Grade 6 - Unit 1
Expressions and Equations: Area, Algebraic Expressions, and Exponents

Skills and Standards

- **NY-6.G.1** Find area of triangles, trapezoids, and other polygons by composing into rectangles or decomposing into triangles and quadrilaterals. Apply these techniques in the context of solving real-world and mathematical problems. Note: The inclusive definition of a trapezoid will be utilized, which defines a trapezoid as "A quadrilateral with at least one pair of parallel sides." (This definition includes parallelograms.)
- **NY-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. Note: Three-dimensional figures include only right rectangular prisms, right rectangular pyramids, and right triangular prisms. When finding surface areas, all necessary measurements will be given
- **NY-6.EE.2c** Evaluate expressions given specific values for their variables. Include expressions that arise from formulas in real-world problems. Perform arithmetic operations, including those involving whole-number exponents, in the conventional order (Order of Operations). Note: Expressions may or may not include parentheses. Nested grouping symbols are not included.
- **NY-6.EE.2** Write, read, and evaluate expressions in which letters stand for numbers.
- **NY-6.EE.2a** Write expressions that record operations with numbers and with letters standing for numbers. e.g., Express the calculation "Subtract y from 5" as 5 – y
- **NY-6.EE.2b** Identify parts of an expression using mathematical terms (term, coefficient, sum, difference, product, factor, and quotient); view one or more parts of an expression as a single entity. e.g., 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.
- **NY-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.
- **NY-6.G.5** Use area and volume models to explain perfect squares and perfect cubes.
- **NY-6.EE.1** Write and evaluate numerical expressions involving whole-number exponents.
- **NY-6.NS.4** Find the greatest common factor of two whole numbers less than or equal to 100. 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 other than 1. Find the least common multiple of two whole numbers less than or equal to 12.

Pacing Notes

Included:

- 23 days for Lessons
- 2 days i-Ready Inform (required)
- 5 days for Lesson 0 **(required)**
- Unit Test (required)

Strategies and Models

Resources to Review prior to instruction:
Found through Teacher Toolbox – Beginning of Unit

- Unit Flow and Progression
- Math Background Unit 1

NYS Released Questions

- NYS Released Questions

Assessments

- I-Ready Inform (2 days) (required)
- Lesson Quizzes / Digital Comprehension Check
- Math in Action
- Unit Test: **Think Tech (required)**

Educator Notes

Consider modifying the unit materials to include the following content provided in the **Enhancement Activities:**

- Removing nested grouping symbols
- Using the term *perfect square* and *perfect cube* when working with area and volume models

Grade 6 - Unit 2
Decimals and Fractions: Base-Ten Operations, Division with Fractions, and Volume

Skills and Standards

- **NY-6.NS.3** Fluently add, subtract, multiply, and divide multi-digit decimals using a standard algorithm for each operation
- **NY-6.NS.2** Fluently divide multi-digit numbers using a standard algorithm.
- **NY-6.NS.1** Interpret and compute quotients of fractions, and solve word problems involving division of fractions by fractions.

e.g., Create a story context for $(\frac{2}{3}) \div (\frac{3}{4})$ and use a visual fraction model to show the quotient; use the relationship between multiplication and division to explain that $(\frac{2}{3}) \div (\frac{3}{4}) = \frac{8}{9}$ because $\frac{3}{4}$ of $\frac{8}{9}$ is $\frac{2}{3}$.
In general, $(\frac{a}{b}) \div (\frac{c}{d}) = \frac{ad}{bc}$.

e.g.,
- How much chocolate will each person get if 3 people share $\frac{1}{2}$ lb of chocolate equally?
- How many $\frac{3}{4}$ cup servings are in $\frac{2}{3}$ of a cup of yogurt?
- How wide is a rectangular strip of land with length $\frac{3}{4}$ mi and area $\frac{1}{2}$ square mi?

- **NY-6.G.2** Find volumes of right rectangular prisms with fractional edge lengths in the context of solving real-world and mathematical problems. **e.g.,** Use the formulas **$V = s^3$** and **$SA = 6s^2$** to find the volume and surface area of a cube with sides of length **$s = ½$.**

Pacing Notes	Strategies and Models
Included: • 20 days for Lessons • Unit Test (required)	Resources to Review prior to instruction: Found through Teacher Toolbox – Beginning of Unit • Unit Flow and Progression • Math Background Unit 2
NYS Released Questions	**Assessments**
• NYS Released Questions	• Lesson Quizzes / Digital Comprehension Check • Math in Action • Unit Test: **Think Tech** (required) •

Educator Notes

* Suggested – Tools for Instruction- *Understand Positive and Negative Numbers* (from unit 6) in beginning of unit as a prerequisite.

