Unit: 1.1	**Title: Understanding Place Value and Properties of Operations**	**Days : 14 Days**

Essential Questions

How can you describe the value of a digit?
How can you read and write numbers through hundred thousands?
How can you read and write numbers through hundred thousands?
How can you compare and order numbers?
How can you round numbers?

Content to be Learned	**Skills**
* Recognize that the value of one place is ten times the place to the right. * Read and write multi-digit whole numbers using base-ten numerals, word form and expanded form. * Compare multi-digit whole numbers using base-ten numerals, word form and expanded form. * Explain to students that the rounded number is the result of a number that is close to the original number, but simpler in form. * Explain how rounded numbers can aid in performing a mental computation or estimating to check reasonableness. * Discuss the meaning of the word round * Guide students through examples * Discuss how in the rounded number, there should be a zero in each place to the right of the place of the underlined digit.	* Students will begin to recognize that the value of one place is ten times the place to its right as they: **work with base-ten blocks** **complete Lesson 16 in the On Core book pgs. 31 & 32 and Lesson 15 pgs. 29 & 30.** * Students will read and write multi-digit whole numbers using base-ten numerals, word form and expanded form. * Students will read and write multi-digit whole numbers using base-ten numerals, word form, and expanded form. They will practice using **On Core** pgs. 33 & 34 * Students will compare two multi-digit whole numbers using comparison symbols. They will practice using **On Core** pgs. 35 & 36 * Students will round multi-digit whole numbers to any place using the **On Core** book pgs. 37 & 38.
Assessments	**Standards**
* **On Core math worksheets** * **Teacher created quizzes**	**4.NBT.1** Recognize that in a multi-digit whole number, a digit in one place represents ten times what it represents in the place to its right. *For example, recognize that 700 ÷ 70 = 10 by applying concepts of place value and division.* **4.NBT 2** Read and write multi-digit whole numbers using base-ten numerals, number names, and expanded form. **4.NBT 2** Compare two multi-digit numbers based on meanings of

	the digits in each place, using >, =, and < symbols to record the results of comparisons. **4.NBT 3** Use place value understanding to round multi-digit whole numbers to any place.
Sample Instructional Activities	**Resources**
Teacher will: * Model a three-digit number using base-ten blocks. Review how to trade blocks for equal amounts, such as trading 10 one blocks for 1 ten block * Explain how trades can be used to write different names for different numbers. Use p. 31 of Lesson 16 in the On Core book * discuss the meaning of essential vocabulary * discuss how commas are placed between the periods in the word form * check students understanding of periods and places by giving them an example of a six digit number and asking which digits are in the thousands period and that each period is made up of the ones, tend, and hundreds * Use examples to discuss meanings of the essential vocabulary words. * Discuss the word period and point out that commas are placed between the periods in the word form. * Check that students understand the distinction between periods and places by displaying a 6 digit number and asking which digits are in the thousands period and that each period is made up of the ones, tens, and hundreds. * Review <, >, and = symbols to compare numbers * Model how if the numbers compared have different numbers of digits, the number with the more digits is the greater number * If the number being compared has the same number of digits, teacher will model how they are compared place by place starting at the greatest	• **On Core** Lesson 15 & 16 • **Student pages 29-32** • **SAB p. 39 & 41** • **Base Ten Blocks** * **On Core** Lesson 17 pgs. 33-34 • **On Core** Lesson 17 Student p. 33-34 • **On Core** Lesson 18 Student p. 35-36 • **On Core** Lesson 19 Student pgs. 37-38 • **Investigations Snap In 5-1.5A** • **Investigations Snap In 5 - 3.6A**

place value * Review On Core Lesson 18 p. 35	

Unit: 1.2	**Title: Factors, Multiples, and Arrays**	**Days : 10**

Essential Questions	
How can you use models to find factors? How do you know you have found all the factors pairs? How can you tell whether one number is a factor of a given number? **How can you use the *make a list* strategy to solve problems with common factors?** How are factors and multiples related? □ How do you find the multiples of a number? How many multiples does a number have? How can you tell whether a number is prime or composite? What is the difference between a prime and composite number?	
Content to be Learned	**Skills**
Students will find all factor pairs for a whole number in the range 1-100. Students will determine if a number is a factor of a given number. **Solve problems by using the strategy:** *make a list.* Understand the relationship between factors and multiples, and determine whether a whole number (1-100) is a multiple of a give1-digit number. Determine whether a whole number (1-100) is prime or composite. Make and describe patterns.	Find factors of multiples using area models Determine multiples as being prime or composite. Use tiles or grid paper to build arrays and identify that the numbers of rows and columns are that factors, and the total number of squares is the product.
Assessments	**Standards**
Teacher generated	**4.OA.4** Find all factor pairs for a whole number in the range 1-100. Recognize that a whole 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. **4.OA.5** 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. *For example, given the rule "Add 3" and the starting number 1, generate terms in the resulting sequence and observe that the terms appear to alternate between odd and even numbers. Explain informally why the numbers will continue to alternate in this way.*
Sample Instructional Activities	**Resources**
Teacher created activities **On Core**	Square tiles & grid paper. **OnCore** Lesson 8 & 9 pages 15-16, 17-18 **OnCore** Lesson 10 pp. 19-20 **OnCore** Lesson 11 pp. 21-22 **OnCore** Lesson 12 pp. 23-24 **OnCore** Lesson 13- pp. 25-26 **OnCore** Lesson 14- p. 15 INV Student pp. 27-28 **Investigations snap-in** **Investigations:** Unit 1 p. 3-4, 27-29, 39-40 Unit 2 p. 5, 23-24, 48 Unit 1 pg. 33-34, 37 Unit 2 pg. 39 & 46 Unit 3 pg. 28,55,63

Unit: 1.3	**Title: Multiplying with Whole Numbers to Solve Problems**	**Days : 15 days**

Essential Questions

- How can you model multiplication comparisons?
- How does a model help you solve a comparison problem?
- When can you use the draw a diagram strategy to solve a multi step multiplication problem?

Content to be Learned	**Skills**
* Interpret a multiplication comparison as a comparison. * Solve word problems involving multiplicative comparisons. * Solve multi-step word problems with whole numbers representing the problem with an equation with a letter standing for the unknown. * Multiply a whole number up to four digits by a one-digit number using strategies based on place value. * Using a Distributive Property to multiply a 2 -digit number by a 1 digit number. * Using expanded form to multiply a multi-digit number by a 1-digit number. • Use place value and partial products to multiply a multi digit number by a 1-digit number. • Use regrouping to multiply a 2-digit, 3 digit, and a 4-digit number by a 1-digit number.	* Draw a model for problems and write equations to represent multiplicative comparisons. * Write comparison equations and solve problems. * Look at quick images and represent their multiplicative thinking. *** Students will draw a model, write an equation, and solve comparison problems using n for the unknown by completing Lesson 2 pages 3 & 4 and Investigations Unit 1.6A pages C2, C3, C4** *** Students will solve multistep multiplication problems using the strategy draw a diagram on OnCore pages 5 & 6** *** Students will also solve multistep multiplication problems from Investigations SAB Unit 3 page 2.** *** Students will use place value and patterns to multiply with tens, hundreds, and thousands.** *** Students will complete the following pages:** **OnCore pages 45 - 48 and** **Investigations SAB:** **Unit 3 page 42, 43, 47, 48, 50** **Unit 4 page 53** **Unit 5 page 27** **Students will use expanded form and the distributive property to multiply multi-digit numbers by a 1-digit number.** **Students will complete the following pages:**

