td>4</td><td>5</td><td>6</td><td>7</td><td>8</td><td>9</td><td>10</td><td>100</td></tr>
<tr><td>Number of Cubes</td><td>6</td><td>7</td><td>8</td><td></td><td></td><td></td><td></td><td></td><td></td></tr>
</table>
How does the table help you see a pattern? [You can see that the number of cubes increases by 1 each time and the number of cubes is 3 ore than the number of stories.]
</td>
<td>Homework and Practice<br><br>Nonlinguistic Representation<br><br>Setting Objectives and Providing Feedback<br><br>Summarizing and Notetaking<br><br>Reinforcing Effort and Providing Recognition<br><br>Similarities and Differences<br><br>Cooperative Learning</td>
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|---|---|---|---|---|
| | | 6. **Visual Learning:** Call the students' attention to the Visual Learning Bridge at the top of page 50 in the student book. *In the lesson, you will learn to continue a geometric pattern and then use that pattern to complete a table of number pairs.*<br>7. **Another Example:** Call the students' attention to the Another Example section of the book on page 50. *Look at the numbers in the top row of the table. Can you use an "add" rule to get the number in the bottom row?* [No] *Why not?* [There is no addition that is the same for all three pairs of numbers.] *Can you use a "subtract" rule?* [No] *Can you use a "multiply"* [No] *Compare these towers to the towers in the example at the top of page 51. How are the towers different?* [Sample Answer: The towers at the top of page 51 have the same number of blocks in every row. These towers have a different number of blocks in every row.]<br>8. **Guided Practice:** Call the students' attention to the Guided Practice section on page 51. Remind students that the number of blocks in the towers they draw should match the numbers they get in the table when they use a rule.<br>9. **Independent Practice:** As students work on page 51 through 53, assist or work with small groups as necessary.<br>10. **Close/Essential Understanding:** Some sequences of geometric objects change in predictable ways that can be described using a mathematical rule. *In this lesson, you learned to continue a geometric pattern and then use that pattern to complete a table of number pairs.*<br>11. **Assessment:** Have the students complete the Quick Check Master 2-5. Use the 3-point scoring rubric on page 53A of Envisions TE to grade the assessment. Then, use student work on the Quick Check to prescribe differentiated instruction. | | |

| **UNIT RESOURCES** |
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| **Teacher Resources:**<br>● **Envisions Teacher Manual**<br>● **Pearson Realize**<br>● **Manipulative kit** |
| **Student Resources:**<br>● Envisions Student Book |
| **Vocabulary:**<br>● **Array:** objects arranged in equal rows.<br>● **Product:** the answer to a multiplication problem.<br>● **Factors:** the numbers multiplied together to find the product.<br>● **Multiple:** the product of a number and any whole number. |

- **Commutative Property of Multiplication:** when two numbers can be multiplied in any order and the product will be the same.
- **Zero Property of Multiplication:** the product of any number and zero is zero.
- **Identity Property of Multiplication:** the product of any number and one is that number.
- **Distributive Property of Multiplication:** to break apart a problem into two simpler problems.
- **Inverse Operations:** the operation that reverses the effect of another operation. (Addition and subtraction are inverse operations.)
- **Fact Family:** a group or set of numbers that are related, in that the addition, subtraction, division or multiplication of two numbers.
- **Repeating Pattern:** made up of shapes or numbers that form a part that repeats.

| **Content Area:** Math | **Course: Grade 4** | **UNIT: Numbers and Operations** |
|---|---|---|
| **Unit Description**: The base-ten numeration system is a scheme for recording numbers using digits 0-9, groups of ten, and place value. Numbers, expressions, measures, and objects can be compared and related to other numbers, expressions, measures, and objects in different ways. Numbers can be approximated by numbers that are close. Mathematics content and practices can be applied to solve problems.<br><br>Any number, measure, numerical expression, algebraic expression, or equation can be represented in an infinite number of ways that have the same value. There is more than one algorithm for each of the operations with rational numbers. Some strategies for basic facts and most algorithms for operations with rational numbers, both mental math and paper and pencil, use equivalence to transform calculations into simpler ones. Numbers can be approximated by numbers that are close. Numerical calculations can be approximated by replacing numbers with other numbers that are close and easy to compute mentally. Some measurements can be approximated using known referents as the unit in the measurement process.<br><br>Relationships can be described and generalizations made for mathematical situations that have numbers or objects that repeat in predictable ways. For some relationships, mathematical expressions and equations can be used to describe how members of one set are related to members of a second set. There are multiple interpretations of addition, subtraction, multiplication, and division of rational numbers and each operation is related to other operations. | | **Unit Timeline:** 50 days |

| **DESIRED RESULTS** |
|---|
| **<u>Transfer Goals</u>** ***Students will be able to independently use their learning to…*** |
| ● Write and compare whole numbers in standard and expanded form.<br>● Add and subtract two-digit numbers when solving a real-world problem, and communicate how they solved the problem.<br>● Use estimation to solve multiplication problems, and check accuracy with reasonableness.<br>● Use mental math to multiply two-digit numbers, estimate products, and solve two-step problems by making sense of the information given.<br>● Use multiplication of two 2-digit numbers, as well as addition and subtraction, to solve problems.<br>● Use division to divide a group of objects, and interpret the meaning of a remainder. |

- Use division to divide 2-digit and 3-digit numbers by a 1-digit number correctly.
- 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. **Ten** in one place value is equivalent to **one** in the next greater place value.
2. In a multi-digit whole number, a digit in one place represents ten times what it would represent in the place immediately to its right.
3. Place value can be used to compare and order numbers.
4. Rounding whole numbers is a process for finding the multiple of 10, 100, and so on closest to a given number.
5. Representing numbers and numerical expressions in equivalent forms can make some calculations easy to do mentally.
6. There is more than one way to do a mental calculation.
7. The standard addition and subtraction algorithms for multi-digit numbers break the calculation into simpler calculations using place value starting with the ones, then the tens, and so on.
8. There is more than one way to estimate a sum or difference, each estimation technique gives a way to replace numbers with other numbers that are close and easy to compute with mentally.
9. 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.
10. Making an array with place-value blocks proves a way to visualize and find products. A 2-digit by 1-digit multiplication calculation can be broken into simpler problems: a basic fact and a 1-digit number times a multiple of 10. Answers to the simpler problems can be added to give the product.
11. Basic facts and place value patterns can be used to find products when one factor is 10 or 100.
12. Rounding is one way to estimate products.
13. Answers to problems should always be checked for reasonableness and this can be done in different ways. Two ways are to use estimation and to check the answer against the question and conditions to the problem.

14. There is an expanded algorithm for multiplying where numbers are broken apart using place value and the parts are used to find partial products. The partial products are then added together to find the product. Multiplication can be conceptualized with area models, detailing the partial products.
15. The standard multiplication algorithm is a shortcut for the expanded algorithm. Regrouping is used rather than showing all partial products. The process is the same regardless of the size of the factors.
16. Basic facts and place-value patterns can be used to mentally multiply a two-digit number by a multiple of 10 or 100.
17. Products can be estimated by replacing numbers with the closest multiple of 10 or 100, or with other numbers that are close and easy to multiply mentally.
18. 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.
19. The expanded algorithm for multiplying by two-digit numbers is just an extension of the expanded algorithm for multiplying with one-digit numbers.
20. Making an array with place-value blocks provides a way to visualize and find products using an expanded algorithm.
21. The standard algorithm for multiplying a two-digit number by a multiple of 10 is just an extension of the algorithm for multiplying multi-digit numbers by a one-digit number.
22. Sometimes the answer to one problem/question is needed to find the answer to another problem/question.
23. Basic facts and place-value patterns can be used to divide multiples of 10 and 100 by one-digit numbers.
24. Substituting compatible numbers is an efficient technique for estimating quotients.
25. Mentally multiplying by different powers of ten will help you arrive at an estimate for a quotient of a multi-digit division problem
26. The remainder when dividing must be less than the divisor. The nature of the question asked determines how to interpret and use the remainder.
27. Some real-world problems involving joining equal groups, separating equal groups or comparison can be solved using multiplication; others can be solved using division.
28. Information in a problem can often be shown using a picture or diagram and used to understand and solve a problem. Some problems can be solved by writing and completing a number sentence or equation.
29. Repeated subtraction situations can be solved using a division algorithm different from the standard algorithm.
30. The sharing interpretation of division can be used to model the standard division algorithm.
31. The standard division algorithm breaks the calculation into simpler calculations using basic facts, place value, the relationship between multiplication and division, and estimation.
32. The relationship between multiplication, division, and estimation can help determine the place value of the largest digit in a quotient.

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

- In a given number, what is the value of each of the digits?

- How can you round numbers?
- How can sums and differences of whole numbers be estimated?
- How can you use mental math, bar diagrams, or standard procedures to add and subtract?
- How can some products be found mentally or estimated?
- How can you use arrays to multiply by 10 and 100?
- What place-value patterns can be seen when you multiply 1-digit numbers by multiples of 10 and 100?
- How can you break apart arrays to help you multiply with greater numbers?
- How do you know when an answer is reasonable?
- How can you multiply a 2-digit number by a 1-digit number and check the product for reasonableness?
- What is the hidden question or questions within single or multi-step problems?
- What is a standard procedure for multiplying multi-digit numbers?
- How can arrays help you multiply 2-digit numbers?
- How can you find the product of a 2-digit number and a multiple of ten?
- How do you multiply 2-digit by 2-digit numbers?
- What are different meanings of division?
- How can mental math and estimation be used to divide?
- How can you use place value and patterns to help you divide mentally?
- How do you estimate quotients using place value?
- What does it mean when you divide and some are left over?
- How can you decide when to multiply and when to divide to solve a problem?
- How can a bar diagram help you solve a division problem?
- How can repeated subtraction be used to model division?
- What is the standard procedure for dividing multi-digit numbers?
- How can place value help you divide?
- How can you estimate larger quotients?

