	Items that are highlighted in blue are not covered in the Algebra 1 standards but are covered either before or after Algebra 1

Chapter 1 Functions 38-42% 9-10 Days plus optional time for Chapter Closure				
Lesson Title	**Instructional Focus**	**TN Standard**	**Learning Outcome**	**Additional Resources**
1.1.1 How can I work with my team to figure it out?	Solving Puzzles in Teams	**A1.F.IF.A.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) **A1.F.IF.A.2**— Use function notation, evaluate functions for inputs in their domains, and interpret statements that use function notation in terms of a context.	Students will be reminded of the multiple representations of a linear function as they form study teams for the chapter. Students will be challenged to work together as a team as they consider the output of various composite relations.	
1.1.2 How does it grow?	Investigating the Growth of Patterns	**A1.F.IF.C.6a**—Graph linear and quadratic functions and show intercepts, maxima, and minima. **A2.F.IF.B.3c**—Graph exponential and logarithmic functions, showing intercepts and end behavior.	Students will collect and analyze data with tables and graphs. Students will be introduced to contexts that result in proportional, inversely proportional, and exponential data.	
1.1.3 What do I know about a parabola?	Investigating the Graphs of Quadratic Functions	**A1.AREI.D.5**—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). **A1.F.IF.B.3**—For a function that models a relationship between two quantities, interpret key features of graphs and tables in terms of the quantities, and sketch graphs showing key features given a verbal description of the relationship. **A1.F.IF.C.6a**—Graph linear and quadratic functions and show intercepts, maxima, and minima.	Students will describe a parabola, using its intercepts, minima, maxima, vertex, symmetry, and whether it is positively or negatively oriented.	Parent Guide 1.1.3 to 1.2.2

1.2.1 How can I describe a graph?	Describing a Graph	**A1.AREI.D.5**—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). **A1.F.IF.B.3**—For a function that models a relationship between two quantities, interpret key features of graphs and tables in terms of the quantities, and sketch graphs showing key features given a verbal description of the relationship. **A1.F.IF.C.6b**—Graph square root, cube root, and piecewise-defined functions, including step functions and absolute value functions.	Students will write summary statements describing the graph of $y=\sqrt{x}$. They will generate a list of questions that will facilitate future relation investigations.	
1.2.2 What is the difference?	Cube Root and Absolute Value Relations	**A1.AREI.D.5**—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). **A1.F.IF.C.6b**—Graph square root, cube root, and piecewise-defined functions, including step functions and absolute value functions.	Students will graph and describe cube root and absolute value functions.	
1.2.3 What is the function?	Relation Machines	**A1.F.IF.A.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) **A1.F.IF.A.2**— Use function notation, evaluate functions for inputs in their domains, and interpret statements that use function notation in terms of a context.	Students will understand the input/output nature of relations and will begin to understand the possible limitations for the domain and range (although students are not introduced to this vocabulary until Lesson 1.2.4).	
1.2.4 Can I predict the output?	Functions		Students will determine which relations are functions and which are not, using both graphs and tables.	

1.2.5 What can go in? What can come out?	Domain and Range	**A1.F.IF.A.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) **A1.F.IF.A.2**— Use function notation, evaluate functions for inputs in their domains, and interpret statements that use function notation in terms of a context. **A1.F.IF.B.4**—Relate the domain of a function to its graph, and where applicable, to the quantitative relationship it describes.	Students will be able to describe the domain and range of a relation by examining an equation or graph.	Parent Guide 1.2.4 to 1.2.5

Appendix **(Equations and Inequalities)** **29-33%** **9 Days plus optional time for Appendix Closure & Assessment**				
Lesson Title	**Instructional Focus**	**Mathematical Practice**	**Learning Outcome**	**Additional Resources**
A.1.1 What is a variable?	Exploring Variables and Combining Like Terms		Students will be introduced to algebra tiles, which will lay the foundation for later work with manipulating algebraic expressions and solving equations. Students will name each tile by its area and will learn how to combine like terms.	

A.1.2 What is the perimeter?	Simplifying Expressions by Combining Like Terms	Use appropriate tools strategically, look for and make use of structure.	As students find the perimeters of shapes formed with tiles, they will differentiate between the dimensions (length and width) of the tiles and the area. Students will apply their understanding of combining like terms to find the simplest expression to represent perimeter.	Parent Guide A.1.1 & A.1.2
A.1.3 What does “minus” mean?	Writing Algebraic Expressions	Make sense of problems and persevere in solving them, use appropriate tools strategically.	Students will learn about the different interpretations of “minus” and how to represent negatives with algebra tiles. Students will also construct and simplify algebraic expressions using the tiles.	Parent Guide A.1.3 to A.1.5
A.1.4 What makes zero?	Using Zero to Simplify Algebraic Expressions	Make sense of problems and persevere in solving them, use appropriate tools strategically, look for and make use of structure.	Students will deepen their understanding of the concept of zero and will learn how to represent zero in multiple ways with algebra tiles. Students will also build and simplify algebraic expressions using tiles.	
A.1.5 How can I simplify the expression?	Using Algebra Tiles to Simplify Algebraic Expressions	Reason abstractly and quantitatively, use appropriate tools strategically.	Students will practice using different interpretations of “minus” as they represent negatives with algebra tiles. Students will also build and simplify algebraic expressions using the tiles and will begin to use Expression Comparison Mats to determine whether two expressions are the same or different.	
A.1.6 Which is greater?	Using Algebra Tiles to Compare Expressions	Reason abstractly and quantitatively, construct viable arguments and critique the reasoning of others.	Students will practice simplifying algebraic expressions using algebra tiles and will use an Expression Comparison Mat to determine which of two expressions is greater.	

A.1.7 How can I write it?	Simplifying and Recording Work	Reason abstractly and quantitatively, attend to precision, look for and make use of structure.	Students will practice simplifying algebraic expressions using algebra tiles and will use an Expression Comparison Mat to determine which of two expressions is greater. Students will also learn how to record their work to show their solution steps.	Parent Guide A.1.6 & A.1.7
A.1.8 What if both sides are equal?	Using Algebra Tiles to Solve for x	Use appropriate tools strategically, attend to precision.	Students will begin solving equations for *x* and will strengthen their simplification skills.	Parent Guide A.1.8 & A.1.9
A.1.9 What is x?	More Solving Equations	Reason abstractly and quantitatively, construct viable arguments and critique the reasoning of others, look for and make use of structure.	Students will continue solving equations for *x* and will begin to consider special types of solutions such as “all numbers” and “no solution.” They will also strengthen their simplification and recording skills.	

Chapter 2 Linear Relationships 29-33% 10 Days plus optional time for Extension Activity, Chapter Closure and Assessment				
Lesson Title	**Instructional Focus**	**TN Standard**	**Learning Outcome**	**Additional Resources**

2.1.1 How does it grow?	Seeing Growth in Linear Representations	**A1.F.IF.C.6a**—Graph linear and quadratic functions and show intercepts, maxima and minima. **A1.F.LE.A.1a**— Recognize that linear functions grow by equal differences over equal intervals, and that exponential functions grow by equal factors over equal intervals. **A1.F.LE.A.2**—Construct linear and exponential functions, including arithmetic and geometric sequences, given a graph, a description of a relationship, or two input-output pairs. **A1.F.LE.B.4**—Interpret the parameters in a linear or exponential function in terms of a context.	Students will write linear algebraic equations relating the figure number of a geometric pattern and its number of tiles. They will identify connections between the growth of a pattern, its starting value, and its linear equation.	
2.1.2 How can I measure steepness?	Slope		Students will gain an abstract understanding of slope as they discover that slope is the change in y (referred to as Δy) divided by the change in x (referred to as Δx) between any two points on a line. They will continue to connect growth and starting value to multiple representations of a linear function.	
2.1.3 How steep is it?	Comparing *Δy* and *Δx*	**A1.F.IF.B.3**—For a function that models a relationship between two quantities, interpret key features of graphs and tables in terms of the quantities, and sketch graphs showing key features given a verbal description of the relationship. **A1.F.IF.C.6a**—Graph linear and quadratic functions and show intercepts, maxima and minima. **A1.F.LE.A.1a**— Recognize that linear functions grow by equal differences over equal intervals, and that exponential functions grow by equal factors over equal intervals. **A1.F.LE.B.4**—Interpret the parameters in a linear or exponential function in terms of a context.	Students will use slope triangles both to compare the relative steepness of lines and to build intuition about positive, negative, and zero slopes.	

