Mathematics
Algebra I: Year at a Glance
2019 - 2020

Q1		Q2		Q3		Q4	
Module 1 **Aug. 12 – Oct. 11**		**Module 3** **Oct. 21 - Dec. 20**		**Module 4** **Jan. 6 – Mar. 13**		**Modules 2 and 5** **Mar. 23 – May 22** **TN Ready Testing** **Apr 13 – May 8**	
Module 1 **Relationships Between Quantities and Reasoning with Equations and Their Graphs**		**Module 3** **Linear and Exponential Functions**		**Module 4** **Polynomials and Quadratic Expressions, Equations, and Functions**		**Module 2** **Descriptive Statistics** **Module 5** **A Synthesis of Modeling with Equations and Functions**	
A1. N.Q.A.1	A1.A.REI. C.4*	A1. A. SSE. B.3	A1. F.IF.C.8*	A1. A. SSE. A.1	A1. F.IF.C.6*	A1. N.Q.A.2	A1. S.ID.A.1
A1. N.Q.A.2	A1.A.REI. D.5*	A1. A. SSE. B.3c*	A1. F.BF.A.1	A1. A. SSE. A.2	A1. F.IF.C.7*	A1. N.Q.A.3	A1. S.ID.A.2
A1. N.Q.A.3	A1.A.REI. D.7*	A1. A. CED.A.1	A1. F.BF.A.1a	A1. A. SSE. B.3	A1. F.IF.C.8*	A1. A. CED.A.1	A1. S.ID.A.3
A1. A. APR.A.1		A1.A.REI. D.6*	A1. F.BF.B.2*	A1. A. APR.A.1	A1. F.BF.B.2*	A1. A. CED.A.2	A1. S.ID.B.4*
A1. A. CED.A.1		A1. F.IF.A.1	A1. F.LE.A.1a	A1. A. APR.B.2*		A1. F.IF.B.3*	A1. S.ID.B.4a*
A1. A. CED.A.2		A1. F.IF.A.2	A1. F.LE.A.2	A1. A. REI.B.3*		A1. F.IF.B.4*	A1. S.ID.B.4b*
A1. A. CED.A.3		A1. F.IF.B.3*	A1. F.LE.A.3	A1. A. CED.A.1		A1. F.IF.B.5*	A1. S.ID.C.5*
A1. A. CED.A.4		A1. F.IF.B.4*	A1. F.LE.B.4*	A1. A. CED.A.2		A1. F.BF.A.1	A1. S.ID.C.6*
A1. A. SSE. A.1		A1. F.IF.B.5*		A1.A.REI. D.6*		A1. F.LE.A.1	A1. S.ID.C.7*
A1. A. SSE. A.2		A1. F.IF.C.6*		A1. F.IF.B.3*		A1. F.LE.A.1b	
A1. A. REI.A.1		A1. F.IF.C.6a*		A1. F.IF.B.4*		A1. F.LE.A.1c	
A1.A.REI.B. 2*		A1. F.IF.C.6b*		A1. F.IF.B.5*		A1. F.LE.A.2	

Key: **Major Content** ➢ **Supporting Content**

*** (asterisk) Indicates a standard with differences between the TN State Standards' numbering and/or verbiage and the standards in Eureka**

Note: Please use this suggested pacing as a guide. It is understood that teachers may be up to 1 week ahead or 1 week behind depending on the needs of their students.

Use the instructional map and Digital Suite resources as you prepare to teach a module for additional guidance in planning, pacing, and suggestions for omissions.

Introduction

Destination 2025, Shelby County Schools' 10-year strategic plan, is designed not only to improve the quality of public education, but also to create a more knowledgeable, productive workforce and ultimately benefit our entire community.

What will success look like?

In order to achieve these ambitious goals, we must collectively work to provide our students with high quality, college and career ready aligned instruction. The Tennessee State Standards provide a common set of expectations for what students will know and be able to do at the end of a grade. The State of Tennessee provides two sets of standards, which include the Standards for Mathematical Content and The Standards for Mathematical Practice. The Content Standards set high expectations for all students to ensure that Tennessee graduates are prepared to meet the rigorous demands of mathematical understanding for college and career. The eight Standards for Mathematical Practice describe the varieties of expertise, habits of mind, and productive dispositions that educators seek to develop in all students. The Tennessee State Standards also represent three fundamental shifts in mathematics instruction: **focus, coherence and rigor**.

Throughout this curriculum map, you will see resources as well as links to tasks that will support you in ensuring that students are able to reach the demands of the standards in your classroom. In addition to the resources embedded in the map, there are some high-leverage resources around the content standards and mathematical practice standards that teachers should consistently access. For a full description of each, click on the links below.

How to Use the Maps

Overview
An overview is provided for each quarter and includes the topics, focus standards, intended rigor of the standards and foundational skills needed for success of those standards.

Your curriculum map contains four columns that each highlight specific instructional components. Use the details below as a guide for information included in each column.

Tennessee State Standards
TN State Standards are located in the left column. Each content standard is identified as Major Content or Supporting Content. A key can be found at the bottom of the map.

