

# MATHEMATICS: GEOMETRY Curriculum Map

L. Volbidakht, 2022-2023 school year

UNIT TITLE & ESSENTIAL QUESTION	UNIT TIMELINE	UNIT CONTENT & SKILLS	CORE TEXTS & MATERIALS	FORMATIVE & SUMMATIVE ASSESSMENTS	CSRE ALIGNMENT	NEXT GENERATION/ CORE CONTENT STANDARDS
<p><b>Unit 1:</b> <b>Essential Geometric Concepts</b></p> <p>◆ What is Geometry?</p>	<p>2 weeks 8 topics</p>	<p><u>RCHS FOCUS PRACTICES:</u></p> <ul style="list-style-type: none"> <li>◆ Make sense of problems and persevere in solving them</li> <li>◆ Construct viable arguments and critique the reasoning of others</li> <li>◆ Model with mathematics</li> <li>◆ Look for and make use of structure</li> </ul> <p><u>UNIT SKILLS:</u></p> <ul style="list-style-type: none"> <li>◆ Proper annotation techniques, including identifying relevant information and labeling it on a diagram</li> <li>◆ Identifying variables and setting up equations to solve a problem.</li> <li>◆ Foundation of measurement and construction.</li> <li>◆ Using a compass to compare lengths and create geometric shapes based on the given information.</li> <li>◆ The idea of congruence, and understanding that, when it comes to congruence, actual value is not relevant.</li> </ul>	<p><u>Core Texts:</u> eMathInstruction.com (videos and worksheets)</p> <p><u>Digital Resources:</u></p> <ul style="list-style-type: none"> <li>◆ DeltaMath.com (hands-on practice with geometric concepts)</li> <li>◆ IXL (practice skills and diagnostics)</li> </ul> <p><u>Materials:</u></p> <ul style="list-style-type: none"> <li>◆ KIM chart</li> <li>◆ Compass, protractor, ruler for deeper understanding of concepts through constructions</li> </ul>	<p><u>Formative:</u></p> <ul style="list-style-type: none"> <li>◆ DeltaMath.com task assessments</li> <li>◆ DeltaMath.com diagnostic</li> <li>◆ IXL diagnostic</li> <li>◆ Fish Bowl strategy, where a group of students first work with the teacher to learn a task and then work with their peers explaining and showing it.</li> </ul> <p><u>Summative:</u></p> <ul style="list-style-type: none"> <li>◆ Multiple choice and open response questions aligned to NYS Regents</li> <li>◆ Students will analyze and correct multiple choice questions. They will provide reasoning for their wrong choice, as well as reasoning for the correct choice. Students will determine which definitions help with answering a particular question.</li> </ul>	<p>In this unit, students will:</p> <ul style="list-style-type: none"> <li>◆ Take risks and view mistakes as opportunities to grow academically and emotionally</li> <li>◆ Draw upon your past learning, prior experiences, and the richness of your cultural background to make meaning of new concepts and apply learning on an ongoing basis.</li> <li>◆ Collaborate peers to demonstrate their knowledge and growth over time and align to the varied learning styles and interests of those in the class community.</li> <li>◆ Experience multiple perspectives on a topic and be afforded the opportunity to draw your own conclusions on that topic.</li> </ul>	<p>G-CO.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</p> <p>G-CO.12 Make formal geometric constructions with a variety of tools and methods (compass and straightedge, string, reflective devices, paper folding, dynamic geometric software, etc.). Copying a segment; copying an angle; bisecting a segment; bisecting an angle; constructing perpendicular lines, including the perpendicular bisector of a line segment; and constructing a line parallel to a given line through a point not on the line</p>

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<p><b>Unit 2: Transformations, Rigid Motions, and Congruence</b></p> <p>◆ Do images always look the same when they are moved?