	OnCore pages 49, 50, 51, 52 **Investigations SAB Unit 3 pp. 7, 8, 11, and 12** *** Students are using place value and partial product so multiply a multi-digit number by a 1-digit number.** *** Students will complete OnCore pages 53 & 54** *** Students are using regrouping to multiply a multi-digit number by a 1-digit number.** *** Students will complete:** **OnCore pages 57 - 60** **Investigations SAB Unit 3 pages 3, 13 and 61 can be used with regrouping.**
Assessments	**Standards**
*** OnCore workbook pages** *** Teacher created quizzes** *** Word problems**	**4.OA.1** Interpret a multiplication equation as a comparison, e.g., interpret 35 = 5 × 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. Multiply or divide to solve word 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.1 **4.OA.2** Multiply ~~or divide~~ to solve word 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. **4.OA.3** Solve multistep word problems posed with whole numbers and having whole-number answers using the four operations, including problems in which remainders must be interpreted. Represent these problems using equations with a letter standing for the unknown quantity. Assess the reasonableness of answers using mental computation and estimation strategies including rounding. **4.NBT.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.

	Illustrate and explain the calculation by using equations, rectangular arrays, and/or area models. **4.NBT.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. Illustrate and explain the calculation by using equations, rectangular arrays, and/or area models.
Sample Instructional Activities	**Resources**
Teacher will: **• Guide students through the example on top of OnCore Lesson 1 page 1.** **• Review with students the word "equation".** **• Explain what an "unknown" is.** **• Discuss with students how to translate a comparison statement into an equation.** *** Give students examples of multiplication comparisons to review the concept** **• Comparisons may be represented using a bar model or diagram.** **• Make sure students understand when writing an equal on the letter n is the unknown** *** Review with students how to model a multiplication by drawing equal groups and by drawing an array.** **• Model to students how drawing a diagram can help them solve problems that involve several steps.** **• Remind students that they need to perform more than one operation to solve each problem.** **• Review OnCore Lesson 2 page 3 comparison problem.** **• Model to students how multiplying a 1-digit number by a multiple of 10, 100, or 1000 can be accomplished by place value concepts.** **• Illustrate and explain calculations by using equations, rectangular arrays, and/or area models.**	*** OnCoreLesson 1 Student pp.1and 2** **• Investigations Unit 1 Sessions 2.1 TM pp. 58-63 Resource Master 33 (Quick Image Cards)** *** OnCore Lesson 2 Student pages 3 & 4** *** Investigations Snap-In Unit 1- 1.6A Student pp. C2- C4** **OnCore Lesson 3 pages 5-6** *** Investigations Unit 3 Session 1.1 SAB p.2** *** OnCore Lesson 23 & 24** *** Investigations Unit 3 Session 3.1-3.4** *** Investigations Unit 4 SAB p.53** *** Investigations Unit 5 SAB p.27** *** Investigation Unit 9 Snap-In p.C65** *** OnCore Lesson 25 & 26** *** Investigations Unit 3 Sessions 1.1-1.5 SAB pp.7, 8 and 11,12** **Resource Master M43 (optional assessment)** *** OnCore Lesson 27** *** Design own problems for continued practice with partial products.** *** OnCore Lesson 29 & 30** *** Investigations SAB Unit 3 pp.3, 13, and 61 (use regrouping)**

• Explain how the number of zeros in the factors corresponds to the number of zeros in the product. • Emphasize how even though the product of a basic fact has a zero, another zero will be in the final product: for example 5 x 4000; 5x 4 = 20 then the final product will have 4 zeros. • Model to students how when multiplying a 2-digit number by a 1-digit number, the 2-digit number can be decomposed into tens and ones. • Show how the product of a multi-digit number by a 1-digit number can be found by applying the expanded form and the Distributive Property. • Model how products can be calculated by the sum of partial products. * Please note the examples multiply from left to right (hundreds first), but remind students that it is commutative and you can multiply from right to left. * Model to students how multiplication using expanded form or partial product breaks down calculations to make them simpler. • Show to students how the standard multiplication algorithm involves the same calculations, but in abbreviated form. • Review with students how to multiply a 2-digit number by a 1-digit number with regrouping.	

Unit:2.1	**Title: Understanding Multi-digit Multiplication**	**Days : 10**

Essential Questions	
How can you use mental math and properties to help you multiply whole numbers? What strategies can you use when multiplying a whole numbers by a multiple of ten? How can a diagram help you show multiplication? What strategies can you use to estimate products? How can you use area models to multiply 2-digit numbers? How can you use place value and partial products to multiply 2-digit numbers? How can you use regrouping to multiply 2-digit numbers? □ How can you relate the strategy of partial products to regrouping? □ Why is the understanding of place value important when regrouping? How can you find and record products of two 2-digit numbers? □ What strategies can be used to multiply two 2-digit numbers?	
Content to be Learned	**Skills**
Use mental math strategy (halving, doubling, breaking apart,..)and multiplication properties of operations (See Table 3 CCSS) to multiply whole numbers; 1-digit by up to 4- digits. Use place value and multiplication properties to multiply whole numbers by multiples of ten. Estimate products by using the strategies of rounding and compatible numbers. Use area models to multiply 2- digit by 2-digit whole numbers? Use place value and partial products to multiply 2-digit whole numbers. Use regrouping to multiply 2- digit numbers. Write a multiplication story problem and solve it. Choose a method (mental math, place value and multiplication properties, rounding, compatible numbers, area models, partial products or regrouping) to two 2- digit whole numbers.	**Find products of multi-digit factors using area models, arrays, and partial products.**
Assessments	**Standards**

Teacher created	**4.NBT.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. Illustrate and explain the calculation by using equations, rectangular arrays, and/or area models.
Sample Instructional Activities	**Resources**
Teacher created formal assessments	**OnCore** Lesson 28 p. 55,56 INV Snap-in Lesson, Unit 8 Session 2.4A p. C57 – C60 **OnCore** Lesson 31 p.61-62 **OnCore Lesson 32** pg.63 & 64 **INV** Unit 8 p. 1,3,14,15 Unit 9 p. 38 **OnCore** Lesson 33 pg 65 & 66 Lesson 34 pg 67 & 68 **INV** Additional practice Unit 4, p5 Unit 8 p. 18,27 Unit 9 p. 48 **OnCore** Lesson 35 pg. 69&70 **INV** Unit 8 p. 5,6, 8, 29, 31, 32 Unit 9 p. 62 **OnCore** Lesson 36 pg 71&72 **INV** Unit 8 p.7, 40

Unit: 2.2	**Title: Division with Remainders**	**Days : 10**

Essential Questions

- How can you tell if the answer to this multi-step word problem is reasonable?
- How can you use remainders in division problems?
- What does the remainder in a quotient mean?
- How can you use the strategy draw a diagram to solve multi-step problems?
- What strategies can be used to find whole number quotients and remainders with up to four-digit dividends and one-digit divisors?
- How can you use multiples to estimate quotients?
- How can you use models to divide whole numbers that do not divide evenly?
- How can you use repeated subtraction and multiples to find quotients?
- Using equations, rectangular arrays, and/or area models how can you explain division problems?
- How can you use base-ten blocks to model division with regrouping?
- How can you use place value to know where to place the first digit in the quotient?
- How can you divide multi-digit numbers and check your answers?