Content
This section contains learning objectives based upon the TN State Standards. Best practices tell us that clearly communicating measurable objectives lead to greater student understanding. Additionally, essential questions are provided to guide student exploration and inquiry.

Instructional Support
District and web-based resources have been provided in the Instructional Support column. You will find a variety of instructional resources that align with the content standards. The additional resources provided should be used as needed for content support and scaffolding.

Vocabulary and Fluency
The inclusion of vocabulary serves as a resource for teacher planning and for building a common language across K-12 mathematics. One of the goals for Tennessee State Standards is to create a common language, and the expectation is that teachers will embed this language throughout their daily lessons. In order to aid your planning, we have also included a list of fluency activities for each lesson. It is expected that fluency practice will be a part of your daily instruction. (Note: Fluency practice is not intended to be speed drills, but rather an intentional sequence to support student automaticity. Conceptual understanding must underpin the work of fluency.

Instructional Calendar
As a support to teachers and leaders, an instructional calendar is provided ***as a guide***. Teachers should use this calendar for effective planning and pacing, and leaders should use this calendar to provide *support* for teachers. Due to variances in class schedules and differentiated support that may be needed for students' adjustment to the calendar may be required.

Topics Addressed in Quarter

Module 2
Topic A: Shapes and Centers of Distribution
Topic B: Describing the Center of a Distribution
Topic D: Numerical Data on Two Variables

Module 5
Topic A: Elements of Modeling
Topic B: Completing the Modeling Cycle

Time Frame: March 23 – May 22, 2020

Overview

In Module 2, students reconnect with and deepen their understanding of statistics and probability concepts first introduced in Grades 6, 7, and 8. Students develop a set of tools for understanding and interpreting variability in data, and begin to make more informed decisions from data. They work with data distributions of various shapes, centers, and spreads. Module 2 sets the stage for more extensive work with sampling and inference in later grades. In Module 5, students synthesize what they have learned during the year about functions to select the correct function type in a series of modeling problems. Students no longer have the benefit of a module or lesson title that includes function type to guide them in their choices. Skills and knowledge from the previous modules will support the requirements of this module, including writing, rewriting, comparing, and graphing functions and interpretation of the parameters of an equation. Students must also draw on their study of statistics in Module 2, using graphs and functions to model a context presented with data and/or tables of values. In module 5, the modeling cycle is used as the organizing structure, rather than function type.

Grade Level Standard	Type of Rigor	Foundational Standards
A1. N.Q.A.2	Conceptual Understanding	Introductory
A1. N.Q.A.3	Conceptual Understanding	8.EE
A1. S.ID.C.1	Conceptual Understanding & Procedural Fluency	6.SP
A1. S.ID.C.2	Conceptual Understanding & Procedural Fluency	6.SP
A1. S.ID.C.3	Conceptual Understanding	6.SP
A1. S.ID.C.4*	Conceptual Understanding & Procedural Fluency	8.SP
A1. S.ID.C.5*	Conceptual Understanding	8.SP
A1. S.ID.C.6*	Conceptual Understanding & Procedural Fluency	8.SP
A1. S.ID.C.7*	Conceptual Understanding	8.SP
A1. A. CED.A.1	Conceptual Understanding, Procedural Fluency & Application	8.EE
A1. A. CED.A.2	Conceptual Understanding & Application	8.EE
A1. F.IF.B.3*	Conceptual Understanding	8.F.B
A1. F.IF.B.4*	Conceptual Understanding	8.F.B
A1. F.IF.B.5*	Conceptual Understanding & Procedural Fluency	8.F.B
A1. F.LE.A.1	Conceptual Understanding	8.F.A, 8.F.B
A1. F.LE.A.2	Conceptual Understanding	8.F.B
A1. F.BF.A.1	Conceptual Understanding & Procedural Fluency	8.F.B
Indicates 2017-2018 Power Standard		
Instructional Focus Documents-Algebra I		

TN STATE STANDARDS	CONTENT	INSTRUCTIONAL SUPPORT	VOCABULARY

Module 2: Descriptive Statistics

Algebra I Pacing and Preparation Guide

Allow approximately 0.5 week for instruction, review and assessment of Topic A (includes TN Ready review)

Allow 1 week for instruction, review and assessment of Topic B (includes TN Ready review)

Mid-Module 2 Assessment Window – April 1 - April 2 (do not use problems from omitted lesson)

Allow approximately 1 week for instruction, review and assessment of Topic D (includes TN Ready review)

End-of-Module 2 Assessment Window – April 9 (do not use problems from omitted lesson)

Domain: Interpreting Categorical and Quantitative Data

Cluster: Summarize, represent, and interpret data on a single count or measurement variable.

- 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).

Essential Questions:

- In what different ways can data be represented on a real number line, and how can statistics appropriate to the shape of the data distribution serve to compare two or more data sets?
- What information can a slope (rate of change) and intercept (constant term) of a linear model provide regarding the context of a situation?

Topic A Objectives

Lesson 1: A1. S.ID.A.1

- Students use informal language to describe the shape, center, and variability of a distribution based on a dot plot, histogram, or box plot.
- § Students recognize that a first step in interpreting data is making sense of the context.
- § Students make meaningful conjectures to connect data distributions to their contexts and the questions that could be answered by studying the distributions.

