

Grade: 6	Unit 1 Ratios and Unit Rates	Duration: 7 weeks
<p>Essential Questions:</p> <p>How do you apply reasoning when solving collections of ratio problems in real world contexts using various tools?</p> <p>How do you formalize the understanding of equivalent ratios?</p> <p>What is the relationship between ratios and percentages?</p>	<p>Real World Problems/Applications:</p> <p>What are the benefits of understanding unit rate? And when/why would you use it</p> <p>Getting the “best buy”</p> <p>Distance and time</p> <p>Baking/cooking</p>	
<p>Standards/Eligible Content (Skills):</p> <p>CC.2.1.6.D.1 Understand ratio concepts and use ratio reasoning to solve problems.</p> <p>M06.A-R.1.1.1 Use ratio language and notation (such as 3 to 4, 3:4, 3/4) to describe a ratio relationship between two quantities.</p> <p>M06.A-R.1.1.2 Find the unit rate a/b associated with a ratio $a:b$ (with $b \neq 0$) and use rate language in the context of a ratio relationship.</p> <p>M06.A-R.1.1.3 Construct tables of equivalent ratios relating quantities with whole-number measurements, find missing values in the tables, and/or plot the pairs of values on the coordinate plane. Use tables to compare ratios.</p> <p>M06.A-R.1.1.4 Solve unit rate problems including those involving unit pricing and constant speed.</p>	<p>Standards Reinforced:</p> <p>Use the four operations with whole numbers to solve problems.</p> <p>Apply and extend previous understandings of multiplication and division to multiply and divide fractions.</p> <p>Convert like measurement units within a given measurement system.</p> <p>Graph points on the coordinate plane to solve real-world and mathematical problems.</p>	

Grade: 6	Unit 2 Arithmetic Operations	Duration: 5 weeks
<p>Essential Questions:</p> <p>How do students use their understanding of multiplication and division to divide fractions by fractions?</p> <p>How do you choose the correct mathematical operation (addition, subtraction, multiplication, division) to solve real-life problems?</p> <p>How can students apply divisibility rules and number properties to find common factors and multiples?</p>	<p>Real World Problems/Applications:</p> <p>What are the benefits of being able to find equal groups?</p> <p>How do you encounter fractions in the real world?</p>	
<p>Standards/Eligible Content (Skills):</p> <p>6.NS.A.1 Interpret and compute quotients of fractions (including mixed numbers), and solve word problems involving division of fractions by fractions.</p> <p>6.NS.A.3 Solve problems involving operations (+, −, ×, and ÷) with whole numbers, decimals (through thousandths), straight computation, or word problems.</p> <p>6.NS.A.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.</p> <p>6.NS.A.4 Apply the distributive property to express a sum of two whole numbers, 1 through 100, with a common factor as a multiple of a sum of two whole numbers with no common factor.</p>	<p>Standards Reinforced:</p> <p>Gain familiarity with factors and multiples.</p> <p>Understand the place value system.</p> <p>Perform operations with multi-digit whole numbers and with decimals to hundredths.</p> <p>Apply and extend previous understandings of multiplication and division to multiply and divide fractions.</p>	
<p>Critical Thinking/Reasoning Skills:</p> <p>Math Design Collaborative Problems:</p> <p>Interpreting Equations</p> <p>Using Standard Algorithms for Number Operations</p>		
<p>Reading/Writing/Listening/Speaking Skills:</p>		

MP# 1. Make sense of problems and persevere in solving them
MP# 2. Reason abstractly and quantitatively
MP# 3. Construct viable arguments and critique the reasoning of others
MP# 4. Model with mathematics
MP# 5. Use appropriate tools strategically
MP# 6. Attend to precision
MP# 8. Look for and express regularity in repeated reasoning

Fluency:
Add, subtract, multiply, and divide multi-digit numbers
Multiplication and division of fractions
GCF (Greatest Common Factor)
LCM (Least Common Multiple)

Vocabulary:
Greatest common factor
Least common multiple
Multiplicative inverse
Algorithm
Composite number
Distributive property
Dividend
Divisor
Estimate
Factors
Multiples
Prime Numbers
Reciprocal

Technology/Manipulatives/Resources:
Counters
Fraction tiles
Tape diagrams

Area models

Authentic Performance Assessments:

Mid-module assessment (Engage NY)

End of module assessment (Engage NY)

Other teacher-created assessments (Go Math)

[Fractions Performance Task](#)

[Boxes: Performance Assessment](#)

[Percent, Decimal, Fraction: Performance Assessment](#)

[Performance Task Rubric](#)

M06.A-R.1.1.5 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 percentage.

