6th Grade Math Pacing Guide

First Quarter

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| **Sequence of Concepts** | | **Rationale for Sequence** | **Prior Knowledge** | | |
| **Multi-Digit Division**   * Fluently divide multi-digit numbers using the standard algorithm. * Understand how to set up a problem based on the context of the problem. * Be able to interpret the quotient. | | In 5th grade, students worked with the operations of whole numbers and decimals. In 6th grade, starting with whole number division builds on prior knowledge and will be the foundation for mastery of division of multi-digit numbers. | In previous grades, students learned to divide whole numbers.   * Multiplication and division are inverse operations. * Division is either fair sharing or repeated subtraction. * Divide whole numbers. * Model division with manipulatives, diagrams, and story context. | | |
| **Division with Fractions**   * Understand the meaning of division. * Use models to show division of fractions. * Use understanding of multiplication of fractions to understand division of fractions. | | This concept follows division of whole numbers to continue with the understanding of division. It is before multiplication/division of decimals because fractions are used to teach operations with decimals. | In previous grades, students learned multiplication and division with whole numbers.   * Multiplication and division are inverse operations. * Division is either fair sharing or repeated subtraction. * Divide whole numbers. * Model division with manipulatives, diagrams, and story context. | | |
| **Decimal Operations**   * Fluently add, subtract, multiply, and divide decimals using the standard algorithm for each operation. * Understand role of place value in each of the operations. * Identify when it is appropriate to use the standard algorithm. * Estimate before using the standard algorithm and use estimation to check the reasonableness of answers. * Model each of the operations with manipulatives, diagrams, and story contexts for multi-digit decimals. | | Students will be increasing the number of digits from 5th grade that are being used when adding, subtracting, and multiplying decimals. The placement of the decimal will continue to be an emphasis. By placing the fluency at the beginning of the year, students will be prepared to complete other calculations (ex. unit rate) without calculators. | In previous grades, students learned the meaning of decimals and worked with decimal place value.   * Understand decimal place values * Know basic facts for addition, subtraction, multiplication, and division. * Add, subtract, multiply, and divide single-digit decimals. * Model the operations of addition, subtraction, multiplication, and division with manipulatives, diagrams, and story contexts for single-digit numbers. | | |
| **Common Factors and Multiples**   * Understand that the greatest common factor (GCF) and least common multiple (LCM) are ways to discuss number relationships in multiplication and division. * Use the distributive property to express a sum of two numbers with a common factor as a multiple of a sum of two whole numbers with no common factor. * Find the GCF of two whole numbers less than or equal to 100 and the LCM of two whole numbers less than or equal to 12. * Model factorization of whole numbers 1-100. | | The students' understanding of common factors and multiples will aid number sense as well as finding equivalent ratios and other skills that come later in the year. The distributive property will use these skills in later lessons for expressions.  Only 2 days are being spent on L11 because it is "additional content" in the standards and finding common factors was also used in a previous lesson on simplifying fractions. | In prior grades, students have learned about factors, prime numbers, and multiples.   * Understand that a factor is a whole number that divides without a remainder into another number. * Understand that a multiple is a whole number that is a product of the number and any other factor. * Find factors and multiples of a given number. * Compute using the distributive property. | | |
| **Integers**   * Relate positive and negative numbers to the real world. * Understand the sign of a number indicates its direction from zero and the absolute value represents the distance on a number line from zero. * Recognize that the opposite of an opposite number is the number itself; 0 is its own opposite. * Write, interpret, and explain statements of order for rational numbers. * Distinguish comparisons of absolute value from statements about order. | | 6th grade is the foundation year for negative numbers, so the students are expanding what they know about number lines to include values less than zero. Students must understand both sides of zero, how each side relates to each other, and the position of zero. Students must understand that each negative or positive number has a mirror-image, or opposite, on the other side of zero. Zero is its own opposite. It is important to differentiate opposites from absolute value. Students must understand the concept of absolute value; the distance is always positive. All of these concepts must be used in real-world scenarios. | In previous grades, students learned about whole numbers as well as positive fractions and decimals.   * Know where positive integers are on a number line. * Understand that zero represents a position. * Draw a number line and represent real-life contexts on a number line. * Compare and order whole numbers. * Use horizontal and vertical number lines to show rational numbers and represent quantities. * Describe quantities having opposite values. | | |