Lesson 2: A1. S.ID.A.1, A1. S.ID.A.3

- Students construct a dot plot from a data set.
- Students calculate the mean of a data set and the median of a data set.

Topic A: Descriptive Statistics

Special Note: *It is recommended that teachers access the additional resources below to meet the needs of your students*

Lesson 1 (This is a review of concepts previously studied related to data. This should be reviewed as needed.): (eMath U10:L1 Graphical Displays of Data)

Lesson 2: (eMath U10:L3 Measures of Central Tendency)

Lesson 3

Special Note: *It is recommended that teachers assess student gaps and scaffold accordingly using the resources/ tasks/lessons in the Resource Toolbox or those provided under Additional Resources.*

Also, assessments other than Mid-Module and End-of-Module assessments should be given based upon the lessons taught and the needs of the students.

Additional Resources:

Khan Academy Videos: Statistics Overview

Task(s)

MVP Task 1 Texting By the Numbers

MVP Task 2 Data Distributions

MathBits Algebra I Notebook

Vocabulary/Familiar Terms and Symbols for Module 2:

Box Plot
Data Distribution
Mean
Mean Absolute Deviation
Median
Quartile
Variability

New or Recently Introduced Terms for Module 2

Association
Conditional Relative Frequency
Correlation Coefficient
Interquartile Range
Outlier
Residual
Residual Plot
Sample Standard Deviation
Skewed Data Distribution

TN STATE STANDARDS	CONTENT	INSTRUCTIONAL SUPPORT	VOCABULARY
Domain: Interpreting Categorical and Quantitative Data **Cluster:** Summarize, represent, and interpret data on a single count or measurement variable. 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 observe and describe that measures of center (mean and median) are nearly the same for distributions that are nearly symmetrical. • Students observe and explain why the mean and median are different for distributions that are skewed. • Students select the mean as an appropriate description of center for a symmetrical distribution and the median as a better description of center for a distribution that is skewed. **Lesson 3: A1. S.ID.A.1, A1. S.ID.A.2, A1. S.ID.A.3** • Students estimate the mean and median of a distribution represented by a dot plot or a histogram. • Students indicate that the mean is a reasonable description of a typical value for a distribution that is symmetrical but that the median is a better description of a typical value for a distribution that is skewed. • Students interpret the mean as a balance point of a distribution. • Students indicate that for a distribution in which neither the mean nor the median is a good description of a typical value, the mean still provides a description of the center of a distribution in terms of the balance point.	**Topic A: Descriptive Statistics** **Special Note:** *It is recommended that teachers access the additional resources below to meet the needs of your students* **Lesson 1** (This is a review of concepts previously studied related to data. This should be reviewed as needed.): (eMath U10:L1 Graphical Displays of Data) **Lesson 2:** (eMath U10:L3 Measures of Central Tendency) **Lesson 3** **Special Note:** *It is recommended that teachers assess student gaps and scaffold accordingly using the resources/ tasks/lessons in the Resource Toolbox or those provided under Additional Resources.* *Also, assessments other than Mid-Module and End-of-Module assessments should be given based upon the lessons taught and the needs of the students.* **Additional Resources:** Khan Academy Videos: Statistics Overview **Task(s)** MVP Task 1 Texting By the Numbers MVP Task 2 Data Distributions MathBits Algebra I Notebook	**Vocabulary/Familiar Terms and Symbols for Module 2**: Box Plot Data Distribution Mean Mean Absolute Deviation Median Quartile Variability **New or Recently Introduced Terms for Module 2** Association Conditional Relative Frequency Correlation Coefficient Interquartile Range Outlier Residual Residual Plot Sample Standard Deviation Skewed Data Distribution
Domain: Interpreting Categorical and Quantitative Data **Cluster:** Summarize, represent, and interpret data on a single count or measurement variable.	**Topic B Objectives:** **Lesson 4: A1. S.ID.A.1, A1. S.ID.A.2, A1. S.ID.A.3** • Students calculate the deviations from the mean for two symmetrical data sets that have the same means.	**Topic B: Describing Variability and Comparing Distributions** **Special Note:** *It is recommended that teachers access the additional resources below to meet the needs of your students* **Lesson 4**	**Vocabulary/Familiar Terms and Symbols for Module 2**: Box Plot Data Distribution Mean Mean Absolute Deviation