Critical Thinking/Reasoning Skills:
Is that a reasonable answer? Why or why not?

[Sharing Costs Equitably: Traveling to School](#)

[Use Proportional Reasoning](#)

[Math Shell 100 People Project](#)

[Math Shell Short Tasks](#)

Reading/Writing/Listening/Speaking Skills:

1. Make sense of problems and persevere in solving them.
2. Reason abstractly and quantitatively.
5. Use appropriate tools strategically.
6. Attend to precision.
7. Look for and make use of structure.

Journal Prompt: Give the students 3 options for cereal with cost and amount. Students need to find the unit rate for each cereal and determine which they would buy. They would then need to explain the best buy and why. To further explore, they could write about the difference in costs between products.

Fluency:

Multiplication and division of fractions




Adding, subtracting, and multiplying decimals

GCF

Vocabulary:

Equivalent ratios

Measurement of a quantity

Percent
Quantity
Rate
Ratio
Ratio Relationship
Type of quantity
Unit of measurement
Unit rate
Value of a ratio
Equivalent Ratios 
Measurement of a Quantity 
Percent 
Quantity
Rate

Technology/Manipulatives/Resources:
Tape diagrams
Double number line diagrams
Ratio tables
Coordinate plane
(See “Suggested Tools and Representations” in Engage NY)
Khan Academy

Authentic Performance Assessments:
Mid-module assessment (Engage NY)
End of module assessment (Engage NY)
Other teacher-created assessments (Go Math)
[Rate and Ratio Performance Task](#)
[Snail Pace: Performance Task](#)
[Truffles: Performance Task](#)
[Ratio, Fraction Performance Task](#)
[Page 16 Percentage Task](#)
[Question 47 Ratios Task](#)

[Performance Task Rubric](#)

Grade: 6	Unit 3 Rational Numbers	Duration: 5 weeks
<p>Essential Questions: How can a student use positive and negative numbers to represent real-world quantities? How do students use the concept of absolute value and notation to show a number's distance from zero and recognize that opposite numbers have the same absolute value? How can students use absolute value to determine the distance between points in any quadrants on a coordinate plane?</p>	<p>Real World Problems/Applications: Where do you see positive and negative integers in real life? What is the difference between positive and negative integers, in terms of money?</p>	
<p>Standards/Eligible Content (Skills): 6.NS.C.5 Represent quantities in real-world contexts using positive and negative numbers, explaining the meaning of 0 in each situation (e.g., temperature above/below zero, elevation above/below sea level, credits/debits, positive/negative electric charge). 6.NS.C.6 Determine the opposite of a number and recognize that the opposite of the opposite of a number is the number itself (e.g., $-(-3) = 3$; 0 is its own opposite). 6.NS.C.6 Locate and plot integers and other rational numbers on a horizontal or vertical number line; locate and plot pairs of integers and other rational numbers on a coordinate plane. 6.NS.C.6 Write, interpret, and explain statements of order for rational numbers in real-world contexts. 6.NS.C.7 Interpret the absolute value of a rational number as its distance from 0 on the number line and as a magnitude for a positive or negative quantity in a real-world situation. 6.NS.C.8 Solve real-world and mathematical problems by plotting 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.</p>	<p>Standards Reinforced: Develop understanding of fractions as numbers. Draw and identify lines and angles, and classify shapes by properties of their lines and angles. Graph points on the coordinate plane to solve real-world and mathematical problems.</p>	

<p>Critical Thinking/Reasoning Skills: Math Design Collaborative Problems: Using Coordinates to Interpret and Represent Data Adding and Subtracting Directed Numbers</p>
<p>Reading/Writing/Listening/Speaking Skills: MP# 4. Model with mathematics MP# 5. Use appropriate tools strategically</p>
<p>Fluency: Locating coordinates on a coordinate plane Absolute value</p>
<p>Vocabulary: Absolute value Integer Magnitude Negative number Opposite Quadrant Rational number Coordinate pair Coordinate plane X-axis X-coordinate Y-axis Y-coordinate Origin Line of symmetry</p>
<p>Technology/Manipulatives/Resources: Horizontal and vertical number lines Coordinate plane</p>
<p>Authentic Performance Assessments:</p>

Mid-module assessment (Engage NY)
End of module assessment (Engage NY)
Other teacher-created assessments (Go Math)
[Questions 52 and 56 Coordinate Plane](#)
[Performance Task Rubric](#)

