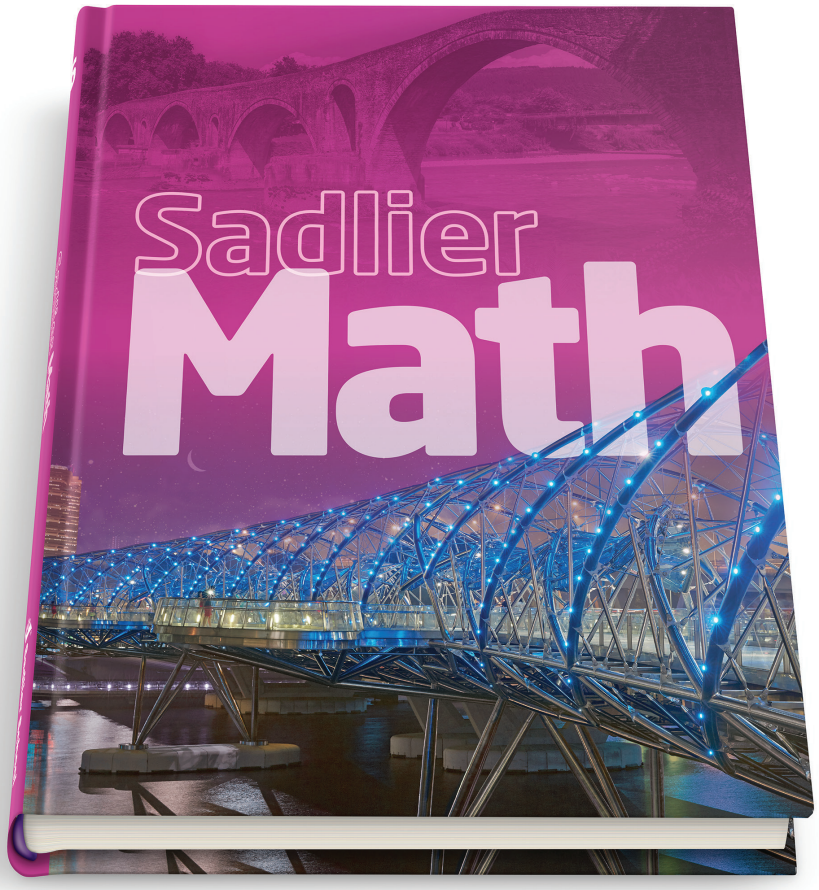
Sadlier Math™

Correlation to the Archdiocese of New York Mathematics Learning Standards

Grade 6



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RATIOS AND PROPORTIONAL RELATIONSHIPS 6.RP

Grade 6 Content Standards	*Sadlier Math*, Grade 6
Understand ratio concepts and use ratio reasoning to solve problems.	
6.RP.1 Understand the concept of a ratio and use ratio language to describe a ratio relationship between two quantities. For example, "The ratio of wings to beaks in the bird house at the zoo was 2:1, because for every 2 wings there was 1 beak." "For every vote candidate A received, candidate C received nearly three votes." A ratio is the comparison of two quantities or measures. The comparison can be part-to-whole (ratio of guppies to all fish in an aquarium) or part-to-part (ratio of guppies to goldfish). Example 1: A comparison of 6 guppies and 9 goldfish could be expressed in any of the following forms: 6/9, 6 to 9 or 6:9. Students should be able to identify and describe any ratio using "For every _____ ,there are _____" In the example above, the ratio could be expressed saying, "For every 2 goldfish, there are 3 guppies".	**Chapter 10: 10-1**
6.RP.2 Understand the concept of a unit rate a/b associated with a ratio $a:b$ with $b \neq 0$, and use rate language in the context of a ratio relationship. For example, "This recipe has a ratio of 3 cups of flour to 4 cups of sugar, so there is 3/4 cup of flour for each cup of sugar." "We paid $75 for 15 hamburgers, which is a rate of $5 per hamburger." A unit rate expresses a ratio as part to one, comparing a quantity in terms of one unit of another quantity. Common unit rates are cost per item or distance per time.	**Chapter 10: 10-6 through 10-9**
6.RP.3 Use ratio and rate reasoning to solve real-world and mathematical problems, e.g., by reasoning about tables of equivalent ratios, tape diagrams, double number line diagrams, or equations.	
6.RP.3a Make tables of equivalent ratios relating quantities with whole- number measurements, find missing values in the tables, and plot the pairs of values on the coordinate plane. Use tables to compare ratios. *continued*	**Chapter 10: 10-2, 10-5, 10-7, 10-9 & 10-10**

