Mathematics
Geometry: Year at a Glance
2018 - 2019

Q1	Q2	Q3	Q4
Aug. 6 – Oct. 5	Oct. 16 - Dec. 19	Jan. 7 – Mar. 8	Mar. 18 – May 24 TN Ready Testing Apr. 22 - May23
Tools of Geometry, Reasoning and Proof, Transformations and Congruence, Transformations and Symmetry, Lines and Angles	Triangle Congruence with Applications, Properties of Triangles, Special Segments in Triangles, Properties of Quadrilaterals with Coordinate Proofs	Similarity and Transformations, Using Similar Triangles, Trigonometry with Right Triangles, Trigonometry with All Triangles, Properties of Angles and Segments in Circles	Properties of Circles, Arc Length, Sector Area, and Equations of Circles, Measurement and Modeling in Two and Three Dimensions, Volume Formulas, Visualizing Solids, Trigonometry with All Triangles
G.CO.A.1	G.CO.B.7	G.CO.A.1	G.CO.D.12
G.CO.A.2	G.CO.B.8	G. SRT.A.1	G.C.A.2
G.CO.A.3	G.CO.C.10	G. SRT.A.2	G.C.A.3
G.CO.A.4	G.CO.C.11	G. SRT.A.3	G.C.B.4
G.CO.A.5	G.CO.D.12	G. SRT.B.4	G. GPE.A.1
G.CO.B.6	G. SRT.B.4	G. SRT.B.5	G. GPE.B.2
G.CO.B.7	G. SRT.B.5	G. SRT.C.6	G. GPE.B.3
G.CO.C.9	G. GPE.B.2	G. SRT.C.7	G. GPE.B.4
G.CO.D.12	G. GPE.B.5	G. SRT.C.8	G.MG.A.1
G. GPE.B.2	G.MG.A.1	G. MG.A.2	G. MG.A.2
G. GPE.B.3	G.MG.A.2	G. GMD.A.1	G. GMD.A.1
		G.C.A.1	G. GMD.A.2
		G.C.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.

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**.

Curriculum and Instruction – Mathematics

Quarter 1 Geometry

The **Standards for Mathematical Practice** describe varieties of expertise, habits of minds and productive dispositions that mathematics educators at all levels should seek to develop in their students. These practices rest on important National Council of Teachers of Mathematics (NCTM) "processes and proficiencies" with longstanding importance in mathematics education. Throughout the year, students should continue to develop proficiency with the eight Standards for Mathematical Practice. The following are the eight Standards for Mathematical Practice:

1. Make sense of problems and persevere in solving them.
2. Reason abstractly and quantitatively.
3. Construct viable arguments and critique the reasoning of them.
4. Model with mathematics.
5. Use appropriate tools strategically.
6. Attend to precision.
7. Look for and make use of structure.
8. Look for and express regularity in repeated reasoning.

This curriculum map is designed to help teachers make effective decisions about what mathematical content to teach so that ultimately our students can reach Destination 2025. 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.

- Tennessee Mathematics Content Standards
- Standards for Mathematical Practice
- Literacy Skills for Mathematical Proficency

Structure of the Standards

Structure of the TN State Standards include:

- **Content Standards** - Statements of what a student should know, understand, and be able to do.
- **Clusters** - Groups of related standards. Cluster headings may be considered as the big idea(s) that the group of standards they represent are addressing. They are therefore useful as a quick summary of the progression of ideas that the standards in a domain are covering and can help teachers to determine the focus of the standards they are teaching.
- **Domains** - A large category of mathematics that the clusters and their respective content standards delineate and address. For example, Number and Operations – Fractions is a domain under which there are a number of clusters (the big ideas that will be addressed) along with their respective content standards, which give the specifics of what the student should know, understand, and be able to do when working with fractions.
- **Conceptual Categories** – The content standards, clusters, and domains in the 9th-12th grades are further organized under conceptual categories. These are very broad categories of mathematical thought and lend themselves to the organization of high school course work. For example, Algebra is a conceptual category in the high school standards under which are domains such as Seeing Structure in Expressions, Creating Equations, Arithmetic with Polynomials and Rational Expressions, etc.

