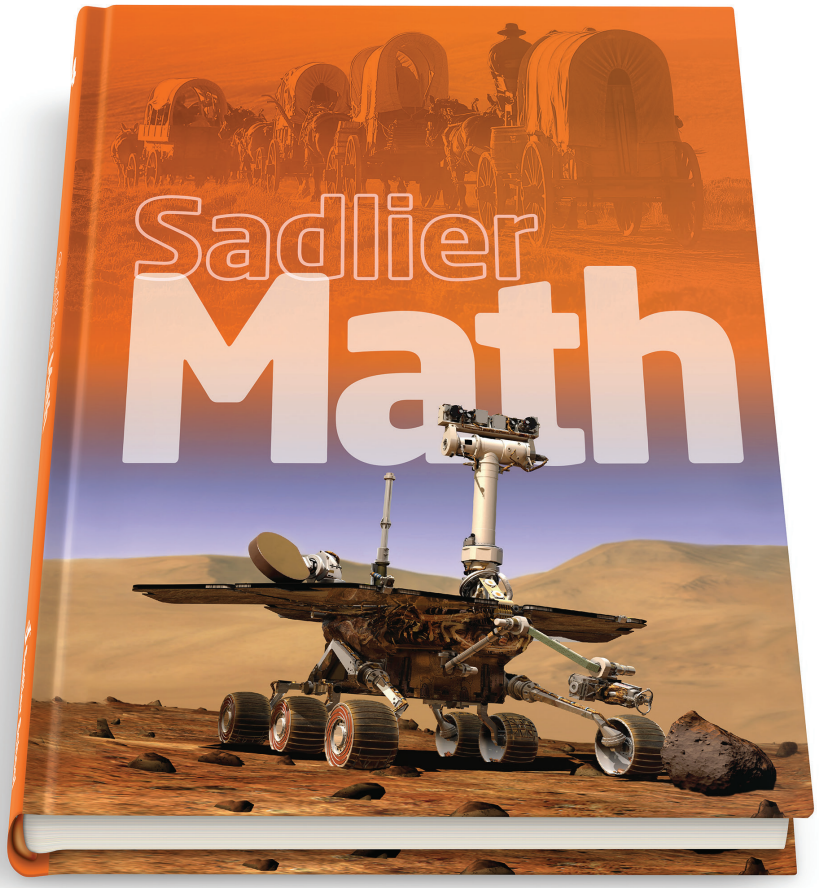
Sadlier Math™

Correlation to the Archdiocese of New York Mathematics Learning Standards

Grade 4



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OPERATIONS AND ALGEBRAIC THINKING 4.OA

Grade 4 Content Standards	*Sadlier Math*, Grade 4
Use the four operations with whole numbers to solve problems.	
4.OA.1 Interpret a multiplication equation as a comparison, e.g., interpret 35 = 5 × 7 as a statement that 35 is 5 times as many as 7 and 7 times as many as 5. Represent verbal statements of multiplicative comparisons as multiplication equations. A multiplicative comparison is a situation in which one quantity is multiplied by a specified number to get another quantity (e.g. a is n times as much as b). students should be able to identify and verbalize which quantity is being multiplied and which number tells how many times.	**Chapter 4: 4-5** **Chapter 5: 5-5**
4.OA.2 Multiply or divide to solve word problems involving multiplicative comparison, e.g., by using drawings and equations with a symbol for the unknown number to represent the problem, distinguishing multiplicative comparison from additive comparison. This standard calls for students to translate comparative situations into equations with an unknown and solve. Students need many opportunities to solve contextual problems. In an additive comparison, the underlying question is "what amount would be added to one quantity in order to result in the other". In a multiplicative comparison, the underlying question is "what factor would multiply one quantity in order to result in the other?". An additive comparison focuses on the difference between two quantities whereas a multiplicative comparison focuses on comparing two quantities by showing one quantity is a specified number of times larger or smaller than the other.	**Chapter 4: 4-5** **Chapter 5: 5-5** **Chapter 7: 7-6** **Chapter 8: 8-8**
4.OA.3 Solve multi-step word problems posed with whole numbers and having whole-number answers using the four operations, including problems in which remainders must be interpreted. Represent these problems using equations with a letter standing for the unknown quantity. Assess the reasonableness of answers using mental computation and estimation strategies including rounding. *continued*	**Chapter 2: 2-1 through 2-3** **Chapter 3: 3-1 & 3-6** **Chapter 4: 4-4** **Chapter 7: 7-3** **Chapter 8: 8-1 & 8-3**