Grade 6 - Unit 3
Ratio Reasoning: Ratio Concepts and Equivalent Ratios

Skills and Standards

- **NY-6.RP.1** Understand the concept of a ratio and use ratio language to describe a ratio relationship between two quantities. e.g., "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 three votes."
- **NY-6.RP.3** Use ratio and rate reasoning to solve real-world and mathematical problems. Note: Strategies may include but are not limited to the following: tables of equivalent ratios, tape diagrams, double number lines, and equations.
- **NY-6.RP.3a** 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.

Pacing Notes

Included:

- 12 days for Lessons
- Unit Test (required)
- i-Ready Inform (required)

Strategies and Models

Resources to Review prior to instruction:
Found through Teacher Toolbox – Beginning of Unit

- Unit Flow and Progression
- Math Background Unit 3

NYS Released Questions

- NYS Released Questions

Assessments

- Lesson Quizzes / Digital Comprehension Checks
- Math in Action
- Unit Test: **Think Tech** (required)
- i-Ready Inform (2 days) (required)

Educator Notes

Grade 6 - Unit 4
Ratio Reasoning: Unit Rates and Percent

Skills and Standards

- **NY-6.RP.2** Understand the concept of a unit rate a/b associated with a ratio a:b with b ≠ 0 (b not equal to zero), and use rate language in the context of a ratio relationship. e.g., “This recipe has a ratio of 3 cups of flour to 4 cups of sugar, so there are ¾ cup of flour for each cup of sugar.” "We paid $75 for 15 hamburgers, which is a rate of $5 per hamburger." Note: Expectations for unit rates in this grade are limited to non-complex fractions.
- **NY-6.RP.3** Use ratio and rate reasoning to solve real-world and mathematical problems. Note: Strategies may include but are not limited to the following: tables of equivalent ratios, tape diagrams, double number lines, and equations.
- **NY-6.RP.3b** Solve unit rate problems. e.g., 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? What is the unit rate? Note: Problems may include unit pricing and constant speed.
- **NY-6.RP.3d** Use ratio reasoning to convert measurement units; manipulate and transform units appropriately when multiplying or dividing quantities. Note: Conversion of units occur within a given measurement system, not across different measurement systems.
- **NY-6.RP.3c** Find a percent of a quantity as a rate per 100. Solve problems that involve finding the whole given a part and the percent, and finding a part of a whole given the percent. e.g., 30% of a quantity means 30 100 times the quantity.

Pacing Notes

Included:

- 15 days for Lessons
- Unit Test (required)

Strategies and Models

Resources to Review prior to instruction:
Found through Teacher Toolbox – Beginning of Unit

- Unit Flow and Progression
- Math Background Unit 4

NYS Released Questions

- NYS Released Questions

Assessments

- Lesson Quizzes / Digital Comprehension Checks
- Math in Action
- Unit Test: **Think Tech** (required)

Educator Notes

Grade 6 - Unit 5
Algebraic Thinking: Equivalent Expressions and Equations with Variables

Skills and Standards

- **NY-6.NS.4** Find the greatest common factor of two whole numbers less than or equal to 100. 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 other than 1. Find the least common multiple of two whole numbers less than or equal to 12. e.g., Express 36 + 8 as 4 (9 + 2).
- **NY-6.EE.3** Apply the properties of operations to generate equivalent expressions. e.g., 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
- **NY-6.EE.4** Identify when two expressions are equivalent. e.g., The expressions y + y + y and 3y are equivalent because they name the same number regardless of which number y represents.
- **NY-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.
- **NY-6.EE.7** Solve real-world and mathematical problems by writing and solving equations of the form x + p = q; x – p = q; px = q; and $\boldsymbol{x/p}$ = q for cases in which p, q and x are all nonnegative rational. Note: For the $\boldsymbol{x/p}$ = q case, p ≠ 0
- **NY-6.EE.9** Use variables to represent two quantities in a real-world problem that change in relationship to one another. Given a verbal context and an equation, identify 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. e.g., In a problem involving motion at constant speed, list and graph ordered pairs of distances and times. e.g., Given the equation d = 65t to represent the relationship between distance and time, identify t as the independent variable and d as the dependent variable.