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

- **Tools of Geometry**
- **Reasoning & Proof**
- **Transformations, Congruence & Similarity**
- **Lines & Angles**

Overview

Rotations, reflections, translations and congruency are developed experimentally in grade 8, and this experience is built upon in geometry, giving greater attention to precise definitions and formal reasoning. Properties of lines and angles, triangles and parallelograms were investigated in Grades 7 and 8. In geometry, these properties are revisited in a more formal setting, giving greater attention to precise statements of theorems and establishing these theorems by means of formal reasoning. During quarter one students will develop the relationship between transformations and congruency. Students will study Congruence (G-CO), namely experimenting with transformations in the plane, understanding congruence in terms of rigid motions, proving geometric theorems, prove geometric theorems, and make geometric constructions with a variety of tools. Students will also use congruence and similarity criteria for triangles to solve problems and to prove relationships (G-SRT). Additionally, in this quarter, students will use coordinates to prove simple geometric theorems algebraically (G-GPE).

Content Standard	Type of Rigor	Foundational Standards
G-CO.A.1,2,3,4,5	Procedural Skill and Fluency, Conceptual Understanding & Application	8.G.A.1, 2,3, 4,5
G-CO.B.6, 7, 8	Conceptual Understanding & Application	8.G.A.1, 2,3, 4,5
G-CO.C.9, 10	Conceptual Understanding & Application	8.G.A.1, 2,3, 4,5
G-CO.D.12	Conceptual Understanding & Application	8.G.A.5; 8. EE.B.6
G-GPE.B.2, 3	Procedural Skill and Fluency & Conceptual Understanding	8.EE.B.6

Curriculum and Instruction – Mathematics

Quarter 1 — Geometry

TN STATE STANDARDS	CONTENT	INSTRUCTIONAL SUPPORT & RESOURCES	
Tools of Geometry **(Allow approximately 2.5 weeks for instruction, review, and assessment)**			
Domain: Congruence (G.CO) **Cluster**: Experiment with transformations in the plane ➢ **G.CO.A.1** Know precise definitions of angle, circle, perpendicular line, parallel line, and line segment, based on the undefined notions of point, line, distance along a line, and distance around a circular arc. **Domain**: Congruence **Cluster**: Make geometric constructions ➢ **G.CO.D.12** Make formal geometric constructions with a variety of tools and methods (compass and straightedge, string, reflective devices, paper folding, dynamic geometric software, etc.).	**Essential Question(s)** In what ways can congruence be useful? **Objective(s):** • Students will explore and know precise definitions of basic geometric terms. • Students will identify the undefined notions used in geometry (point, line, plane, distance). • Students will use tools and methods to precisely copy a segment, copy an angle, bisect a segment, and bisect an angle. • Students will informally perform the constructions listed above using string, reflective devices, paper folding, and/or dynamic geometric software.	***Textbook Lessons*** Lesson 1.1 Points, Lines and Planes, pp. 5 – 13 ***Optional: Use the following resources to ensure that the intended outcome and level of rigor of the standards are met.*** **Task(s)** Illustrative Mathematics Defining Parallel and Perpendicular Lines Task **Additional Resource(s)** **HS Flip Book with examples of each Standard** Points, Lines, and Planes (Interactive Notebook/Foldables)	**Vocabulary** Undefined term, point, line, plane, collinear, coplanar, intersection, definition, defined term, space Include Vocabulary from 3.1 - parallel lines, skew lines, parallel planes **Writing in Math** Connect the words *collinear* and *coplanar* to the prefix *co-*. Is it possible for two points on the surface of a prism to be neither collinear nor coplanar? Justify your answer.
Domain: Congruence **Cluster**: Experiment with transformations in the plane ➢ **G.CO.A.1** Know precise definitions of angle, circle, perpendicular line, parallel line, and line segment, based on the undefined notions of point, line, distance along a line, and distance around a circular arc. **Domain**: Congruence (G.CO) **Cluster**: Make geometric constructions ➢ **G.CO.D.12** Make formal geometric constructions with a variety of tools	**Essential Question(s)** Why are geometry and measurement important in the real world? **Objective(s):** • Students will use a compass and straightedge to draw a segment and use a ruler to measure it. • Students will identify the tools used in formal constructions. • Students will use tools and methods to precisely copy a segment, copy an angle, bisect	***Textbook Lessons*** Lesson 1.2 – Linear Measure and Precision, pp. 14 – 24	**Vocabulary** Line segment, betweeness of points, between, congruent segments, construction **Discussion** Discuss the *Ruler Postulate*. **Writing in Math** Why is it important to have a standard of measure? Refer to p. 14, and include an advantage and disadvantage to the builders of the pyramids.