OPERATIONS AND ALGEBRAIC THINKING 4.OA

Grade 4 Content Standards	*Sadlier Math*, Grade 4
The focus on this standard is to have students use and discuss various strategies. It refers to estimation strategies, including using compatible numbers (numbers that sum to 10 or 100) or rounding. Problems should be structured so that all acceptable estimation strategies will arrive at a reasonable answer. Students need many opportunities solving multistep story problems using all four operations.	
Gain familiarity with factors and multiples.	
4.OA.4 Find all factor pairs for a whole number in the range 1-100. Recognize that a whole number is a multiple of its factors. Determine whether a given whole number in the range 1-100 is prime or composite. This standard requires students to demonstrate understanding factors and multiples of whole numbers. This standard also refers to prime and composite numbers. Prime numbers have exactly two factors, the number one and their own number. For example, the number 17 has the factors 1 and 17. Composite numbers have more than two factors. For example, 8 has the factors 1,2,4,and 8. A common misconception is that 1 is prime, when it is, in fact, neither prime nor composite. Another misconception is that all prime numbers are odd numbers. This is not true, since the number 2 has more than two factors, 1 and 2 and is also an even number.	**Chapter 9: 9-1 through 9-5**
Generate and analyze patterns.	
4.OA.5 Generate a number or shape pattern that follows a given rule. Identify apparent features of the pattern that were not explicit in the rule itself. Patterns involve numbers or symbols that repeat or grow. Patterns and rules are related. A pattern is a sequence that repeats the same process over and over. A rule dictates what the process will look like. For example, given the rule "Add 3" and the starting number 1, generate terms in the resulting sequence and observe that the terms appear to alternate between odd and even numbers.	**Chapter 7: 7-5** **Chapter 17: 17-5**

NUMBER AND OPERATIONS IN BASE TEN — 4.NBT

Grade 4 Content Standards	*Sadlier Math*, Grade 4
Generalize place value understanding for multi-digit whole numbers.	
4.NBT.1 Recognize that in a multi-digit whole number, a digit in one place represents ten times what it represents in the place to its right. For example, recognize that 700 divided by 70=10 by applying concepts of place value and division. In the base ten system, the value of each place is 10 times the value of the place to the immediate right.	**Chapter 1: 1-2 & 1-3**
4.NBT.2 Read and write multi-digit whole numbers using base-ten numerals, number names, and expanded form. Compare two multi-digit numbers based on meanings of the digits in each place, using >, =, and < symbols to record the results of comparisons. This standard refers to various ways to write numbers. Students should have flexibility with the different number forms. Traditional expanded form is 285=200+80+5. Written form or number name is "two hundred eighty". Students should also have opportunities to explore the idea that 285 could also be 28 tens plus 5 ones or 1 hundred, 18 tens, and 5 ones. Students also need to know the role of commas in numbers between 1,000 and 1,000,000. Each sequence of 3 zeros.	**Chapter 1: 1-1 through 1-6**
4.NBT.3 Use place value understanding to round multi-digit whole numbers to any place. This standard refers to place value understanding, which extends beyond a procedure for rounding. The expectation is that students have a deep understanding of place value and number sense and can explain and reason about answers they get when they round. Students should have the chance to use a number line and hundreds chart as tools to support their work.	**Chapter 1: 1-5**
Use place value understanding and properties of operations to perform multi-digit arithmetic.	
4.NBT.4 Fluently add and subtract multi-digit whole numbers using the standard algorithm. Students build their understanding of addition and subtraction, their use of place value and their flexibility with multiple strategies to make sense of the standard algorithm. They continue to use place value in describing and justify the processes they use to add and subtract.	**Chapter 2: 2-2, 2-4 through 2-6** **Chapter 3: 3-2 through 3-5**

