Strand: Number Sense	
4.1 The student will a) read, write, and identify the place and value of each digit in a nine-digit whole number; b) compare and order whole numbers expressed through millions; and c) round whole numbers expressed through millions to the nearest thousand, ten thousand, and hundred thousand.	
Suggested Pacing	
Related Spiraling Standards	
Spiral Down 3.1 The student will a) read, write, and identify the place and value of each digit in a six-digit whole number, with and without models; b) round whole numbers, 9,999 or less, to the nearest ten, hundred, and thousand; and c) compare and order whole numbers, each 9,999 or less.	Spiral Up 5.1 The student, given a decimal through thousandths, will round to the nearest whole number, tenth, or hundredth.
Essential Questions	**Common Misconceptions**
● How do patterns in our place value number system help us read, write, compare and order, and round whole numbers? ● What are the relationship between the places in our place value system? ● How can a whole number be represented using models? ● What does it mean to round numbers, and when is it appropriate? ● What models can be used to compare and order whole numbers?	Students recognize simple multi digit numbers, such as thirty (30) or 400 (four hundred), but they do not understand that the position of a digit determines its value. Students under generalize results of multiplication by powers of 10 and do not understand that shifting digits to higher place values is like multiplying by powers of 10. Students apply the alternate conception “Write the numbers you hear” when writing numbers in standard form when given the number in words.

● What are strategies for comparing and ordering whole numbers? ● What models can be used to round whole numbers? ● What are strategies for rounding whole numbers? ● How can identifying the range of numbers that round to a given place value be determined?	Students misapply the rule for "rounding down" and actually lower the value of the digit in the designated place. Students misapply the rule for "rounding up" and change the digit in the designated place while leaving digits in smaller places as they are.
Understanding the Standard	**Essential Knowledge and Skills**
● The structure of the base-ten number system is based upon a simple pattern of tens, in which the value of each place is ten times the value of the place to its right. ● Place value refers to the value of each digit and depends upon the position of the digit in the number. For example, in the number 7,864,352, the 8 is in the hundred thousand place, and the value of the 8 is eight hundred thousand or 800,000. ● Whole numbers may be written in a variety of forms: – Standard: 1,234,567 – Written: one million, two hundred thirty-four thousand, five hundred sixty-seven – Expanded:(1,000,000 + 200,000 + 30,000 + 4,000 + 500 + 60 + 7) ● Numbers are arranged into groups of three places called periods (ones, thousands, millions). The value of the places within the periods repeat (hundreds, tens, ones). Commas are used to separate the periods. Knowing the value of the place and period of a number helps students determine values of digits in any number as well as read and write numbers. Students at this level will work with numbers through the millions period (nine-digit numbers).	**The student will use problem solving, mathematical communication, mathematical reasoning, connections, and representations to** ● Read nine-digit whole numbers, presented in standard form and represent the same number in written form. (a) ● Write nine-digit whole numbers in standard form when the numbers are presented orally or in written form. (a) ● Identify and communicate, orally and in written form, the place and value for each digit in a nine-digit whole number. (a) ● Compare two whole numbers expressed through millions, using the words greater than, less than, equal to, and not equal to or using the symbols >, <, =, or ≠. (b) ● Order up to four whole numbers expressed through millions. (b) ● Round whole numbers expressed through millions to the nearest thousand, ten thousand, and hundred thousand place. (c) ● Identify the range of numbers that round to a given thousand, ten thousand, and hundred thousand. (c)

• Reading and writing large numbers should be meaningful for students. Experiences can be provided that relate practical situations (e.g., numbers found in the students' environment including population, number of school lunches sold statewide in a day, etc.). • Concrete materials such as base-ten blocks or bundles of sticks may be used to represent whole numbers through thousands. Larger numbers may be represented by digit cards and place value charts or on number lines. • Number lines are useful tools when developing a conceptual understanding of rounding with whole numbers. When given a number to round, locate it on the number line. Next, determine the closest multiples of thousand, ten-thousand, or hundred-thousand it is between. Then, identify to which it is closer. • Mathematical symbols (>, <) used to compare two unequal numbers are called inequality symbols.	
Vocabulary	**Instructional Activities Organized by Learning Objective**
ten million hundred million ten thousand million thousand compare ones hundreds tens order order place value written form nearest expanded form place greater than less than equal to range	**Textbook** **4.1a** enVision Math: Lesson 1-1 Thousands (Problem of the Day, Spiral Review, Problem Based Interactive Learning,Visual Learning,Intervention, Reteaching Master, Practice Master, Enrichment Master, Quick Check) enVision Math: Lesson 1-2 Millions (Problem of the Day, Spiral Review, Problem Based Interactive Learning,Visual Learning, Intervention, Reteaching Master, Practice Master, Enrichment Master, Quick Check)

hundred thousand round standard form whole number **Assessment** **Powerschool** – Exam identifier	enVision Math: Ready-Made Centers for Differentiated Instruction 1-1, 1-.2 **4.1b** enVision Math: Lesson 1-3 Comparing and Ordering Whole Numbers (Problem of the Day, Spiral Review, Problem Based Interactive Learning,Visual Learning, Intervention, Reteaching Master, Practice Master, Enrichment Master, Quick Check) enVision Math: Ready-Made Centers for Differentiated Instruction 1-3 **4.1c** enVision Math: Lesson 1-4 Rounding Whole Numbers (Problem of the Day, Spiral Review, Problem Based Interactive Learning,Visual Learning, Intervention, Reteaching Master, Practice Master, Enrichment Master, Quick Check) enVision Math: Ready-Made Centers for Differentiated Instruction 1-4 **Eureka Math** **4.1a** Grade 4 Module 1 Topic A: Place Value of Multi-Digit Whole Numbers Grade 4 Module 3 Topic B: Multiplication by 10, 100, and 1,000 **4.1b** Grade 4 Module 1 Topic A: Place Value of Multi-Digit Whole Numbers Grade 4 Module 1 Topic B: Comparing Multi-Digit Whole Numbers **4.1c** Grade 4 Module 1 Topic C: Rounding Multi-Digit Whole Numbers

	Notes **Interactive Notebooks Math Grade 4** Place Value, pp.12-13 Word Form, pp. 14-15 Comparing and Ordering Numbers, pp.16-17 Rounding Numbers pg. 18-19 **Resources** ● **Print** **FACEing MATH: Elementary Math** Lesson 1: Reading Whole Numbers and Understand Place Value (a) Lesson 2: Rounding and Expanded Notation (c) **Teaching Student-Centered Mathematics 3-5 (2006)** **4.1** Activity 2.8 What Comes Next (a) Activity 2.7 Is It Reasonable? (c) **Performance Task** ● **Card Task Place Value (a,b)** ● **Technology-based** **aaamath** ● **Place Value (a)** **mathcats** ● **Really Big Numbers (a)** **PowerPoint** ● **Place Value (a)** **Discovery Education** ● **Place Value (a)** ● **Comparing Numbers (b)** **BrainPOP**

	• **Rounding (c)** **Mathnook** • **Place Value, Compare and Order (a,b)** **Sheppardsoftware** • **Comparing Numbers (b)** **abcya** • **Rounding (c)** **learnzillion** • **Rounding (c)** **Flocabulary** • **Rounding Numbers** **Station Activities/Manipulatives** 0-9 Cubes Given 0-9 cubes, the students will toss/roll to create the largest/smallest 8 digit number that is possible. The students will write their numbers in a place value chart. (a,b) Place Value Cubes Using place value cubes, students will roll/toss to create a number, write the number in word form, standard form and record the number in a place value chart. **(a)** Foam Base 10s Given a model of one whole, students will use foam base-10 models to build numbers that are written in standard form. **(a)** Base 10 Magnetic Kits Given a whole number using the magnetic Base-10s, student groups will build a different model of the same number, using the foam Base 10s **(a)**
Cross-Curricular Connections	**Differentiation**

How Much Is a Million? by David Schwartz Have students figure out how many stars there would be on a page if there were 70 pages. Read Aloud **A Million Dots** by Andrew Clements Use the book to help students make connections with place value. Ask students to compare a few of the examples using the <,>, and = sign. **One Grain of Rice: a Mathematical Folktale** by Demi **Read Aloud**	**Mathabc** • **Counting up to 1,000,000 + (a)** • **Value of Numbers (a)** • **Rounding (c)** **Instructional Activities and Resources(Printables)** • **Place Value (a)** • **Word to Standard Form(a)** • **Word Form Match (a)** • **Biggest Smallest Game (b)** • **Ordering Whole Number Sorts(b)** • **Greatest Least Compare Activity (b)** • **Digit Change (a)** • **Rounding Numbers in Context (c)**

Strand: Number Sense	
4.2 The student will a) compare and order fractions and mixed numbers, with and without models;* b) represent equivalent fractions;* and c) identify the division statement that represents a fraction, with models and in context. *On the state assessment, items measuring this objective are assessed without the use of a calculator.	
Suggested Pacing	
Related Spiraling Standards	
Spiral Down 3.2 The student will a) name and write fractions and mixed numbers represented by a model; b) represent fractions and mixed numbers, with models and symbols; and c) compare fractions having like and unlike denominators, using words and symbols (>, <, =, or ≠), with models.	Spiral Up 5.2 The student will a) represent and identify equivalencies among fractions and decimals, with and without models; * and b) compare and order fractions, mixed numbers, and/or decimals, in a given set, from least to greatest and greatest to least.* *On the state assessment, items measuring this objective are assessed without the use of a calculator.
Essential Questions	**Common Misconceptions**
● How can we use fractions to describe everyday situations? ● How can fractions (including mixed numbers) be modeled as parts of a whole, as parts of a set, and as locations on a number line? ● What are benchmarks, and how can they be used to compare and order fractions?	Students write fraction as part/part instead of part/whole. Students do not understand that when finding fractions of amounts, lengths, or areas, the parts need to be equal in size. Students think that when finding fractions using area models, the equal-sized pieces must look the same.

● What are some strategies for comparing fractions? (using a benchmark, same size parts, same number of parts, using equivalent fractions) ● How does a fraction represent division? ● What is a context for identifying the division statement that represents a fraction? ● How can a model be used to represent a fraction as a division statement?	Students think that mixed numbers are larger than improper fractions because mixed numbers contain a whole number part and whole numbers are larger than fractions. Students have restricted their definitions and think fractions have to be less than 1. Students overgeneralize the idea that "the bigger the denominator, the smaller the part" by ignoring numerators when they compare fractions. Students interpret fractions inappropriately and do not understand that different fractions can name the same amount and are equivalent.
Understanding the Standard	**Essential Knowledge and Skills**
● A fraction is a way of representing part of a whole region (i.e., an area model), part of a group (i.e., a set model), or part of a length (i.e., a measurement model). ● In the area and length/measurement fraction models, the parts must be equivalent. ● In a set model, each member of the set is an equivalent part of the set. In set models, the whole needs to be defined, but members of the set may have different sizes and shapes. For instance, if a whole is defined as a set of 10 animals, the animals within the set may be different. For - example, students should be able to identify monkeys as representing $\frac{1}{2}$ of the animals in the following set.	**The student will use problem solving, mathematical communication, mathematical reasoning, connections, and representations to** ● Compare and order no more than four fractions having like and unlike denominators of 12 or less, using concrete and pictorial models. (a) ● Use benchmarks (e.g., 0, $\frac{1}{2}$ or 1) to compare and order no more than four fractions having unlike denominators of 12 or less. (a) ● Compare and order no more than four fractions with like denominators of 12 or less by comparing number of parts (numerators) (e.g., $\frac{1}{5} < \frac{3}{5}$). (a) ● Compare and order no more than four fractions with like numerators and unlike denominators of 12 or less by comparing the size of the parts (e.g., $\frac{1}{9} < \frac{3}{5}$). (a)

- Proper fractions, improper fractions, and mixed numbers are terms often used to describe fractions. A proper fraction is a fraction whose numerator is less than the denominator. An improper fraction is a fraction whose numerator is equal to or greater than the denominator. An improper fraction may be expressed as a mixed number. A mixed number is written with two parts: a whole number and a proper fraction (e.g., $3\frac{5}{8}$)
- The value of a fraction is dependent on both the number of equivalent parts in a whole (denominator) and the number of those parts being considered (numerator).
- The more parts the whole is divided into, the smaller the parts (e.g., $\frac{1}{5} < \frac{1}{3}$).
- When fractions have the same denominator, they are said to have "common denominators" or "like denominators." Comparing fractions with like denominators involves comparing only the numerators.
- Strategies for comparing fractions having unlike denominators may include:

  – comparing fractions to familiar benchmarks (e.g., 0, $\frac{1}{2}$, 1);

  – determining equivalent fractions, using models such as fraction strips, number lines, fraction circles, rods, pattern blocks, cubes, base-ten blocks, tangrams, graph paper, or patterns in a multiplication chart; and

  – determining a common denominator by determining the least common multiple (LCM) of both denominators and then

- Compare and order no more than four fractions (proper or improper), and/or mixed numbers, having denominators of 12 or less. (a)
- Use the symbols >, <, =, and ≠ to compare fractions (proper or improper) and/or mixed numbers having denominators of 12 or less. (a)
- Represent equivalent fractions through twelfths, using region/area models, set models, and measurement/length models. (b)
- Identify the division statement that represents a fraction with models and in context (e.g., $\frac{3}{5}$ means the same as 3 divided by 5 or $\frac{3}{5}$ represents the amount of muffin each of five children will receive when sharing 3 muffins equally). (c)

rewriting each fraction as an equivalent fraction, using the LCM as the denominator.

- A variety of fraction models should be used to expand students' understanding of fractions and mixed numbers:
  – Region/area models: a surface or area is subdivided into smaller equal parts, and each part is compared with the whole (e.g., fraction circles, pattern blocks, geoboards, grid paper, color tiles).
  – Set models: the whole is understood to be a set of objects, and subsets of the whole make up fractional parts (e.g., counters, chips).
  – Measurement models: similar to area models but lengths instead of areas are compared (e.g., fraction strips, rods, cubes, number lines, rulers).
- Equivalent fractions name the same amount. Students should use a variety of representations and models to identify different names for equivalent fractions.
- When presented with a fraction $\frac{3}{5}$ representing division, the division expression representing the fraction is written as 3 ÷ 5.
- When presented with a fraction $\frac{3}{5}$ representing division, the division expression representing the fraction is written as 3 ÷ 5.

Vocabulary			
compare	like denominators	equivalent	denominators
order	mixed numbers	numerator	division statement
whole	improper fraction	greater than	
part	proper fraction	less than	area model

Instructional Activities Organized by Learning Objective

Textbook
4.2a
enVision Math: Lesson 10-6 Improper Fractions and Mixed Numbers (Problem of the Day, Spiral Review, Problem Based Interactive Learning, Visual Learning, Intervention, Reteaching Master, Practice Master, Enrichment Master, Quick Check)

least unlike denominators equal to **Assessment** **Powerschool** – Exam identifier	enVision Math: Lesson 10-7 Comparing Fractions (Problem of the Day, Spiral Review, Problem Based Interactive Learning, Visual Learning, Intervention, Reteaching Master, Practice Master, Enrichment Master, Quick Check) enVision Math: Lesson 10-8 Ordering Fractions (Problem of the Day, Spiral Review, Problem Based Interactive Learning, Visual Learning, Intervention, Reteaching Master, Practice Master, Enrichment Master, Quick Check) enVision Math: Ready-Made Centers for Differentiated Instruction 10-6, 10-7, 10-8 **4.2b** enVision Math: Lesson 10-1 Regions and Sets (Problem of the Day, Spiral Review, Problem Based Interactive Learning, Visual Learning,, Intervention, Reteaching Master, Practice Master, Enrichment Master, Quick Check) enVision Math: Lesson 10-4 Equivalent Fractions (Problem of the Day, Spiral Review, Problem Based Interactive Learning, Visual Learning, Algebra Connection, Intervention, Reteaching Master, Practice Master, Enrichment Master, Quick Check) enVision Math: Lesson 10-5 Fractions in Simplest Form (Problem of the Day, Spiral Review, Problem Based Interactive Learning, Visual Learning, Intervention, Reteaching Master, Practice Master, Enrichment Master, Quick Check) enVision Math: Ready-Made Centers for Differentiated Instruction 10-1, 10-4, 10-5, **4.2c** enVision Math: Lesson 10-2 Fractions and Division (Problem of the Day, Spiral Review, Problem Based Interactive Learning, Visual

	Learning, Algebra Connection, Intervention, Reteaching Master, Practice Master, Enrichment Master, Quick Check) enVision Math: Ready-Made Centers for Differentiated Instruction 10-2 **Eureka Math** **4.2a** Grade 4 Module 5 Topic C: Fraction Comparison Grade 4 Module 5 Lesson 26: Compare fractions greater than 1 by reasoning using benchmark fractions. Grade 4 Module 5 Lesson 27: Compare fractions greater than 1 by creating common numerators or denominators. Grade 4 Module 5 Lesson 28: Solve word problems with line plots. **4.2b** Grade 4 Module 5 Topic A: Decomposition and Fraction Equivalence Grade 4 Module 5 Topic B: Fraction Equivalence Using Multiplication and Division **4.2c** Grade 5 Module 4 Topic B: Fraction as Division **Notes** **Interactive Notebooks Math Grade 3** Equivalent Fractions, pp. 46-47 Comparing Fractions, pp. 48-49 **Interactive Notebooks Math Grade 4** Equivalent Fractions, pp. 32-33 **Interactive Notebooks Math Grade 5**