TN STATE STANDARDS	CONTENT	INSTRUCTIONAL SUPPORT	VOCABULARY
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 interpret deviations that are generally larger as identifying distributions that have a greater spread or variability than a distribution in which the deviations are generally smaller. **Lesson 5**: A1. S.ID.A.1, A1. S.ID.A.2, A1. S.ID.A.3 • Students calculate the standard deviation for a set of data. • Students interpret the standard deviation as a typical distance from the mean. **Lesson 6:** A1. S.ID.A.1, A1. S.ID.A.2, A1. S.ID.A.3 • Students calculate the standard deviation of a sample with the aid of a calculator. • Students compare the relative variability of distributions using standard deviations. **Lesson 7:** A1. S.ID.A.1, A1. S.ID.A.3 • Students explain why a median is a better description of a typical value for a skewed distribution. • Students calculate the 5-number summary of a data set. • Students construct a box plot based on the 5-number summary and calculate the interquartile range (IQR). • Students interpret the IQR as a description of variability in the data. • Students identify outliers in a data distribution. **Lesson 8:** A1. S.ID.A.1, A1. S.ID.A.2, A1. S.ID.A.3 • Students compare two or more distributions in terms of center, variability,	**Lesson 5** (Combine with Lesson 6): (eMath U10:L4 Variation within a Data Set) **Lesson 7:** (eMath U10:L2 Quartiles and Boxplots) / (Arlington Algebra Project: Percentiles pg.343 & Statistics on the Graphing Calculator pg.409) **Lesson 8** **Mid-Module 2 Assessment** ***(Complete by 4/2/20; do not use problems from omitted lesson)*** **Special Note:** *It is recommended that teachers assess student gaps and scaffold accordingly using the resources/ tasks/lessons in the Resource Toolbox or those provided under Additional Resources.* *Also, assessments other than Mid-Module and End-of-Module assessments should be given based upon the lessons taught and the needs of the students.* **Additional Resources:** Khan Academy Videos: Statistics Overview MathBits Algebra I Notebook **Task(s)** Illustrative Math: Haircut Costs Illustrative Math: Speed Trap	Median Quartile Variability **New or Recently Introduced Terms for Module 2** Association Conditional Relative Frequency Correlation Coefficient Interquartile Range Outlier Residual Residual Plot Sample Standard Deviation Skewed Data Distribution

TN STATE STANDARDS	CONTENT	INSTRUCTIONAL SUPPORT	VOCABULARY
	and shape. • Students interpret a measure of center as a typical value. • Students interpret the IQR as a description of the variability of the data. • Students answer questions that address differences and similarities for two or more distributions.		
Domain: Interpreting Categorical and Quantitative Data **Cluster:** Summarize, represent, and interpret data on two categorical and quantitative variables. ➢ **A1. S.ID.B.4 (formerly S-ID.B.6)** 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. **b. (formerly S-ID.B.6.c)** Fit a linear function for a scatter plot that suggests a linear association. *Emphasize linear models, quadratic models, and exponential models with domains in the integers.* *For A1. S.ID.B.4a:* *i) Tasks have a real-world context.* *ii) Exponential functions are limited to those with domains in the integers.*	**Topic D Objectives:** **Lesson 12: A1. S.ID.B.4a** • Students distinguish between scatter plots that display a relationship that can be reasonably modeled by a linear equation and those that should be modeled by a nonlinear equation. **Lesson 13: A1. S.ID.B.4a** • Students distinguish between scatter plots that display a relationship that can be reasonably modeled by a linear equation and those that should be modeled by a nonlinear equation. • Students use an equation given as a model for a nonlinear relationship to answer questions based on an understanding of the specific equation and the context of the data. **Lesson 14: A1. S.ID.C.5** • Students determine the least-squares regression line from a given set of data using technology. • Students use the least-squares regression line to make predictions. **Lesson 15-20 (optional standards included)** ***Omit problems/tasks/lessons that***	***OMIT Topic C*** **Topic D: Numerical Data on Two Variables** **Special Note:** *It is recommended that teachers access the additional resources below to meet the needs of your students* **Lesson 12** (Review lesson): **Lesson 13:** (eMath U10:L6 Bivariate Data Analysis) **Lesson 14:** (eMath U10:L7 Linear Regression on the Calculator) / (eMath U10:L8 Other Types of Regression) **Lesson 15** (omit) **Lesson 16** (omit) **Lesson 17** (omit) **Lesson 18** (omit) **Lesson 19:** (eMath U10:L9 Quantifying Predictability) / (Arlington Algebra Project: Correlation Coefficient pg.85) **Lesson 20** (extension) **Task** Illustrative Math: Olympic Men's 100-meter dash **Additional Resources:** MathBits Algebra I Notebook **Special Note:** *It is recommended that*	**Vocabulary/Familiar Terms and Symbols for Module 2**: Box Plot Data Distribution Mean Mean Absolute Deviation Median Quartile Variability **New or Recently Introduced Terms for Module 2** Association Conditional Relative Frequency Correlation Coefficient Interquartile Range Outlier Residual Residual Plot Sample Standard Deviation Skewed Data Distribution