| Students Will Know… | Students Will Be Able to … | Standard |
|---|---|---|
| **Vocabulary**<br>● **digits**- the numbers 0, 1, 2, 3, 4, 5, 6, 7, 8, and 9<br>● **place value**- the value of the place a digit has in a number.<br>● **standard form**- a number written in a way that shows only its digits<br>● **expanded form**- a number written as the sum of the values of its digits<br>● **word form**- a number written in words<br>● **compare**- when you find out which number is greater, and which number is less when looking at two numbers.<br>● **breaking apart**-mental math used to rewrite a number as the sum of numbers to form an easier problem<br>● **compensation**- choosing numbers close the numbers in a problem, and then adjusting the answer to compensate for the numbers chosen<br>● **counting on**- counting up from a smaller number to find the difference of two numbers<br>● **Commutative Property of Addition**- you can add two numbers in any order<br>● **Associative Property of Addition**- you can change the grouping of addends<br>● **Identity Property of Addition**- adding zero does not change the number<br>● **inverse operations**- operations that undo each other<br>● **partial products**-products found by breaking one factor in a multiplication problem into ones, tens, hundreds, and so on, and then multiplying each of these by the other factor<br>● **compatible numbers**-numbers that are easy to compute mentally<br>● **remainder**- in division, the number that is left after when the division is complete | 1. Recognize that in a multi-digit whole number, a digit in one place represents then times what it represents in the place to its right.<br>2. Read and write multi-digit whole numbers using base-ten numerals, number names, and expanded form. Compare two multi-digit numbers based on meanings of the digits in each place, using >, =, and < symbols to record the results of comparisons.<br>3. Use place value understanding to round multi-digit whole numbers to any place.<br>4. Fluently add and subtract multi-digit whole numbers using the standard algorithm.<br>5. Multiply a whole number of up to four digits by a one-digit whole number, and multiply two two-digit numbers using strategies based on place value and the properties of operations. Students will explain their understanding using mathematically precise language instead of "put the number here, line up, put a zero there and bring down." Illustrate and explain the calculation by using equations, rectangular arrays and/or area models. Students will explain their understanding using mathematically precise language instead of "put the number here, line up, put a zero there and bring down" Students will use variations of standard division algorithms to show which methods require the greatest divisor and which allow more flexibility but also more work.<br>6. Find whole number quotients and remainders with up to four-digit dividends and one-digit divisors, using strategies based on place value, the properties of operations, and/or the relationship between multiplication and division. Illustrate and explain the calculation by using equations, rectangular arrays, and/or area models. | 4.NBT.1<br>4.NBT.2<br>4.NBT.3<br>4.NBT.4<br>4.NBT.5<br>4.NBT.6 |

| EVIDENCE of LEARNING | | | |
|---|---|---|---|
| Understanding | Standards | **Unit Performance Assessment**: | **R/R Quadrant** |
| 13, 14, 15, 17, 20, 22, 24, 28 | 4.NBT.3, 4.NBT.4 | **Summative: Topic 6 Performance Assessment: REQUIRED FOR DATA ENTRY**<br>**Scoring Guide:** see new protocol and scoring rubric on HowellNET | C |
| 3 | 4.NBT.2 | ● **Formative #1: Quick Check Master, Lesson 3-4** (place value, comparing)<br>**Scoring Guide:** see 3-point scoring rubric on page 77A, Envisions TE Topic 3 | A |
| 13, 14, 15, 17, 20, 22, 24, 28 | 4.OA.3<br>4.NBT.5 | ● **Formative #2: Quick Check Master, Lesson 6-5** (Multiplying by 1-digit numbers, problem solving)<br>**Scoring Guide:** see 3-point scoring rubric on page 153A, Envisions TE Topic 6 | C |
| 25, 26, 27, 28, 29, 30, 31, 32 | 4.NBT.4<br>4.NBT.6 | **Summative: Topic 10 Performance Assessment: REQUIRED FOR DATA ENTRY**<br>**Scoring Guide:** see new protocol and scoring rubric on HowellNET | B |
| 9, 13, 14, 15, 16, 17, 19, 21, 23, 24 | 4.OA.3<br>4.NBT.5 | ● **Formative #3: Quick Check Master, Lesson 8-3** (Multiplying by 2-digit numbers, problem solving, using a grid)<br>**Scoring Guide:** see 3-point scoring rubric on page 193A, Envisions TE Topic 8 | B |

| SAMPLE LEARNING PLAN | | | | |
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| **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 | 4.NBT.2 | **Lesson 3-3: Students use place-value blocks and place-value charts to compare 4-digit numbers and write number sentences to show the comparison.**<br>1. Pose the problem: Compare 1,345 and 1,380. Give the students time to model the numbers and discuss their solutions with a partner. Lead students through a model of using the place-value blocks and the place-value chart using both numbers. Compare each digit to the same digit in the other number by asking leading questions. Discuss your findings.<br>2. Set the purpose by telling students they will compare numbers using place-value blocks and place-value charts. Call students' attention to Visual Learning Bridge at the top of page 90 in the student book. You could also use the Animated Glossary on Pearson Realize) .<br>3. Explain to students that when comparing numbers, you always start with the digits in the greatest place value. If these digits are equal, you compare the digits in the next greatest place value, and so on. Model with the example, *Compare 3,456 and 3,482. Which place value determines which number is greater? Why?*<br>4. Introduce the comparison signs, <, >, and = during guided practice, and monitor understanding during independent practice (pages 71 & 72).<br>5. Students use underlying processes and mathematical tools to complete exercises 22-26. Remind students to check for reasonableness when solving each problem.<br>6. **Optional Journal exercise**- Ask students to choose two of the buildings shown in the pictures. Have them explain how to find which building is taller.<br>7. **Algebra Connections**- Point out to students that the symbols <, >, and = show the relationship between two numbers or two sides of a statement. Discuss the example with students to be sure they understand that it may | Cooperative Learning<br><br>Using Mathematical tools<br><br>Modeling | A |

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| | | not be necessary to simplify both sides of a statement before one of these three symbols can be used. | | |
| 5, 6, 7, 8 | 4.NBT.3<br><br>4.NBT.4 | **Lesson 4-1: Students will learn how to use mental math to add and subtract.**<br>1. Engage students by setting the purpose and connecting to prior knowledge.<br>Pose the problem- *Luke collected 3 baseball cards and 34 football cards. Find the number of cards in his collection without using a pen and paper.* Allow students to work in pairs and share their responses.<br>Model- Have students work in the pairs to show 36+34 with place-value blocks.<br>Use vocabulary like *sum, addends, blocks, breaking apart, mental math.*<br>2. Set the purpose by telling students they will learn different ways to perform addition and subtraction in their heads. Call students' attention to Visual Learning Bridge at the top of page 90 in the student book. You could also use the Animated Glossary on Pearson Realize.<br>3. Model strategies- Example of *breaking apart* strategy:<br>135 +48. Break 48 into 5 and 43. Adding 5 to 135 is easy; it = 140. The number 140 is easier to work with mentally than 135. 140 + 43 = 183.<br>Go over the examples for *compensation,* & *counting on.* Students may confuse addition and subtraction when using the compensation strategy. The opposite operation must be performed to compensate in both cases.<br>4. Guided Practice. Remind students to think about the numbers in the problem before deciding which mental-math strategy to use. Reteach if necessary from page 108.<br>5. Circulate the room and check for understanding during independent practice and problem solving on pages 91 & 92.<br>6. Algebra Connection- Students need to understand that subtraction can be used to find missing numbers in equations. Ex- Students should translate "What number plus 8 equals 35?" to "35 minus 8 equals what number?" Attend to Precision- Remind students that in math, the word "more" is usually used to compare one amount to another. | Cooperative learning<br><br>Using mathematical tools<br><br>Nonlinguistic representation of vocabulary | C |
| 10, 11, 13 | 4.NBT.5 | **Lesson 5-2: Students will identify patterns that occur when the same 1-digit number is multiplied by multiples of 10 and 100.** | Using patterns | A |

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| | | 1. Engage students by setting the purpose and connecting to prior knowledge. Pose the problem: 3X4= _____, 3X40= _____, 3X400=____ Direct students to use any method they want to find the products. Discuss patterns they observed. Go over steps and allow students to work on similar problems in small groups.<br>2. Set the purpose of the lesson by telling students they will use basic multiplication facts and number patterns to multiply by multiples of 10 and 100.<br>3. Guided Practice- Remind students that if the product of a basic fact ends with a zero, the product when multiplying by a multiple of 10 will have one more zero than the total number of zero the factors have. Use page 118 in the student for Reteaching if necessary.<br>4. Circulate the room and check for understanding during independent practice and problem solving on pages 91 & 92.<br>5. Optional Journal Activity- Have students write three basic multiplication facts. Have them rewrite each basic fact with one factor written as a multiple of 10 and find each new product. Then have them write a sentence explaining the pattern between the products in each set of basic facts. | Using Known Strategies | |
| 13, 14, 15. 16, 17, 18, 19 | 4.NBT.5 | **Lesson 6-2: Students will use the expanded algorithm and the standard algorithm to record multiplication.**<br>1. Engage the students by setting the purpose and connecting to prior knowledge. Pose the problem: *A large bus can seat 52 people. If 8 of these buses are fully loaded to take students from one school to a high school graduation, how many students are on all of the buses?* Give students time to solve the problem any way they choose. Encourage them to use place-value blocks or draw pictures as needed. Then have students share their work. Model and think aloud as you solve the problem using the expanded algorithm (52 X 8 = 16 + 400 = 416), and the standard algorithm<br>52<br><u>x8</u><br>416 | Build on prior knowledge | C |

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| | | Have students work in pairs to solve the problem 36 X 4.<br>2. As students work through guided practice, independent practice and problem-solving questions on pages 142-143, remind them to first multiply ones and then tens with both the expanded and standard algorithms. | | |
| 21, 22, 23, 24 | 4.NBT.5 | **Lesson 7-3: Students will use rounding to estimate products of 2-digit numbers**<br>1. Engage students by setting the purpose and connecting to prior learning. Show intro problem on Pearson Realize<br>Pose the problem: T*o win a game, you need a product that is as close to 1,600 as possible. You can choose two factors from the numbers 18, 42, 56, and 81. Which numbers can you select so that the product is closest to 1,600? Work with a partner to decide which numbers to select.* Give students time to work on this problem and share their answers. Have a whole class discussion where you use modeling and guided questions to lead the class to the answer 18 and 81. Have students work in pairs posing the same question and factors, but with the product of 4.800.<br>2. Review the terms *estimate, rounding,* and *product*. Remind students of the pattern for multiplying multiples of 10. Model and reteach as necessary as you work through the guided practice problems on page 172.<br>3. Circulate the room and check for understanding as students work on independent practice and problem-solving questions on pages 172 and 173. | Modeling<br><br>Think Aloud<br><br>Partner sharing | B |
| 14, 15, 19, 21, 23 | 4.NBT.B.5 | **Lesson 8-2: Students will use arrays and an expanded algorithm to multiply 2-digit numbers**<br>1. Engage students by setting the purpose and connecting to prior knowledge. Pose the problem: *There are 11 players and 5 substitutes on a professional soccer team. How many players are there in all 15 teams? Solve this problem any way you choose. Show your work and be ready to explain how you found the answer.* Distribute grid paper to students and encourage them to make drawings as needed. After giving students time to solve the problem, model how to use an array on grid paper to find the product. | Using known strategies<br><br>Nonlinguistic presentation<br><br>Modeling | C |

