SD Common Core State Standards Disaggregated Math Template

Domain:	Ratios & Proportional Relationships	**Cluster:**	Understand ratio concepts and use ratio reasoning to solve problems.	**Grade level:**	6

Correlating Standard in Previous Year	Number Sequence & Standard	Correlating Standard in Following Year
5.NF.3 Interpret a fraction as division of the numerator by the denominator (a/b = a÷b). Solve word problems involving division of whole numbers leading to answers in the form of fractions or mixed numbers, e.g., by using visual fraction models or equations to represent the problem. For example, interpret 3/4 as the result of dividing 3 by 4, noting the 3/4 multiplied by 4 equals 3, and that when 3 wholes are shared equally among 4 people each person has a share of size 3/4. If 9 people want to share a 50-pound sack of rice equally by weights, how many pounds of rice should each person get? Between what two whole numbers does your answer lie?	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."*	7.RP.2 Recognize and represent proportional relationships between quantities.

Student Friendly Language:

I can write and explain a ratio describing the relationship between two quantities. For example if I am given 3 red chips and 2 blue chips, I will be able to give the ratio of red chips to blue chips as 3 to 2, 3:2, or 3/2

I can define the term ratio and give various examples.

Know (Factual)	Understand (Conceptual) The students will understand that:	Do (Procedural, Application, Extended Thinking)
• Ratio • Fraction • Part to part • Part to whole	Ratios compare two quantities. Ratios can be written 3 ways such as 3 to 2, 3:2, or 3/2. There are a variety of contexts for using ratios and ways to express them, such as part to part or part to whole.	Write and model a ratio using two quantities. Describe and compare two numbers using ratios including appropriate notation. Simplify ratios. Identify a ratio in a real life context.

Key Vocabulary:

fraction	ratio	simplify	equivalent fractions
quantity	part to part	part to whole	

Relevance and Applications: How might the grade level expectation be applied at home, on the job or in a real-world, relevant context? Include at least one example stem for the conversation with students to answer the question “why do I have to learn this”?

Teacher/student ratio
Boy/Girl ratio
Construction: cost of small project and relate to bigger projects (cost per sq foot)
Cooking/Baking: Doubling/Tripling recipes
Farming: Pesticides application, bags of seeds per acre
Mixing gasoline and oil amounts for snowmobiles, weed eaters, and lawnmowers etc.
Painting: Mixing colors together to get a specific color
Ratio of sugar to water in lemonade

SD Common Core State Standards Disaggregated Math Template

Domain:	Ratios & Proportions Relationships	**Cluster:**	Understand ratio concepts and use ratio reasoning to solve problems.	**Grade level:**	6

Correlating Standard in Previous Year	Number Sequence & Standard	Correlating Standard in Following Year
5.NF.3 Interpret a fraction as division of the numerator by the denominator (a/b = a÷b). Solve word problems involving division of whole numbers leading to answers in the form of fractions or mixed numbers. e.g., by using visual fraction models or equations to represent the problem. For example, interpret 3/4 multiplied by 4 equals 3, and that when 3 wholes are shared equally among 4 people each person has a share of size 3/4. If 9 people want to share a 50-pound sack of rice equally by weight, how many pounds of rice should each person get? Between what two whole numbers does your answer lie?	6.RP.2 Understand the concept of a unit rate a/b associated with a ratio a:b with b ≠ 0, and use rate language in the context of a ratio relationship.	7.RP.1 Compute unit rates associated with ratios of fractions, including ratios of lengths, areas and other quantities measured in like or different units. *For example, if a person walks 1/2 mile in each 1/4 hour, compute the unit rate as the complex fraction 1/2/1/4 miles per hour, equivalently 2 miles per hour.*

Student Friendly Language:

I can understand the difference between a rate and a ratio.

I can calculate the unit rate when given a ratio.

I can say and write a unit rate and ratio.

I can use correct labels after finding a unit rate.

Know (Factual)	Understand (Conceptual) The students will understand that:	Do (Procedural, Application, Extended Thinking)
• Ratios • Rates • Unit rates	A relationship exists between ratios and unit rates. Units can be compared using ratios. Ratios can be written as equivalent unit rates.	Calculate a unit rate. Solve one-step problems converting a ratio to a unit rate. Compare and contrast ratios and rates.

Key Vocabulary:

ratio	rate	unit rate	simplify
equivalent	per	fraction	

Relevance and Applications: How might the grade level expectation be applied at home, on the job or in a real-world, relevant context? Include at least one example stem for the conversation with students to answer the question "why do I have to learn this"?

Shopping: 15 ounces costs $0.75. What does it cost for one ounce?

Restaurant bill: $75.00 total. How much is that per person when you have a party of 5?

Traveling: If you are traveling 300 miles in 5 hours, how many miles did you travel in 1 hour?

Comparison shopping: 20 oz. pop for $1.49 and a 12 oz. pop for $1.00. Which is the better deal?

Cooking: A recipe calls for 30 liters of water for 7 people. How much water will be needed per serving?

SD Common Core State Standards Disaggregated Math Template

Domain:	Ratios and Proportional Relationships	**Cluster:**	Understand ratio concepts and use ratio reasoning to solve problems	**Grade level:**	6

Correlating Standard in Previous Year	Number Sequence & Standard	Correlating Standard in Following Year
5.MD.1 Convert among different-sized standard measurement units within a given measurement system (e.g., convert 5 cm to 0.05 m), and use these conversions in solving multi-step, real world problems.	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. a. 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. b. 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 n 35 hours? At what rate were lawns being mowed?* c. 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. d. Use ratio reasoning to convert measurement units; manipulate and transform units appropriately when multiplying or dividing quantities.	7.RP.1 Compute unit rates associated with ratios of fractions, including ratios of lengths, areas and other quantities measured in like or different units. 7.RP.2 Recognize and represent proportional relationships between quantities. 7.RP.3 Use proportional relationships to solve multi-step ratio and percent problems. 7.G.1 Solve problems involving scale drawings of geometric figures, including computing actual lengths and areas from a scale drawing and reproducing a scale drawing at a different scale.

Student Friendly Language:

I can solve real-life problems using ratios and rates.

I can make a table to compare ratios and plot the results on a coordinate plane.

I can calculate unit rate problems involving unit pricing and speed.

I can find a percent of a quantity as a rate per 100.

I can change measurements from one unit to another by using ratios.

Know (Factual)	Understand (Conceptual) The students will understand that:	Do (Procedural, Application, Extended Thinking)
• Equivalent ratios • Representations of equivalent ratios • Coordinate plane (x and y axis) • Ordered pairs • Unit rate • Percent as per 100 • Measurement conversion	Ratios can be used to find missing values in a table. Rate reasoning can be used to solve unit rate problems. Percent is a rate per 100. Ratio reasoning can be used to convert measurement units.	Make a table to compare ratios and plot the results on a coordinate plane. Calculate unit rate problems involving unit pricing and speed. Calculate percent and solve problems involving whole, part, and percent. Convert measurement units by using ratios.

Key Vocabulary:

equivalent ratios coordinate plane quantity plot ordered pairs rate rate percentage quantity part whole per 100 convert table tape diagram double number line diagram ratio reasoning rate reasoning

Relevance and Applications: How might the grade level expectation be applied at home, on the job or in a real-world, relevant context? Include at least one example stem for the conversation with students to answer the question "why do I have to learn this"?

Graphing Hourly Rate – mowing, babysitting, newspaper carrier

Comparing prices for two companies – What is the best price for one shirt?
- Soda Prices – Is the 12-pack of pop a better deal than the 6-pack of pop?
- Vehicles – Miles per gallon and Miles per hour
- Vacation – d=rt – I traveled 500 miles and it took 6 hours. What is my speed?

Grades – I got 7 out of 10 problems correct. What percent did I receive?
- Sports – Statistics, Averages (Free Throw, etc.)

Measurement – How many cups would I have to use to fill a gallon?
- Comparing two heights – 70 inches to 5'8"

SD Common Core State Standards Disaggregated Math Template

Domain:	Number System	**Cluster:**	Apply and extend previous understandings of multiplication and division to divide fractions by fractions	**Grade level:**	6

Correlating Standard in Previous Year	Number Sequence & Standard	Correlating Standard in Following Year
5.NF.3 - Interpret a fraction as division of the numerator by the denominator (a/b = a÷b). Solve word problems involving division of whole numbers leading to answers in the form of fractions or mixed numbers. e.g., by using visual fraction models or equations to represent the problem. For example, interpret 3/4 multiplied by 4 equals 3, and that when 3 wholes are shared equally among 4 people each person has a share of size 3/4. If 9 people want to share a 50-pound sack of rice equally by weight, how many pounds of rice should each person get? Between what two whole numbers does your answer lie? 5.NF.7 Apply and extend previous understandings of division to divide unit fractions by whole numbers and whole numbers by unit 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. For example, create a story context for (2/3) ÷ (3/4) and use a visual fraction model to show the quotient; use the relationship between multiplication and division to explain that (2/3) ÷ (3/4) = 8/9 because 3/4 of 8/9 is 2/3. (In general, (a/b) ÷ (c/d) = ad/bc.) How much chocolate will each person get if 3 people share 1/2 lb of chocolate equally? How many 3/4-cup servings are in 2/3 of a cup of yogurt? How wide is a rectangular strip of land with length 3/4 mi and area 1/2 square mi?	7.NS.2 Apply and extend previous understandings of multiplication and division and of fractions to multiply and divide rational numbers. 7.NS.3 Solve real-world and mathematical problems involving the four operations with rational numbers.