| **HCDE Math Website:** Tasks Arcs, Tasks, and other teacher resources referenced on the pacing guide may be found at [www.hcde.org](http://www.hcde.org).  Website Directions:   1. Log in using username and password in top right hand corner of webpage (HCDE email & password). 2. Select 6-HS Math/Teacher Resources/6th Grade   **Ready TNCore Website:** Materials referenced and updates may be found at [www.teacher-toolbox.com](http://www.teacher-toolbox.com)  Website Directions:   1. Log in 2. Select Grade 6   **Teacher Notes**  Tasks, CRAs, and Assessments that previously appeared on TNCore are now located on EduTOOLBOX.org, which is a free website. Many of these tasks do not require a user account to access. You just go to EduTOOLBOX.org. For tasks or resources in this pacing guide which show an \* beside them, a user account is necessary. To create a user account:   1. Go to EduTOOLBOX.org 2. Click on Login in the right hand corner 3. Select the Tab: Create a New Account 4. Complete the information which includes a username that you create, a password of your choice, and other additional information. 5. Once you log in with your username and password, resources with the \* will be unlocked and available to the user. | | | | | |
| **Dates** | **Tennessee State Standards** | | | **Core Material** | **Additional Resources** |
| 8/11-8/15  (3 days) | 5.NBT.B.5 Fluently multiply multi-digit whole numbers using the standard algorithm.  5.NBT.B.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.  5.NBT.B.7 Add, subtract, multiply and divide decimals to hundredths, using concrete 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. | | | [Elmer's Multiplication Error](https://www.illustrativemathematics.org/content-standards/5/NBT/B/5/tasks/1812)  [What is 23/5?](https://www.illustrativemathematics.org/content-standards/5/NBT/B/7/tasks/292) | Review Addition, Subtraction, Multiplication and Division of Whole Numbers |
| 8/16-8/19  (4 days) | 6.NS.B.2 Fluently divide multi-digit numbers using the standard algorithm. | | | **MI**-L8: Divide Multi-Digit Numbers | **TRB**: Pg. 79  Hands on Activity  **TRB**: Pg. 87  Hands on Activity |
| 8/22-8/25  (4 days) | 6.NS.A.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 mile? | | | **MI-**L6: Understand Division with Fractions | **TRB**: Pg. 60  Visual Model |
| 8/26-9/2  (6 days) | 6.NS.A.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 mile? | | | **MI**-L7:Divide with Fractions | [Bike Ride Task](http://edutoolbox.org/system/files/rasp_file/Gr_6_Bike_Ride.pdf)  **TRB**: Pg. 67  Visual Model  **TRB**: Pg. 68  Visual Model  **TRB**: Pg. 69  Hands on Activity  **TRB**: Pg. 77  Hands on Activity |
| 9/6-9/8  (3 days) | 6.NS.B.3 Fluently add, subtract, ~~multiply, and divide~~ multi-digit decimals using the standard algorithm for each operation. | | | **MI**-L9: Add and Subtract Decimals | [Fluency 1 CRA](http://edutoolbox.org/system/files/rasp_file/G6%20Fluency%20Scoring.pdf)  **TRB**: Pg. 90  Concept Extension  **TRB**: Pg. 91  Visual Model |
| 9/9 (1 day) |  | | | Review/Reteach Day |  |
| 9/12-9/16  (5 days) | 6.NS.B.3 Fluently ~~add, subtract~~, multiply, and divide multi-digit decimals using the standard algorithm for each operation. | | | **MI**-L10: Multiply and Divide Decimals | \*[Fluency 2 CRA](http://edutoolbox.org/tntools/list/grade/819/955/6)  \*[Fluency 3 CRA](http://edutoolbox.org/tntools/list/grade/819/955/6)  **TRB**: Pg. 101  Visual Model  **TRB**: Pg. 106  Concept Extension |
| 9/19-9/20  (2 days) | 6.NS.B.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). | | | **MI**-L11: Common Factors and Multiples | [Rectangle CRA](http://edutoolbox.org/system/files/rasp_file/Grade6RectangleTaskAnchorSet.pdf)  **TRB**: Pg.111  Visual Model  **TRB**: Pg. 119  Hands on Activity |