</p>	<p><b>2 weeks</b> <b>9 topics</b></p>	<p><u>RCHS FOCUS PRACTICES:</u></p> <ul style="list-style-type: none"> <li>◆ Make sense of problems and persevere in solving them</li> <li>◆ Construct viable arguments and critique the reasoning of others</li> <li>◆ Model with mathematics</li> <li>◆ Look for and make use of structure</li> </ul> <p><u>UNIT SKILLS:</u></p> <ul style="list-style-type: none"> <li>◆ Understanding rotation and the necessary components involved with it (center, direction, angle)</li> <li>◆ Understanding translation and the necessary components involved with it (the only rigid motion where orientation stays intact)</li> <li>◆ Understanding reflection and the necessary components involved with it (line of reflection being the perpendicular bisector of a segment connecting each point and its image after a reflection)</li> <li>◆ Using properties of circles, as well as properties of parallel and perpendicular lines to perform rotations, translations, and reflections.</li> </ul>	<p><u>Core Texts:</u> eMathInstruction.com (videos and worksheets)</p> <p><u>Digital Resources:</u></p> <ul style="list-style-type: none"> <li>◆ DeltaMath.com (hands-on practice with geometric concepts)</li> <li>◆ IXL practice skills</li> </ul> <p><u>Materials:</u></p> <ul style="list-style-type: none"> <li>◆ KIM chart</li> <li>◆ Compass, protractor, ruler for deeper understanding of concepts through constructions</li> </ul>	<p><u>Formative:</u></p> <ul style="list-style-type: none"> <li>◆ DeltaMath.com task assessments</li> <li>◆ IXL target skill building</li> <li>◆ PAO strategy, where students work independently, in pairs, and in groups to first understand how a transformation is made and then to complete their own transformation</li> </ul> <p><u>Summative:</u></p> <ul style="list-style-type: none"> <li>◆ Multiple choice and open response questions aligned to NYS Regents</li> <li>◆ Students will analyze and correct multiple choice questions. They will provide reasoning for their wrong choice, as well as reasoning for the correct choice. Students will determine which definitions help with answering a particular question.</li> </ul>	<p>In this unit, students will:</p> <ul style="list-style-type: none"> <li>◆ Take risks and view mistakes as opportunities to grow academically and emotionally</li> <li>◆ Draw upon your past learning, prior experiences, and the richness of your cultural background to make meaning of new concepts and apply learning on an ongoing basis.</li> <li>◆ Collaborate with peers to demonstrate their knowledge and growth over time and align to the varied learning styles and interests of those in the class community.</li> <li>◆ Experience multiple perspectives on a topic and be afforded the opportunity to draw your own conclusions on that topic.</li> </ul>	<p>G-CO.2 Represent transformations in the plane using, e.g., transparencies and geometry software; describe transformations as functions that take points in the plane as inputs and give other points as outputs. Compare transformations that preserve distance and angle to those that do not (e.g., translation versus horizontal stretch).</p> <p>G-CO.3 Given a rectangle, parallelogram, trapezoid, or regular polygon, describe the rotations and reflections that carry it onto itself.</p> <p>G-CO.4 Develop definitions of rotations, reflections, and translations in terms of angles, circles, perpendicular lines, parallel lines, and line segments.</p> <p>G-CO.5 Given a geometric figure and a rotation, reflection, or translation, draw the transformed figure using, e.g., graph paper, tracing paper, or geometry software. Specify a sequence of transformations that will carry a given figure onto another.</p> <p>G-CO.6 Use geometric descriptions of rigid motions to transform figures and to predict the effect of a given rigid</p>

						<p>motion on a given figure; given two figures, use the definition of congruence in terms of rigid motions to decide if they are congruent.</p> <p>G-CO.7 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.</p> <p>G-CO.8 Explain how the criteria for triangle congruence (ASA, SAS, and SSS) follow from the definition of congruence in terms of rigid motions.</p> <p>G-CO.9 Prove theorems about lines and angles. Theorems include: vertical angles are congruent; when a transversal crosses parallel lines, alternate interior angles are congruent and corresponding angles are congruent; points on a perpendicular bisector of a line segment are exactly those equidistant from the segment's endpoints.</p> <p>G-CO.10 Prove theorems about triangles. Theorems include: measures of interior angles of a triangle sum to <math>180^\circ</math>; base angles of isosceles triangles are congruent; the segment joining midpoints of two sides of a triangle is parallel to the third side and half the length; the medians of a triangle meet at a point.</p>