Student Friendly Language:

When given real-life problems involving fractions, I can solve using division.
I can make a visual model and write an equation in order to solve the problem.

Know (Factual)	Understand (Conceptual) The students will understand that:	Do (Procedural, Application, Extended Thinking)
• Quotients can be represented using visual fraction models • Quotients can be computed using equations • Key words and symbols that represent division	Dividing fractions is the same as multiplying by the reciprocal/multiplicative inverse. Dividing a proper fraction by a proper fraction results in a quotient larger than the dividend or divisor. Fractions can be a “part to whole” relationship. Key words like “share” and “equal” indicate division. Multiplication is the inverse of division.	Interpret the problem to identify and compute using the correct operation. Explain the relationship between their model and equation. Justify why the answer is a reasonable solution to the problem. Explain an algorithm and use it to solve division problems. Create a story context that will represent a real life problem that involves division of fractions by fractions.

Key Vocabulary:

quotient product reciprocal/multiplicative inverse proper fraction numerator denominator
mixed number improper fraction equation divisor dividend

Relevance and Applications: How might the grade level expectation be applied at home, on the job or in a real-world, relevant context? Include at least one example stem for the conversation with students to answer the question “why do I have to learn this”?

Recipes: Determine that if a recipe for a batch of cookies calls for 2/3 cup of sugar and you have 6 1/3 cups of sugar, how many batches of cookies could you make?
Dividing a recipe; Sharing a fractional amount of food with a part of a group: We have ¾ of a pizza to share with ½ the class. How much will the students receive?
How many ¾ cup servings are in 6 ½ cups of ice cream?
If you have a gallon and a half of weed killer, and you need 2/3 cup for every one hundred acres, how many acres could you spray?
How many quarter miles are in 2 ½ miles?
How many eighth notes (1/2 beat) are in a dotted half note (3 beats)?
In which jobs would you work with fractions?
In groups, students will cut up 6 candy bars to see how they can be divided into 1/3’s.

SD Common Core State Standards Disaggregated Math Template

Domain:	Number System	**Cluster:**	Compute fluently with multi-digit numbers and find common factors and multiples	**Grade level:**	6

Correlating Standard in Previous Year	Number Sequence & Standard	Correlating Standard in Following Year
5.NBT.6 Find whole-number quotients of whole numbers with up to four-digit dividends and two-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.	6.NS.2 Fluently divide multi-digit numbers using the standard algorithm.	7.NS.2 Apply and extend previous understandings of multiplication and division and of fractions to multiply and divide rational numbers.

Student Friendly Language:
I can divide a number with two or more digits by another number with two or more digits using the standard algorithm.

Know (Factual)	**Understand (Conceptual) The students will understand that:**	**Do (Procedural, Application, Extended Thinking)**
• Standard division algorithm for single digit numbers is the same as multi-digit numbers • Quotients are expressed in different forms • Estimation strategies for division	The process of standard division algorithm calculates the quotient. Quotients can be expressed as a whole number, mixed number, fraction, terminating decimal and/or repeating decimal. Estimation strategies can be used to find reasonable digits in the quotient.	Use the standard division algorithm to divide multi-digit numbers fluently. Apply the standard algorithm of division in a variety of real life situations. Use estimation strategies throughout the division process. Choose the appropriate quotient form for the situation.

Key Vocabulary:
standard division algorithm dividend divisor quotient remainder terminating decimal repeating decimal/non-terminating decimal mixed number
Relevance and Applications: How might the grade level expectation be applied at home, on the job or in a real-world, relevant context? Include at least one example stem for the conversation with students to answer the question "why do I have to learn this"?
Break something into equal sized groups or parts. The school is having a fund drive for their local food pantry. There are 84 students in the participating classes. They raised a total of 756 items. How many items did each student bring? Mike had to bring snacks for the Halloween party. There were 225 animal crackers in a jumbo pack. If there are 22 students in his classroom, how many crackers would each student receive?

SD Common Core State Standards Disaggregated Math Template

Domain:	Number System	Cluster:	Compute fluently with multi-digit numbers and find common factors and multiples.	Grade Level:	6

Correlating Standard in Previous Year	Number Sequence & Standard	Correlating Standard in Following Year
5.NBT.7 Add, subtract, multiply, and divide decimals to hundredths, using concrete models or drawings and strategies based on place value, properties of operations, and/or the relationship between addition and subtraction; relate the strategy to a written method and explain the reasoning used.	6.NS.3 Fluently add, subtract, multiply, and divide multi-digit decimals using the standard algorithm for each operation.	7.NS.1d Apply properties of operations as strategies to add and subtract rational numbers. 7.NS.2 Apply and extend previous understandings of multiplication and division and of fractions to multiply and divide rational numbers. 7.NS.3 Solve real-world and mathematical problems involving the four operations with rational numbers.

Student Friendly Language:
I can add multi-digit decimals using the standard algorithm. I can subtract multi-digit decimals using the standard algorithm. I can multiply multi-digit decimals using the standard algorithm. I can divide multi-digit decimals using the standard algorithm.

Know (Factual)	Understand (Conceptual) The students will understand that:	Do (Procedural, Application, Extended Thinking)
• Decimal place value • Standard algorithm for addition, subtraction, multiplication, and division of decimals • Estimation strategies for addition, subtraction, multiplication, and division	Place value alignment is important when adding and subtracting multi-digit decimals. Placement of the decimal point is important when multiplying and dividing multi-digit decimals. Estimation strategies can be used to find reasonable answers.	Explain the process of adding and subtracting multi-digit decimals to the other students. Create problems that involve adding or subtracting multi-digit decimals. Explain the decimal point placement in the product of two multi-digit decimals. Explain the movement of the decimal point when dividing two multi-digit decimals. Create problems that involve multiplication or division of multi-digit decimals. Calculate the sum, difference, product, and quotient of two multi-digit decimals Estimate to determine if the answer is reasonable.

Key Vocabulary:				
multiplication	product	division	quotient	subtraction
difference	addition	sum	decimal point	<u>decimal place value</u>

Relevance and Applications: How might the grade level expectation be applied at home, on the job or in a real-world, relevant context? Include at least one example stem for the conversation with students to answer the question "why do I have to learn this"?

At home/Real-World: Ask your family members to take their savings from their piggy banks and pool their money together to buy one family toy.
Calculate the amount of tax, when given the percentage in decimal form, on items for purchase at a local business.
Calculate the increases and decreases in temperature using decimals.
Calculate a store discount.
Calculate the total cost of multiple items purchased.

SD Common Core State Standards Disaggregated Math Template

Domain:	Number System	**Cluster:**	Compute fluently with multi-digit numbers and find common factors and multiples	**Grade level:**	6

Correlating Standard in Previous Year	Number Sequence & Standard	Correlating Standard in Following Year
5.OA.2. Write simple expressions that record calculations with numbers, and interpret numerical expressions without evaluating them. *For example, express the calculation "add 8 and 7, then multiply by 2" as 2 × (8 + 7).* Recognize that 3 × (18932 + 921) is three times as large as 18932 + 921, without having to calculate the indicated sum or product.	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 a multiple of a sum of two whole numbers with no common factor. For example, express 36 + 8 as 4 (9 + 2).	7.EE.1 Apply properties of operations as strategies to add, subtract, factor, and expand linear expressions with rational coefficients. 7.EE.4a. Solve word problems leading to equations of the form $px + q = r$ and $p(x + q) = r$, where p, q, and r are specific rational numbers. Solve equations of these forms fluently. Compare an algebraic solution to an arithmetic solution, identifying the sequence of the operations used in each approach. *For example, the perimeter of a rectangle is 54 cm. Its length is 6 cm. What is its width?* Solve word problems leading to inequalities of the form $px + q > r$ or $px + q < r$, where p, q, and r are specific rational numbers. Graph the solution set of the

Student Friendly Language:
I can find the greatest common factor of two whole numbers from 1-100. I can find the least common multiple of two whole numbers less than or equal to 12. I can use the distributive property to rewrite expressions.

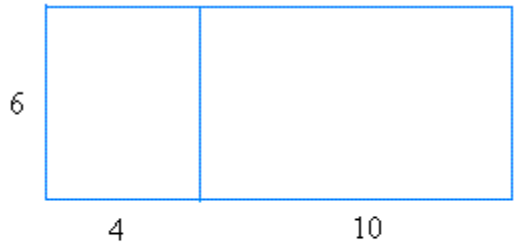
Know	Understand (Conceptual) The students will understand that:	Do (Procedural, Application, Extended Thinking)
• greatest common factor (GCF) • least common multiple(LCM) • distributive property can be used to rewrite an addition expression .	The distributive property can change one's perspective on an expression or situation. The GCF and LCM can help us see patterns and structure between whole numbers. The sum of any pair of whole numbers can be rewritten as the GCF multiplied by the sum of two whole numbers sharing only one as a factor. The GCF of two prime numbers is 1 Common factors can help us solve rate and fraction problems. Factors of two whole numbers less than or equal to 100 help to identify common factors	Identify GCF of two whole numbers less than or equal to 100. Determine LCM of two whole numbers less than or equal to 12. Use the distributive property to express a sum of two whole numbers as the GCF multiplied by the sum of two whole numbers. Connect knowledge and explain the GCF and Distributive Property in an everyday situation.