TN STATE STANDARDS	CONTENT	INSTRUCTIONAL SUPPORT	VOCABULARY
Domain: Interpreting Categorical and Quantitative Data **Cluster:** Interpret linear models **A1. S.ID.C.5 (formerly S-ID.C.7)** 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 (formerly S-ID.C.8)** Compute (using technology) and interpret the correlation coefficient of a linear fit. **A1.S.ID.C.7 (formerly S-ID.C.9)** Distinguish between correlation and causation.	***are no longer assessed.*** **Lesson 19: A1. S.ID.B.4a, A1. S.ID.B.4b, A1.S.ID.C.6, A1.S.ID.C.7** • Students use technology to determine the value of the correlation coefficient for a given data set. • Students interpret the value of the correlation coefficient as a measure of strength and direction of a linear relationship. • Students explain why correlation does not imply causation.	*teachers assess student gaps and scaffold accordingly using the resources/ tasks/lessons in the Resource Toolbox or those provided under Additional Resources.* *Also, assessments other than Mid-Module and End-of-Module assessments should be given based upon the lessons taught and the needs of the students.* **End-of-Module 2 Assessment (*Complete by 4/9/20*; do not use problems from omitted lesson)**	
Module 5: A Synthesis of Modeling with Equations and Functions **Algebra I Pacing and Preparation Guide** ***Allow approximately 1 week for instruction, review and assessment of Topic A*** ***Allow 1 week for instruction, review and assessment of Topic B*** **End-of-Module Assessment Window – May 14-15** **Final Exams – May 19 - 20**			
Domain: Quantities **Cluster:** Reason quantitatively and use units to solve problems. ➢ **A1. N.Q.A.2 (formerly N.Q.B.2)** Identify, interpret, and justify appropriate quantities for the purpose of descriptive modeling. *Descriptive modeling refers to understanding and interpreting graphs; identifying extraneous information; choosing appropriate units; etc.* **Domain:** Create equations **Cluster:** Create equations that describe	**Essential Questions:** • How can an appropriate equation be built by looking at a mathematical pattern? • How can prior knowledge of functions be used to build precise and efficient models? • How do the multiple representation of functions aid in building more efficient and more accurate models? • How can technology be employed to help build mathematical models, and how can it be used to assess the appropriateness of a specific model? • How can we derive and apply the formula for the sum of a finite geometric	**Topic A: Elements of Modeling** **Lesson 1** **Lesson 2** **Lesson 3** **Special Note:** *It is recommended that teachers assess student gaps and scaffold accordingly using the resources/ tasks/lessons in the Resource Toolbox or those provided under Additional Resources.* *Also, assessments other than Mid-Module and End-of-Module assessments should be given based upon the lessons taught and the needs of the students.*	**Vocabulary/Familiar Terms and Symbols for Module 5**: Analytical Model Arithmetic Sequence Average Rate of Change Cube Root Function End Behavior Exponential Function First Differences Function Geometric Sequence Linear Function Parameter Parent Function Piecewise Defined Function Quadratic Function

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numbers or relationships. ■ 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. **Domain**: Interpreting Functions **Cluster:** Interpret functions that arise in applications in terms of the context. ■ A1. F.IF.B.3 **(formerly F.IF.B.4)** 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 **(formerly F.IF.B.5)** Relate the domain of a function to its graph and, where applicable, to the quantitative relationship it describes. ■ A1. F.IF.B.5 **(formerly F.IF.B.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. **Domain**: Building Functions **Cluster:** Build a function that models a relationship between two quantities. ➢ A1. F.BF.A.1 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.	series? • How can both algebraic and geometric models optimize particular important values? • How can systems of equations and inequalities be used to define feasible regions of solutions to solve problems? • What is the purpose of building constraints for a model, including using constraints to define feasible solutions and using domain restrictions when analyzing graphs to ensure validity of a function? • Why is a deep knowledge of the various types of basic mathematical functions absolutely necessary in order to build models for real-world phenomena? **Topic A Objectives** **Lesson 1**: A1.A.CED.A.2, A1. F.BF.A.1, A1. F.IF.B.4, A1. N.Q.A.2 • From a graphic representation, students recognize the function type, interpret key features of the graph, and create an equation or table to use as a model of the context for functions addressed in previous modules (i.e., linear, exponential, quadratic, cubic, square root, cube root, absolute value, and other piecewise functions). **Lesson 2:** A1.A.CED.A.2, A1. F.BF.A.1, A1. F.IF.B.3, A1. F.LE.A.1b, A1. F.LE.A.1c, A1. F.LE.A.2 • Students recognize linear, quadratic, and exponential functions when presented as a data set or sequence, and formulate a model based on the data.	**Additional Resources:** MathBits Algebra I Notebook **Task(s)** MVP Task 8 What Does It Mean? MVP Task 9 Geometric Meanies MVP Task 10 I Know...What Do You Know?	Range Recursive Process Square Root Function Second Differences **New or Recently Introduced Terms for Module 5** Analytical Model Descriptive Model

