

JOHNSON CITY SCHOOLS
GEOMETRY SCOPE AND SEQUENCE
SCHOOL YEAR: 2024-2025

The Tennessee Math Standards are addressed throughout Algebra I and are aligned with each unit. In addition, ACT standards are aligned with each chapter. Standards that are major works of the grade are bolded and the Instructional Focus Documents were highly utilized in writing Learning and Performance Goals.

The following Standards for Mathematical Practice and Literacy Skills for Mathematical Proficiency will be addressed throughout the course.

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 others.
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.

Literacy Skills for Mathematical Proficiency

1. Use multiple reading strategies.
2. Understand and use correct mathematical vocabulary.
3. Discuss and articulate mathematical ideas.
4. Write mathematical arguments.

Honors Geometry Addendum

Honors courses are high school courses that provide additional rigor and substantially exceed the academic standards approved by the State Board of Education. Teachers of honors courses model instructional approaches that facilitate the maximum interchange of ideas among students: independent study, self-directed research and learning, and appropriate use of technology. All honors courses include multiple assessments exemplifying coursework (such as short answer, constructed-response prompts, performance-based tasks, open-ended questions, essays, original or creative interpretations, authentic products, portfolios, and analytical writing). This honors course includes the following components:

- Projects that apply the course curriculum to relevant or real-world situations. These may include oral presentations, PowerPoint, or other modes of sharing findings. The connection of the project to the community is encouraged. (The Pizza Delivery Task)
- Open-ended investigations in which the student selects the questions and designs the research. (Utility Poles task)
- Writing assignments that demonstrate a variety of modes, purposes, and styles. This is done with geometric proof.
 - Examples of purpose include to persuade.
 - Examples of the style include formal and technical.
- Integration of appropriate technology into the course of study. Students should be able to use Desmos calculators effectively and independently.
- Extensive opportunities for problem-solving experiences through imagination, critical analysis, and application. (Measurement Task)

CHAPTER 1: BASICS OF GEOMETRY

Chapter Learning Target: Understand the basics of geometry.

Length of Chapter: 7 days

LESSON	LEARNING TARGETS	TENNESSEE ACADEMIC STANDARDS	ASSESSMENTS
1.1 Points, Lines, and Planes (preparing)	Use defined terms and undefined terms.	<ul style="list-style-type: none"> • G.CO.A.3 Develop definitions of rotations, reflections, and translations in terms of angles, circles, perpendicular lines, parallel lines, and line segments. (1.1, 1.6) • G.CO.D.11 Perform formal geometric constructions with a variety of tools and methods (compass and straightedge, string, reflective devices, paper folding, dynamic geometry software, etc.). (1.2, 1.3, 1.5) • G.GPE.A.3 Understand the relationship between the Pythagorean Theorem and the distance formula and use an efficient method to solve problems on the coordinate plane. (1.3, 1.4) • G.MG.A.1 Use geometric shapes, their measures, and their properties to model objects found in a real-world context for the purpose of approximating solutions to problems. (1.4) 	At the conclusion of the chapter, students will be evaluated through a common summative assessment.
1.2 Measuring and Constructing Segments	Measure and construct line segments.		Task(s): Cross Country Cable Task
1.3 Using Midpoint and Distance Formulas	Find midpoints and lengths of segments.		ACT Standard(s): G504, G511, G605
1.4 Perimeter and Area in the Coordinate Plane	Find perimeters and areas of polygons in the coordinate plane.		
1.5 Measuring and Constructing Angles	Measure, construct, and describe angles.		
1.6 Describing Pairs of Angles (preparing)	Identify and use pairs of angles.		

CHAPTER 2: REASONING AND PROOF

Chapter Learning Target: Understand reasoning and proof.