and methods (compass and straightedge, string, reflective devices, paper folding, dynamic geometric software, etc.).	a segment, and bisect an angle.		
Domain: Congruence (G.CO) **Cluster**: Experiment with transformations in the plane. ➢ **G.CO.A.1** Know precise definitions of angle, circle, perpendicular line, parallel line, and line segment, based on the undefined notions of point, line, distance along a line, and distance around a circular arc. **Domain**: Congruence (G.CO) **Cluster**: Make geometric constructions. ➢ **G.CO.D.12** Make formal geometric constructions with a variety of tools and methods (compass and straightedge, string, reflective devices, paper folding, dynamic geometric software, etc.). **Domain**: Expressing Geometric Properties with Equations (G.GPE) **Cluster:** Use coordinates to prove simple geometric theorems algebraically. ■ **G. GPE.B.2** Use coordinates to prove simple geometric theorems algebraically.	**Essential Question(s)** Why are the Distance and Midpoint Formulas important in the real world? **Objective(s):** • Students will connect two points on a coordinate plane to form a segment and use the Distance Formula to find its length. • Students will find the midpoint of a segment and in the coordinate plane.	***Textbook Lessons*** Lesson 1.3 – Distance and Midpoint, pp. 25 – 35 ***Optional: Use the following resources to ensure that the intended outcome and level of rigor of the standards are met.*** **Task(s)** TN Task Arc, Geometry - Investigating Coordinate Geometry and Its Use in Solving Mathematical Problems *Task 1- My Point is That There Are Many Points!* *Task 2 - The Distance Between Us* *Task 3 - Will That Work for ANY Two Points?*	**Vocabulary** Distance, irrational number, midpoint, segment bisector **Writing in Math** Compare the Distance and Midpoint Formulas. Draw an example of each on a grid.
Domain: Congruence (G.CO) **Cluster**: Experiment with transformations in the plane. ➢ **G.CO.A.1** Know precise definitions of angle, circle, perpendicular line, parallel line, and line segment, based on the undefined notions of point, line, distance along a line, and distance around a circular arc.	**Essential Question(s):** How are number operations used to find and compare the measures of angles. **Objective(s):** • Students will describe the characteristics, and identify angles, circles, perpendicular lines, parallel lines,	***Textbook Lessons*** Lesson 1.4 – Angle Measure, pp. 36 – 45 ***Optional: Use the following resources to ensure that the intended outcome and level of rigor of the standards are met.***	**Vocabulary** Ray, angle, vertex, degree, right angle, acute angle, obtuse angle **Writing in Math** Explain the prefix *bi-* when discussing *segment bisector*.