Grade: 6	Unit 4 Expressions and Equations	Duration: 9 Weeks
<p>Essential Questions:</p> <ol style="list-style-type: none"> 1) How do students acquire the knowledge to build an evaluate unknowns that are essential for solving equations. 2) How can students demonstrate the meaning of exponents and how to evaluate expressions. 3) What can students conclude about equations, when a number or numbers are substituted for a variable. 	<p>Real World Problems/Applications: Problem solving situations: Time, Money, Distance, cost vs time, shopping, any of these skills require real life application.</p>	
<p>Standards/Eligible Content (Skills):</p> <p>6.EE.A.1 Write and evaluate numerical expressions involving whole-number exponents.</p> <p>6.EE.A.2 Write, read, and evaluate expressions in which letters stand for numbers.</p> <p>6.EE.A.3 Apply the properties of operations to generate equivalent expressions.</p> <p>6.EE.A.4 Identify when two expressions are equivalent.</p> <p>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.</p> <p>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.</p> <p>6.EE.B.7 Solve real-world and mathematical problems by writing and solving equations of the form $ax + b = c$ and $ax + b = c$ for cases in which a, b, c, and x are all nonnegative rational numbers.</p> <p>6.EE.B.8 Write an inequality of the form $ax + b > c$ or $ax + b < c$ to represent a constraint or condition in a real-world mathematical problem.</p>	<p>Standards Reinforced:</p> <p>Apply properties of operations as strategies to add and subtract. Apply properties of operations as strategies to multiply and divide. Find all factor pairs for a whole number in the range 1–100. Recognize angles as geometric shapes that are formed wherever two rays share a common endpoint and understand concepts of angle measurement. Measure angles in whole-number degrees using a protractor. Sketch angles of specified measure. Recognize angle measure as additive. Write simple expressions that record calculations with numbers and interpret numerical expressions without evaluating them. Generate two numerical patterns using two given rules. Explain patterns in the number of zeros of the product when multiplying a number by powers of 10, and explain patterns in the placement of the decimal point when a decimal is multiplied or divided by a power of 10. 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 the plane located by using an ordered pair of numbers, called its coordinates.</p>	

<p>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.</p>	<p>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.</p> <p>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.</p> <p>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.</p>
<p>Critical Thinking/Reasoning Skills: Math Design Collaborative Problems:</p> <p>Interpreting Equations</p>	
<p>Reading/Writing/Listening/Speaking Skills:</p> <p>2. Reason abstractly and quantitatively. 6. Attend to precision. 7. Look for and make use of structure. 8. Look for and express regularity in repeated reasoning.</p>	
<p>Fluency: Grade 6 Mathematics Fluency Support</p> <p>Division of Fractions Division of Fractions II Greatest Common Fraction Addition of Decimals I Addition of Decimals II Subtraction of Decimals Division of Fractions Addition and Subtraction of Equations</p>	
<p>Vocabulary:</p> <p>Equation Equivalent Expressions Exponential Notation for Whole Number Exponents</p>	

Expression

Linear Expression Number Sentence

Numerical Expression

Solution of an Equation

Truth Values of a Number Sentence

Value of a Numerical Expression

Variable

Technology/Manipulatives/Resources:

Bar model

Geometric figures

Protractors

Authentic Performance Assessments:

Mid-module assessment (Engage NY)

End of module assessment (Engage NY)

Other teacher-created assessments (Go Math)

[Performance Assessment Task Pdf. \(Gym\)](#)

[Algebra Performance Task](#)

[Question 17 Writing Expressions Task](#)

[Inequality Task](#)

[Performance Task Rubric](#)