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<p><b>Unit 3: Euclidean Triangle Proof</b></p> <p>◆ How do we string together a winning argument?</p>	<p><b>4 weeks</b> <b>10 topics</b></p>	<p><u>RCHS FOCUS PRACTICES:</u></p> <ul style="list-style-type: none"> <li>◆ Make sense of problems and persevere in solving them</li> <li>◆ Construct viable arguments and critique the reasoning of others</li> <li>◆ Model with mathematics</li> <li>◆ Look for and make use of structure</li> </ul> <p><u>UNIT SKILLS:</u></p> <ul style="list-style-type: none"> <li>◆ Understanding and utilizing basic geometric axioms to prove theorems about lines, angles, and triangles.</li> <li>◆ Understanding the two-column proof.</li> <li>◆ The layers of the two-column proof: givens, inferences, conclusions.</li> <li>◆ Outlining a proof before completing it.</li> <li>◆ Learning to self-assess: where am I when it comes to triangle proofs? How far can I go?</li> <li>◆ Proving things congruent without knowing their actual size.</li> </ul>	<p><u>Core Texts:</u> eMathInstruction.com (videos and worksheets)</p> <p><u>Digital Resources:</u></p> <ul style="list-style-type: none"> <li>◆ DeltaMath.com (hands-on practice with geometric concepts)</li> <li>◆ IXL practice skills</li> </ul> <p><u>Materials:</u></p> <ul style="list-style-type: none"> <li>◆ KIM chart</li> <li>◆ Compass, protractor, ruler for deeper understanding of concepts through constructions</li> </ul>	<p><u>Formative:</u></p> <ul style="list-style-type: none"> <li>◆ DeltaMath.com task assessments</li> <li>◆ IXL target skill building</li> <li>◆ PAO strategy, where students work independently, in pairs, and in groups to first understand how a transformation is made and then to complete proofs</li> <li>◆ Prove me wrong strategy, where students need to identify and correct errors in proofs</li> </ul> <p><u>Summative:</u></p> <ul style="list-style-type: none"> <li>◆ Multiple choice and open response questions aligned to NYS Regents</li> <li>◆ Students will analyze and correct multiple choice questions. They will provide reasoning for their wrong choice, as well as reasoning for the correct choice. Students will determine which definitions help with answering a particular question.</li> <li>◆ Writing and correcting proofs based on teacher feedback.</li> </ul>	<p>In this unit, students will:</p> <ul style="list-style-type: none"> <li>◆ Take risks and view mistakes as opportunities to grow academically and emotionally</li> <li>◆ Work cooperatively toward goals and hold each other accountable in supportive ways.</li> <li>◆ Experience multiple perspectives on a topic and be afforded the opportunity to draw your own conclusions on that topic.</li> </ul>	<p>G-CO.9 Prove theorems about lines and angles. Theorems include: vertical angles are congruent; when a transversal crosses parallel lines, alternate interior angles are congruent and corresponding angles are congruent; points on a perpendicular bisector of a line segment are exactly those equidistant from the segment's endpoints.</p> <p>G-CO.10 Prove theorems about triangles. Theorems include: measures of interior angles of a triangle sum to <math>180^\circ</math>; base angles of isosceles triangles are congruent; the segment joining midpoints of two sides of a triangle is parallel to the third side and half the length; the medians of a triangle meet at a point.</p>