NUMBER AND OPERATIONS IN BASE TEN 4.NBT

Grade 4 Content Standards	*Sadlier Math*, Grade 4
4.NBT.5 Multiply a whole number of up to four digits by a one-digit whole number, and multiply two two-digit numbers, using strategies based on place value and the properties of operations. Illustrate and explain the calculation by using equations, rectangular arrays, and/or area models. Students who develop flexibility in breaking numbers apart have a better understanding of the importance of place value and the distributive property in multi-digit multiplication. Students should use the terms factor and product when communicating their reasoning. The distributive property allows numbers to be decomposed into base ten units, products of the units to be computed , and then combined. By decomposing the factors into like base ten units and applying the distributive property, multiplication computations are reduced to single digit multiplication and products of numbers with multiples of 10, of 100, and 1,000. Computing products of two two-digit numbers requires using the distributive property several times when the factors are decomposed into base ten units.	**Chapter 4: 4-1 through 4-3** **Chapter 5: 5-1 through 5-5** **Chapter 6: 6-1 through 6-5** **Chapter 8: 8-7**
4.NBT.6 Find whole-number quotients and remainders with up to four digit dividends and one-digit divisors, using strategies based on place value, the properties of operations, and/or the relationship between multiplication and division. Illustrate and explain the calculation by using equations, rectangular arrays, and/or area models. In fourth grade, students build on their third grade work with division within 100. Students need opportunities to develop their understanding by using problems in and out of context. General methods for computing quotients of multi-digit numbers and one-digit numbers rely on the same understanding as for multiplication, but cast in terms of division. One component is quotients of multiples of 10,100, or 1000 and one-digit numbers. For example, 42 divided by 6 is related to 420 divided by 6 and 4200 divided by 6. Students can draw on their work with multiplication to reason that 4200 divided by 6 means partitioning 42 hundreds into 6 equal groups., so there are 7 hundreds in each group. Multi digit division involves work with remainders. In preparation for work with remainders, students can compute sums of a product and a number, such as 4 x 8 +3 In multi-digit division, students will need *continued*	**Chapter 7: 7-1, 7-2 & 7-4** **Chapter 8: 8-1 through 8-7**

NUMBER AND OPERATIONS IN BASE TEN — 4.NBT

Grade 4 Content Standards	*Sadlier Math*, Grade 4
to find the greatest multiple less than a given number. For example, when dividing by 6, the greatest multiple of 6 less than 50 is 6 x 8 = 48. Students can think of these "greatest multiples" in terms of putting objects into groups. For example, when 50 objects are shared among 6 groups, the largest whole number of objects that can be put in each group is 8 and 2 objects are left over. Or when 50 objects are allocated into groups of 6, the largest whole number of groups that can be made is 8, and 2 objects are left over. The equation 6 x 8 + 2 = 50 or 8 x 6 + 2 = 50 corresponds with this situation.	