Key Vocabulary:
multiples factors prime number composite number distributive property least common multiple <u>greatest common factor</u>

Relevance and Applications: How might the grade level expectation be applied at home, on the job or in a real-world, relevant context? Include at least one example stem for the conversation with students to answer the question "why do I have to learn this"?

Mental Math: The distributive property is important in real life because it makes complex problems easier to calculate mentally.

Earn money: If you work for 6 hours one day and 4 hours another day, how much would you earn if you made $2 per hour?
Cycles: Many things happen over and over again in fixed cycles, like the earth circling the sun, cicadas emerging from the earth, economies rising and falling. Scientists and researchers are interested in figuring out when events with different cycles can occur at the same time. The greatest common factor and least common multiple are both tools they may use to answer those questions.
Eliminating Waste
Suppose you run a small convenience store. You donate treats for school parties, but you don't want your donations to be wasted. Suppose you donated 120 cans of juice and 90 packs of cheese crackers for a class field trip. Each student is to receive the same number of cans of juice and the same number of packs of crackers. What is the greatest number of students who can go on the trip and share the donations with no waste? Knowledge of greatest common factors and least common multiples will answer these types of questions
Thanksgiving: You are making pumpkin pies for the bake sale. Pie crusts are sold in packages of 3. Pie filling is sold in 4-can packages. What is the least number of pie crusts and filling that you can buy to have the same number of each? How many packages of each should you buy?
Youth activities: Bridget has swimming lessons every fifth day and diving lessons every third day. If she had a swimming lesson and a diving lesson on May 5, what will be the next date on which she has both swimming and diving lessons
Wedding Banquet: Shannon is making identical balloon arrangements for a party. She has 32 maroon balloons, 24 white balloons, and 16 orange balloons. She wants each arrangement to have the same number of each color. What is the greatest number of arrangements that she can make if every balloon is used?
Building a garage: Look at the following illustration. How would you get the area?



$$\text{Area} = 6*(4+10) = 6*4+6*10$$

Distributive property

Area = width × length
Since width = 6 and length = 4 + 10, area = 6 × (4 + 10)
You can do the math two ways.
You can add 4 and 10 and multiply what you get by 6.
Otherwise, you can use the distributive property illustrated above by multiplying 6 by 4 and 6 by 10 and adding the results.

Shopping: You go to the supermarket. 1 bag of apples costs 4 dollars. 1 gallon of olive oil costs 10 dollars. You get 6 bags of apples and 6 gallons of olive oil.
How much money do you pay the cashier?
Total cost = # of items you purchased × (cost for apples + cost for olive oil)
Total cost = 6 × (4 + 10) = (6 × 4) + (6 × 10) = 24 + 60 = 84 dollars.

SD Common Core State Standards Disaggregated Math Template

Domain:	Number System	**Cluster:**	Apply and extend previous understandings of numbers to the system of rational numbers	**Grade level:**	6

Correlating Standard in Previous Year	Number Sequence & Standard	Correlating Standard in Following Year
5.G.2 Represent real world and mathematical problems by graphing points in the first quadrant of the coordinate plane, and interpret values of points in the context of the situation	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, debits/credits, positive/negative electric charge); use positive and negative numbers to represent quantities in real-world contexts, explaining the meaning of 0 in each situation.	7.NS.1 Apply and extend previous understandings of addition and subtraction to add and subtract rational numbers; represent addition and subtraction on a horizontal or vertical number line diagram.

Student Friendly Language:
I can use positive and negative numbers to describe situations in real life such as temperatures, elevations, saving or owing money, and positive/negative electrical charges. I can explain the concept of zero in different situations.

Know (Factual)	Understand (Conceptual) The students will understand that:	Do (Procedural, Application, Extended Thinking)
• Positive and negative numbers • Value of zero	Positive and negative numbers are used together to describe quantities. Zero has a role in real world contexts when positive and negative numbers are used together.	Use positive and negative numbers to represent real-life quantities. Explain a number's relationship to zero in various situations.

Key Vocabulary:							
positive numbers	negative numbers	zero	quantities	value	direction	integers	opposite

Relevance and Applications: How might the grade level expectation be applied at home, on the job or in a real-world, relevant context? Include at least one example stem for the conversation with students to answer the question "why do I have to learn this"?
What integers would represent various real world situations? For example; a loss of 6 yards, 200 feet above sea level, $25 deposit, $75 withdrawal, a decrease in temperature of 9 degrees.

SD Common Core State Standards Disaggregated Math Template

Domain:	Number System	**Cluster:**	Apply and extend previous understandings of numbers to the system of rational numbers	**Grade level:**	6

Correlating Standard in Previous Year	Number Sequence & Standard	Correlating Standard in Following Year
5.G.1 Use a pair of perpendicular number lines, called axes, to define a coordinate system, which the intersection of the lines (the origin) arranged to coincide with the 0 on each line and a given point in the plane located by using an ordered pair of numbers, called its coordinates. Understand that the first number indicates how far to travel from the origin in the direction of one axis, and the second number indicates how far to travel in the direction of the second axis, with the convention that the names of the two axes and the coordinates correspond (e.g., x-axis and x-coordinate, y-axis and y-coordinate).	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. a. 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. b. 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. c. 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.	7.NS.1 Apply and extend previous understandings of addition and subtraction to add and subtract rational numbers; represent addition and subtraction on a horizontal or vertical number line diagram. a. Describe situations in which opposite quantities combine to make 0. *For example, a hydrogen atom has 0 charge because its two constituents are oppositely charged.* b. Understand p + q as the number located a distance |q| from p, in the positive or negative direction depending on whether q is positive or negative. Show that a number and its opposite have a sum of 0 (are additive inverses). Interpret sums of rational numbers by describing real-world contexts. c. Understand subtraction of rational numbers as adding the additive inverse, p – q = p + (–q). Show that the distance between two rational numbers on the number line is the absolute value of their difference, and apply this principle in real-world contexts. d. Apply properties of operations as strategies to add and subtract rational numbers.

Student Friendly Language:

I can locate positive and negative rational numbers and their opposites on a horizontal or vertical number line.
I can plot positive and negative rational numbers and their opposites on a horizontal or vertical number line.
I can locate ordered pairs on a coordinate plane.
I can plot ordered pairs on a coordinate plane.
I can identify the quadrant in which the ordered pair is located.
I can reflect an ordered pair across one or both axes.

Know (Factual)	Understand (Conceptual) The students will understand that:	Do (Procedural, Application, Extended Thinking)
• Integers and their opposites • Four quadrants in a coordinate plane • Reflection over x and/or y-axis	All rational numbers can be placed on a number line. Number's sign will determine its placement on a number line or in a specific quadrant. Numbers and their opposites are equally distant from 0. The opposite of an ordered pair is a reflection across one or both axes. Number lines can be horizontal or vertical. Zero is its own opposite.	Locate and plot rational numbers and their opposites on a number line. Identify the value of a number based on its location on a number line. Locate and plot ordered pairs on a coordinate plane. Identify the coordinates of plotted points. Given an ordered pair, graph the reflection.

Key Vocabulary:

integers opposites coordinate plane ordered pairs quadrants rational numbers
number lines reflection positive negative horizontal axis (x-axis)
vertical axis (y-axis) origin coordinate x-coordinate y-coordinate

Relevance and Applications: How might the grade level expectation be applied at home, on the job or in a real-world, relevant context? Include at least one example stem for the conversation with students to answer the question "why do I have to learn this"?

Temperature/thermometer – "The temperature was 5º below zero when I left for school in the morning. When I came home it was 5º above zero. Plot both of these temperatures on a vertical number line."
Banking – credits and debits
Sports – football and golf
Stock market - increase and decrease
Elevation - below and above sea level

SD Common Core State Standards Disaggregated Math Template

Domain:	Number System	**Cluster:**	Apply and extend previous understandings of numbers to the system of rational numbers	**Grade level:**	6

Correlating Standard in Previous Year	Number Sequence & Standard	Correlating Standard in Following Year
5.NF.5 Interpret multiplication as scaling (resizing), by: a. Comparing the size of a product to the size of one factor on the basis of the size of the other factor, without performing the indicated multiplication. b. Explaining why multiplying a given number by a fraction greater than 1 results in a product greater than the given number (recognizing multiplication by whole numbers greater than 1 as a familiar case); explaining why multiplying a given number by a fraction less than 1 results in a product smaller than the given number; and relating the principle of fraction equivalence $a/b = (n \times a)/(n \times b)$ to the effect of multiplying a/b by 1. 5.NBT.3 Read, write, and compare decimals to thousandths. a. Read and write decimals to thousandths using base-ten numerals, number names, and expanded form, e.g., 347.392 = 3 × 100 + 4 × 10 + 7 × 1 + 3 × (1/10) + 9 × (1/100) + 2 × (1/1000). b. Compare two decimals to thousandths based on meanings of the digits in each place, using >, =, and < symbols to record the results of comparisons.	6.NS.7 Understand ordering and absolute value of rational numbers. a. 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.* b. Write, interpret, and explain statements of order for rational numbers in real-world contexts. (*for example, write -3 degrees Celsius > -7 degrees Celsius to express the fact that -3 is warmer than -7 degrees)* c. 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 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.* d. 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.*	7.NS.1 Apply and extend previous understandings of addition and subtraction to add and subtract rational numbers; represent addition and subtraction on a horizontal or vertical number line diagram. a. Describe situations in which opposite quantities combine to make 0. *For example, a hydrogen atom has 0 charge because its two constituents are oppositely charged.* b. Understand p + q as the number located a distance |q| from p, in the positive or negative direction depending on whether q is positive or negative. Show that a number and its opposite have a sum of 0 (are additive inverses). Interpret sums of rational numbers by describing real-world context. c. Understand subtraction of rational numbers as adding the additive inverse, p – q = p + (–q). Show that the distance between two rational numbers on the number line is the absolute value of their difference, and apply this principle in real-world contexts. d. Apply properties of operations as strategies to add and subtract rational numbers.