RATIOS AND PROPORTIONAL RELATIONSHIPS 6.RP

Grade 6 Content Standards	*Sadlier Math*, Grade 6
Ratios and rates can be used in ratio tables and graphs to solve problems. To begin the shift to proportional reasoning the students need to begin to use multiplicative reasoning.	
6.RP.3b Solve unit rate problems including those involving unit pricing and constant speed. For example, if it took 7 hours to mow 4 lawns, then at that rate, how many lawns could be mowed in 35 hours? At what rate were lawns being mowed? Students recognize the use of ratios, unit rate and multiplication in solving problems, which could allow for the use of fractions and decimals.	**Chapter 10: 10-6 through 10-9**
6.RP.3c Find a percent of a quantity as a rate per 100 (e.g., 30% of a quantity means 30/100 times the quantity); solve problems involving finding the whole, given a part and the percent. This is the students' first introduction to percents. Percentages are a rate per 100.	**Chapter 11: 11-1 through 11-10**
6.RP.3d Use ratio reasoning to convert measurement units; manipulate and transform units appropriately when multiplying or dividing quantities. A ratio can be used to compare measures of two different types, such as inches per foot, milliliters per liter and centimeters per inch. Students recognize that a conversion factor is a fraction equal to 1, since the numerator and denominator describe the same quantity. For example 12 inches/1 foot is a conversion factor since the numerator and denominator describe the same quantity.	**Chapter 10: 10-2 through 10-9** **Chapter 11: 11-1 through 11-10** **Chapter 12: 12-1 through 12-4**

THE NUMBER SYSTEM 6.NS

Grade 6 Content Standards	*Sadlier Math*, Grade 6
Apply and extend previous understandings of multiplication and division to divide fractions by fractions.	
6.NS.1 Interpret and compute quotients of fractions, and solve word problems involving division of fractions by fractions, e.g., by using visual fraction models and equations to represent the problem. In 5th grade students divided whole numbers by unit fractions and divided unit fractions by whole numbers. Students continue to develop these concepts by using visual models and equations to divide whole numbers by fractions and fractions by fractions to solve word problems.	**Chapter 8: 8-3 through 8-11**
Compute fluently with multi-digit numbers and find common factors and multiples.	
6.NS.2 Fluently divide multi-digit numbers using the standard algorithm. In this grade students become fluent in the use of the standard division algorithm and continue to use their understanding of place value to describe what they are doing. This standard is the end of the progression to address students' understanding of place value.	**Chapter 3: 3-1**
6.NS.3 Fluently add, subtract, multiply, and divide multi-digit decimals using the standard algorithm for each operation. Procedural fluency is defined as "skill in carrying out procedures flexibly, accurately, efficiently, and appropriately". At the elementary level these operations were based on concrete models or drawings and strategies based on place value, properties of operations, and or the relationship between addition and subtraction. In the 6th grade, students become fluent in the use of the standard algorithms of each of these operations.	**Chapter 1: 1-1 through 1-3** **Chapter 2: 2-1 through 2-3** **Chapter 3: 3-2 through 3-7**
6.NS.4 Find the greatest common factor of two whole numbers less than or equal to 100 and the least common multiple of two whole numbers less than or equal to 12. Use the distributive property to express a sum of two whole numbers 1–100 with a common factor as *continued*	**Chapter 6: 6-1 through 6-4**

THE NUMBER SYSTEM 6.NS

Grade 6 Content Standards	*Sadlier Math*, Grade 6
a multiple of a sum of two whole numbers with no common factor. For example, express 36 + 8 as 4 (9 + 2). Students find the greatest common factor of two whole numbers less than or equal to 100. For example, the greatest common factor of 40 and 16 can be found by listing the factors of 40 (1,2,4,5,8,10,20,40) and 16 (1,2,4,8,16) then taking the greatest factor shared by both which is 8.	
Apply and extend previous understandings of numbers to the system of rational numbers.	
6.NS.5 Understand that positive and negative numbers are used together to describe quantities having opposite directions or values (e.g., temperature above/below zero, elevation above/below sea level, credits/debits, positive/negative electric charge); use positive and negative numbers to represent quantities in real-world contexts, explaining the meaning of 0 in each situation. Students use rational numbers (fractions, decimals, and integers) to represent real world contexts and understand the meaning of 0 in each situation.	**Chapter 9: 9-2**
6.NS.6 Understand a rational number as a point on the number line. Extend number line diagrams and coordinate axes familiar from previous grades to represent points on the line and in the plane with negative number coordinates. In elementary schools, students worked with positive fractions, decimals and whole numbers on the number line and in quadrant 1 of the coordinate plane. In 6th grade, students extend the number line to represent all rational numbers and recognize that number lines may be horizontal or vertical (i.e. Thermometers) which facilitates the movement from number lines to coordinate grids. Students recognize that a number and its opposite are the same distance from 0. The opposite sign (-) shifts the number to the opposite side of 0. For example, -4 could be read as "the opposite of 4" which would be negative 4. Zero is its own opposite.	
6.NS.6a Recognize opposite signs of numbers as indicating locations on opposite sides of 0 on the number line; recognize that the opposite of the opposite of a number is the number itself, e.g., –(–3) = 3, and that 0 is its own opposite.	**Chapter 9: 9-1**