Length of Chapter: 6 days

LESSON	LEARNING TARGETS	TENNESSEE ACADEMIC STANDARDS	ASSESSMENTS
2.1 Conditional Statements (preparing)	Understand and write conditional statements.	<ul style="list-style-type: none"> • G.CO.C.8 Use definitions and theorems about lines and angles to solve problems and to justify relationships in geometric figures. (2.1, 2.2, 2.3, 2.4, 2.5, 2.6) • G.CO.C.9 Use definitions and theorems about triangles to solve problems and to justify relationships in geometric figures. (2.1, 2.2, 2.3, 2.4) • G.CO.C.10 Use definitions and theorems about parallelograms to solve problems and to justify relationships in geometric figures. (2.1, 2.2, 2.3, 2.4) • G.SRT.B.3 Use congruence and similarity criteria for triangles to solve problems and to justify relationships in geometric figures. (2.1, 2.2, 2.3, 2.4) 	<p>At the conclusion of the chapter, students will be evaluated through a common summative assessment.</p> <p>Task(s):</p> <p>ACT Standard(s): G402, G501, G704, G705</p>
2.2 Inductive and Deductive Reasoning (preparing)	Use inductive and deductive reasoning.		
2.3 Postulates and Diagrams (preparing)	Interpret and sketch diagrams.		
2.4 Algebraic Reasoning (preparing)	Use properties of equality to solve problems		
2.5 Proving Statements about Segments and Angles	Prove statements about segments and angles.		
2.6 Proving Geometric Relationships	Prove geometric relationships		

CHAPTER 3: PARALLEL AND PERPENDICULAR LINES

Chapter Learning Target: Understand parallel and perpendicular lines.

Length of Chapter: 8 days

LESSON	LEARNING TARGETS	TENNESSEE ACADEMIC STANDARDS	ASSESSMENTS
3.1 Pairs of Lines and Angles	Understand lines, planes, and pairs of angles.	<ul style="list-style-type: none"> • G.CO.A.3 Develop definitions of rotations, reflections, and translations in terms of angles, circles, perpendicular lines, parallel lines, and line segments. (3.1) • G.CO.A.8 Use definitions and theorems about lines and angles to solve problems and to justify relationships in geometric figures. (3.2, 3.3, 3.4) • G.CO.D.11 Perform formal geometric constructions with a variety of tools and methods (compass and straightedge, string, reflective devices, paper folding, dynamic geometric software, etc.). (3.3, 3.4) • G.GPE.A.1 Use coordinates to justify geometric relationships algebraically and to solve problems. (3.5) • G.GPE.A.2 Use the slope criteria for parallel and perpendicular lines to solve problems and to justify relationships in geometric figures. (3.5) 	<p>At the conclusion of the chapter, students will be evaluated through a common summative assessment.</p> <p>Task(s): Perpendicular Bisector Task</p> <p>ACT Standard(s): G401, G501, G510, G606</p>
3.2 Parallel Lines and Transversals	Prove and use theorems about parallel lines.		
3.3 Proofs with Parallel Lines	Prove and use theorems about identifying parallel lines.		
3.4 Proofs with Perpendicular Lines	Prove and use theorems about perpendicular lines.		
3.5 Equations of Parallel and Perpendicular Lines	Understand slopes of parallel and perpendicular lines to write linear equations.		

CHAPTER 4: TRANSFORMATIONS

Chapter Learning Target: Understand transformations.