2.1.4 What information determines a line?	*y=mx+b* and More on Slope	**A1.A.SSE.A.1a**—Interpret parts of an expression, such as terms, factors, and coefficients. **A1.A.SSE.A.1b**—Interpret complicated expressions by viewing one or more of their parts as a single entity. **A1.A.REI.D.5**—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). **A1.F.IF.B.3**—For a function that models a relationship between two quantities, interpret key features of graphs and tables in terms of the quantities, and sketch graphs showing key features given a verbal description of the relationship. **A1.F.IF.C.6a**—Graph linear and quadratic functions and show intercepts, maxima and minima. **A1.F.BF.A.1a**—Determine an explicit expression, a recursive process, or steps for calculation from a context. **A1.F.LE.A.1a**— Recognize that linear functions grow by equal differences over equal intervals, and that exponential functions grow by equal factors over equal intervals. **A1.F.LE.A.2**—Construct linear and exponential functions, including arithmetic and geometric sequences, given a graph, a table, a description of a relationship, or input-output pairs. **A1.F.LE.B.4**—Interpret the parameters in a linear or exponential function in terms of a context.	Students will formalize y=mx+b form and will explore what information is needed to determine a line. They will continue to write equations of lines given various pieces of information about the slope and y-intercept. They will develop an algorithm for finding the slope of a line through two points without graphing. Finally, students will investigate the slope of vertical lines.	Parent Guide 2.1.2 to 2.1.4

2.2.1 What is the equation of the line? (Optional)	Slope as Motion	**A1.A.CED.A.2**—Create equations in two or more variables to represent relationships between quantities; graph equations on coordinate axes with labels and scales. **A1.F.IF.B.3**—For a function that models a relationship between two quantities, interpret key features of graphs and tables in terms of the quantities, and sketch graphs showing key features given a verbal description of the relationship. **A1.F.IF.C.6a**—Graph linear and quadratic functions and show intercepts, maxima and minima. **A1.F.BF.A.1a**—Determine an explicit expression, a recursive process, or steps for calculation from a context. **A1.F.LE.A.1b**—Recognize situations in which one quantity changes at a constant rate per unit interval relative to another. **A1.F.LE.A.2**—Construct linear and exponential functions, including arithmetic and geometric sequences, given a graph, a table, a description of a relationship, or input-output pairs. **A1.F.LE.B.4**—Interpret the parameters in a linear or exponential function in terms of a context.	Students will apply their knowledge of finding the equation of the line from a graph to a motion problem by "walking the walk" of a graph with a given equation. Students will begin to connect slope with rate.	

2.2.2 What can rate of change represent?	Rate of Change	**A1.N.Q.A.1**—Use units as a way to understand problems and to guide the solution of multi-step problems; choose and interpret units consistently in formulas; choose and interpret the scale and the origin in graphs and data displays. **A1.N.Q.A.2**—Identify, interpret, and justify appropriate quantities for the purpose of descriptive modeling. **A1.A.CED.A.2**—Create equations in two or more variables to represent relationships between quantities; graph equations on coordinate axes with labels and scales. **A1.F.IF.B.3**—For a function that models a relationship between two quantities, interpret key features of graphs and tables in terms of the quantities, and sketch graphs showing key features given a verbal description of the relationship. **A1.F.IF.B.5**—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. **A1.F.IF.C.6a**—Graph linear and quadratic functions and show intercepts, maxima, and minima. **A1.F.IF.C.6b**—Graph square root, cube root, and piecewise-defined functions, including step functions and absolute value functions. **A1.F.IF.C.8**—Compare properties of two functions each represented in a different way (algebraically, graphically, numerically in tables, or by verbal descriptions). **A1.F.BF.A.1a**—Determine an explicit expression, a recursive process, or steps for calculation from a context. **A1.F.LE.A.1b**—Recognize situations in which one quantity changes at a constant rate per unit interval relative to another. **A1.F.LE.A.2**—Construct linear and exponential functions, including arithmetic and geometric sequences, given a graph, a table, a description of a relationship, or input-output pairs. **A1.F.LE.B.4**—Interpret the parameters in a linear or exponential function in terms of a context.	Students will understand speed as a rate. Students will apply contextual meaning to m and b.	
2.2.3 How can I use $y=mx+b$?	Equations of Lines in Situations	**A1.N.Q.A.2**—Identify, interpret, and justify appropriate quantities for the purpose of descriptive modeling. **A1.A.CED.A.2**—Create equations in two or more	Students will practice finding slopes and writing linear equations while solving a challenging team puzzle.	

2.3.1 How can the solutions help find an equation?	Finding an Equation Given the Slope and a Point	variables to represent relationships between quantities; graph equations on coordinate axes with labels and scales. **A1.F.IF.B.3**—For a function that models a relationship between two quantities, interpret key features of graphs and tables in terms of the quantities, and sketch graphs showing key features given a verbal description of the relationship. **A1.F.IF.C.6a**—Graph linear and quadratic functions and show intercepts, maxima, and minima. **A1.F.BF.A.1a**—Determine an explicit expression, a recursive process, or steps for calculation from a context. **A1.F.LE.A.1b**—Recognize situations in which one quantity changes at a constant rate per unit interval relative to another. **A1.F.LE.A.2**—Construct linear and exponential functions, including arithmetic and geometric sequences, given a graph, a table, a description of a relationship, or input-output pairs. **A1.F.LE.B.4**—Interpret the parameters in a linear or exponential function in terms of a context.	Students will employ multiple methods to find the *y*-intercept of a line given its slope and one point on it. They will learn how to solve for the y-intercept to find the equation of a line algebraically.	Parent Guide 2.3.1
2.3.2 What is the equation of the line?	Finding the Equation of a Line Through Two Points	**A1.AREI.D.5**—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). **A1.F.IF.C.6a**—Graph linear and quadratic functions and show intercepts, maxima, and minima. **A1.F.BF.A.1a**—Determine an explicit expression, a recursive process, or steps for calculation from a context. **A1.F.LE.A.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).	Students will use their knowledge of y=mx+b to find the equations of lines from two points on a table or graph.	Parent Guide 2.3.2

Chapter 3 Simplifying and Solving 24-28% 9-11 Days plus optional time for Chapter Closure and Assessment				
Lesson Title	**Instructional Focus**	**TN Standard**	**Learning Outcome**	**Additional Resources**

3.1.1 How can I rewrite it?	Simplifying Exponential Expressions	**A1.A.SSE.B.3c**—Use the properties of exponents to transform expressions for exponential functions.	Students will expand exponential expressions into repeated multiplication in order to simplify them. They will also discover shortcuts that will later be formalized into the laws of exponents.	Parent Guide 3.1.1 & 3.1.2
3.1.2 How can I rewrite it?	Zero and Negative Exponents		Students will formalize the laws of exponents and will use them to deduce the meaning of x^0 and x^{-1}.	
3.2.1 How can I represent an equation?	Equations ↔ Algebra Tiles	**A1.A.REI.A.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. **A1.A.REI.B.2**—Solve linear equations and inequalities in one variable, including equations with coefficients represented by letters.	Students will use algebra tiles to make another equation ↔ situation connection in the multiple representations web from Chapter 2. Algebra tiles are a way to represent an equation physically and visually. The objective of this lesson is for students to become comfortable with the physical representation of equations (that is, comfortable with algebra tiles). This will lay the foundation for work later in this chapter when students use tiles to multiply binomials, and later in this course when students use tiles to factor quadratics and complete the square. It is not an objective of this lesson to teach equation solving. See the Suggested Lesson Activity for pathways through this optional lesson.	Parent Guide 3.2.1