THE NUMBER SYSTEM 6.NS

Grade 6 Content Standards	*Sadlier Math*, Grade 6
6.NS.6b Understand signs of numbers in ordered pairs as indicating locations in quadrants of the coordinate plane; recognize that when two ordered pairs differ only by signs, the locations of the points are related by reflections across one or both axes.	**Chapter 9: 9-8**
6.NS.6c Find and position integers and other rational numbers on a horizontal or vertical number line diagram; find and position pairs of integers and other rational numbers on a coordinate plane.	**Chapter 9: 9-1 through 9-3, 9-5 through 9-11**
6.NS.7 Understand ordering and absolute value of rational numbers.	
6.NS.7a Interpret statements of inequality as statements about the relative position of two numbers on a number line diagram. For example, interpret –3 > –7 as a statement that –3 is located to the right of –7 on a number line oriented from left to right. Students use inequalities to express the relationship between two rational numbers, understanding that the value of numbers is smaller moving to the left on a number line. Students should know larger numbers are to the right(horizontal) or top (vertical) of the number line and smaller numbers to the left (horizontal) or bottom(vertical) of the number line.	**Chapter 9: 9-3 & 9-6**
6.NS.7b Write, interpret, and explain statements of order for rational numbers in real-world contexts. For example, write –3 °C > –7 °C to express the fact that –3 °C is warmer than –7 °C. Students can write statements using > or < to compare rational numbers in context.	**Chapter 9: 9-3 & 9-6**
6.NS.7c Understand the absolute value of a rational number as its distance from 0 on the number line; interpret absolute value as magnitude for a positive or negative quantity *continued*	**Chapter 9: 9-3 & 9-4**

THE NUMBER SYSTEM 6.NS

Grade 6 Content Standards	*Sadlier Math*, Grade 6
in a real-world situation. For example, for an account balance of –30 dollars, write |–30| = 30 to describe the size of the debt in dollars. Students understand absolute value as the distance from 0 and recognize the symbols that represent absolute value (double straight bars around the number).	
6.NS.7d Distinguish comparisons of absolute value from statements about order. For example, recognize that an account balance less than –30 dollars represents a debt greater than 30 dollars. When working with positive numbers, the number and the absolute value (the distance from zero) are the same. As the size of a negative number increases (moves; to the left of the number line), the value of the number decreases.	**Chapter 9: 9-4**
6.NS.8 Solve real-world and mathematical problems by graphing points in all four quadrants of the coordinate plane. Include use of coordinates and absolute value to find distances between points with the same first coordinate or the same second coordinate. Students find the difference between two points when ordered pairs have the same vertical (*x* coordinate) or the same horizontal (*y* coordinate).	**Chapter 9: 9-7 through 9-11**

EXPRESSIONS AND EQUATIONS 6.EE

Grade 6 Content Standards	*Sadlier Math*, Grade 6
Apply and extend previous understandings of arithmetic to algebraic expressions.	
6.EE.1 Write and evaluate numerical expressions involving whole-number exponents. Students demonstrate the meaning of exponents to write and evaluate numerical expressions with whole number exponents.	**Chapter 4: 4-1 & 4-2**