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<p><b>Unit 4: Constructions</b></p> <p>◆ How do we construct shapes without knowing exact measurements?</p>	<p><b>2 weeks, 7 topics</b></p>	<p><u>RCHS FOCUS PRACTICES:</u></p> <ul style="list-style-type: none"> <li>◆ Make sense of problems and persevere in solving them</li> <li>◆ Construct viable arguments and critique the reasoning of others</li> <li>◆ Model with mathematics</li> <li>◆ Look for and make use of structure</li> </ul> <p><u>UNIT SKILLS:</u></p> <ul style="list-style-type: none"> <li>◆ Performing various constructions using a compass and a straightedge.</li> <li>◆ Using reasoning to show that the construction is accurate.</li> <li>◆ Creating step-by-step guides for constructions that were learned.</li> </ul>	<p><u>Core Texts:</u> eMathInstruction.com (videos and worksheets)</p> <p><u>Digital Resources:</u></p> <ul style="list-style-type: none"> <li>◆ DeltaMath.com (hands-on practice with geometric concepts)</li> <li>◆ IXL practice skills</li> </ul> <p><u>Materials:</u></p> <ul style="list-style-type: none"> <li>◆ KIM chart</li> <li>◆ Compass, protractor, ruler for deeper understanding of concepts through constructions</li> </ul>	<p><u>Formative:</u></p> <ul style="list-style-type: none"> <li>◆ DeltaMath.com task assessments</li> <li>◆ IXL target skill building</li> <li>◆ Fish Bowl strategy, where a group of students first work with the teacher to learn a task and then work with their peers explaining and showing it.</li> </ul> <p><u>Summative:</u></p> <ul style="list-style-type: none"> <li>◆ Multiple choice and open response questions aligned to NYS Regents</li> <li>◆ Students will analyze and correct multiple choice questions. They will provide reasoning for their wrong choice, as well as reasoning for the correct choice.</li> <li>◆ Complex constructions involving multiple different constructions, such that construction of inscribed geometric shapes.</li> </ul>	<p>In this unit, students will:</p> <ul style="list-style-type: none"> <li>◆ Take risks and view mistakes as opportunities to grow academically and emotionally</li> <li>◆ Draw upon your past learning, prior experiences, and the richness of your cultural background to make meaning of new concepts and apply learning on an ongoing basis.</li> <li>◆ Collaborate with peers to demonstrate their knowledge and growth over time and align to the varied learning styles and interests of those in the class community.</li> <li>◆ Experience multiple perspectives on a topic and be afforded the opportunity to draw your own conclusions on that topic.</li> </ul>	<p>G-CO.12 Make formal geometric constructions with a variety of tools and methods (compass and straightedge, string, reflective devices, paper folding, dynamic geometric software, etc.). Copying a segment; copying an angle; bisecting a segment; bisecting an angle; constructing perpendicular lines, including the perpendicular bisector of a line segment; and constructing a line parallel to a given line through a point not on the line</p> <p>G-CO.13 Construct an equilateral triangle, a square, and a regular hexagon inscribed in a circle.</p> <p>G-C.3 Construct the inscribed and circumscribed circles of a triangle, and prove properties of angles for a quadrilateral inscribed in a circle, i.e. opposite angles are supplementary.</p>

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<p><b>Unit 5: The Tools of Coordinate Geometry</b></p> <p>◆ How do you find measurements of any line segment?</p>	<p>3 weeks, 11 topics</p>	<p><u>RCHS FOCUS PRACTICES:</u></p> <ul style="list-style-type: none"> <li>◆ Make sense of problems and persevere in solving them</li> <li>◆ Construct viable arguments and critique the reasoning of others</li> <li>◆ Model with mathematics</li> <li>◆ Look for and make use of structure</li> </ul> <p><u>UNIT SKILLS:</u></p> <ul style="list-style-type: none"> <li>◆ Understanding and utilizing the slope formula and its applications to parallelism and perpendicularity.</li> <li>◆ Understanding and utilizing the midpoint formula and its applications.</li> <li>◆ Understanding and utilizing the distance formula and its applications.</li> <li>◆ Using slope, midpoint, and distance formulas to perform transformations on the coordinate plane.</li> <li>◆ Utilizing both the geometric (diagram analysis) approach and the algebraic (more numerical) approach in coordinate geometry questions.