TN STATE STANDARDS	CONTENT	INSTRUCTIONAL SUPPORT	VOCABULARY
Domain: Linear, Quadratic, and Exponential Models **Cluster:** Construct and compare linear, quadratic, and exponential models and solve problems. ➢ A1. F.LE.A.1 Distinguish between situations that can be modeled with linear functions and with exponential functions. **a.** Recognize that linear functions grow by equal differences over equal intervals and that exponential functions grow by equal factors over equal intervals. **b.** Recognize situations in which one quantity changes at a constant rate per unit interval relative to another. **c.** 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.	**Lesson 3:** A1.A.CED.A.2, A1. F.BF.A.1, A1. F.LE.A.1b, A1. F.LE.A.1c, A1. F.LE.A.2 • Students make sense of a contextual situation that can be modeled with linear, quadratic, and exponential functions when presented as a word problem. They analyze a verbal description and create a model using equations, graphs, or tables.	**Topic A: Elements of Modeling** **Lesson 1** **Lesson 2** **Lesson 3** **Special Note:** *It is recommended that teachers assess student gaps and scaffold accordingly using the resources/ tasks/lessons in the Resource Toolbox or those provided under Additional Resources.* *Also, assessments other than Mid-Module and End-of-Module assessments should be given based upon the lessons taught and the needs of the students.* **Additional Resources:** MathBits Algebra I Notebook **Task(s)** MVP Task 8 What Does It Mean? MVP Task 9 Geometric Meanies MVP Task 10 I Know...What Do You Know?	**Vocabulary/Familiar Terms and Symbols for Module 5**: Analytical Model Arithmetic Sequence Average Rate of Change Cube Root Function End Behavior Exponential Function First Differences Function Geometric Sequence Linear Function Parameter Parent Function Piecewise Defined Function Quadratic Function Range Recursive Process Square Root Function Second Differences **New or Recently Introduced Terms for Module 5** Analytical Model Descriptive Model
Domain: Quantities **Cluster:** Reason quantitatively and use units to solve problems. ➢ A1. N.Q.A.2 **(formerly N.Q.B.2)** Identify, interpret, and justify appropriate quantities for the purpose of descriptive modeling. *Descriptive modeling refers to understanding and interpreting graphs; identifying extraneous*	**Lesson 4:** A1.A.CED.A.2, A1. F.IF.B.3, A1. F.IF.B.4, A1. F.IF.B.5, A1. N.Q.A.2 • Students create a two-variable equation that models the graph from a context. Function types include linear, quadratic, exponential, square root, cube root, and absolute value. They interpret the graph and function and answer questions related to the model, choosing an	**Topic B; Completing the Modeling Cycle** Lesson 4 (optional) Lesson 5 (optional) Lessons 6-7 (optional) Lessons 8-9 (optional) **Special Note:** *It is recommended that teachers assess student gaps and scaffold accordingly using the resources/ tasks/lessons in the Resource Toolbox or those provided*	**Module 5**: Analytical Model Arithmetic Sequence Average Rate of Change Cube Root Function End Behavior Exponential Function First Differences Function Geometric Sequence

TN STATE STANDARDS	CONTENT	INSTRUCTIONAL SUPPORT	VOCABULARY
information; choosing appropriate units; etc. ➢ A1. N.Q.A.3 **(formerly N.Q.B.3)** Choose a level of accuracy appropriate to limitations on measurement when reporting quantities **Domain:** Create equations **Cluster:** Create equations that describe numbers or relationships. A1.A.CED.A.1 Create equations and inequalities in one variable and use them to solve problems. *Tasks are limited to linear, quadratic, or exponential equations with integer exponents.* 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. **Domain**: Interpreting Functions **Cluster:** Interpret functions that arise in applications in terms of the context. A1. F.IF.B.3 **(formerly F.IF.B.4)** 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 **(formerly F.IF.B.5)** Relate the domain of a function to its graph and, where applicable, to the quantitative relationship it describes.	appropriate level of precision in reporting their results **Lesson 5:** A1.A.CED.A.2, A1.F.BF.A.1a, A1. F.LE.A.1b, A1.F.LE.A.1c, A1. F.LE.A.2 • Students recognize when a table of values represents an arithmetic or geometric sequence. Patterns are present in tables of values. They choose and define the parameter values for a function that represents a sequence. **Lesson 6:** A1.A.CED.A.1, A1.A.CED.A.2, A1.F.BF.A.1, A1. F.IF.B.3, A1. F.LE.A.1b, A1.F.LE.A.1c, A1. F.LE.A.2, A1. N.Q.A.3 • Students write equations to model data from tables, which can be represented with linear, quadratic, or exponential functions, including several from Lessons 4 and 5. They recognize when a set of data can be modeled with a linear, exponential, or quadratic function and create the equation that models the data. • Students interpret the function in terms of the context in which it is presented, make predictions based on the model, and use an appropriate level of precision for reporting results and solutions. **Lesson 7:** A1. F.BF.A.1, A1. F.IF.B.3, A1. N.Q.A.2, A1. N.Q.A.3, A1. S.ID.B.4a, A1. S.ID.B.4b, A1.S.ID.C.6 • Students use linear, quadratic, and exponential functions to model data from tables, and choose the regression most	*under Additional Resources.* *Also, assessments other than Mid-Module and End-of-Module assessments should be given based upon the lessons taught and the needs of the students.* **Additional Resources:** MathBits Algebra I Notebook **Task(s)** MVP Task 2 Sorting Out the Change MVP Task 3 Where's My Change? MVP Task 5 Getting Down to Business MVP Task 6 Growing, Growing, Gone MVP Task 4 Training Day MVP Task 5 Training Day Part II MVP Task 6 Shifting Functions **Special Note:** *It is recommended that teachers assess student gaps and scaffold accordingly using the resources/ tasks/lessons in the Resource Toolbox or those provided under Additional Resources.* *Also, assessments other than Mid-Module and End-of-Module assessments should be given based upon the lessons taught and the needs of the students.* **End-of-Module 5 Assessment (*Complete by 5/15/20*; do not use problems from omitted lesson)**	Linear Function Parameter Parent Function Piecewise Defined Function Quadratic Function Range Recursive Process Square Root Function Second Differences **New or Recently Introduced Terms for Module 5** Analytical Model Descriptive Model **Module 5**: Analytical Model Arithmetic Sequence Average Rate of Change Cube Root Function End Behavior Exponential Function First Differences Function Geometric Sequence Linear Function Parameter Parent Function Piecewise Defined Function Quadratic Function Range Recursive Process Square Root Function