EXPRESSIONS AND EQUATIONS 6.EE

Grade 6 Content Standards	*Sadlier Math*, Grade 6
6.EE.2 Write, read, and evaluate expressions in which letters stand for numbers.	
6.EE.2a Write expressions that record operations with numbers and with letters standing for numbers. For example, express the calculation "Subtract *y* from 5" as 5 – y. Students write expressions from verbal descriptions using letters and numbers, understanding that order is important in writing subtraction and division problems. The expression " 5 times any number, n" could be represented with 5n and a number and a letter together means to multiply. The variable, n, could represent any number.	**Chapter 1: 1-4** **Chapter 2: 2-4** **Chapter 3: 3-8** **Chapter 4: 4-2 through 4-9** **Chapter 7: 7-5** **Chapter 8: 8-10**
6.EE.2b Identify parts of an expression using mathematical terms (sum, term, product, factor, quotient, coefficient); view one or more parts of an expression as a single entity. For example, describe the expression 2(8 + 7) as a product of two factors; view (8 + 7) as both a single entity and a sum of two terms. Students can describe expressions such as 3(2 + 6) as the product of two factors: 3 and (2 + 6).the quantity (2 + 6) is viewed as one factor consisting of two terms. Terms are the parts of a sum. When the term is a number, it is called a constant. When the term is a product of a number and a variable, the number is called the coefficient of the variable.	**Chapter 1: 1-4** **Chapter 2: 2-1 & 2-4** **Chapter 3: 3-8** **Chapter 4: 4-3**
6.EE.2c Evaluate expressions at specific values of their variables. Include expressions that arise from formulas used in real-world problems. Perform arithmetic operations, including those involving whole-number exponents, in the conventional order when there are no parentheses to specify a particular order (Order of Operations). For example, use the formulas $V = s^3$ and $A = 6\ s^2$ to find the volume and surface area of a cube with sides of length $s = 1/2$. *continued*	**Chapter 1: 1-5** **Chapter 2: 2-5** **Chapter 3: 3-9** **Chapter 4: 4-2, 4-6, 4-8 & 4-9** **Chapter 7: 7-5** **Chapter 8: 8-10**

EXPRESSIONS AND EQUATIONS 6.EE

Grade 6 Content Standards	*Sadlier Math*, Grade 6
6.EE.2c Evaluate expressions at specific values of their variables. Include expressions that arise from formulas used in real-world problems. Perform arithmetic operations, including those involving whole-number exponents, in the conventional order when there are no parentheses to specify a particular order (Order of Operations). For example, use the formulas $V = s^3$ and $A = 6\ s^2$ to find the volume and surface area of a cube with sides of length $s = 1/2$. Students evaluate algebraic expressions using order of operations using exponents as needed. For example, evaluate the expression 3x + 2*y* when *x* is equal to 4 and *y* is equal to 2.4 The answer is 16.8.	**Chapter 1: 1-5** **Chapter 2: 2-5** **Chapter 3: 3-9** **Chapter 4: 4-2, 4-6, 4-8 & 4-9** **Chapter 7: 7-5** **Chapter 8: 8-10**
6.EE.3 Apply the properties of operations to generate equivalent expressions. For example, apply the distributive property to the expression 3 (2 + *x*) to produce the equivalent expression 6 + 3*x*; apply the distributive property to the expression 24*x* + 18*y* to produce the equivalent expression 6 (4*x* + 3*y*); apply properties of operations to *y* + *y* + *y* to produce the equivalent expression 3*y*. Students use the distributive property to write equivalent expressions. Properties were introduced in the earlier grades but in this grade must now know the names of the properties that are being used such as associative, distributive, commutative.	**Chapter 4: 4-7**
6.EE.4 Identify when two expressions are equivalent (i.e., when the two expressions name the same number regardless of which value is substituted into them). For example, the expressions *y + y + y* and *3y* are equivalent because they name the same number regardless of which number *y* stands for. Students understand that quantities that are like terms can be added or subtracted with the same variables and *continued*	**Chapter 4: 4-8**