Length of Chapter: 7 days

LESSON	LEARNING TARGETS	TENNESSEE ACADEMIC STANDARDS	ASSESSMENTS
4.1 Translations	Understand translations of figures.	<ul style="list-style-type: none"> • G.CO.A.1 Describe transformations as functions that take points in the plane (pre-image) as inputs and give other points (image) as outputs. Compare transformations that preserve distance and angle measure to those that do not, by hand for basic transformations and using technology for more complex cases. (4.1, 4.2, 4.3, 4.5) • G.CO.A.2 Given a rectangle, parallelogram, trapezoid, or regular polygon, determine the transformations that carry the shape onto itself and describe them in terms of the symmetry of the figure. (4.2, 4.3) • G.CO.A.3 Develop definitions of rotations, reflections, and translations in terms of angles, circles, perpendicular lines, parallel lines, and line segments. (4.1, 4.2, 4.3) • G.CO.A.4 Given a geometric figure, draw the image of the figure after a sequence of one or more rigid motions, by hand and using technology. Identify a sequence of rigid motions that will carry a given figure onto another. (4.1, 4.2, 4.3, 4.4, 4.6) • G.CO.B.5 Given two figures, use the definition of congruence in terms of rigid motions to determine informally if they are congruent. (4.1, 4.2, 4.3, 4.4) • G.SRT.A.1 Use properties of dilations given by a center and a scale factor to solve problems and to justify relationships in geometric figures. (4.5) G.SRT.A.2 Define similarity in terms of transformations. Use transformations to determine whether two figures are similar. (4.6) 	<p>At the conclusion of the chapter, students will be evaluated through a common summative assessment.</p> <p>Task(s):</p> <p>ACT Standard(s): G502, G512, G407, G607, G608, G703</p>
4.2 Reflections	Understand reflections of figures.		
4.3 Rotations	Understand rotations of figures.		
4.4 Congruence and Transformations	Understand congruence transformations.		
4.5 Dilations	Understand dilations of figures.		
4.6 Similarity and Transformations	Understand similarity transformations.		

CHAPTER 5: CONGRUENT TRIANGLES

Chapter Learning Target: Understand congruent triangles.

Length of Chapter: 6 days

LESSON	LEARNING TARGETS	TENNESSEE ACADEMIC STANDARDS	ASSESSMENTS
5.1 Angles of Triangles	Prove and use theorems about angles of triangles.	<ul style="list-style-type: none"> • G.CO.B.6 Use the definition of congruence in terms of rigid motions to show that two triangles are congruent if and only if corresponding pairs of sides and corresponding pairs of angles are congruent. (5.2) • G.CO.B.7 Explain how the criteria for triangle congruence (ASA, SAS, AAS, SSS, and HL) follow from the definition of congruence in terms of rigid motions. (5.3, 5.5, 5.6) • G.CO.C.9 Use definitions and theorems about triangles to solve problems and to justify relationships in geometric figures. (5.2, 5.4) • G.SRT.B.3 Use congruence and similarity criteria for triangles to solve problems and to justify relationships in geometric figures. (5.7) • G.GPE.A.1 Use coordinates to justify geometric relationships algebraically and to solve problems. (5.1, 5.8) 	<p>At the conclusion of the chapter, students will be evaluated through a common summative assessment.</p> <p>Task(s):</p> <p>ACT Standard(s): G503</p>
5.2 Congruent Polygons	Understand congruence in terms of rigid motions.		
5.3 Proving Triangle Congruence by SAS	Prove and use the Side-Angle-Side Congruence Theorem.		
5.4 Equilateral and Isosceles Triangles	Prove and use theorems about isosceles and equilateral triangles.		
5.5 Proving Triangle Congruence by SSS	Prove and use the Side-Side-Side Congruence Theorem.		
5.6 Proving Triangle Congruence by ASA and AAS	Prove and use the Angle-Side-Angle Congruence Theorem and the Angle-Angle-Side Congruence Theorem.		
5.7 Using Congruent Triangles	Use congruent triangles in proofs and to measure distances.		
5.8 Coordinate Proofs	Use coordinates to write proofs.		

CHAPTER 6: RELATIONSHIPS WITH TRIANGLES

Chapter Learning Target: Understand relationships within triangles.