Student Friendly Language:
I can write inequalities to compare rational numbers. I can use inequality symbols to compare rational numbers. I can use a number line to compare negative and positive numbers. I can write positive and negative numbers in real life situations. (For example: temperatures, money, golf scores) I can use positive and negative numbers in real life situations. I can use absolute value to help me find the distance of positive and negative numbers from 0. I can tell the difference between comparing negative numbers and the absolute value of negative numbers.

Know (Factual)	Understand (Conceptual) The students will understand that:	Do (Procedural, Application, Extended Thinking)
• Integers are rational numbers • Absolute value is the distance from zero • Symbols for greater than and less than (inequalities)	There is a relationship between positive and negative numbers and between two negative numbers. Positive and negative numbers occur in the real world. Absolute value is a number's distance from 0 on a number line. Absolute value has real world applications. Number lines with rational numbers plotted on them can aid in interpreting inequality statements.	Interpret an inequality with negative and positive numbers using a number line. Explain how the order of rational numbers is used in real life. Interpret the absolute value as a distance from 0. Explain the difference between the order of negative numbers and the order of the absolute value of negative numbers. Plot rational numbers on a number line. Explain how absolute value is used in real life situations.

Key Vocabulary:			
inequality number line	integers magnitude	rational numbers negative	absolute value positive

Relevance and Applications: How might the grade level expectation be applied at home, on the job or in a real-world, relevant context? Include at least one example stem for the conversation with students to answer the question "why do I have to learn this"?

The temperature today is -1 degree and the temperature yesterday was -5 degrees. Is it warmer or colder today?

In a golf tournament, Annika Sorenstam shot 5 under par on Thursday and 2 under par on Friday. Using comparisons of absolute value, determine which day she golfed the best (in golf, the lower the number, the better the score).

If you add $42.98 to your savings account, would you describe that as a debit or credit?

At a pizza party, three large pizzas were ordered. After the meal, there was 2/3 of the supreme, 1/8 of the pepperoni, and 3/16 of the cheese pizzas remaining. Which kind of pizza had the greatest portion left?

SD Common Core State Standards Disaggregated Math Template

Domain:	Number System	**Cluster:**	Apply and extend previous understandings of numbers to the system of rational numbers	**Grade level:**	6

Correlating Standard in Previous Year	Number Sequence & Standard	Correlating Standard in Following Year
5.G.1 Use a pair of perpendicular number lines, called axes, to define a coordinate system, with the intersection of the lines (the origin) arranged to coincide with the 0 on each line and a given point in a plane located by using an ordered pair of numbers, called its coordinates. Understand that the first number indicates how far to travel from the origin in the direction of one axis, and the second number indicates how far to travel in the direction of the second axis, with the convention that the names of the two axes and the coordinates correspond (e.g., x-axis and x-coordinate, y-axis and y-coordinate. 5.G.2 Represent real-world and mathematical problems by graphing points in the first quadrant of the coordinate plane, and interpret coordinate values of points in the context of the situation.	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.	7.NS.1c Understand subtraction of rational numbers as adding the additive inverse, $p - q = p + (-q)$. Show that the distance between two rational numbers on the number line is the absolute value of their difference, and apply this principle in real-world contexts.

Student Friendly Language:

I can graph ordered pairs in all four quadrants of a coordinate plane.
I am able to determine which quadrant an ordered pair would be plotted by reading the coordinates alone.
I can find the distance between points with the same first coordinate or second coordinate.
I can use absolute value to find distance between points anywhere on a coordinate plane.

Know (Factual)	Understand (Conceptual) The students will understand that:	Do (Procedural, Application, Extended Thinking)
• Four quadrants in a coordinate plane • Integers and their opposes	Distance between points on a coordinate plane can be calculated by using absolute value. Real world problems can be solved by graphing points on a coordinate plane.	Calculate the distance between points on a coordinate plane. Plot points to solve real world problems. Explain how to calculate distance between points on a coordinate plane.

Key Vocabulary:

absolute value	ordered pair	coordinate plane	horizontal axis (x-axis)	x-coordinate
vertical axis (y-axis)	y-coordinate	quadrant	integer	opposite
positive	negative	origin		

Relevance and Applications: How might the grade level expectation be applied at home, on the job or in a real-world, relevant context? Include at least one example stem for the conversation with students to answer the question "why do I have to learn this"?

Using a map on a coordinate plane, calculate the distance from one landmark to another. (The landmarks share the same first coordinate or same second coordinate.)

Draw the Big Dipper constellation on a coordinate plane and list the plotted ordered pairs.

SD Common Core State Standards Disaggregated Math Template

Domain:	Expressions and Equations	**Cluster:**	Apply and extend previous understandings of arithmetic to algebraic expressions	**Grade level:**	6

Correlating Standard in Previous Year	Number Sequence & Standard	Correlating Standard in Following Year
5.OA.1 Write and interpret numerical expressions: use parentheses, brackets, or braces in numerical expressions, and evaluate expressions with these symbols. 5.OA.2 Write simple expressions that record calculations with numbers, and interpret numerical expressions without evaluating them. For example, express the calculation "add 8 and 7, then multiply by 2" as 2 × (8 + 7). Recognize that 3 × (18932 + 921) is three times as large as 18932 + 921, without having to calculate the indicated sum or product.	6.EE.1 Write and evaluate numerical expressions involving whole-number exponents.	7.EE.1 Apply properties of operations as strategies to add, subtract, factor, and expand linear expressions with rational coefficients. 8.EE.1 Know and apply the properties of integer exponents to generate equivalent numerical expressions. For example, 3^2 x 3^(-5) = 3^(-3) - 1/(3^3) = 1/27.

Student Friendly Language:

I can evaluate an expression that uses addition, subtraction, multiplication, division, and whole number exponents.
I can explain what exponents stand for and use them to find the value of an expression.
I can write a numerical expression that uses addition, subtraction, multiplication, division, and whole number exponents.

Know (Factual)	Understand (Conceptual) The students will understand that:	Do (Procedural, Application, Extended Thinking)
• Numerical expression is a mathematical statement • Sequence of the order of operations	Order of operations must be followed to properly evaluate an expression. Exponents represent repeated multiplication of the same factor. Numerical expressions can be written to represent real life situations.	Explain what an exponent is and how it is used. Write and evaluate a numerical expression using whole number exponents. Apply order of operations when evaluating expressions using whole number exponents. Expand an exponent by showing repeated multiplication to find its value. Represent repeated multiplication of the same factor using an exponent.

Key Vocabulary:

numerical expression	evaluate	exponents	order of operations	power	base	factor
sum	product	quotient	difference	value	cubed	squared

Relevance and Applications: How might the grade level expectation be applied at home, on the job or in a real-world, relevant context? Include at least one example stem for the conversation with students to answer the question "why do I have to learn this"?

Create a fenced-in area for your pet. Using a specified number of fencing pieces, draw all the possible sizes of pens that you could create to give your pet the largest area. When finished use the largest pen to write a numerical expression to show how to find the area.
When given an "x" by "x" sized pool (for example x=10 meters), determine the number of tiles needed to go around the perimeter of the pool. Write a numerical expression to show the number of tiles needed for the pool.
The tree frog population doubles every three weeks. Assume that there are 10 tree frogs in your backyard now. How many will there be in 24 weeks?
If you went out for recess and shook hands with two other students, then they shook hands with two different students, and those students each shook hands with two different students, how many hands have been shaken?

SD Common Core State Standards Disaggregated Math Template

Domain:	Expressions and Equations	**Cluster:**	Apply and extend previous understandings of arithmetic to algebraic expressions.	**Grade level:**	6

Correlating Standard in Previous Year	Number Sequence & Standard	Correlating Standard in Following Year
5.OA.2 Write simple expressions that record calculations with numbers, and interpret numerical expressions without evaluating them.	6.EE.2 Write, read, and evaluate expressions in which letters stand for numbers. a. 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.* b. 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.* c. 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 = s3 and A = 6 s2 to find the volume and surface area of a cube with sides of length s = 1/2.*	7.EE.4 Use variables to represent quantities in a real-world or mathematical problem, and construct simple equations and inequalities to solve problems by reasoning about the quantities. a. Solve word problems leading to equations of the form px + q = r and p(x + q) = r, where p, q, and r are specific rational numbers. Solve equations of these forms fluently. Compare an algebraic solution to an arithmetic solution, identifying the sequence of the operations used in each approach. b./ Solve word problems leading to inequalities of the form px + q > r or px + q < r, where p, q, and r are specific rational numbers. Graph the solution set of the inequality and interpret it in the context of the problem

Student Friendly Language:
I can write an algebraic expression using variables, numbers, and operation symbols to represent the problem. I can identify clue/key words to write algebraic expressions. I can identify clue/keywords to evaluate algebraic expressions. I can apply an algebraic expression to formulas such as volume and area. I can use order of operations to evaluate algebraic expressions. I can substitute the information from the problem into the expression/formula.