| 9/21-9/28  (6 days) | 6.NS.C.5 Understand that positive and negative numbers are used together to describe quantities having opposite directions or values (e.g., temperature above/below zero, elevation above/below sea level, credits/debits, positive/negative electric charge); use positive and negative numbers to represent quantities in real-world contexts, explaining the meaning of 0 in each situation. 6.NS.C.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.  6.NS.C.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°C > –7°C to express the fact that –3°C is warmer than –7°C. 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. | | | \*[Locating, Ordering and Finding Distance Between Positive and Negative Numbers Task Arc](http://edutoolbox.org/tntools/list/grade/819/955/6) | [Comparing on a Number Line CRA](http://edutoolbox.org/system/files/rasp_file/0G6ComparingonaNumberLine.pdf)  [Temperature Task](http://edutoolbox.org/system/files/rasp_file/G6T4%20Temperature%20Anchor_Final.pdf)  [Absolute Value Task](http://edutoolbox.org/system/files/rasp_file/0G6AbsoluteValue.pdf)  [Ordering Task](http://edutoolbox.org/system/files/rasp_file/0G6OrderingTask.pdf) |
| 9/29-9/30  (2 days) | 6.NS.C.5 Understand that positive and negative numbers are used together to describe quantities having opposite directions or values (e.g., temperature above/below zero, elevation above/below sea level, credits/debits, positive/negative electric charge); use positive and negative numbers to represent quantities in real-world contexts, explaining the meaning of 0 in each situation. 6.NS.C.6 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. 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. | | | **MI**-L12: Understand Positive and Negative Numbers |  |
| 10/3-10/6  (4 days) | 6.NS.C.5 Understand that positive and negative numbers are used together to describe quantities having opposite directions or values (e.g., temperature above/below zero, elevation above/below sea level, credits/debits, positive/negative electric charge); use positive and negative numbers to represent quantities in real-world contexts, explaining the meaning of 0 in each situation.  6.NS.C.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°C > –7°C to express the fact that –3°C is warmer than –7°C.  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. | | | **MI**-L13: Absolute Value and Ordering Numbers | [Fun at the Ocean Task](http://edutoolbox.org/system/files/rasp_file/Grade%206%20fun%20in%20the%20ocean.pdf)  **TRB**: Pg. 130  Concept Extension  **TRB**: Pg. 131  Concept Extension |
| 10/7  (1 day) |  | | | Review/Reteach Day  End of First Quarter |  |

6th Grade Math Pacing Guide

Second Quarter

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| **Sequence of Concepts** | | **Rationale for Sequence** | **Prior Knowledge** | | |
| The Coordinate Plane   * Identify the origin and four quadrants of the coordinate plane. * Plot ordered pairs in all quadrants. * Use the signs of coordinates to locate points in quadrants. * Recognize that if the coordinates only differ by the signs, the points are reflections across one or both axes. * Use the coordinates and absolute values to find distances between points. * Solve real-world problems by graphing in all quadrants. | | Students will take their understanding of horizontal and vertical number lines in the previous integers lesson and combine the two creating the coordinate plane. Students must have a good understanding of the x-coordinate and y-coordinate and how to plot points based on these coordinates. Students must understand (0,0) as the origin. In addition, students should remember that distance is always positive. | In previous grades, students worked with positive fractions, decimals, and whole numbers on the number line and in the first quadrant of the coordinate plane.   * Understand absolute value as a number’s distance from zero. * Describe quantities having opposite values. Graph on a number line and a coordinate plane. | | |
| Polygons on a Coordinate Plane   * Understand that a line segment from one coordinate pair to another represents a distance. * Understand that if two coordinates have the same x or y-value they are on the same number line. * Find the distance between two points on the coordinate plane. * Plot points in all four quadrants of the Cartesian coordinate plane. * Plot a polygon in the Cartesian coordinate plane with given coordinates. | | This lesson continues the learning of coordinate planes, absolute value, and distance between points. Students should make connections by creating polygons, finding their dimensions (distances), and calculating the area.  \*\*Students should recognize that triangles are half of the area of the related square or rectangle. | Students have worked previously with finding area and perimeter of rectangles. Students have also plotted points in the coordinate plane.   * Understand and plot ordered pairs (x, y). * Recognize that a coordinate plane has 4 quadrants. | | |
| Ratios   * Understand the concept of a ratio as a way of expressing relationships between quantities. * Write a ratio to describe a relationship between two quantities using three different formats: a to b, a:b, a/b. * Use ratio language; e.g., *for every, for each.* | | This topic immediately follows the number system unit and builds on students’ previous understanding of fractions as part to whole relationships. | In previous grades, students worked with fractions.   * Compute with whole numbers and fractions. * Understand equivalent fractions. | | |