	Fractions as Division, pp. 34-35 **Resources** ● **Print** **Teaching Student-Centered Mathematics 3-5 (2014)** **4.2** Activity 12.9 On The Line (a) Activity 12.10 Zero, One-half, or One (a) Activity 12.11 Close Fractions (a) Activity 12.12 Different Fillers (a) Activity 12.17 Ordering Unit Fraction (a) Activity 12.22 Who is Winning? (a) Activity 12.5 How Far Did She Go? (a) Activity 12.6 More, Less or Equal to One Whole (a) Activity 12.14 Apples and Bananas (b) --includes suggestions for students who are ELLs and SWD Activity 12.15 Missing-Number Equivalencies (b) Activity 12.16 Garden Plots (b**)** **Nimble with Numbers Grades 4 and 5:** Finding Fractions (a) ● **Technology-based** **Gizmos** ● **Fraction Garden (Comparing Fractions (a)** ● **Modeling Fractions (Area Models)** (a) ● **Fraction Artist** (b) ● **Equivalent Fractions (b)** ● **Toy Factory (a,b)** **abcya** ● **Fraction Fling** (b) ● **Fraction Climb** (a)

	Math Playground ● **Math Monster Comparing Fractions (a)** **Math Zillion** ● **Compare Fractions Using a Numberline (a) (Video)** **Khanacademy** ● **Comparing Fractions Unlike Denominators (a)** ● **Comparing Fractions Unlike Denominators (a)** ● **Ordering Fractions (a)** ● **Equivalent Fractions (b)** **Visual Fractions** ● **Identify, Compare (a,b)** **Splashmath** ● **Fraction Games (a,b)** **Smart Exchange** ● **Fractions (a,b)** **Flocabulary** ● **Fractions (a)** ● **Equivalent Fractions (b)** **Fraction Bars Interactive Games** ● **Fraction Games (a,b)** **Station Activities/Manipulatives** Fraction Number Line Using a blank fraction number line label with benchmarks 0, ½, and 1, students will place any given fraction in the correct place on the number line and give a justification for its placement. (a) Using all three fraction number lines, students will compare fractions as >, <, =, or ≠. (a) Using a blank fraction number line, students will correctly display the fractions indicated. (a) Fraction Cubes

	Students will roll fraction cubes to generate four fractions, then use a blank Student Write & Wipe number line to put the fractions in order from least to greatest and vice versa. (a) <u>Linking Cubes</u> Given two different colored linking cubes, students will create a square/rectangle and identify the fractional part for each color used. (a) <u>Square Tiles</u> Given two different colored square tiles, students will create a square/rectangle and identify the fractional part for each color used. (a) <u>0-9 Cubes/Foam Cubes 1-6</u> Given number cubes, students will roll/toss the cubes to create four fractions to compare and order from greatest to least. (a) <u>Pattern Blocks</u> Using pattern blocks, students will identify the relationship of the blocks as fractional parts of a whole with the yellow hexagon having a value of 1 whole. (a) <u>Fraction Tiles</u> Using fraction tiles, students will find equivalent fractions with unlike denominators and label them on a fraction number line.(b) <u>Fraction Circles</u> Using fraction circles, students will find equivalent fractions with unlike denominators and label them on a fraction number line. (b)
Cross-Curricular Connections	**Differentiation**

Ed Emberley's Picture Pie: A Circle Drawing Book by Ed Emberley Create pictures with fraction circle pieces and compare pictures. **Activity** **Full House: An Invitation to Fractions** by Dayle Ann Dodds **Activity** **Inchworm and a Half** by Elinor Pinczes Students create a ruler adding in the fractions. Read Aloud	**Multilingual Glossary** **mathabc** • **Fractions with Pictures (a)** **Instructional Activities and Resources** • **Mixed Numbers on the Numberline(a)** • **Math Arrays for Comparing Fractions (a)** • **Order Fractions with Benchmarks (a)** • **Fun with Fractions (b)** • **Equivalent Fractions (b)** • **Equivalent Fractions Cards (b)** • **Changing Fractions 2 (b)** • **Fractions as Division Statements ©** **Interactive Instructional Lessons** • **Math Live**

Strand: Number Sense	
4.3 The student will a) read, write, represent, and identify decimals expressed through thousandths; b) round decimals to the nearest whole number; c) compare and order decimals; and d) given a model, write the decimal and fraction equivalents.* *On the state assessment, items measuring this objective are assessed without the use of a calculator.	
Suggested Pacing	
Related Spiraling Standards	
Spiral Down 3.1 The student will a) read, write, and identify the place and value of each digit in a six-digit whole number, with and without models; b) round whole numbers, 9,999 or less, to the nearest ten, hundred, and thousand; and c) compare and order whole numbers, each 9,999 or less.	Spiral Up 5.1 The student, given a decimal through thousandths, will round to the nearest whole number, tenth, or hundredth. 5.2 The student will a) represent and identify equivalencies among fractions and decimals, with and without models; * and b) compare and order fractions, mixed numbers, and/or decimals, in a given set, from least to greatest and greatest to least.* *On the state assessment, items measuring this objective are assessed without the use of a calculator.
Essential Questions	**Common Misconceptions**

● How do patterns in our place value number system help us read, write, compare and order, and round decimal numbers? ● What are the relationship between the places in our place value system? ● How can a decimal number be expressed using models? ● What does it mean to round decimal numbers, and when is it appropriate? ● How is rounding decimal numbers similar to or different from rounding whole numbers? ● What models can be used to round decimal numbers? ● What are strategies for rounding decimal numbers? ● What models can be used to compare and order decimal numbers? ● What are strategies for comparing and ordering decimal numbers? ● What is the relationship between fractions and decimals? ● How can the relationship between fractions and decimals be modeled?	Students misapply knowledge of whole numbers when reading decimals and ignore the decimal point. Students misapply the procedure for rounding whole numbers when rounding decimals. Students round to the nearest ten instead of the nearest tenth, etc. Students misapply rules for comparing whole numbers in decimal situations. Students think that decimals with more digits are smaller because tenths are bigger than hundredths and thousandths. Students think that decimals with more digits are larger because they have more numbers. Students believe that zeros placed to the right of the decimal number changes the value of the number. Students do not use zero as a placeholder when ordering numbers or finding numbers between given decimals that have different numbers of significant digits.
Understanding the Standard	**Essential Knowledge and Skills**

• Decimal numbers expand the set of whole numbers and, like fractions, are a way of representing part of a whole. • The structure of the base-ten number system is based upon a simple pattern of tens, where each place is ten times the value of the place to its right. This is known as a ten-to-one place value relationship (e.g., in 2.35, 3 is in the tenths place since it takes ten one-tenths to make one whole). Use base-ten proportional manipulatives, such as place value mats/charts, decimal squares, base ten blocks, meter sticks, as well as the ten-to-one non-proportional model, money, to investigate this relationship • A decimal point separates the whole number places from the places that are less than one. A number containing a decimal point is called a decimal number or simply a decimal. • To read decimals, – read the whole number to the left of the decimal point; – read the decimal point as "and"; – read the digits to the right of the decimal point just as you would read a whole number; and – say the name of the place value of the digit in the smallest place. • Any decimal less than 1 will include a leading zero. For example 0.125 which can be read as "zero and one hundred twenty-five thousandths" or as "one hundred twenty-five thousandths." • Decimals may be written in a variety of forms: – Standard: 26.537 – Written: twenty-six and five hundred thirty-seven thousandths – Expanded: 20 + 6 + 0.5 + 0.03 + 0.007. • Strategies for rounding whole numbers can be applied to rounding - decimals.	**The student will use problem solving, mathematical communication, mathematical reasoning, connections, and representations to** • Read and write decimals expressed through thousandths, using base-ten manipulatives, drawings, and numerical symbols. (a) • Represent and identify decimals expressed through thousandths, using base-ten manipulatives, pictorial representations, and numerical symbols (e.g., relate the appropriate drawing to 0.05). (a) • Investigate the ten-to-one place value relationship for decimals through thousandths, using base-ten manipulatives (e.g., place value mats/charts, decimal squares, and base-ten blocks). (a) • Identify and communicate, both orally and in written form, the position and value of a decimal through thousandths (e.g., given 0.385, the 8 is in the hundredths place and has a value of 0.08.(a) • Round decimals expressed through thousandths to the nearest whole number. (b) • Compare two decimals expressed through thousandths, using symbols (>, <, =, and ≠) and/or words (greater than, less than, equal to, and not equal to).(c) • Order a set of up to four decimals, expressed through thousandths, from least to greatest or greatest to least. (c) • Represent fractions for halves, fourths, fifths, and tenths as decimals through hundredths, using concrete objects. (d) • Relate fractions to decimals, using concrete objects (e.g., 10-by-10 grids, meter sticks, number lines, decimal squares, decimal circles, money). (d) • Write the decimal and fraction equivalent for a given model (e.g., $\frac{1}{4}$ = 0.25 or 0.25 = $\frac{1}{4}$; 1.25 = $\frac{5}{4}$ or 1 $\frac{1}{4}$). (d)

- Number lines are useful tools when developing a conceptual understanding of rounding with decimals. When given a decimal to round to the nearest whole or ones place, locate it on the number line. Next, determine the two whole numbers it is between. Then, identify to which it is closer.
- Base-ten models concretely relate fractions to decimals (e.g., 10-by-10 grids, meter sticks, number lines, decimal squares, decimal circles, money).
- Decimals and fractions represent the same relationships; however, they are presented in two different forms. The decimal 0.25 is written as $\frac{1}{4}$. Decimal numbers are another way of writing fractions.

Vocabulary

decimal point	compare	tenths	decimal	fraction
mixed numbers	equivalent	order	thousandths	hundredths
whole number	round	greatest	least	equivalent
greater than	less than	equal to		

Assessment

Powerschool – Exam identifier

Instructional Activities Organized by Learning Objective

Textbook
4.3a
enVision Math: Lesson 12-1 Decimal Place Value (Problem of the Day, Spiral Review, Problem Based Interactive Learning, Visual Learning, Algebra Connection, Intervention, Reteaching Master, Practice Master, Enrichment Master, Quick Check)

enVision Math: Ready-Made Centers for Differentiated Instruction 12-1,
4.3b
enVision Math: Lesson 13-1 Rounding Decimals (Problem of the Day, Spiral Review, Problem Based Interactive Learning, Visual Learning, Algebra Connection, Intervention, Reteaching Master, Practice Master, Enrichment Master, Quick Check)

enVision Math: Ready-Made Centers for Differentiated Instruction 13-1**,**

	4.3c enVision Math: Lesson 12-2 Comparing and Ordering Decimals (Problem of the Day, Spiral Review, Problem Based Interactive Learning, Visual Learning, Algebra Connection, Intervention, Reteaching Master, Practice Master, Enrichment Master, Quick Check) enVision Math: Ready-Made Centers for Differentiated Instruction 12-2 **4.3d** enVision Math: Lesson 12-3 Fractions and Decimals (Problem of the Day, Problem Based Interactive Learning, Develop the Concept, Center Activity, Reteaching Master, Quick Check, The Language of Math) enVision Math: Lesson 12-4 Fractions and Decimals on the Number Line (Problem of the Day, Spiral Review, Problem Based Interactive Learning, Visual Learning, Intervention, Reteaching Master, Practice Master, Enrichment Master, Quick Check) enVision Math: Ready-Made Centers for Differentiated Instruction 12-3, 12.4 **Eureka Math** **4.3a** Grade 4 Module 6: Decimal Fractions **4.3b** Grade 5 Module 1 Topic C: Place Value and Rounding Decimal Fractions

	4.3c Grade 4 Module 6 Topic C: Decimal Comparison **4.3d** Grade 4 Module 6: Decimal Fractions **Notes** **<u>Interactive Notebooks Math Grade 4</u>** Comparing and Ordering Decimals, pp. 40-41 **<u>Interactive Notebooks Math Grade 5</u>** Reading and Writing Decimals, pp. 20-21 Rounding Decimals, pp.24-15 Comparing and Ordering Decimals, pp. 22-23 Relating Fractions and Decimals, pp. 38-39 **Resources** ● **Print** **<u>Teaching Student-Centered Mathematics 3-5 (2006)</u>** **<u>4.3</u>** Activity 7.1 The Decimal Names the Unit (a) Activity 7.10 Close "Nice" Numbers (b) Activity 7.9 Line 'Em Up (c) Activity 7.2 Base-Ten Fractions to Decimals (d) Activity 7.4 Friendly Fractions to Decimals (d) Activity 7.5 Estimate, Then Verify (d) Activity 7.6 Decimals on a Friendly Fraction Line (d) ● **Technology-based**

	Gizmos ● **Modeling Decimals (Area and Grid Models (a)** ● **Comparing and Ordering Decimals (c)** ● **Treasure Hunter (Decimals on the Number Line)** (a) **Discovery Education** ● **Reading and Writing Decimals (a)** ● **Rounding Decimals** (b) **Studyjams** ● **Place Value of Decimals** (a) ● **Rounding Decimals (b)** ● **Fraction and Decimal Equivalents** (d) **BrainPop** ● **Decimals (a,c)** **Math Zillion** ● **Comparing Fraction and Decimals Through Hundredths Place (c) (Video Lesson)** **Flocabulary** ● **Decimals (a)** **Decimal Squares Interactive Games internet explorer(a,b)** **Station Activities/Manipulatives** Foam Base 10s - Given a model of one whole, students will use foam base 10 models to build decimal numbers that are written in standard form. (a) Magnetic Base 10s - Given a decimal number using the magnetic Base 10s, student groups will build a different model of the same number, using the foam Base 10s. (a) Classroom Money Kit - Using half-dollars, quarters, dimes and nickels, students will make connections between fractions and decimals by determining what

	money amount represents ½, ¼, ¾, etc of a dollar and color the value amount on a 10x10 grid. (d) Decimal Tiles Using decimal tiles, the students will create a given decimal number and then create another decimal number to determine if they are equivalent. (a) Decimal Cubes Students will a roll decimal cube to generate a number and then round the number to the nearest whole number. (b)
Cross-Curricular Connections	**Differentiation**
MacMillan Book of Baseball Stories by Terry Egan and Stan Friedmann Use baseball averages to read, write, round and compare decimals. **Piece=Part=Portion** By Scott Gifford Read Aloud **Ed Emberley's Picture Pie: A Circle Drawing Book** by Ed Emberley **Activity** **Baseball's Best: Five True Stories** by Andrew Gutelle Use baseball averages to read, write, round, and compare decimals. **Activity** Have the students compare batting averages for players on the Flying Squirrels team and find batting averages that would round to a given number.	**mathabc** • Decimal Numbers **(a)** • Comparing Decimals (Video) **(c)** • Decimals on Number Lines **(d)** **Instructional Activities and Resources** • Decimal in Words **(a)** • Decimal Name that Place **(a)** • Rounding Decimals **(b)** • Rounding Decimals True False Sort **(b)** • Comparing Decimals Sort **(c)** **Interactive Instructional Lessons** • Math Live

Strand: Number Sense	
4.4 The student will a) demonstrate fluency with multiplication facts through 12 × 12, and the corresponding division facts;* b) estimate and determine sums, differences, and products of whole numbers;* c) estimate and determine quotients of whole numbers, with and without remainders;* and d) create and solve single-step and multistep practical problems involving addition, subtraction, and multiplication, and single-step practical problems involving division with whole numbers. *On the state assessment, items measuring this objective are assessed without the use of a calculator.	
Suggested Pacing	
Related Spiraling Standards	
Spiral Down	Spiral Up
3.3 The student will a) estimate and determine the sum or difference of two whole numbers; and b) create and solve single-step and multistep practical problems involving sums or differences of two whole numbers, each 9,999 or less. 3.4 The student will a) represent multiplication and division through 10 × 10, using a variety of approaches and models; b) create and solve single-step practical problems that involve multiplication and division through 10 × 10; c) demonstrate fluency with multiplication facts of 0, 1, 2, 5, and 10; and	5.3 The student will a) identify and describe the characteristics of prime and composite numbers; and b) identify and describe the characteristics of even and odd numbers. 5.4 The student will create and solve single-step and multistep practical problems involving addition, subtraction, multiplication, and division of whole numbers.

d) solve single-step practical problems involving multiplication of whole numbers, where one factor is 99 or less and the second factor is 5 or less.	
Essential Questions	**Common Misconceptions**
● How can we use the inverse relationships between addition and subtraction and multiplication and division to solve problems? ● When is it more appropriate to estimate sums, differences, products, and/or quotients than to compute them? ● What are some strategies to use to estimate sums, differences, products, and/or quotients, and how do we decide which to use? ● What situations call for the computation of sums, differences, products, and/or quotients? ● How can place value understandings be used to devise strategies to compute sums, differences, products, and/or quotients? ● How does the problem situation help us make sense of remainders in division? ● How can we use number sense to determine the reasonableness of an estimation or computation?	Students know how to add but do not know when to add (other than because they are told to do so, or because the computation was written as an addition problem). Students see addition and subtraction as discrete and separate operations. Their conception of the operations does not include the fact that they are linked as inverse operations. When adding or subtracting, students misapply the procedure for regrouping. When subtracting, students overgeneralize from previous learning and “subtract the smaller number from the larger one” digit by digit. When adding and subtracting numbers, students do not line up the numbers correctly according to place value. Students add and subtract from left to right. Students see multiplication and division as discrete and separate operations. Their conception of the operations does not include the fact that they are linked as inverse operations. Students know how to multiply but do not know when to multiply (other than because they are told to do so, or because the computation was written as a multiplication problem).

	Students know how to divide but do not know when to divide (other than because they are told to do so, or because the computation was written as a division problem). Students generalize what they have learned about single-digit multiplication and apply it to multi-digit multiplication by multiplying each column as a separate single-digit multiplication. Students misapply the procedure for multiplying multi-digit numbers by ignoring place value. Students misapply the procedure for regrouping when multiplying
Understanding the Standard	**Essential Knowledge and Skills**

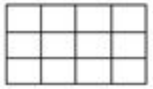
- Computational fluency is the ability to think flexibly in order to choose appropriate strategies to solve problems accurately and efficiently.
- The development of computational fluency relies on quick access to number facts. There are patterns and relationships that exist in the facts. These relationships can be used to learn and retain the facts.
- A certain amount of practice is necessary to develop fluency with computational strategies; however, the practice must be motivating and systematic if students are to develop fluency in computation, whether mental, with manipulative materials, or with paper and pencil.
- In grade three, students developed an understanding of the meanings of multiplication and division of whole numbers through activities and practical problems involving equal-sized groups, arrays, and length models. In addition, grade three students have worked on fluency of facts for 0, 1, 2, 5, and 10.
- Three models used to develop an understanding of multiplication include:

– The equal-sets or equal-groups model lends itself to sorting a variety of concrete objects into equal groups and reinforces the concept of multiplication as a way to find the total number of items in a collection of groups, with the same amount in each group, and the total number of items can be found by repeated addition or skip counting.