3.2.2 What can I do with rectangles?	Exploring an Area Model	**A1.A.SSE.B.3a**—Factor a quadratic expression to reveal the zeros of the function it defines.	Students will identify dimensions of rectangles formed with algebra tiles (identify factors of quadratics). They will write the area of composite rectangles as a sum and as a product. (Note: Formal factoring vocabulary is not introduced in this chapter, nor is the concept that all quadratics are not factorable. Factoring will be revisited with the appropriate mathematical vocabulary in Chapter 8.)	
3.2.3 How can I rewrite a product?	Multiplying Binomials and the Distributive Property	**A1.A.APR.A.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.	Students will multiply polynomial expressions using algebra tiles. Students will use the **Distributive Property** with polynomial expressions.	
3.2.4 How can I generalize the process?	Using Generic Rectangles to Multiply		Students will continue to practice multiplying expressions and will begin to use generic rectangles to simplify the process. Students will find missing dimensions of generic rectangles given pieces of area and will find missing pieces of area given dimensions.	Parent Guide 3.2.4
3.3.1 What if an equation has a product?	Solving Equations With Multiplication and Absolute Value	**A1.A.REI.A.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. **A1.A.REI.B.2**—Solve linear equations and inequalities in one variable, including equations with coefficients represented by letters.	Students will solve linear equations that involve multiplication. Students will solve problems that involve absolute value.	Parent Guide 3.3.1

3.3.2 How can I change it to y=mx+b form?	Working With Multi-Variable Equations	**A1.A.SSE.A.1a**—Interpret parts of an expression, such as terms, factors, and coefficients. **A1.A.APR.A.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. **A1.A.CED.A.4**—Rearrange formulas to highlight a quantity of interest, using the same reasoning as in solving equations. **A1.A.REI.B.2**—Solve linear equations and inequalities in one variable, including equations with coefficients represented by letters.	Students will solve multi-variable equations for one of the variable.	Parent Guide 3.3.2
3.3.3 What kinds of equations can I solve now? (Optional)	Summary of Solving Equations	**A1.A.CED.A.4**—Rearrange formulas to highlight a quantity of interest, using the same reasoning as in solving equations. **A1.A.REI.B.2**—Solve linear equations and inequalities in one variable, including equations with coefficients represented by letters.	Students will solve single- and multi-variable linear equations.	

	Items that are highlighted in blue are not covered in the Algebra 1 standards but are covered either before or after Algebra 1

Chapter 4 Systems of Equations 29-33% 10-11 Days plus optional time for Chapter Closure and Assessment				
Lesson Title	**Instructional Focus**	**TN Standard**	**Learning Outcome**	**Additional Resources**
4.1.1 How can I use variables to solve problems?	Solving Word Problems by Writing Equations	**A1.N.Q.A.2**—Identify, interpret, and justify appropriate quantities for the purpose of descriptive modeling. **A1.A.SSE.A.1b**—Interpret complicated expressions by viewing one or more of their parts as a single entity. **A1.A.CED.A.1**—Create equations and inequalities in one variable and use them to solve problems. **A1.A.REI.C.4**—Write and solve a system of linear equations in context. **A1.F.LE.A.1b**—Recognize situations in which one quantity changes at a constant rate per unit interval relative to another.	Students will define variables and write equations to solve word problems. They will review the connections between a graph, table, and the equations of a system of equations and how to write equations to solve word problems. They will solve a simple system of equations.	Parent Guide 4.1.1 Parent Guide 4.1.1 & 4.2.1
4.1.2 How many equations do I need?	One Equation or Two?	**A1.N.Q.A.2**—Identify, interpret, and justify appropriate quantities for the purpose of descriptive modeling. **A1.A.CED.A.1**—Create equations and inequalities in one variable and use them to solve problems. **A1.A.CED.A.2**—Create equations in two or more variables to represent relationships between quantities; graph equations with two variables on coordinate axes with labels and scales. **A1.A.REI.C.4**—Write and solve a system of linear equations in context.	Students will continue to learn how to write equations from word problems. Students will solve a system of equations by rewriting one of the equations so that they can use the Equal Values Method.	
4.2.1 How can I solve the system?	Solving Systems of Equations Using Substitution	**A1.A.REI.C.4**—Write and solve a system of linear equations in context.	Students will understand how to use substitution to solve systems of linear equations. Students will also recognize the benefits of using substitution in certain situations.	Parent Guide 4.1.1 & 4.2.1

4.2.2 How does a graph show a solution?	Making Connections: Systems, Solutions, and Graphs	**A1.N.Q.A.2**—Identify, interpret, and justify appropriate quantities for the purpose of descriptive modeling. **A1.A.REI.C.4**—Write and solve a system of linear equations in context. **A1.A.REI.D.5**—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).	Students will examine how a solution to a system of equations relates to those equations and to a graph of those equations.	
4.2.3 Can I solve without substituting?	Solving Systems Using Elimination	**A1.A.REI.C.4**—Write and solve a system of linear equations in context.	Students will develop the Elimination Method for solving systems of equations.	Parent Guide 4.2.3 to 4.2.5
4.2.4 How can I eliminate a variable?	More Elimination		Students will study more complex applications of the Elimination Method. Students will learn that multiplying both sides of an equation by a constant can create an equivalent equation. Furthermore, students will understand that different approaches to setting up an elimination problem yield the same result.	
4.2.5 What is the best method?	Choosing a Strategy for Solving Systems		Students will review each strategy for solving systems of linear equations and choose the best strategy. Students will learn that all methods should produce the same result but that some methods are more efficient based on the form of the system given.	
		A1.N.Q.A.1—Use units as a way to understand		

Chapter 5
Sequences
38-42%
11-12 Days plus optional time for Chapter Closure

Lesson Title	Instructional Focus	TN Standard	Learning Outcome	Additional Resources
		coordinate axes with labels and scales.		

5.1.1 How does the pattern grow?	Representing Exponential Growth	**A1.N.Q.A.2**—Identify, interpret, and justify appropriate quantities for the purpose of descriptive modeling. **A1.F.LE.A.1c**—Recognize situations in which a quantity grows or decays by a constant factor per unit interval relative to another.	Students will represent exponential growth with a diagram, table, and graph. Students will write descriptions of exponential growth based on the patterns in their tables, recognize patterns of exponential growth, and use their descriptions to make predictions.	Parent Guide 5.1.1 to 5.1.3
5.1.2 How high will it bounce? (Optional)	Rebound Ratios	**A1.F.LE.A.1c**—Recognize situations in which a quantity grows or decays by a constant factor per unit interval relative to another.	Students will generate data and model the data collected with tables, equations, and graphs. They will calculate the rebound ratio when a ball bounces. The function is linear. In Lesson 5.1.3, students will use this rebound ratio to investigate exponential decay.	
5.1.3 What is the pattern? (Optional)	The Bouncing Ball and Exponential Decay	**A2.F.IF.B.3c**—Graph exponential and logarithmic functions, showing intercepts and end behavior. **A1.F.LE.A.1c**—Recognize situations in which a quantity grows or decays by a constant factor per unit interval relative to another.	Students will be introduced to an example of exponential decay and compare it to the linear function from the previous lesson.	
5.2.1 How can I describe a sequence?	Generating and Investigating Sequences	**A2.F.BF.A.2**—Write arithmetic and geometric sequences with an explicit formula and use them to model situations. **A1.F.LE.A.2**—Construct linear and exponential functions, including arithmetic and geometric sequences, given a graph, a table, a description of a relationship, or input-output pairs.	Students will be introduced to sequences and will sort them into groups based on patterns in their representations. They will identify sequences generated by adding a constant as *arithmetic*, and those generated by multiplying by a constant as *geometric.*	Parent Guide 5.2.1 to 5.2.3
5.2.2 How do arithmetic sequences work?	Generalizing Arithmetic Sequences	**P.F.IF.A.8**—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 $f(0)=f(1)=1$, $f(n+2)=f(n)+f(n-1)$ for $n>1$.	Students will learn the vocabulary and notation for arithmetic sequences as they develop formulas for the nth term.	