Pacing Notes

Included:

- 17 days for Lessons
- Unit Test (required)

Strategies and Models

Resources to Review prior to instruction:
Found through Teacher Toolbox – Beginning of Unit

- Unit Flow and Progression
- Math Background Unit 5

NYS Released Questions

- NYS Released Questions

Assessments

- Lesson Quizzes / Digital Comprehension Checks
- Math in Action
- Unit Test: **Think Tech** (required)

Educator Notes

Grade 6 - Unit 6 – Part 1
Positive and Negative Numbers: Absolute Value, Inequalities, and the Coordinate Plane

Skills and Standards

- **NY-6.NS.5** Understand that positive and negative numbers are used together to describe quantities having opposite directions or values. Use positive and negative numbers to represent quantities in real-world contexts, explaining the meaning of 0 in each situation. e.g., temperature above/below zero, elevation above/below sea level, debits/credits, positive/negative electric charge.
- **NY-6.NS.6** Understand a rational number as a point on the number line. Use number lines and coordinate axes to represent points on a number line and in the coordinate plane with negative number coordinates.
- **NY-6.NS.6a** 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, and that 0 is its own opposite. e.g., With the number 3, – (–3) = 3
- **NY-6.NS.6c** Find and position integers and other rational numbers on a horizontal or vertical number line. Find and position pairs of integers and other rational numbers on a coordinate plane.
- **NY-6.NS.7** Understand ordering and absolute value of rational numbers.
- **NY-6.NS.7a** Interpret statements of inequality as statements about the relative position of two numbers on a number line. e.g., Interpret –3 > –7 as a statement that –3 is located to the right of –7 on a number line oriented from left to right.
- **NY-6.NS.7b** Write, interpret, and explain statements of order for rational numbers in real-world contexts. e.g., Write –3°C > –7°C to express the fact that –3°C is warmer than – 7°C.
- **NY-6.NS.7c** 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. e.g., For an account balance of –30 dollars, write |–30| = 30 to describe the size of the debt in dollars.
- **NY-6.NS.7d** Distinguish comparisons of absolute value from statements about order. e.g., Someone with a balance of $100 in their bank account has more money than someone with a balance of –$1000, because 100 > –1000. But, the second person's debt balance is much greater than the first person's credit balance because |–1000| > |100|.

Pacing Notes

Included:

- 21 days for Lessons
- Unit Test (required

Strategies and Models

Resources to Review prior to instruction:
Found through Teacher Toolbox – Beginning of Unit

- Unit Flow and Progression
- Math Background Unit 6

NYS Released Questions

- NYS Released Questions

Assessments

- Lesson Quizzes / Digital Comprehension Checks
- Math in Action
- Unit Test: **Think Tech** (required)

Educator Notes

Grade 6 - Unit 6 – Part 2
Positive and Negative Numbers: Absolute Value, Inequalities, and the Coordinate Plane

Skills and Standards

- **NY-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.
- **NY-6.EE.8** Write an inequality of the form $x > c$, $x \geq c$, $x \leq c$ or $x < c$ to represent a constraint or condition in a real-world or mathematical problem. Recognize that inequalities of these forms have infinitely many solutions; represent solutions of such inequalities on a number line.
- **NY-6.NS.6b** 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.
- **NY-6.NS.8** Solve real-world and mathematical problems by graphing points on a coordinate plane. Include use of coordinates and absolute value to find distances between points with the same first coordinate or the same second coordinate.
- **NY-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.

Pacing Notes

Included:

- 21 days for Lessons
- Unit Test (required)

Strategies and Models

Resources to Review prior to instruction:
Found through Teacher Toolbox – Beginning of Unit

- Unit Flow and Progression
- Math Background Unit 6

NYS Released Questions

- NYS Released Questions

Assessments

- Lesson Quizzes / Digital Comprehension Checks
- Math in Action
- Unit Test: **Think Tech** (required)

Educator Notes

Grade 6 - Unit 7 – Part 1
Statistical Thinking: Data Distributions and Measures of Center and Variability

