



G-E-T Middle School Curriculum

Align, Explore, Empower

Scope and Sequence

Math - Grade 6

Unit 1 - Computing with Multi-Digit Numbers

2 weeks

In this unit, students will:

-complete their understanding of the four operations as they study division of whole numbers and operations on multi-digit decimals

Standards for Number System:

The students will:

Compute fluently with multi-digit numbers and find common factors and multiples.

6.NS.2 - Fluently divide multi-digit numbers using the standard algorithm.

6.NS.3 - Fluently add, subtract, multiply, and divide multi-digit decimals using the standard algorithm for each operation.

Unit 2 - Multiply and Divide Fractions

3 weeks

In this unit, students will:

-demonstrate knowledge on how to multiply and divide fractions and mixed numbers

Standards for Number System:

The students will:

Apply and extend previous understandings of multiplication and division to divide fractions by fractions.

6.NS.1 - Interpret and compute quotients of fractions, and solve word problems involving division of fractions by fractions, e.g., by using visual fraction models and equations to represent the problem.

Unit 3 - Fractions, Decimals, & Percents

4 weeks

In this unit, students will:

-convert decimals to fractions, percents to fractions and decimals.

-solve percent problems.

Standards for Ratios and Proportional Relationships:

The students will:

Understand ratio concepts and use ratio reasoning to solve problems.

6.RP.3 - Use ratio and rate reasoning to solve real-world and mathematical problems, e.g., by reasoning about tables of equivalent ratios, tape diagrams, double number line diagrams, or equations.

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.

Unit 4 - Ratios and Rates

4 weeks

In this unit, students will:

-investigate the concepts of ratio and rates.

-use multiple forms of ratio language and ratio notation, and formalize understanding of equivalent ratios.

-apply reasoning when solving collections of ratio problems in real world contexts using various tools (e.g., tape diagrams, double number line diagrams, tables, equations and graphs).

-bridge their understanding of ratios to the value of a ratio, and then to rate and unit rate, discovering that a percent of a quantity is a rate per 100.

-expressing a fraction as a percent and finding a percent of a quantity in real world concepts, supporting their reasoning with familiar representations

Standards for Ratios and Proportional Relationships & Number System:

The students will:

Understand ratio concepts and use ratio reasoning to solve problems.

6.RP.1 - Understand the concept of a ratio and use ratio language to describe a ratio relationship between two quantities. For example, "The ratio of wings to beaks in the bird house at the zoo was 2:1, because for every 2 wings there was 1 beak." "For every vote candidate A received, candidate C received nearly three votes."

6.RP.2 - Understand the concept of a unit rate a/b associated with a ratio $a:b$ with $b \neq 0$, and use rate language in the context of a ratio relationship. For example, "This recipe has a ratio of 3 cups of flour to 4 cups of sugar, so there is $3/4$ cup of flour for each cup of sugar." "We paid \$75 for 15 hamburgers, which is a rate of \$5 per hamburger."

6.RP.3 - Use ratio and rate reasoning to solve real-world and mathematical problems, e.g., by reasoning about tables of equivalent ratios, tape diagrams, double number line diagrams, or equations.

- a. Make tables of equivalent ratios relating quantities with whole number measurements, find missing values in the tables, and plot the pairs of values on the coordinate plane. Use tables to compare ratios.
- b. Solve unit rate problems including those involving unit pricing and constant speed. For example, if it took 7 hours to mow 4 lawns, then at that rate, how many lawns could be mowed 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.

6.NS.4 - Find the greatest common factor of two whole numbers less than or equal to 100 and the least common multiple of two whole numbers less than or equal to 12. Use the distributive property to express a sum of two whole numbers 1–100 with a common factor as a multiple of a sum of two whole numbers with no common factor. For example, express $36 + 8$ as $4(9 + 2)$

Unit 5 - Integers and Coordinate Planes

4 weeks

In this unit, students will:

- demonstrate how to use and graph coordinates(ordered pairs) on a coordinate graph. They will also apply and extend previous learning of numbers to the system of rational numbers.
- extend the number line (both horizontally and vertically)to include the opposites of whole numbers
- use the coordinate plane to model and solve real-world problems involving rational numbers.

Standards for: Number System

The students will:

Apply and extend previous understandings of numbers to the system of rational numbers.

6.NS.5 - Understand that positive and negative numbers are used together to describe quantities having opposite directions or values (e.g., temperature above/below zero, elevation above/below sea level, credits/debits, positive/negative electric charge); use positive and negative numbers to represent quantities in real-world contexts, explaining the meaning of 0 in each situation.

6.NS.6 - Understand a rational number as a point on the number line. Extend number line diagrams and coordinate axes familiar from previous grades to represent points on the line and in the plane with negative number coordinates.