Length of Chapter: 8 days

LESSON	LEARNING TARGETS	TENNESSEE ACADEMIC STANDARDS	ASSESSMENTS
6.1 Perpendicular and Angle Bisectors	Use theorems about perpendicular and angle bisectors.	<ul style="list-style-type: none"> • G.CO.C.8 Use definitions and theorems about lines and angles to solve problems and to justify relationships in geometric figures. (6.1) • G.CO.C.9 Use definitions and theorems about triangles to solve problems and to justify relationships in geometric figures. (6.2, 6.3, 6.4, 6.5, 6.6) • G.CO.D.12 Use geometric constructions to solve geometric problems in context, by hand and using technology. (6.1, 6.2) • G.GPE.A.1 Use coordinates to justify geometric relationships algebraically and to solve problems. (6.3) 	At the conclusion of the chapter, students will be evaluated through a common summative assessment.
6.2 Bisectors of Triangles	Use bisectors of triangles.		Task(s): Pizza Delivery Task
6.3 Medians and Altitudes of Triangles	Use medians and altitudes of triangles.		ACT Standard(s):
6.4 The Triangle Midsegment Theorem	Find and use midsegments of triangles.		
6.5 Indirect Proof and Inequalities in One Triangle	Write indirect proofs and understand inequalities in a triangle.		
6.6 Inequalities in Two Triangles	Understand inequalities in two triangles.		

CHAPTER 7: QUADRILATERALS AND OTHER POLYGONS

Chapter Learning Target: Understand quadrilaterals and other polygons.

Length of Chapter: 6 days

LESSON	LEARNING TARGETS	TENNESSEE ACADEMIC STANDARDS	ASSESSMENTS
7.1 Angles of Polygons (preparing)	Find angle measures of polygons.	<ul style="list-style-type: none"> • G.CO.C.10 Use definitions and theorems about parallelograms to solve problems and to justify relationships in geometric figures. (7.2, 7.3, 7.4) • G.SRT.A.2 Define similarity in terms of transformations. Use transformations to determine whether two figures are similar. (7.1) • G.GPE.A.1 Use coordinates to justify geometric relationships algebraically and to solve problems. (7.3, 7.4, 7.5) 	At the conclusion of the chapter, students will be evaluated through a common summative assessment.
7.2 Properties of Parallelograms	Prove and use properties of parallelograms.		Task(s):
7.3 Proving That a Quadrilateral Is a Parallelogram	Prove that a quadrilateral is a parallelogram.		ACT Standard(s):
7.4 Properties of Special Parallelograms	Explain the properties of special parallelograms.		
7.5 Properties of Trapezoids and Kites	Use properties of trapezoids and kites to find measures.		

CHAPTER 8: SIMILARITY

Chapter Learning Target: Understand similarity.

Length of Chapter: 6 days

LESSON	LEARNING TARGETS	TENNESSEE ACADEMIC STANDARDS	ASSESSMENTS
8.1 Similar Polygons	Understand the relationship between similar polygons.	<ul style="list-style-type: none"> • G.SRT.A.2 Define similarity in terms of transformations. Use transformations to determine whether two figures are similar. (8.1) • G.SRT.B.3 Use congruence and similarity criteria for triangles to solve problems and to justify relationships in geometric figures. (8.1, 8.2, 8.3, 8.4) • G.GPE.A.2 Use the slope criteria for parallel and perpendicular lines to solve problems and to justify relationships in geometric figures. (8.3) 	<p>At the conclusion of the chapter, students will be evaluated through a common summative assessment.</p> <p>Task(s): Measurement Tasks</p> <p>ACT Standard(s):</p>
8.2 Proving Triangle Similarity by AA	Understand and use the Angle-Angle Similarity Theorem.		
8.3 Proving Triangle Similarity by SSS and SAS	Understand and use additional triangle similarity theorems.		
8.4 Proportionality Theorems	Understand and use proportionality theorems.		

CHAPTER 9: RIGHT TRIANGLES AND TRIGONOMETRY

Chapter Learning Target: Understand right triangles and trigonometry.