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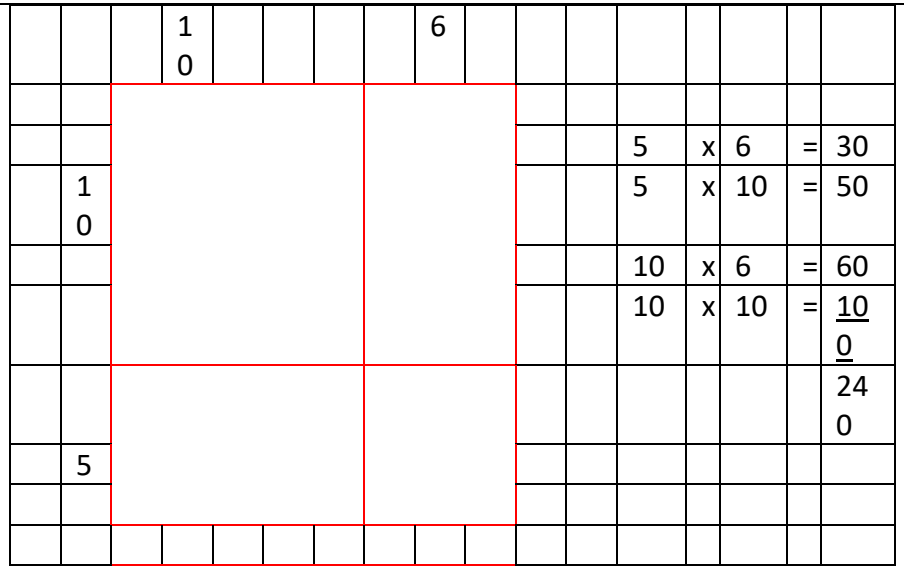
| | |  Have students work with a partner to find 17 x 13 by recording partial products and drawing an array.<br>2. To help students write the correct number of zeros in their partial products, encourage them to write the factors for each partial product next to the partial product. Model and reteach as necessary through the guided practice exercises on page 190.<br>3. Circulate the room and check for understanding as students work on independent practice and problem-solving questions on pages 190 and 191. | | |
| 26, 27 | 4.NBT.B.6 | **Lesson 9-4: Students will use counters to model division with remainders**<br>1. Engage students by setting the purpose and connecting to prior learning. Pose the problem: *Jaycen has 14 trophies and 4 shelves. He wants to put the same number of trophies on each shelf. How many trophies will be on each shelf? How many trophies will be left over?* Distribute 14 counters per pair of students. Have students share their solutions with the class. After some time to work, work through the problem using etools from Pearson Realize. Model and think aloud as you work through the problem. Introduce the academic vocabulary *remainder*. Have student pairs work through another problem: 14 trophies and 5 shelves. | Problem solving strategies<br><br>Cooperative learning<br><br>Using manipulatives | A |

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| | | 2. Before starting guided practice, point out that the remainder must be less than the divisor. This can be used as a check on the accuracy of the calculation.<br>Reteach and expand as necessary throughout the guided practice problems on page 212.<br>3. Circulate the room and check for understanding as students work on independent practice and problem-solving questions on pages 212 and 213. | | |
| 29, 30 | 4.NBT.B.6 | **Lesson 10-1: Students will use an algorithm for dividing that is based on repeated subtraction**<br>1. Engage students by setting the purpose and connecting to prior knowledge. Show intro problem on Pearson Realize<br>2. Pose the problem: *Solve this problem without using counters or pictures. Instead, show how to divide using paper and pencil. A certain bird feeder holds 6 cups of bird feed. How many times can this bird feeder be filled using a 72-cup bag of bird seed?* Give students time to figure out their solutions and share with the class. Think aloud by asking why this is a situation where repeated subtraction would work. Show at least two ways this would work.<br>3. Before starting guided practice, tell students they can start with a multiple of the divisor that is less than the dividend. Reteach and expand as necessary throughout the guided practice problems on page 228.<br>4. Circulate the room and check for understanding as students work on independent practice and problem-solving questions on pages 228 and 229. | Modeling<br>Think Aloud | A |

| **UNIT RESOURCES** |
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| **Teacher Resources:**<br>● **Envisions Teacher Manual**<br>● **PearsonRealize**<br>● **Manipulative kit** |
| **Student Resources:** |

- Envisions Student Book

**Vocabulary:**

- **digits**- the numbers 0, 1, 2, 3, 4, 5, 6, 7, 8, and 9
- **place value**- the value of the place a digit has in a number.
- **standard form**- a number written in a way that shows only its digits
- **expanded form**- a number written as the sum of the values of its digits
- **word form**- a number written in words
- **compare**- when you find out which number is greater, and which number is less when looking at two numbers.
- **breaking apart**-mental math used to rewrite a number as the sum of numbers to form an easier problem
- **compensation**- choosing numbers close the numbers in a problem, and then adjusting the answer to compensate for the numbers chosen
- **counting on**- counting up from a smaller number to find the difference of two numbers
- **Commutative Property of Addition**- you can add two numbers in any order
- **Associative Property of Addition**- you can change the grouping of addends
- **Identity Property of Addition**- adding zero does not change the number
- **inverse operations**- operations that undo each other
- **partial products**-products found by breaking one factor in a multiplication problem into ones, tens, hundreds, and so on, and then multiplying each of these by the other factor
- **compatible numbers**-numbers that are easy to compute mentally
- **remainder**- in division, the number that is left after when the division is complete

| **Content Area:** Math | **Course:** Grade 4 | **UNIT:** Number and Operations-Fractions |
|---|---|---|
| **Unit Description**: In this unit, students will learn that numbers can be used for different purposes and that numbers can be classified and represented in different ways. Students will learn how to visualize benchmark fractions and find equivalent fractions to compare and order fractions. Then, they will be able to model adding and subtracting fractions with like denominators, understand place value after the decimal point and be able to label fractions and decimals on a number line. | | **Unit Timeline:** 29 -35 days |

**DESIRED RESULTS**

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

- Write fractions for parts of a region in simplest form and estimate fractional amounts.
- Use information to determine the operation that is necessary to solve and compute with mixed numbers.
- Compare fractions and order them by reasoning about their size relative to 0, ½, and 1.
- Understand properties of operations for fractions are the same as for whole numbers, including associative, commutative, distributive, and the need to combine "like terms" as in "same place values" and "same denominators."
- Write equivalent fractions with denominators of 10 and 100 and then write the fraction as a decimal.
- 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. Numbers can be used for different purposes, and numbers can be classified and represented in different ways.
2. Any number, measure, numerical expression, algebraic expression, or equation can be represented in an infinite number of ways that have the same value.
3. Numbers, expressions, measures, and objects can be compared and related to other numbers, expressions, measures, and objects in different ways.

4. Mathematics content and practices can be applied to solve problems.
5. There is more than one algorithm for each of the operations with rational numbers. Some strategies for basic facts and most algorithms for operations with rational numbers, both mental math and paper and pencil, use equivalence to transform calculations into simpler ones.
6. There are multiple interpretations of addition, subtraction, multiplication, and division of rational numbers and each operation is related to other operations.
7. The set of real numbers is infinite and ordered. Whole numbers, integers and fractions are real numbers. Each real number can be associated with a unique point on the number line.
8. Students will be able to explain, using place value terminology and fractions with denominators of powers of ten why .3 < .035
9. The base-ten numeration system is a scheme for recording numbers using digits 0-9, groups of ten, and place value.

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

- How can the same fractional amount be named using symbols in different ways?
- How can fractions be compared and ordered?
- What does it mean to add and subtract fractions and mixed numbers with like denominators?
- What is a standard procedure for adding and subtracting fractions and mixed numbers with like denominators?
- How can fractions and mixed numbers be added and subtracted on a number line?
- How is decimal numeration related to whole number numeration?
- How can decimals be compared and ordered?
- How are fractions and decimals related?

| Students Will Know… | Students Will Be Able to … | Standard |
|---|---|---|
| ● **Fraction:** describes one or more parts of a whole that is divided into equal parts.<br>● **Denominator:** tells how many equal parts in all.<br>● **Numerator:** tells how many equal parts are described.<br>● **Benchmark Fraction:** a fraction that is easy to visualize and use. (e.g.: ¼, ½, ¾)<br>● **Equivalent Fractions:** name the same part of a whole.<br>● **Prime Number:** a whole number greater than 1 that has exactly two factors, 1 and itself.<br>● **Composite Number:** s whole number greater than 1 that have more than two factors.<br>● **Mixed Number:** has a whole number part and a fraction part.<br>● **Improper Fraction:** has a numerator greater than or equal to its denominator.<br>● **Unit Fraction:** a fraction that describes one part of the whole.<br>● **Decimal Point:** A point or dot used to separate the whole number part from the fractional part of a number.<br>● **Hundredth:** a penny is one hundredth of a dollar. (0.01) | 1. Explain why a fraction *a/b* is equivalent to a fraction *(n x a)/(n x b)* by using visual fraction models, with attention to how the number and size of the parts differ even though the two fractions themselves are the same size. Use this principle to recognize and generate equivalent fractions.<br>2. Compare two fractions with different numerators and different denominators, e.g., by creating common denominators or numerators, or by comparing to a benchmark fraction such as ½. Recognize that comparisons are valid only when the two fractions refer to the same whole. Record the results of comparisons with symbols >, =, or <, and justify the conclusions, e.g., by using a visual fraction model.<br>3. Find all factor pairs for a whole number in the range 1-100. Recognize that a while number is a multiple of each of its factors. Determine whether a given whole number in the range 1-100 is a multiple of a given one-digit number. Determine whether a given whole number in the range 1-100 is prime or composite. Students will use area models or arrays to explain why a given number is prime or demonstrate factor pairs.<br>4. Understand a fraction a/b with a > 1 as a sum of fractions 1/b. Understand addition and subtraction of fractions as joining and separating parts referring to the same whole.<br>5. Decompose a fraction into a sum of fractions with the same denominator in more than one way, recording each decomposition by an equation. Justify decompositions, e.g., by using a visual fraction model.<br>6. Add and subtract mixed numbers with like denominators, e.g., by replacing each mixed number with an equivalent fraction, and/or by using properties of operation and the relationship between addition and subtraction. *For example, 3 1/2 + 2 3/2 can be added using associative and commutative properties as (3 + 2) + (1/2 + 3/2).*<br>7. Solve word problems involving addition and subtraction of fractions referring to the same whole and having like denominators. | 4.NF.1<br>4.NF.2<br>4.OA.4<br>4.NF.3a<br>4.NF.3b<br>4.NF.3c<br>4.NF.3d |