| Unit Rates   * Understand the concept of a unit rate. * Use rate and unit rate language. * Solve unit rate problems. * Use ratio reasoning to convert measurement units within the same system and between different systems. | | Building on the previous ratio lesson, students will extend thinking of ratio relationships by developing an understanding of rate as a type of ratio and a unit rate as a rate *per 1*. Students will also solve problems involving unit price and unit speed. | In previous grades, students worked with fractions. In a previous lesson, students worked with ratio language.   * Simplify fractions. * Communicate relationships between two quantities using ratio notation. | | |
| Equivalent Ratios   * Use a table to find equivalent ratios or missing values in ratio table. * Plot pairs of values in a table on a coordinate plane. * Use a table and graph to reason and compare ratios. | | Students will use their understanding of ratios and rates to find equivalent ratios and display them on multiple visual representations (tables, graphs, and number lines). This lesson follows unit rates to allow students to use this strategy to create equivalent ratios. In some cases, the knowledge of unit rate is a more efficient method (scaling down first to scale up) to finding equivalent ratios. | In previous grades, students worked with fractions. In previous lessons, students worked with ratio language and unit rate.   * Understand ratio reasoning and relationships. * Understand equivalent fractions. * Use the four basic operations. * Represent equivalent ratios with ratio notation. | | |
| Percent   * Understand percent as a rate per hundred. * Convert between fraction, decimal, and percent. * Find a percent of a quantity as a rate per hundred. * Solve percent problems involving finding the whole. | | In the Number System unit, students deepened their understanding of the relationship between fractions and decimals. Building on this, students will understand the meaning of a percent and its equivalency to a decimal and fraction. Students will solve problems given a missing number (part, whole, or percent) by creating equivalent ratios. | In previous lessons, students worked with fractions, decimals, ratios and unit rate.   * Understand the concept of rate. * Understand whole and parts in the context of a ratio. * Use unit pricing and constant speed to solve problems. * Use unit rates to solve problems. * Represent unit rates with models. | | |
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| **Dates** | **Tennessee State Standards** | | | **Core Material** | **Additional Resources** |
| 10/10-  10-14 | **FALL BREAK** | | | | |
| 10/17-10/21  (5 days) | 6.NS.C.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. 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. 6.NS.C.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. | | | **MI**-L14: The Coordinate Plane  **TRB**: pg. 140  Concept Extension  **TRB**: Pg. 144  Visual Model | [Changing Signs Task](http://edutoolbox.org/system/files/rasp_file/SGG6T1ChangingSignsAnchorSet_Final.pdf)  **TRB**: Pg. 149  Hands on Activity  Challenge Activity |
| 10/24-10/28  (5 days) | 6.G.A.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. | | | **MI**-L23: Polygons in the Coordinate Plane  [Illustrative Math Activity: Polygons on Coordinate Plane](https://www.illustrativemathematics.org/content-standards/6/G/A/1/tasks/1188) | **TRB**: Pg.255  Hands on Activity  Challenge Activity  [Distance on a Coordinate Plane](https://www.engageny.org/resource/grade-6-mathematics-module-5-topic-b-lesson-7) |
| 10/31-11/1  (2 days) | 6.RP.A.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.” | | | **MI**-L1: Ratios | [Ratios](https://www.engageny.org/resource/grade-6-mathematics-module-1-topic-lesson-2)  **TRB**: Pg. 7  Concept Extension |
| 11/2-11/3  (2 days) | 6.RP.A.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. For example, “This recipe has a ratio of 3 cups of flour to 4 cups of sugar, so there is 3/4 cup of flour for each cup of sugar.” “We paid $75 for 15 hamburgers, which is a rate of $5 per hamburger.” (Expectations for unit rates in this grade are limited to non-complex fractions.) | | | **MI**-L2: Understand Unit Rate | **TRB**: Pg. 18  Challenge Activity |
| 11/4-11/14  (7 days) | 6.RP.A.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. | | | **MI**-L3: Equivalent Ratios  [Birthday Candy CRA](http://edutoolbox.org/system/files/rasp_file/G6T4%20Birthday%20Candy%20Guide.pdf)  Three Trips CRA  [Triangles and Stars CRA](http://edutoolbox.org/system/files/rasp_file/0G6TrianglesandStars.pdf) | **TRB**: Pg. 21  Hands on Activity  **TRB**: Pg. 28  Challenge Activity  [Are These Ratios the Same? CRA](http://edutoolbox.org/system/files/rasp_file/0G6AreTheseRatiostheSame.pdf) |