TN STATE STANDARDS	CONTENT	INSTRUCTIONAL SUPPORT	VOCABULARY
Domain: Building Functions **Cluster:** Build a function that models a relationship between two quantities. ➢ A1. F.BF.A.1 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. **Domain**: Linear, Quadratic, and Exponential Models **Cluster:** Construct and compare linear, quadratic, and exponential models and solve problems. ➢ A1. F.LE.A.1 Distinguish between situations that can be modeled with linear functions and with exponential functions. **a.** Recognize that linear functions grow by equal differences over equal intervals and that exponential functions grow by equal factors over equal intervals. **b.** Recognize situations in which one quantity changes at a constant rate per unit interval relative to another. **c.** 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 **Domain:** Interpreting Categorical and Quantitative Data	appropriate to a given context. They use the correlation coefficient to determine the accuracy of a regression model and then interpret the function in context. They then make predictions based on their model, and use an appropriate level of precision for reporting results and solutions.**:** **Lesson 8: A1.A.CED.A.2, A1.F.BF.A.1, A1.F.LE.A.1c, A1. F.LE.A.2, A1. N.Q.A.2** • Students model functions described verbally in a given context using graphs, tables, or algebraic representations. **Lesson 9: A1.A.CED.A.1, A1.F.BF.A.1, A1. F.LE.A.2, A1. N.Q.A.2, A1. N.Q.A.3** • Students interpret the function and its graph and use them to answer questions related to the model, including calculating the rate of change over an interval, and always using an appropriate level of precision when reporting results. • Students use graphs to interpret the function represented by the equation in terms of the context, and answer questions about the model using the appropriate level of precision in reporting results.	**Topic B; Completing the Modeling Cycle** Lesson 4 (optional) Lesson 5 (optional) Lessons 6-7 (optional) Lessons 8-9 (optional) **Special Note:** *It is recommended that teachers assess student gaps and scaffold accordingly using the resources/ tasks/lessons in the Resource Toolbox or those provided under Additional Resources.* *Also, assessments other than Mid-Module and End-of-Module assessments should be given based upon the lessons taught and the needs of the students.* **Additional Resources:** MathBits Algebra I Notebook **Task(s)** MVP Task 2 Sorting Out the Change MVP Task 3 Where's My Change? MVP Task 5 Getting Down to Business MVP Task 6 Growing, Growing, Gone MVP Task 4 Training Day MVP Task 5 Training Day Part II MVP Task 6 Shifting Functions **Special Note:** *It is recommended that teachers assess student gaps and scaffold accordingly using the resources/ tasks/lessons in the Resource Toolbox or those provided under Additional Resources.* *Also, assessments other than Mid-Module and*	Second Differences **New or Recently Introduced Terms for Module 5** Analytical Model Descriptive Model

TN STATE STANDARDS	CONTENT	INSTRUCTIONAL SUPPORT	VOCABULARY
Cluster: Summarize, represent, and interpret data on two categorical and quantitative variables. ➢ A1. S.ID.B.4 **(formerly S-ID.B.6)** 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. **b. (formerly S-ID.B.6.c)** Fit a linear function for a scatter plot that suggests a linear association. *Emphasize linear models, quadratic models, and exponential models with domains in the integers.* *For A1. S.ID.B.4a:* *i) Tasks have a real-world context.* *ii) Exponential functions are limited to those with domains in the integers.* **Domain:** Interpreting Categorical and Quantitative Data **Cluster:** Interpret linear models ■ A1.S.ID.C.6 **(formerly S-ID.C.8)** Compute (using technology) and interpret the correlation coefficient of a linear fit.		*End-of-Module assessments should be given based upon the lessons taught and the needs of the students.* **End-of-Module 5 Assessment (*Complete by 5/15/20*; do not use problems from omitted lesson)**	**Vocabulary/Familiar Terms and Symbols for Module 5**: Analytical Model Arithmetic Sequence Average Rate of Change Cube Root Function End Behavior Exponential Function First Differences Function Geometric Sequence Linear Function Parameter Parent Function Piecewise Defined Function Quadratic Function Range Recursive Process Square Root Function Second Differences **New or Recently Introduced Terms for Module 5** Analytical Model Descriptive Model

RESOURCE TOOLKIT

Standards

***Teacher Guide* to Algebra I Standards: Linear Equations**
HS Flip Book with Examples of Each Standard
CCSS
http://www.ccsstoolbox.org/
http://parcconline.org/
Achieve
Tennessee Academic Standards for Mathematics
Tennessee Assessment LiveBinder
Achieve the Core Coherence Map

Videos

Khan Academy
Illuminations (NCTM)
Discovery Education
The Futures Channel
The Teaching Channel
Teachertube.com
Get The Math
eMathInstruction