Domain: Congruence **Cluster**: Make geometric constructions. ➢ **G.CO.D.12** Make formal geometric constructions with a variety of tools and methods (compass and straightedge, string, reflective devices, paper folding, dynamic geometric software, etc.).	rays, and line segments. • Students will use tools and methods to precisely copy a segment, copy an angle, bisect a segment, and bisect an angle.	**Task(s)** Select appropriate tasks from GSE Analytic Geometry Unit 1: Similarity, Congruence and Proofs Illustrative Mathematics Angle Bisection and Midpoints of Line Segment Task Illustrative Mathematics Bisecting an Angle Task	Connect the word *degree* to the idea of measurement. Discuss the similarity between the *Protractor Postulate* and the *Ruler Postulate*.
Domain: Congruence (G.CO) **Cluster**: Experiment with transformations in the plane. ➢ **G.CO.A.1** Know precise definitions of angle, circle, perpendicular line, parallel line, and line segment, based on the undefined notions of point, line, distance along a line, and distance around a circular arc. **Domain**: Congruence (G.CO) **Cluster**: Make geometric constructions. ➢ **G.CO.D.12** Make formal geometric constructions with a variety of tools and methods (compass and straightedge, string, reflective devices, paper folding, dynamic geometric software, etc.).	**Essential Question(s)** What are some real-life applications of congruence? **Objective(s):** • Students will identify and use special pairs of angles. Students will identify perpendicular lines.	***Textbook Lessons*** Lesson 1.5 – Angle Relationships, pp. 46 – 55 ***Optional: Use the following resources to ensure that the intended outcome and level of rigor of the standards are met.*** **Task(s)** Select appropriate tasks from GSE Analytic Geometry Unit 1: Similarity, Congruence and Proofs	**Vocabulary** Adjacent angles, linear pair, vertical angles, complementary angles, supplementary angles, perpendicular **Writing in Math** Discuss the similarity between the postulates for angles and the postulates for segments. Describe three different ways you can determine that an angle is a right angle. *See the Teacher version of the Engage^{ny} lesson which has a thorough graphic organizer of previously learned angle facts.*
Domain: Congruence (G.CO) **Cluster**: Experiment with transformations in the plane. ➢ **G.CO.A.1** Know precise definitions of angle, circle, perpendicular line,	**Essential Question(s)** Why are geometry and measurement important in the real world? **Objective(s):**	***Textbook Lessons*** Definitions of parallel lines, skew lines, and parallel lines from Lesson 3-1 Parallel Lines and Transversals, pp. 171 (definitions only)	

parallel line, and line segment, based on the undefined notions of point, line, distance along a line, and distance around a circular arc. **Domain**: Congruence (G.CO) **Cluster**: Make geometric constructions. ➢ **G.CO.D.12** Make formal geometric constructions with a variety of tools and methods (compass and straightedge, string, reflective devices, paper folding, dynamic geometric software, etc.).	• Students will use a compass and straightedge to draw a segment and use a ruler to measure it. • Students will identify the tools used in formal constructions. Students will use tools and methods to precisely copy a segment, copy an angle, bisect a segment, and bisect an angle.	Constructing a Copy of a Line Segment p.17 Constructing a Copy of an Angle p. 39 Constructing an Angle Bisector p. 40 **Eureka Math Lessons** Eureka Math Geometry Module 1, Topic A, Lessons 1 & 2 – Construct an Equilateral Triangle ***Optional: Use the following resources to ensure that the intended outcome and level of rigor of the standards are met.*** **Eureka Math** Eureka Math Geometry Module 1, Topic A, Lesson 3 – Copy and Bisect an Angle Eureka Math Geometry Module 1, Topic B, Lesson 6 – Solve for Unknown Angles – Angles and Lines at a Point	
Reasoning and Proof **(Allow approximately 1.5 weeks for instruction, review, and assessment)**			
Domain: Congruence (G.CO) **Cluster**: Prove geometric theorems. ■ **G.CO.C.9** Prove theorems about lines and angles.	**Essential Question(s)** How do you use inductive reasoning to make a conjecture? **Objective(s):** • Students will make conjectures based on inductive reasoning. • Students will find counterexamples.	***Textbook Lesson*** Lesson 2.1 – Inductive Reasoning and Conjecture, pp. 89 – 96 **Additional Resource(s)** HS Flip Book with examples of each Standard	**Vocabulary** Inductive reasoning, conjecture, counterexample **Writing in Math** Consider the conjecture: *If two points are equidistant from a third point, then the three points are collinear*. Is this conjecture *true* or *false*? If false, give a counterexample.