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| ● **Tenth:** a dime is one tenth of a dollar. (0.1) | *8.* Apply and extend previous understandings of multiplication to multiply a fraction by a whole number. Understand a fraction *a/b* as a multiple of *1/b*. *For example, 2 x 3/7 = 6/7 because we are doubling 3/7.*<br>9. Understand a fraction a/b as a multiple of 1/b, and use this understanding to multiply a fraction by a whole number.<br>10. Solve word problems involving multiplication of a fraction by a whole number.<br>11. Express a fraction with denominator 10 as an equivalent fraction with a denominator 100, and use this technique to add two fractions with respective denominators 10 and 100.<br>12. Use decimal notation with denominators 10 or 100.<br>13. Compare two decimals to hundredths by reasoning about their size. Recognize that comparisons are valid only when the two decimals refer to the same whole. Record the results of comparison with the symbols >, =, or <, and justify the conclusions, e.g., by using a visual model.<br>14. Use the four operations to solve word problems involving distances, intervals of time, liquid volumes, masses of objects, and money, including problems involving simple fractions or decimals, and problems that require expressing measurements given in a larger unit in terms of a smaller unit. Represent measurement quantities using diagrams such as number line diagrams that feature a measurement scale. | 4.NF.4a<br>4.NF.4b<br>4.NF.4c<br>4.NF.5<br>4.NF.6<br>4.NF.7<br>4.MD.2 |

| **EVIDENCE of LEARNING** | | | |
|---|---|---|---|
| Understanding | Standards | **Unit Performance Assessment**: | **R/R Quadrant** |
| 1, 2, 4, 7, 8, 9 | 4.NF.4a, 4.NF.4b, 4.NF.4c, 4.NF.6, 4.MD.2 | **Summative: Topic 13 Performance REQUIRED FOR DATA ENTRY**<br>**Scoring Guide:** see new protocol and scoring rubric on HowellNET | B |
| 1, 2, 3, 4 | 4.NF.1, 4.NF.2, 4.OA.4 | **Formative #1: Topic 11 Performance Task – For this assessment, students write fractions for parts of a region in simplest form and estimate fractional amounts.**<br>○ **Scoring Guide:** see 3-point scoring rubric on page 284 of Envisions TE | B |

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| 1, 3, 4, 5, 6 | 4.NF.3a, 4.NF.3b, 4.NF.3c, 4.NF.3d | **Formative #2: Topic 12 Performance Task – For this assessment, students use the information in the problem to determine the operations that are necessary to solve and compute with mixed numbers.**<br>○ **Scoring Guide:** see 3-point scoring rubric on page 324 of Envisions TE | C |

| **SAMPLE LEARNING PLAN** | | | | |
|---|---|---|---|---|
| **Pre-assessment:** Use "Review What you Know" to diagnose students' readiness by assessing prerequisite content. (Page 253 in Student Book) | | | | |
| **Understanding** | **Standards** | **Major Learning Activities:** | **Instructional Strategy:** | **R/R Quadrant** |
| 1, 2, 3, 4 | 4.NF.1, 4.NF.2 | **Number Lines and Equivalent Fractions** – Page 266A – 267A of Envisions TE<br>1. **Set the Purpose:** *You have learned how to identify the fraction that names a point on the number line, such as 3/8 or 5/6. Today we will learn that each fraction identifies one point on the number line, but that each point has more than one fraction name.* Show intro problem on Pearson Realize<br>**2. Connect:** *Suppose you have a cake that is cut into 3 equal pieces and 3 people are sharing it. How much does each person get?* [One piece or 1/3 of the cake] *What if the cake is cut into 6 equal pieces and 3 people are sharing all of it?* [Two pieces, or 2/6 of the cake] *Are 1/3 of the cake and 2/6 of the cake the same amount? Explain why.* [Yes, 1/3 is 1 piece of cake when it is divided into 3 equal parts and 2/6 is 2 pieces of cake when it is divided into 6 equal parts. The total amount of cake stays the same.]<br>**3. Pose the Problem:** *How can a point on the number line have more than one fraction name?* Distribute the paper strips and teaching tool 14, and then have students work on the problem in small groups. Each strip represents the distance from 0 to 1 on a large number line.<br>**4. Link to Prior Knowledge:** Have students fold one of the paper strips into halves, another into fourths, and the third into eighths. They should mark the ends with 0 and 1, and mark each fold with the appropriate fractions: e.g., ¼, 2/4, ¾. Have each student lay their fraction strips next to a number line strip and transfer their fractions onto the number line. *Do any of the* | Homework and Practice<br><br>Nonlinguistic Representation<br><br>Setting Objectives and Providing Feedback<br><br>Summarizing and Notetaking<br><br>Reinforcing Effort and Providing Recognition<br><br>Cooperative Learning | A |

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| | | *marks form the fraction strips line up?* [Sample answers: Yes, so the folds from the paper strips name the same point on the number line.]<br>**5. Small-Group Interaction:** *What happened when you transferred your paper strip marks to the number line?* [Some points on the number line have more than one fraction marked on them, for example ½ and 2/4 and 4/8.] *Why do you think that is?* [Sample answer: As with the regions, one ½ piece is the same amount as two ¼ pieces.]<br>**6. Visual Learning:** Call the students' attention to the Visual Learning Bridge at the top of page 266 in the student book. *In this lesson, you will learn to use a number line to find equivalent fractions.*<br>**7. Guided Practice:** Call the students' attention to the Guided Practice on page 266 in the student book. Remind students that equivalent fractions name the same location on a number line.<br>**8. Independent Practice:** As students work on page 266 and 267, assist or work with small groups as necessary.<br>**9. Close/Essential Understanding:** The same fractional amount can be represented by an infinite set of different but equivalent fractions. *In this lesson you learned how to identify and write equivalent fractions using a number line.*<br>**10. Assessment:** Have the students complete the Quick Check Master 11-5. Use the 3-point scoring rubric on page 267A of Envisions TE to grade the assessment. Then, use student work on the Quick Check to prescribe differentiated instruction. | | |
| 1, 3, 4 | 4.NF.2 | **Comparing Fractions** – Page 268A – 271A of Envisions TE<br>1. **Set the Purpose:** *You have learned to use fraction strips to find equivalent fractions. Today, you will learn to use <u>benchmark fractions</u> to compare fractions.* Show intro problem on Pearson Realize<br>**2. Connect:** Draw a rectangle on the board. *Suppose this was a carton of juice and I said it was about half full. Someone comes to the board and shades to show what it means to be about half full.* Have a volunteer shade the rectangle.<br>**3. Pose the Problem:** *Juan read for 5/6 of an hour. Larissa read for 1/3 of an hour. Without writing anything or using fraction strips, can you tell who* | Homework and Practice<br><br>Nonlinguistic Representation<br><br>Setting Objectives and Providing Feedback | B |

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| | | *read for a longer period of time? Explain.* Have students discuss the answer with a partner. Then have students share their thinking. Relate their answers to the fraction ½.<br>4. **Whole Class Discussion:** *The fraction ½ is called a benchmark because it is often easy to compare fractions to ½ using number sense. Is 5/6 greater than or less than ½? Explain.* [3/6 is the same as ½, so 5/6 is greater than ½.] *Is 1/3 greater than or less than ½?* [For 1/3, 3 equal parts are needed to make 1 whole; for 1/2, 2 equal parts are needed to make 1 whole, so 1/3 is less than ½.] *Use fraction strips to show that 5/6 is greater than 1/3.* Have students show each. Then show ½ using fraction strips and compare each to ½. *So, 5/6 > 1/3. Juan read for a longer period of time.*<br>5. **Academic Vocabulary:** Write on the board: <u>Benchmark Fraction</u>: a fraction that is easy to visualize and use. Examples: ½, ¼, ¾<br>6. **Small Group Instruction:** On the board, write 3/8 __ 8/10, 1/3 __ 3/4, 5/8 __ 2/6. *Use the benchmark fraction ½ to compare each set of numbers.* [3/8 < 8/10, 1/3 < 3/4, 5/8 > 2/6.] Use fraction strips to verify your results.<br>7. **Visual Learning:** Call the students' attention to the Visual Learning Bridge at the top of page 268 in the student book. In this lesson, you will use benchmark fractions to compare fractions with different denominators. You could also use the Animated Glossary on Pearson Realize.<br>8. **Another Example:** Call the students' attention to the Another Example section on page 268 in the student book. *You can compare two fractions by plotting them on a number line. Where is 4/5 on the number line?* [Between 3/5 and 1] *Where is 7/10 on the number line?* [Between 6/10 and 8/10] *How can you tell which fraction is greater?* [The fraction that is further to the right on the number line is greater.] *Compare 5/8 and 4/10 to a benchmark fraction. Which fraction will you choose?* [Both 5/8 and 4/10 are close to ½ so I'll use that benchmark fraction to compare.] *How can you compare 5/8 and 4/10 to ½?* [Plot a number line for eighths, find where ½ would go on the number line, and compare ½ to 5/8. Repeat the process for tenths.] *What is another way you could compare these fractions?* [Using fraction strips] | Summarizing and Notetaking<br><br>Reinforcing Effort and Providing Recognition<br><br>Cooperative Learning | |