NUMBER AND OPERATIONS — FRACTIONS — 4.NF

Grade 4 Content Standards	*Sadlier Math*, Grade 4
Extend understanding of fraction equivalence and ordering.	
4.NF.1 Explain why a fraction a/b is equivalent to a fraction $(n \times a)/(n \times b)$ by using visual fraction models, with attention to how the number and size of the parts differ even though the two fractions themselves are the same size. Use this principle to recognize and generate equivalent fractions. This standard addresses equivalent fractions by examining the idea that equivalent fractions can be made by multiplying the numerator (the top number) and denominator (the bottom number) by the same number.	**Chapter 10: 10-1 through 10-6**
4.NF.2 Compare two fractions with different numerators and different denominators, e.g., by creating common denominators or numerators, or by comparing to a benchmark fraction such as ½. Recognize that comparisons are valid only when the two fractions refer to the same whole. Record the results of comparisons with symbols >, =, or <, and justify the conclusions, e.g., by using a visual fraction model. This standard calls for students to recognize that they must consider the size of the whole when comparing fractions. For example, ½ and ⅛ of a medium pizza is very different from ½ and ⅛ of one large pizza.	**Chapter 10: 10-7 through 10-11**

NUMBER AND OPERATIONS — FRACTIONS 4.NF

Grade 4 Content Standards	*Sadlier Math*, Grade 4
Build fractions from unit fractions by applying and extending previous understandings of operations on whole numbers.	
4.NF.3 Understand a fraction *a*/*b* with *a* > 1 as a sum of fractions 1/*b*. A fraction with a numerator of one is called a unit fraction. When investigating fractions other than the unit fraction, students should be able to join (compose) or separate (decompose) the fractions of the same whole. For example, ⅔ = ⅓ + ⅓.	
4.NF.3a Understand addition and subtraction of fractions as joining and separating parts referring to the same whole.	**Chapter 11: 11-1 through 11-5**
4.NF.3b Decompose a fraction into a sum of fractions with the same denominator in more than one way, recording each decomposition by an equation. Justify decompositions, e.g., by using a visual fraction model.	**Chapter 11: 11-2 through 11-4**
4.NF.3c Add and subtract mixed numbers with like denominators, e.g., by replacing each mixed number with an equivalent fraction, and/or by using properties of operations and the relationship between addition and subtraction.	**Chapter 10: 10-9** **Chapter 11: 11-6 through 11-8**
4.NF.3d Solve word problems involving addition and subtraction of fractions referring to the same whole and having like denominators, e.g., by using visual fraction models and equations to represent the problem.	**Chapter 11: 11-1 through 11-5**
4.NF.4 Apply and extend previous understandings of multiplication to multiply a fraction by a whole number. This standard builds on students' work of adding fractions and extending that work to multiplication. Student should see a fraction as a numerator times the unit fraction with the same denominator. For example, 7/5 = 7 x 1/5. This standard also extends the idea of multiplication as repeated addition. For example 3 x (2/5) = 2/5 + 2/5 + 2/5 = 6/5 = 6 x (1/5).	
4.NF.4a Understand a fraction *a*/*b* as a multiple of 1/*b*.	**Chapter 12: 12-1 through 12-4**

NUMBER AND OPERATIONS — FRACTIONS 4.NF

Grade 4 Content Standards	*Sadlier Math*, Grade 4
4.NF.4b Understand a multiple of *a*/*b* as a multiple of 1/*b*, and use this understanding to multiply a fraction by a whole number.	**Chapter 12: 12-1 through 12-5**
4.NF.4c Solve word problems involving multiplication of a fraction by a whole number, e.g., by using visual fraction models and equations to represent the problem.	**Chapter 12: 12-1 through 12-7**
Understand decimal notation for fractions, and compare decimal fractions.	
4.NF.5 Express a fraction with denominator 10 as an equivalent fraction with denominator 100, and use this technique to add two fractions with respective denominators 10 and 100. This standard continues the work of equivalent fractions by having students change fractions with a 10 in the denominator into equivalent fractions that have a 100 in the denominator. Students need to extend the place value system to the right of the decimal point. The first position after the decimal point is the tenths, the second position on the right of the decimal point is the hundredths. This continues the rule of each column being 10 times the value of the column to the right .This work also lays the foundation for decimals.	**Chapter 13: 13-1 through 13-5**
4.NF.6 Use decimal notation for fractions with denominators 10 or 100. Decimals are introduced for the first time and students should have ample time to explore and reason about the idea that a number can be represented as a fraction and a decimal. Students should make connections between fractions with a denominator of 10 and 100 and the place value chart. By reading fraction names students say 32/100 as thirty-two hundredths and rewrite this as .32.	**Chapter 13: 13-3 through 13-5**
4.NF.7 Compare two decimals to hundredths by reasoning about their size. Recognize that comparisons are valid only when the two decimals refer to the same whole. Record the results of comparisons with the symbols >, =, or <, and justify the conclusions, e.g., by using a visual model. *continued*	**Chapter 13: 13-6 & 13-7**