Content to be Learned	**Skills**
• Solve multi-step word problems with whole numbers using the four operations. • Illustrate and explain the calculations by using equations, rectangular arrays, and/or area models. • Find whole number quotients and remainders with up to four-digit dividends and one-digit dividers. • Use properties based on place value, properties of operations, and the relationship between multiplication and division.	• Solve multi-step word problems using the four operations. • Justify answers using numerical equations, rectangular arrays, area models and/or written explanations. • Interpret and illustrate remainders as part of a whole. • Construct equations using variables to represent these problems. • Assess reasonableness of answers using estimation, mental computations, and inverse operations.

Assessments	**Standards**
Teacher created quizzes and tasks	**4.OA.3** Solve multistep word problems posed with whole numbers and having whole-number answers using the four operations, including problems in which remainders must be interpreted. Represent these problems using equations with a letter standing for

	the unknown quantity. Assess the reasonableness of answers using mental computation and estimation strategies including rounding. 4.NBT.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.
Sample Instructional Activities	**Resources**
Teacher created	**Graph Paper** **OnCore** Lessons 6 and 7 Student pp. 11-14 **OnCore** Lessons 37-38 and 42 Student pp. 73-76 and 83-84 **OnCore** Lessons 44-46 Student pp. 87-92 Base-ten blocks **Investigations** Unit 8 Snap-in 3.5A SAB pp.C61-C63

Unit: 2.3	**Title:** **Developing an Understanding of Fractions (limited to fractions with denominators 2,3,4,5,6,8,10,12,100)**	**Days :10**

Essential Questions

- How can you use models to show equivalent fractions?
- How can you use multiplication (Identity Property) to find equivalent fractions?
- How can you write a fraction as an equivalent fraction in simplest form?
- How can you write a pair of fractions with a common denominator?
- How can you use the strategy *make a table* to help you solve problems with equivalent fractions?
- How can a number line be used to show equivalent fractions?
- How can you use benchmarks to compare fractions?
- How do you compare fractions with common numerators? Common denominators?
- How you can justify your comparison using a visual model?
- Explain two strategies that help when ordering fractions.
- How does knowing how to compare fractions help you to order them?
- How do you know a/b is < c/d?
- How can using a number line or fraction bars help you order fractions?

Content to be Learned	**Skills**
• Use models to show equivalent fractions. • Use the Identity Property of Multiplication, by multiplying a given fraction by 1 in the form n/n to generate equivalent fractions. • Understand why a fraction is equivalent. • Write and identify equivalent fractions in simplest form. • Use equivalent fractions to represent a pair of fractions with a common denominator. • Use the strategy *make a table* to solve problems using equivalent fractions. • Identify fractions and their equivalence on a number line. • Using benchmarks to compare fractions. • Compare fractions by writing them with a common	• Understand and demonstrate that when you multiply any fraction by any form of 1 (n/n) it will result in an equivalent fraction. Students will be using the *Identity Property of Multiplication,* but they are not expected to know this property by name. • Recognize that even when the number and size of the parts differ, the two fractions are equivalent, if the fractions both relate to the same whole. • Write and identify fractions in simplest form, represent pairs of fractions with common denominators and use the strategy *make a table* to solve problems using equivalent fractions. • Compare fractions using benchmarks, by rewriting the fractions being compared with common numerators or denominators,

numerator. Compare fractions by writing them with a common denominator. • Justify comparisons using a visual model and record using symbols >, =, or <. • Order fractions from least to greatest. • Order fractions using a number line or fraction bars. • Explain your reasoning for ordering the fractions and justify ordering with a visual model.	• Justify comparisons using visual models and recording the results with the >, =, or < symbols. • Order fractions from least to greatest. Students may order visually by using area models or symbolically by renaming with a common denominator and comparing the numerators.
Assessments	**Standards**
Teacher created **On Core workbook** **En Visions** **Investigations**	**4.NF.1** Explain why a fraction *a/b* is equivalent to a fraction *(nxa)(nxb)* 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. **4.NF.2** Compare two fractions with different numerators and different denominators, e.g., by creating common denominators or numerators, or be comparing to a benchmark fraction such as 1/2. Recognize the results of comparisons with symbols >, =, or <, and justify the conclusion, e.g. by using a visual model.
Sample Instructional Activities	**Resources**
Teacher created **On Core workbook** **En Visions** **Investigations**	**OnCore** Lesson 47 & 48 Student pages 93 – 96 **Investigations** Unit 6 Session 1.2 *Relationship between halves and fourths, thirds and sixths.* **OnCore** Lessons 49 – 51 Student pages 97 – 102 **EnVision** 10-5A Common Core Student pages & activities **K-5 Math Resources** Fraction Wall Game **OnCore** Lesson 52 - 53 Student pages 103 -106 **Investigations** Unit 6 Session 2 *Game:* Capture Fractions **K-5 Math Resources** Birthday Fractions Pattern Block Fractions

	Who Ate More? Fraction Compare Fraction Cards Which is Larger? Snack Time **OnCore** Lesson 54 Student pages 107 & 108 **Investigations** Unit 6 Session 2 Continued from lesson 3 **EnVision** Topic 10 – 8 Student pages 73 - 76 **Illuminations interactive:** Fraction Game *Use the fraction cards (Fraction Cards) from lesson 3 to have students practice ordering. A clothesline may be used or just have students stand holding the cards.

Unit: 2.4	Title: Addition and Subtraction of Fractions	Days : 10 Days

Essential Questions

- When can you add or subtract parts of a whole?
- How can you write a fraction as a sum of fractions with the same denominator?
- How can you rename mixed numbers as fractions greater than 1 and rename fractions greater than 1 as mixed numbers?
- How can you add and subtract fractions with like denominators using models?
- How can you add and subtract fractions with like denominators?
- How can you use the strategy act it out to solve multistep problems with fractions?

Content to be Learned	Skills
* Understand that to add or to subtract fractions, they must refer to parts of the same-size wholes. * Decompose a fraction by writing it as a sum of fractions with the same denominators. * Use models to represent and find sums and differences involving fractions. * Solve word problems involving addition and subtraction with fractions. * Use the strategy act it out to solve multistep problems with fractions.	In Lesson 55 students will: * Add and subtract fractions * Use a model to write an equation * Explain which models show an addition and which show a subtraction * Complete student pgs. 109-110 In Investigations Unit 6 Session 1.8A students will: * Use visual representations to subtract fractions with like denominators * Complete resource book pgs. 29-31 * Add and subtract fractions from the activities at K-5 Math Resources In Lesson 56-57 students will: * Recognize the numerator in a fraction is the same as he number of addends in the sum of the unit fractions * Write fractions as the sum of unit fractions * Write fractions as different possible sums * Write mixed numbers as a fraction greater than one * Write fractions greater than 1as a mixed number * Complete student pgs. 111-114 * Decompose fraction from the activities at K-5 Math Resources