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| | | 9. **Guided Practice:** Call the students' attention to the Guided Practice on page 269 in the student book. Suggest that students think about how far a fraction is from ½ to help them compare fractions.<br>10. **Independent Practice:** As students work on page 269 and 270, assist or work with small groups as necessary.<br>11. **Close/Essential Understanding:** If two fractions have the same denominator, the fraction with the greater numerator is the greater fraction. If two fractions have the same numerator, the fraction with the lesser denominator is the greater fraction. *In this lesson, you used benchmark fractions to compare fractions with different denominators.*<br>12. **Assessment:** Have the students complete the Quick Check Master 11-6. Use the 3-point scoring rubric on page 271A of Envisions TE to grade the assessment. Then, use student work on the Quick Check to prescribe differentiated instruction. | | |
| 1, 4, 5, 6 | 4.NF.3a | **Adding Fractions with Like Denominators–** Page 290A – 291A of Envisions TE<br>1. **Set the Purpose:** *You have learned how to add fractions with like denominators using fraction strips. Today you will draw pictures and learn the steps for adding fractions with like denominators.* Show intro problem on **Pearson Realize**<br>2. **Connect:** *What are some examples of when you might add fractions at home?* [Sample answers: adding ¼ cup and 2/4 cup of liquid to a recipe; adding parts of an inch on a ruler]<br>3. **Pose the Problem:** *Mark is baking banana bread and muffins for a neighborhood street party. He uses 2/5 bags of walnuts for the banana bread and 1/5 bag for the muffins. How much of the bag of walnuts does Mark use all together?* Have students solve using any method they choose. Encourage students to draw pictures or use fraction strips if helpful. Then discuss their answers.<br>4. **Link to Prior Knowledge:** *In the previous lesson (12-1), how did you add fractions with like denominators using fraction strips?* [I shaded a fraction strip with two colors to show each of the two numbers added.] *How did you choose which fraction strip to use?* [I looked at the denominators of the fractions to find the number of parts in the whole | Homework and Practice<br><br>Nonlinguistic Representation<br><br>Setting Objectives and Providing Feedback<br><br>Summarizing and Notetaking<br><br>Reinforcing Effort and | B |

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| | | and chose the strip with that number of parts.] *How did you know how many parts to shade?* [By looking at the numerators of each fraction]<br>5. **Instruct in Small Steps:** *What addition expression can you write to represent the two parts of the bag of walnuts Mark uses?* [2/5 + 1/5] Draw a fraction strip on the board with 5 equal parts. Ask students to tell you how to shade the strip so that it represents the parts Mark uses. *What is the denominator of the sum?* [5] *How did you decide?* [The denominators of the numbers being added are the same.] *How do you find the numerator?* [Add the numerators of the two fractions.]<br>6. **Summarize:** *What rule can you state for adding fractions with like denominators?* [Add the numerators and the denominators stay the same.]<br>7. **Visual Learning:** Call the students' attention to the Visual Learning Bridge at the top of page 290 in the student book. *In the lesson, you will learn how to add fractions with like denominators.*<br>8. **Guided Practice:** Call the students' attention to the Guided Practice section on page 290. Remind students to add the numerators and write the sum over the common denominator.<br>9. **Independent Practice:** As students work on page 290 through 291, assist or work with small groups as necessary.<br>10. **Close/Essential Understanding:** When adding fractions with like denominators, you are adding portions of the same size. So, you can add the numerators without changing the denominator. *In this lesson, you learned how to add fractions with like denominators.*<br>11. **Assessment:** Have the students complete the Quick Check Master 12-2. Use the 3-point scoring rubric on page 291A of Envisions TE to grade the assessment. Then, use student work on the Quick Check to prescribe differentiated instruction. | Providing Recognition | |
| 1, 2, 3, 4, 5, 7 | 4.NF.3c | **Adding Mixed Numbers -** Page 308A – 309A of Envisions TE<br>1. **Set the Purpose:** *You have added fractions with like denominators. Today you will learn to add mixed numbers.* | Homework and Practice<br><br>Nonlinguistic Representation | A |

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| | | 2. **Connect:** *When do you encounter mixed numbers in everyday life?* [Sample answers: measuring distances; recording height at doctor's office; statistics for sports teams.]<br>3. **Pose the Problem:** *Joaquin used 1 3/6 cups of whole-wheat flour and 1 4/6 cups of buckwheat flour in a recipe. How much flour did he use in all? Solve in any way you choose, and record your work on a sheet of paper.* Provide students time to work. Afterward, invite students to share their solutions. [3 1/6 cups]<br>4. **Whole-Class Discussion:** *Which strips will you need to model the problem?* [The ones and the sixths.] *What should you model first?* [I should model each mixed number from the problem.] *How many sixths fraction strips did you use to model both mixed numbers?* [7] *How many sixth fraction strips are equal to a "ones" fraction strip?* [6] Have students replace 6 of the sixths fraction strips with 1 of the ones fraction strips. *How many sixths fraction strips do you now have in your model?* [1] *How many "ones" fraction strips do you now have in your model?* [3] *How many cups of flour did Joaquin use in his recipe?* [3 1/6 cups]<br>5. **Visual Learning:** Call the students' attention to the Visual Learning Bridge at the top of page 308 in the student book. *In this lesson, you will learn how to add mixed numbers.*<br>6. **Another Example:** Call the students' attention to the Another Example section on page 308 in the student book. *You can use a number line to replace mixed numbers with the nearest one-half or whole unit. To locate the mixed number 2 7/8 on a number line, what part of the number line is used?* [The part between 2 and 3 with 2 ½ labeled] *How can you decide where 2 7/8 would be located on the number line?* [Rewrite 2 ½ as 2 4/8] *To decide if 2 7/8 is closer to 2 4/8 or 3, you can think of 3 as 2 8/8. Is 2 7/8 closer to 2 4/8 or 2 8/8?* [2 8/8 or 3]<br>7. **Guided Practice:** Call the students' attention to the Guided Practice on page 308 in the student book. Remind students to rename improper fractions as mixed numbers.<br>8. **Independent Practice:** As students work on page 308 and 309, assist or work with small groups as necessary. | Setting Objectives and Providing Feedback<br><br>Summarizing and Notetaking<br><br>Reinforcing Effort and Providing Recognition | |

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| | | 9. **Close/Essential Understanding:** One way to add mixed numbers is to add the fractional parts and then add the whole number parts. Sometimes whole numbers or fractions need to be renamed. *In this lesson, you learned how to add mixed numbers using a variety of methods.*<br>10. **Assessment:** Have the students complete the Quick Check Master 12-8. Use the 3-point scoring rubric on page 309A of Envisions TE to grade the assessment. Then, use student work on the Quick Check to prescribe differentiated instruction. | | |
| 1, 2, 4, 7, 8, 9 | 4.NF.5, 4.NF.6 | **Fractions and Decimals on the Number Line -** Page 336A – 339A of Envisions TE<br>*1.* **Set the Purpose:** *You have learned to locate points for whole numbers on a number line. Today, you will learn to locate points for fractions and decimals on a number line. Show intro problem on Pearson Realize*<br>**2. Connect:** *What does it mean for two fractions to be equivalent?* [They are different names for the same amount.]<br>**3. Pose the Problem:** Have students work in pairs to solve this problem. *Jacob jogged 3/5 of a mile and walked 3/10 of a mile to get to the park. How can a number line be used to show these distances?* Have students solve the problem and then share their solutions.<br>**4. Whole-Class Discussion:** Draw a number line on the board, and divide the distance from 0 to 1 into 10 equal parts. *How many equal parts are shown on the number line?* [10 equal parts] *Each part equals one-tenth. Since 3/10 is already in tenths, how can I show this on the number line?* [Count three parts and draw a dot a 3/10.] Label 3/10 on the number line. *Can I find 3/5 on the number line? Why?* [No; you need to find an equivalent fraction since it is not in tenths.] *Find the equivalent fraction in tenths and label this on the number line.* [Check students'' work.]<br>**5. Small-Group Instruction:** Distribute number lines to students. *Work with your partner. Name a decimal in tenths less than 1. Trade decimals with your partner. Have your partner locate your decimal and label it on a number line.*<br>**6. Visual Learning:** Call the students' attention to the Visual Learning Bridge at the top of page 336 in the student book. *Fractions and decimals describe* | Homework and Practice<br><br>Nonlinguistic Representation<br><br>Setting Objectives and Providing Feedback<br><br>Summarizing and Notetaking<br><br>Reinforcing Effort and Providing Recognition<br><br>Cooperative Learning | B |

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| | | *parts of a whole. They can also describe parts of a distance. You will learn how to find fractions and decimals on a number line.*<br>7. **Another Example:** Call the students' attention to the Another Example section on page 336 in the student book. *What clue tells you that there are 10 equal parts on the number line?* [Sample answer: there are 10 intervals of 1/10 each.] *For the number line below, what does the hundredths number line show?* [Sample answer: the 10 hundredth intervals between 4/10 and 5/10.]<br>8. **Guided Practice:** Call the students' attention to the Guided Practice on page 337 in the student book. Remind students that fractions and decimals describe parts of a distance.<br>9. **Independent Practice:** As students work on page 337 through 339, assist or work with small groups as necessary.<br>10. **Close/Essential Understanding:** Each fraction, mixed number, and decimal can be associated with a unique point on the number line. *In this lesson, you learned how to locate fractions and decimals on a number line.*<br>11. **Assessment:** Have the students complete the Quick Check Master 13-5. Use the 3-point scoring rubric on page 339A of Envisions TE to grade the assessment. Then, use student work on the Quick Check to prescribe differentiated instruction. | | |
| 1, 2, 3, 4, 8, 9 | 4.NF.6 | **Decimal Place Value -** Page 344A – 345A of Envisions TE<br>1. **Set the Purpose:** *You have learned how to write fractions as equivalent decimals. Today, you will use decimal models and place-value charts to show different ways of reading and writing decimals.*<br>2. **Connect:** *Can you think of examples where a whole is divided into tenths or hundredths?* [A car odometer measures tenths of miles; cents are hundredths of a dollar.]<br>3. **Pose the Problem:** Draw a 10 x 10 grid on the board. Shade 8 columns and 3 squares in the ninth column. *Juan is competing in a game show. Every time he answers a question correctly, a bulb lights up. This is what the board looks like at the end of the show. How could you describe Juan's score?* [83 out of 100, 0.83] Give students time to work in pairs and then discuss different ways of showing the score. | Homework and Practice<br><br>Nonlinguistic Representation<br><br>Setting Objectives and Providing Feedback<br><br>Summarizing and Notetaking | A |