EXPRESSIONS AND EQUATIONS 6.EE

Grade 6 Content Standards	*Sadlier Math*, Grade 6
exponents. For example, 3x+4*x* are like terms and can be combined as 7*x*.; however, 3*x* + 4 x 2 are unlike terms that cannot be combined because the exponents with the *x* are not the same.	
Reason about and solve one-variable equations and inequalities.	
6.EE.5 Understand solving an equation or inequality as a process of answering a question: which values from a specified set, if any, make the equation or inequality true? Use substitution to determine whether a given number in a specified set makes an equation or inequality true. Students are exploring equations as expressions being set equal to a specific value. The solution is the value of the variable that will make the equation true. For example, Joey had 26 on his desk. His teacher gave him some more and now he has 100. How many papers did his teacher give him? This situation can be represented by the equation 26+n=100 where n is the number of papers the teacher gives to Joey. This equation can be stated as "some number was added to 26 and the result was 100". Students ask themselves "What number was added to 26 to get 100?" to help them determine the value of the variable that makes the equation true. Different strategies can be used to find a solution to the problem.	**Chapter 5: 5-1 & 5-6**
6.EE.6 Use variables to represent numbers and write expressions when solving a real-world or mathematical problem; understand that a variable can represent an unknown number, or, depending on the purpose at hand, any number in a specified set. Students write expressions to represent various real world settings. For example, write an expression to represent Sara's age in 3 years when a represents her age (*a* +3).	**Chapter 4: 4-4** **Chapter 5: 5-2 through 5-4, 5-7 through 5-9**
6.EE.7 Solve real-world and mathematical problems by writing and solving equations of the form *x* + *p* = *q* and *px* = *q* for cases in which *p, q* and *x* are all nonnegative rational numbers. *continued*	**Chapter 5: 5-2 & 5-3** **Chapter 7: 7-6** **Chapter 8: 8-11**

EXPRESSIONS AND EQUATIONS 6.EE

Grade 6 Content Standards	*Sadlier Math*, Grade 6
Students are now being asked to find the value of a variable when the outcome is known. For example, Meghan spent $56.58 on three pairs of jeans. If each jean costs the same, how many pairs of jeans did she purchase? The answer is 56.58 divided by 3 which is $18.86	
6.EE.8 Write an inequality of the form $x > c$ or $x < c$ to represent a constraint or condition in a real-world or mathematical problem. Recognize that inequalities of the form $x > c$ or $x < c$ have infinitely many solutions; represent solutions of such inequalities on number line diagrams. Students use a number line to represent real world and mathematical solutions, especially inequalities to represent real and mathematical solutions. For example, a class must raise at least $100 to go on a field trip. They have $20 already. Write an inequality to represent the money, m, the class still needs to raise for the trip.	**Chapter 5: 5-5 through 5-8**

Represent and analyze quantitative relationships between dependent and independent variables.

6.EE.9 Use variables to represent two quantities in a real-world problem that change in relationship to one another; write an equation to express one quantity, thought of as the dependent variable, in terms of the other quantity, thought of as the independent variable. Analyze the relationship between the dependent and independent variables using graphs and tables, and relate these to the equation. For example, in a problem involving motion at constant speed, list and graph ordered pairs of distances and times, and write the equation $d = 65t$ to represent the relationship between distance and time. The purpose of this standard is for students to understand the relationship between two variables. This begins with knowing the difference between a dependent and an independent variable. The independent variable is the one that can be changed. The dependent variable is the variable affected by the change in the independent variable. The *continued*	**Chapter 13: 13-1 through 13-4**

EXPRESSIONS AND EQUATIONS 6.EE

Grade 6 Content Standards	*Sadlier Math*, Grade 6
independent variable is graphed on the *x* axis, whereas the dependent variable is graphed on the *y* axis.	

GEOMETRY 6.G

Grade 6 Content Standards	*Sadlier Math*, Grade 6
Solve real-world and mathematical problems involving area, surface area, and volume.	
6.G.1 Find the area of right triangles, other triangles, special quadrilaterals, and polygons by composing into rectangles or decomposing into triangles and other shapes; apply these techniques in the context of solving real-world and mathematical problems. Students still continue to understand area as the number of squares needed to cover a plane figure. They should know the formulas for quadrilaterals and triangles so that they can decompose more complex shapes composed of these figures to calculate area. Students should also recognize that slashed lines through the side of a triangle indicate sides with the same length.	**Chapter 14: 14-1 through 14-6**
6.G.2 Find the volume of a right rectangular prism with fractional edge lengths by packing it with unit cubes of the appropriate unit fraction edge lengths, and show that the volume is the same as would be found by multiplying the edge lengths of the prism. Apply the formulas $V = l\ w\ h$ and $V = b\ h$ to find volumes of right rectangular prisms with fractional edge lengths in the context of solving real-world and mathematical problems. Previously students calculated volume using whole numbers. Now, they use fractional edge lengths to do the same calculations. This requires that students be comfortable with multiplying and dividing fractions learned in prior years.	**Chapter 15: 15-4 & 15-5**
6.G.3 Draw polygons in the coordinate plane given coordinates for the vertices; use *continued*	**Chapter 9: 9-10 & 9-11**