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Quarter 1 — Geometry

Domain: Congruence (G.CO) **Cluster**: Prove geometric theorems. ■ **G.CO.C.9** Prove theorems about lines and angles.	**Essential Question(s)** How can theorems help prove figures congruent? **Objective(s):** • Students will analyze statements in if-then form. • Students will write converses, inverses, and contrapositives. • Students will write biconditional statements.	***Textbook Lessons*** Lesson 2.3 – Conditional Statements, pp. 105 – 113 ***Optional: Use the following resources to ensure that the intended outcome and level of rigor of the standards are met.*** Lesson 2.3 Extension – Geometry Lab: Biconditional Statements p. 114	**Vocabulary** Conditional statement, if-then statement, hypothesis, conclusion, related conditionals, converse, inverse, contrapositive, logically equivalent **Writing in Math** Describe a relationship between a conditional, its converse, its inverse, and its contrapositive.
Domain: Congruence (G.CO) **Cluster**: Prove geometric theorems. ■ **G.CO.C.9** Prove theorems about lines and angles.	**Essential Question(s)** How are the properties used in geometry helpful in solving problems? **Objective(s):** • Students will identify and use the properties of congruence and equality in proofs. • Students will interpret geometric diagrams by identifying what can and cannot be assumed.	***Textbook Lesson*** Lesson 2.5 – Postulates and Paragraph Proofs, pp. 125-132	**Vocabulary** Postulate, axiom, proof, theorem, deductive reasoning, paragraph proof, informal proof **Writing in Math** Explain how undefined terms, definitions, postulates, and theorems are alike and how are they different.
Domain: Congruence (G.CO) **Cluster**: Prove geometric theorems. ■ **G.CO.C.9** Prove theorems about lines and angles.	**Essential Question(s)** How can information, definitions, postulate, properties and theorems helpful in writing proofs? **Objective(s):** • Students will use algebra to write two – column proofs. • Students will use properties of equality to write geometric proofs.	***Textbook Lesson*** Lesson 2.6 – Algebraic Proof, pp. 134-141	**Vocabulary** Algebraic proof, two-column proof, formal proof **Writing in Math** Compare and contrast informal or paragraph proofs with formal or two-column proofs. Which type of proof do you find easier to write? Justify your answer.

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Quarter 1 — Geometry

Transformations and Congruence; Transformations and Symmetry (Allow approximately 3 weeks for instruction, review, and assessment)			
Domain: Congruence (G.CO) **Cluster**: Experiment with transformations in the plane. **G.CO.A.4** Develop definitions of rotations, reflections, and translations in terms of angles, circles, perpendicular lines, parallel lines, and line segments.	**Essential Question(s)** How can you represent a transformation in the coordinate plane? **Objective(s):** • Students will construct the reflection definition by connecting any point on the pre-image to is corresponding parts on the reflected image and describe the line segment's relationship to the line of reflection (i.e., the line of reflection is the perpendicular bisector of the segment).	***Textbook Lesson*** Lessons 9.1 –Reflections, pp. 615 – 623 ***Optional: Use the following resources to ensure that the intended outcome and level of rigor of the standards are met.*** **Eureka Math** Eureka Math Geometry Module 1, Topic C, Lesson 14 – Reflections **Task(s)** TN Task Arc, Geometry -Investigating Congruence in Terms of Rigid Motion *Task 3 – Reflect on This* *(Use patty paper to differentiate for struggling learners.)* Illustrative Mathematics Defining Reflections Task	**Vocabulary** Line of reflection **Writing in Math** Describe how to reflect a coordinate figure not on a plane across a line.
Domain: Congruence (G.CO) **Cluster**: Experiment with transformations in the plane. ➢ **G.CO.A.4** Develop definitions of rotations, reflections, and translations in terms of angles, circles, perpendicular lines, parallel lines, and line segments.	**Essential Question(s)** How can you represent a transformation in the coordinate plane? **Objective(s):** • Students will construct the translation definition by connecting any point on the pre-image to its corresponding point on the translated image, and connecting a second point on	***Textbook Lesson*** Lesson 9.2 –Translations, pp. 624 – 631 ***Optional: Use the following resources to ensure that the intended outcome and level of rigor of the standards are met.*** **Eureka Math** Eureka Math Geometry Module 1, Topic	**Vocabulary** Translation vector **Writing in Math** Compare and contrast a translation and a reflection. Describe what a vector is and how it is used to define a translation.