	In Lessons 56-57 students will: *** Add fractions using a number line** *** Subtract fractions using fraction strips** *** Find sums and differences of two fractions** *** Solve multistep fraction problems** *** Complete student pgs. 121-128** *** Solve multistep fraction problems from the activities at K-5 Math Resources**
Assessments	**Standards**
On Core pgs. **Teacher created quizzes**	**4.NF.3** Understand a fraction *a/b* with *a* > 1 as a sum of fractions 1/*b*. **4.NF.3a** Understand addition and subtraction of fractions as joining and separating parts referring to the same whole. **4.NF.3b** 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. *Examples: 3/8 = 1/8 + 1/8 + 1/8 ; 3/8 = 1/8 + 2/8 ; 2 1/8 = 1 + 1 + 1/8 = 8/8 + 8/8 + 1/8.*
Sample Instruction al Activities	**Resources**
* Guide children to understand that to add or subtract fractions they must refer to parts of the same-size whole following the lesson guidelines in On Core lesson 55 (TM p. 58) * Remind students they learned how to use a fraction to represent a part of a whole that has been divided into parts and tell them they now will learn how they can use fractions to describe what happens when parts are joined together or taken away. * Show students addition and subtraction models and discuss how to write an equation that describes the same amount. * Investigations Unit 6 session 1.8A materials. (TM pp. CC48-51) * Ask students to solve a problem by draw a model to subtract fractions. Ask students to write an equation to represent the problem * Teachers will guide children to decompose a fraction as a sum of	**On Core Lesson 55** **Student pgs. 109-110** **Fraction strips** **Investigation Unit 6 Session 1.8A** **Resource Book pgs. 29-31** **K-5 Math Resources-activities for 4.NF.3a** **htpp://www.k-5mathteachingresources.com/4th-grade-number-activities.html** **On Core Lessons 56-57** **Student pgs. 11-114** **K-5 Math Resources-Decomposing fractions in different ways activity:** **Htpp://www.k-5mathteachingresources.com/support-files/decomposingfractions4nf3b.pdfandhtpp://www.k-**

fractions with the same denominators and write fractions greater than 1 as a mixed number and write a mixed numbers as fractions greater than 1 following the lesson guidelines in On Core lessons 56-57 (TM p. 59-60) * Introduce the lesson by writing whole numbers as the sum of other whole numbers and then tell students they will learn how to write a fraction as a sum of other fractions. * Remind students that a fraction with the numerator and the denominator (like 5/5) is equal to 1. * Lead them to see fractions with numerators larger than the denominator (like 6/5) represent an amount greater than 1. * Discuss the meaning of the term mixed number and point out that dividing 16 by 3 shows how many groups of 3 thirds are in 16 units. * Guide children to use models to represent and find sums and differences involving fractions, solve word problems involving addition and subtraction with fractions, use the strategy act it out to solve multistep fraction problems following the lesson guidelines in On Core lessons 61-64 (TM p. 64-67) * Review how to show a fraction on a number line stressing that the distance between 0 and 1 is divided into a number of parts equal to the denominator of the fraction. * Guide students to see that two distances on the number line are being combined and that the shading of one begins at the end of the shading for the other. * Remind students that they used fraction strips to add fractions and that they can use them to subtract them. Ask students how modeling an addition of fractions with strips is different from modeling a subtraction. Ask students to describe how the numerator and the denominator of the sum or differences are related to the numerators and denominators of the fractions being added or subtracted. Work with students to model a repeated-addition problem using fraction strips.	**5matheteachingresources.com/support-files/pizza-share/pdf** **On Core Lessons 61-64** **Student pgs. 121-128**

Unit: 3.1	**Title: Understanding Mixed Numbers**	**Days : 10**

Essential Questions	
How can you represent an improper fraction as an equation with both a fraction and a whole number? What would the result be of multiplying a fraction by a whole number? In what ways can you add and subtract mixed numbers with like denominators? How can you solve word problems involving multiplication of a fraction by a whole number? How can you rename a mixed number to subtract? How can you add fractions with like denominators using the properties of addition? How can you write a fraction as a product of a whole number and a unit fraction? How can you multiply a fraction by a whole number to solve a problem? How can you use the strategy *draw a diagram* to solve comparison problems with fractions?	
Content to be Learned	**Skills**
Add and subtract mixed numbers with like denominators by replacing each mixed number with an equivalent fraction. Apply and extend previous understanding of multiplication to multiply a fraction by a whole number. Understand a fraction *a*/*b* as a multiple of 1/*b* by using a visual fraction model and recording the conclusion with an equation [e.g., 5/4 = 5 · (1/4)]. Understand a multiple of *a*/*b* as a multiple of 1/*b*, and use this understanding to multiply a fraction by a whole number. For example, use a visual fraction model to express 3 · (2/5) as 6 · (1/5), recognizing this product as 6/5. Solve word problems involving multiplication of a fraction by a whole number. Use properties of operations and the relationship between addition and subtraction to add and subtract mixed numbers with like denominators.	Add and subtract mixed numbers with like denominators. Rename mixed numbers to subtract. Use the properties of addition to add fractions. Write a fraction as a product of a whole number and a unit fraction. Write a product of a whole number and a fraction as a product of a whole number and a unit fraction. Use a model to multiply a fraction by a whole number. Multiply a fraction by a whole number to solve a problem. Use the strategy *draw a diagram* to solve comparison problems with fractions.
Assessments	**Standards**
Teacher created assessments	**4.NF.3** Understand a fraction a/b with a>1 as a sum of fractions 1/b. c. 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 operations and the relationship between addition and subtraction. **4.NF.4** Apply and extend previous understandings of multiplication to multiply a fraction by a whole number. a. Understand a fraction *a/b* as a

	multiple of 1/*b*. *For example, use a visual fraction model to represent 5/4 as the product 5 X (1/4), recording the conclusion by the equation 5/4 = 5 X (1/4)* .b .Understand a multiple of *a/b* as a multiple of *1/b*, and use this understanding to multiply a fraction by a whole number. *For example, use a visual fraction model to express 3 × (2/5) as 6 × (1/5), recognizing this product as 6/5. (In general, n × (a/b) = (n × a)/b.)* c. Solve word problems involving multiplication of a fraction by a whole number, e.g., by using visual fraction models and equations to represent the problem. *For example, if each person at a party will eat 3/8 of a pound of roast beef, and there will be 5 people at the party, how many pounds of roast beef will be needed? Between what two whole numbers does your answer lie?*
Sample Instructional Activities	**Resources**
Teachers will guide children to add and subtract mixed numbers following the lesson guidelines in OnCore lessons 58-60 (TM p. 61-63), teachers will: Review with students that a mixed number has a whole number part and a fraction part. Discuss that they can use what they know about adding and subtracting whole numbers and fractions to add and subtract mixed numbers. Give students an example in which the sum of the fractional part is more than 1 and discuss how to rewrite the sum so that the fractional part is less than 1. (e.g., sum of 10 12 = 11 4) Remind students how when subtracting 2- 88 digit numbers they sometimes needed to rename 1 ten into 10 ones and that now they will sometimes need to rename a whole number into fractional parts to subtract a larger fraction from a smaller fraction. Review the Commutative and Associative Properties of Addition and remind students they may use these properties to make it easy to add fractions and mixed numbers as well as whole numbers. Check that students understand how to recognize fractions whose sum is 1. Ask students why using the properties to add the numbers was easier than adding the numbers in the order given. Remind students to focus on the fractional parts of the mixed numbers and look for sums that equal 1. Teachers will be following lesson activities from Investigations Unit 6 session 2.7A materials. (TM pp. CC52-CC56) In the activities teachers will: Have students look at the data on page C32 and ask them what they notice about the data. Draw the number line for the line plot on the board. Ask students what each of the tick marks between the whole numbers on the line plot represents; establish that each tick mark represents 1⁄4 of an inch and the 2/4 is equivalent to 1⁄2. Have students use the data from the table to create a line plot. Make sure students understand where to place an X on the line plot.	**OnCore** Lessons 58-60 Student pp. 115-120 Fraction strips **Investigations** Unit 6 Session 2.7A Resource Book pp. 32-34 K-5 Math Resources – activities for 4.NF.3c: Mixed Number Word Problems (like denominators) Adding Mixed Numbers Subtracting Mixed Numbers **OnCore** Lesson 65 Student pp. 129-130 K-5 Math Resources – activities for 4.NF.4a Models for Fraction Multiplication Numeral cards and Fraction dice **OnCore** Lessons 66 and 67 Student pp. 131-134 **OnCore** Lesson 68 and 69 Student pp. 135-138 **Investigations** Unit 6 Session 3A.1-3A.3 Resource Book pp. C35--C42 and C44-C46 K-5 Math Resources – activities for 4.NF.4c Whole Number x Fraction Word Problems