NUMBER AND OPERATIONS — FRACTIONS 4.NF

Grade 4 Content Standards	*Sadlier Math*, Grade 4
Students should reason that comparisons of decimals are only valid when they apply to the same whole. Ways of reading decimal s aloud vary. Mathematicians and scientists read .15 aloud as "zero point one five" or "point 15". Other ways to read .15 are "15 hundredths". Just as 15 is understood as 15 ones and as 1 ten and 5 ones in computations with whole numbers, .15 is viewed as 15 hundredths and as one tenth and 5 hundredths in computations with decimals.	

MEASUREMENT AND DATA 4.MD

Grade 4 Content Standards	*Sadlier Math*, Grade 4
Solve problems involving measurement and conversion of measurements from a larger unit to a smaller unit.	
4.MD.1 Know relative sizes of measurement units within one system of units including km, m, cm; kg, g; lb, oz.; l, ml; hr, min, sec. Within a single system of measurement, express measurements in a larger unit in terms of a smaller unit. Record measurement equivalents in a two-column table. Students should know that 1 ft is 12 times as long as 1 inch. They should be able to express the length of a 4-foot object as 48 inches. Students begin to develop mental images as to how large a meter is compared to a centimeter or an inch.	**Chapter 14: 14-1 through 14-10**
4.MD.2 Use the four operations to solve word problems involving distances, intervals of time, liquid volumes, masses of objects, and money, including problems involving simple fractions or decimals, and problems that require expressing measurements given in a larger unit in terms of a smaller unit. Represent measurement quantities using diagrams such as number line diagrams that feature a measurement scale. This standard includes multi-step word problems related to expressing measurement from a larger unit in terms of a smaller unit (e.g. feet to inches, meters to centimeters, and dollars to cents).	**Chapter 14: 14-1 through 14-9** **Chapter 15: 15-1 through 15-3**

MEASUREMENT AND DATA 4.MD

Grade 4 Content Standards	*Sadlier Math*, Grade 4
4.MD.3 Apply the area and perimeter formulas for rectangles in real world and mathematical problems. For example, find the width of a rectangular room given the area of the flooring and the length, by viewing the area formula as a multiplication equation with an unknown factor. The area of a rectangle formula is $A = l \times w$ where A is the area, l is the length and w is the width. The product of this formula gives the area in square units. These square units are derived from the length and width units. Perimeter is the distance around the rectangle and its formula is $P = 2l + 2w$ where l is the length and w is the width.	**Chapter 17: 17-6 & 17-7**
Represent and interpret data.	
4.MD.4 Make a line plot to display a data set of measurements in fractions of a unit (1/2, 1/4, 1/8). Solve problems involving addition and subtraction of fractions by using information presented in line plots. This standard provides a context for students to work with fractions by measuring objects to an eighth of an inch. Students make a line plot of this data and then add and subtract fractions based on the data in the line plot.	**Chapter 15: 15-6 & 15-7**
Geometric measurement: understand concepts of angle and measure angles.	
4.MD.5 Recognize angles as geometric shapes that are formed wherever two rays share a common endpoint, and understand concepts of angle measurement: This standard brings up a connection between angles and circular measurement. which is 360 degrees. Angle measure is a turning point in the study of geometry. An angle is the union of two rays, a and b, with the same initial point P. The rays can be made to coincide by rotating one to the other about P. This rotation determines the size of the angle between a and b. The rays are sometimes called the sides of the angle. Another way to say this is that each ray determines a direction and the angle size measures the change from one direction to another. Degrees are the units used to measure angles. Angle measures can be added. Angle measure is not related to area.	
4.MD.5a An angle is measured with reference to a circle with its center at the common endpoint of the rays, by considering the fraction of the circular arc between the points *continued*	**Chapter 16: 16-2**