	the pre-image to its corresponding point on the translated image, and describe how the two segments are equal in length, point in the same direction, and are parallel.	C, Lesson 16 – Translations **Task(s)** Select appropriate tasks from GSE Analytic Geometry Unit 1: Similarity, Congruence and Proofs Illustrative Mathematics Identifying Translations Task	Describe any similarities between the meaning of *translation* as it us used in geometry and the word's meaning when used to describe the process of converting words from one language to another.
Domain: Congruence (G.CO) **Cluster**: Experiment with transformations in the plane. ➢ **G.CO.A.4** Develop definitions of rotations, reflections, and translations in terms of angles, circles, perpendicular lines, parallel lines, and line segments.	**Essential Question(s)** How can you represent a transformation in the coordinate plane? **Objective(s):** • Students will construct rotation definition by connecting the center of rotation to any point on the pre-image and to its corresponding point on the rotated image, and describe the measure of the angle formed and the equal measures of the segments that formed the angles part of the definition.	***Textbook Lessons*** Lesson 9.3 – Rotations, pp. 632 – 638 Lesson 9.3 Explore – Geometry Lab: Rotations p. 631 ***Eureka Math*** Eureka Math Geometry Module 1, Topic C, Lesson 13 – Rotations ***Optional: Use the following resources to ensure that the intended outcome and level of rigor of the standards are met.*** **Task(s)** TN Task Arc, Geometry -Investigating Congruence in Terms of Rigid Motion Task 2: Twisting Triangles *(Use patty paper to differentiate for struggling learners.)* Select appropriate tasks from GSE Analytic Geometry Unit 1: Similarity, Congruence and Proofs Illustrative Mathematics Defining Rotations Task Illustrative Mathematics Identifying Rotations	**Vocabulary** Center of rotation, angle of rotation **Writing in Math** Use a graphic organizer to keep track of the types of transformations and their properties in a sequence of transformations.

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Quarter 1 — Geometry

		Task	
Domain: Congruence (G.CO) **Cluster**: Experiment with transformations in the plane ➢ **G.CO.A.5** Given a geometric figure and a rigid motion, draw the image of the figure in multiple ways, including technology. Specify a sequence of rigid motions that will carry a given figure onto another.	**Essential Question(s)** How can you represent a transformation in the coordinate plane**?** **Objective(s):** • Students will draw a specific transformation given a geometric figure and a rotation. Students will predict and verify the sequence of transformations (a composition) that will map a figure onto another.	***Textbook Lesson*** Lesson 9.4 – Compositions of Transformations, pp. 641 – 649 ***Optional: Use the following resources to ensure that the intended outcome and level of rigor of the standards are met.*** Lesson 9.4 Explore – Geometry Software Lab: Compositions of Transformations, p. 640 Eureka Math Geometry Module 1, Topic C, Lesson 13 – Rotations	**Vocabulary** Composition of transformations, glide reflection **Writing in Math** Explain how the Latin word for *rigid* helps to understand *nonrigid transformation*. Compare and contrast the methods learned for combining rigid transformations and nonrigid transformations in the coordinate plane.
Domain: Congruence (G.CO) **Cluster**: Experiment with transformations in the plane ➢ **G.CO.A.3** Given a rectangle, parallelogram, trapezoid, or regular polygon, describe the rotations and reflections that carry it onto itself.	**Essential Question(s)** How can you identify the type of symmetry that a figure has? **Objective(s):** Students will identify line and rotational symmetries in two-dimensional figures.	***Textbook Lesson*** Lesson 9.5 – Symmetry, pp. 653 - 659 ***Optional: Use the following resources to ensure that the intended outcome and level of rigor of the standards are met.*** **Eureka Math** Eureka Math Geometry Module 1, Topic C, Lesson 15 – Rotations, Reflections, and Symmetry	**Vocabulary** Symmetry, line symmetry, line of symmetry, rotational symmetry, center of symmetry, order of symmetry, magnitude of symmetry, plane symmetry, axis symmetry **Writing in Math** Connect the idea of a *reflection* to a figure with *line symmetry*.
Domain: Congruence (G.CO) **Cluster**: Understand congruence in terms of rigid motion ➢ ■ **G.CO.B.6** Use geometric descriptions of rigid motions to transform figures and to predict the effect of a given rigid motion on a given	**Essential Question(s)** How do you define congruence in terms of rigid motion? **Objective(s):** • Students will predict the composition of transformations	**Additional Lesson(s)** Extra lesson – Congruence Transformation Rigid Motions and Congruence Activity (just the activity page) ***Optional: Use the following resources to ensure that the intended outcome and***	**Writing in Math** Define congruent. Relate the word to the terms *equal* and *equivalent*.