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| | | 4. **Whole-Class Discussion:** *If the grid represents one whole, what does one column represent?* [One-tenth] *one square?* [One hundredth] *What is the value of the 8 full columns?* [8 tenths or 80 hundredths] *What is the value of the 3 squares in the ninth column?* [3 hundredths] *How many squares are shaded in all?* [83] *How do you say this decimal?* [Eighty-three hundredths] Write 0.83 in a place-value chart. *How does the place-value chart relate to the decimal model?* [The 8 tenths are represented as 8 shaded columns of 10 squares each; the 3 hundredths are 3 shaded squares.]<br>5. **Small-Group Instruction:** Provide students with Recording Sheet" Decimal Place Value. *Find two different ways to show 0.67 on two of the grids.* Pair up students. *With your partner, compare your grids. Are they identical?* [There will often be differences in the squares that students chose to shade.] *What does it mean if the total number of shaded squares is not the same?* [One or both students have made a mistake.]<br>6. **Visual Learning:** Call the students' attention to the Visual Learning Bridge at the top of page 344 in the student book. *In this lesson, you will use models and place-value charts to represent decimals to hundredths and write decimals in expanded form, standard form, and word form.*<br>7. **Guided Practice:** Call the students' attention to the Guided Practice on page 344 in the student book. Review with students the meanings of expanded form (a number written as the sum of the values of its digits); standard form (a way to write a number showing only its digits); and word form (a number written in words).<br>8. **Independent Practice:** As students work on page 344 through 345, assist or work with small groups as necessary.<br>9. **Close/Essential Understanding:** Decimal numeration is just an extension of whole number numeration. *In this lesson, you learned that decimal models and place-value charts can help you write and compare decimals to hundredths in expanded form, standard form and word form.*<br>10. **Assessment:** Have the students complete the Quick Check Master 13-7. Use the 3-point scoring rubric on page 345A of Envisions TE to grade the | Reinforcing Effort and Providing Recognition<br><br>Cooperative Learning | |

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| | | assessment. Then, use student work on the Quick Check to prescribe differentiated instruction. | | |

| **UNIT RESOURCES** |
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| **Teacher Resources:**<br>● **Envisions Teacher Manual**<br>● **Pearson Realize**<br>● **Manipulative kit** |
| **Student Resources:**<br>● Envisions Student Book |
| **Vocabulary:**<br>● **Fraction:** describes one or more parts of a whole that is divided into equal parts.<br>● **Denominator:** tells how many equal parts in all.<br>● **Numerator:** tells how many equal parts are described.<br>● **Benchmark Fraction:** a fraction that is easy to visualize and use. (e.g.: ¼, ½, ¾)<br>● **Equivalent Fractions:** name the same part of a whole.<br>● **Prime Number:** a whole number greater than 1 that has exactly two factors, 1 and itself.<br>● **Composite Number:** s whole number greater than 1 that have more than two factors.<br>● **Mixed Number:** has a whole number part and a fraction part.<br>● **Improper Fraction:** has a numerator greater than or equal to its denominator.<br>● **Unit Fraction:** a fraction that describes one part of the whole.<br>● **Decimal Point:** A point or dot used to separate the whole number part from the fractional part of a number.<br>● **Hundredth:** a penny is one hundredth of a dollar. (0.01)<br>● **Tenth:** a dime is one tenth of a dollar. (0.1) |

| **Content Area:** Math | **Course: Grade 4** | **UNIT: Measurement and Data** |
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| **Unit Description** :( 2nd page) Students need to become familiar with the customary units used to measure in the United States as well as the metric system which is used throughout the rest of the world. Students should develop an understanding of the following general process for measuring: identify the attribute you want to measure, select an appropriate unit, compare the unit to the object to find out how many units are needed to "match" the attribute of the object, and report the number of units that describe the attribute of the object. Students should also learn that all measurements are approximates and that using smaller units to measure an object results in a more precise measurement. Explain to students that weight is simply affected by gravity. Students can make comparisons by understanding the relationships between any two units of measure and recognizing that measures can be expressed in equivalent forms.<br>The area of a polygon is the region inside the polygon. Areas can be found or approximated by covering a space with unit squares. The perimeter of a polygon is the distance around it. The perimeter of a polygon is found by adding the lengths of its sides. Our money system of coins and bills is similar to our base-ten number system. Pennies, dimes, and one, ten, and hundred-dollar bills increase in value by a factor of ten. Discuss the relationship between various coins and bills. A line plot is a simple, easy way to organize data. | | **Unit Timeline:** 20 days |

**DESIRED RESULTS**

**<u>Transfer Goals</u>- *Students will be able to independently use their learning to…***

- Convert ounces to pounds or pounds to ounces and divide the costs.
- Clearly identify and understand the different units used to measure length, capacity, weight, mass, and time.
- Understand that the small unit of measure needs more units to equal an amount than a greater unit of measure does.
- Show that they understand how to tell time and to count backward.
- Understand that line plots provide a visual way to show how data are distributed and that two sets of related data can be compared using line plots.
- Use the formulas for the perimeter and area of rectangles to solve real-world problems.
- Design and determine the measurement to a pattern, calculate the area of the design, answer all questions correctly, and provide a completed table.
- Demonstrate a thorough understanding of area and perimeter.
- 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. Length can be estimated and measured in different systems (customary, metric) using different units in each system that are related to each other. Length can also be estimated in different measurement systems.
2. Capacity is a measure of the amount of liquid a container can hold. Capacity can be measured in different systems (customary, metric) and using different units in each system that are related to each other.
3. The weight of an object is a measure of how heavy an object is.
4. Relationships between customary measurement units can be expressed as a function (e.g., 12 inches to 1 ft or 12 in. = 1 ft). Relationships exist that enable you to convert between customary units of the same attribute by multiplying or dividing.
5. Mathematical explanations can be given using words, pictures, numbers, or symbols. A good explanation would be correct, simple, complete, and easy to understand.
6. Mass is a measure of the quantity of matter in an object. Weight and mass are different measures.
7. Relationships between metric units can be expressed as a function (e.g., 10mm to 1 cm or 10mm = 1cm). Relationships exist that enable you to convert between metric units of the same attribute by multiplying or dividing.
8. Time can be expressed using different units that are related to each other.
9. Some problems with the initial data point unknown can be solved by starting with the end result and by reversing the steps and processes to work backward to find the initial data point.
10. Line plots can be used to organize and represent data generated by measuring lengths.
11. Some data can be represented using a line plot and the line plot can be used to answer certain questions about the data.
12. Some problems can be solved by applying the formula for the perimeter of a rectangle or the formula for the area of a rectangle and students should understand the formulas well enough to be able to modify them for non-standard contexts.
13. Some measurement problems can be represented and solved using models.
14. Making change is often easiest by counting up from the smaller amount to the larger amount.
15. Some problems can be solved by breaking apart or changing the problem into simpler ones, solving simpler ones, and using these solutions to solve the original problem. Recording information in a table can help students understand and solve some problems.

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

- What are customary and metric units for measuring length, capacity, and weight/mass, and how are they related?
- How do you estimate and measure length?

- How do you measure capacity with customary units?
- How do you measure weight?
- How do you change customary units?
- How can you write to explain using measurement?
- How do you estimate and measure length using metric units?
- How do you measure capacity with metric units?
- How do you measure mass?
- How do you change metric units?
- How do you compare units of time?
- How can you work backward to solve a problem?
- What do area and perimeter mean and how can each be found?
- How can line plots and other tools help to solve measurement problems?
- How can you make line plots to organize and represent data you have collected?
- How can you use line plots to solve problems?
- How can perimeter and area formulas be used to solve problems?
- How can the relationship between quantities in a measurement problem be represented using a diagram that can help to solve the problem?
- How can change be given by counting up from one amount of money to another?
- How can you solve a simpler problem and make a table?

| Students Will Know… | Students Will Be Able to … | Standard |
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| ● inch: a customary unit of length. 12 inches equal to 1 ft.<br>● foot: a customary unit of length. 3 feet equal to 1 yd.<br>● yard: a customary unit of length. 1,760 yds. equal to 1 mi.<br>● mile: a customary unit of length. 1 mile equals 5,280 ft, 1,760 yds.<br>● capacity: the volume of a container measured in liquid units.<br>● weight: a measure of how light or how heavy something is.<br>● ounce: a customary unit of weight. 16 ounces equals 1 pound.<br>● pound: a customary unit of weight. 1 pound equals 16 ounces.<br>● ton: a customary unit of weight equal to 2,000 pounds.<br>● millimeter: a metric unit of length. 1,000 millimeters equals 1 meter.<br>● centimeter: a metric unit of length. 100 centimeters equals 1 meter.<br>● decimeter: 1 decimeter equal to 10 centimeters.<br>● meter: a metric unit of length. One meter is equal to 1,000.<br>● kilometer: a metric unit of length. One kilometer is 1,000 meters.<br>● milliliter: a metric unit of capacity. 1,000 milliliters equal 1 liter.<br>● liter: a metric unit of capacity equal 1,000 milliliters.<br>● mass: the measure of the quantity of matter in an object.<br>● gram: a metric unit of mass equal to 1,000 milligrams.<br>● kilogram: a metric unit of mass equal to 1,000 grams.<br>● line plot: a display of responses along a number line with X's recorded above the response to indicate the number of times the response occurred.<br>● perimeter: the distance around the outside of any polygon.<br>● area: the number of square units needed to cover a surface or figure. | 1. Know relative sizes of measurement units within one system of units including km, m, cm; kg, g; lb, oz.; l, ml; hr, min, sec. Within a single system of measurement, express measurements in a larger unit in terms of a smaller unit. Record measurements equivalents in a two-column table. *For example, know that 1 ft is 12 times as long as 1 in. Express the length of a 4 ft snake as 48 in. Generate a conversion table for feet and inches listing the number pairs (1, 12), (2, 24), (3, 36).* The wording "times as many" and "times as long" is critical to understanding ratios and proportional reasoning in 6th grade and should be solidly developed within 4th and 5th grades.<br>2. Use the four operations to solve word problems involving distances, intervals of time, liquid volumes, masses of objects, and money, including problems involving simple fractions or decimals, and problems that require expressing measurements given in a larger unit in terms of a smaller unit. Represent measurement quantities using diagrams such as number line diagrams that feature a measurement scale.<br>3. Apply the area and perimeter formulas for rectangles in real world and mathematical problems.<br>4. Make a line plot to display a data set of measurements in fractions of a unit (½, ¼, ⅛). Solve problems involving addition and subtraction of fractions by using information presented in line plots. *For example, from a line plot find and interpret the difference in length between the longest and shortest specimens in an insect collection.* | 4.MD.1<br><br>4.MD.2<br><br>4.MD.3<br><br>4.MD.4<br><br>4.MD.5 |

