G-E-T High School Curriculum
Align, Explore, Empower
Scope and Sequence
Algebra

Unit 0 - Algebraic Expressions	~2 weeks

In this unit, students will …
apply order of operations, evaluate and write an algebraic expression, identify properties, types of numbers, and simplify algebraic expressions.

Standards for Algebra

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.

7.NS.2 Apply and extend previous understandings of multiplication and division and of fractions to multiply and divide rational numbers.

7.EE.1 Apply   properties of   operations as strategies to add, subtract, factor, and expand linear expressions with rational coefficients.

Unit 1 - Solving Linear Equations	~ 4 weeks

In this unit, students will …
Solve and write linear one variable equations. Students will also solve and write proportions. Students will also work with percents.

Standards for Algebra

A-REI.1 Explain each step in solving a simple equation as following from the equality of numbers asserted at the previous step, starting from the assumption that the original equation has a solution. Construct a viable argument to justify a solution method.
A-REI.3 Solve linear equations and inequalities in one variable, including equations with coefficients represented by letters.
A-CED.4 Rearrange formulas to highlight a quantity of interest, using the same reasoning as in solving equations. For example, rearrange Ohm's law $V = IR$ to highlight resistance R.

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.
- 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 2- Functions & Sequences   ~ 2 weeks

In this unit, students will …
-Identify functions in various formats, they will also be able to identify the domain and range of those functions.
-Evaluate functions using function notation
-Graph linear functions using tables, and x & y intercepts.
-Write recursive and explicit formulas for sequences.

Mastery Standards for Algebra

F-IF.1 Understand that a function from one set (called the domain)to another set (called the range) assigns to each Element of the domain exactly one element of the range. If f is a function and x is an element of its domain, then $f(x)$ denotes the output of f corresponding to the input x. The graph of f is the graph of the equation $y = f(x)$.

F-IF.2 Use function notation, evaluate functions for inputs in their domains, and interpret statements that use function Notation in terms of a context.

F-IF.3 Recognize that sequences are functions, sometimes defined recursively, whose domain is a subset of the Integers. For example, the Fibonacci sequence is defined recursively by $f(0) = f(1) = 1$, $f(n+1) = f(n) + f(n-1)$ for $n \geq 1$.

F-BF.2 Write arithmetic and geometric sequences both recursively and with an explicit formula, use them to model Situations, and translate between the two forms.★

Unit 3- Rates and Linear Equations   ~4 weeks

In this unit, students will …
-find slope, rate of change and apply rate of change
- graph and write linear equations
-write linear equations for parallel and perpendicular lines
-discuss positive and negative correlation

Standards for Algebra

F-IF.6 Calculate and interpret the average rate of change of a function (presented symbolically or as a table) over a
Specified interval. Estimate the rate of change from a graph.★

F-LE.1B Distinguish between situations that can be modeled with linear functions and with exponential functions.
B. Recognize situations in which one quantity changes at a constant rate per unit interval relative to another.

A-REI.10 Understand that the graph of an equation in two variables is the set of all its solutions plotted in the
Coordinate plane, often forming a curve (which could be a line).

F-LE.2 Construct linear and exponential functions, including arithmetic and geometric sequences, given   a graph, a
Description of a relationship, or two input-output pairs (include reading these from a table).

S-ID.6a-c   Represent data on two quantitative variables on a scatter plot, and describe how the variables are related.
a. Fit a function to the data; use functions fitted to data to solve problems in the context of the data. Use given
functions or choose a function suggested by the context. Emphasize linear, quadratic, and exponential models.
b. Informally assess the fit of a function by plotting and analyzing residuals.
c. Fit a linear function for a scatter plot that suggests a linear association.

S-ID.7 Interpret the slope (rate of change) and the intercept (constant term) of a linear model in the context of the data.

S-ID.9 Distinguish between correlation and causation.