figure; given two figures, use the definition of congruence in terms of rigid motions to determine informally if they are congruent.	that will map a figure onto a congruent figure. • Students will determine if two figures are congruent by determining if rigid motions will turn one figure into the other.	***level of rigor of the standards are met.*** **Task(s)** TN Task Arc, Geometry -Investigating Congruence in Terms of Rigid Motion Task 4 -Looks Can Be Deceiving	
Lines, Angles and Triangles' Lines and Angles **(Allow approximately 2 weeks for instruction, review, and assessment)**			
Domain: Congruence (G.CO) **Cluster**: Prove geometric theorems ■ **G-CO.C.9** Prove theorems about lines and angles.	**Essential Question(s)** How can you identify relationships between two lines or two planes? **Objective(s):** • Students will identify the relationships between two lines. • Students will name angle pairs formed by parallel lines and transversals.	***Textbook Lesson*** Lesson 3.1 – Parallel Lines and Transversals, pp. 171 – 176 ***Optional: Use the following resources to ensure that the intended outcome and level of rigor of the standards are met.*** **Task(s)** Parallel Lines and Transversals (Interactive Notebook/Foldables) Select appropriate tasks from GSE Analytic Geometry Unit 1: Similarity, Congruence and Proofs	**Vocabulary** Parallel lines, skew lines, parallel planes, transversal, interior angles, exterior angles, consecutive interior angles, alternate interior angles, alternate exterior angles, corresponding angles **Writing in Math** Determine what the term *alternate* means and demonstrate its using a series of figures.
Domain: Congruence (G.CO) **Cluster**: Prove geometric theorems. ■ **G.CO.C.9** Prove theorems about lines and angles.	**Essential Question(s)** How are the angles formed by two parallel lines cut by a transversal related? **Objective(s):** • Students will use theorems to determine the relationship [s between specific pairs of angels. • Students will use algebra to find angle measurements.	***Textbook Lesson*** Lesson 3.2 – Angles and Parallel Lines, pp. 178 - 184 ***Optional: Use the following resources to ensure that the intended outcome and level of rigor of the standards are met.*** **Textbook Lesson** Lesson 3.2 Explore – Geometry Software Lab: Angles and Parallel Lines p. 177 **Eureka Math**	**Domain**: Congruence (G.CO) **Cluster**: Prove geometric theorems. ■ **G.CO.C.9** Prove theorems about lines and angles.