After the students complete the line plot, tell them to write statements about the data. When they are done, have them check their work with a neighbor. Have students work alone or with a partner to answer the questions on p. C33 and then do daily practice p. C34. Teachers will guide children to write a product of a whole number and a fraction as a product of a whole number and a unit fraction and use a model to multiply a fraction by a whole number following the lesson guidelines in OnCore lesson 65(TM p. 68), teachers will: Have students recall how to write multiples of a unit fraction and tell them they are now going to find multiples of other fractions. Draw a number line and have students explain how 3 X 2/5 = 6/5 is shown on the number line. Discuss how they could extend the number line to show 10/5. Guide students to realize that the units on the number line are unit fractions, so each fifth represents a product of a whole number and the unit fraction, 1/5. Have students name various ways they have used models to show multiplication with whole numbers such as arrays, objects arranged in equal groups, and number lines. Tell them they can also use models to multiply a fraction by a whole number. Make sure students understand that 4 X 3/5 means 4 groups of 3/5 and show with the bar model that they can count the shaded fifths to find the product 12/5. Teachers will guide children to multiply a fraction by a whole number to solve a problem and use the strategy draw a diagram to solve comparison problems with fractions following the lesson guidelines in OnCore lesson 65(TM p. 68), teachers will: Ask students to explain and illustrate what a mixed number is and review how to write a fraction as a mixed number and a mixed number as a fraction. Have students rename a mixed number as a fraction and then multiply. Discuss how to multiply two fractions: multiply the numerators and multiply the denominators. Point out that the product is greater than 1 so they should simplify by writing it as a mixed number. In the example be sure that students understand how listing 18 fourths and grouping 4 fourths into wholes shows the conversion of the fraction to a mixed number. Review how use a comparison bar diagram with whole numbers and tell students they can draw a similar diagram to solve comparison problems with fractions. Teachers will be following lesson activities from Investigations Unit 6 sessions 3A.1-3A.3 materials. (TM pp. CC57-CC70) In the activities teachers will: Go over strategies for multiplying fractions. Give students time to work with a partner to solve problems. Check to see if students can write equations for the problems.	

Unit: 3.2	Title: Understanding Decimals	Days :10

Essential Questions

How can you compare fractions with a denominator of 10 and a denominator of 100?
How can you represent fractions with a denominator of 10 or 100 as decimals?
How can you compare two decimals to the hundredths by reasoning about their size?
How can you express seven tenths as a fraction with a denominator of 100?
How can you add fractions when one of the fractions has a denominator of 10 and the other has a denominator of 100?
How can you record tenths and hundredths as fractions and decimals?
How can you relate fractions, decimals and money?
How can you compare two decimals?
How can you use a model to show that one fraction is larger than another?
What does the digit in the tenths place mean?
What does the digit in the hundredths place mean?

Content to be Learned	Skills
Understand decimal notation for fractions and compare decimal notation. Express a fraction with denominator 10 as an equivalent fraction with denominator 100 and use this technique to add two fractions with respective denominators 10 and 100. Use decimal notation for fractions with denominators 10 or 100. 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 comparisons with the symbols >, =, or <. Justify your conclusions by using a visual model.	Record tenths and hundredths as fractions and decimals. Find equivalent fractions and decimals. □ Add fractions when the denominators are 10 and 100. □ Relate tenths and hundredths to decimals. □ Relate fractions, decimals, and money. □ Write money amounts as decimals. □ Use correct dollar sign and decimal notation for money amounts. □ Represent decimal numbers in tenths and hundredths on a grid. □ Use tenths and hundredths number cards to find sums of 1. □ Solve word problems with equivalent fractions having denominators of 10 and 100. □ Count, record and compare amounts of money. □ Represent decimals with Base 10 Blocks. □ Solve decimal riddles. □ Show metric relationships among centimeter, decimeter, and meter. Use a number line to compare decimals Correctly use the symbols > and < when comparing decimals. Decide if the shown inequalities are true or false. Correctly use the symbols > and < when comparing decimals. □ Explain their reasoning for deciding which decimal is greater. □

	Compare decimals using base 10 blocks. Sort decimal as near 0, about 1⁄2, and close to 1.
Assessments	**Standards**
Teacher created assessments	4.NF.5 Express a fraction with denominator 10 as an equivalent fraction with denominator 100, and use this technique to add two fractions with respective denominators 10 and 100.[4] *For example, express 3/10 as 30/100, and add 3/10 + 4/100 = 34/100.* [4] Students who can generate equivalent fractions can develop strategies for adding fractions with unlike denominators in general. But addition and subtraction with unlike denominators in general is not a requirement at this grade. 4.NF.6 Use decimal notation for fractions with denominators 10 or 100. *For example, rewrite 0.62 as 62/100; describe a length as 0.62 meters; locate 0.62 on a number line diagram.* Compare two decimals to hundredths by reasoning about their size. 4.NF.7 Recognize that comparisons are valid only when the two decimals refer to the same whole. Record the results of comparisons with the symbols >, =, or <, and justify the conclusions, e.g., by using a visual model.
Sample Instructional Activities	**Resources**
Teachers will guide children to record tenths and hundredths as fractions and decimals, add fractions when the denominators are 10 or 100, and translate among representations of fractions, decimals, and money following the lesson guidelines in OnCore lessons 70-74 (TM pp.73-77), teachers will: Helps students apply their knowledge of place value experiences of grouping 10 ones to make 1 ten and 10 tens to make 1 hundred to writing equivalent fractions and decimals. Review the term equivalent fraction. Remind students that they have learned how to add fractions with a common denominator. Review how to write decimals for tenths and hundredths as fractions and how to write a fraction such as 3/10 as a number of hundredths. Make sure students understand that they can only add fractions with like denominators and that is why it is necessary to find equivalent fractions. Point out that answers to the problems should be in the same form as the addends, fractions, decimals, or money amounts. Review how fractions are used to represent a part of a whole and how to represent a point on a number line. Remind students that a fraction can only be written if the whole is divided into equal parts.	**OnCore** Lessons 70 and 71 Student pp. 139-142 **Please Note:** Lessons 70 & 71 are said to be standard CC4.NF.5, but they also address CC4.NF.6 decimal equivalents **K-5 Math Resources** Sums of 1 Equivalent Fractions with a Denominator of 100 Problems **OnCore** Lessons 72-74 Student pp. 143-148 **Investigations Unit 6-** Session 3.1 SAB. pp.44, 45, 50, and 51 Decimals in Money Representing Decimals with Base 10 Blocks Decimal Riddles Metric Relationships **OnCore** Lessons 75 Student pp. 149-150 **Investigations Unit 6-** Session 3.2 RM27-28andSAB.p.55 **Unit 7-**SAB pp.2, 25, 37 **K-5 Math Resources**–activities for 4.NF.7 Comparing Decimals Decimal Sort

