

Unit 1: Ratios

Unit Overview: Students will compare ratio and rate language, and they will learn to write ratios in various forms. They will model ratios and use ratios to extend patterns. They will use different strategies and models, including ratio tables, tape diagrams, double number lines, and ratio reasoning to create equivalent ratios and solve problems. Students will also represent ratios as pairs of values on the coordinate plane. (Focus on MP.4, MP.5, MP.7)

Concept 1: Understand Ratios

Concept Overview: Students make comparisons using ratio and rate language. They learn to write ratios in various forms. Students model ratios and use ratios to extend patterns. They also analyze ratio information to make decisions.

Unit 1, Concept 1 Standards

- 6.RP.A.1
- 6.RP.A.3.a
- 6.RP.3.A

Concept 2: Create Equivalent Ratios

Concept Overview: Students learn about equivalent ratios and their use in solving real-world problems. They use different strategies and models, including ratio tables, tape diagrams, double number lines, and ratio reasoning to create equivalent ratios and solve problems. Students also represent ratios as pairs of values on the coordinate plane. They use different strategies to determine if given ratios are equivalent.

Unit 1, Concept 2 Standards

- 6.RP.A.3
- 6.RP.A.3a

Unit 2: Division, Factors, and Multiples

Unit Overview: Students will divide multi-digit numbers using the standard algorithm by reasoning with place value, using estimation strategies, and completing multi-digit computations to solve problems. They will apply divisibility rules, properties of operations, and number properties to find multiples and factors. Students will learn how the prime factorization of a number can help them to identify the greatest common factor and the least common multiple of two whole numbers. They will use the distributive property to express a sum of two whole numbers with a common factor as a multiple of a sum of two whole numbers with no common factor. (Focus on MP.2, MP.5, MP.7)

Concept 1: Use the Standard Algorithm for Division

Concept Overview: Students become fluent in dividing multi-digit numbers using the standard algorithm by reasoning with place value, using estimation strategies, and completing multi-digit computations to solve problems.

Unit 2, Concept 1 Standards

- 6.NS.2.B

Concept 2: Solve Problems with GCF and LCM

Concept Overview: Students apply divisibility rules, properties of operations, and number properties to find multiples and factors. They learn how the prime factorization of a number can help them to identify the greatest common factor and the least common multiple of two whole numbers. Students develop the ability to use the distributive property to express a sum of two whole numbers with a common factor as a multiple of a sum of two whole numbers with no common factor.

Unit 2, Concept 2 Standards

- 6.NS.B.4

Unit 3: Operations with Fractions and Decimals

Unit Overview: Students will explain, compute, and solve word problems involving division of fractions. They will compare problem types, estimate to find the reasonableness of an answer, and use visual models. Students will use the relationship between multiplication and division to explain why dividing a number by a fraction is equivalent to multiplying that number by the reciprocal of the fraction. Students will add, subtract, multiply, and divide decimal numbers using a standard algorithm. (Focus on MP.1, MP.3, MP.8)

Concept 1: Divide Fractions

Concept Overview: Students explain, compute, and solve word problems involving division of fractions. They compare problem types, estimate to find the reasonableness of an answer, and use visual models.

Students use the relationship between multiplication and division to explain why dividing a number by a fraction is equivalent to multiplying that number by the reciprocal of the fraction.

Unit 3, Concept 1 Standards

- 6.NS.A.1

Concept 2: Perform Operations with Decimals

Concept Overview: Students become fluent in adding, subtracting, multiplying, and dividing decimal numbers using a standard algorithm. This fluency is obtained by solving real-world application problems, estimating to find the reasonableness of answers, and making connections to visual models that represent the standard algorithm.

Unit 3, Concept 2 Standards

- 6.NS.B.3

Unit 4: Unit Rates and Percents

Unit Overview: Students will explore unit rates as a special type of ratio. They will investigate what distinguishes unit rates from other types of rates and how a unit rate can be determined from a given rate or ratio. They will use such models as tape diagrams, double number lines, and ratio tables to determine unit rates. Students will identify conversion factors as unit rates and then use the same strategies they used to find equivalent ratios to convert measurements in real-world contexts. They will learn that percent is a rate per 100 units. They will solve real-world problems

using visual representations (tape diagrams, double number lines, and grids) and ratio reasoning to find the part, whole, or percent given the other two values. (Focus on MP.1, MP.4, MP.8)

Concept 1: Understand Unit Rates

Concept Overview: Students use their background knowledge of ratios to explore unit rates as a special type of ratio. They determine what distinguishes unit rates from other types of rates and how a unit rate can be determined from a given rate or ratio. They use such models as tape diagrams, double number lines, and ratio tables to determine unit rates, and they use unit rates to solve a variety of problems. Finally, they use unit rates to make comparisons, such as determining which product is the best buy.