Grade: 6	Unit 5 Area, Surface Area, and Volume	Duration: 5 weeks
<p>Essential Questions:</p> <p>1) How do students determine the area of quadrilaterals, triangles, compound polygons, and shapes plotted on the coordinate plane?</p> <p>2) How do students determine the net, area, and volume of three-dimensional objects?</p> <p>3) How do students determine the surface area of triangular and rectangular prisms?</p>	<p>Real World Problems/Applications:</p> <p>Determine how much wrapping paper you would need to cover a present.</p> <p>Determine how much water you would need to fill a swimming pool.</p>	
<p>Standards/Eligible Content (Skills):</p> <p>6.G.A.1 Determine the area of triangles and special quadrilaterals (i.e., square, rectangle, parallelogram, rhombus, and trapezoid). Formulas will be provided.</p> <p>6.G.A.2 Determine the area of irregular or compound polygons.</p> <p>6.G.A.2 Determine the volume of right rectangular prisms with fractional edge lengths. Formulas will be provided.</p> <p>6.G.A.3 Given coordinates for the vertices of a polygon in the plane, use the coordinates to find side lengths and area of the polygon (limited to triangles and special quadrilaterals). Formulas will be provided.</p> <p>6.G.A.4 Represent three-dimensional figures using nets made of rectangles and triangles.</p> <p>6.G.A.4 Determine the surface area of triangular and rectangular prisms (including cubes). Formulas will be provided.</p>	<p>Standards Reinforced:</p> <p>Reason with shapes and their attributes.</p> <p>Solve problems involving measurement and conversion of measurements from a larger unit to a smaller unit.</p> <p>Draw and identify lines and angles, and classify shapes by properties of their lines and angles</p> <p>Apply and extend previous understandings of multiplication and division to multiply and divide fractions.</p> <p>Geometric measurement: understand conceptual concepts of volume and relate volume to multiplication and to addition.</p> <p>Graph points on a coordinate plane to solve real-world and mathematical problems.</p> <p>Classify two-dimensional figures into categories based on their properties</p> <p>Apply and extend previous understandings of numbers to the system of rational numbers.</p> <p>Reason about and solve one-variable equations and inequalities.</p>	
<p>Critical Thinking/Reasoning Skills:</p> <p>Divide a compound/irregular polygon into regular polygons to find area</p>		

Reading/Writing/Listening/Speaking Skills:

MP# 1. Make sense of problems and persevere In solving them

MP# 3. Construct viable arguments and critique the reasoning of others

MP# 5. Use appropriate tools strategically

MP# 6. Attend to precision

MP# 7. Look for and make use of structure

Fluency:

Multiplication of fractions

Multiplication of whole numbers

Absolute value

Vocabulary:

Base

Cube

Hexagon

Net

Parallel

Perpendicular

Rectangular prism

Angle

Area

Perimeter

Quadrilateral

Rectangle

Square

Trapezoid

Triangle

Volume

Technology/Manipulatives/Resources:

Coordinate plane

Nets

Prism

Ruler

Authentic Performance Assessments:

[Designing 3D Products: Candy Cartons](#)

[Building Blocks: Performance Assessment Task](#)

[Rectangular Prism Task](#)

[Painting a Barn](#)

[Performance Task Rubric](#)

Grade: 6	Unit 6 Statistics	Duration: 5 weeks
<p>Essential Questions:</p> <p>1) How do students display numerical data on a number line, including dot plots, histograms, and box-and-whisker plots?</p> <p>2) How will students apply measures of center and variability based upon the shape of the distribution. (Symmetrical or Skewed)</p>	<p>Real World Problems/Applications:</p> <p>Mean: Athletes scoring/hitting averages, scores on assessments</p> <p>Range: Scores on assessments</p>	
<p>Standards/Eligible Content (Skills):</p> <p>6.SP.B.4 Display numerical data in plots on a number line, including line plots, histograms, and box-and-whisker plots.</p> <p>6.SP.A.2 Determine quantitative measures of center (e.g., median, mean, mode) and variability (e.g., range, interquartile range, mean absolute deviation).</p> <p>6.SP.B.5 Describe any overall pattern and any deviations from the overall pattern with reference to the context in which the data were gathered.</p> <p>6.SP.B.5 Relate the choice of measures of center and variability to the shape of the data distribution and the context in which the data were gathered.</p>	<p>Standards Reinforced:</p> <p>Perform operations with multi-digit whole numbers and with decimals to hundredths.</p> <p>Represent and interpret data.</p> <p>Apply and extend previous understandings of arithmetic to algebraic expressions.</p>	
<p>Critical Thinking/Reasoning Skills:</p> <p>Designing: A Game of Chance</p>		
<p>Reading/Writing/Listening/Speaking Skills:</p> <p>MP# 1: Make sense of problems and persevere in solving them</p> <p>MP# 3: Construct viable arguments and critique the reasoning of others</p> <p>MP# 4: Model with mathematics</p> <p>MP# 5: Use appropriate tools strategically</p> <p>MP# 6: Attend to precision</p> <p>MP# 8: Look for and express regularity in repeated reasoning</p>		
<p>Fluency:</p>		

Mean
Median
Range
Interquartile range

Vocabulary:
Line plot/Dot plot
Mean absolute deviation
Box plot
Frequency
Frequency table
Histogram
Interquartile range
Mean
Median
Mode
Range
Statistical question
Variability

Technology/Manipulatives/Resources:
Dot plots
Histograms
Box plots

Authentic Performance Assessments:
[Baseball Players: Performance Task](#)
[Representing Variability with Mean, Median, Mode and Range](#)
[Performance Task: Open Ended Problem](#)
[Performance Task Rubric](#)