Unit 4 Linear Systems	~3 weeks

In this unit, students will …
-solve systems of linear equations by graphing, substitution, and elimination
-Applying systems of equations to real life applications

Standards for Algebra

A-CED.1 Create equations and inequalities in one variable and use them to solve problems. Include equations arising
from linear and quadratic functions, and simple rational and exponential functions.

A-CED.2 Create equations in two or more variables to represent relationships between quantities; graph equations
on coordinate axes with labels and scales.

A-CED.3 Represent constraints by equations or inequalities, and by systems of equations and/or inequalities, and
interpret solutions as viable or nonviable options in a modeling context. For example, represent inequalities describing
nutritional and cost constraints on combinations of different foods.

A-REI.5 Prove that, given a system of two equations in two variables, replacing one equation by the sum of that
equation and a multiple of the other produces a system with the same solutions.

A-REI.6 Solve systems of linear equations exactly and approximately (e.g., with graphs), focusing on pairs of linear
equations in two variables.

A-REI.11 Explain why the x-coordinates of the points where the graphs of the equations y=f(x)   and y = g(x)
intersect are the solutions of the equation f(x)=g(x); find the solutions approximately, e.g., using technology   to

graph the functions, make tables of values, or find successive approximations. Include cases where f(x)   and/or g(x) are linear, polynomial, rational, absolute value, exponential, and logarithmic functions.★

F-BF.1a Write a function that describes a relationship between two quantities.★
        a. Determine an explicit expression, a recursive process, or steps for calculation from a context.

Unit 5-Linear Inequalities	~ 3 weeks

In this unit, students will …
- Solve singular and compound inequalities.
- Graph linear inequalities and systems of inequalities

Standards for Algebra

A-REI.10   Understand that the graph of an equation in two variables is the set of all its solutions plotted in the coordinate plane, often forming a curve (which could be a line).

A-REI.12 Graph the solutions to a linear inequality in two variables as a halfplan (excluding the   boundary in the case of a strict inequality), and graph the solution set to a system of linear inequalities in two variables as the   intersection of the corresponding half-planes.

Unit 6 -Polynomials	~ 3 weeks

In this unit, students will …
- Apply exponent properties
- Add/ Subtract/ and Multiply polynomials

Standards for Algebra

A-SSE.1A Interpret expressions that represent a quantity in terms of its context.★
        A. Interpret parts of an expression, such as terms, factors, and coefficients.

A-APR.1 Understand that polynomials form a system analogous to the integers, namely, they are closed under   the operations of addition, subtraction, and multiplication; add, subtract, and multiply polynomials.

Unit 7 - Quadratics	~ 6 weeks

In this unit, students will …
-Factor Quadratic by Greatest Common Factor, Trinomials, and Grouping
-Graph Quadratic Function, identify key features like: domain, range, x-intercepts, vertex and axis of symmetry
-Solve Quadratics by Graphing, Factoring, Quadratic Formula, and Square Root property

Standards for Algebra

A-SSE.1a Interpret expressions that represent a quantity in terms of its context.★
    a. Interpret parts of an expression, such as terms, factors, and coefficients.

A-SSE.3a Choose and produce an equivalent form of an expression to reveal and explain properties of the quantity represented by the expression. Factor a quadratic expression to reveal the zeros of the function it defines

A-REI.4b Solve quadratic equations by inspection (e.g., for $x2 = 49$), taking square roots, completing the square, the quadratic formula and factoring, as appropriate to the initial form of the equation. Recognize when the quadratic formula gives complex solutions and write them as $a \pm bi$ for real numbers a and b.

Unit 8 - Exponentials	~ 1 week

In this unit, students will …
-Graph exponential growth and decay functions
- Model Exponential growth and decay functions to solve real life applications.

Standards for Algebra

F-LE.1a Prove that linear functions grow by equal differences over equal intervals, and that exponential functions grow by equal factors over equal intervals.