| 11/15-  11/21  (5 days) | 6.RP.A.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. 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 in 35 hours? At what rate were lawns being mowed? d. Use ratio reasoning to convert measurement units; manipulate and transform units appropriately when multiplying or dividing quantities. | | | **MI**-L4: Solve Problems with Unit Rates  [Comparing Cars CRA](http://edutoolbox.org/system/files/rasp_file/G6T2%20Comparing%20Cars%20Guide.pdf)  [Playground CRA](http://edutoolbox.org/system/files/rasp_file/0G6Playground.pdf) | **TRB**: Pg. 36  Visual Model  [Mall CRA](http://edutoolbox.org/system/files/rasp_file/0G6Mall.pdf)  [Water Pumps CRA](http://edutoolbox.org/system/files/rasp_file/0G6WaterPumps.pdf)  [Reading Rates Task](http://edutoolbox.org/system/files/rasp_file/Gr6_Reading_Rates.pdf) |
| 11/21 |  | | | Review/Reteach Day |  |
| 11/28-12/6  (7 days) | 6.RP.A.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. 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. | | | [Percent and Rate Per 100](https://www.engageny.org/resource/grade-6-mathematics-module-1-topic-d-lesson-24)  [Fraction as a Percent](https://www.engageny.org/resource/grade-6-mathematics-module-1-topic-d-lesson-25)  **MI**-L5: Solve Problems with Percent  **TRB**: Pg. 43  Visual Model  [Lunchroom Tiles Task](http://edutoolbox.org/system/files/rasp_file/0G6LunchroomTiles.pdf) | **TRB:** Pg. 44  Concept Extension  **TRB**: Pg. 47  Hands on Activity  [Courtyard CRA](http://edutoolbox.org/system/files/rasp_file/G6T4%20Courtyard%20Task%20Full%20Scoring%20Guide_1.pdf)  \*[String Bean and Slim Task](http://edutoolbox.org/tntools/list/grade/819/955/6) |
| 12/7-12/14  (6 days) | 6.RP.A.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. 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. | | | [Reasoning with Ratios and Rates](http://edutoolbox.org/system/files/rasp_file/Arc6_RP_1_3FINAL.pdf) | [Shirt Sale](https://www.illustrativemathematics.org/content-standards/6/RP/A/3/tasks/54) |
| 12/15 |  | | | Review/Reteach day  End of Second Quarter |  |

6th Grade Math Pacing Guide

Third Quarter

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| --- | --- | --- | --- | --- | --- |
| **Sequence of Concepts** | | **Rationale for Sequence** | **Prior Knowledge** | | |
| Numerical Expressions with Exponents   * Write and evaluate numerical expressions involving whole-number exponents. | | This lesson extends students’ understanding of writing expressions using order of operations and exponents. | In fifth grade, students learned:   * Powers of ten. * How to write/evaluate simple numerical expressions using order of operations. * How to multiply with fractions and decimals. | | |
| Algebraic Expressions   * Write, read, and evaluate variable expressions. * Apply order of operations on expressions with variables and exponents. * Translate an expression from word form to an algebraic expression and vice versa. * Understand that the properties used with numbers also apply to expressions with variables. * Recognize and generate equivalent expressions   substitution to prove equivalency. | | After learning how to evaluate numerical expressions with exponents, students will apply this understanding to algebraic expressions with exponents and be able to use the properties of numbers in algebraic situations. | In fifth grade, students:   * Wrote, interpreted and evaluated numerical expressions. * Analyzed patterns and relationships between expressions. * Learned the commutative, associate and distributive properties. | | |
| Understanding and Solving Equations   * Understanding how expressions and equations are different. * Use substitution to determine whether a given number makes an equation. * Recognize that real-world math problems can be expressed using a variable to represent an unknown. * Recognize that both sides of an equation are equal and must remain that way. * Write and solve equations for real-world situations using variables and non-negative rational numbers. | | Students will apply what they learned about writing expressions to include writing and solving equations. They will also apply their knowledge of solving problems using the inverse method to balance equations. | In fifth grade, students:   * Wrote and solved equations that represent real-world situations. * Used variables to represent unknowns and worked expressions without evaluating them. * Solved one step word problems. | | |
| Solving Inequalities   * Understanding how expressions, equations and inequalities are different. * Inequalities represent a range of possible values rather than a single solution. * Use substitution to determine whether a given number makes an inequality true. | | Following students’ work with equations, they can now apply that information to inequalities. They can use substitution to prove given values as true and graph those values on a number line. | In fifth grade:   * Students had an initial understanding of inequalities (i.e., 3 < 5, 5 > 3).   They now understand the concept that an algebraic equation has a solution and that solution can be verified by substitution. | | |