Know (Factual)	Understand (Conceptual) The students will understand that:	Do (Procedural, Application, Extended Thinking)
• Terms of an expression • Clue/key words that signal operations • Order of operations	Expressions are a mathematical way to represent real life problems. Variables represent an unknown quantity in the problem. The value of an expression varies as the value of the variable changes. Following the order of operations is essential. Algebraic expressions are useful when solving formulas	Read and identify the relevant information from the problem. Write an expression using the relevant information. Evaluate the expression or formulas for various numerical values. Recognize when algebraic formulas are useful in other subject areas and use them appropriately.

Key Vocabulary:					
algebraic expression	variable	numerical expression	constant	coefficient	term
sum	difference	product	factor	quotient	formula
evaluate	exponents	substitute	order of operations		parentheses

Relevance and Applications: How might the grade level expectation be applied at home, on the job or in a real-world, relevant context? Include at least one example stem for the conversation with students to answer the question "why do I have to learn this"?

Make a table and write an expression to find out how many hours at $8 an hour you would have to work to purchase a $239 iPod.

Compute the time it takes to get to different cities at a constant speed.

Compute the cost of bowling per game plus amount for renting shoes: The cost of a bowling game is $15 plus a $3 rental fee per person for shoes.

Figure cell phone, cable, water, and electricity bills.

Figure shopping and coupon totals.

Figure restaurant with tip bills: After eating at Buffalo Wild Wings, your total comes to $23.41. How much would you charge your credit card if you leave a 15% tip?

Buy tickets with age group variations.

SD Common Core State Standards Disaggregated Math Template

Domain:	Expressions and Equations	**Cluster:**	Apply and extend previous understandings of arithmetic to algebraic expressions	**Grade level:**	6

Correlating Standard in Previous Year	Number Sequence & Standard	Correlating Standard in Following Year
5 OA 1 Use parentheses, brackets, or braces in numerical expressions and evaluate expressions with these symbols. 5.OA.2 Write simple expressions that record calculations with numbers, and interpret numerical expressions without evaluating them. For example, express the calculation “add 8 and 7, then multiply by 2” as 2 × (8 + 7). Recognize that 3 × (18932 + 921) is three times as large as 18932 + 921, without having to calculate the indicated sum or product.	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 + 3x; apply the distributive property to the expression 24x + 18y to produce the equivalent expression 6 (4x + 3y); apply properties of operations to y + y + y to produce the equivalent expression 3y.	7.EE.1 Apply properties of operations as strategies to add, subtract, factor, and expand linear expressions with rational coefficients.

Student Friendly Language:
I can apply the distributive property to write equivalent algebraic expressions. I can apply the associative property to write equivalent algebraic expressions. I can apply the commutative property to write equivalent algebraic expressions.

Know (Factual)	Understand (Conceptual) The students will understand that:	Do (Procedural, Application, Extended Thinking)
• Mathematical properties include distributive, associative and commutative	By applying the associative, commutative, and distributive properties, they can create equivalent expressions to make problem solving easier. The associative, commutative, and distributive properties can be applied to algebraic expressions.	Identify the associative, commutative, and distributive properties when given examples. Demonstrate the use of the distributive property, associative property, and commutative property showing that two different expressions are equal. Examples: 5(x+2)=5x + 10 5x + 10=5(x+2) Create equivalent expressions in a real world problem.

Key Vocabulary:			
equivalent expression associative property	distributive property coefficient	algebraic expression	commutative property

Relevance and Applications: How might the grade level expectation be applied at home, on the job or in a real-world, relevant context? Include at least one example stem for the conversation with students to answer the question “why do I have to learn this”?
The length of the rectangle is twice the width. How can I express the perimeter? What is an equivalent expression? Justin bought 43 cards that cost 85 cents each and 43 envelopes that cost 15 cents each. Write an equivalent expression using the distributive property to find the total cost. How much did he spend on cards and envelopes?

SD Common Core State Standards Disaggregated Math Template

Domain:	Expressions and Equations	**Cluster:**	Apply and extend previous understandings of arithmetic to algebraic expressions	**Grade level:**	6

Correlating Standard in Previous Year	Number Sequence & Standard	Correlating Standard in Following Year
5.OA.2. Write simple expressions that record calculations with numbers, and interpret numerical expressions without evaluating them. *For example, express the calculation "add 8 and 7, then multiply by 2" as 2 × (8 + 7). Recognize that 3 × (18932 + 921) is three times as large as 18932 + 921, without having to calculate the indicated sum or product.*	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.	7.EE.1 Apply properties of operations as strategies to add, subtract, factor, and expand linear expressions with rational coefficients. 7.EE.2 Understand that rewriting an expression in different forms in a problem context can shed light on the problem and how the quantities in it are related. *For example, a + 0.05a = 1.05a means that "increase by 5%" is the same as "multiply by 1.05."*

Student Friendly Language:

I can identify when two expressions are equivalent.
I can combine like terms in an expression.
I can write expressions that include variables in a variety of ways.

Know (Factual)	Understand (Conceptual) The students will understand that:	Do (Procedural, Application, Extended Thinking)
• Properties of arithmetic	Combining like terms leads to simplifying expressions. Expressions can look different and can be equivalent. A variable represents a consistent value in an expression. The value of two equivalent expressions are equal regardless of the value that is substituted for the variable.	Rewrite an algebraic expression as equivalent algebraic expressions in multiple ways. Identify when two expressions are equal. Explain why two expressions are equivalent using pictures, tiles, diagrams, and algebraic expressions. Demonstrate that combining like terms leads to simplifying expressions.

Key Vocabulary:

equivalence equivalent expressions algebraic expressions like terms combine
variable unknown properties of arithmetic coefficient

Relevance and Applications: How might the grade level expectation be applied at home, on the job or in a real-world, relevant context? Include at least one example stem for the conversation with students to answer the question "why do I have to learn this"?

Mental Math: A student buys 3 CD's. Write two equivalent algebraic expressions you could use to solve this problem.
College Days:
Jane and her three college friends each pay the same portion for the cost of a 3-bedroom apartment. Each girl's rent is *n* dollars. Write an algebraic expression that represents the total cost of the rent. Write an equivalent expression for the total cost.
Football:
The length of the Jet's football field is 30 yards more than its width. The football teams in the rest of the league have the same sized fields. Write an algebraic expression to find the length of 3 football fields.
Skiing: If 5 students are going up to skiing and you know the individual cost is $40, what are the different ways that you could find the total cost? Using a variable for the number of students attending, how can you express the total cost?

SD Common Core State Standards Disaggregated Math Template

Domain:	Expressions and Equations	**Cluster:**	Reason about and solve one-variable equations and inequalities	**Grade Level:**	6

Correlating Standard in Previous Year	Number Sequence and Standard	Correlating Standard in Following Year
NA	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.	7.EE.4 Use variables to represent quantities in a real-world or mathematical problem, and construct simple equations and inequalities to solve problems by reasoning about the quantities.

Student Friendly Language:

I can use reasoning to find which number or numbers make an equation or inequality true.

I can check my answer by substituting it into the equation.

I can use substitution to find which number or numbers make an equation or inequality true.

Know (Factual)	Understand (Conceptual) The students will understand that:	Do (Procedural, Application, Extended Thinking)
• The value on both sides of an equation must be equal • Inequalities have more than one solution • Symbols of equality and inequality	Solving an equation/inequality is a process of finding a number or numbers, that make the equation/inequality true. There may be some equations/inequalities that have no solution within the given set. There may be some equations/inequalities that have a solution set of all real numbers. An equation is true if the expressions on both sides of the equal sign are equivalent.	Substitute a value to determine whether or not that value makes the equation true. Substitute a value to determine whether or not that value makes the inequality true. Determine whether or not both sides of an equation are equivalent. Use reasoning to determine which number or numbers make an equation or inequality true.

Key Vocabulary:

equation inequality solution solution set substitution equal solve evaluate variable

Relevance and Applications: How might the grade level expectation be applied at home, on the job or in a real-world, relevant context? Include at least one example stem for the conversation with students to answer the question "why do I have to learn this"?

Juan is selling hats for $5. He paid $36 for his supplies. How many hats does he need to sell to make a profit? Which of the following amounts make this inequality true? (4,6,8,10) $5x>36$

You have $12 and want to buy a toy for $37. How much more money do you need to buy the toy? $12 + x = 37$
Which of the following amounts make this equation true? (12, 25, 37)

SD Common Core State Standards Disaggregated Math Template

Domain:	Expressions and Equations	**Cluster:**	Reason about and solve one-variable equations and inequalities	**Grade level:**	6

Correlating Standard in Previous Year	Number Sequence & Standard	Correlating Standard in Following Year
NA	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.	7.EE.4 Use variables to represent quantities in a real-world or mathematical problem, and construct simple equations and inequalities to solve problems by reasoning about the quantities.