5.2.3 How else can I write the equation?	Recursive Sequences	f(0)=f(1)=1, f(n+a)=f(n)+f(n-1) for n≥1. **A2.F.BF.A.2**—Write arithmetic and geometric sequences with an explicit formula and use them to model situations. **A1.F.LE.A.2**—Construct linear and exponential functions, including arithmetic and geometric sequences, given a graph, a table, a description of a relationship, or input-output pairs.	Students will write sequences from recursive equations. They will write recursive equations for arithmetic sequences, and convert between explicit and recursive equations for arithmetic sequences.	
5.3.1 What is the rate of change?	Patterns of Growth in Tables and Graphs	**A1.F.IF.B.5**—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. **A1.F.LE.A.1a**—Recognize that linear functions grow by equal differences over equal intervals and that exponential functions grow by equal factors over equal intervals. **A1.F.LE.A.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.	Students will look at and compare patterns of growth in linear and exponential tables.	Parent Guide 5.3.1
5.3.2 How can I use a multiplier?	Using Multipliers to Solve Problems	**A1.F.LE.A.1c**—Recognize situations in which a quantity grows or decays by a constant factor per unit interval relative to another. **A1.F.LE.A.2**—Construct linear and exponential functions, including arithmetic and geometric sequences, given a graph, a table, a description of a relationship, or input-output pairs.	Students will find equations for geometric sequences and see relationships between geometric sequences and exponential functions. Students will use geometric sequences to solve problems involving percent increase and decrease.	
5.3.3 Is it a function?	Comparing Sequences to Functions	**P.F.IF.A.8**—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+a)=f(n)+f(n-1) for n≥1.	Students will recognize that all sequences are functions with domains limited to positive integers. Students will use graphical methods to solve exponential equations.	

Chapter 7 Exponential Functions 38-42% 11 Days plus optional time for Chapter Closure				
Lesson Title	**Instructional Focus**	**TN Standard**	**Learning Outcome**	**Additional Resources**
7.1.1 What do exponential graphs look like?	Investigation $y=b^x$	**A1.F.IF.B.3**—For a function that models a relationship between two quantities, interpret key features of graphs and tables in terms of the quantities, and sketch graphs showing key features given a verbal description of the relationship. **A2.F.IF.B.3c**—Graph exponential and logarithmic functions, showing intercepts and end behavior.	Students will investigate the family of functions $y=b^x$. They will make and justify statements about the behaviors of graphs in this family.	
7.1.2 What is the connection?	Multiple Representations of Exponential Functions	**A1.A.CED.A.1**—Create equations and inequalities in one variable and use them to solve problems. **A1.A.CED.A.2**—Create equations in two or more variables to represent relationships between quantities; graph equations with two variables on coordinate axes with labels and scales. **A2.F.IF.B.3c**—Graph exponential and logarithmic functions, showing intercepts and end behavior. **A2.F.IF.B.4a**—Know and use the properties of exponents to interpret expressions for exponential functions. **A1.F.LE.A.1c**—Recognize situations in which a quantity grows or decays by a constant factor per unit interval relative to another. **A1.F.LE.A.2**—Construct linear and exponential functions, including arithmetic and geometric sequences, given a graph, a table, a description of a relationship, or input-output pairs. **A1.F.LE.B.4**—Interpret the parameters in a linear of exponential function in terms of a context.	Students will depend and extend their understanding of exponential functions by examining the multiplier ("b") and starting point ("a") in different representations. Students will generalize the roles of *a* and *b* for the equations $y=a \bullet b^x$	

7.1.3 How does it grow?	More Applications of Exponential Growth	**A1.A.SSE.A.1b**—Interpret complicated expressions by viewing one or more of their parts as a single entity. **A1.A.CED.A.1**—Create equations and inequalities in one variable and use them to solve problems. **A1.A.CED.A.2**—Create equations in two or more variables to represent relationships between quantities; graph equations with two variables on coordinate axes with labels and scales. **A1.F.IF.C.6b**—Graph square root, cube root, and piecewise-defined functions, including step functions and absolute value functions. **A2.F.IF.B.3c**—Graph exponential and logarithmic functions, showing intercepts and end behavior. **A2.F.IF.B.4a**—Know and use the properties of exponents to interpret expressions for exponential functions. **A1.F.LE.A.1a**—Recognize that linear functions grow by equal differences over equal intervals and that exponential functions grow by equal factors over equal intervals. **A1.F.LE.A.1c**—Recognize situations in which a quantity grows or decays by a constant factor per unit interval relative to another. **A1.F.LE.A.2**—Construct linear and exponential functions, including arithmetic and geometric sequences, given a graph, a table, a description of a relationship, or input-output pairs. **A1.F.LE.B.4**—Interpret the parameters in a linear of exponential function in terms of a context.	Students will use what they know about linear and exponential functions to investigate the relationship between simple and compound interest.

7.1.4 What if it does not grow?	Exponential Decay	**A1.A.SSE.B.3c**—Use the properties of exponents to rewrite expressions for exponential functions. **A1.A.CED.A.1**—Create equations and inequalities in one variable and use them to solve problems. **A1.A.CED.A.2**—Create equations in two or more variables to represent relationships between quantities; graph equations with two variables on coordinate axes with labels and scales. **A2.F.IF.B.3c**—Graph exponential and logarithmic functions, showing intercepts and end behavior. **A2.F.IF.B.4a**—Know and use the properties of exponents to interpret expressions for exponential functions. **A1.F.LE.A.1c**—Recognize situations in which a quantity grows or decays by a constant factor per unit interval relative to another. **A1.F.LE.A.2**—Construct linear and exponential functions, including arithmetic and geometric sequences, given a graph, a table, a description of a relationship, or input-output pairs. **A1.F.LE.B.4**—Interpret the parameters in a linear of exponential function in terms of a context.	Students will represent exponential decay in multiple ways and will further investigate the effect when the exponent is 0 or negative.	Parent Guide 7.1.1 to 7.1.6

7.1.5 What are the connections?	Graph → Equation	**A1.A.CED.A.1**—Create equations and inequalities in one variable and use them to solve problems. **A1.A.CED.A.2**—Create equations in two or more variables to represent relationships between quantities; graph equations with two variables on coordinate axes with labels and scales. **A1.F.IF.B.3**—For a function that models a relationship between two quantities, interpret key features of graphs and tables in terms of the quantities, and sketch graphs showing key features given a verbal description of the relationship. **A1.F.IF.B.4**—Relate the domain of a function to its graph and, where applicable, to the quantitative relationship it describes. **A1.F.IF.C.6b**—Graph square root, cube root, and piecewise-defined functions, including step functions and absolute value functions. **A2.F.IF.B.3c**—Graph exponential and logarithmic functions, showing intercepts and end behavior. **A2.F.IF.B.4a**—Know and use the properties of exponents to interpret expressions for exponential functions. **A1.F.LE.A.1c**—Recognize situations in which a quantity grows or decays by a constant factor per unit interval relative to another. **A1.F.LE.A.2**—Construct linear and exponential functions, including arithmetic and geometric sequences, given a graph, a table, a description of a relationship, or input-output pairs. **A1.F.LE.B.4**—Interpret the parameters in a linear of exponential function in terms of a context.	Students will use what they know about exponential growth to write equations for exponential functions presented as graphs.