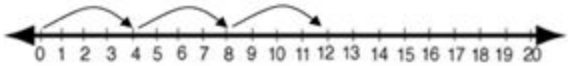
The student will use problem solving, mathematical communication, mathematical reasoning, connections, and representations to

- Demonstrate fluency with multiplication through 12 × 12, and the corresponding division facts. (a)
- Estimate whole number sums, differences, products, and quotients, with and without context. (b, c)
- Apply strategies, including place value and the properties of addition to determine the sum or difference of two whole numbers, each 999,999 or less. (b)
- Apply strategies, including place value and the properties of multiplication and/or addition, to determine the product of two whole numbers when both factors have two digits or fewer. (b)
- Apply strategies, including place value and the properties of multiplication and/or addition, to determine the quotient of two whole numbers, given a one-digit divisor and a two- or three-digit dividend, with and without remainders. (c)
- Refine estimates by adjusting the final amount, using terms such as closer to, between, and a little more than. (b, c)
- Create and solve single-step and multistep practical problems involving addition, subtraction, and multiplication with whole numbers. (d)
- Create and solve single-step practical problems involving division with whole numbers. (d)
- Use the context in which a practical problem is situated to interpret the quotient and remainder. (d)

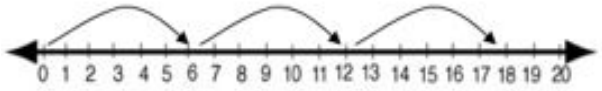
– The array model, consisting of rows and columns (e.g., three rows of four columns for a 3-by-4 array), helps build an understanding of the commutative property.



– The length model (e.g., a number line) also reinforces repeated addition or skip counting.



- There is an inverse relationship between multiplication and division.
- The number line model can be used to solve a multiplication problem such as 3 ´ 6. This is represented on the number line by three jumps of six or six jumps of three, depending on the context of the problem.



- The number line model can be used to solve a division problem such as 6 ÷ 3 and is represented on the number line by noting how many jumps of three go from 6 to 0.

• The number line model above shows two jumps of three between 6 and 0, answering the question of how many jumps of three go from 6 to 0; therefore, 6 ÷ 3 = 2. • In order to develop and use strategies to learn the multiplication facts through the twelves table, students should use concrete materials, a hundreds chart, and mental mathematics. Strategies to learn the multiplication facts include an understanding of multiples, properties of zero and one as factors, commutative property, and related facts. Investigating arithmetic operations with whole numbers helps students learn about the different properties of arithmetic relationships. These relationships remain true regardless of the whole numbers. • Grade four students should explore and apply the properties of addition and multiplication as strategies for solving addition, subtraction, multiplication, and division problems using a variety of representations (e.g., manipulatives, diagrams, and symbols). • The properties of the operations are "rules" about how numbers work and how they relate to one another. Students at this level do not need to use the formal terms for these properties but should utilize these properties to further develop flexibility and fluency in solving problems. The following properties are most appropriate for exploration at this level: – The identity property of addition states that if zero is added to a given number, the sum is the same as the given number. The identity property of multiplication states that if	

a given number is multiplied by one, the product is the same as the given number.

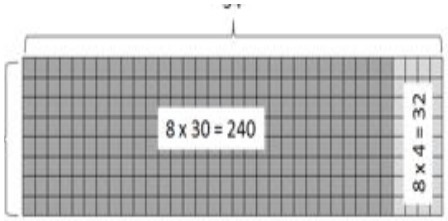
– The commutative property of addition states that changing the order of the addends does not affect the sum (e.g., 24 + 136 = 136 + 24). Similarly, the commutative property of multiplication states that changing the order of the factors does not affect the product (e.g., 12 ´ 43 = 43 ´ 12).

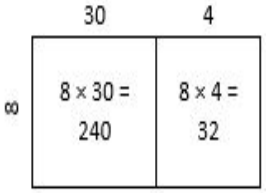
– The associative property of addition states that the sum stays the same when the grouping of addends is changed (e.g., 15 + (35 + 16) = (15 + 35) + 16). The associative property of multiplication states that the product stays the same when the grouping of factors is changed [e.g., 16 ´ (40 ´ 5) = (16 ´ 40) ´ 5].

– The distributive property states that multiplying a sum by a number gives the same result as multiplying each addend by the number and then adding the products. Several examples are shown below:

- 3(9) = 3(5 + 4)
  3(5 + 4) = (3 × 5) + (3 × 4)
- 5 × (3 + 7) = (5 × 3) + (5 × 7)
- (2 × 3) + (2 × 5) = 2 × (3 + 5)

- 9 × 23
  9(20+3)
  180 + 27
  207





- Addition is the combining of quantities; it uses the following terms:

addend	→	*45,623*
addend	→	*+ 37,846*
sum	→	*83,469*

- Subtraction is the inverse of addition; it yields the difference between two numbers and uses the following terms:

minuend	→	45,698
subtrahend	→	– 32,741
difference	→	12,957

- The terms associated with multiplication are listed below:

factor	→	76
factor	→	x 23
product	→	1,748

- In multiplication, one factor represents the number of equal groups and the other factor represents the number in or size of each group. The product is the total number in all of the groups.

- Multiplication can also refer to a multiplicative comparison, such as: “Gwen has six times as many stickers as Phillip”. Both situations should be modeled with manipulatives.

- Models of multiplication may include repeated addition and collections of like sets, partial products, and area or array models.

- Division is the operation of making equal groups or shares. When the original amount and the number of shares are known, divide to determine the size of each share. When the original amount and the size of each share are known, divide to determine the number of shares. Both situations may be modeled with base-ten manipulatives.

- Division is the inverse of multiplication. Terms used in division are dividend, divisor, and quotient.

$dividend \div divisor = quotient$ $\qquad$ $divisor\overline{)\,dividend}^{\,quotient}$ $\qquad$ $\frac{dividend}{divisor} = quotient$

- Students benefit from experiences with various methods of division, such as repeated subtraction and partial quotients.

- Estimation can be used to determine the approximation for and then to verify the reasonableness of sums, differences, products, and quotients of whole numbers. An estimate is a number that lies within a range of the exact solution, and the estimation strategy used in a particular problem determines how close the number is to the exact solution. An estimate tells about how much or about how many.

• Strategies such as rounding up or down, front-end, and compatible numbers may be used to estimate sums, differences, products, and quotients of whole numbers. • The least number of steps necessary to solve a single-step problem is one. • The problem-solving process is enhanced when students create and solve their own practical problems and model problems using manipulatives and drawings. • In problem solving, emphasis should be placed on thinking and reasoning rather than on keywords. Focusing on key words such as *in all, altogether, difference,* etc., encourages students to perform a particular operation rather than make sense of the context of the problem. A key-word focus prepares students to solve a limited set of problems and often leads to incorrect solutions as well as challenges in upcoming grades and courses. • Extensive research has been undertaken over the last several decades regarding different problem types. Many of these studies have been published in professional mathematics education publications using different labels and terminology to describe the varied problem types. • Students should experience a variety of problem types related to multiplication and division. Some examples are included in the following chart:	

GRADE 4: COMMON MULTIPLICATION AND DIVISION PROBLEM TYPES		
Equal Group Problems		
Whole Unknown (Multiplication)	Size of Groups Unknown (Partitive Division)	Number of Groups Unknown (Measurement Division)
There are six boxes of crayons. Each box contains 24 crayons. How many crayons are there in all?	If 144 crayons are shared equally among six friends, how many crayons will each friend get?	If 144 crayons are placed into school boxes with each box containing 24 crayons, how many school boxes can be filled?
Multiplicative Comparison Problems		
Result Unknown	Start Unknown	Comparison Factor Unknown
Tyrone ran 30 miles last month. Jasmine ran four times as many miles as Tyrone during the same month. How many miles did Jasmine run?	Jasmine ran 120 miles. She ran four times as many miles as Tyrone. How many miles did Tyrone run?	Jasmine ran 120 miles. Tyrone ran 30 miles. How many times more miles did Jasmine run than Tyrone?
Array or Area Problems		
Whole Unknown	One Dimension Unknown	
There are 12 baseball teams competing in the tournament. Each team has 9 baseball players. How many baseball players are there all together? Mr. Myers's dog pen measures 15 feet by 22 feet. How many square feet are in the dog pen?	There are 108 baseball players competing in the tournament. The players are divided equally among 12 teams. How many players are on each team? There are 108 baseball players competing in the tournament. There are exactly 9 players on each team. How many teams are there? The dog pen covers 60 square feet. The length of the dog pen is 15 feet. What is the width of the dog pen?	

- Students need exposure to various types of practical problems in which they must interpret the quotient and remainder based on the context. The chart below includes one example of each type of problem.

MAKING SENSE OF THE REMAINDER IN DIVISION	
TYPE OF PROBLEM	EXAMPLE
Remainder is not needed and can be left over (or discarded).	Bill has 29 pencils to share fairly with 6 friends. How many pencils will each friend receive? 4 pencils with 5 pencils left over
Remainder is partitioned and represented as a fraction or decimal.	Six friends will share 29 ounces of juice. How many ounces will each person get if all of the juice is shared equally? $4\frac{5}{6}$ ounces
Remainder forces the answer to be increased to the next whole number.	There are 29 people going to the party by car. How many cars will be needed if each car holds 6 people? 5 cars
Remainder forces the answer to be rounded (giving an approximate answer).	Six children will share a bag of candy containing 29 pieces. About how many pieces of candy will each child get? about 5 pieces of candy

Vocabulary	Instructional Activities Organized by Learning Objective
estimate multiplication quotient difference product remainders single-step addition divisor dividend multistep division sum factor subtrahend column between row closer to minuend a little more than front end estimation compatible numbers place value equal-sets/ equal groups model division number line model in all commutative property of addition array model associative property of multiplication identity property of addition	**Textbook** **4.4a** enVision Math: Lesson 3-1 Meanings of Multiplication (Problem of the Day, Spiral Review, Problem Based Interactive Learning,Visual Learning, Intervention, Reteaching Master, Practice Master, Enrichment Master, Quick Checks) enVision Math: Lesson 3-2 Patterns for Facts (Problem of the Day, Spiral Review, Problem Based Interactive Learning,Visual Learning, Intervention, Reteaching Master, Practice Master, Enrichment Master, Quick Checks)

associative property of addition distributive property commutative property of multiplication identity property of multiplication **Assessment** **Powerschool** – Exam identifier	enVision Math: Lesson 3-3 Multiplication Properties (Problem of the Day, Spiral Review, Problem Based Interactive Learning,Visual Learning, Intervention, Reteaching Master, Practice Master, Enrichment Master, Quick Checks) enVision Math: Lesson 3-4 3 and 4 as Factors (Problem of the Day, Spiral Review, Problem Based Interactive Learning,Visual Learning, Intervention, Reteaching Master, Practice Master, Enrichment Master, Quick Checks) enVision Math: Lesson 3-5 6, 7, and 8 as Factors (Problem of the Day, Spiral Review, Problem Based Interactive Learning,Visual Learning, Intervention, Reteaching Master, Practice Master, Enrichment Master, Quick Checks) enVision Math: Lesson 3-6 10, 11, and 12 as Factors (Problem of the Day, Spiral Review, Problem Based Interactive Learning,Visual Learning, Intervention, Reteaching Master, Practice Master, Enrichment Master, Quick Checks) EnVision Math: Ready-Made Centers for Differentiated Instruction 3-1, 3-2, 3-3, 3-4, 3-5, and 3-6 **4.4b** enVision Math: Lesson 2-2 Estimating Sums and Differences of Whole Numbers (Problem of the Day, Spiral Review, Problem Based Interactive Learning,Visual Learning, Intervention, Reteaching Master, Practice Master, Enrichment Master, Quick Checks) enVision Math: Lesson 7-2 Estimating Products (Problem of the Day, Spiral Review, Problem Based Interactive Learning,Visual Learning, Intervention, Reteaching Master, Practice Master, Enrichment Master, Quick Check)

	enVision Math: Lesson 2-1 Using Mental Math to Add and Subtract (Problem of the Day, Spiral Review, Problem Based Interactive Learning, Visual Learning, Algebra Connection, Intervention, Reteaching Master, Practice Master, Enrichment Master, Quick Check) enVision Math: Lesson 2-4 Adding Whole Numbers (Problem of the Day, Spiral Review, Problem Based Interactive Learning, Visual Learning, Intervention, Reteaching Master, Practice Master, Enrichment Master, Quick Check) enVision Math: Lesson 2-5 Subtracting Whole Numbers (Problem of the Day, Spiral Review, Problem Based Interactive Learning, Visual Learning, Intervention, Reteaching Master, Practice Master, Enrichment Master, Quick Check) enVision Math: Lesson 7-5 Multiplying 2-Digit by 2-Digit Numbers, (Problem of the Day, Spiral Review, Problem Based Interactive Learning, Visual Learning, Intervention, Reteaching Master, Practice Master, Enrichment Master, Quick Check) EnVision Math: Ready-Made Centers for Differentiated Instruction 2-1, 2-2, 2-4, 2-5, 2-6, 7-2, 7-5 **4.4c** enVision Math: Lesson 8-2 Estimating Quotients (Problem of the Day, Spiral Review, Problem Based Interactive Learning,Visual Learning, Intervention, Reteaching Master, Practice Master, Enrichment Master) enVision Math: Lesson 8-3 Dividing with Remainders (Problem of the Day, Spiral Review, Problem Based Interactive Learning,Visual Learning,, Intervention, Reteaching Master, Practice Master, Enrichment Master, Quick Checks)

	enVision Math: Lesson 8.5 Dividing 2-Digit by 1-Digit Numbers(Problem of the Day, Spiral Review, Problem Based Interactive Learning,Visual Learning, Intervention, Reteaching Master, Practice Master, Enrichment Master, Quick Checks) enVision Math: Lesson 8-6 Dividing 3-Digit by 1-Digit Numbers (Problem of the Day, Spiral Review, Problem Based Interactive Learning,Visual Learning, Intervention, Reteaching Master, Practice Master, Enrichment Master, Quick Checks) enVision Math: Ready-Made Centers for Differentiated Instruction 8-2, 8-3, 8-5, 8-6 **4d** enVision Math: Lesson 8-10 Problem Solving: Multiple-Step Problems (Problem of the Day, Spiral Review, Problem Based Interactive Learning, Visual Learning,, Intervention, Reteaching Master, Practice Master, Enrichment Master, Quick Check) enVision Math: Ready-Made Centers for Differentiated Instruction 8-10 **Eureka Math** **4.4a** Grade 3 Module 1: Properties of Multiplication and Division and Solving Problems with Units of 2-5 and 10 Grade 3 Module 3: Multiplication and Division with Units 0, 1. 6-9, and Multiples of 10 **4.4b** Grade 4 Module 1: Place Value, Rounding, and Algorithms for Addition and Subtraction Grade 4 Module 3: Multi-Digit Multiplication and Division

	4.4c Grade 4 Module 3 Topic E: Division of Tens and Ones with Successive Remainders Grade 4 Module G: Division of Thousands, Hundreds, Tens and Ones **4.4d** Grade 4 Module 1: Place Value, Rounding, Algorithms for Addition and Subtraction Grade 4 Module 3 Topic D: Multiplication Word Problems Grade 4 Module 7 Lesson 14: Solve multi-step word problems involving converting mixed number measurements to a single unit. **Notes** **Interactive Notebooks Math Grade 3** Multiplication, pp. 22-23 **Interactive Notebooks Math Grade 4** Adding and Subtracting Whole Numbers, pp. 20-21 Multiplying Two-Digit Numbers, pp. 28-29 Dividing Large Numbers, pp. 30-31 **Interactive Notebooks Math Grade 5** Dividing Multi-Digit Numbers, pp. 18-19 **Resources** ● **Print** **Teaching Student-Centered Mathematics 3-5 (2006)** **4.4** Activity 3.7 Clock Facts (a) Activity 3.8 Patterns in the Nines Facts(a) Activity 3.9 If You Didn't Know (a) Activity 3.19 How Close Can You Get? (a) Activity 3.11 Sort Them as You Do Them (a)

FACEing MATH: Elementary Math:
Lesson 5: Find the Sum or Difference of Two Whole Numbers(b)
Lesson 6: Relating Multiplication and Division(a)
Lesson 8: Division of Multi-Digit Numbers by a One-Digit Number (c

- **Technology-based**

Gizmos

- Chocomatic (Multiplication, Arrays, and Area **(a)**
- Factor Trees (Factoring Numbers **(a)**
- Critter Count **(a)**
- No Alien Left Behind (Division with Remainders **(c)**

Studyjams

- Estimate Sums and Differences **(b)**

Discovery Education

- Multiplying by Two Digit Numbers **(b)**
- Division Problems **(c)**
- Division with Remainders **(c)**
- Division Word Problems **(d)**

Flocabulary

- Word Problems **(d)**

Station Activities/Manipulatives

Foam Cubes (1-6)
Using foam cubes, students will roll 4 digits and build a two digit by two digit problem and create a matching multiplication story problem.

0-9 Cubes
Using 0-9 cubes, students will create a story problem by rolling 1 digit to be the divisor and roll 3 digits to be the dividend.