- a. Recognize opposite signs of numbers as indicating locations on opposite sides of 0 on the number line; recognize that the opposite of the opposite of a number is the number itself, e.g., $-(-3) = 3$, and that 0 is its own opposite.
- b. Understand signs of numbers in ordered pairs as indicating locations in quadrants of the coordinate plane; recognize that when two ordered pairs differ only by signs, the locations of the points are related by reflections across one or both axes.
- c. Find and position integers and other rational numbers on a horizontal or vertical number line diagram; find and position pairs of integers and other rational numbers on a coordinate plane.

6.NS.7 - Understand ordering and absolute value of rational numbers.

- a. Interpret statements of inequality as statements about the relative position of two numbers on a

number line diagram. For example, interpret $-3 > -7$ as a statement that -3 is located to the right of -7 on a number line oriented from left to right.

- b. Write, interpret, and explain statements of order for rational numbers in real-world contexts. For example, write $-3\text{ }^{\circ}\text{C} > -7\text{ }^{\circ}\text{C}$ to express the fact that $-3\text{ }^{\circ}\text{C}$ is warmer than $-7\text{ }^{\circ}\text{C}$.
- 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.

6.NS.8 - Solve real-world and mathematical problems by graphing points in all four quadrants of the coordinate plane. Include use of coordinates and absolute value to find distances between points with the same first coordinate or the same second coordinate.

Unit 6 - Statistical Measures and Displays

4 weeks

In this unit, students will:

- develop an understanding of statistical distributions and how to apply them in everyday life.
- think and reason statistically, first by recognizing a statistical question as one that can be answered by collecting data.
- learn that the data collected to answer a statistical question has a distribution that is often summarized in terms of center, variability, and shape
- see and represent data distributions using dot plots and histograms

Standards for: Statistics and Probability

The students will:

Develop understanding of statistical variability.

6.SP.1 - Recognize a statistical question as one that anticipates variability in the data related to the question and accounts for it in the answers. For example, "How old am I?" is not a statistical question, but "How old are the students in my school?" is a statistical question because one anticipates variability in students' ages.

6.SP.2 - Understand that a set of data collected to answer a statistical question has a distribution which can be described by its center, spread, and overall shape.

6.SP.3 - Recognize that a measure of center for a numerical data set summarizes all of its values with a single number, while a measure of variation describes how its values vary with a single number.

Summarize and describe distributions.

6.SP.4 - Display numerical data in plots on a number line, including dot plots, histograms, and box plots.

6.SP.5 - Summarize numerical data sets in relation to their context, such as by:

- a. Reporting the number of observations.
- b. Describing the nature of the attribute under investigation, including how it was measured and its units of measurement.

- c. Giving quantitative measures of center (median and/or mean) and variability (interquartile range and/or mean absolute deviation), as well as describing any overall pattern and any striking deviations from the overall pattern with reference to the context in which the data were gathered.
- d. Relating the choice of measures of center and variability to the shape of the data distribution and the context in which the data were gathered.

Unit 7 - Area

4 weeks

In this unit, students will:

- use composition and decomposition to determine the area of triangles, quadrilaterals, and other polygons
- use coordinates and absolute value to find distances between points on a coordinate plane, students determine distance, perimeter, and area on the coordinate plane in real-world contexts

Standards for: Geometry

The students will:

Solve real-world and mathematical problems involving area, surface area, and volume.

6.G.1 - Find the area of right triangles, other triangles, special quadrilaterals, and polygons by composing into rectangles or decomposing into triangles and other shapes; apply these techniques in the context of solving real-world and mathematical problems.

6.G.3 - Draw polygons in the coordinate plane given coordinates for the vertices; use coordinates to find the length of a side joining points with the same first coordinate or the same second coordinate. Apply these techniques in the context of solving real-world and mathematical problems.

Unit 8 - Volume and Surface Area

4 weeks

In this unit, students will:

- learn to apply and solve real-world and mathematical problems involving surface area and volume of rectangular and triangular prisms and pyramids.
- apply volume formulas and use their previous experience with solving equations to find missing volumes and missing dimensions.
- apply the surface area formula to real-life contexts and distinguish between the need to find surface area or volume within contextual situations.

Standards for: Geometry

The students will:

Solve real-world and mathematical problems involving area, surface area, and volume.

6.G.2 - Find the volume of a right rectangular prism with fractional edge lengths by packing it with unit cubes of

the appropriate unit fraction edge lengths, and show that the volume is the same as would be found by multiplying the edge lengths of the prism. Apply the formulas $V = l w h$ and $V = b h$ to find volumes of right rectangular prisms with fractional edge lengths in the context of solving real-world and mathematical problems.