7.1.6 What is the connection?	Completing the Multiple Representations Web	**A1.N.Q.A.1**—Use units as a way to understand problems and to guide the solution of multi-step problems; choose and interpret units consistently in formulas; choose and interpret the scale and the origin in graphs and data displays. **A1.N.Q.A.2**—Identify, interprets and justify appropriate quantities for the purpose of descriptive modeling. **A1.A.CED.A.1**—Create equations and inequalities in one variable and use them to solve problems. **A1.A.CED.A.2**—Create equations in two or more variables to represent relationships between quantities; graph equations with two variables on coordinate axes with labels and scales. **A1.F.IF.B.3**—For a function that models a relationship between two quantities, interpret key features of graphs and tables in terms of the quantities, and sketch graphs showing key features given a verbal description of the relationship. **A1.F.IF.B.4**—Relate the domain of a function to its graph and, where applicable, to the quantitative relationship it describes. **A2.F.IF.B.3c**—Graph exponential and logarithmic functions, showing intercepts and end behavior. **A2.F.IF.B.4a**—Know and use the properties of exponents to interpret expressions for exponential functions. **A1.F.IF.C.8**—Compare properties of two functions each represented in a different way (algebraically, graphically, numerically in tables, or by verbal descriptions). **A1.F.LE.A.1c**—Recognize situations in which a quantity grows or decays by a constant factor per unit interval relative to another. **A1.F.LE.A.2**—Construct linear and exponential functions, including arithmetic and geometric sequences, given a graph, a table, a description of a relationship, or input-output pairs. **A1.F.LE.B.4**—Interpret the parameters in a linear of exponential function in terms of a context.	Students will complete the exponential multiple representations web, solidifying connections between the table, equation, graph, and situation representations of an exponential function.	

7.2.1 How can I find the equation? (Optional)	Curve Fitting and Fractional Exponents	**A2.N.RN.A.1**—Explain how the definition of the meaning of rational exponents follows from extending the properties of integer exponents to those values, allowing for a notation for radicals in terms of rational exponents. **A2.N.RN.A.2**—Rewrite expressions involving radicals and rational exponents using the properties of exponents. **A1.F.IF.B.4**—Relate the domain of a function to its graph and, where applicable, to the quantitative relationship it describes. **A2.F.IF.B.3c**—Graph exponential and logarithmic functions, showing intercepts and end behavior. **A1.F.BF.A.1a**—Determine an explicit expression, a recursive process, or steps for calculation from a context. **A1.F.LE.A.2**—Construct linear and exponential functions, including arithmetic and geometric sequences, given a graph, a table, a description of a relationship, or input-output pairs.	Students will find equations of linear and exponential functions by using known quantities to solve for a missing parameter. Students will interpret fractional exponents.	Parent Guide 7.2.1
7.2.2 How can I find the equation? (Optional)	More Curve Fitting	**A1.A.REI.D.5**—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). **A2.F.IF.B.3c**—Graph exponential and logarithmic functions, showing intercepts and end behavior. **A1.F.BF.A.1a**—Determine an explicit expression, a recursive process, or steps for calculation from a context. **A1.F.LE.A.2**—Construct linear and exponential functions, including arithmetic and geometric sequences, given a graph, a table, a description of a relationship, or input-output pairs.	Students will find linear functions and exponential equations of the form $y = ab^x$ given two points.	Parent Guide 7.2.2 to 7.2.3
7.2.3 How can I use exponential functions?	Solving a System of Exponential Functions Graphically	**A1.N.Q.A.2**—Identify, interprets and justify appropriate quantities for the purpose of descriptive modeling. **A2.F.IF.B.3c**—Graph exponential and logarithmic functions, showing intercepts and end behavior. **A1.F.BF.A.1a**—Determine an explicit expression, a recursive process, or steps for calculation from a context. **A1.F.LE.A.1c**—Recognize situations in which a quantity grows or decays by a constant factor per unit interval relative to another.	Students will write and graphically solve a system of exponential functions in the context of investigating used-car prices.	

	Items that are highlighted in blue are not covered in the Algebra 1 standards but are covered either before or after Algebra 1

Chapter 8 Quadratic Functions 38-42% 10 Days plus optional time for Chapter Closure and Assessment				
Lesson Title	**Instructional Focus**	**TN Standard**	**Learning Outcome**	**Additional Resources**
8.1.1 How can I find the product?	Introduction to Factoring Quadratic Expressions	**A1.A.SSE.B.3a**—Factor a quadratic expression to reveal the zeros of the function it defines.	Students will review how to build rectangles with tiles and learn shortcuts for finding the dimensions of a completed generic rectangle. Students will discover that the products of the terms in each diagonal of a generic rectangle are equal.	Parent Guide 8.1.1 to 8.1.4
8.1.2 Is there a shortcut?	Factoring with Generic Rectangles		Students will develop an algorithm to factor quadratic expressions without algebra tiles.	
8.1.3 How can I factor this?	Factoring with Special Cases		Students will continue to practice their factoring skills while learning about special cases: quadratic expressions with missing terms, quadratics that are not in standard form, and quadratics with more than one possible factored form.	
8.1.4 Can it still be factored?	Factoring Completely	**A1.A.SSE.A.2**—Use the structure of an expression to identify ways to rewrite it. **A1.A.SSE.B.3a**—Factor a quadratic expression to reveal the zeros of the function it defines.	Students will complete their focus on factoring by considering expressions that can be factored first with a common factor and then again using the quadratic factoring method.	
8.1.5 Is there a shortcut?	Factoring Shortcuts		Students will learn a quick way to factor perfect square trinomials and quadratics that are a difference of squares.	Parent Guide 8.1.5

8.2.1 What is the connection?	Multiple Representations for Quadratic Functions	**A1.N.Q.A.1**—Use units as a way to understand problems and to guide the solution of multi-step problems; choose and interpret units consistently in formulas; choose and interpret the scale and the origin in graphs and data displays. **A1.A.SSE.B.3a**—Factor a quadratic expression to reveal the zeros of the function it defines. **A1.A.CED.A.2**—Create equations in two or more variables to represent relationships between quantities; graph equations with two variables on coordinate axes with labels and scales. **A1.F.IF.B.3**—For a function that models a relationship between two quantities, interpret key features of graphs and tables in terms of the quantities, and sketch graphs showing key features given a verbal description of the relationship. **A1.F.IF.B.4**—Relate the domain of a function to its graph and, where applicable, to the quantitative relationship it describes. **A1.F.IF.C.6a**—Graph linear and quadratic functions and show intercepts, maxima, and minima. **A1.F.IF.C.7a**—Use the process of factoring and completing the square in a quadratic function to show zeros, extreme values, and symmetry of the graph, and interpret these in terms of a context. **A1.F.IF.C.8**—Compare properties of two functions each represented in a different way (algebraically, graphically, numerically in tables, or by verbal descriptions). **A1.F.BF.A.1a**—Determine an explicit expression, a recursive process, or steps for calculation from a context.	Students will identify connections between different representations of quadratics: an equation, a table, a situation, and a graph. Students will also connect the intercepts and vertex of a parabola to a situation.	

8.2.2 How are quadratic rules and graphs connected?	Zero Product Property	**A1.A.SSE.B.3a**—Factor a quadratic expression to reveal the zeros of the function it defines. **A1.A.CED.A.2**—Create equations in two or more variables to represent relationships between quantities; graph equations with two variables on coordinate axes with labels and scales. **A1.A.REI.B.3b**—Solve quadratic equations by inspection (e.g., for $x^2=49$), taking square roots, completing the square, knowing and applying the quadratic formula, and factoring, as appropriate to the initial form of the equation. Recognize when the quadratic formula gives complex solutions. **A1.F.IF.C.7a**—Use the process of factoring and completing the square in a quadratic function to show zeros, extreme values, and symmetry of the graph, and interpret these in terms of a context. **A1.F.BF.A.1a**—Determine an explicit expression, a recursive process, or steps for calculation from a context.	Students will learn that they can sketch the graph of a quadratic rule quickly, using its intercepts. Students will also learn how to find the *x*-intercepts of a parabola by factoring the corresponding quadratic equation and applying the Zero Product Property.	
8.2.3 How else can I find the roots?	More Ways to Find the x-Intercepts	**A1.A.SSE.B.3a**—Factor a quadratic expression to reveal the zeros of the function it defines. **A1.A.CED.A.2**—Create equations in two or more variables to represent relationships between quantities; graph equations with two variables on coordinate axes with labels and scales. **A1.A.REI.B.3b**—Solve quadratic equations by inspection (*e.g., for* $x^2=49$), taking square roots, completing the square, knowing and applying the quadratic formula, and factoring, as appropriate to the initial form of the equation. Recognize when the quadratic formula gives complex solutions. **A1.F.IF.B.3**—For a function that models a relationship between two quantities, interpret key features of graphs and tables in terms of the quantities, and sketch graphs showing key features given a verbal description of the relationship. **A1.F.IF.C.6a**—Graph linear and quadratic functions and show intercepts, maxima, and minima. **A1.F.IF.C.7a**—Use the process of factoring and completing the square in a quadratic function to show zeros, extreme values, and symmetry of the graph, and interpret these in terms of a context. **A1.F.BF.A.1a**—Determine an explicit expression, a recursive process, or steps for calculation from a context.	Students will use graphing calculators and the graphing form of a quadratic equation to find the *x*-intercepts and vertex of a parabola. Students will use square roots to solve an equation.	Parent Guide 8.2.2 & 8.2.3