	Square Tiles/Linking Cubes Using square tiles/linking cubes students will act out practical story problems involving multiplication, division, addition and subtraction.
Cross-Curricular Connections	**Differentiation**
A Remainder of One by Elinor Pinczes **Activity** **The Great Divide** by Dayle Ann Dodds **Amanda Bean's Amazing Dream** by Cindy Neuschwander **Activity** **The Doorbell Rang** by Pat Hutchins **Activity** **Esio Trot** by Dahl, Roald **The King's Chessboard** by Birch, David **Read Aloud** **One Is A Snail, Ten is a Crab** There are 3 snails and 5 crabs. How many legs? Read Aloud **Let's Go Rock Collecting** by Roma Gans Have students bring in their own collections to create and solve +/- problems.	Multilingual Glossary **Topmarks** ● Computation **(b)** **Math Play** ● Multiplication-Jeopardy **(a,b)** ● Math Jeopardy **Instructional Activities and Resources** ● Shopping Estimates Add/Subtract **(b.c)** ● Refining Estimates Add/Subtract **(b,c)** ● Estimating Quotients **(b, c)** ● Refining Estimates Multiplication **(b, c)** ● Single Step Problems Add/Subtract **(d)** ● Word Problems for Division **(d)** ● Cube Games **(a, b,c)** **Interactive Instructional Lessons** ● Math Live

I Know an Old Lady Who Swallowed a Fly by Nadine Wescott Assign weights to the animals. Add and subtract their weights. Read Aloud **It's a Fair Day, Amber Brown** by Paula Danziger Given a number of animals, how many in each group, how many prizes, how much food?	

Strand: Number Sense	
4.5 The student will a) determine common multiples and factors, including least common multiple and greatest common factor; b) add and subtract fractions and mixed numbers having like and unlike denominators;* and c) solve single-step practical problems involving addition and subtraction with fractions and mixed numbers. *On the state assessment, items measuring this objective are assessed without the use of a calculator.	
Suggested Pacing	
Related Spiraling Standards	
Spiral Down 3.5 The student will solve practical problems that involve addition and subtraction with proper fractions having like denominators of 12 or less.	Spiral Up 5.6 The student will a) solve single-step and multistep practical problems involving addition and subtraction with fractions and mixed numbers; and b) solve single-step practical problems involving multiplication of a whole number, limited to 12 or less, and a proper fraction, with models.* *On the state assessment, items measuring this objective are assessed without the use of a calculator.
Essential Questions	**Common Misconceptions**
● What situations require the addition or subtraction of fractions? ● How can concrete materials and visual models be used to demonstrate the addition and subtraction of fractions? ● How can we use models, benchmarks, and approximate fraction equivalents to estimate sums and differences of fractions? ● How can we use models (e.g., arrays, Venn diagrams, multiplication charts) to demonstrate the meanings of common factor, common	When adding fractions, students generalize the procedure for multiplication of fractions by adding the numerators and adding the denominators. When adding two fractions, students add the numerators and multiply the denominators.

multiple, greatest common factor (GCF) and least common multiple (LCM)? ● How is finding the greatest common factor (GCF) or least common multiple (LCM) useful when simplifying fractions or finding common denominators? ● How can finding common denominators help with addition and subtraction of fractions and mixed numbers?	When subtracting mixed numbers, students always subtract the smaller whole number from the larger whole number or subtract the smaller fraction from the larger fraction. Students have the“conception”that fractions are just two whole numbers that can be treated separately.
Understanding the Standard	**Essential Knowledge and Skills**

• A factor of a whole number is a whole number that divides evenly into that number with no remainder. A factor of a number is a divisor of the number. • A common factor of two or more numbers is a divisor that all of the numbers share. • The greatest common factor of two or more numbers is the largest of the common factors that all of the numbers share. • The product of the number and any natural number is a multiple of the number. • Common multiples and common factors can be useful when simplifying fractions. • The least common multiple of two or more numbers is the lowest number that is a multiple of all of the given numbers. • Estimation keeps the focus on the meaning of the numbers and operations, encourages reflective thinking, and helps build informal number sense with fractions. Students can reason with benchmarks to get an estimate without using an algorithm. • Reasonable answers to problems involving addition and subtraction of fractions can be established by using benchmarks such as 0, $\frac{1}{2}$,, and 1. For example, $\frac{3}{5}$ and $\frac{4}{5}$ are each greater than $\frac{1}{2}$, so their sum is greater than 1. • Students should investigate addition and subtraction with fractions, using a variety of models (e.g., fraction circles, fraction strips, lines, pattern blocks). • While this standard requires instruction in solving problems with denominators of 2, 3, 4, 5, 6, 8, 10, and 12, students would benefit from experiences with other denominators. • When students use the least common multiple to determine common denominators to add or subtract fractions with unlike denominators, the least common multiple may be greater than 12, but will not exceed 60. • Proper fractions, improper fractions, and mixed numbers are terms often used to describe fractions. A proper fraction is a	**The student will use problem solving, mathematical communication, mathematical reasoning, connections, and representations to** • Determine common multiples and common factors of numbers. (a) • Determine the least common multiple and greatest common factor of no more than three numbers. (a)\ • Determine a common denominator for fractions, using common multiples. Common denominators should not exceed 60. (b) • Estimate the sum or difference of two fractions. (b, c) • Add and subtract fractions (proper or improper) and/or mixed numbers, having like and unlike denominators limited to 2, 3, 4, 5, 6, 8, 10, and 12, and simplify the resulting fraction. (Subtraction with fractions will be limited to problems that do not require regrouping). (b) • Solve single-step practical problems that involve addition and subtraction with fractions (proper or improper) and/or mixed numbers, having like and unlike denominators limited to 2, 3, 4, 5, 6, 8, 10, and 12, and simplify the resulting fraction. (Subtraction with fractions will be limited to problems that do not require regrouping). (c)

fraction whose numerator is less than the denominator. An improper fraction is a fraction whose numerator is equal to or greater than the denominator. An improper fraction may be expressed as a mixed number. A mixed number is written with two parts: a whole number and a proper fraction (e.g., $3\ \frac{5}{8}$). ● Instruction involving addition and subtraction of fractions should include experiences with proper fractions, improper fractions, and mixed numbers as addends, minuends, subtrahends, sums, and differences. ● A fraction is in simplest form when its numerator and denominator have no common factors other than one. The numerator can be greater than the denominator. ● The problem-solving process is enhanced when students create and solve their own practical problems and model problems using manipulatives and drawings. ● In problem solving, emphasis should be placed on thinking and reasoning rather than on key-words. Focusing on key words such as *in all, altogether, difference*, etc. encourages students to perform a particular operation rather than make sense of the context of the problem. It prepares students to solve a very limited set of problems and often leads to incorrect solutions. ● At this level, denominators of fractions resulting from simplification will be limited to 12 or less.	
Vocabulary	**Instructional Activities Organized by Learning Objective**
greatest common factor unlike denominators proper fraction mixed number least common multiple common denominator fraction simplest form like denominators improper fraction common factor multiple	**Textbook** **4.5a** enVision Math: Lesson 3-2 Patterns for Facts (Problem of the Day, Spiral Review, Problem Based Interactive Learning, Visual Learning, Intervention, Reteaching Master, Practice Master, Enrichment Master, Quick Check) **4.5b**
Assessment	
Powerschool – Exam identifier	

	enVision Math: Lesson 11-1 Adding and Subtracting Fractions with Like Denominators (Problem of the Day, Spiral Review, Problem Based Interactive Learning, Visual Learning, Intervention, Reteaching Master, Practice Master, Enrichment Master, Quick Check) enVision Math: Lesson 11-2 Adding Fractions with Unlike Denominators (Problem of the Day, Spiral Review, Problem Based Interactive Learning, Visual Learning, Intervention, Reteaching Master, Practice Master, Enrichment Master, Quick Check) enVision Math: Lesson 11-3 Subtracting Fractions with Unlike Denominators (Problem of the Day, Spiral Review, Problem Based Interactive Learning, Visual Learning, Intervention, Reteaching Master, Practice Master, Enrichment Master, Quick Check) enVision Math: Ready-Made Centers for Differentiated Instruction 11-1 ,11-2, 11-3 **4.c** enVision Math: Lesson 11-4 Problem Solving: Draw a Picture and Write an Equation (Problem of the Day, Spiral Review, Problem Based Interactive Learning, Visual Learning, Intervention, Reteaching Master, Practice Master, Enrichment Master, Quick Check) enVision Math: Ready-Made Centers for Differentiated Instruction 11-4 **Eureka Math** **4.5a** Grade 4 Module 3 Topic F: Reasoning and Divisibility

	Grade 6 Module 2 Topic D: Number Theory- Thinking Logically About Multiplicative Arithmetic **4.5b** Grade 4 Module 5 Lesson 24: Decompose and compose fractions greater than 1 to express them in various forms. Grade 4 Module 5 Topic F: Addition and Subtraction of Fractions by Decomposition Grade 5 Module 3: Addition and Subtraction of Fractions **4.5c** Grade 4 Module 5 Lesson 19: Solve word problems involving addition and subtraction of fractions. Grade 4 Module 5 Lesson 28: Solve word problems with line plots. Grade 5 Module 3 : Addition and Subtraction of Fractions **Notes** **Interactive Notebooks Math Grade 4** Factors, pp. 22-23 (a) Multiples, pp. 24-25 (a) Adding and Subtracting Mixed Numbers, pp. 34-35 (b) **Interactive Notebooks Math Grade 5** Adding and Subtracting Fractions, pp. 30-31 (a) **Resources** ● **Print** **Teaching Student-Centered Mathematics 3-5 (2014)** **4.5** Activity 6.1 LCM Flash Cards(a) **FACEing Math: Fractions, Decimals, & Percents**:

	Lesson 4: Adding and Subtracting Fractions with Like Denominators (b) Lesson 5: Adding and Subtracting Fractions with Unlike Denominators (b) Lesson 6: Adding and Subtracting Mixed Numbers (b) ● **Technology-based** **Gizmos** ● **Adding Fractions (Fraction Tiles) (b)** **Discovery Education** ● **Adding and Subtracting Fractions (b)** **Studyjams** ● **Add and Subtract Fractions with Unlike Denominators (b)** **sheppardsoftware** ● **Madman- Add Fractions with Unlike Denominators (b** **Fraction Bars Interactive Games** ● **Targeted Sums** **Flocabulary** ● **LCM and GCF (a)** ● **Adding Fractions (b)** **Mathplay** ● **Factors and Multiples-LCM_GCF Jeopardy (a)** ● **GCF (a)** **Decimal Squares Interactive Games (a)** **Station Activities/Manipulatives** Fraction Circles Using fraction circles, students will model a given subtraction and addition problem. (b) Fraction Tiles

	Students will read practical problems and use fraction tiles to represent the addition and or subtraction problems. (c) Fraction Number Lines Given an addition or subtraction problem, students will use the fraction number lines to demonstrate the problem. (b) Fraction Cubes Using fraction cubes, students will roll 2 fractions and write an addition or subtraction problem for a partner to solve. (b) Foam Cubes (1-6)/Cubes (0-9) - Using number cubes the students will roll/toss the cubes to create fractions to solve addition or subtraction number sentences they create. (b).
Cross-Curricular Connections	**Differentiation**
Little House in the Big Woods by Laura Ingalls Wilder Students split paper cookies in fractions and share. **Give Me Half** by Stuart J. Murphy Use this simple story as introduction to adding fractions with like denominators and then have students reimagine the story based on more siblings (a sister and another brother, two sisters and two brothers, etc.). Each group would explain how the division of the pizza, juice, and cupcakes would change with the different amount of siblings and demonstrate the adding of unit fractions to get to one. Read Aloud	Multilingual Glossary **mathabc** • Addition **(a)** • Subtraction **(a)** • Subtracting Like Denominators **(a)** **Instructional Activities and Resources** • Finding a Common Denominator Activity **(a, b)** • LCM and GCF Task Cards **(a)** • Finding Factors **(a)** • Adding and Subtracting Fractions with Fraction Bars **(b)** • Fraction Word Problem Collection **(c)** **Interactive Instructional Lessons** • Math Live

Strand: Number Sense	
4.6 The student will a) add and subtract decimals;* and b) solve single-step and multistep practical problems involving addition and subtraction with decimals. *On the state assessment, items measuring this objective are assessed without the use of a calculator.	
Suggested Pacing	
Related Spiraling Standards	
Spiral Down	Spiral Up 5.5 The student will a) estimate and determine the product and quotient of two numbers involving decimals* and b) create and solve single-step and multistep practical problems involving addition, subtraction, and multiplication of decimals, and create and solve single-step practical problems involving division of decimals. *On the state assessment, items measuring this objective are assessed without the use of a calculator.
Essential Questions	**Common Misconceptions**
● What situations require the addition or subtraction of decimal numbers? ● How can concrete materials and visual models be used to demonstrate the addition and subtraction of decimals?	When adding a sequence, students add the decimal part separately from the whole number part. Students add or subtract without considering place value, or start at the right as with whole numbers.

● How do strategies for the addition and subtraction of whole numbers relate to the addition and subtraction of decimals? ● How can we use models and benchmarks to estimate sums and differences of decimals?	Students misunderstand the use of zero as a placeholder. Students think that you don't have to line up the decimal points when adding or subtracting decimals.
Understanding the Standard	**Essential Knowledge and Skills**

- Addition and subtraction of decimals may be explored, using a variety of models (e.g., 10-by-10 grids, number lines, money).
- The problem-solving process is enhanced when students create and solve their own practical problems and model problems using manipulatives and drawings.
- In problem solving, emphasis should be placed on thinking and reasoning rather than on key-words. Focusing on key words such as *in all, altogether, difference*, etc. encourages students to perform a particular operation rather than make sense of the context of the problem. It prepares students to solve a very limited set of problems and often leads to incorrect solutions.
- The least number of steps necessary to solve a single-step problem is one.

The student will use problem solving, mathematical communication, mathematical reasoning, connections, and representations to

- Estimate sums and differences of decimals. (a)
- Add and subtract decimals through thousandths, using concrete materials, pictorial representations, and paper and pencil. (a)
- Solve single-step and multistep practical problems that involve adding and subtracting with decimals through thousandths. (b)

Vocabulary

decimal	decimal points	differences	estimate	sums
hundredths	thousandths	whole number	single-step	
tenths	decimal place value	reasonableness	multi-step	

Assessment

Instructional Activities Organized by Learning Objective

Textbook
4.6a
enVision Math: Lesson 13-2 Estimating Sums and Differences of Decimals (Problem of the Day, Spiral Review, Problem Based Interactive Learning, Visual Learning, Algebra Connection,

Powerschool – Exam identifier	Intervention, Reteaching Master, Practice Master, Enrichment Master, Quick Check) enVision Math: Lesson 13-3 Modeling Addition and Subtraction of Decimals (Problem of the Day, Spiral Review, Problem Based Interactive Learning, Visual Learning, Algebra Connection, Intervention, Reteaching Master, Practice Master, Enrichment Master, Quick Check) enVision Math: Lesson 13-4 Adding and Subtracting Decimals (Problem of the Day, Spiral Review, Problem Based Interactive Learning, Visual Learning, Algebra Connection, Intervention, Reteaching Master, Practice Master, Enrichment Master, Quick Check) enVision Math: Ready-Made Centers for Differentiated Instruction 13-2,13-3,13-4 **4.6b** enVision Math: Lesson 13-7 Problem Solving: Try, Check, and Revise (Problem of the Day, Spiral Review, Problem Based Interactive Learning, Visual Learning,, Intervention, Reteaching Master, Practice Master, Enrichment Master, Quick Checks) enVision Math: Ready-Made Centers for Differentiated Instruction 13-7 **Eureka Math** **4.6a,b** Grade 5 Module 1 Topic D: Adding and Subtracting Decimals **Notes** **Interactive Notebooks Math Grade 4** Adding and Subtracting Decimals, pp. 42-43(a)

	Resources ● **Print** **Teaching Student-Centered Mathematics 3-5 (2014)** **4.6** Activity 12.97.11 Exact Sums and Differences (a) **FACEing Math: Fractions, Decimals, & Percents:** Lesson 12: Adding and Subtracting Decimals (a) ● **Technology-based** **Gizmos** ● Adding Whole Numbers and Decimals (Base-10 Blocks (a) ● Adding Whole Numbers and Decimals (Base-10 Blocks (a) **Studyjams** ● Adding and Subtracting Decimals (a) **Discovery Education** ● Add and Subtract Decimals (a) **Station Activities/Manipulatives** Foam Cubes (1-6) Cubes (0-9 Decimal Cubes

	Students will roll/toss the decimals to create two decimal numbers write the numbers in a place value chart to add or subtract. They can also estimate the sums and differences of the decimals created. Foam Base 10s Using Foam Base 10s, the students will create two decimal numbers, write them in a place value chart and solve by adding or subtracting. Decimal Tiles Students will read practical problems and use decimal tiles to represent the addition and or subtraction problems. Decimal Number Lines Given an addition or subtraction problem, students will use the decimal number lines to demonstrate the problem.
Cross-Curricular Connections	**Differentiation**
	Instructional Activities and Resources ● **Shopping Estimates (a)** ● **Decimal Activity (a)** ● **Class Sort Decimal Subtraction (a)** ● **Decimal Word Problems (b)** **Interactive Instructional Lessons** ● **Math Live**

Strand: Number Sense	
4.7 The student will solve practical problems that involve determining perimeter and area in U.S. Customary and metric units.	
Suggested Pacing	
Related Spiraling Standards	
Spiral Down 3.8 The student will estimate and a) measure the distance around a polygon in order to determine its perimeter using U.S. Customary and metric units; and b) count the number of square units needed to cover a given surface in order to determine its area	Spiral Up 5.8 The student will a) solve practical problems that involve perimeter, area, and volume in standard units of measure; and b) differentiate among perimeter, area, and volume and identify whether the application of the concept of perimeter, area, or volume is appropriate for a given situation.
Essential Questions	**Common Misconceptions**
● What real life situations require knowledge of perimeter and area? ● How can a diagram support with the conceptual understanding of area and perimeter? ● Why is area measured in square units? ● What properties of rectangles and squares do students need to be familiar with in order to solve area and perimeter problems with and without diagrams?	Confusion between ‘area’ and ‘perimeter’. This might cause pupils to add lengths rather than multiply them when attempting to calculate area. Some textbooks label the lengths of certain sides and require the pupil to calculate the others. Pupils might mistakenly believe that they should only add labelled lengths.