Student Friendly Language:
I can use variables to write an algebraic expression to solve a real-world or mathematical problem. I can use a variable to represent a number in a real-world or mathematical problem.

Know (Factual)	Understand (Conceptual) The students will understand that:	Do (Procedural, Application, Extended Thinking)
● Variables represent a number ● Algebraic expressions represent mathematical situations	Variables can represent an unknown number or any number in a specified set. Algebraic expressions are used to solve real-world or mathematical problems.	Write an algebraic expression to use in solving a real-world or mathematical problem. Identify what the variable in an algebraic expression represents.

Key Vocabulary:
variable algebraic expressions substitution
Relevance and Applications: How might the grade level expectation be applied at home, on the job or in a real-world, relevant context? Include at least one example stem for the conversation with students to answer the question “why do I have to learn this”?
If a group of five divers have a total of 85 seashells and they each collected an equal amount, how many seashells did they each collect? Write and solve an algebraic expression to represent this situation.

SD Common Core State Standards Disaggregated Math Template

Domain:	Expressions and Equations	**Cluster:**	Reason about and solve one-variable equations and inequalities	**Grade level:**	6

Correlating Standard in Previous Year	Number Sequence & Standard	Correlating Standard in Following Year
NA	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.	7.EE.4 Use variables to represent quantities in a real-world or mathematical problem, and construct simple equations and inequalities to solve problems by reasoning about the quantities.

Friendly Language:
I can write addition or multiplication equations using variables. I can solve addition or multiplication equations using variables.

Know (Factual)	Understand (Conceptual) The students will understand that:	Do (Procedural, Application, Extended Thinking)
• Variables represent numbers • Mathematical operations	Mathematical equations can be solved using variables to represent numbers. A variety of strategies can be used when solving real world problems.	Create an equation using variables to solve a real world problem. Solve a real world problem using algebraic equations.

Key Vocabulary:
non negative rational numbers <u>variables</u> equations
Relevance and Applications: How might the grade level expectation be applied at home, on the job or in a real-world, relevant context? Include at least one example stem for the conversation with students to answer the question “why do I have to learn this”?
Write all formulas that could be used to find the perimeter and area of a rectangle. Use those formulas to solve real world problems. Carpentry Lay Carpet

SD Common Core State Standards Disaggregated Math Template

Domain:	Expressions and Equations	**Cluster:**	Reason about and solve one-variable equations and inequalities	**Grade level:**	6

Correlating Standard in Previous Year	Number Sequence & Standard	Correlating Standard in Following Year
NA	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.	7.EE. Apply properties of operations as strategies to add, subtract, factor, and expand linear expressions with rational coefficients.

Student Friendly Language:

I can explain variables.
I can order numbers.
I can compare numbers.
I can create a number line.
I can read the greater than and less than symbol.
I can write math sentences using variables to represent numbers.
I can identify many solutions for problems like (x>3, solutions could be 4, 5, 6 and many more.)
I can solve inequalities using variables as numbers.

Know (Factual)	**Understand (Conceptual) The students will understand that:**	**Do (Procedural, Application, Extended Thinking)**
• Letters can represent numbers • Symbols are used to compare • Inequalities can have many solutions • Solutions to an inequality are represented symbolically or using a number line	Greater than and less than symbols are used to compare numbers. Greater than and less than symbols may be used to order variables. Number lines are used to compare values. Number lines are used to show a solution set for an inequality.	Compare numbers using greater and less than symbols. Use number line to graph solution set for an inequality. Apply knowledge of greater than or less than symbols to create a real life situation.

Key Vocabulary:

inequality variable number line diagram infinitely solution constraint condition solution set

Relevance and Applications: How might the grade level expectation be applied at home, on the job or in a real-world, relevant context? Include at least one example stem for the conversation with students to answer the question “why do I have to learn this”?

Comparing food labels (nutritional value, calories, ingredients)
Air pressure in tires
Map skills (shortest or longest distance)
Distance to the equator from the sun (distance from one planet to another, distance from sun to planets)
Compare gas mileage of different vehicle
Compare temperature

SD Common Core State Standards Disaggregated Math Template

Domain:	Expressions and Equations	**Cluster:**	Represent and analyze quantitative relationships between dependent and independent variables	**Grade level:**	6

Correlating Standard in Previous Year	Number Sequence & Standard	Correlating Standard in Following Year
NA	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.	7.EE.4 Use variables to represent quantities in a real-world or mathematical problem, and construct simple equations and inequalities to solve problems by reasoning about the quantities. a. Solve word problems leading to equations of the form px + q = r and p(x + q) = r, where p, q, and r are specific rational numbers. Solve equations of these forms fluently. Compare an algebraic solution to an arithmetic solution, identifying the sequence of the operations used in each approach. *For example, the perimeter of a rectangle is 54 cm. Its length is 6 cm. What is its width?* b. Solve word problems leading to inequalities of the form px + q > r or px + q < r, where p, q, and r are specific rational numbers. Graph the solution set of the inequality and interpret it in the context of the problem. *For example: As a salesperson, you are paid $50 per week plus $3 per sale. This week you want your pay to be at least $100. Write an inequality for the number of sales you need to make, and describe the solutions.*

Student Friendly Language:

I can write an algebraic equation that explains the relationship between two variables.
I can represent the relationship between two variables by constructing a graph or table.
I can identify the independent and dependent variables in a real-world problem.

Know (Factual)	Understand (Conceptual) The students will understand that:	Do (Procedural, Application, Extended Thinking)
• Relationship between independent and dependent variables • Relationship between equations, lines, and graphs	There is a relationship between independent and dependent variables in an equation. Creating an equation involves two variables. Equations, charts, graphs, and tables can represent the same information.	Interpret the effect of one variable on another variable in an equation. Apply the variable relationship to a real–world situation. Analyze the relationship of the variables in an equation by making a graph and/or table.

Key Vocabulary:

independent variable dependent variable line graph constant

Relevance and Applications: How might the grade level expectation be applied at home, on the job or in a real-world, relevant context? Include at least one example stem for the conversation with students to answer the question "why do I have to learn this"?

Calculate travel time: How long will it take me to travel x number of miles traveling at the speed limit? If a car sets the cruise at 55 mph estimate the time it would take to travel 125 miles? Represent your answers as a table, equation and graph.

Calculate the amount of feed needed to feed a certain number of cattle:
If thirty cattle eat 40 lbs of feed a week, how much would they eat in seven weeks? Represent your answers as a table, equation and graph.

SD Common Core State Standards Disaggregated Math Template

Domain:	Geometry	**Cluster:**	Solve real-world and mathematical problems involving area, surface area, and volume	**Grade level:**	6

Correlating Standard in Previous Year	Number Sequence & Standard	Correlating Standard in Following Year
NA	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.	7.G.6 Solve real-world and mathematical problems involving area, volume and surface area of two- and three-dimensional objects composed of triangles, quadrilaterals, polygons, cubes, and right prisms.

Student Friendly Language:

I can find the area of triangles.

I can find the area of quadrilaterals.

I can find the area of polygons by composing or decomposing them into rectangles, triangles, or other polygons.

I can solve word problems involving area of triangles, quadrilaterals, and polygons.

Know (Factual)	Understand (Conceptual) The students will understand that:	Do (Procedural, Application, Extended Thinking)
• Names of quadrilaterals • Base and height of triangles • Area is the number of square units inside a polygon • Area formulas for triangles and quadrilaterals	Quadrilaterals are named based on their characteristics. Polygons can be decomposed or composed into other polygons to determine the number of square units inside a polygon, the area.	Name quadrilaterals. Find area of polygons to solve real-world problems.

Key Vocabulary:

area	right triangle	quadrilaterals	squares
parallelograms	trapezoids	rectangles	base
height	rhombus	decompose	compose

Relevance and Applications: How might the grade level expectation be applied at home, on the job or in a real-world, relevant context? Include at least one example stem for the conversation with students to answer the question “why do I have to learn this”?

Calculate how much square footage you need to put new carpet your dining room.
Calculate square footage of your bedroom walls to determine how many gallons of paint you will need.
Calculate the area of your yard to purchase sod for your yard.

SD Common Core State Standards Disaggregated Math Template

Domain:	Geometry	**Cluster:**	Solve real-world and mathematical problems involving area, surface area, and volume	**Grade level:**	6

Correlating Standard in Previous Year	Number Sequence & Standard	Correlating Standard in Following Year
5.MD.5a-c Relate volume to the operations of multiplication and addition and solve real world and mathematical problems involving volume. 5.NF.4b Find the area of a rectangle with fractional side lengths by tiling it with unit squares of the appropriate unit fraction side lengths, and show that the area is the same as would be found by multiplying the side lengths. Multiply fractional side lengths to find areas of rectangles, and represent fraction products as rectangular areas. 5.MD.3 Recognize volume as an attribute of solid figures and understand concepts of volume measurement. A cube with side length 1 unit, called a "unit cube," is said to have "one cubic unit" of volume, and can be used to measure volume. A solid figure which can be packed without gaps or overlaps using *n* unit cubes is said to have a volume of *n* cubic units. 5.MD.4 Measure volumes by counting unit cubes, using cubic cm, cubic in, cubic ft, and improvised units.	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.	7.G.6 Solve real-world and mathematical problems involving area, volume and surface area of two- and three-dimensional objects composed of triangles, quadrilaterals, polygons, cubes, and right prisms.