MEASUREMENT AND DATA 4.MD

Grade 4 Content Standards	*Sadlier Math*, Grade 4
where the two rays intersect the circle. An angle that turns through 1/360 of a circle is called a "one-degree angle," and can be used to measure angles.	
4.MD.5b An angle that turns through *n* one-degree angles is said to have an angle measure of *n* degrees.	**Chapter 16: 16-1 & 16-2**
4.MD.6 Measure angles in whole-number degrees using a protractor. Sketch angles of specified measure. Students must first understand that 360 degrees is a full circle rotation around a point. They extend this understanding to measure and sketch angles that measure 45 and 30 degrees. They use appropriate terminology such as right angle, acute angle, and obtuse angles.	**Chapter 16: 16-1 through 16-3**
4.MD.7 Recognize angle measure as additive. When an angle is decomposed into non-overlapping parts, the angle measure of the whole is the sum of the angle measures of the parts. Solve addition and subtraction problems to find unknown angles on a diagram in real world and mathematical problems, e.g., by using an equation with a symbol for the unknown angle measure. This standard addresses the idea of decomposing angles (breaking it apart) into smaller angles. As with length, volume, and area when an angle is decomposed into non-overlapping parts, the angle measure is the sum of the parts. Students can then solve interesting and challenging addition and subtraction problems to find the measurements of unknown angles on a diagram in real world and mathematical problems. They can use a protractor to check. Students should have an idea of benchmark angles such as 30, 45, 60, and 90 degrees.	**Chapter 16: 16-4**

GEOMETRY 4.G

Grade 4 Content Standards	*Sadlier Math*, Grade 4
Draw and identify lines and angles, and classify shapes by properties of their lines and angles.	
4.G.1 Draw points, lines, line segments, rays, angles (right, acute, obtuse), and perpendicular and parallel lines. Identify these in two-dimensional figures. This standard asks students to draw two-dimensional geometric objects and to also identify them in two-dimensional figures. This is the first time a child is exposed to rays, angles, and perpendicular and parallel lines. Examples of these can be seen daily. Students should be able to use side length to classify triangles as equilateral, equiangular, isosceles, or scalene and can use angle size to classify them as acute, obtuse, and right angles. They learn to cross classify such as a right isosceles triangle. Thus, students develop explicit awareness and vocabulary for many concepts that have been developing, including points, lines, line segments, rays, angles, and perpendicular and parallel lines.	**Chapter 16: 16-1 through 16-6**
4.G.2 Classify two-dimensional figures based on the presence or absence of parallel or perpendicular lines, or the presence or absence of angles of a specified size. Recognize right triangles as a category, and identify right triangles. Two-dimensional figures may be classified using different characteristics such as parallel or perpendicular lines or by angle measurement. Students should become familiar with perpendicular and parallel lines. Two lines are parallel if they never intersect and are always equidistant. Two lines are perpendicular if they intersect in right angles (90 degrees).	**Chapter 17: 17-1 through 17-3**
4.G.3 Recognize a line of symmetry for a two-dimensional figure as a line across the figure such that the figure can be folded along the line into matching parts. Identify line symmetric figures and draw lines of symmetry. Students need experiences with figures that are symmetrical and asymmetrical. Figures include both regular and non-regular polygons.	**Chapter 17: 17-4**