Understanding the Standard	Essential Knowledge and Skills
● Perimeter is the path or distance around any plane figure. ● To determine the perimeter of any polygon, determine the sum of the lengths of the sides. ● Area is the surface included within a plane figure. Area is measured by the number of square units needed to cover a surface or plane figure. ● Students should have opportunities to investigate and discover, using manipulatives, the formulas for the area of a square and the area of a rectangle. - Area of a square = side length × side length - Area of rectangle = length × width ● Perimeter and area should always be labeled with the appropriate unit of measure.	**The student will use problem solving, mathematical communication, mathematical reasoning, connections, and representations to** ● Determine the perimeter of a polygon with no more than eight sides, when the lengths of the sides are given, with diagrams. ● Determine the perimeter and area of a rectangle when given the measure of two adjacent sides, with and without diagrams. ● Determine the perimeter and area of a square when the measure of one side is given, with and without diagrams. ● Solve practical problems that involve determining perimeter and area in U.S. Customary and metric units.
Vocabulary	**Instructional Activities Organized by Learning Objective**
area adjacent distance Metric Unit rectangle perimeter distance measure square units side polygon length width U.S. Customary closed	**Textbook** **4.7** enVision Math: Lesson 14-1 Understanding Area (Problem of the Day, Spiral Review, Problem Based Interactive Learning,Visual

	Learning, Intervention, Reteaching Master, Practice Master, Enrichment Master, Quick Check) enVision Math: Lesson 14-2 Area of Squares and Rectangles (Problem of the Day, Spiral Review, Problem Based Interactive Learning,Visual Learning, Intervention, Reteaching Master, Practice Master, Enrichment Master, Quick Check)
Assessment	
Powerschool – Exam identifier	enVision Math: Lesson 14-6 Perimeter(Problem of the Day, Spiral Review, Problem Based Interactive Learning,Visual Learning, Intervention, Reteaching Master, Practice Master, Enrichment Master, Quick Check) enVision Math: Lesson 14-7 Same Perimeter, Different Area (Problem of the Day, Spiral Review, Problem Based Interactive Learning,Visual Learning, Intervention, Reteaching Master, Practice Master, Enrichment Master, Quick Check) enVision Math: Lesson 14-8 Same Area, Different Perimeter (Problem of the Day, Spiral Review, Problem Based Interactive Learning,Visual Learning, Intervention, Reteaching Master, Practice Master, Enrichment Master, Quick Check) enVision Math: Ready-Made Centers for Differentiated Instruction 14-1, 14-2, 14-6, 14-7, 14-8 **Eureka Math** **4.7** Grade 3 Module 4: Multiplication and Area Grade 4 Module 3 Topic A: Multiplicative Comparison Word Problems

	Notes **Interactive Notebooks Math Grade 3** Understanding Area, pp. 62-63 The Formula for Finding Area, pp. 65-65 Understanding Perimeter, pp. 68-69 Relating Perimeter and Area, pp. 70-71 **Interactive Notebooks Math Grade 4** Area and Perimeter, pp. 54-55 **Resources** **Print** **Teaching Student-Centered Mathematics 3-5 (2014)** **4.7** Activity 9.3 Rectangle Comparison-No Units Activity 9.4 Tangram Areas Activity 9.5 Fill and Compare Activity 9.7 Fixed Perimeters Activity 9.8 Fixed Areas **Performance Task** ● **Squares, Rectangles, Area_Perimeter** **Technology-based** **Gizmos** ● **Fido's Flower Bed (Perimeter and Area)** Math PlayGround ● Area and Perimeter **Fun Brain** ● Shape Surveyor **BrainPop** ● Squareoff **Discovery Education** ● Area and Perimeter

	Math Score ● Practical Word Problems - Area and Perimeter **Station Activities/Manipulatives** Square Tiles/ Given square tiles, student will create a given shape and find the area in square inches and the length of the perimeter by counting squares. The students will make 3 more shapes with given measure of area and perimeter. Rulers Using a ruler, students will find the perimeter of their desk in inches and centimeters. Then students will choose four objects of their choice and record the perimeter in inches and centimeters. Yardstick/Meter Stick- Students will use a yardstick to measure the perimeter of the bulletin board. Then they will find the perimeter of the same bulletin board using a meter stick. Students will use the formula A=l x w to find the area of the same board in square yards and meters.
Cross-Curricular Connections	**Differentiation**

The Promise Quilt by Candice Ransom Explore area and perimeter with quilt squares. **Perimeter, Area, and Volume: a Monster Book of Dimensions** by David A. Adler Explore these three concepts in one story with a movie theater theme. Read Aloud **Benjamin Banneker: American Mathematician and Astronomer** by Arthur Schlesinger Benjamin worked with a survey team to lay out boundaries for a 10 mile square. What would be the area and perimeter of a square whose sides were 10 miles long? **The Secret Garden** by Frances Burnett Find the area and perimeter of different sized gardens. **Spaghetti and Meatballs For All** by Marilyn Burns Students find perimeter and area of different sized tables using color tiles. **Activity** **Read Aloud**	**Multilingual Glossary** **mathabc** • **What is the Area** • **What is the Perimeter** • **What is the Area of the Rectangle** **Instructional Activities and Resources** • **Rolling Rectangles** • **Perimeter Practice** • **Comparing Area and Perimeter of Rectangles** • **Exploring Area Perimeter with Grid Paper** **Interactive Instructional Lessons** • **Math Live**

Strand: Number Sense
4.8 The student will a) estimate and measure length and describe the result in U.S. Customary and metric units; b) estimate and measure weight/mass and describe the result in U.S. Customary and metric units; c) given the equivalent measure of one unit, identify equivalent measures of length, weight/mass, and liquid volume between units within the U.S. Customary system; and d) solve practical problems that involve length, weight/mass, and liquid volume in U.S. Customary units.    On the state assessment, items measuring this objective are assessed **WITH** the use of a calculator. Grades 4 and 5 mathematics assessments will include a Desmos four-function calculator on the section of the test in which a calculator is allowed.
Suggested Pacing

Related Spiraling Standards	
3.7 The student will estimate and use U.S. Customary and metric units to measure a) length to the nearest $\frac{1}{2}$ inch, inch, foot, yard, centimeter, and meter; and b) liquid volume in cups, pints, quarts, gallons, and liters.	5.9 The student will a) given the equivalent measure of one unit, identify equivalent measurements within the metric system; and b) solve practical problems involving length, mass, and liquid volume using metric units.

Essential Questions	Common Misconceptions
a) ● How do we determine an appropriate unit of measure to use when measuring length in metric units and in U.S. Customary units? ● How can we use real life benchmarks to estimate lengths in metric units and in U.S. Customary units? ● How does a ruler utilize fractional parts? b) ● How do we determine an appropriate unit of measure to use when measuring weight/mass in metric units and in U.S. Customary units? ● How can we use real life benchmarks to estimate weight/mass in metric units and in U.S. Customary units? ● What are equivalent measures between units of weight/mass within the U.S. Customary system? c) ● What are equivalent measures between units of weight/mass within the U.S. Customary system? ● What are equivalent measures between units of length within the U.S. Customary system? ● What are equivalent measures between units of liquid volume within the U.S. Customary system? d) ● What are some examples of practical situations that involve length, weight/mass, and liquid volume in U.S. Customary units?	● When using a ruler, students may struggle with starting at zero instead of the edge of the ruler. Students may also use the incorrect unit if the ruler has both inches and centimeters marked. ● Students may also struggle with how to read the ruler when measuring to the nearest eighth inch if they are struggling to understand fractions on a number line. Additionally, students may confuse the hash marks on a ruler and struggle with the idea that the hash mark represents the end of a space that is divided into equal-size units. ● Students have difficulty when the number at the end of a ruler may not be printed on the ruler itself. For example, if they use a 12 inch ruler and measure an object that is exactly 12 inches long, the number 12 may not be visible on the ruler. ● Students may struggle with the difference between weight and mass. Mass is the amount of matter in an object, while weight is determined by the pull of gravity on an object. Mass is always the same, whereas weight changes depending on location. ● Students may struggle with whether they have to multiply or divide when solving problems involving measurement conversions.
Understanding the Standard	**Essential Knowledge and Skills**
● The measurement of an object must include the unit of measure along with the number of iterations. ● Length is the distance between two points along a line.	**The student will use problem solving, mathematical communication, mathematical reasoning, connections, and representations to**

● U.S. Customary units for measurement of length include inches, feet, yards, and miles. Appropriate measuring devices include rulers, yardsticks, and tape measures. ● Metric units for measurement of length include millimeters, centimeters, meters, and kilometers. Appropriate measuring devices include centimeter rulers, meter sticks, and tape measures. ● When measuring with U.S. Customary units, students should be able to measure to the nearest part of an inch ($\frac{1}{2}$, $\frac{1}{4}$, $\frac{1}{8}$), foot, or yard. ● Weight and mass are different. Mass is the amount of matter in an object. Weight is determined by the pull of gravity on the mass of an object. The mass of an object remains the same regardless of its location. The weight of an object changes depending on the gravitational pull at its location. In everyday life, most people are actually interested in determining an object's mass, although they use the term *weight* (e.g., "How much does it weigh?" versus "What is its mass?"). ● Balances are appropriate measuring devices to measure weight in U.S. Customary units (ounces, pounds) and mass in metric units (grams, kilograms). ● Practical experience measuring the weight/mass of familiar objects (e.g., foods, pencils, book bags, shoes) helps to establish benchmarks and facilitates the student's ability to estimate weight/mass. ● Students should measure the liquid volume of everyday objects in U.S. Customary units, including cups, pints, quarts, gallons, and record the volume including the appropriate unit of measure (e.g., 24 gallons). ● Students at this level will be given the equivalent measure of one unit when asked to determine equivalencies between units in the U.S. Customary system. ○ For example, students will be told one gallon is	● Determine an appropriate unit of measure (inch, foot, yard, mile, millimeter, centimeter, and meter) to use when measuring length in both U.S. Customary and metric units. (a) ● Estimate and measure length in U.S. Customary and metric units, measuring to the nearest part of an inch ($\frac{1}{2}$, $\frac{1}{4}$, $\frac{1}{8}$), and to the nearest foot, yard, millimeter, centimeter, or meter, and record the length including the unit of measure (e.g., 24 inches). (a) ● Compare estimates of the length with the actual measurement of the length. (a) ● Determine an appropriate unit of measure (ounce, pound, gram, and kilogram) to use when measuring the weight/mass of everyday objects in both U.S. Customary and metric units. (b) ● Estimate and measure the weight/mass of objects in both U.S. Customary and metric units (ounce, pound, gram, or kilogram) to the nearest appropriate measure, using a variety of measuring instruments. (b) ● Record the weight/mass of an object with the unit of measure (e.g., 24 grams). (b) ● Given the equivalent measure of one unit, identify equivalent measures between units within the U.S. Customary system for: ○ length (inches and feet, feet and yards, inches and yards); yards and miles; ○ weight/mass (ounces and pounds); and ○ liquid volume (cups, pints, quarts, and gallons). (c) ● Solve practical problems that involve length, weight/mass, and liquid volume in U.S. Customary units. (d)

equivalent to four quarts and then will be asked to apply that relationship to determine: ■ the number of quarts in five gallons; ■ the number of gallons equal to 20 quarts; ■ When empty, Tim's 10-gallon container can hold how many quarts?; or ■ Maria has 20 quarts of lemonade. How many empty one-gallon containers will she be able to fill?	
Vocabulary	**Instructional Activities Organized by Learning Objective**
estimate, measure, weight, length, liquid volume, standard unit, U.S. Customary, metric, ounce, pound, ton, gram, kilogram, inch, foot, yard, mile, millimeter, centimeter, meter, kilometer, cup, pint, quart, gallon, capacity, balance scale, mass, scale, ruler	**Textbook:** **4.8a** enVision Math: Lesson 16-2 Customary Units of Capacity (Problem of the Day, Spiral Review, Problem Based Interactive Learning, Visual Learning, Algebra Connection, Intervention, Reteaching Master, Practice Master, Enrichment Master, Quick Check) enVision Math: Ready-Made Centers for Differentiated Instruction 16- 2 **4.8b** enVision Math: Lesson 16-3 Units of Weight (Problem of the Day, Spiral Review, Problem Based Interactive Learning, Visual Learning, Algebra Connection, Intervention, Reteaching Master, Practice Master, Enrichment Master, Quick Check) enVision Math Lesson 16-7 Units/Metric of Mass (Problem of the Day, Spiral Review, Problem Based Interactive Learning, Visual Learning, Algebra Connection, Intervention, Reteaching Master, Practice Master, Enrichment Master, Quick Check) enVision Math: Ready-Made Centers for Differentiated Instruction 16-3, 16-7
Assessment	
Powerschool – Exam identifier	

	4.8c enVision Math: Lesson 16-4 Changing Customary Units (Problem of the Day, Spiral Review, Problem Based Interactive Learning, Visual Learning, Algebra Connection, Intervention, Reteaching Master, Practice Master, Enrichment Master, Quick Check) enVision Math: Lesson 16-8 Changing Metric Units (Problem of the Day, Spiral Review, Problem Based Interactive Learning, Visual Learning, Algebra Connection, Intervention, Reteaching Master, Practice Master, Enrichment Master, Quick Check) EnVision Math: Ready-Made Centers for Differentiated Instruction 16-4 **4.8d** enVision Math: Lesson 16-1 Using Customary Units of Length (Problem of the Day, Spiral Review, Problem Based Interactive Learning, Visual Learning, Algebra Connection, Intervention, Reteaching Master, Practice Master, Enrichment Master, Quick Check) enVision Math: Lesson 16-2 Using Customary Units of Capacity (Problem of the Day, Spiral Review, Problem Based Interactive Learning, Visual Learning, Algebra Connection, Intervention, Reteaching Master, Practice Master, Enrichment Master, Quick Check) enVision Math: Lesson 16-3 Customary Units of Weight (Problem of the Day, Spiral Review, Problem Based Interactive Learning, Visual Learning, Algebra Connection, Intervention, Reteaching Master, Practice Master, Enrichment Master, Quick Check)

	enVision Math:Ready-Made Centers for Differentiated Instruction 16-1, 16-2, 16-3 **Eureka Math** **4.8a** Grade 4 Module 7: Exploring Measurement with Multiplication Grade 4 Module 5 Lesson 40: Solve word problems involving the multiplication of a whole number and a fraction including those involving line plots. Grade 4 Module 7: Exploring Measurement with Multiplication **4.8b** Grade 4 Module 2: Unit Conversions and Problem Solving with Metric Measurement **4.8c,d** Grade 4 Module 7: Exploring Measurement with Multiplication Grade 4 Module 6 Lesson 14: Solve word problems involving addition of measurements in decimal form. Grade 4 Module 7: Exploring Measurement with Multiplication **Notes:** **Interactive Notebooks Math Grade 3** Measuring Mass and Liquid Volume, pp 58-59(b) **Interactive Notebooks Math Grade 4** Converting Measurements, pp. 50-51 (c) **Resources** ● **Print:**

	FACEing Math: Elementary Topics Lesson 15: Customary Measurement (a,b,c) Lesson 16: Metric Measurement (a.b,c) ● **Technology-based:** o **Measurement** ▪ Interactive Length (a) ▪ Measuring Fractional Parts **(a)** **Station Activities/Manipulatives:** Ruler- When given everyday objects (books, markers, stapler), students will estimate the length to the nearest part of a inch. Then use a ruler to find the actual length in U.S. Customary and metric. Yardsticks & Meter Sticks- When given yardsticks and meter sticks, students will estimate the length of the hallway to the nearest yard and meter. Then using a yardstick and meter stick, find the actual length and record on data sheet Yardstick & Ruler- When given a yardstick and a ruler, students will compare the number of feet in a yard, how many inches are in a yard, and vice versa and record the data. School Pan Balance- When given everyday objects (calculator, rubber ball, etc.), estimate the weight/mass of the object. The using the School Pan Balance to find the actual weight/mass using the Customary Weight set and Metric Weight set and record on the data sheet. Customary Weight and Metric Weight sets- When given the Customary and Metric weight set, student will put the Customary

	units (ex. ounce) on one pan and the Metric units (ex. gram) on the other pan to find the equivalent units. Counters (fruit, pets, insects)- When given a number of pet counters, students will estimate the weight/mass of the counters. Then using the School Pan Balance and the weight sets (Customary & Metric) students will find the actual weight in both systems and record the data.
Cross-Curricular Connections	**Differentiation**
Literature Connections: **Measuring Penny** by Loreen Leedy Read Aloud **The King's Chessboard** by David Birch Read Aloud **Actual Size** by Steve Jenkins Students compare other animals to the animals in the book. Read Aloud **Millions to Measure** by David M. Schwartz Practice using metric units of length to measure items around the classroom. Read Aloud **Beanstalk: The Measure of a Giant** by Ann McCallum	**Khan Academy - Fourth Grade - Math Measurement** **Math is Fun - Measure**

If You Hopped Like a Frog by David M. Schwartz Read Aloud **How Big is a Foot?** By Rolf Myller Read Aloud Activity	

Strand: Number Sense	
4.9 The student will solve practical problems related to elapsed time in hours and minutes within a 12-hour period.  On the state assessment, items measuring this objective are assessed **WITH** the use of a calculator. Grades 4 and 5 mathematics assessments will include a Desmos four-function calculator on the section of the test in which a calculator is allowed.	
Suggested Pacing	
Related Spiraling Standards	
3.9 The student will a) tell time to the nearest minute, using analog and digital clocks; b) solve practical problems related to elapsed time in one-hour increments within a 12-hour period; and c) identify equivalent periods of time and solve practical problems related to equivalent periods of time.	5.11 The student will solve practical problems related to elapsed time in hours and minutes within a 24-hour period.
Essential Questions	**Common Misconceptions**
• What is meant by elapsed time? • In what everyday situations do we determine elapsed time? • How can elapsed time be determined, in hours and minutes within a 12-hour period, when the beginning time and ending time are known? • How can the beginning time of an event be determined when the elapsed time, in hours and minutes within a 12-hour period, and ending time are known? • How can the ending time of an event be determined when the elapsed time,in hours and minutes within a 12-hour period, and beginning time are known?	• Misconceptions with telling time may prevent students from correctly determining elapsed time when presented as a practical situation involving analog clocks. • When solving problems with elapsed time, students frequently want to just add or subtract the times given in the problem. • Students may struggle with the language in a problem, especially when the problem says someone “arrives at practice” at a given time and they “left their house” at an