Student Friendly Language:

I can find the volume of a rectangular prism with fractional edge lengths using unit cubes.

I can find the volume of a right rectangular prism with fractional edge lengths using the volume formula.

I can solve real world volume problems involving right rectangular prisms.

Know (Factual)	Understand (Conceptual) The students will understand that:	Do (Procedural, Application, Extended Thinking)
• Right rectangular prism volume formulas	Volume of a 3-dimensional shape is the number of cubes inside. Volume of a right rectangular prism with fractional edge lengths is found by multiplying the edges of the prism.	Find the volume of a right rectangular prism with fractional edge lengths by counting unit cubes. Apply the volume formulas (V = lwh and V = bh) to calculate the volume of right rectangular prisms with fractional edge lengths. Prove the formula for volume.

Key Vocabulary:

edges	base area	fractional edge lengths	length	width
height	prism	volume	right rectangular prism	formula

Relevance and Applications: How might the grade level expectation be applied at home, on the job or in a real-world, relevant context? Include at least one example stem for the conversation with students to answer the question "why do I have to learn this"?

Calculate how much water it will take to fill your swimming pool.
Calculate the volume of a right rectangular water tower.
Calculate the volume of a box to see how many boxes of baseballs would fit inside.
Calculate the volume of a right rectangular prism fish tank.

SD Common Core State Standards Disaggregated Math Template

Domain:	Geometry	**Cluster:**	Solve real-world and mathematical problems involving area, surface area, and volume	**Grade level:**	6

Correlating Standard in Previous Year	Number Sequence & Standard	Correlating Standard in Following Year
5.G.2 Represent real world and mathematical problems by graphing points in the first quadrant of the coordinate plane, and interpret coordinate values of points in the context of the situation.	6.G.3 Draw polygons in the coordinate plane given coordinates for the vertices; use 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.	7.G.2 Draw (freehand, with ruler and protractor, and with technology) geometric shapes with given conditions. Focus on constructing triangles from three measures of angles or sides, noticing when the conditions determine a unique triangle, more than one triangle, or no triangle.

Student Friendly Language:

I can plot ordered pairs on a coordinate plane and connect vertices to draw/create polygons.

I can use the coordinates to find the length of the sides of polygons on a coordinate plane.

I can solve real world problems involving lengths of sides of polygons.

Know (Factual)	Understand (Conceptual) The students will understand that:	Do (Procedural, Application, Extended Thinking)
● Ordered Pairs represent a location on a coordinate plane	Coordinates can be plotted and connected in a coordinate plane to form polygons. The length of a side of a polygon in a coordinate plane can be found using the coordinates with the same first or second coordinate.	Plot coordinates on a coordinate plane to make a polygon. Use the coordinates to find the length of the sides of a polygon in a coordinate plane in which the ordered pairs have the same first or second coordinate.

Key Vocabulary:

ordered pairs	coordinate plane	coordinates	length
polygons	quadrants	vertices	plot

Relevance and Applications: How might the grade level expectation be applied at home, on the job or in a real-world, relevant context? Include at least one example stem for the conversation with students to answer the question "why do I have to learn this"?

Create a coordinate grid to create landscape area in a backyard. Use the coordinates to find the perimeter of the yard. Use the coordinates to find distances between trees in the yard.

Using an archaeological dig map, record the ordered pairs of the artifacts found. Find the length or width of each artifact using the coordinates.

SD Common Core State Standards Disaggregated Math Template

Domain:	Geometry	**Cluster:**	Solve real-world and mathematical problems involving area, surface area, and volume	**Grade level:**	6

Correlating Standard in Previous Year	Number Sequence & Standard	Correlating Standard in Following Year
NA	G.6.4 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.	7.G.3 Describe the two-dimensional figures that result from slicing three-dimensional figures, as in plane sections of right rectangular prisms and right rectangular pyramids. 7.G.6 Solve real-world and mathematical problems involving area, volume and surface area of two- and three-dimensional objects composed of triangles, quadrilaterals, polygons, cubes, and right prisms.

Student Friendly Language:

I can make a net for a three-dimensional figure.

I can use a net to find the surface area of a three-dimensional figure.

I can solve real world problems involving surface area.

Know (Factual)	Understand (Conceptual) The students will understand that:	Do (Procedural, Application, Extended Thinking)
• Net is a two-dimensional figure	A three-dimensional figure can be drawn into a two-dimensional figure called a net. Surface area of a three-dimensional shape can be found using a net.	Draw a net of a three-dimensional figure. Find the surface area of a three-dimensional figure using the net. Create a two-dimensional model of a mathematical situation to find the surface area of a three-dimensional figure.

Key Vocabulary:

surface area	base area	length	width
height	net	three-dimensional	two-dimensional

Relevance and Applications: How might the grade level expectation be applied at home, on the job or in a real-world, relevant context? Include at least one example stem for the conversation with students to answer the question “why do I have to learn this”?

Make a pattern/net for a gift box.

Find the amount of material you need to make a gift box.

SD Common Core State Standards Disaggregated Math Template

Domain:	Statistics and Probability	**Cluster:**	Develop understanding of statistical variability	**Grade level:**	6

Correlating Standard in Previous Year	Number Sequence & Standard	Correlating Standard in Following Year
NA	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.*	7.SP.1 Understand that statistics can be used to gain information about a population by examining a sample of the population; generalizations about a population from a sample are valid only if the sample is representative of that population. Understand that random sampling tends to produce representative samples and support valid inferences. based on randomly sampled survey data. Gauge how far off the estimate or prediction might be.

Student Friendly Language:
I can tell the difference between statistical questions and those that are not. I can write a statistical question.

Know (Factual)	Understand (Conceptual) The students will understand that:	Do (Procedural, Application, Extended Thinking)
• Examples of numerical data • Question-writing	A statistical question is open-ended.	Recognize statistical questions. Formulate questions that anticipate variability in a population.

Key Vocabulary:					
statistical question	data	variability	population	poll	survey

Relevance and Applications: How might the grade level expectation be applied at home, on the job or in a real-world, relevant context? Include at least one example stem for the conversation with students to answer the question "why do I have to learn this"?

Gathering data: "Identify which Presidential candidate your classmates support."

Conducting polls: "Ascertain community support for a new city swimming pool."

Finding a consensus: "Survey which architectural plan is best for the new middle school."

Finding an average: "Find the average time it takes community members to commute to work each day,"

"How many hours per week do my classmates sleep?", or "How many hours per week do my classmates watch television?"

SD Common Core State Standards Disaggregated Math Template

Domain:	Statistics and Probability	**Cluster:**	Develop understanding of statistical variability	**Grade level:**	6

Correlating Standard in Previous Year	Number Sequence & Standard	Correlating Standard in Following Year
	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.	7.SP.4 Use measures of center and measures of variability for numerical data from random samples to draw informal comparative inferences about two populations. For example, decide whether the words in a chapter of a seventh-grade science book are generally longer than the words in a chapter of a fourth-grade science book.

Student Friendly Language:
When given a data set, I can describe its distribution using its center (median or mean), outliers, and range.

Know (Factual)	Understand (Conceptual) The students will understand that:	Do (Procedural, Application, Extended Thinking)
• Distribution representations including line plots, histograms, box and whisker plots, and pictographs • Statistical questions	Distribution can be described using center and range. Data collected can be represented on graphs which show the shape of the data distribution.	Interpret the distribution of a data set Summarize and describe a data set's center and overall shape using range, peak, median, average, and mean. Create a data display from the results of a statistical question.

Key Vocabulary:
center mean average median range peak distribution dot plots histogram box and whisker plot pictograph frequency table statistical questions minimum maximum
Relevance and Applications: How might the grade level expectation be applied at home, on the job or in a real-world, relevant context? Include at least one example stem for the conversation with students to answer the question "why do I have to learn this"?
When given a distribution representation of any of the following examples, describe its center, spread, and overall shape. Analyze store inventory Bowling scores Test scores

SD Common Core State Standards Disaggregated Math Template

Domain:	Statistics and Probability	**Cluster:**	Develop understanding of statistical variability	**Grade level:**	6

Correlating Standard in Previous Year	Number Sequence & Standard	Correlating Standard in Following Year
no previous standard	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.	7.SP.4 Use measures of center and measures of variability for numerical data from random samples to draw informal comparative inferences about two populations. For example, decide whether the words in a chapter of a seventh-grade science book are generally longer than the words in a chapter of a fourth-grade science book.

Student Friendly Language:

When given a set of data, I can calculate the mean, median and/or mode to represent my data with one number.
When given a set of data, I can calculate the range to show the variation in my data.