8.2.4 What is the connection?	Completing the Quadratic Web	**A1.A.SSE.B.3a**—Factor a quadratic expression to reveal the zeros of the function it defines. **A1.A.CED.A.2**—Create equations in two or more variables to represent relationships between quantities; graph equations with two variables on coordinate axes with labels and scales. **A1.F.IF.B.3**—For a function that models a relationship between two quantities, interpret key features of graphs and tables in terms of the quantities, and sketch graphs showing key features given a verbal description of the relationship. **A1.F.IF.C.6a**—Graph linear and quadratic functions and show intercepts, maxima, and minima. **A1.F.IF.C.7a**—Use the process of factoring and completing the square in a quadratic function to show zeros, extreme values, and symmetry of the graph, and interpret these in terms of a context. **A1.F.IF.C.8**—Compare properties of two functions each represented in a different way (algebraically, graphically, numerically in tables, or by verbal descriptions). **A1.F.BF.A.1a**—Determine an explicit expression, a recursive process, or steps for calculation from a context.	Students will practice moving from a table, graph, or situation to a quadratic rule.	
8.2.5 How can I write it in graphing form?	Completing the Square	**A1.A.SSE.A.1b**—Interpret complicated expressions by viewing one or more of their parts as a single entity. **A1.A.SSE.B.3b**—Complete the square in a quadratic expression in the form Ax^2+Bx+C to reveal the maximum or minimum value of the function it defines. **A1.A.REI.B.3a**—Use the method of completing the square to rewrite any quadratic equation in x into an equation of the form $(x-p)^2=q$ that has the same solutions. Derive the quadratic formula from this form. **A1.F.IF.C.6a**—Graph linear and quadratic functions and show intercepts, maxima, and minima. **A1.F.IF.C.7a**—Use the process of factoring and completing the square in a quadratic function to show zeros, extreme values, and symmetry of the graph, and interpret these in terms of a context.	Students will learn how to convert the equation of a parabola into graphing form by completing the square.	Parent Guide 8.2.5

Chapter 9 Solving Quadratics and Inequalities 29-33% 11 Days plus optional time for Chapter Closure and Assessment				
Lesson Title	**Instructional Focus**	**TN Standard**	**Learning Outcome**	**Additional Resources**
9.1.1 What else can I solve?	Solving Quadratic Equations	**A1.A.SSE.B.3b**—Complete the square in a quadratic expression in the form Ax^2+Bx+C to reveal the maximum or minimum value of the function it defines. **A1.A.REI.B.3a**—Use the method of completing the square to rewrite any quadratic equation in x into an equation of the form $(x-p)^2=q$ that has the same solutions. Derive the quadratic formula from this form. **A1.A.REI.B.3b**—Solve quadratic equations by inspection (*e.g., for* $x^2=49$), taking square roots, completing the square, knowing and applying the quadratic formula, and factoring, as appropriate to the initial form of the equation. Recognize when the quadratic formula gives complex solutions.	Students will expand their skills using the Zero Product Property to solve quadratic equations. They will develop the method of completing the square to solve equations.	
9.1.2 What if it is not factorable?	Introduction to the Quadratic Formula	**A1.A.REI.B.3a**—Use the method of completing the square to rewrite any quadratic equation in x into an equation of the form $(x-p)^2=q$ that has the same solutions. Derive the quadratic formula from this form. **A1.A.REI.B.3b**—Solve quadratic equations by inspection (*e.g., for* $x^2=49$), taking square roots, completing the square, knowing and applying the quadratic formula, and factoring, as appropriate to the initial form of the equation. Recognize when the quadratic formula gives complex solutions.	Students will learn how to use the **Quadratic Formula** to solve quadratic equations.	Parent Guide 9.1.2 & 9.1.3
9.1.3 What if the equation is not in standard form?	More Solving Quadratic Equations	**A1.A.CED.A.1**—Create equations and inequalities in one variable and use them to solve problems. **A1.A.CED.A.2**—Create equations in two or more variables to represent relationships between quantities; graph equations with two variables on coordinate axes with labels and scales.	Students will continue to solve quadratic equations, including some that are not in standard form, and some that have only one solution or no real solutions.	

9.1.4 Which method should I use?	Choosing a Strategy	**A1.A.REI.B.3a**—Use the method of completing the square to rewrite any quadratic equation in *x* into an equation of the form $(x-p)^2=q$ that has the same solutions. Derive the quadratic formula from this form. **A1.A.REI.B.3b**—Solve quadratic equations by inspection (*e.g., for* $x^2=49$), taking square roots, completing the square, knowing and applying the quadratic formula, and factoring, as appropriate to the initial form of the equation. Recognize when the quadratic formula gives complex solutions. **A1.F.IF.C.7a**—Use the process of factoring and completing the square in a quadratic function to show zeros, extreme values, and symmetry of the graph, and interpret these in terms of a context.	Students will practice using the Zero Product Property, completing the square, and the Quadratic Formula, by deciding which method is best to try first for different types of equations. They will also be reminded that creating graphs and tables can help them estimate a solution or verify an algebraic one.	
9.2.1 What if the quantities are not equal?	Solving Linear, One-Variable Inequalities	**A1.A.CED.A.1**—Create equations and inequalities in one variable and use them to solve problems. **A1.A.REI.B.2**—Solve linear equations and inequalities in one variable, including equations with coefficients represented by letters.	Students will learn how to solve linear inequalities with one variable and how to represent the solutions on a number line.	Parent Guide 9.2.1 & 9.2.2
9.2.2 How can I use inequalities	More Solving Inequalities	**A1.N.Q.A.2**—Identify, interprets and justify appropriate quantities for the purpose of descriptive modeling. **A1.A.CED.A.1**—Create equations and inequalities in one variable and use them to solve problems. **A1.A.REI.B.2**—Solve linear equations and inequalities in one variable, including equations with coefficients represented by letters.	Students will continue to develop their ability to solve linear, one-variable inequalities by finding a boundary point and testing a value in the inequality. Students will use an inequality to solve a word problem.	
9.3.1 What if the inequality has two variables?	Graphing Two-Variable Inequalities	**A1.A.REI.D.5**—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). **A1.A.REI.D.7**—Graph the solutions to a linear inequality in two variables as a half-plane (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. **A1.A.CED.A.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.	Students will learn how to graph linear inequalities with two variables.	Parent Guide 9.3.1 & 9.3.2

9.3.2 What if the inequality is not linear?	Graphing Linear and Non-Linear Inequalities	**A1.N.Q.A.2**—Identify, interprets and justify appropriate quantities for the purpose of descriptive modeling. **A1.A.REI.D.7**—Graph the solutions to a linear inequality in two variables as a half-plane (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. **A1.A.CED.A.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.	Students will continue to learn how to graph linear and non-linear inequalities that contain two variables. Students will also use the graph of a two-variable, linear inequality to solve a word problem.	
9.4.1 How can I represent it?	Systems of Inequalities	**A1.A.REI.D.7**—Graph the solutions to a linear inequality in two variables as a half-plane (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.	Students will continue to develop their ability to graph two-variable inequalities as they learn how to graph constraints using systems of inequalities.	Parent Guide 9.4.1 & 9.4.3
9.4.2 How can I apply it?	More Systems of Inequalities	**A1.N.Q.A.2**—Identify, interprets and justify appropriate quantities for the purpose of descriptive modeling. **A1.A.CED.A.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. **A1.A.REI.D.7**—Graph the solutions to a linear inequality in two variables as a half-plane (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.	Students will continue to learn how to graph systems of inequalities and will apply this understanding to solve problems.	
9.4.3 How can I use inequalities to solve problems?	Applying Inequalities to Solve Problems		Students will practice writing inequalities from a word problem. Students will use a system of inequalities to create a graph of a feasible region and then will analyze different scenarios based on the feasible region.	Parent Guide 9.4.1 & 9.4.3