Unit 4, Concept 1 Standards

- 6.RP.A.2
- 6.RP.A.3
- 6.RP.A.3a
- 6.RP.A.3b

Concept 2: Convert Measurements with Ratios

Concept Overview: Students build on their earlier work with ratios by identifying conversion factors as unit rates and then use the same strategies they used to find equivalent ratios to convert measurements in real-world contexts.

Unit 4, Concept 2 Standards

- 6.RP.A.2
- 6.RP.A.3d

Concept 3: Understand Percents as Rates

Concept Overview: Students learn that percent is a rate per 100 units. They solve real-world problems using visual representations (tape diagrams, double number lines, and grids) and ratio reasoning to find the part, whole, or percent given the other two values.

Unit 4, Concept 3 Standards

- 6.RP.A.3c

Unit 5: Rational Numbers

Unit Overview: Students will build on their knowledge of numbers to include negative integers. They will represent and interpret positive and negative integers on both vertical and horizontal number lines. Students will learn that opposite numbers have positions on opposite sides of zero on the number line. They will study a new classification of numbers, rational numbers. By recognizing a real-world need for negative rational numbers, students plot and interpret rational numbers on both the vertical and horizontal number lines. They will use their knowledge of opposites to help position negative rational numbers and use the positions of the rational numbers to write an inequality or order a set of numbers. Students will be introduced to absolute value as the distance from zero. (Focus on MP.2, MP.3, MP.5)

Concept 1: Explore the Number Line

Concept Overview: Students extend their knowledge of numbers to include negative integers. Students represent and interpret positive and negative integers on both

Unit 5, Concept 1 Standards

- 6.NS.C.6
- 6.NS.C.6c
- 6.NS.C.5
- 6.NS.C.6a

vertical and horizontal number lines. Real-world contexts are represented by positive and negative integers with a focus on understanding the meaning of zero. Students understand opposite numbers to have positions on opposite sides of zero on the number line.

Concept 2: Investigate Rational Numbers

Concept Overview: Students learn a new classification of numbers, rational numbers. By recognizing a real-world need for negative rational numbers, students plot and interpret rational numbers on both the vertical and horizontal number lines. Students use their understanding of opposites to help position negative rational numbers. They use the positions of the rational numbers to write an inequality or to order a set of numbers. While choosing an appropriate scale, they also write and interpret inequalities related to real-world situations.

Unit 5, Concept 2 Standards

- 6.NS.C.5
- 6.NS.C.6
- 6.NS.C.6c
- 6.NS.C.7a
- 6.NS.C.7
- 6.NS.C.7b

Concept 3: Interpret and Use Absolute Value

Concept Overview: Students are introduced to absolute value as the distance from zero. They are provided with real-world situations that can be solved using absolute value. It is important for students to see the difference between comparing absolute values to comparing order of rational numbers.

Unit 5, Concept 3 Standards

- 6.NS.C.7c
- 6.NS.C.7d

Unit 6: Coordinate Plane

Unit Overview: Students will explore how the axes of the plane can be extended to include negative numbers. They will graph ordered pairs and give the coordinates of points in all four quadrants, including those with non-integer coordinates. They will interpret the meaning of negative and positive coordinates, and they investigate the relationship between the coordinates of points that are reflections of each other across an axis. Students will learn how to find horizontal and vertical distance between points plotted in any quadrant of the coordinate plane using the absolute value of the distances between the points. They will plot vertices of two-dimensional figures on the coordinate plane and then find the side lengths, perimeter, and area of the figures. (Focus on MP.5, MP.7, MP.8)

Concept 1: Understand the Coordinate Plane

Concept Overview: Students investigate how the axes of the plane can be extended to include negative numbers. They graph ordered pairs and give the coordinates of points in all four quadrants, including those with non-integer coordinates. They interpret the meaning of negative and positive coordinates, and they investigate the

Unit 6, Concept 1 Standards

- 6.NS.C.6
- 6.NS.C.6c
- 6.NS.C.6b
- 6.NS.C.8

relationship between the coordinates of points that are reflections of each other across an axis. In addition, they make use of the coordinate plane to solve real-world and mathematical problems.

Concept 2: Use Coordinate Geometry

Concept Overview: Students learn how to find horizontal and vertical distance between points plotted in any quadrant of the coordinate plane using the absolute value of the distances between the points. They also use their understanding of properties of geometric figures to plot vertices of two-dimensional figures on the coordinate plane and then find the side lengths, perimeter, and area of the figures.