Make sure students are aware that they should write a 0 in the ones place for decimals less than 1 (i.e. 0.2). Note: In lesson 73 you are asked to check understanding by asking students to give both fraction and decimal names for a model that represents a number greater than 1. (i.e. 1.54 or 1 54/100) Check to see that students understand they must write 0 in the tenths place for the fraction 9/100. Review the values of coins, pennies, nickels, dimes, quarters, and a $1 bill. Ask students to describe some relationships among the coins and the bill, such as 2 nickels =1 dime. Explain that money amounts are related to fractions (part of a dollar- 1 dime is 1/10 of a dollar) and to decimals (tenths and hundredths – 1 dime is a tenth of a dollar). In both cases the dollar is the whole, and they are learning to represent money amounts as fractional parts of that whole. Discuss that one cent is one hundredth of a dollar (the prefix "cent" means hundred and on the penny coin are the words "one cent"). Remind students to use the dollar sign and decimal point notation when writing a money amount. (Please note OnCore lessons 70 and 71 include decimal equivalents and coins. These are not part of the standard for 4.NF.5 as stated in the book, but they do address 4.NF.6 which is the other standard being addressed now.) Teachers will be following lesson activities from Investigations Unit 6 session 3.1 and 3.3materials. (TM pp. 104-110) and 116-119 In the activities teachers will: Call attention to the word decimal and give students the meaning of decimal as 10 and remind them that our number system is based on tens. Go over everyday uses of fractions and decimals and have students come up with as many examples as they can in 5-10 minutes. For some students referring to a context helps them visualize and talk about decimal fractions. Give students a copy of Decimal Grids and go over how many parts are shaded for different amounts of tenths and hundredths. (Please note that this standard is for 10ths and 100ths only and there is also a grid for 1000ths. You need only refer to the 10ths and 100ths grids.) Teachers will guide children to compare decimals to hundredths by reasoning about their size following the lesson guidelines in OnCore lessons 75 (TM p78), teachers will: Review how to use a number line to compare two whole numbers, stressing that the greater number is the number located farther to the right. Also review how to compare two fractions by modeling each as part of the same whole and comparing the sizes of the parts. Explain to the students	

that they will see how to use these same methods to compare two decimals. Be sure that students are aware that 0.1, 0.2, and 0.3 represent 0.10, 0.20, and 0.30. Also be sure to see that students see it is not possible to just compare 2 and 23 in 2/10 and 23/100 because tenths and hundredths are not equal parts. Make sure that students are interpreting the > and < symbols correctly. Teachers will be following lesson activities from Investigations Unit 6 session 3.2 materials. (TM pp. 111-115) In the activities teachers will: Guide students through reasoning about representations and meanings of numbers with the purpose of ordering decimals and justify their ordering. Teachers may use the activities from K-5 Math Resources.	

Unit: 4.1	**Title: Representing and Interpreting Data**	**Days : 10**

Essential Questions

- When analyzing data, what is the most appropriate graph to use to represent the data?
- How can you compare two data sets using information from a line plot?
- What does the X represent on a line plot/graph? What does the Y represent on a line plot/graph?
- How can you determine the scale that is appropriate when making a line plot?

Content to be Learned	**Skills**
• Make a line plot to display a data set of measurements and fractions of a unit (1/2, 1/4, 1/8). • Analyze data on a line plot. • Solve problems involving addition and subtraction of fractions by using information presented in line plots.	Students will be able to model with mathematics. Represent problem situations in multiple ways. Connect representations and explain the connections. * Students will be able to attend to precision. Communicate precisely to others. Specify units of measure carefully. Give carefully formulated explanations to each other.

Assessments	**Standards**
Formative Assessments: Daily Work Quizzes Unit Test On Core practice Investigations Games	4.MD.4 Make a line plot to display a data set of measurements in fractions of a unit (1/2, 1/4, 1/8). 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.*

Sample Instructional Activities	**Resources**
Day 1 Data from Surveys-introduce basic aspects of conducting surveys and interpreting results. **Day 2 Reading & Interpreting Graphs- teach students that different graphs can be used to**	• **Investigations Snap-In Unit 6 Session 2.7A** • **Pearson CC Standards Practice Workbook** • **K-5 Math Resources: Length of Ants Line Plot Objects in My Desk Line Plot** • **Math Worksheets Land** **http://www.mathworksheetsland.com/4/26measfrac/ip.pdf**

represent specific data. Review/introduce median, mode, & range. **Day 3 Line Plots** **Day 4 Line Graphs** **Day 5 Circle Graphs** **Day 6 Coordinates/Ordered Pairs** **Day 10 Assessment** ***some lessons will need more than 1 day for instruction & practice** ***problem solving should be incorporated throughout unit**	**http://www.mathworksheetsland.com/4/26measfrac/matching.pdf** • https://www.georgiastandards.org/Common-Core/Common%20Core%20Frameworks/CCGPS_Math_4_Unit7Framework.pdf

Unit: 4.2	**Title: Lines, Angles, & Shapes**	**Days : 10**

Essential Questions

How can you identify and draw points, lines, line segments, and angles? How can you identify and draw parallel lines and perpendicular lines?
How can you classify triangles by the size of their angles? How can you sort and classify quadrilaterals?
How do you find lines of symmetry? How can you check if a shape has a line of symmetry?

Content to be Learned	**Skills**
How to draw and identify points, lines, line segments, rays, 3 types of angles, and perpendicular and parallel lines in 2-dimensional figures. **How to classify 2-dimesional figures based on attributes of lines, and angles.** **How to recognize right angles and triangles.** **How to recognize a line of symmetry for a 2-dimensional figure as a line across the figure that separate the figure into 2 equal and matching parts.** **How to draw lines of symmetry.**	In **OnCore Lessons 98-99** students will: Draw and label lines, line segments, and angles. Name line segments, angles, and rays. Classify angles as obtuse, acute, or right Reading notations for lines, line segments, rays, parallel and perpendicular lines. Name sets of lines that are parallel, perpendicular, or intersecting. Draw and label lines that are intersecting, parallel, and perpendicular. Complete student pp.195-198 In **Investigations Unit 4 Snap-in Session 3.4A** students will: Draw lines and angles. Use a protractor to measure angles. (Extension activity- Use a protractor to draw angles with given measures.) Complete Resource Masters C-13-C16. In **K-5 Math Resources**–activity for 4.G.1 students will:Use a geoboard to make uppercase letters that have parallel lines, In **OnCore Lessons 100-101** students will: In **Investigations Unit 4 Snap-in Session 2.3A** students will: Identify angles as acute, right, or obtuse. Classify triangles by their angle size. Classify quadrilaterals as many ways as possible. Complete student pp.199 - 202 Identify geometric figures. Compare shapes to see how they are the same and different. Sort shapes by their attributes. Complete Resource Masters C9-C12. In **OnCore Lessons 102 – 103** students will: Tell whether the parts on either side of a line are congruent. Tell if a line is a line of symmetry. Complete a design by reflecting over the line of symmetry. Find and draw lines of symmetry. Tell whether the shape has zero, 1, or more than 1 line of symmetry. Draw shapes for the statements given and draw lines of symmetry. Complete student pp.203 - 206
Assessments	**Standards**
Formative Assessments: Daily Work Quizzes Unit Test	**4.G.1** Draw points, lines, line segments, rays, angles (right, acute, obtuse), and perpendicular and parallel lines, identify these in two-dimensional figures. **4.G.2** Classify two-dimensional figures based on the presence or absence of