Know (Factual)	Understand (Conceptual) The students will understand that:	Do (Procedural, Application, Extended Thinking)

• Measures of Center
  ○ Mean - average
  ○ Median - middle
• Measures of Variation
  ○ Range - the difference between the largest data point and the smallest
	Measures of center produce a single number to describe the data set.
	Measures of variation describe the spread of a set of data.
	In order to find the median, the data must first be ordered from least to greatest.
	If there are two middle numbers, we find the average of those two numbers.
		Calculate the mean, median, and range.
		
		Explain which measure of center best represents the data and why.
		
		Explain the meaning of the measures of center and the measures of variation in context of a real-world situations.

Key Vocabulary:

data mean median range center outliers inference population
measures of center measures of variation skewed most common least common typical

Relevance and Applications: How might the grade level expectation be applied at home, on the job or in a real-world, relevant context? Include at least one example stem for the conversation with students to answer the question "why do I have to learn this"?

A teacher would like to know how his/her class performed on an assessment. Calculate the mean, median, mode and range. Which looks to be an outlier? Is the range an accurate representation of the data?

How much time (outside) of class are students working on homework? Interview your classmates and find the mean, median, mode, and range. Which would you use to persuade the teacher that he/she is assigning too much homework?

How many calories are in a cheeseburger? Gather data from at least 5 eating establishments and find the mean, median, mode and range. Display your findings in a bar graph and a box and whisker plot.

SD Common Core State Standards Disaggregated Math Template

Domain:	Statistics and Probability	**Cluster:**	Summarize and describe distributions	**Grade level:**	6

Correlating Standard in Previous Year	Number Sequence & Standard	Correlating Standard in Following Year
5.MD.2 Make a line plot to display a data set of measurements in fractions of a unit (1/2,1/4,1/8). Use operations on fractions for this grade to solve problems involving information presented in line plots. For example, given different measurements of liquid in identical beakers, fine the amount of liquid each beaker would contain if the total amount in all the beakers were redistributed equally.	6.SP.4 Display numerical data in plots on a number line, including dot plots, histograms, and box plots.	7.SP.3 Informally assess the degree of visual overlap of two numerical data distributions with similar variabilities, measuring the difference between the centers by expressing it as a multiple of a measure of variability

Student Friendly Language:
I can create a number line. I can use dot plots, histograms, and box and whisker plots to display my data.

Know (Factual)	Understand (Conceptual) The students will understand that:	Do (Procedural, Application, Extended Thinking)
• Number line • Dot plot • Histogram • Box and whisker plots • Intervals/increments • Outliers • Quartiles	Numerical data can be displayed in various ways. Some visual representations can be misleading. A box plot uses outliers. A histogram can also be a bar graph. Using intervals/increments can change the appearance of a number line. Dot plots are simple plots on a number line where each dot represents a piece of data in the data set Dot plots are suitable for small to moderate size data sets and are useful for highlighting the distribution of the data including clusters, gaps, and outliers. A histogram shows the distribution of continuous data using intervals on the number line. A box plot shows the distribution of values in a data set by dividing the set into quartiles.	Create a number line using a dot plot. Explain and demonstrate why certain visual aides can be misleading. Make inferences when presented data and number lines. Create a histogram using equal intervals. Identify the quartiles in a box and whisker plot. Create a box and whisker plot.

Key Vocabulary:
data number line dot plot histogram bar graph box and whisker plots intervals/increments outliers inference frequency table minimum maximum quartiles
Relevance and Applications: How might the grade level expectation be applied at home, on the job or in a real-world, relevant context? Include at least one example stem for the conversation with students to answer the question "why do I have to learn this"?
An office manager would like to see how many sick days his/her employees used during the year. Create a number line to showcase the information. How much time (outside) of class are students working on homework? Interview your classmates and create a number line to show the data. Prepare a letter or a speech to give to your teacher explaining how he/she could change their homework procedure. How many times a week does a family eat out? Gather data from 50 students and create a box and whisker plot showing your data. What conclusions can you draw from your plot? Nineteen students completed a writing sample that was scored on organization. The scores for organization were 0, 1, 2, 2, 3, 3, 3, 3, 3, 3, 4, 4, 4, 4, 5, 5, 5, 6, 6. Create a data display. What are some observations that can be made from the data display? Students can use applets to create data displays. Examples of applets include the Box Plot Tool and Histogram Tool on NCTM's Illuminations. Box Plot Tool - http://illuminations.nctm.org/ActivityDetail.aspx?ID=77 Histogram Tool -- http://illuminations.nctm.org/ActivityDetail.aspx?ID=78

SD Common Core State Standards Disaggregated Math Template

Domain:	Statistics and Probability	**Cluster:**	Summarize and describe distributions.	**Grade level:**	6

Correlating Standard in Previous Year	Number Sequence & Standard	Correlating Standard in Following Year
5.MD.2 Make a line plot to display a data set of measurements in fractions of a unit (1/2, 1/4, 1/8). Use operations on fractions for this grade to solve problems involving information presented in line plots. *For example, given different measurements of liquid in identical beakers, find the amount of liquid each beaker would contain if the total amount in all the beakers were redistributed equally.*	6.SP.5 Summarize numerical data sets in relation to their context, such as by: a. Reporting the number of observations. b. Describing the nature of the attribute under investigation, including how it was measured and its units of measurement. c. Giving quantitative measures of center (median and/or mean) and variability (interquartile 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. d. 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.	7.SP.3 Informally assess the degree of visual overlap of two numerical data distributions with similar variabilities, measuring the difference between the centers by expressing it as a multiple of a measure of variability. *For example, the mean height of players on the basketball team is 10 cm greater than the mean height of players on the soccer team, about twice the variability (mean absolute deviation) on either team; on a dot plot, the separation between the two distributions of heights is noticeable.*

Student Friendly Language:
I can summarize data sets by identifying the number of observations. I can summarize data sets by showing how the data was collected and the units of measurements used. I can summarize data sets by describing patterns and measures of the center and variability. I can choose a measure of center that best describes a specific data set.

Know (Factual)	Understand (Conceptual) **The students will understand that:**	Do (Procedural, Application, Extended Thinking)
• Measures of center • Measures of variability • Mean absolute deviation • Data distribution	Data can be displayed and interpreted numerous ways. Data can be examined to find measures of center which are mean and median. Data can be examined in measures of variability which are range, interquartile range (IQR), outliers and mean absolute deviation. The shape of the data can tell a story about a set of data	Describe a data set including the number of observations, how it was collected and units of measurement. Describe the box plot, dot plot and histogram using the measures of center and variability. Using the same box plot, examine the interquartile range or mean absolute deviation and analyze the data for possible outliers. Determine if a set of data has any outliers. Discuss the effect of outliers on a set of data and how “mean absolute deviation (MAD)” or by just looking at the interquartile range can better describe the data distribution in a set of numbers. Analyze the mean, mode and median of a set of data and decide which central tendency best illustrates this set of numbers and support their opinion with a viable argument.

Key Vocabulary:				
numerical data sets	observations	measures of center (central tendencies)	median	mean
measures of variability	interquartile range	range	mean absolute deviation	deviation
data distribution	outlier	skewed	five number summary	

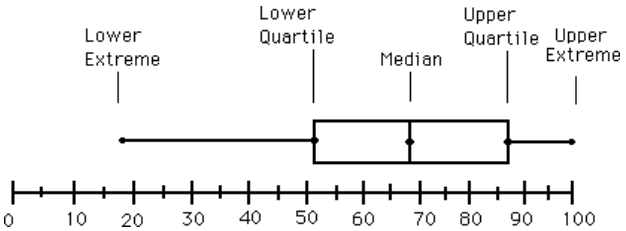
Relevance and Applications: How might the grade level expectation be applied at home, on the job or in a real-world, relevant context? Include at least one example stem for the conversation with students to answer the question "why do I have to learn this"?

The weather service has asked you to find the average precipitation in your region for the month of April. What measure of center would most accurately convey the average? How might the measure of center you select depend on the specific data points?

Your teacher is trying to determine your grade for the semester. How would you advise your teacher to compile your test scores into one grade? What measure of center would be most appropriate?

Tammy Sue has four 20-point projects for math class. Tammy Sue's scores on the first 3 projects are shown below:
Project 1: 18
Project 2: 15
Project 3: 16
Project 4: ??
What does she need to make on Project 4 so that the average for the four projects is 17? Explain your reasoning.
Solution:
One possible solution to is calculate the total number of points needed (17 x 4 or 68) to have an average of 17. She has earned 49 points on the first 3 projects, which means she needs to earn 19 points on Project 4 (68 – 49 = 19).

What is the IQR of the data below:



Solution:
The first quartile is 52; the third quartile is 87. The IQR is 35, which is (87-52). This value indicates that the values of the middle 50% of the data vary by 35.

The following data set represents the size of 9 families:
3, 2, 4, 2, 9, 8, 2, 11, 4.
What is the MAD for this data set?
Solution:
The mean is 5. The MAD is the average variability of the data set. To find the MAD:
1. Find the deviation from the mean.
2. Find the absolute deviation for each of the values from step 1
3. Find the average of these absolute deviations.
The table below shows these calculations:

Data Value	Deviation from Mean	Absolute Deviation
3	-2	2
2	-3	3
4	-1	1
2	-3	3
9	4	4
8	3	3
2	-3	3
11	6	6
4	-1	1
		26/9 = 2.89

This value indicates that on average family size varies 2.89 from the mean of 5.