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| | 5. Recognize angles as geometric shapes that are formed wherever two rays share a common endpoint, and understand concepts of angle measurement:<br>a. An angle is measured with reference to a circle with its center at the common endpoint of the rays, by considering the fraction of the circular arc between the points where the two rays intersect the circle. An angle that turns through 1/360 of a circle is called a "one-degree angle," and can be used to measure angles.<br>b. An angle that turns through n one-degree angles is said to have an angle measure of n degrees.<br>6. Measure angles in whole-number degrees using a protractor. Sketch angles of specified measure.<br>7. Recognize angle measure as additive. When an angle is decomposed into non-overlapping parts, the angle measure of the whole is the sum of the angle measures of the parts. Solve addition and subtraction problems to find unknown angles on a diagram in real world and mathematical problems, e.g., by using an equation with a symbol for the unknown angle measure. | 4.MD.6<br>4.MD.7 |

| EVIDENCE of LEARNING | | | |
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| Understanding | Standards | **Unit Performance Assessment**: | **R/R Quadrant** |
| 1-9 | 4.MD.1, 4.MD.2 | **Formative: Topic 14 Chapter Assessment & Performance Task**<br>o **Scoring Guide:** see 3-point scoring rubric on page 396 of Envisions TE for Performance Task | C |
| 9-15 | 4.MD.3, 4.MD.4 | **Summative: Topic 15 Chapter Assessment & Performance Task**<br>o **Scoring Guide:** see 3-point scoring rubric on page 418 of Envisions TE for Performance Task | C |

| SAMPLE LEARNING PLAN | | | | |
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| **Pre-assessment:** Not required, teachers may create pretests using Envisions test bank | | | | |
| **Understanding** | **Standards** | **Major Learning Activities: Daily Common Core (DCC), PBIL, Visual Learning, Guided Practice, Independent Practice, Problem Solving** | **Instructional Strategy:** | **R/R Quadrant** |
| 1 | 4.MD.1, 4.MD.2 | **14-1 Using Customary Units of Length**<br>1. DCC (10 minutes)<br>2. PBIL (10-15 minutes)<br>a) Set the purpose Today we will learn to use measuring tools and estimation skills to find the length of classroom objects. Show intro problem on Pearson Realize<br>b) Connect What are some situations when you might need a precise measurement of length or distance? When might you need only an estimate?<br>c) Pose the problem: Which objects in the classroom are about 1 inch long? about 1 foot long? about 1 yard long? How will you decide? *Have work in small groups to generate a list of as many items as they can for each unit of measure. Then have the groups share their lists and explain how they chose the items.*<br>d) Whole-Class Discussion Display or point out objects in the classroom that are about 1 inch long, about 1 foot long, and about 1 yard long. Ask "would you use the same unit to measure each of these"?<br>3. Academic Vocabulary Inch, foot, and yard are customary units used to measure various lengths and distances. Very long distances, such as the distances between cities, are measured in miles. It would take a fourth-grader about 20-25 minutes to walk 1 mile.<br>4. Visual Learning & Guided Practice (5-10 minutes)<br>5. Independent Practice & Problem Solving- teacher may want to pull small groups and assist as needed (10-20minutes)<br>Optional/Time permitting<br>Quick Checks, Differentiated Instruction, Leveled Homework | Cooperative Learning<br><br>Homework and Practice | A, B |
| 3 | 4.MD.1 | **14-3 Units of Weight**<br>1. DCCR (10 minutes) | Cooperative Learning | A, B |

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| | | 2. PBIL (10-15 minutes)<br>a) Set the purpose by telling students that they have learned how to select an appropriate unit to measure capacity. Today we will learn how to measure weight. Show intro problem on Pearson Realize<br>b) Connect What customary unit commonly used to measure a person's weight? (pound) How many pennies weigh about one ounce? (ten pennies) Name something that weighs about 1 pound? (loaf of bread, kitten, package of butter)<br>c) Academic Vocabulary: Weight is a measure of the heaviness of an object. Some customary units for measuring weight are ounce (oz), pound (lb), and ton (T). Sixteen ounces equals 1 pound and 2,000 pounds equal 1 ton.<br>d) Pose the problem: Name 3 animals: one that could have a weight less than 1 pound (measured in ounces), one that could have a weight greater than 1 pound, and one that could have a weight of about 1 ton. *Have students work in groups to complete the problem and record their answers.*<br>e) Whole-Class Discussion: Have groups share their answers. Which unit is the smallest, largest?<br>3. Small-Group Interaction Choose the most appropriate unit to measure the weight of each of the following items: a truck, a bowl of cereal, a letter, a bag of apples.<br>4. Visual Learning & Guided Practice (5-10 minutes)<br>5. Independent Practice & Problem Solving- teacher may want to pull small groups and assist as needed (10-20minutes)<br>Optional/Time permitting<br>Quick Checks, Differentiated Instruction, Leveled Homework | Homework and practice | |
| 4 | 4.MD.1, 4.MD.2 | **14-6 Using Metric Units of Weight**<br>1. DCC (10 minutes)<br>2. PBIL (10-15 minutes)<br>a) Set the purpose by telling students that they have learned about the relationships among the customary units of length-inch, foot, yard, and mile. Today you will learn about the relationships among | Cooperative Learning<br><br>Homework and practice | A, B |

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| | | the metric units of length-millimeter, centimeter, decimeter, meter, and kilometer. Show intro problem on Pearson Realize<br>b) Connect Have you ever seen posters announcing a 10K race? What do you think a 10K race is?<br>c) Pose the problem: Display a unit cube and a tens rod. Explain that the length of each side of the cube is 1 centimeter and 10 cubes equal 1 rod. Ask: If one cube is 1 centimeter long, then how many centimeters long is 1 rod? One rod is 1 decimeter. How can you use the rod to measure objects in the classroom? Have students use the rods to measure 5 objects. When they are finished, discuss how they expressed results that were greater than or less than one whole decimeter.<br>d) Whole-Class Discussion Explain that the metric system is based on units in groups of 10. Ask: What do you know about the decimeter that illustrated this idea? What can you do when you measure something with a decimeter, but the object is a little longer or a little shorter than the decimeter?<br>3. Visual Learning & Guided Practice (5-10 minutes)<br>4. Independent Practice & Problem Solving- teacher may want to pull small groups and assist as needed (10-20minutes)<br>Optional/Time permitting<br>Quick Checks, Differentiated Instruction, Leveled Homework | | |
| 13 | 4.MD.2 | **15-4 Solving Measurement Problems**<br>1. DCC (10 minutes)<br>2. PBIL (10-15 minutes)<br>a) Set the purpose by telling students that they know about different units of measurement and how to convert measurement units. Today you will learn how to use diagrams to solve real-world problems involving measurement.<br>b) Connect Suppose you have an empty 1-gallon container. How many times would you have to fill a 1-quart bottle to fill the 1-gallon container? How do you know? | Cooperative Learning<br><br>Homework and practice | A, B |

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| | | c) Pose the problem: A wild bird feeder holds 8 cups of bird seed. How many times can this feeder be filled from a 3-gallon container of bird seed? You can solve this problem any way you choose. Students will work with a partner to explain their solutions.<br>d) Link to Prior Knowledge In previous lessons you learned the customary units of capacity. Think about how you can use the relationships between those units to solve this problem.<br>e) Model/Demonstrate: *For students needing assistance, show the diagram that relates gallons, quarts, pints, and cups. Record these relationships on the board.* How many cups are in 1 pint? How many cups are in 1 quart? How many cups are in 1 gallon?<br>f) Instruct in Small Steps Ask-How many gallons are in the container of bird seed? How many quarts is this? Continue questions on page 406B.<br>3. Visual Learning & Guided Practice (5-10 minutes)<br>4. Independent Practice & Problem Solving- teacher may want to pull small groups and assist as needed (10-20minutes)<br>Optional/Time permitting<br>Quick Checks, Differentiated Instruction, Leveled Homework | | |

| **UNIT RESOURCES** |
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| **Teacher Resources:**<br>● **Envisions Teacher Manual**<br>● **Pearson Realize**<br>● **Manipulative kit** |
| **Student Resources:**<br>● Envisions Student Book |
| **Vocabulary:**<br>● Inch: a customary unit of length. 12 inches equal to 1 ft.<br>● Foot: a customary unit of length. 3 feet equal to 1 yd.<br>● Yard: a customary unit of length. 1,760 yds. equal to 1 mi.<br>● Mile: a customary unit of length. 1 mile equal to 5,280 ft, 1,760 yds.<br>● Capacity: the volume of a container measured in liquid units. |

- Weight: a measure of how light or how heavy something is.
- Ounce: a customary unit of weight. 16 ounces equal 1 pound.
- Pound: a customary unit of weight. 1 pound equals 16 ounces.
- Ton: a customary unit of weight equal to 2,000 pounds.
- Millimeter: a metric unit of length. 1,000 millimeters equals 1 meter.
- Centimeter: a metric unit of length. 100 centimeters equals 1 meter.
- Decimeter: a metric unit of length. 1 decimeter equals 10 centimeters.
- Meter: a metric unit of length. One meter is equal to 1,000 millimeters.
- Kilometer: a metric unit of length. One kilometer is 1,000 meters.
- Milliliter: a metric unit of capacity. 1,000 milliliters equal 1 liter.
- Liter: a metric unit of capacity equal 1,000 milliliters.
- Mass: the measure of the quantity of matter in an object.
- Gram: a metric unit of mass equal to 1,000 milligrams.
- Kilogram: a metric unit of mass equal to 1,000 grams.
- Line plot: a display of responses along a number line with X's recorded above the response to indicate the number of times the response occurred.
- Perimeter: the distance around the outside of any polygon.
- Area: the number of square units needed to cover a surface or figure.

| **Content Area:** Math | **Course: Grade 4** | **UNIT: Geometry** |
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| **Unit Description**:<br>Students describe, analyze, compare, and classify two-dimensional shapes. Through building, drawing, and analyzing two-dimensional shapes, students deepen their understanding of properties of two-dimensional objects and the use of them to solve problems involving symmetry. Two- and three-dimensional objects with or without curved surfaces can be described, classified, and analyzed by their attributes. Some attributes of objects are measurable and can be quantified using unit amounts. | | **Unit Timeline:** Approx. 13 days |

**DESIRED RESULTS**

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

- Classify two-dimensional geometric shapes noting their lines and angles.
- Show an angle for a fraction of a circle (1/8, 1/4, 1/3) and then write and solve an equation using division to determine the measure of the angle.
- List all the attributes of triangles (right and equilateral) and quadrilaterals.
- Know that figures with lines of symmetry can be folded along those lines to form equal parts.
- 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. Undefined Terms: Points, lines, and planes are called undefined terms in geometry. These terms are the building blocks for geometry and cannot be defined by other figures. These terms are assumed to be understood and are used to define terms.
2. Two distinct lines in a plane can either be parallel or intersecting. If two lines are parallel, they are always the same distance apart. If two lines intersect, they intersect at a point. If the two lines intersect to form a right angle they are said to be perpendicular.