Calculator

Texas Instruments Education
TI-Nspire
http://www.atomiclearning.com/ti_84
TICommonCore.com
http://www.casioeducation.com/educators

Manipulatives/Other Resources

MathBits Algebra I Notebook
Problem Attic
OpenEd
National Library of Virtual Manipulatives
http://www.shodor.org/interactivate/activities/
Edugoodies
Graphic Organizers (9-12)

SEL Resources

SEL Connections with Math Practices
SEL Core Competencies
The Collaborative for Academic, Social, and Emotional Learning (CASEL)

Tasks/Lessons

Edutoolbox (formerly Tncore.org)
Mathematics Assessment Project (MARS Tasks, Lessons & PD Modules)
Dan Meyer's Three-Act Math Tasks
Illustrative Math Tasks
UT Dana Center
Inside Math Tasks
LearnZillion
eMathInstruction
Arlington Algebra Project

ACT/SAT Testing

ACT & SAT
TN ACT Information & Resources
ACT College & Career Readiness Mathematics Standards
SAT Connections
SAT Practice from Khan Academy

March 2020

Suggested Lessons for the Week	Monday	Tuesday	Wednesday	Thursday	Friday	Notes:
	2	**3**	**4**	**5**	**6**	***Please use this suggested pacing as a guide. It is understood that teachers may be up to 1 week ahead or 1 week behind depending on their individual class needs.***
	9	**10**	**11**	**12**	**13** *End of Quarter 3*	**Flex Day Options Include:** ***Standard-*** Suggested standard(s) to review for the day (*****-denotes a Power Standard) ***Pacing*** – Use this time to adjust instruction to stay on pace. ***Other***- This includes assessments, review, re-teaching, etc.
	16	**17**	**18**	**19**	**20**	
	Spring Break					
Module 2, Topic A (Lessons 2&3) Module 2, Topic B (Lesson 4-6)	**23** *Quarter 4 Begins* Topic A Lesson 2	**24** Topic A Lesson 3	**25** Topic B Lesson 4	**26** Topic B Lesson 5 & 6	**27** **Flex Day Options** **A1.A.CED.A.1** **A1.A.CED.A.2** **Pacing** **Other**	
Module 2, Topic B (Lesson 7-8)	**30** Topic B Lesson 7	**31** Topic B Lesson 8	1	2	3	

April 2020

Suggested Lessons for the Week	Monday	Tuesday	Wednesday	Thursday	Friday	Notes:
Assessment, Remediation, and/or Further Application			1 Assessment, Remediation, and/or Further Application	2 Mid Module Assessment (do not use problems from omitted lessons)	3 **Flex Day Options** **A1. F.IF.B.4** **A1. F.IF.B.5** **Pacing** **Other**	***Please use this suggested pacing as a guide. It is understood that teachers may be up to 1 week ahead or 1 week behind depending on their individual class needs.*** **Flex Day Options Include:** ***Standard***- Suggested standard(s) to review for the day (*-denotes a Power Standard) ***Pacing*** – Use this time to adjust instruction to stay on pace. ***Other***- This includes assessments, review, re-teaching, etc.
Module 2, Topic D (Lesson 13-19)	6 Topic D Lesson 13	7 Topic D Lesson 14	8 Topic D Lesson 19	9 End of Module Assessment (do not use problems from omitted lessons)	10 ***Spring Holiday/Good Friday (Out)***	
Assessment, Remediation, and/or Further Application	13	14	15	16	17	
	Flex – TN Ready Testing					
Assessment, Remediation, and/or Further Application	20	21	22	23	24	
	Flex – TN Ready Testing					
Assessment, Remediation, and/or Further Application	27	28	29	30	1	
	Flex – TN Ready Testing					

May 2020

Suggested Lessons for the Week	Monday	Tuesday	Wednesday	Thursday	Friday
Assessment, Remediation, and/or Further Application					**1**
	Flex – TN Ready Testing				
Assessment, Remediation, and/or Further Application	**4**	**5**	**6**	**7**	**8**
	Flex – TN Ready Testing				
Module 5, Topic A (Lessons 1-3)	**11** Topic A Lesson 1	**12** Topic A Lesson 2	**13** Topic A Lesson 3	**14** End of Module Assessment (do not use problems from omitted lessons)	**15** **Flex Day Options** **A1. F.LE.A.2** **A1.S.ID.C.5** **Pacing** **Other**
Assessment, Remediation, and/or Further Application	**18** Assessment, Remediation, and/or Further Application	**19** *Final Exams*	**20** *Final Exams*	**21** *Final Exams*	**22** *½ day students* *End of 4TH Quarter* **Flex Day Options** **A1.S.ID.C.6** **Pacing** **Other**
	25 *Memorial Day*	**26** **PD FLEX DAYS**	**27**	**28**	**29**

Please use this suggested pacing as a guide. It is understood that teachers may be up to 1 week ahead or 1 week behind depending on their individual class needs.

Flex Day Options Include:

***Standard*-** Suggested standard(s) to review for the day
(*-denotes a Power Standard)

Pacing – Use this time to adjust instruction to stay on pace.

Other- This includes assessments, review, re-teaching, etc.