F-LE.1c Recognize situations in which a quantity grows or decays by a constant percent rate per unit interval relative to another.

F-LE.3 Observe using graphs and tables that a quantity increasing exponentially eventually exceeds a quantity increasing linearly, quadratically, or (more generally) as a polynomial function.

F-LE.5 Interpret the parameters in a linear or exponential function in terms of a context.

F-IF.8b Write a function defined by an expression in different but equivalent forms to reveal and explain different properties of the function.
    B. Use the properties of exponents to interpret expressions for exponential functions. For example, identify percent rate of change in functions such as $y = (1.02)t$, $y = (0.97)t$, $y = (1.01)12t$, $y = (1.2)t/10$, and classify them as representing exponential growth or decay

A-SSE.1b Interpret expressions that represent a quantity in terms of its context.★

b.Interpret complicated expressions by viewing one or more of their parts as a single entity. For example, interpret P(1+r)n as the product of P and a factor not depending on P.

Unit 9- Probability	~ 3 weeks

In this unit, students will …
-identify sample and population
-identify methods of sampling
-determine possible outcomes using Fundamental Counting, Permutations, and Combinations
-find probability of single and compound events

Standards for Algebra

S-IC.1 Understand statistics as a process for making inferences about population parameters based on a random sample from that population.

S-IC.2 Decide if a specified model is consistent with results from a given data-generating process, e.g., using simulation. *For example, a model says a spinning coin falls heads up with probability 0.5. Would a result of 5 tails in a row cause you to question the model?*

S-IC.3 Recognize the purposes of and differences among sample surveys, experiments, and observational studies; explain how randomization relates to each.

S-IC.4 Use data from a sample survey to estimate a population mean or proportion; develop a margin of error through the use of simulation models for random sampling.

S-IC.5 Use data from a randomized experiment to compare two treatments; use simulations to decide if differences between parameters are significant.

S-IC.6 Evaluate reports based on data.

S-CP.1 Describe events as subsets of a sample space (the set of outcomes) using characteristics (or categories) of the outcomes, or as unions, intersections, or complements of other events ("or," "and," "not").

S-CP.2 Understand that two events A and B are independent if the probability of A and B occurring together is the product of their probabilities, and use this characterization to determine if they are independent.

S-CP.3 Understand the conditional probability of A given B as $P(A$ and $B)/P(B)$, and interpret independence of A and B as saying that the conditional probability of A given B is the same as the probability of A, and the conditional probability of B given A is the same as the probability of B.

S-CP.4 Construct and interpret two-way frequency tables of data when two categories are associated   with each object being classified. Use the two-way table as a sample space to decide if events are independent   and to approximate conditional probabilities. For example, collect data from a random sample of students in your school on their favorite subject among math, science, and English. Estimate the probability that a randomly selected student from your school will favor science given that the student is in tenth grade. Do the same for other subjects and compare the results.

S-CP.5 Recognize and explain the concepts of conditional probability and independence in everyday language and everyday situations. For example, compare the chance of having lung cancer if you are a smoker with the chance of

being a smoker if you have lung cancer

S-CP.6 Find the conditional probability of A given B as the fraction of B's outcomes that also belong to A, and interpret the answer in terms of the model.

S-CP.7 Apply the Addition Rule, P(A or B) = P(A) +P(B) – P(A and B), and interpret the answer in terms of the model.

Unit 10 - Pythagorean Theorem	~ 1 week

In this unit, students will …
-apply the Pythagorean theorem to find the missing sides of triangles
-determine if triangles are right triangles using the Pythagorean theorem
-apply the Pythagorean theorem to real life applications

Mastery Standards for Algebra

G.SRT.4 Prove theorems about triangles. Theorems include: a line parallel to one side of a triangle divides the other two proportionally, and conversely; the Pythagorean Theorem proved using triangle similarity

G.SRT.8 Use trigonometric ratios and the Pythagorean Theorem to solve right triangles in applied problems.★