3. A line segment is different from a line because it contains two endpoints. A line contains an infinite number of points but no endpoint and thus will continue on forever. A drawing of a line is distinguished from a line segment by drawing arrows on both ends. A drawing of a line segment clearly indicates two endpoints.
4. A ray is part of a line. Like a line, a ray will continue in a direction. It contains one endpoint and all the points on one side of the endpoint. Unlike a line, it contains a definite endpoint. Two rays with a common endpoint form an angle. The rays are the sides of the angle. Angles are measured in degrees from 0 to 360. One complete rotation is $360^o$. There are some special names for angles based on the measure of their angle. An angle that measures less than $90^o$ is called an acute angle. An angle that measures greater than $90^o$ is called an obtuse angle. An angle that measures exactly $90^o$ is called a right angle.
5. Polygons are closed plane figures composed of line segments called sides, intersecting only at their endpoints, called vertices. Polygons are named based on the number of sides.
6. Triangles can be classified in different ways based upon the lengths of their sides or the measures of their angles. When triangles are classified by their angles, there are three different types of triangles: right (one right angle), acute (three acute angles), and obtuse (one obtuse angle). When triangles are classified by the lengths of their sides, there are also three different types: equilateral (all sides equal), isosceles (at least two sides equal), or scalene (no equal sides).
7. Quadrilaterals can also be classified based upon the measurements of their angles and lengths of their sides. When opposite sides are equal and all angles are $90^o$, the quadrilateral is a rectangle. When all the sides are equal, the quadrilateral is a rhombus. When all sides are equal and all angles are $90^o$, the quadrilateral is a square. A square is also a rhombus and a rectangle.

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

- How can I describe, identify, and classify shapes?
- How can lines, angles, and shapes be described, analyzed, and classified?
- How are angles measured, added, and subtracted?

| Students Will Know… | Students Will Be Able to … | Standard |
|---|---|---|
| • **acute triangle** – a triangle with three acute angles<br>• **acute angle**- an angle that is less than $90^o$<br>• **angle**- a figure formed by two rays that have the same endpoint.<br>• **angle measure**- the degrees of an angle<br>• **degree**- a unit of measures for angles.<br>• **equilateral triangle**- a triangle in which all sides are the same length<br>• **hexagon**-a polygon with six sides<br>• **intersecting lines**- lines that cross at one point<br>• **isosceles triangle**-a triangle that has at least two equal sides<br>• **line**-a straight path of points that goes on and on in two directions<br>• **line segment**-a part of a line that has two endpoints<br>• **line symmetry**-a line on which a figure can be folded so that both parts match exactly<br>• **obtuse angle**- an angle that measures between $90^o$ and $180^o$<br>• **obtuse triangle**- a triangle in which there is one obtuse angle<br>• **octagon**- a polygon with eight sides<br>• **parallel lines**- in a plane, lines that never intersect<br>• **parallelogram**- a quadrilateral in which opposite sides are parallel<br>• **pentagon**- a plane figure with five sides<br>• **perpendicular lines**- two intersecting lines that form right angles<br>• **plane**- an endless flat surface<br>• **point**- an exact location in space<br>• **polygon**- a closed plane figure made up of line segments<br>• **protractor**- a tool used to measure and draw angles<br>• **quadrilateral**- a polygon with four sides<br>• **ray-** a part of a line that has one endpoint and continues endlessly in one direction<br>• **rectangle**- a quadrilateral with four right angles<br>• **rhombus**- a quadrilateral in which opposite sides are parallel and all sides are the same length | 1. Draw points, lines, line segments, rays, angles (right, acute, obtuse), and perpendicular and parallel lines. Identify these in two-dimensional figures.<br>2. Classify two-dimensional figures based on the presence or absence of parallel or perpendicular lines, or the presence or absence of angles of a specified size. Recognize right triangles as a category, and identify right triangles.<br>3. Recognize a line of symmetry for a two-dimensional figure as a line across the figure such that the figure can be folded along the line into matching parts. Identify line-symmetric figures and draw lines of symmetry. | 4.G.1<br>4.G.2<br>4.G.3 |

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| ● **right angle**- an angle that measures $90^{o}$<br>● **right triangle**- a triangle with one right angle<br>● **scalene triangle**- a triangle in which no sides are the same length<br>● **side-** each of the line segments of a polygon<br>● **square**- a quadrilateral with 4 right angles and all sides the same length<br>● **straight angle-** an angle that forms a straight line<br>● **symmetric-** a figure is symmetric if it can be folded into two congruent halves that will fit on top of each other<br>● **trapezoid**- a quadrilateral with only one pair of parallel sides<br>● **triangle**- a polygon with three sides<br>● **unit angle**- an angle with a measure of 1 degree<br>● **vertex (plural; vertices)**-in an angle, the common endpoint of two rays that form the angle | | |

| **EVIDENCE of LEARNING** | | | |
|---|---|---|---|
| Understanding | Standards | **Unit Performance Assessment**: | **R/R Quadrant** |
| 1, 2, 4 | 4.G.1<br>4.G.2<br>4.G.3 | **Summative: Topic 16 Performance Task**<br>● Create a design and write a paragraph that describes your design. Don't forget to tell about the shapes!<br>○ **Scoring Guide:** see 3-point scoring rubric on page 450 of Envisions: Realize TE | B |
| 1, 4 | 4.G.2 | **Formative #1:** See Quick Check 16-4, #3 (Writing to Explain)<br>○ **Scoring Guide:** see 3-point scoring guide on page 429A of Envision: Realize TE | C |
| 1, 2, 7 | 4.G.1 | **Formative #2:** Explain why a square is also a rectangle, quadrilateral, rhombus, and a parallelogram.<br>○ **Scoring Guide:** see 3-point scoring guide on page 439A of Envision: Realize TE | A |

| SAMPLE LEARNING PLAN | | | | |
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| **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, 4 | 4.G.1<br>4.G.2 | Flat Surfaces, Vertices, and Edges<br>1. **Set the Purpose:** Tell the students, "You already know the names of different types of pairs of lines. Today you will learn the special names of different types of angles." Show intro problem on Pearson Realize<br>2. **Make a Connection:** Point out that the hands of an analog clock meet at a point in the center of the clock. As they move, the size of the opening they make changes from minute to minute. Ask what words they might use to describe the different openings.<br>3. **Pose a problem**: Explain that a ray is part of a line with one endpoint. When two rays share the same end-point they form an angle. Provide students with dot paper. Ask them to draw a pair of rays that form a square corner by sharing the same endpoint. Check their work. Ask them to draw another pair of rays which form an opening less than a square corner, and another pair that form an opening greater than a square corner.<br>4. **Academic Vocabulary:** As you introduce the new vocabulary, write the terms on the board. Invite the students to display their drawings of angles as you discuss them. "How many rays does each of your pairs have? (2) Two rays sharing the same endpoint make an **angle.** A square corner is a **right angle.** Angles that are less than a right angle are **acute angles.** Angles that are greater than right angles are **obtuse angles.**" Check to see if any students drew a straight angle. If so, display it. Otherwise say "Draw two rays from the same point to form a straight line. **Straight angles** form a straight line.<br>5. **Small-Group Interaction:** On your dot paper, draw other examples of each type of angle we have just identified. Exchange drawings with your partner. Label your partner's drawings. Then check your work together. | Cooperative Learning | B |

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| 5,7 | 4.5.1<br>4.G.2 | 1. **Set the Purpose:** Tell the students, "You have learned to identify parallel lines and right angles. Today you will learn to use these features to classify quadrilaterals."<br>2. **Make a Connection: "**What is the same about all polygons that are quadrilaterals? [Quadrilaterals have 4 sides and 4 vertices.]<br>3. **Pose a problem**: Write these descriptions on the board:<br>a. Opposite sides parallel; all sides the same length<br>b. Only 1 pair of parallel sides<br>c. 2 pairs of parallel sides<br>d. 4 right angles<br>e. 4 right angles; all sides the same length<br>"Work with a partner and use the quadrilaterals in your set of polygons. Find a quadrilateral to match each description. Trace the quadrilateral on a sheet of paper. Name it in any way you can.<br>4. **Academic Vocabulary:** Next to the first description, invite students to draw quadrilaterals they found that have opposite sides parallel and all sides the same length. Point out how each figure matches the description. *"A figure with opposite sides parallel and all sides the same length is a **rhombus."*** If a square has been drawn say: *"A **square** is like a rhombus, but it will have 4 right angles."* Write "rhombus" next to the figure(s). Repeat the same steps for the other four descriptions to introduce the **trapezoid, parallelogram, rectangle,** and **square.**<br>5. **Small-Group Interaction:** "*Work with your partner. Choose two different types of quadrilaterals. List all the ways they are the same and all the ways they are different.* | Cooperative Learning | A |

| **UNIT RESOURCES** |
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| **Teacher Resources:**<br>● **Envisions: Realize Teacher Manual**<br>● **PearsonRealize.com**<br>● **Manipulative kit** |
| **Student Resources:**<br>● Envisions: Realize 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