Skills and Standards

- **NY-6.SP.3** Recognize that a measure of center for a quantitative 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. Note: Measures of center are mean, median, and mode. The measure of variation is the range.
- **NY-6. SP.1a** Recognize that a statistical question is one that anticipates variability in the data related to the question and accounts for it in the answers. e.g., "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.
- **NY-6. SP.2** Understand that a set of quantitative data collected to answer a statistical question has a distribution which can be described by its center, spread, and overall shape. Notes: • Students need to determine and justify the most appropriate graph to display a given set of data (histogram, dot plot). • Students extend their knowledge of symmetric shapes, to describe data displayed in dot plots and histograms in terms of symmetry. They identify clusters, peaks and gaps, recognizing common shapes and patterns in these displays of data distributions, and ask why a distribution takes on a particular shape for the context of the variable being considered.
- **NY-6. SP.5** Summarize quantitative data sets in relation to their context.
- **NY-6. SP.5a** Report the number of observations.
- **NY-6. SP.1b** Understand that statistics can be used to gain information about a population by examining a sample of the population; generalizations about a population from a sample are valid only if the sample is representative of that population. Note: Students need to understand that data are generated with respect to particular contexts or situations and can be used to answer questions about those contexts or situations.
- **NY-6. SP.1c** Understand that the method and sample size used to collect data for a particular question is intended to reduce the difference between a population and a sample taken from the population so valid inferences can be drawn about the population. Generate multiple samples (or simulated samples) of the same size to recognize the variation in estimates or predictions. Note: Examples of acceptable methods to obtain a representative sample from a population include, but are not limited to, a simple random sample for a given population or a systematic random sample for an unknown population. Examples of unacceptable methods of sampling include, but are not limited to, online polls and convenience sampling because they introduce bias and are not representative of the population.
- **NY-6. SP.4** Display quantitative data in plots on a number line, including dot plots and histograms.
- **NY-6. SP.5b** Describe the nature of the attribute under investigation, including how it was measured and its units of measurement.
- **NY-6. SP.5c** Calculate range and measures of center, as well as describe any overall pattern and any striking deviations from the overall pattern with reference to the context in which the data were gathered. Note: Measures of center are mean, median, and mode. The measure of variation is the range. Role of outliers should be discussed, but no formula required.
- **NY-6. SP.5d** Relate the range and the choice of measures of center to the shape of the data distribution and the context in which the data were gathered. Note: Measures of center are mean, median, and mode. The measure of variation is the range.

Dates/Number of Days/ Pacing Notes	Strategies and Models	Assessments
Included: • 14 days for Educator Notes Lessons • 18 days for Lessons • i-Ready Inform (required) • Unit Test (required)	Resources to Review prior to instruction: Found through Teacher Toolbox – Beginning of Unit • Unit Flow and Progression • Math Background Unit 7	• Lesson Quizzes / Digital Comprehension Checks • Math in Action • Unit Test **Think Tech** (required) • i-Ready Inform (2 days) (required)

Educator Notes

Consider modifying the unit materials to include the following content provided in the **Enhancement Activities**:

- Defining *range* as a measure of variability
- Analyzing whether a sample is random and whether it is likely to be representative of a population
- Determining whether a sample can be used to make a valid inference about a population
- Replacing references to box plots with references to measures of center and variability
- Removing references to interquartile range (IQR) and mean absolute deviation (MAD)

Grade 6 - Unit 7 – Part 2
Statistical Thinking: Data Distributions and Measures of Center and Variability

Skills and Standards

- **NY-6.SP.6** Understand that the probability of a chance event is a number between 0 and 1 inclusive, that expresses the likelihood of the event occurring. Larger numbers indicate greater likelihood. A probability near 0 indicates an unlikely event, a probability around 1/2 indicates an event that is neither unlikely nor likely, and a probability near 1 indicates a likely event.
- **NY-6. SP.7** Approximate the probability of a simple event by collecting data on the chance process that produces it and observing its long-run relative frequency, and predict the approximate relative frequency given the probability. e.g., When rolling a number cube 600 times, predict that a 3 or 6 would be rolled roughly 200 times, but probably not exactly 200 times. Note: Compound events are introduced in grade 7.
- **NY-6. SP.8b** Develop a probability model (which may not be uniform) by observing frequencies in data generated from a chance process. e.g., Find the approximate probability that a spinning penny will land heads up or that a tossed paper cup will land open-end down. Do the outcomes for the spinning penny appear to be equally likely based on the observed frequencies?
- **NY-6. SP.8** Develop a probability model and use it to find probabilities of simple events. Compare probabilities from a model to observed frequencies; if the agreement is not good, explain possible sources of the discrepancy.
- **NY-6. SP.8a** Develop a uniform probability model by assigning equal probability to all outcomes, and use the model to determine probabilities of simple events. e.g., The probability of rolling a six-sided fair number cube and landing on a 2 is $\mathbf{1/6}$. The probability of landing on an even number is $\mathbf{3/6}$.

Pacing Notes	Strategies and Models	Assessments
Included: • 14 days for Educator Notes Lessons • 18 days for Lessons • Unit Test (required) • i-Ready Inform (required)	Resources to Review prior to instruction: Found through Teacher Toolbox – Beginning of Unit • Unit Flow and Progression • Math Background Unit 7	• Lesson Quizzes / Digital Comprehension Checks • Math in Action • Unit Test Think Tech (required) • i-Ready Inform (2 days) (required)

Educator Notes

Consider modifying the unit materials to include the following content provided in the **Enhancement Activities**:

- Expressing the probability of a chance event as a number from 0 to 1 inclusive
- Finding the experimental probability and approximate relative frequency of an event
- Finding the theoretical probability of an event
- Comparing the experimental and theoretical probability of an event and accounting for any discrepancy