Oncore practice Investigations Games	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. **4.G.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.
Sample Instructional Activities	**Resources**
Days 1-4 Teachers will guide children to identify and draw points, lines, line segments, rays, angles, parallel lines, perpendicular lines, and intersecting lines following the lesson guidelines in OnCore lessons 98-99 (TM pp.103-104), teachers will: Introduce the lesson by drawing a point and a line and asking the students to describe each figure. Explain what they are called and tell them that they will see how other figures are formed using just points and lines. Discuss the vocabulary that is on page 195 and ask students to explain how rays and line segments are different from lines, Stress when naming a ray, the beginning point is always named first. Draw a line on the board and ask what type of figure it is. Then draw a second line that intersects it. Ask students to classify the angles as acute, obtuse, and right. Guide students through the discussion at the top of page 197. Make sure students understand that perpendicular lines can be intersecting lines. (Side note: if students confuse the words parallel and perpendicular, point out that the two ll's in parallel look like lines that do not meet.) Teachers will be following lesson activities from Investigations Unit 4 Snap-in session 3.4A materials. (TM pp. CC21-CC25) In the activities teachers will: Go over why you draw two arrows for a line, a point and an arrow for a ray, and two endpoints for a line segment. Have students relate circular arcs to angle measures before they use a protractor. (TM p. CC23.) Note: There are several variations of the definition of an angle. The definition of an angle sometimes reads, "An angle is formed by two rays that share a common endpoint." When students are classifying different angles in two -dimensional figures they do not see the lines segments as rays and may be confused by the definition. **Days 5-8** Teachers will guide children to classify triangles by the size of their angles and sort and classify quadrilaterals following the lesson guidelines in OnCore lessons 101-102 (TM pp.105-106), teachers will: Introduce the lesson by displaying several angles and having the students identify each angle as acute, right, or obtuse. Tell them they will use these types of angles to give special names to triangles. Discuss the square-corner mark on the triangle shows a right angle. Stress the fact that all triangles have at least two acute angles. It is important that students understand that it is not possible for a triangle to have more than one obtuse angle or more than one right angle. Remind students of how they classified triangles by their angle size and explain that to classify quadrilaterals they will use the definitions of parallel and perpendicular lines. Discuss the flow chart of quadrilaterals and point out how the information in the chart defines each figure. (**NOTE:** When reading the chart from the	**OnCore** Lessons 98-99 Student pp. 195-198 **Investigations Unit 4 Snap-In** Session 3.4A Resource Masters C13- C16 **K-5 Math Resources**–activity for 4.G.1 Alphabet Lines **OnCore** Lessons 100 - 101 Student pp. 199-202 **Investigations Unit 4 Snap-In** Session 2.3A Resource Masters C9-C12 (*Optional -Investigations Unit 4 sessions 3.1-3.2 making angles with power polygons. - may want to do lessons or just some activity pp. 37-45.) **K-5 Math Resources**–activity for 4.G.2 Classifying 2D Shapes (On this **K-5 Math Resources** site there are 6 other activities that are optional.) **OnCore** Lessons 102-103 Student pp. 203 - 206 Tracing paper, grid paper, scissors **K-5 Math Resources**–activity for 4.G.3 Symmetry on the Geoboard (Optional) This site has 5 other nice activities that could be used for enrichment.

top down say “some”- i.e., Some rectangles are squares. When reading from the bottom up say “all”- i.e., All squares are rectangles. If the shapes are not vertically connected, say “never”- i.e., A square is never a trapezoid.) Teachers will be following lesson activities from Investigations Unit 4 Snap-in session 2.3A materials. (TM pp. CC16-CC19) In the activities teachers will: Go over definitions of the vocabulary words and have student demonstrate them. Have students sort shapes by their angle sizes and whether the sides are parallel or perpendicular. **Days 9-10** Teachers will guide children to determine whether a figure has a line of symmetry and identify and draw lines of symmetry in two-dimensional figures following the lesson guidelines in OnCore lessons 102-103 (TM pp.107-108), teachers will: Display a heart shape and point out that it can be divided into two matching parts. Ask students to name other familiar shapes that have matching (congruent) parts. Discuss the meanings of line symmetry and line of symmetry. Make sure that students recognize that if the corners of some parts do not meet when a figure is folded along a line, then it is not a line of symmetry. Give students half a shape drawn on grid paper with a line of symmetry indicated along one side and have the students complete the shape on the other side of the line. Have students look at figures with no lines drawn and decide if there is a way to draw a line of symmetry. In the examples given, if students have trouble seeing the diagonal lines of symmetry, suggest they turn the tracing so that the lines are positioned vertically or horizontally. Give students a description of a figure – zero lines of symmetry, one line of symmetry, or more than one line of symmetry – and have them draw a shape that matches the description.	

Unit: 4.3	**Title: Understanding and Measuring Angles**	**Days : 10 Days**

Essential Questions

How can you relate angles and fractional parts of a circle?
How are degrees related to fractional parts of a circle?
How can you use a protractor to measure and draw angles?
How can you determine the measure of an angle separated into parts?
How can you use the strategy draw a diagram to solve angle measurement problems?

Content to be Learned	**Skills**
* Relate angles and fractional parts of a circle. * Relate degrees to fractional parts of a circle by understanding that an angle that measures 1º turn through n/360 of a circle. * Use a protractor to measure an angle and to draw an angle with a given measure. * Determine the measure of an angle separated into parts. * Use the strategy draw a diagram to solve angle measurement problems. * Relate degrees to fractional parts of a circle by understanding that an angle that measures 1° turn through n/360 of a circle. * Use a protractor to measure an angle and to draw an angle with a given measure. * Determine the measure of an angle separated into parts. * Use the strategy draw a diagram to solve angle measurement problems.	In On Core Lesson 93 students will: * Tell what fraction of the circle the shaded angle represents. * Tell whether the angle of the circle shows a ., ó, . or 1 full turn clockwise or counterclockwise. * Solve problems and describe the turns. * Complete student pp.185 - 186 In On Core Lesson 94 students will: * Tell the measure of an angle in degrees. * Classify angles. * Classify triangles. * Complete student pp.187-188 In K-5 Math Resources students will: * Write their names in capital letters and calculate the value of their name given that an acute angle is worth 7 points, a right angle is worth 8 points, and an obtuse angle is worth 10 points. In On Core Lesson 95 students will: * Use a protractor to find an angle measure. * Use a protractor to draw a given angle. * Draw examples of angles and label its measure. * Complete student pp.189-190 In On Core Lessons 96 - 97 students will: * Find the measure of a given angle by adding the measures of its parts.