<table>
<tr><td></td><td>earlier time. Students should employ the same problem solving strategies of understand, plan, solve and look back when working with elapsed time. Also be sure to stay away from the idea of key words when providing story problems for students. Reinforce the idea of understanding what the problem is asking by having students restate what is happening in the problem in their own words, then act it out with appropriate manipulatives.
● Students may confuse which direction to go when completing an elapsed time question with either no start time, end time, or when the elapsed time and end time are given.</td></tr>
<tr><td>Understanding the Standard</td><td>Essential Knowledge and Skills</td></tr>
<tr><td>● Elapsed time is the amount of time that has passed between two given times.
● Elapsed time should be modeled and demonstrated using analog clocks and timelines.
● Elapsed time can be found by counting on from the beginning time or counting back from the ending time.</td><td>The student will use problem solving, mathematical communication, mathematical reasoning, connections, and representations to
● Solve practical problems related to elapsed time in hours and minutes, within a 12-hour period (within a.m., within p.m., and across a.m. and p.m.):
○ when given the beginning time and the ending time, determine the time that has elapsed;
○ when given the beginning time and amount of elapsed time in hours and minutes, determine the ending time; or
○ when given the ending time and the elapsed time in hours and minutes, determine the beginning time.</td></tr>
<tr><td>Vocabulary</td><td rowspan="3">Instructional Activities Organized by Learning Objective
Textbook:
4.9
<u>EnVision Math</u>: Lesson 16-10 Elapsed Time (Problem of the Day, Spiral Review, Problem Based Interactive Learning, Visual</td></tr>
<tr><td>elapsed time, hour, minute</td></tr>
<tr><td>Assessment</td></tr>
</table>

Powerschool – Exam identifier	Learning, Algebra Connection, Intervention, Reteaching Master, Practice Master, Enrichment Master), Quick Check 16-10 EnVisionMath: Digital Path Topic: 16-10 Quiz EnVision Math: Lesson 16-12 Working Backwards (Problem of the Day, Spiral Review, Problem Based Interactive Learning, Visual Learning, Algebra Connection, Intervention, Reteaching Master, Practice Master, Enrichment Master), Quick Check 16-2 EnVision Math: Ready-Made Centers for Differentiated Instruction 16-10, 16-12 **Eureka Math** **4.9** Grade 3 Module 2 Topic A: Time Measurement and Problem Solving Grade 3 Module 2 Lesson 12: Round two-digit measurements to the nearest ten on the vertical number line **Notes** **Interactive Notebooks Math Grade 3** Time, pp 52-53 **Interactive Notebooks Math Grade 4** Elapsed Time, pp.52-53 **Resources** ● **Print:** ● **Technology-based:** o Elapsed Time Elapsed Time on a Clock **(use Internet Explorer)** o Elapsed Time Online Quiz o Elapsed Time Scenario Quiz

	o EnVisionMath Digital Path: Lesson: 16-10 Measurement Elapsed Time o Smart Exchange-smartboard interactive instructional resource o Gizmos: Elapsed Time o BrainPop: Elapsed Time o That Quiz Elapsed Time- interactive instructional resource o Elapsed Time T-Chart Strategy- interactive instructional resource o Study Jams Elapsed Time- interactive instructional resource o "Mr. Z Strategy"-(mainly for the teacher) o mathnook.com- printable math tasks o SOL Teacher- interactive skill practice and word wall content vocabulary cards **Station Activities/Manipulatives:** Write On, Wipe Off Clocks- When given a beginning time and an ending time, students will determine the elapsed time When given a beginning time and the amount of elapsed time, determine the ending time When given an ending time and the elapsed time, determine the beginning time
Cross-Curricular Connections	**Differentiation**

Literature Connections: **The Grouchy Ladybug** by Eric Carle Read Aloud Use post-it notes to develop different scenarios changing the times to allow for practice of change in time within a 12 hour time frame. EX. Instead of only changing an hour later for each page, give a more challenging increase in time and also change start times to allow for more appropriate practice.	

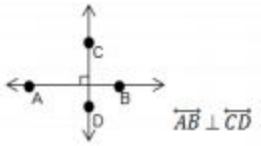
Strand: Number Sense	
4.10 The student will a) identify and describe points, lines, line segments, rays, and angles, including endpoints and vertices; and b) identify and describe intersecting, parallel, and perpendicular lines.  On the state assessment, items measuring this objective are assessed **WITH** the use of a calculator. Grades 4 and 5 mathematics assessments will include a Desmos four-function calculator on the section of the test in which a calculator is allowed.	
Suggested Pacing	
Related Spiraling Standards	
3.11 The student will identify and draw representations of points, lines, line segments, rays, and angles.	5.12 The student will classify and measure right, acute, obtuse, and straight angles.
Essential Questions	**Common Misconceptions**
• How are the concepts of points, lines, line segments, rays, angles, endpoints, and vertices important when describing and comparing geometric figures? • Where can we find points, lines, line segments, rays, and angles in the world around us? • How do we use symbolic notations when naming points, lines, line segments, rays, and angles? • Where are parallel, perpendicular, and intersecting lines found in plane and solid figures? • How do parallel and intersecting lines differ? • What is the relationship between perpendicular lines and intersecting lines? • What are real-world examples which illustrate parallel,	• Students may struggle to understand that points, rays and line segments are all parts of a line. • Because we frequently refer to any straight line segment as a "line" in our everyday language, students may confuse the terms line and line segment. They may believe that the sides of polygons are constructed of lines instead of line segments. • Students may struggle with writing the symbolic notation for ray because the first letter named should be the endpoint. • Students may not realize that there are 3 ways to name an angle: 1 letter for the vertex, 3 letters in order (1 for vertex, 1 for a ray, 1 for the other ray), and a number inside of the rays

intersecting, and perpendicular lines? ● How do we use symbolic notation to describe parallel and perpendicular lines?	of the angle. ● Students are often confused by the fact that perpendicular lines are a special case for intersecting lines because the lines must be 90 degree angles and that they should be classified as both perpendicular and intersecting.
Understanding the Standard	**Essential Knowledge and Skills**
● Points, lines, line segments, rays, and angles, including endpoints and vertices are fundamental components of noncircular geometric figures. ● A point is a location in space. It has no length, width, or height. A point is usually named with a capital letter. ● The shortest distance between two points in a plane, a flat surface, is a line segment. ● A line is a collection of points extending infinitely in both directions. It has no endpoints. When a line is drawn, at least two points on it can be marked and given capital letter names. Arrows must be drawn to show that the line goes on infinitely in both directions (e.g., $\overleftrightarrow{AB}$ read as "line AB"). ● A line segment is part of a line. It has two endpoints and includes all the points between and including the endpoints. To name a line segment, name the endpoints (e.g., $\overline{AB}$ read as "line segment AB"). ● A ray is part of a line. It has one endpoint and extends infinitely in one direction. To name a ray, say the name of its endpoint first and then say the name of one other point on the ray (e.g., $\overrightarrow{AB}$ read as "ray AB"). ● An angle is formed by two rays that share a common endpoint called the vertex. Angles are found wherever lines or line segments intersect. ● An angle can be named in three different ways by using: - three letters in order: a point on one ray, the vertex, and a	**The student will use problem solving, mathematical communication, mathematical reasoning, connections, and representations to** ● Identify and describe points, lines, line segments, rays, and angles, including endpoints and vertices. (a) ● Use symbolic notation to name points, lines, line segments, rays, and angles. (a) ● Identify parallel, perpendicular, and intersecting line segments in plane and solid figures. (b) ● Identify practical situations that illustrate parallel, intersecting, and perpendicular lines. (b) ● Use symbolic notation to describe parallel lines and perpendicular lines. (b)

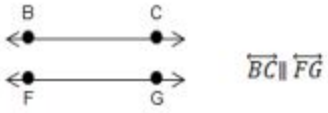
point on the other ray;

- one letter at the vertex; or
- a number written inside the rays of the angle.

- A vertex is the point at which two lines, line segments, or rays meet to form an angle. In solid figures, a vertex is the point at which three or more edges meet.
- Lines in a plane either intersect or are parallel. Perpendicularity is a special case of intersection.
- Intersecting lines have one point in common.
- Perpendicular lines intersect at right angles. The symbol ⊥ is used to indicate that two lines are perpendicular. For example, $\overleftrightarrow{AB} \perp \overleftrightarrow{CD}$ the notation is read as "line AB is perpendicular to line CD."



- Students need experiences using geometric markings in figures to indicate congruence of sides and angles and to indicate parallel sides.
- Parallel lines lie in the same plane and never intersect. Parallel lines are always the same distance apart and do not share any points. The symbol // indicates that two or more lines are parallel. For example, the notation $\overleftrightarrow{BC} \parallel \overleftrightarrow{FG}$ is read as "line BC is parallel to line FG".



Vocabulary	**Instructional Activities Organized by Learning Objective**
point, line, line segment, ray, angle, vertex (vertices), endpoint,	**Textbook:**

infinite, parallel, intersect, perpendicular **Assessment** **Powerschool** – Exam identifier	**4.10a** EnVision Math: Lesson 9 -1 Points, Lines, and Planes (Review, Problem Based Interactive Learning, Visual Learning, Algebra Connection, Intervention, Reteaching Master, Practice Master, Enrichment Master EnVision Math: Lesson 9-2 Line Segments, Rays, and Angles (Review, Problem Based Interactive Learning, Visual Learning, Algebra Connection, Intervention, Reteaching Master, Practice Master, Enrichment Master EnVision Math: Ready-Made Centers for Differentiated Instruction 9-1, 9-.2 **4.10b** EnVision Math: Lesson 9-1 Perpendicular and Parallel (Problem of the Day, Spiral Review, Problem Based Interactive Learning, Visual Learning, Algebra Connection, Intervention, Reteaching Master, Practice Master, Enrichment Master) EnVision Math: Ready-Made Centers for Differentiated Instruction 9-1 **Eureka Math** **4.10a,b** Grade 4 Module 4: Angle Measures and Plane Figures **Notes:** **Interactive Notebooks Math Grade 4** Points, Lines, and Rays, pp. 60-61 (a) Introduction to Angles, pp. 64-65 (a) Parallel and Perpendicular Lines, pp. 62-63 (b)

	Resources: ● **Print:** **FACEing Math: Elementary Topics** Lesson 17: Lines, Segments, Angles & Polygons (a) ● **Technology-based** o Geometry Review Game- (a) o Symbolic Notation in Geometry (a) ● **Study Jams** ○ Geometry types of Lines Video (a) ● **BrainPop Jr:** ○ Points, Lines, Segments, Rays (a) ○ Parallel and Perpendicular Lines (b) ● **Gizmos:** ○ **Parallel, Intersecting, and Skew Lines (b)** **Station Activities/Manipulatives:**
Cross-Curricular Connections	**Differentiation**
Literature Connections: **The Straight Line Wonder** by Mem Fox Read Aloud Students each use a pipe cleaner to demonstrate points, lines, segments and rays. **Straight Lines, Parallel Lines, Perpendicular Lines** by Mannis Charosh Find examples of lines and their relationships in the classroom. **Lines, Segments, Rays, and Angles** by Claire Piddock	

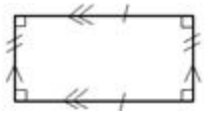
Strand: Number Sense	
4.11 The student will identify, describe, compare, and contrast plane and solid figures according to their characteristics (number of angles, vertices, edges, and the number and shape of faces) using concrete models and pictorial representations.  On the state assessment, items measuring this objective are assessed **WITH** the use of a calculator. Grades 4 and 5 mathematics assessments will include a Desmos four-function calculator on the section of the test in which a calculator is allowed.	
Suggested Pacing	
Related Spiraling Standards	
3.12 The student will a) define polygon; b) identify and name polygons with 10 or fewer sides; and c) combine and subdivide polygons with three or four sides and name the resulting polygon(s).	5.13 The student will a) classify triangles as right, acute, or obtuse and equilateral, scalene, or isosceles; and b) investigate the sum of the interior angles in a triangle and determine an unknown angle measure.
Essential Questions	**Common Misconceptions**
• What are some examples of real world models of a cube, rectangular prism, square pyramid, sphere, cone, and cylinder? • How are sides, angles, vertices, edges, and faces used to describe plane and solid geometric figures? • How can the characteristics (attributes) of geometric figures be used to recognize and define them? • What are the differences and similarities between and among plane and solid geometric shapes according to their characteristics (attributes)?	• Students may get confused by the pictorial representation of a solid figure, especially when all faces, edges and vertices are not visible. It is always best to have concrete examples. • Students should be using the vocabulary of sides, angles, vertex (vertices) and right angles. While it is still completely appropriate for students to refer to "corners," as teachers we need to use corners, angles, and vertices interchangeably. • Students often struggle with the vocabulary of faces and edges. Help students make the connection that the straight

	sides of the plane figures they are already familiar with are joined on a solid figure to create an edge. ● Students struggle to name shapes within a hierarchy, and may not realize that a cube is always a rectangular prism, but a rectangular prism is not always a cube.
Understanding the Standard	**Essential Knowledge and Skills**
● The study of geometric figures must be active, using visual images and concrete materials (tools such as graph paper, pattern blocks, geoboards, geometric solids, and computer software tools). ● Opportunity must be provided for building and using geometric vocabulary to describe plane and solid figures. ● A plane figure is any closed, two-dimensional shape. ● A solid figure is three-dimensional, having length, width, and height. ● A face is any flat surface of a solid figure. ● An angle is formed by two rays with a common endpoint called the *vertex*. Angles are found wherever lines and/or line segments intersect. ● An edge is the line segment where two faces of a solid figure intersect. ● A vertex is the point at which two or more lines, line segments, or rays meet to form an angle. In solid figures, a vertex is the point at which three or more faces meet. ● A cube is a solid figure with six congruent, square faces. All edges are the same length. A cube has eight vertices and 12 edges. ● A rectangular prism is a solid figure in which all six faces are rectangles. A rectangular prism has eight vertices and 12 edges. A cube is a special case of a rectangular prism. ● A sphere is a solid figure with all of its points the same distance from its center.	**The student will use problem solving, mathematical communication, mathematical reasoning, connections, and representations to** ● Identify concrete models and pictorial representations of solid figures (cube, rectangular prism, square pyramid, sphere, cone, and cylinder). ● Identify and describe solid figures (cube, rectangular prism, square pyramid, and sphere) according to their characteristics (number of angles, vertices, edges, and by the number and shape of faces). ● Compare and contrast plane and solid figures (circle/sphere, square/cube, triangle/square pyramid, and rectangle/ rectangular prism) according to their characteristics (number of sides, angles, vertices, edges, and the number and shape of faces).

- A square pyramid is a solid figure with a square base and four faces that are triangles with a common vertex. A square pyramid has five vertices and eight edges.
- Characteristics of solid figures included at this grade level are defined in the chart below:

Solid Figure	# of Faces	Shape of Faces	# of Edges	# of Vertices
Cube	6	Squares	12	8
Rectangular Prism	6	Rectangles	12	8
Square Pyramid	5	Square/Triangles	8	5
Sphere	0	N/A	0	0

- A quadrilateral is a polygon with four sides.
- A parallelogram is a quadrilateral with both pairs of opposite sides parallel and congruent.
- Congruent figures have the same size and shape. Congruent sides are the same length.
- A rectangle is a quadrilateral with four right angles, and, opposite sides that are parallel and congruent.
- The geometric markings shown on the rectangle below indicate parallel sides with an equal number of arrows and congruent sides indicated with an equal number of hatch (hash) marks.



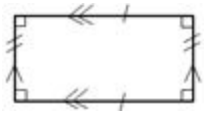
- A square is a rectangle with four congruent sides and four right angles.
- A trapezoid is a quadrilateral with exactly one pair of parallel sides.
- A rhombus is a quadrilateral with four congruent sides. Properties of a rhombus include the following:
    - opposite sides are congruent
    - opposite sides are parallel
    - opposite angles are congruent

Vocabulary	Instructional Activities Organized by Learning Objective
circle, square, rectangle, triangle, cube, rectangular solid prism, square pyramid, sphere, cone, cylinder, side, face, edge, angle, vertex, right angle	**Textbook** enVision Math: Lesson 15-1 Solids (Problem of the Day, Spiral Review, Problem Based Interactive Learning,Visual Learning, Intervention, Reteaching Master, Practice Master, Enrichment Master, Quick Checks) enVision Math: Lesson 15-2 Views of Solids: Nets (Problem of the Day, Spiral Review, Problem Based Interactive Learning,Visual Learning, Intervention, Reteaching Master, Practice Master, Enrichment Master, Quick Checks) enVision Math: Lesson 15-3 Views of Solids: Perspective (Problem of the Day, Spiral Review, Problem Based Interactive Learning,Visual Learning, Intervention, Reteaching Master, Practice Master, Enrichment Master, Quick Checks) EnVision Math: Ready-Made Centers for Differentiated Instruction 15-1, 15-2, 15-3 **Eureka Math** Grade 4 Module 4 Topic D: Two-Dimensional Figures and Symmetry **Notes** **Resources** ● **Print** ● **Technology-based:** o Quadrilateral online practice **Station Activities/Manipulatives:**
Assessment	
Powerschool – Exam identifier	

	Attribute Blocks: When given a set of attribute blocks, the student will be able to classify the block by its characteristics (number of sides and angles). Pattern Blocks: When given pattern blocks, the student will use the pieces to create another polygon. The student will be able to name the pieces used to create the new shape.
Cross-Curricular Connections	**Differentiation**
Literature Connections: **The Greedy Triangle** by Marilyn Burns Read Aloud Count the number of sides, vertices, and angles of various plane figures in the book. Have available precut circles, squares, rectangles, and triangles for students to use to create their own pictures. Students include a story about the shapes they used. **Captain Invincible and the Space Shapes** by Stuart Murphy Read Aloud Use to introduce three-dimensional shapes, including cubes, cones, and square pyramids. **The Important Book** by Margaret Wise Brown Read Aloud What is the important thing about a square? A circle? Have students work in groups to generate paragraphs detailing the characteristics of 2D and 3D shapes.	