Unit 6, Concept 2 Standards

- 6.NS.C.8
- 6.G.A.3

Unit 7: Algebraic Expressions

Unit Overview: Students will use variables to represent the value of an unknown number. They will read, write, and interpret numerical and algebraic expressions involving one variable and use algebraic expressions to represent real-world situations. They will begin to understand the components of an algebraic expression and use appropriate terms to describe each as they relate an expression to a real-world situation. Students will write and evaluate algebraic expressions using the standard order of operations, including exponents for variable values. They will use formulas to evaluate problems, including finding the volume of a cube. Students will learn to apply properties of operations to generate equivalent expressions and to use substitution for variables to verify equivalence. (Focus on MP.2, MP.7, MP.8)

Concept 1: Use and Analyze Expressions

Concept Overview: Students learn how to use variables to represent the value of an unknown number. They read, write, and interpret numerical and algebraic expressions involving one variable and use algebraic expressions to represent real-world situations. Students begin to learn the components of an algebraic expression and use appropriate terms to describe each as they relate an expression to a real-world situation.

Unit 7, Concept 1 Standards

- 6.EE.A.1
- 6.EE.A.2
- 6.EE.A.2a
- 6.EE.B.6
- 6.EE.A.2b

Concept 2: Evaluate Expressions

Concept Overview: Students apply their previous understanding of numerical expressions to algebraic expressions. They write and evaluate algebraic expressions using the standard order of operations that now include exponents for variable values. Students confirm that a variable can represent any given number in an expression and that the value of a variable expression changes depending on the value of the variable. They apply this knowledge as they use formulas to evaluate problems, including finding the volume of a cube.

Unit 7, Concept 2 Standards

- 6.EE.A.1
- 6.EE.A.2
- 6.EE.B.6
- 6.EE.A.2c

Concept 3: Create Equivalent Expressions

Concept Overview: Students use properties of operations to generate equivalent expressions. They also learn to use substitution for variables to verify equivalence. In addition, students learn to distinguish among the properties and can explain why certain properties do not hold true for some operations.

Unit 7, Concept 3 Standards

- 6.EE.A.3
- 6.EE.A.4

Unit 8: Equations and Inequalities

Unit Overview: Students will represent quantities in real-world or mathematical problems using variables, and they will construct simple equations to represent situations and relationships. They will develop models to represent equations, and they will use those models to suggest and interpret steps to solve equations. Students will write a one-variable inequality to represent a real-world situation. They will substitute values for the variable to see whether that value is a solution to the inequality, and they will sketch all the solutions to an inequality as a range of values on a number line. (Focus on MP.1, MP.2, MP.7)

Concept 1: Write and Solve Equations

Concept Overview: Students use variables to represent quantities in real-world or mathematical problems, and they construct simple equations to represent situations and relationships. They develop models to represent equations and use the models to suggest and interpret steps to solve equations.

Unit 8, Concept 1 Standards

- 6.EE.B.5
- 6.EE.B.6
- 6.EE.A.2c
- 6.EE.B.7

Concept 2: Write and Solve Inequalities

Concept Overview: Students learn how to write a one-variable inequality to represent a real-world situation. They substitute values for the variable to see whether that value is a solution to the inequality, and they sketch all the solutions to an inequality as a range of values on a number line.

Unit 8, Concept 2 Standards

- 6.EE.B.6
- 6.EE.B.8
- 6.EE.B.5

Unit 9: Dependent and Independent Variables

Unit Overview: In a given scenario, students will differentiate between the independent variable and the dependent variable and write equations to solve real-world problems. They will use equations, tables, and graphs to analyze the relationship between variables in these situations. (Focus on MP.2, MP.4, MP.8)

Concept 1: Explore Relationships between Two Variables

Concept Overview: Students learn to differentiate between the independent variable and the dependent variable in a given scenario and write equations to solve real-world problems. They analyze the relationship between variables in these situations using equations, tables, and graphs.

Unit 9, Concept 1 Standards

- 6.EE.C.9

Unit 10: Data Distributions

Unit Overview: Students will explore what makes a good statistical question and learn to categorize statistical questions as numerical or categorical. They will create and examine tallies, line plots, bar graphs, histograms, and box plots for their similarities and differences, as well as for the most effective use for each display. Students will use the shape of the graph to help them gain insight into what the data means in terms of the context. They will begin to make decisions about which type of graphical representation is best used for different data sets. (Focus on MP.2, MP.4, MP.6)

Concept 1: Collect and Represent Data

Concept Overview: Students build on their previous experience with data analysis as they develop a deeper understanding of analyzing a graph. They explore what makes a good statistical question and learn to categorize statistical questions as numerical or categorical. They create and examine tallies, line plots, bar graphs, histograms, and box plots for their similarities and differences, as well as for the most effective use for each display.