| Dependent and Independent Variables   * Recognize that a change in the independent. variable creates a change in the dependent variable. * Make a table, graph or equation to represent a problem context. * Identify relationships between tables, graphs and equations. Recognize when quantitative relationships between dependent and independent variables are linear. | | Following a study on algebraic equations and inequalities, students can now understand how two variables are related in a table and graph. | In elementary grades students worked with patterns and graphs. They plotted dependent and independent variables, even though they did not call them such. | | |
| Area of Polygons   * Identify special quadrilaterals. * Relate the area of triangles and the area of squares. * Identify the relationship between bases and heights in polygons. * Decompose and compose polygons into rectangles and triangles to find the area. | | Building on 4th and 5th grade work with area of rectangles, as well as, the work with area of triangles in 2nd quarter, students will find the area of polygons by decomposing and composing the figures into triangles and rectangles. | In previous grades, students worked with area of rectangles and identified regular polygons.   * Recognize that perpendicular lines form right angles * Define and identify polygons * Recognize the area is measured in square units * Determine the area of rectangles * Compose and decompose polygons. | | |
| Nets and Surface Area   * Recognize that surface of three-dimensional shapes are composed of two-dimensional faces. * Use a net to represent a 3-D figure. * Use a net to find the surface area of a polyhedron made up of rectangles and triangles. | | Students will apply previous learning about area of polygons to find the surface area of three dimensional figures. | In previous lessons, students worked with area of polygons.   * Understand that polygons can be decomposed. * Understand that area is measured in square units. * Find the area of a rectangle and of a triangle. | | |
| Volume   * Measuring with fractional units requires relating volume to multiplication with fractions. * Use the formulas: V=lwh and V=Bh. * Prove that the volume formula works by creating diagrams of prisms with unit fraction edge lengths and showing how unit fraction cubes pack them. | | In 5th grade, students find volume of rectangular prisms only. This year, students will incorporate the use of fractional units and will find a missing dimension, given the volume. | In 5th grade, students found volume of rectangular prisms.   * Volume is measured in cubic units. * Ability to multiply fractions. * Finding the area of polygons, including those with unit fraction edge lengths. * Substitution for values in formulas. * Finding volume of prisms with whole-unit side lengths. * Use of physical models with whole-unit side lengths. * Find volume using a unit cube model. | | |
| **HCDE Math Website:** Tasks Arcs, Tasks, and other teacher resources referenced on the pacing guide may be found at [www.hcde.org](http://www.hcde.org).  Website Directions:   1. Log in using username and password in top right hand corner of webpage (HCDE email & password). 2. Select 6-HS Math/Teacher Resources/6th Grade   **Ready TNCore Website:** Materials referenced and updates may be found at [www.teacher-toolbox.com](http://www.teacher-toolbox.com)  Website Directions:   1. Log in 2. Select Grade 6   **Teacher Notes**  Tasks, CRAs, and Assessments that previously appeared on TNCore are now located on EduTOOLBOX.org, which is a free website. Many of these tasks do not require a user account to access. You just go to EduTOOLBOX.org. For tasks or resources in this pacing guide which show an \* beside them, a user account is necessary. To create a user account:   1. Go to EduTOOLBOX.org 2. Click on Login in the right hand corner 3. Select the Tab: Create a New Account 4. Complete the information which includes a username that you create, a password of your choice, and other additional information. 5. Once you log in with your username and password, resources with the \* will be unlocked and available to the user. | | | | | |
| **Dates** | **Tennessee State Standards** | | | **Core Material** | **Additional Resources** |
| 1/4-1/6  (3 days) | 6.EE.A.1 Write and evaluate numerical expressions involving whole-number exponents. | | | **MI**-L15: Numerical Expressions with Exponents | **TRB**: Pg. 159  Concept Extension  **TRB**: Pg. 166  Hands on Activity  [Expressions Task CRA](http://edutoolbox.org/system/files/rasp_file/G6ExpressionsTaskAnchorSet.pdf) |
| 1/9-1/13  (5 days) | 6.EE.A.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 = 6s2 to find the volume and surface area of a cube with sides of length s = 1/2. | | | **MI**-L16: Algebraic Expressions | **TRB**: Pg. 169  Visual Model  **TRB:** Pg. 170  Concept Extension  **TRB**: Pg. 178  Hands on Activity |
| 1/17-1/20  (4 days) | 6.EE.A.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. 6.EE.A.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. | | | \*[Expressions Task Arc](http://edutoolbox.org/tntools/list/grade/819/955/6) |  |