Cubes, Cones, Cylinders, and Spheres by Tana Hoban Make a class collection of 3D shape objects. **Mummy Math: An Adventure in Geometry** by Cindy Neuschwander Read Aloud Have students identify the different geometric solids as you read the story. Have students explore geometric solids and determine the number and types of faces, the number of edges, and the number of vertices.	

Strand: Number Sense	
4.12 The student will classify quadrilaterals as parallelograms, rectangles, squares, rhombi, and/or trapezoids.  On the state assessment, items measuring this objective are assessed **WITH** the use of a calculator. Grades 4 and 5 mathematics assessments will include a Desmos four-function calculator on the section of the test in which a calculator is allowed.	
Suggested Pacing	
Related Spiraling Standards	
3.12 The student will a) define polygon; b) identify and name polygons with 10 or fewer sides; and c) combine and subdivide polygons with three or four sides and name the resulting polygon(s).	5.13 The student will a) classify triangles as right, acute, or obtuse and equilateral, scalene, or isosceles; and b) investigate the sum of the interior angles in a triangle and determine an unknown angle measure.
Essential Questions	**Common Misconceptions**
• What is a polygon? Why isn't a circle a polygon? • What is a quadrilateral? • How can the properties of specific polygons be used to define and classify them? • How are parallelograms, rectangles, squares, and rhombi similar? • How are trapezoids different from parallelograms, rectangles, squares, and rhombi? • How are a rectangle and square similar? Different? • How are a square and rhombus similar? Different? • How can geometric markings on pictorial representations of quadrilaterals help identify parallel and/or congruent sides, and right angles?	• Students may get confused between the geometric markings for parallel sides and congruent sides. • Students struggle to name shapes within a hierarchy, and may not realize that a square can also be classified as a parallelogram, a rectangle, and a rhombus. • Students have a common misconception that changing the orientation of an object changes what shape it is. Students will frequently refer to a rotated square as a diamond. Clarification needs to be ongoing (e.g., a square is a square regardless of its location in space; there is no plane figure

	called a diamond).
Understanding the Standard	**Essential Knowledge and Skills**
• A quadrilateral is a polygon with four sides. • A parallelogram is a quadrilateral with both pairs of opposite sides parallel and congruent. • Congruent figures have the same size and shape. Congruent sides are the same length. • A rectangle is a quadrilateral with four right angles, and, opposite sides that are parallel and congruent. • · The geometric markings shown on the rectangle below indicate parallel sides with an equal number of arrows and congruent sides indicated with an equal number of hatch (hash) marks.  • A square is a rectangle with four congruent sides and four right angles. • ·A trapezoid is a quadrilateral with exactly one pair of parallel sides. • A rhombus is a quadrilateral with four congruent sides. Properties of a rhombus include the following: ○ opposite sides are congruent ○ opposite sides are parallel ○ opposite angles are congruent	**The student will use problem solving, mathematical communication, mathematical reasoning, connections and representation to** • Develop definitions for parallelograms, rectangles, squares, rhombi, and trapezoids. • Identify properties of quadrilaterals including parallel, perpendicular, and congruent sides. • Classify quadrilaterals as parallelograms, rectangles, squares, rhombi, and/or trapezoids. • Compare and contrast the properties of quadrilaterals. • Identify parallel sides, congruent sides, and right angles using geometric markings to denote properties of quadrilaterals.
Vocabulary	**Instructional Activities Organized by Learning Objective**

polygon, quadrilateral, parallelogram, rectangle, square, rhombus (rhombi), trapezoid, parallel, perpendicular, congruent, right angle	**Textbook:** **4.12** EnVision Math: Lesson 9-6 Quadrilaterals (Problem of the Day, Spiral Review, Problem Based Interactive Learning, Visual Learning, Algebra Connection, Intervention, Reteaching Master, Practice Master, Enrichment Master), Quick Check EnVision Math: Ready-Made Centers for Differentiated Instruction 9-6 **Eureka Math** Grade 5 Module 5 Topic D: Drawing, Analysis, and Classification of Two-Dimensional Shapes **Notes:** **Interactive Notebooks Math Grade 3** Quadrilaterals, pp 74-75 **Resources:** ● **Print:** o FACEing Math: Elementary Topics ▪ Lesson 19: Quadrilaterals ● **Technology-based:** o EnVisionMath: Digital Path Lesson 9-6 Geometry: Quadrilaterals o Matching Shapes Game - o Virtual Geoboard - o Interactive Quadrilaterals o Quadrilateral Shape Game-. **(use Internet Explorer)** o Gizmos: Classifying Quadrilaterals o Math Antics: Quadrilaterals video o NUMBEROCK Quadrilaterals Song For Kids video
Assessment **Powerschool** – Exam identifier	

	o SOL Teacher interactive skill practice and word wall content vocabulary cards **Station Activities/Manipulatives:** **Pattern Blocks** **Geo Sticks** **Geoboards**
Cross-Curricular Connections	**Differentiation**
Literature Connections: **Three Pigs, One Wolf and Seven Magic Shapes** by Grace Maccarone Identify properties of shapes and congruence of shapes. Have students show transformations with various shapes. **Shape Up!** by David A. Adler **If You Were a Polygon** by Marcie Aboff **Polygon Song** **The Greedy Triangle** by Marilyn Burns Read Aloud Assign small groups of students a polygon. Each group should generate a list of everyday objects that are examples of a triangle, quadrilateral, etc. **Grandfather Tang's Story** by Tompert Read Aloud	

Lesson **The Silly Story of Goldilocks and the Three Squares** by Grace Maccarone Read Aloud	

Strand: Number Sense	
4.13 The student will a) determine the likelihood of an outcome of a simple event; b) represent probability as a number between 0 and 1, inclusive; and c) create a model or practical problem to represent a given probability. On the state assessment, items measuring this objective are assessed **WITH** the use of a calculator. Grades 4 and 5 mathematics assessments will include a Desmos four-function calculator on the section of the test in which a calculator is allowed.	
Suggested Pacing	
Related Spiraling Standards	
3.14 The student will investigate and describe the concept of probability as a measurement of chance and list possible outcomes for a single event.	5.15 The student will determine the probability of an outcome by constructing a sample space or using the Fundamental (Basic) Counting Principle.
Essential Questions	**Common Misconceptions**
• What types of real-world situations involve probability? • How is the probability of an event occurring determined and described? • How can the measure of the probability of an event be	• Students often believe that probability is somehow connected to a person's "luck." They tend to think all events are equally likely and happen purely by chance or that a specific event

represented by a number between 0 and 1? ● How can we use models to (a) determine the total number of probable outcomes of an event and (b) the likelihood of a specific outcome?	may be more likely to happen if they "wish for" it to happen or are "lucky." ● When working with spinners, students often think that probability is determined by the number of sections rather than size of sections. Students should have experiences with a variety of equally partitioned and randomly partitioned spinners to eliminate this misconception. ● Students may struggle with the idea of an event being both "unlikely" and "equally likely" depending on the wording of the sentence. Rolling a 1 on a standard die is unlikely. However rolling a 1 on a standard die is as likely as rolling any other number.
Understanding the Standard	**Essential Knowledge and Skills**
● A spirit of investigation and experimentation should permeate probability instruction, where students are actively engaged in explorations and have opportunities to use manipulatives. ● Probability is the measure of likelihood that an event will occur. An event is a collection of outcomes from an investigation or experiment. ● The terms certain, *likely, equally likely, unlikely, and impossible* can be used to describe the likelihood of an event. If all outcomes of an event are equally likely, the probability of an event can be expressed as a fraction, where the numerator represents the number of favorable outcomes and the denominator represents the total number of possible outcomes. If all the outcomes of an event are equally likely to occur, the probability of the event is equal to: $\frac{\text{number of favorable outcomes}}{}$	**The student will use problem solving, mathematical communication, mathematical reasoning, connections, and representations to** ● Model and determine all possible outcomes of a given simple event where there are no more than 24 possible outcomes, using a variety of manipulatives (e.g., coins, number cubes, and spinners). (a) ● Determine the outcome of an event that is least likely to occur or most likely to occur where there are no more than 24 possible outcomes. (a) ● Write the probability of a given simple event as a fraction, where there are no more than 24 possible outcomes. (b) ● Determine the likelihood of an event occurring and relate it to its whole number or fractional representation (e.g., impossible or zero; equally likely; certain or one). (a, b) ● Create a model or practical problem to represent a given probability. (c)

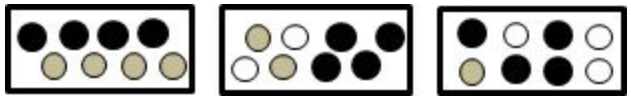
total number of possible outcomes.

.

- Probability is quantified as a number between 0 and 1. An event is "impossible" if it has a probability of 0 (e.g., if eight balls are in a bag, four yellow and four blue, there is zero probability that a red ball could be selected). An event is "certain" if it has a probability of one (e.g., the probability that if 10 coins, all pennies, are in a bag that it is certain a penny could be selected).
- For an event such as flipping a coin, the things that can happen are called outcomes. For example, there are two possible outcomes when flipping a coin: the coin can land heads up, or the coin can land tails up. The two possible outcomes, heads up or tails up, are equally likely.
- For another event such as spinning a spinner that is one-third red and two-thirds blue, the two outcomes, red and blue, are not equally likely.

- Equally likely events can be represented with fractions of equivalent value. For example, on a spinner with eight sections of equal size, where three of the sections are labeled G (green) and three are labeled B (blue), the chances of landing on green or on blue are equally likely; the probability of each of these events is the same, or $\frac{3}{8}$

- Students need opportunities to create a model or practical problem that represents a given probability. For example, if asked to create a box of marbles where the probability of selecting a black marble is $\frac{4}{8}$, sample responses might include:



- When a probability experiment has very few trials, the results can be misleading. The more times an experiment is done, the closer the experimental probability comes to the theoretical probability (e.g., a coin lands heads up half of the time).

Vocabulary	**Instructional Activities Organized by Learning Objective**
probability, chance, likelihood, likely, unlikely, certain, impossible, equally likely, chance, outcome	**Textbook:** **4.13a** EnVision Math: Lesson 20-3 Writing Probability as a Fraction (Problem of the Day, Spiral Review, Problem Based Interactive Learning, Visual Learning, Algebra Connection, Intervention, Reteaching Master, Practice Master, Enrichment Master), Quick Check
Assessment	
Powerschool – Exam identifier	

	EnVision Math: Ready-Made Centers for Differentiated Instruction 20-3 **4.13b** EnVision Math: Lesson 20-3 Writing Probability as a Fraction (Problem of the Day, Spiral Review, Problem Based Interactive Learning, Visual Learning, Algebra Connection, Intervention, Reteaching Master, Practice Master, Enrichment Master,Quick Check EnVision Math: Ready-Made Centers for Differentiated Instruction 20-3 **4.13c** EnVision Math: Lesson 20-4 Using Reasoning Problem of the Day, Spiral Review, Problem Based Interactive Learning, Visual Learning, Algebra Connection, Intervention, Reteaching Master, Practice Master, Enrichment Master), Quick Check EnVision Math: Ready-Made Centers for Differentiated Instruction 20-4 **Eureka Math** **4.13a** Grade 7 Module 5 Lesson 2: Estimating Probabilities by Collecting Data **4.13b** Grade 7 Module 5 Lesson 1: Chance Experiments **4.13c** Grade 7 Module 5 Topic A: Calculating and Interpreting Probabilities

	Notes **Interactive Notebooks Math Grade 4** Probability, pp 58-59 (a,b) **Interactive Notebooks Math Grade 5** Probability, pp. 68-69 (a,b) **Resources:** ● **Print** ● **Technology-based:** o Spinner Game **(use internet explorer) (a,b)** o Probability Game**(use internet explorer)(a)** o Probability Tables **(use internet explorer)(a)** o EnVision Math: Games CD Probability Pond (a) o EnVisionMath: Digital Lesson 20-03 Writing Probability as a Fraction (b) o Sheppard Software Matching Software- educational review game (a) o That Quiz..Probability-interactive skill practice(a) o SOL Teacher interactive skill practice and word wall content vocabulary cards (a) o BrainPop Probability (a,b) o Study Jams: ▪ Probability-likelihood (a,b) ▪ Probability as a fraction (b) ▪ Identifying outcomes and making predictions (a) ▪ Combinations (c) **Station Activities/Manipulatives:**

	Foam Cubes (1-6): When given a number cube, the student will be able to determine an outcome of an event and represent the probability as a number between 0 and 1. Spinners and Die: When given a spinner and die, the student will be able to model and determine all possible outcomes. Coins: When given two coins, the student will be able to model and determine all possible outcomes. When given a coin, the student will be able to represent the probability as a number between 0 and 1. Linking Cubes: When given linking cubes, the student will be able to write the probability of a given event as a fraction. Blank Spinners When given blank spinners, the student will be able to create a spinner based on particular criteria and justify their thinking.
Cross-Curricular Connections	**Differentiation**
Literature Connections: **Dear Mr. Blueberry** by Simon James Read Aloud Discuss the likelihood of a whale living in Emily's pond. Elicit the word *impossible* as defined in the book. Hang a probability line chart on the wall and have students generate pictures/statements to place under the appropriate word.	

<u>The Thirteen Days of Halloween</u> by Carol Greene Students find probability of picking a hissing cat out of all of the animals in the story.	

Strand: Number Sense
4.14 The student will a) collect, organize, and represent data in bar graphs and line graphs; b) interpret data represented in bar graphs and line graphs; and c) compare two different representations of the same data (e.g., a set of data displayed on a chart and a bar graph, a chart and a line graph, or a pictograph and a bar graph).

 On the state assessment, items measuring this objective are assessed **WITH** the use of a calculator. Grades 4 and 5 mathematics assessments will include a Desmos four-function calculator on the section of the test in which a calculator is allowed.

Suggested Pacing	
Related Spiraling Standards	
3.15 The student will a) collect, organize, and represent data in pictographs or bar graphs; and b) read and interpret data represented in pictographs and bar graphs.	5.16 The student, given a practical problem, will a) represent data in line plots and stem-and-leaf plots; b) interpret data represented in line plots and stem-and-leaf plots; and c) compare data represented in a line plot with the same data represented in a stem-and-leaf plot.
Essential Questions	**Common Misconceptions**
• What types of questions generate categorical data?...numerical data? • Which type of graph is most appropriate for a given set of data? • How are bar graphs constructed? …line graphs...? • Why are the title and labels of a graph important? • How do line graphs illustrate different rates of change?	• Students may struggle to think of data in graphs holistically and think of it as separate entities. • Students may recognize that the same data can be represented in multiple ways (ex. Chart, Bar Graph, Pictograph) and apply this generalization to line graphs as well, assuming that categorical data that can be presented in bar graphs or pictographs can also be presented in a line graph. • Students may get confused on a reasonable estimated for a value in between two increments on the scale. • Students often struggle to interpret trends in a line graph, especially when there is a horizontal line on the graph indicating no change over time.
Understanding the Standard	**Essential Knowledge and Skills**

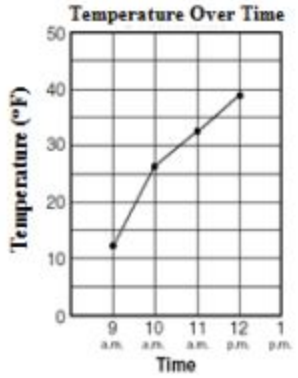
● Data analysis helps describe data, recognize patterns or trends, and make predictions. ● Investigations involving practical data should occur frequently; data can be collected through brief class surveys or through more extended projects taking many days ● Students formulate questions, predict answers to questions under investigation, collect and represent initial data, and consider whether the data answer the questions. ● There are two types of data: categorical (e.g., qualitative) and numerical (e.g., quantitative). Categorical data are observations about characteristics that can be sorted into groups or categories, while numerical data are values or observations that can be measured. For example, types of fish caught would be categorical data while weights of fish caught would be numerical data. While students need to be aware of the differences, they do not have to know the terms for each type of data. ● Bar graphs display grouped data such as categories using rectangular bars whose length represents the quantity the bar represents. Bar graphs should be used to compare counts of different categories (categorical or qualitative data). Grid paper can assist students in creating graphs with greater accuracy. ○ A bar graph uses horizontal or vertical bars to represent counts for several categories. One bar is used for each category, with the length of the bar representing the count for that category. ○ There is space before, between, and after the bars. ○ The axis that displays the scale representing the count for the categories should begin at zero and extend one increment above the greatest recorded piece of data. Grade four students should collect and represent data that are recorded in increments of whole numbers, usually multiples of 1, 2, 5, 10, or 100.	**The student will use problem solving, mathematical communication, mathematical reasoning, connections, and representations to** ● Collect data, using, for example, observations, measurement, surveys, scientific experiments, polls, or questionnaires. (a) ● Organize data into a chart or table. (a) ● Represent data in bar graphs, labeling one axis with equal whole number increments of one or more (numerical data) (e.g., 2, 5, 10, or 100) and the other axis with categories related to the title of the graph (categorical data) (e.g., swimming, fishing, boating, and water skiing as the categories of "Favorite Summer Sports"). (a) ● Represent data in line graphs, labeling the vertical axis with equal whole number increments of one or more and the horizontal axis with continuous data commonly related to time (e.g., hours, days, months, years. Line graphs will have no more than 10 identified points along a continuum for continuous data. (a) ● Title the graph or identify an appropriate title. Label the axes or identify the appropriate labels. (a) ● Interpret data by making observations from bar graphs and line graphs by describing the characteristics of the data and the data as a whole (e.g., the time period when the temperature increased the most, the category with the greatest/least, categories with the same number of responses, similarities and differences, the total number). One set of data will be represented on a graph. (b) ● Interpret data by making inferences from bar graphs and line graphs. (b) ● Interpret the data to answer the question posed, and compare the answer to the prediction (e.g., "The summer sport preferred by most is swimming, which is what I predicted before collecting the data."). (b)