Unit 10, Concept 1 Standards

- 6.SP.A.1
- 6.SP.B.4
- 6.SP.B.5
- 6.SP.B.5a
- 6.SP.B.5b

Concept 2: Describe and Compare Data

Concept Overview: Students use the shape of the graph to help them gain insight into what the data means in terms of the context, based on the statistical question the graph is answering. They begin to make decisions about which type of graphical representation is best used for different data sets.

Unit 10, Concept 2 Standards

- 6.SP.A.2
- 6.SP.B.5
- 6.SP.B.5a
- 6.SP.B.5b

Unit 11: Measures of Center and Variation

Unit Overview: Students will begin to describe and summarize data. They will explore mean as a balance point and as a fair share to summarize data sets, and they will derive a formula for calculating mean. They will see both mean and median as single numerical values that describe a data set. They

will use these values to summarize and identify patterns within data sets as they relate to their real-world contexts. Students will determine which measure of center best describes a data set based on the shape of the data distribution and the context. They will learn how to calculate range, interquartile range (IQR), and mean average deviation (MAD), which will assist them in describing the overall shape of the distribution. (Focus on MP.3, MP.5, MP.8)

Concept 1: Find and Interpret Mean and Median

Concept Overview: Students move toward statistical reasoning as they begin to describe and summarize data. Students explore mean as a balance point and as a fair share to summarize data sets. They continue to explore median and derive a formula for calculating mean. They see both mean and median as single numerical values that describe a data set. They use these values to summarize and identify patterns within data sets as they relate to their real-world contexts. Students extend this understanding of mean and median as they choose which measure of center best describes a data set based on the shape of the data distribution and the context.

Unit 11, Concept 1 Standards

- 6.SP.A.3
- 6.SP.B.5
- 6.SP.B.5c
- 6.SP.B.5d

Concept 2: Find and Interpret Spread

Concept Overview: Students explore measures of variability as they describe data sets. They learn how to calculate range, interquartile range (IQR), and mean average deviation (MAD), which will assist them in describing the overall shape of the distribution. They use these values to summarize and identify patterns within data sets as they relate to their real-world contexts. Students extend this understanding of IQR and MAD as they choose which measure of center best describes a data set based on the shape of the data distribution and the context.

Unit 11, Concept 2 Standards

- 6.SP.A.3
- 6.SP.B.5d
- 6.SP.B.5
- 6.SP.B.5c

Unit 12: Area of Polygons

Unit Overview: Students will make the connection between composing and decomposing triangles, parallelograms, and rectangles to understanding how area formulas are created and applied. They will decompose trapezoids, kites, pentagons, hexagons, and octagons into rectangles, triangles, and/ or parallelograms in order to calculate their areas. Students will apply what they have learned to calculate the area of real-world polygons. (Focus on MP.1, MP.4, MP.6)

Concept 1: Find Area of Parallelograms and Triangles

Concept Overview: Students learn how composing and decomposing triangles, parallelograms, and rectangles are the basis of understanding how area formulas are created and applied. They also learn to recognize when area formulas can be applied to real-world situations.

Unit 12, Concept 1 Standards

- 6.G.A.1

Concept 2: Find Area of Special Polygons

Concept Overview: Students decompose trapezoids, kites, pentagons, hexagons, and octagons into rectangles, triangles, and/ or parallelograms in order to calculate their areas. They apply what they have learned to calculate the area of real-world polygons.

Unit 12, Concept 2 Standards

- 6.G.A.1

Unit 13: Surface Area and Volume

Unit Overview: Students will use their knowledge of two-dimensional figures to represent three-dimensional figures, using nets to find surface area. They will derive a formula and use it to find surface area. Students will broaden their understanding of volume by extending the formulas to rectangular prisms with fractional edges. They will connect the volume found by packing fractional-sided prisms with unit cubes with the applications of the volume formulas. Students will solve real-world volume problems for right rectangular prisms with fractional edge lengths. (Focus on MP.5, MP.6, MP.7)

Concept 1: Use Nets to Find Surface Area

Concept Overview: Students apply their knowledge of two-dimensional figures to represent three-dimensional figures, using nets to find surface area. They derive a formula and use it to find surface area. Students use their understanding of surface area to solve real-world mathematical problems.

Unit 13, Concept 1 Standards

- 6.G.A.4
- 6.EE.A.2c

Concept 2: Calculate Volume

Concept Overview: Students deepen their understanding of volume by extending the formulas to rectangular prisms with fractional edges. They connect the volume found by packing fractional-sided prisms with unit cubes with the applications of the volume formulas. Students solve real-world volume problems for right rectangular prisms with fractional edge lengths.

Unit 13, Concept 2 Standards

- 6.G.A.2