| 1/23-1/27  (5 days) | 6.EE.A.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. 6.EE.A.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. | | | **MI**-L17: Equivalent Expressions | **TRB**: Pg. 182  Visual Model  **TRB**: Pg. 184  Visual Model  [Rectangle Task CRA](http://edutoolbox.org/system/files/rasp_file/Grade6RectangleTaskAnchorSet.pdf) |
| 1/30-2/2  (4 days) | 6.EE.B.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. 6.EE.B.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. 6.EE.B.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. 6.EE.B.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. | | | \*[Exploring Expressions and Equations Task Arc](http://edutoolbox.org/tntools/list/grade/819/955/6) |  |
| 2/3 (1 day) |  | | | Review/Reteach Day |  |
| 2/6-2/10  (5 days) | 6.EE.B.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.  6.EE.B.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. 6.EE.B.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. | | | **MI**-L19: Solve Equations | **MI**-L18: Understand Solutions to Equations  **TRB**: Pg. 192  Hands on Activity  **TRB**: Pg. 200  Hands on Activity  **TRB**: Pg. 201  Real World Connections  [Firefighter Allocation](https://www.illustrativemathematics.org/content-standards/6/EE/B/6/tasks/425) |
| 2/13-2/17  (5 days) | 6.EE.B.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. 6.EE.B.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. | | | **MI**-L20: Solve Inequalities | **TRB**: Pg. 215  Hands on Activity  **TRB**: Pg. 217  Concept Extension  [Real World Inequalities](https://www.engageny.org/resource/grade-6-mathematics-module-4-topic-h-lesson-34)  [Mowing the Lawn CRA](http://edutoolbox.org/system/files/rasp_file/G6MowingtheLawnTaskAnchorSet.pdf) |
| 2/21-2/24  (4 days) | 6.EE.C.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. | | | **MI**-L21: Dependent and Variables | [Car Lot Task](http://edutoolbox.org/system/files/rasp_file/Gr6_Car_Lot_Task.pdf)  [Multi-step problems in the Real World](https://www.engageny.org/resource/grade-6-mathematics-module-4-topic-h-lesson-32) |
| 2/27-3/2  (4 days) | 6.G.A.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. | | | **MI**-L22: Area of Polygons | **TRB**: Pg. 240 Hands on Activity  **TRB**: Pg. 245 Hands on Activity  [Comparing Squares CRA](http://edutoolbox.org/system/files/rasp_file/0G6ComparingSquares.pdf)  [Area of Acute Triangles](https://www.engageny.org/resource/grade-6-mathematics-module-5-topic-lesson-3) |
| 3/3 (1 day) |  | | | Review/Reteach Day |  |
| 3/6-3/14  (7 days) | 6.G.A.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. | | | **MI**-L24: Nets and Surface Area  [Surface Area-PBS](http://utah.pbslearningmedia.org/resource/mgbh.math.g.boxnet/2d-nets-for-3d-decorative-boxes/en/) | **TRB**: Pg. 259  Hands on Activity  **TRB**: Pg. 263 & 264 Concept Extension |
| 3/15-3/17  (3 days) | 6.G.A.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 = lwh and V = Bh to find volumes of right rectangular prisms with fractional edge lengths in the context of solving real-world and mathematical problems. | | | **MI**-L25: Volume  End of Third Quarter | **TRB:** Pg. 272  Hands on Activity  **TRB**: Pg. 277  Hands on Activity  Challenge Activity  [Volume](https://www.engageny.org/resource/grade-6-mathematics-module-5-topic-c-lesson-12) |

6th Grade Math Pacing Guide

Fourth Quarter

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| --- | --- | --- | --- | --- | --- |
| **Sequence of Concepts** | | **Rationale for Sequence** | **Prior Knowledge** | | |
| Understanding Statistical Questions   * Data generated from statistical questions will vary. * Responses to statistical questions have variations that can be used to draw conclusions about the data set. * Identify the difference between a statistical and non-statistical question. * Write simple statistical questions. * Create models that represent the anticipated data from statistical questions such as charts and tables. | | Students need to build a deeper understanding of data and statistical variance in order to make everyday decisions. In 6th grade, students should also understand and create questions that will generate data and have variability. | In fifth grade, students conducted surveys and displayed the data on a line plot. They also analyzed that data to make decisions. | | |
| Measures of Center and Variability   * Data distribution can be viewed by its center (mean, median, mode), spread (range), and overall shape. * Data can be analyzed by its distribution. | | Once students determine whether a question is statistical, they can analyze the data based on its measure of center. They can use these measures of center in their real-life context. | In fifth grade, students:   * Created and interpreted different data displays. * Divided multi-digit numbers | | |