****These Chapters are optional due to many of the standards not being heavily tested on TNReady.
Use these to fill in gaps or for classes that need are ready for more advanced topics.**

	Items that are highlighted in blue are not covered in the Algebra 1 standards but are covered either before or after Algebra 1

Chapter 6
Modeling Two-Variable Data
38-42%
11-12 Days plus optional time for Chapter Closure and Assessment

Lesson Title	Instructional Focus	TN Standard	Learning Outcome	Additional Resources
6.1.1 How can I make predictions?	Line of Best Fit	**A1.N.Q.A.1**—Use units as a way to understand problems and to guide the solution of multi-step problems; choose and interpret units consistently in formulas; choose and interpret the scale and the origin in graphs and data displays. **A1.S.ID.B.4a**—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. **A1.S.ID.4b**—Fit a linear function for a scatter plot that suggests a linear association. **A1.S.ID.C.5**—Interpret the slope (rate of change) and the intercept (constant term) of a linear model in the context of the data.	Students will review drawing a line of best fit by hand. They will make predictions based on their linear model and will interpret slope and *y*-intercept in context.	Parent Guide 6.1.1
6.1.2 How close is the model?	Residuals	**A1.N.Q.A.1**—Use units as a way to understand problems and to guide the solution of multi-step problems; choose and interpret units consistently in formulas; choose and interpret the scale and the origin in graphs and data displays. **A1.S.ID.B.4a**—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. **A1.S.ID.4b**—Fit a linear function for a scatter plot that suggests a linear association.	Students will learn how to calculate, interpret, and graphically represent a residual. Students will learn that extrapolation with a statistical model can lead to nonsensical results. They will interpret slope and *y*-intercept in context.	

6.1.3 What are the bounds of my predictions?	Upper and Lower Bounds	**A1.N.Q.A.1**—Use units as a way to understand problems and to guide the solution of multi-step problems; choose and interpret units consistently in formulas; choose and interpret the scale and the origin in graphs and data displays. **A1.N.Q.A.3**—Choose a level of accuracy appropriate to elimination on measurement when reporting quantities. **A1.S.ID.B.4a**—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. **A1.S.ID.4b**—Fit a linear function for a scatter plot that suggests a linear association.	Students will graphically determine an upper and lower bound on the prediction they make from a linear best-fit model.	Parent Guide 6.1.2 & 6.1.3
6.1.4 How can we agree on a line of best fit?	Least Squares Regression Line	**A1.N.Q.A.1**—Use units as a way to understand problems and to guide the solution of multi-step problems; choose and interpret units consistently in formulas; choose and interpret the scale and the origin in graphs and data displays. **A1.S.ID.B.4a**—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. **A1.S.ID.4b**—Fit a linear function for a scatter plot that suggests a linear association.	Students will find the least squares regression line (LSRL) using their calculators and understand that it is the line that minimizes the sum of the squares of the residuals.	Parent Guide 6.1.4
6.2.1 When is my model appropriate?	Residual Plots	**A1.N.Q.A.1**—Use units as a way to understand problems and to guide the solution of multi-step problems; choose and interpret units consistently in formulas; choose and interpret the scale and the origin in graphs and data displays. **A1.S.ID.B.4a**—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. **8.SP.A.2**—Know that straight lines are widely used to model relationships between two quantitative variables. For scatter plots that suggest a linear association, informally fit a straight line and informally assess the model fit by judging the closeness of the data points to the line.	Students will observe the impact of an outlier on the LSRL. Students will determine if a linear model is a good fit for the data by creating and visually analyzing residual plots.	Parent Guide 6.2.1, 6.2.2, & 6.2.4

6.2.2 How can I measure my linear fit?	Correlation	**A1.N.Q.A.1**—Use units as a way to understand problems and to guide the solution of multi-step problems; choose and interpret units consistently in formulas; choose and interpret the scale and the origin in graphs and data displays. **A1.S.ID.B.4a**—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. **A1.S.ID.C.6**—Use technology to compute and interpret the correlation coefficient of a linear fit.	Students will calculate the correlation coefficient and observe the scatter for various extremes of *r*. Students will also describe an association between two variables in more mathematical terms.	
6.2.3 Why can/t studies determine cause and effect?	Association is Not Causation	**A1.N.Q.A.1**—Use units as a way to understand problems and to guide the solution of multi-step problems; choose and interpret units consistently in formulas; choose and interpret the scale and the origin in graphs and data displays. **A1.S.ID.B.4a**—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. **A1.S.ID.C.7**—Distinguish between correlation and causation.	Students will understand that cause and effect cannot be determined from a study that reports an association.	Parent Guide 6.2.3
6.2.4 What does the correlation mean?	Interpreting Correlation in Context	**A1.N.Q.A.1**—Use units as a way to understand problems and to guide the solution of multi-step problems; choose and interpret units consistently in formulas; choose and interpret the scale and the origin in graphs and data displays. **A1.S.ID.B.4a**—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. **A1.S.ID.C.6**—Use technology to compute and interpret the correlation coefficient of a linear fit.	Students will interpret the correlation coefficient squared in context.	Parent Guide 6.2.1, 6.2.2, & 6.2.4
6.2.5 What if a line does not fit the data?	Curved Best-Fit Models	**A1.N.Q.A.1**—Use units as a way to understand problems and to guide the solution of multi-step problems; choose and interpret units consistently in formulas; choose and interpret the scale and the origin in graphs and data displays. **A1.S.ID.B.4a**—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.	Students will fit a non-linear model to data that shows a curved trend.	Parent Guide 6.2.5

Chapter 10 Solving Complex Equations 29-33% 12 Days plus optional time for Chapter Closure and Assessment				
Lesson Title	**Instructional Focus**	**TN Standard**	**Learning Outcome**	**Additional Resources**
10.1.1 What can I tell from a survey?	Association in Two-Way Tables	**A2.S.ID.B**—Summarize, represent, and interpret data on two categorical and quantitative variables.	Students will calculate probabilities and determine association from data arranged in two-way tables. Students will create conditional relative frequency tables.	Parent Guide 10.1.1
10.2.1 How can I solve it?	Solving by Rewriting	**A1.A.SSE.B.3c**—Use the properties of exponents to rewrite exponential expressions. **A1.A.REI.B.2**—Solve linear equations and inequalities in one variable, including equations with coefficients represented by letters.	Students will learn how to solve complicated equations (ones with large numbers, fractions, or decimals) and simple exponential equations by rewriting and solving a simpler equivalent equation.	

10.2.2 How can I solve it?	Fraction Busters	**A1.A.REI.A.1**—Explain each step in solving an 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. **A1.A.REI.B.2**—Solve linear equations and inequalities in one variable, including equations with coefficients represented by letters.	Students will continue to learn how to solve complicated linear and quadratic equations that involve fractions by rewriting and solving an equivalent equation.	Parent Guide 10.2.1 & 10.2.2
10.2.3 How can I solve it?	Multiple Methods for Solving Equations	**A1.A.SSE.A.1b**—Interpret complicated expressions by viewing one or more of their parts as a single entity. **A1.A.REI.A.1**—Explain each step in solving an 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.	Students will learn multiple methods for solving single-variable equations involving exponents and square roots.	Parent Guide 10.2.3 & 10.2.6
10.2.4 How many solutions?	Determining the Number of Solutions	**A1.A.REI.B.3b**—Solve quadratic equations by inspection (e.g., for $x^2=49$), taking square roots, completing the square, knowing and applying the quadratic formula, and factoring, as appropriate to the initial form of the equation. Recognize when the quadratic formula gives complex solutions.	Students will learn how to determine the number of solutions to an absolute value equation or a quadratic written in perfect square form. Students will also learn how to express their solutions in exact and approximate forms.	
10.2.5 What kinds of numbers are there?	Deriving the Quadratic Formula and the Number System	**A1.A.REI.B.3a**—Use the method of completing the square to rewrite any quadratic equation in x into an equation of the form $(x-p)^2=q$ that has the same solutions. Derive the quadratic formula from this form. **A1.A.REI.B.3b**—Solve quadratic equations by inspection (e.g., for $x^2=49$), taking square roots, completing the square, knowing and applying the quadratic formula, and factoring, as appropriate to the initial form of the equation. Recognize when the quadratic formula gives complex solutions.	Students will learn how to derive the Quadratic Formula by completing the square. Students will be introduced to imaginary numbers as solutions to quadratic equations. They will look at where imaginary numbers fall in the overall number system.	