GEOMETRY 6.G

Grade 6 Content Standards	*Sadlier Math*, Grade 6
coordinates to find the length of a side joining points with the same first coordinate or the same second coordinate. Apply these techniques in the context of solving real-world and mathematical problems. Students are given the coordinates of a polygon (a multi sided figure) to draw in the coordinate plane. When both x coordinates are the same, a vertical line is created and the distance between these coordinates is the difference between the two "*x*" numbers. For example, Given the coordinates (-5,4) and (2,4) the distance between the two points is the distance between -5 and 2, which is 7.	
6.G.4 Represent three-dimensional figures using nets made up of rectangles and triangles, and use the nets to find the surface area of these figures. Apply these techniques in the context of solving real-world and mathematical problems. A net is a two dimensional representation of a three dimensional object. Students represent three-dimensional figures whose nets are composed of rectangles and triangles. Students should recognize that parallel lines on a net are congruent (equal) Using the dimensions of the net, students can calculate the area of each rectangle and/or triangle and add these sums together to arrive at the surface area of the figure.	**Chapter 15: 15-1 through 15-3**

STATISTICS AND PROBABILITY 6.SP

Grade 6 Content Standards	*Sadlier Math*, Grade 6
Develop understanding of statistical variability.	
6.SP.1 Recognize a statistical question as one that anticipates variability in the data related to the question and accounts for it in the answers. For example, "How old am I?" is not a statistical question, but "How old are the students in my school?" is a statistical question because one anticipates variability in students' ages. *continued*	**Chapter 16: 16-1**

STATISTICS AND PROBABILITY 6.SP

Grade 6 Content Standards	*Sadlier Math*, Grade 6
Statistics are numerical data relating to a group of individuals; statistics is also the name of the science of collecting, analyzing and interpreting such data. A statistical question anticipates an answer that varies from one individual to the next and is written to account for the variability in the data. Data are the numbers produced in response to a statistical question. Data are collected from surveys or other sources (documents)	
6.SP.2 Understand that a set of data collected to answer a statistical question has a distribution which can be described by its center, spread, and overall shape. The distribution of data is the arrangement of the values of a data set. Distribution can be described using center (median or mean), and spread. Data can be collected on graphs, which will show the shape of the distribution of the data.	**Chapter 16: 16-2 through 16-5** **Chapter 17: 17-2 & 17-4**
6.SP.3 Recognize that a measure of center for a numerical data set summarizes all of its values with a single number, while a measure of variation describes how its values vary with a single number. Data sets contain many numerical values that can be summarized by one number such as a measure of center. The measure of center gives a numerical value to represent the center of the data (midpoint of an ordered list or the balancing point) another characteristic is the variability (spread) of the values.	**Chapter 16: 16-2 through 16-4**
Summarize and describe distributions.	
6.SP.4 Display numerical data in plots on a number line, including dot plots, histograms, and box plots. Students display data graphically using a number line. Dot plots, histograms, and box plots are three graphs to be graphed either vertically or horizontally. The box plot is constructed from the five number summary (minimum, lower quartile, median, upper quartile, and maximum).	**Chapter 17: 17-1 through 17-3**

STATISTICS AND PROBABILITY 6.SP

Grade 6 Content Standards	*Sadlier Math*, Grade 6
6.SP.5 Summarize numerical data sets in relation to their context, such as by: Students summarize numerical data by providing background information about attributes being measured, methods , and units of measurement, the context of data collection activities, the number of observations, and summary statistics. Summary statistics include quantitative measures of center (median and mean) and variability (inter quartile range and mean absolute deviation) including extreme values (minimum and maximum), mean, median, mode, range, and quartiles. Students also use the concept of mean to solve problems. They are given a set of data and asked to calculate the mean and are also asked to find a missing data point that produces a specific average.	
6.SP.5a Reporting the number of observations.	**Chapter 16: 16-2 through 16-5** **Chapter 17: 17-1 through 17-4**
6.SP.5b Describing the nature of the attribute under investigation, including how it was measured and its units of measurement.	**Chapter 16: 16-2 through 16-5** **Chapter 17: 17-1 through 17-4**
6.SP.5c Giving quantitative measures of center (median and/or mean) and variability (inter-quartile range and/or mean absolute deviation), as well as describing any overall pattern and any striking deviations from the overall pattern with reference to the context in which the data were gathered.	**Chapter 16: 16-2 through 16-5** **Chapter 17: 17-1 through 17-4**
6.SP.5d Relating the choice of measures of center and variability to the shape of the data distribution and the context in which the data were gathered.	**Chapter 16: 16-2 through 16-5** **Chapter 17: 17-1 through 17-4**