6.G.4 - Represent three-dimensional figures using nets made up of rectangles and triangles, and use the nets to find the surface area of these figures. Apply these techniques in the context of solving real-world and mathematical problems.

Unit 9 - Expressions

4 weeks

In this unit, students will:

- apply and understand arithmetic to algebraic expressions by using Algebra properties.
- extend their arithmetic work to include using letters to represent numbers in order to understand that letters are simply "stand-ins" for numbers and that arithmetic is carried out exactly as it is with numbers
- explore operations in terms of verbal expressions and determine that arithmetic properties hold true with expressions because nothing has changed—they are still doing arithmetic with numbers
- understand the relationships of operations and use them to generate equivalent expressions, ultimately extending arithmetic properties from manipulating numbers to manipulating expressions
- read, write and evaluate expressions in order to develop and evaluate formulas

Standards for: Expressions and Equations

The students will:

Apply and extend previous understandings of arithmetic to algebraic expressions.

6.EE.1 - Write and evaluate numerical expressions involving whole-number exponents.

6.EE.2 - Write, read, and evaluate expressions in which letters stand for numbers.

- Write expressions that record operations with numbers and with letters standing for numbers. For example, express the calculation "Subtract y from 5" as $5 - y$.
- 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.
- Evaluate expressions at specific values of their variables. Include expressions that arise from formulas used in real-world problems. Perform arithmetic operations, including those involving whole number exponents, in the conventional order when there are no parentheses to specify a particular order (Order of Operations). For example, use the formulas $V = s^3$ and $A = 6s^2$ to find the volume and surface area of a cube with sides of length $s = \frac{1}{2}$.

6.EE.3 - Apply the properties of operations to generate equivalent expressions. For example, apply the distributive property to the expression $3(2 + x)$ to produce the equivalent expression $6 + 3x$; apply the distributive property to the expression $24x + 18y$ to produce the equivalent expression $6(4x + 3y)$; apply properties of operations to $y + y + y$ to produce the equivalent expression $3y$.

6.EE.4 - Identify when two expressions are equivalent (i.e., when the two expressions name the same number regardless of which value is substituted into them). For example, the expressions $y + y + y$ and $3y$ are equivalent because they name the same number regardless of which number y stands for.

*Reason about and solve one-variable equations and inequalities.

6.EE.6 - Use variables to represent numbers and write expressions when solving a real-world or mathematical problem; understand that a variable can represent an unknown number, or, depending on the purpose at hand, any number in a specified set.

6.NS.4 - Find the greatest common factor of two whole numbers less than or equal to 100 and the least common multiple of two whole numbers less than or equal to 12. Use the distributive property to express a sum of two whole numbers 1–100 with a common factor as a multiple of a sum of two whole numbers with no common factor. For example, express $36 + 8$ as $4(9 + 2)$.

Unit 10 - Equations

4 weeks

In this unit, students will:

- learn to reason and solve, one-variable equations and inequalities.
- determine that letters are used to represent specific but unknown numbers and are used to make statements or identities that are true for all numbers or a range of numbers.
- study true and false number sentences, and conclude that solving an equation is the process of determining the number(s) that, when substituted for the variable, results in a true sentence
- use arithmetic properties, identities, bar models, and finally algebra to solve one-step, two-step, and multi-step equations.

Standards for: Expressions and Equations

The students will:

Reason about and solve one-variable equations and inequalities.

6.EE.5 - Understand solving an equation or inequality as a process of answering a question: which values from a specified set, if any, make the equation or inequality true? Use substitution to determine whether a given number in a specified set makes an equation or inequality true.

6.EE.7 - Solve real-world and mathematical problems by writing and solving equations of the form $x + p = q$ and $px = q$ for cases in which p , q and x are all nonnegative rational numbers.

Unit 11 - Functions & Inequalities

3 weeks

In this unit, students will:

- write and solve functions and inequalities to solve real world problems.

Standards for: Expressions and Equations

The students will:

Reason about and solve one-variable equations and inequalities.

6.EE.8 - Write an inequality of the form $x > c$ or $x < c$ to represent a constraint or condition in a real-world or mathematical problem. Recognize that inequalities of the form $x > c$ or $x < c$ have infinitely many solutions; represent solutions of such inequalities on number line diagrams.

Represent and analyze quantitative relationships between dependent and independent variables.

6.EE.9 - Use variables to represent two quantities in a real-world problem that change in relationship to one another; write an equation to express one quantity, thought of as the dependent variable, in terms of the other quantity, thought of as the independent variable. Analyze the relationship between the dependent and independent variables using graphs and tables, and relate these to the equation. For example, in a problem involving motion at constant speed, list and graph ordered pairs of distances and times, and write the equation.