10.2.6 Which method is best?	More Solving and an Application	**A1.A.SSE.A.1b**—Interpret complicated expressions by viewing one or more of their parts as a single entity. **A1.A.REI.A.1**—Explain each step in solving an 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. **A1.A.REI.B.2**—Solve linear equations and inequalities in one variable, including equations with coefficients represented by letters. **A1.A.REI.B.3b**—Solve quadratic equations by inspection (e.g., for $x^2=49$), taking square roots, completing the square, knowing and applying the quadratic formula, and factoring, as appropriate to the initial form of the equation. Recognize when the quadratic formula gives complex solutions.	Students will practice solving various equations using the methods from Lesson 10.2.3 and will gain confidence in how to select the best method. Students will also be introduced to quadratic inequalities through a context.	Parent Guide 10.2.3 & 10.2.6
10.3.1 Intercept or Intersect?	Intersection of Two Functions	**A1.A.REI.D.6**—Explain why the x-coordinate 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 approximate solutions using technology.	Students will learn how to distinguish between intercepts and intersections and will learn how to solve systems of equations when one or both equations is/are not linear. They will then use intersections of functions to find solutions to the related single-variable equations.	Parent Guide 10.3.1
10.3.2 How many points of intersection?	Number of Parabola Intersections		Students will strengthen their quadratic-solving skills while investigating the possible ways two parabolas or a line and a parabola can intersect. Students will also learn that using an algebraic method to find points of intersection is more reliable than graphing the system.	
10.3.3 How can I solve the inequality?	Solving Quadratic and Absolute Value Inequalities	**A1.A.REI.B.2**—Solve linear equations and inequalities in one variable, including equations with coefficients represented by letters.	Students will learn how to solve complicated single-variable inequalities, including those with absolute values and those with squared terms.	Parent Guide 10.3.3

Chapter 11 Functions and Data 38-42% 15-16 Days plus optional time for Chapter Closure and Assessment				
Lesson Title	**Instructional Focus**	**TN Standard**	**Learning Outcome**	**Additional Resources**
11.1.1 How can I make it different?	Transforming Functions	**A1.F.IF.A.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) **A1.F.IF.C.6a**—Graph linear and quadratic functions and show intercepts, maxima, and minima. **A1.F.BF.B.2**—Identify the effect on the graph of replacing *f(x)* by *f(x)+k*, *k f(x)*, *f(kx)*, and *f(x+k)* for specific values of *k* (both positive and negative); find the value of *k* given the graphs. Experiment with cases and illustrate an explanation of the effects on the graph using technology.	Students will add or multiply by a constant to transform linear, quadratic, and exponential functions.	Parent Guide 11.1.1
11.1.2 How can I "undo" a function?	Inverse Functions	Not covered in TN State Standards	Students will "undo" functions to find the inverse function.	

11.2.1 How do I represent consistency?	Investigating Data Representations	**A1.S.ID.A.1**—Represent single or multiple data sets with dot plots, histograms, stem plots (stem and leaf), and box plots. **A1.S.ID.A.3**—Interpret differences in shape, center, and spread in the context of the data sets, accounting for possible effects of extreme data points (outliers).	Students will review the differences between graphical representations of single-variable data.	Parent Guide 11.2.1 to 11.2.3
11.2.2 How can we compare results?	Comparing Data	**A1.S.ID.A.1**—Represent single or multiple data sets with dot plots, histograms, stem plots (stem and leaf), and box plots. **A1.S.ID.A.2**—Use statistics appropriate to the shape of the data distribution to compare center (median, mean) and spread (interquartile range, standard deviation) of two or more different data sets. **A1.S.ID.A.3**—Interpret differences in shape, center, and spread in the context of the data sets, accounting for possible effects of extreme data points (outliers).	Students will compare the center, shape, spread, and outliers of two collections of numerical data	
11.2.3 How can I measure variability?	Standard Deviation		Students will find and interpret standard deviation.	
11.3.1 How can I make a prediction?	Using a Best-Fit Line to Make a Prediction	**A1.S.ID.B.4a**—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. **A1.S.ID.B.4b**—Fit a linear function for a scatter plot that suggests a linear association. **A1.S.ID.C.5**—Interpret the slope (rate of change) and the intercept (constant term) of a linear model in the context of the data. **A1.S.ID.C.6**—Use technology to compute and interpret the correlation coefficient of a linear fit.	Students will collect and analyze data. They will find the equation of a least squares regression line, describe the association, verify the residual plot, create upper and lower boundary lines, and use the statistics to make a prediction.	
11.3.2 Can I find it?	Relation Treasure Hunt	**A1.F.IF.B.4**—Relate the domain of a function to its graph, and where applicable, to the quantitative relationship it describes.	Students will review their knowledge of relations, including domain, range, functions, intercepts, and symmetry.	
11.3.3 What do I know about the function?	Investigating a Complex Function		Students will connect their understanding of functions, inequalities, and solving equations to analyze a complicated inequality.	

11.3.4 What is the largest area?	Using Algebra to Find a Maximum	**A1.N.Q.A.2**—Identify, interpret, and justify appropriate quantities for the purpose of descriptive modeling. **A1.N.Q.A.3**—Choose a level of accuracy appropriate to elimination on measurement when reporting quantities. **A1.A.SSE.B.3a**—Factor a quadratic expression to reveal the zeros of the function it defines. **A1.A.CED.A.1**—Create equations and inequalities in one variable and use them to solve problems. **A1.A.CED.A.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. **A1.F.IF.B.3**—For a function that models a relationship between two quantities, interpret key features of graphs and tables in terms of the quantities, and sketch graphs showing key features given a verbal description of the relationship.	Students will use multiple representations to maximize a set of quadratic data. They will interpret algebraic and graphical results.	

11.3.5 How much will I need?	Exponential Functions and Linear Inequalities	**A1.N.Q.A.2**—Identify, interpret, and justify appropriate quantities for the purpose of descriptive modeling. **A1.N.Q.A.3**—Choose a level of accuracy appropriate to elimination on measurement when reporting quantities. **A1.A.CED.A.1**—Create equations and inequalities in one variable and use them to solve problems. **A1.A.CED.A.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. **A1.F.IF.B.3**—For a function that models a relationship between two quantities, interpret key features of graphs and tables in terms of the quantities, and sketch graphs showing key features given a verbal description of the relationship. **A2.F.IF.B.3c**—Graph exponential and logarithmic functions, showing intercepts and end behavior. **A1.A.SSE.B.3c**—Use the properties of exponents to transform expressions for exponential functions. **A1.F.LE.A.1a**— Recognize that linear functions grow by equal differences over equal intervals, and that exponential functions grow by equal factors over equal intervals. **A1.F.LE.A.1c**—Recognize situations in which a quantity grows or decays by a constant factor per unit interval relative to another. **A1.F.LE.A.2**—Construct linear and exponential functions, including arithmetic and geometric sequences, given a graph, a description of a relationship, or two input-output pairs. **A1.F.LE.B.4**—Interpret the parameters in a linear or exponential function in terms of a context.	Students will write and solve exponential functions. They will solve a linear programming problem.	