Length of Chapter: 7 days

LESSON	LEARNING TARGETS	TENNESSEE ACADEMIC STANDARDS	ASSESSMENTS
9.1 The Pythagorean Theorem	Understand and apply the Pythagorean Theorem.	<ul style="list-style-type: none"> • G.SRT.B.3 Use congruence and similarity criteria for triangles to solve problems and to justify relationships in geometric figures. (9.1, 9.2, 9.3) • G.SRT.C.4 Use side ratios in right triangles to define trigonometric ratios. (9.4, 9.5) • G.SRT.C.4a Understand that by similarity, side ratios in right triangles are properties of the angles in the triangle, leading to definitions of trigonometric ratios for acute angles. (9.4, 9.5) • G.SRT.C.4b Explain and use the relationship between the sine and cosine of complementary angles. (9.5) • G.SRT.C.5 Solve triangles. (9.1, 9.4, 9.5, 9.6) • G.SRT.C.5a Know and use the Pythagorean Theorem and trigonometric ratios (sine, cosine, tangent, and their inverses) to solve right triangles in a real-world context. (9.1, 9.4, 9.5, 9.6) • G.SRT.C.5b Know and use relationships within special right triangles to solve problems in a real-world context. (9.2) • G.SRT.C.5c Use the Law of Sines and Law of Cosines to solve non-right triangles in a real-world context. (9.7) 	<p>At the conclusion of the chapter, students will be evaluated through a common summative assessment.</p> <p>Task(s): Utility Poles Task-Honors Only</p> <p>ACT Standard(s): G404, G504, G508, G509, G602, G603, G604</p>
9.2 Special Right Triangles	Understand and use special right triangles.		
9.3 Similar Right Triangles	Use proportional relationships in right triangles.		
9.4 The Tangent Ratio	Understand and use the tangent ratio.		
9.5 The Sine and Cosine Ratios	Understand and use the sine and cosine ratios.		
9.6 Solving Right Triangles	Find unknown side lengths and angle measures of right triangles.		
9.7 Law of Sines and Law of Cosines	Find unknown side lengths and angle measures of acute and obtuse triangles.		

CHAPTER 10: CIRCUMFERENCE AND AREA

Chapter Learning Target: Understand circumference and area.

Length of Chapter: 4 days

LESSON	LEARNING TARGETS	TENNESSEE ACADEMIC STANDARDS	ASSESSMENTS
10.1 Circumference	Understand circumference.	<ul style="list-style-type: none"> • G.N.Q.A.1 Use units as a way to understand real-world problems. (10.3, 10.4, 10.5) • G.N.Q.A.1a Use appropriate quantities in formulas, converting units as necessary. (10.4) • G.N.Q.A.1b Define and justify appropriate quantities within a context for the purpose of modeling. (10.5) 	At the conclusion of the chapter, students will be evaluated through a common summative assessment. Task(s): ACT Standard(s): G403, G405, G505, G506, G507, G601, G702, G705
10.2 Finding Arc Measures (preparing)	Understand arc measures and similar circles.	<ul style="list-style-type: none"> • G.N.Q.A.1c Choose an appropriate level of accuracy when reporting quantities. (10.3, 10.5) • G.SRT.B.3 Use congruence and similarity criteria for triangles to solve problems and to justify relationships in geometric figures. (10.4) 	
10.3 Areas of Circles and Sectors	Find areas of circles and areas of sectors of circles.	<ul style="list-style-type: none"> • G.C.A.1 Use proportional relationships between the area of a circle and the area of a sector within the circle to solve problems in a real-world context. (10.2, 10.3) • G.GPE.A.1 Use coordinates to justify geometric relationships algebraically and to solve problems. (10.1, 10.3) 	
10.4 Areas of Polygons	Find angle measures and areas of regular polygons.	<ul style="list-style-type: none"> • G.GPE.A.3 Understand the relationship between the Pythagorean Theorem and the distance formula and use an efficient method to solve problems on the coordinate plane. (10.1, 10.3) 	
10.5 Modeling with Area	Understand the concept of population density and modeling with area.	<ul style="list-style-type: none"> • G.MG.A.1 Use geometric shapes, their measures, and their properties to model objects found in a real-world context for the purpose of approximating solutions to problems. (10.5) 	