	* Use a protractor to find the measure of each angle in a given problem and write the sum of the angle measures as an equation. * Use a protractor to find the measure of each angle in a circle * Use equations to find the unknown angle measures. * Complete student pp.191-194
Assessments	**Standards**
	4.MD.5 Recognize angles as geometric shapes that are formed wherever two rays share a common endpoint, and understand concepts of angle measurement: 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 interest 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. 4.MD.5 Recognize angles as geometric shapes that are formed wherever two rays share a common endpoint, and understand concepts of angle measurement: b. An angle that turns through n one-degree angles is said to have an angle measure of n degrees. 4.MD.6 Measure angles in whole number degrees using a protractor. Sketch angles of specified measure. 4.MD.7 Recognize angle measure as an 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.
Sample Instructional Activities	**Resources**
* Teachers will guide children to relate angles and fractional parts of a circle following the lesson guidelines in On Core lesson 93 (TM p. 97) * Review the meaning of angle and ray. * Remind students they have used fractions to describe parts of a circle and that they will see how the size of an angle is related to a fractional part of a circle.	On Core Lessons 93 Student pp. 185-186 Fraction circles On Core Lessons 94 Student pp. 187 - 188 K-5 Math Resources–activity for 4.MD.5b Angles in Names On Core Lessons 95

* Discuss the difference between clockwise and counterclockwise. * Stress that the tip of the fraction piece must always be places at the center of the circle and that the sides of the angles must match exactly as they move the fraction piece around the circle. * Students to identify fraction turns and if a turn is clockwise or counterclockwise. * Teachers will guide children to relate degrees to fractional parts of a circle by understanding that an angle that measures 1° turn through n/360 of a circle following the lesson guidelines in On Core lesson 94 (TM p. 98), * Ask students to name some standard units that they use for measuring length, weight, and capacity. * Explain that there are also standard units for measuring the size of an angle. If necessary, review how to find a fraction equivalent to a given fraction. * Discuss the meaning of a degree. Guide students through the example of finding the degrees in 1/6th of a circle and stress that to use this method of measuring of an angle, its vertex must be at the center of the circle. * Discuss how to use the measure of an angle to classify it as acute, right, obtuse, or straight. Also explain how angle measures can be used to classify a triangle as acute, obtuse, or right. * Guide children to use a protractor to measure an angle and draw an angle with a given measure following the lesson guidelines in On Core lesson 95 (TM p. 99), * Introduce the lesson by asking students what tools they have used to measure length, weight, capacity, and temperature. * Explain that they are going to use a tool to measure the size of an angle. * Review the meaning of degree as a unit of measure for an angle. * Show students how to read a protractor and discuss its features – the center point, the two scales, and the o° mark on each side. Then guide them through the example on the top of p. 189. * Ask students why they think the top scale, not the bottom, was used to measure the angle.	Student pp. 189 – 190 K-5 Math Resources–activity for 4.MD.6 Predicting and Measuring Angles Angle Barrier Game Angles in Triangles Angles in Quadrilaterals On Core Lessons 96 - 97 Student pp. 191-194 Protractor

* Show students how to use a protractor to draw an angle when its measure is given. Give them one or two angle measures and have them draw the angles. Then give them an angle classification – acute, right, obtuse, or straight – and tell them to use the protractor to draw an angle of that type. Make sure students are lining up their protractors appropriately. * Teachers will guide children to determine the measure of an angle separated into parts and use the strategy draw a diagram to solve angle measurement problems following the lesson guidelines in On Core lessons 96 - 97 (TM pp. 100 - 101) * Introduce the lesson by reviewing how to measure an angle using a protractor. Remind students the notation m‹ABC represents "the measure of angle ABC." Explain that sometimes they can find the measure on a large angle by finding the measures of smaller angles. * Guide students through the example on p 191 and ask students to restate the conclusion in their own words. * Review how to find the measure of a large angle when the measures of its non-overlapping parts are known. Discuss how they can use this information to find the unknown measure of one of the parts. Go over the bar diagram on page 193 that shows the relationship between $x + 60° = 100°$ and $x = 110° - 60°$.	

Unit: 4.4	Title: Operations and Algebraic Thinking in Problem Solving	Days : 15 Days

Essential Questions

* How can you illustrate division of whole numbers using graphic representations?
* How can you divide 10s, 100s, and 1000s by whole numbers through 10?
* How can you use compatible numbers to estimate quotients?
* How can you use the Distributive Property to find quotients?
* How can you use partial quotients to divide by 1-digit divisors?
* Given a multiplication or division word problem, how can multiplicative comparison be used to solve it?
* How does a model help you solve a comparison problem?
* What is multiplicative comparison?
* Give an example and show or explain how it differs from additive comparison.
* How do you represent an solve a multistep word problem with whole numbers using equations with an unknown?
* How can you use the strategy draw a diagram to solve multistep multiplication problems?
* What methods can you use to assess the reasonableness of your answers?

Content to be Learned	Skills
* Solve multi-step word problems with whole numbers using the four operations. * Assess the reasonableness of answers using mental math, estimation, and rounding. * Find whole-number quotients with up to four-digit dividends and one-digit divisors. * Use properties based on place value, properties of operations, and the relationship between multiplication and division. * Illustrate and explain calculations by using equations, rectangular arrays, and/or area models. * Multiply or divide to solve word problems involving multiplicative comparison. * Use drawings and equations with a symbol for the unknown number to represent the problem.	In Lessons 39-43 students will: * Divide base-ten blocks into equal groups. * Use compatible numbers to estimate quotients. * Use area models to divide and model the Distributive Property. * Draw rectangular models and shade numbers that are subtracted. * Notice the similarity to the rectangular model for using the Distributive Property for division. Also notice that the numbers at the top of the rectangles are the partial quotients. * Students will use multiplicative comparisons to draw a model, write an equation and solve multiplication and division word problems In Lessons 4 and 5 students will: * Use Order of Operations to solve multistep problems. * Draw rings around the multiplication expressions and

	perform these first. * Use bar models to represent a comparison problem and subtract. * Multiply 2-digit numbers
Assessments	**Standards**
Teacher created assessments	NBT. 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. OA.2 Multiply or divide to solve word 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.1 OA. 3 Solve multistep word problems posed with whole numbers and having whole-number answers using the four operations, including problems in which remainders must be interpreted. Represent these problems using equations with a letter standing for the unknown quantity. Assess the reasonableness of answers using mental computation and estimation strategies including rounding.
Sample Instructional Activities	**Resources**
* Teachers will guide children to divide tens, hundreds, and thousands by whole numbers through 10, use compatible numbers to estimate quotients, use the Distributive Property, repeated subtraction, and multiples to find quotients, and use partial quotients to divide following the lesson guidelines in On Core lessons 39-41, 43 (TM pp. 41-43, 45), * Have students look for basic facts and use place value of the dividend to divide. * Explain that thinking of multiples of the divisor helps them find numbers that are close to the first two digits of the dividends. * Define the Distributive Property for division & extend the activity	On Core Lessons 39-41, 43 Student pgs. 77-82, 85-86 Base-ten blocks Graph/Grid paper K-5 Math Resources – 27 word problems involving multiplicative comparisons. On Core Lessons 4 and 5 Student pgs. 7-10

by showing students how to use an area model to divide. * Remind students that every time they multiply by the divisor, the number they multiply is a partial quotient. * Remind students they can use rectangular models to record partial quotients. *Teachers will continue to remind students that multiplication and division can be used to compare numbers. * They will give students examples of word problems using multiplicative comparisons to review the concept. * Teachers will make sure that students understand that when writing an equation, a letter like n is used to represent an unknown. *Teachers will guide children to represent & solve multistep problems using equations and use the strategy draw a diagram to solve multistep multiplication problems following the lesson guidelines in On Core lessons 4 and 5 (TM pp. 5-6) * Guide students to solve multistep equations using order of operations before having them solve multistep word problems. Encourage students to draw rings around the multiplication expressions to highlight the fact that these must be performed first. * Guide students to understand why we use multiplication to represent equal groups and have them explain how a bar model helps them solve the problem.	