		Eureka Math Geometry Module 1, Topic B, Lesson 7 -Unknown Angles-Transversals **Task(s)** Illustrative Mathematics Congruent Angles Made by Parallel Lines and a Transverse Task TN Task Arc, Geometry- Proving Theorems Task 3 -Alternate Interior Angles	
Domain: Expressing Geometric Properties with Equations (G.GPE) **Cluster:** Use coordinates to prove simple geometric theorems algebraically. ■ **G. GPE.B.3** Prove the slope criteria for parallel and perpendicular lines and use them to solve geometric problems.	**Essential Question(s)** How can algebra be useful when expressing geometric properties? **Objective(s):** Students will find slopes of lines and use the slope of a line to identify parallel and perpendicular lines. •	***Textbook Lesson*** Lesson 3.3 – Slopes of Lines, pp. 186 – 194 ***Optional: Use the following resources to ensure that the intended outcome and level of rigor of the standards are met.*** **Task(s)** Illustrative Mathematics Slope Criterion for Perpendicular Lines Task	**Vocabulary** Slope, rate of change **Writing in Math** A classmate says that all lines have positive or negative slope. Write a question that would challenge her conjecture.
Domain: Expressing Geometric Properties with Equations (G.GPE) **Cluster:** Use coordinates to prove simple geometric theorems algebraically. ■ **G. GPE.B.3** Prove the slope criteria for parallel and perpendicular lines and use them to solve geometric problems (e.g., find the equation of a line parallel or perpendicular to a given line that passes through a given point).	**Essential Question(s)** How can algebra be useful when expressing geometric properties? **Objective(s):** • Students will write an equation of a line given information about the graph. • Students will solve problems by writing equations.	***Textbook Lessons*** Lesson 3.4 – Equations of Lines, pp. 196 – 203 Lesson 3.4 Extension – Geometry Lab: Equations of Perpendicular Bisectors p. 204	**Vocabulary** Slope-intercept form, point-slope form **Writing in Math** Create a graphic organizer that shows how some of the properties, postulates and theorems build upon one another.

Curriculum and Instruction – Mathematics

Quarter 1 — Geometry

Domain: Congruence (G.CO) **Cluster**: Prove geometric theorems. ■ **G.CO.C.9** Prove theorems about lines and angles.	**Essential Question(s)** How can coordinates and the coordinate plane be used to prove theorems algebraically? **Objective(s):** • Students will determine if lines are parallel using their slopes. • Students will recognize angle pairs that occur with parallel lines. • Students will prove that two lines are parallel	Lesson 3.5 – Proving Lines Parallel, pp. 205 - 212 Constructing Parallel Lines Constructing Perpendicular Lines and Perpendicular Bisectors p. 55 ***Optional: Use the following resources to ensure that the intended outcome and level of rigor of the standards are met.*** **Task(s)** Select appropriate tasks from GSE Analytic Geometry Unit 1: Similarity, Congruence and Proofs	**Writing in Math** Write and solve a problem involving finding the equation of a line that is parallel to a given line.

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Quarter 1 — Geometry

RESOURCE TOOLBOX		
Textbook Resources ConnectED Site - Textbook and Resources Glencoe Video Lessons Hotmath - solutions to odd problems Comprehensive Geometry Help: Online Math Learning (Geometry) NCTM Illuminations **Tasks** Edutoolbox (formerly TNCore) Tasks Inside Math Tasks Dan Meyer's Three-Act Math Tasks Illustrative Math Tasks UT Dana Center GSE Analytic Geometry Unit 1: Similarity, Congruence and Proofs	**Standards** Common Core Standards - Mathematics Common Core Standards - Mathematics Appendix A **HS Flip Book with examples of each Standard** http://www.ccsstoolbox.org/ http://insidemathematics.org/index.php/high-school-geometry http://www.livebinders.com/play/play/454480 https://www.livebinders.com/play/play?id=464831 http://www.livebinders.com/play/play?id=571735 Chicago Public Schools Framework and Tasks **Tennessee Academic Standards for Mathematics** **Tennessee Assessment LiveBinder**	**Videos** Math TV Videos The Teaching Channel Khan Academy Videos (Geometry) **NWEA MAP Resources:**https://teach.mapnwea.org/assist/help_map/ApplicationHelp.htm#UsingTestResults/MAPReportsFinder.htm - Sign in and Click the Learning Continuum Tab – this resources will help as you plan for intervention, and differentiating small group instruction on the skill you are currently teaching. (Four Ways to Impact Teaching with the Learning Continuum) https://support.nwea.org/khanrit - These Khan Academy lessons are aligned to RIT scores.