○ Each axis should be labeled, and the graph should be given a title. ● Statements representing an analysis and interpretation of the characteristics of the data in the graph (e.g., similarities and differences, least and greatest, the categories, and total number of responses) should be written. ● Line graphs are used to show how two data sets (numerical or quantitative data) are related. Line graphs may be used to show how one variable changes over time (numerical or quantitative data). By looking at a line graph, it can be determined whether the change in the data set is increasing, decreasing, or staying the same over time ○ The values along the horizontal axis represent continuous data, usually some measure of time (e.g., time in years, months, or days). The data presented on a line graph is referred to as "continuous data," as it represents data collected over a continuous period of time. ○ The values along the vertical axis represent the range of values in the collected data set at the given time interval on the horizontal axis. The scale values on the vertical axis should represent equal increments of multiples of whole numbers, fractions, or decimals, depending upon the data being collected. The scale should extend one increment above the greatest recorded piece of data. ○ Plot a point to represent the data collected for each time increment. Use line segments to connect the points in order moving left to right. ○ Each axis should be labeled, and the graph should be given a title. ○ Statements representing an analysis and interpretation of the characteristics of the data in the graph should	● Write at least one sentence to describe the analysis and interpretation of the data, identifying parts of the data that have special characteristics, including categories with the greatest, the least, or the same. (b) ● Compare two different representations of the same data (e.g., a set of data displayed on a chart and a bar graph; a chart and a line graph; a pictograph and a bar graph). (c)

be included (e.g., trends of increase and/or decrease, and least and greatest). ● For example, a line graph documenting data gathered during a planting cycle might show length of time and the height of a plant at any given interval. ● Different situations call for different types of graphs. The way data are displayed is often dependent upon what someone is trying to communicate ● Comparing different types of representations (charts and graphs) provide students an opportunity to learn how different graphs can show different aspects of the same data. Following construction of graphs, students benefit from discussions around what information each graph provides ● Tables or charts organize the exact data and display numerical information. They do not show visual comparisons, which generally means it takes longer to understand or to examine trends. ● Line graphs display data that changes continuously over time. This allows overall increases or decreases to be seen more readily. ● Bar graphs can be used to compare data easily and see relationships. They provide a visual display comparing the numerical values of different categories. The scale of a bar graph may affect how one perceives the data. ● Examples of some questions that could be explored in comparing a chart to a line graph include: In which representation do you readily see the increase or decrease of temperature over time? In which representation is it easiest to determine when the greatest rise in temperature occurred?	

Temperature Over Time

Time	Temperature
9 a.m.	12
10 a.m.	26
11 a.m.	33
12 p.m.	39



Vocabulary

data, graph, bar graph, line graph, increase, decrease, difference, trend

Assessment

Powerschool – Exam identifier

Instructional Activities Organized by Learning Objective

Textbook:

4.14a

EnVision Math: Lesson 17-5 Line Graphs (Problem of the Day, Spiral Review, Problem Based Interactive Learning, Visual Learning, Algebra Connection, Intervention, Reteaching Master, Practice Master, Enrichment Master), Quick Check 17-5

EnVision Math: Lesson 17-10 Problem Solving: Make a Graph

EnVision Math: Topic 17 Data and Graphs Reteaching Set A, Set B, Set E, Set K

EnVision Math: Ready-Made Centers for Differentiated Instruction 17-5, 17-10

4.14b

EnVision Math: Lesson 17-1 Data from Surveys Numbers (Problem of the Day, Spiral Review, Problem Based Interactive Learning, Visual Learning, Algebra Connection, Intervention, Reteaching Master, Practice Master, Enrichment Master), Quick Check 17-1

	EnVision Math: Lesson 17-2 Interpreting Graphs (Problem of the Day, Spiral Review, Problem Based Interactive Learning, Visual Learning, Algebra Connection, Intervention, Reteaching Master, Practice Master, Enrichment Master), Quick Check 17-2 EnVision Math: Ready-Made Centers for Differentiated Instruction 17-1, 17-2 **4.14c** EnVisionMath: Digital Path Lesson/video 18-02 (5th grade lesson Bar graphs and Pictographs) **Eureka Math** **4.14a** Grade 3 Module 6: Collecting and Displaying Data **4.14b** Grade 3 Module 6: Collecting and Displaying Data **4.14c** Grade 3 Module 6: Collecting and Displaying Data **Notes** **Interactive Notebooks Math Grade 5** Line Graphs, pp 58-59 (a,b) **Resources** ● **Print** ● **Technology-based** o Create a Graph.(a) o Constructing Line Graphs Interpreting Line Graphs (c)

	o Line Graph Interpretation (c) o Brain pop: Comparing charts and bar graphs (c) o LearnZillion: Comparing bar graph and a pictograph (c) o Explore Learning: Mascot Election (Pictographs and Bar Graphs) (c) **Station Activities/Manipulatives:** Counters (insect, fruit, and pet): When given a collection of pet counters, the student will be able to create a graph. The student will compare and contrast his/her graph with other classmates. Pattern Blocks: When given pattern blocks, the student will be able to create a graph based on the characteristics of the shapes in the student's collection. The student will compare and contrast his/her graph with other classmates. Linking Cubes: When given a collection of linking cubes, the student will create a graph showing the number of colors. The student will then compare and contrast his/her graph with other classmates Student Thermometers: When given a thermometer, the student will be able to collect and record data about the temperature for a week. The student will be able to use the data to create a line graph.
Cross-Curricular Connections	**Differentiation**

Literature Connections: **The Great Turkey Walk** by Kathleen Karr Use data such as the state in which each child was born. **Wilma Unlimited: How Wilma Rudolph Became the World's Fastest Woman** by Kathleen Krull Read Aloud **The Great Graph Contest** by Loreen Leedy Read Aloud	

Strand: Number Sense	
4.15 The student will identify, describe, create, and extend patterns found in objects, pictures, numbers, and tables.  On the state assessment, items measuring this objective are assessed **WITH** the use of a calculator. Grades 4 and 5 mathematics assessments will include a Desmos four-function calculator on the section of the test in which a calculator is allowed.	
Suggested Pacing	
Related Spiraling Standards	
3.16 The student will identify, describe, create, and extend patterns found in objects, pictures, numbers and tables.	5.18 The student will identify, describe, create, express, and extend number patterns found in objects, pictures, numbers and tables.
Essential Questions	**Common Misconceptions**
• What is a pattern? • How can we describe repeating and growing patterns using words, tables, graphs, or symbols? • How can numerical patterns be represented and extended using objects, number lines, tables, graphs, and symbols? • How can pattern identification be used to solve problems? • How can we analyze patterns to identify the rule in a single operation numerical pattern found in a table?	• Students may not make connections that patterns can be represented in many ways and described using words, tables, graphs, and symbols. • Students may not make connections between concrete materials and numerical representations (number sequence, and tables.) • Students may confuse growing patterns with repeating patterns and if not given many opportunities to explore patterns using concrete materials and calculators, they may not gain understanding of these patterns. • Students may struggle with finding an unknown term in a pattern when it is not the very next item. Students often give

	the next item in a pattern when asked to find the 12th or 15th item. ● When working with input/output tables, students may have difficulty figuring out the unknown value without several examples modeled. They have had experiences in 3rd grade with this so it should not be new material. ● Students need to recognize that the rule in an input/output table is read across the input/output and not from output to output or input to input. ● Students may have difficulties with identifying the rule for a table (from input to output) and may just look at the other numbers misleading them into an incorrect rule or unknown. ● When students are looking at growing patterns with objects, they may not recognize how the pattern is growing and need manipulatives to make the pattern. ● Students often assume that if a rule works for the first two numbers in a pattern that it can be applied to the entire pattern. Be sure to check if the pattern keeps working for multiple steps, because 4, 8… could be the beginning of plus 4, or times 2.
Understanding the Standard	**Essential Knowledge and Skills**
● Patterns and functions can be represented in many ways and described using words, tables, graphs, and symbols. ● Patterning activities should involve making connections between concrete materials and numerical representations (e.g., number sequence, table, description). Numeric patterns, at this level, will include both growing and repeating patterns (limited to addition, subtraction, and multiplication of whole	**The student will use problem solving, mathematical communication, mathematical reasoning, connections, and representations to** ● Identify and describe patterns, using words, objects, pictures, numbers, and tables. ● Create patterns using objects, pictures, numbers, and tables ● Extend patterns, using objects, pictures, numbers, and tables.

numbers and addition and subtraction of fractions with like denominators of 12 or less) ● Students need experiences with growing patterns using concrete materials and calculators. ● Reproduction of a given pattern in a different representation, using symbols and objects, lays the foundation for writing the relationship symbolically or algebraically ● Sample growing patterns that are, or can be, represented as numerical (arithmetic) growing patterns include: ○ 2, 4, 8, 16, … ○ 8, 10, 13, 17, …; ○ $\frac{1}{4}$, $\frac{3}{4}$, 1 $\frac{4}{4}$, 1 $\frac{3}{4}$ ….; and  ● Students in grade three had experiences working with input/output tables. At this level, input/output tables should be analyzed for a pattern to determine an unknown value or describe the rule that explains how to find the output when given the input. Determining and applying rules builds the foundation for functional thinking. Sample input/output tables that require determination of the rule or missing terms can be found below:	● Solve practical problems that involve identifying, describing, and extending single-operation input and output rules, limited to addition, subtraction, and multiplication of whole numbers and addition and subtraction of fractions with like denominators of 12 or less ● Identify the rule in a single-operation numerical pattern found in a list or table, limited to addition, subtraction, and multiplication of whole numbers.

Rule ?			Rule ?			Rule ?	
Input	Output		Input	Output		Input	Output
4	11		145	130		2	8
5	12		100	85		4	16
6	13		75	60		?	20
10	17		50	?		8	32

Vocabulary

pattern, rule (function), table, number line, image

Assessment

Powerschool – Exam identifier

Instructional Activities Organized by Learning Objective

Textbook:
4.15
EnVision Math: Lesson 6-1 Algebra: Variables and Expressions (Problem of the Day, Spiral Review, Problem Based Interactive Learning, Visual Learning, Algebra Connection, Intervention, Reteaching Master, Practice Master, Enrichment Master), Quick Check 6-1

EnVision Math: Lesson 6-2 Algebra: Addition and Subtraction Expressions (Problem of the Day, Spiral Review, Problem Based Interactive Learning, Visual Learning, Algebra Connection, Intervention, Reteaching Master, Practice Master, Enrichment Master), Quick Check 6-2

EnVision Math: Lesson 6-3 Algebra: Multiplication and Division Expressions (Problem of the Day, Spiral Review, Problem Based Interactive Learning, Visual Learning, Algebra Connection, Intervention, Reteaching Master, Practice Master, Enrichment Master), Quick Check 6-3

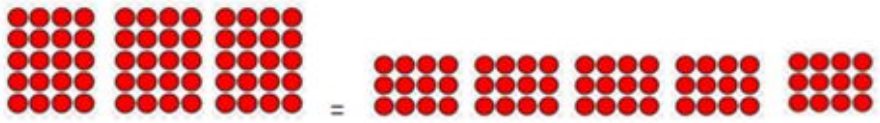
	EnVision Math: Ready-Made Centers for Differentiated Instruction 6-1, 6-2, 6-3 **Eureka Math** **4.15** Grade 4 Module 3 Topic F: Reasoning with Divisibility Grade 4 Module 5 Topic H: Exploring a Fraction Pattern **Notes:** **Interactive Notebooks Math Grade 4** Patterns, pp. 48-47 **Interactive Notebooks Math Grade 5** Graphing Patterns, pp 72-73 Numeric Patterns, pp 48-49 **Resources** ● **Print:** FACEing Math: Elementary Topics ● Lesson 11: Recognizing Functional Relationships and Patterns ● **Technology-based:** o Number Crunchers Number Pattern Mixed Review o Gizmos Function Machines 1 (Functions and Tables) **Station Activities/Manipulatives:** Square Tiles: When given square tiles, the student will create, extend, and describe patterns created by other students. Pattern Blocks:

	When given pattern blocks, the student will create, extend, and describe patterns. When given pattern blocks, the student will create, extend, and describe growing patterns using the following activity Patterns Linking Cubes: When given linking cubes, the student will create, extend, and describe patterns created by other students. Number Lines & Fraction Number Lines: When given a number line or a fraction line with numbers missing, the student is able to identify the pattern and complete the number line.
Cross-Curricular Connections	**Differentiation**
Literature Connections: **Chasing Vermeer** by Blue Balliett Play Guess My Rule with input and output. **One Grain of Rice** by Demi Read Aloud Ask, "How many grains of rice did Rani receive?" and "How could you use a table to figure this out?" Activity (uses money but the same function as story) **Two of Everything** by Lily Toy Hong Read Aloud Activity	

Strand: Number Sense	
4.16 The student will recognize and demonstrate the meaning of equality in an equation.  On the state assessment, items measuring this objective are assessed **WITH** the use of a calculator. Grades 4 and 5 mathematics assessments will include a Desmos four-function calculator on the section of the test in which a calculator is allowed.	
Suggested Pacing	
Related Spiraling Standards	
3.17 The student will create equations to represent equivalent mathematical relationships.	5.19 The student will a) investigate and describe the concept of variable; b) write an equation to represent a given mathematical relationship, using a variable; c) use an expression with a variable to represent a given verbal expression involving one operation; and d) create a problem situation based on a given equation, using a single variable and one operation.
Essential Questions	**Common Misconceptions**
• What is meant by the term “equality” in mathematics? • How is the “equal sign” in an equation like the fulcrum of a balance scale? • How can the truth of an equation be tested? • What is the associative property for addition? • What is the associative property for multiplication? • How can the associative property be used to compute more efficiently?	• Students must realize that equality is a relationship, not an operation. Many students have the misconception that the"=" sign means "the answer is." • Students often mistakenly believe that the equal sign means "and the answer is." Help to rectify this misconception by recording number sentences as 5 = 4 + 1. • Students often only look at the first number after the equal sign when determining if expressions are equivalent. Students may say that 2 + 1 = 3 + 2 because they are ignoring the 2 on the right side of this equation. Students should understand that the

	equal sign means "is the same as" or "another name for" or "equal in value." Students should also understand that equality represents a balance concept. Help students grapple with understanding that two expressions that have the same value can be represented in an equation by routinely recording examples such as $4 + 2 = 5 + 1$ • Students have a more challenging time describing expressions that are not equal and using the not equal appropriately.
Understanding the Standard	**Essential Knowledge and Skills**
• Mathematical relationships can be expressed using equations. • An expression is a representation of a quantity. It is made up of numbers, variables, and/or computational symbols. It does not have an equal symbol (e.g., 8, 15×12). • An equation represents the relationship between two expressions of equal value (e.g., $12 \times 3 = 72 \div 2$). • The equal symbol (=) means that the values on either side are equivalent (balanced). • The not equal symbol ($\neq$) means that the values on either side are not equivalent (not balanced).	**The student will use problem solving, mathematical communication, mathematical reasoning, connections, and representations to** • Write an equation to represent the relationship between equivalent mathematical expressions (e.g., $4 \times 3 = 2 \times 6$; $10 + 8 = 36 \div 2$; $12 \times 4 = 60 - 12$). • Identify and use the appropriate symbol to distinguish between expressions that are equal and expressions that are not equal, using addition, subtraction, multiplication, and division (e.g., $4 \times 12 = 8 \times 6$ and $64 \div 8 \neq 8 \times 8$).
Vocabulary	**Instructional Activities Organized by Learning Objective**
equal, not equal, expression, equation	**Textbook:** **4.16** EnVision Math: Lesson 18-1 Equal or Not Equal (Problem of the Day, Spiral Review, Problem Based Interactive Learning, Visual Learning, Intervention, Reteaching Master, Practice Master, Enrichment Master), Quick Check Envision Math: Digital Path Topic 18-01 Equal or Not Equal
Assessment	
Powerschool – Exam identifier	

	EnVision Math: Ready-Made Centers for Differentiated Instruction 18-1 **Eureka Math** **4.16** Grade 6 Module 4 Lessons 23-24: True and False Number Sentences Grade 6 Module 4 Lessons 25: Finding Solutions to Make Equations True **Notes:** **Resources** ● **Print** **FACEing MAth : Elementary Math,** Lesson 10: Creating TRUE Equations and Inequalities **Performance Task:** **Teaching Student-Centered Mathematics 3-5 (2006):** Activity 9.11: Name for Numbers pg. 279 Activity 9.12: Tilt or Balance pg. 279 Activity 9.13: Adjust the Balance pg. 280 ● **Technology-based:** o Poddle Weigh In Game. o Number Balance o Pan Balance o Number Balance. **Station Activities/Manipulatives:**

	Square Tiles: When given square tiles, the student will create two arrays that equal the same number. The student will be able to justify his/her answer.
Cross-Curricular Connections	**Differentiation**
Literature Connections: **Grapes of Math** by Greg Tang Use pictures to show how to add quickly. Find two different ways to add to show equality. Read Aloud **Equal Shmequal** by Virginia Kroll Explore the associative property of multiplication by creating arrays of dot images. How can you ensure that these are equal? Ex. (5 x 4) x 3 = 5 x (4 x 3) 	Websites: Number Balance Number Balance