CHAPTER 11: SURFACE AREA AND VOLUME

Chapter Learning Target: Understand surface area and volume.		Length of Chapter: 5 days	
LESSON	LEARNING TARGETS	TENNESSEE ACADEMIC STANDARDS	ASSESSMENTS
11.1 Cross Sections of Solids (preparing)	Describe and draw cross sections solids.	<ul style="list-style-type: none"> • G.N.Q.A.1 Use units as a way to understand real-world problems. (11.2, 11.3, 11.7) • G.N.Q.A.1b Define and justify appropriate quantities within a context for the purpose of modeling. (11.2, 11.3, 11.7) • G.N.Q.A.1c Choose an appropriate level of accuracy when reporting quantities. (11.2, 11.3, 11.7) • G.GMD.A.1 Understand and explain the formulas for the volume and surface area of a cylinder, cone, prism, and pyramid. (11.1, 11.2, 11.3, 11.4, 11.5) • G.GMD.A.2 Use volume and surface area formulas for cylinders, cones, prisms, pyramids, and spheres to solve problems in a real-world context. (11.2, 11.3, 11.4, 11.5, 11.6) • G.MG.A.1 Use geometric shapes, their measures, and their properties to model objects found in a real-world context for the purpose of approximating solutions to problems. (11.6) 	<p>At the conclusion of the chapter, students will be evaluated through a common summative assessment.</p> <p>Task(s):</p> <p>ACT Standard(s): G601, G705</p>
11.2 Surface Areas of Prisms and Cylinders	Find and use surface areas of prisms and cylinders.		
11.3 Surface Areas of Pyramids and Cones	Find and use surface areas of pyramids and cones		
11.4 Volumes of Prisms and Cylinders	Find and use volumes of prisms and cylinders.		
11.5 Volumes of Pyramids and Cones	Find and use volumes of pyramids and cones.		
11.6 Surface Areas and Volumes of Spheres	Find and use surface areas and volumes of spheres.		
11.7 Modeling with Surface Area and Volume	Understand the concept of density and modeling with volume.		

CHAPTER 12: PROBABILITY

Chapter Learning Target: Understand probability.

Length of Chapter: 2 days

LESSON	LEARNING TARGETS	TENNESSEE ACADEMIC STANDARDS	ASSESSMENTS
12.1 Sample Spaces and Probability	Find sample spaces and probabilities of events.	<ul style="list-style-type: none"> • G.S.CP.A.1 Use set notation to represent contextual situations. (12.1, 12.3) • G.S.CP.A.1a Describe events as subsets of a sample space (the set of outcomes) using characteristics (or categories) of the outcomes, or as unions, intersections, or complements of other events (“or,” “and,” “not”). (12.1, 12.3) • G.S.CP.A.1b Flexibly move between visual models (Venn diagrams, frequency tables, etc.) and set notation. (12.1, 12.3) 	<p>At the conclusion of the chapter, students will be evaluated through a common summative assessment.</p> <p>Task(s):</p>
12.2 Conditional Probability	Find and use conditional probabilities.	<ul style="list-style-type: none"> • G.S.CP.B.2 Find the conditional probability of A given B as the fraction of B’s outcomes that also belong to A and interpret the answer in terms of the given context. (12.2) • G.S.CP.B.3 Understand and apply the Addition Rule. (12.3) • G.S.CP.B.3a Explain the Addition Rule, $P(A \text{ or } B) = P(A) + P(B) - P(A \text{ and } B)$ in terms of visual models (Venn diagrams, frequency tables, etc.). (12.3) 	<p>ACT Standard(s): S404, S405, S504, S603, S604, S605, S704</p>
12.3 Probability of Disjoint and Overlapping Events	Find probabilities of disjoint and overlapping events.	<ul style="list-style-type: none"> • G.S.CP.B.3b Apply the Addition Rule to solve problems and interpret the answer in terms of the given context. (12.3) • G.S.CP.C.4 Calculate probabilities using geometric figures. (12.1) 	