| Dot Plots, Histograms and Box Plots: Displaying and Analyzing   * Create dot plots, histograms, and box plots, including labeling and scaling axes appropriately. * Know when data are best represented on dot plots, histograms or box plots. * Describe the overall pattern of data, determine variability, and identify striking deviations from the overall pattern. | | Students can now create and analyze various displays using the measures of center (mean, median, mode, range). | In fifth grade, students:   * Created picture graphs, bar graphs, and line plots. * Analyzed data from these various displays. | | |
| Adding, Subtracting, Multiplying, Dividing Integers (7th grade skills)   * Adding integers * Subtracting integers | | After all 6th grade standards have been taught and year-end testing has taken place, the students need to be presented with computation with integers. | This year students have been introduced to negative numbers, where they fall on a number line, and their real-life context. | | |
| **HCDE Math Website:** Tasks Arcs, Tasks, and other teacher resources referenced on the pacing guide may be found at [www.hcde.org](http://www.hcde.org).  Website Directions:   1. Log in using username and password in top right hand corner of webpage (HCDE email & password). 2. Select 6-HS Math/Teacher Resources/6th Grade   **Ready TNCore Website:** Materials referenced and updates may be found at [www.teacher-toolbox.com](http://www.teacher-toolbox.com)  Website Directions:   1. Log in 2. Select Grade 6   **Teacher Notes**  Tasks, CRAs, and Assessments that previously appeared on TNCore are now located on EduTOOLBOX.org, which is a free website. Many of these tasks do not require a user account to access. You just go to EduTOOLBOX.org. For tasks or resources in this pacing guide which show an \* beside them, a user account is necessary. To create a user account:   1. Go to EduTOOLBOX.org 2. Click on Login in the right hand corner 3. Select the Tab: Create a New Account 4. Complete the information which includes a username that you create, a password of your choice, and other additional information. 5. Once you log in with your username and password, resources with the \* will be unlocked and available to the user. | | | | | |
| **Dates** | **Tennessee State Standards** | | | **Core Material** | **Additional Resources** |
| 3/20-2/24 | **SPRING BREAK** | | | | |
| 3/27-3/28  (2 days) | 6. SP.A.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. | | | **MI**-L26: Understand Statistical Questions | **TRB**: Pg. 289  Hands on Activity  **TRB**: Pg. 292  Challenge Activity |
| 3/29-4/6  (7 days) | 6.SP.A.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. 6.SP.A.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. | | | **MI**-L27: Measures of Center and Variability | **TRB**: Pg. 296  Visual Model  **TRB**: Pg. 298  Concept Extension |
| 4/7 (1 day) |  | | | Review/Reteach Day |  |
| 4/10-4/13  (4 days) | 6.SP.B.4 Display numerical data in plots on a number line, including dot plots, histograms, and box plots. | | | **MI**-L28: Display Data on Dot Plots, Histograms, and Box Plots | **TRB**: Pg. 307  Hands on Activity  **TRB**: Pg. 316  Challenge Activity |
| 4/17-4/21  (5 days) | 6.SP.B.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. | | | **MI**-L29: Analyze Numerical Data | [Comparing Test Scores](https://www.illustrativemathematics.org/content-standards/6/SP/B/4/tasks/2047)  [Mean or Median?](https://www.illustrativemathematics.org/content-standards/6/SP/B/5/tasks/2048)  [Electoral College](https://www.illustrativemathematics.org/content-standards/6/SP/A/2/tasks/1199)  **TRB**: Pg. 320  Hands on Activity  **TRB**: Pg. 326  Hands on Activity |
| 4/24-4/28  (5 days) | 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. | | | [Opposite Quantities Combine to Make Zero](https://www.engageny.org/resource/grade-7-mathematics-module-2-topic-lesson-1)  [Using the Number line to Model Addition of Intergers](https://www.engageny.org/resource/grade-7-mathematics-module-2-topic-lesson-2) |  |
| 5/1-5/5  (5 days) | 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. | | | [Understanding Addition of Integers](https://www.engageny.org/resource/grade-7-mathematics-module-2-topic-lesson-3)  [Efficiently Adding Integers and other Rational Numbers](https://www.engageny.org/resource/grade-7-mathematics-module-2-topic-lesson-4) |  |
| 5/8-5/12  (5 days) | 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. | | | [Bookstore Account](https://www.illustrativemathematics.org/content-standards/7/NS/A/1/tasks/1475)  [Distances on the numberline 2](https://www.illustrativemathematics.org/content-standards/7/NS/A/1/tasks/310) |  |
| 5/15-5/19  (5 days) | 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. | | | [Understanding Subtraction of Integers and Other Rational Numbers](https://www.engageny.org/resource/grade-7-mathematics-module-2-topic-lesson-5)  [The Distance Between Two Rational Numbers](https://www.engageny.org/resource/grade-7-mathematics-module-2-topic-lesson-6) |  |
| 5/22-5/26 | 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. | | | Operations on the number line  <https://www.illustrativemathematics.org/content-standards/7/NS/A/1/tasks/46>  End of Fourth Quarter |  |