</li> </ul>	<p><u>Core Texts:</u> eMathInstruction.com (videos and worksheets)</p> <p><u>Digital Resources:</u></p> <ul style="list-style-type: none"> <li>◆ DeltaMath.com (hands-on practice with geometric concepts)</li> <li>◆ IXL practice skills</li> </ul> <p><u>Materials:</u></p> <ul style="list-style-type: none"> <li>◆ KIM chart</li> <li>◆ Compass, protractor, ruler for deeper understanding of concepts through constructions</li> </ul>	<p><u>Formative:</u></p> <ul style="list-style-type: none"> <li>◆ DeltaMath.com task assessments</li> <li>◆ IXL target skill building</li> <li>◆ Reference sheet strategy – putting together a single sheet of information that will be helpful during summative assessment.</li> <li>◆ Perpendicular bisector task – combining coordinate geometry and constructions to create a perpendicular bisector of a segment.</li> </ul> <p><u>Summative:</u></p> <ul style="list-style-type: none"> <li>◆ Multiple choice and open response questions aligned to NYS Regents</li> <li>◆ Students will analyze and correct multiple choice questions. They will provide reasoning for their wrong choice, as well as reasoning for the correct choice.</li> <li>◆ Writing and correcting coordinate geometry proofs based on teacher feedback.</li> </ul>	<p>In this unit, students will:</p> <ul style="list-style-type: none"> <li>◆ Take risks and view mistakes as opportunities to grow academically and emotionally</li> <li>◆ Draw upon your past learning, prior experiences, and the richness of your cultural background to make meaning of new concepts and apply learning on an ongoing basis.</li> <li>◆ Collaborate with peers to demonstrate their knowledge and growth over time and align to the varied learning styles and interests of those in the class community.</li> <li>◆ Experience multiple perspectives on a topic and be afforded the opportunity to draw your own conclusions on that topic.</li> </ul>	<p>G-GPE.4 Use coordinates to prove simple geometric theorems algebraically. For example, prove or disprove that a figure defined by four given points in the coordinate plane is a rectangle; prove or disprove that the point <math>(1, \sqrt{3})</math> lies on the circle centered at the origin and containing the point <math>(0, 2)</math>.</p> <p>G-GPE.5 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).</p> <p>G-SRT.8 Use trigonometric ratios and the Pythagorean Theorem to solve right triangles in applied problems.</p> <p>G-CO.5 Given a geometric figure and a rotation, reflection, or translation, draw the transformed figure using, e.g., graph paper, tracing paper, or geometry software. Specify a sequence of transformations that will carry a given figure onto another.</p>

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<p><b>Unit 6: Quadrilaterals</b></p> <p>♦ What makes a square a square?</p>	<p>2 weeks, 8 topics</p>	<p><u>RCHS FOCUS PRACTICES:</u></p> <ul style="list-style-type: none"> <li>♦ Make sense of problems and persevere in solving them</li> <li>♦ Construct viable arguments and critique the reasoning of others</li> <li>♦ Model with mathematics</li> <li>♦ Look for and make use of structure</li> </ul> <p><u>UNIT SKILLS:</u></p> <ul style="list-style-type: none"> <li>♦ Identifying and differentiating between properties of quadrilaterals</li> <li>♦ Understanding properties of angles and sides of quadrilaterals</li> <li>♦ Utilizing coordinate geometry techniques to prove types of quadrilaterals</li> </ul>	<p><u>Core Texts:</u> eMathInstruction.com (videos and worksheets)</p> <p><u>Digital Resources:</u></p> <ul style="list-style-type: none"> <li>♦ DeltaMath.com (hands-on practice with geometric concepts)</li> <li>♦ IXL practice skills</li> </ul> <p><u>Materials:</u></p> <ul style="list-style-type: none"> <li>♦ KIM chart</li> <li>♦ Compass, protractor, ruler for deeper understanding of concepts through constructions</li> </ul>	<p><u>Formative:</u></p> <ul style="list-style-type: none"> <li>♦ DeltaMath.com task assessments</li> <li>♦ IXL target skill building</li> <li>♦ Reference sheet strategy – putting together a single sheet of information that will be helpful during summative assessment.</li> <li>♦ PAO strategy, where students work independently, in pairs, and in groups to understand and utilize properties of quadrilaterals.</li> </ul> <p><u>Summative:</u></p> <ul style="list-style-type: none"> <li>♦ Multiple choice and open response questions aligned to NYS Regents</li> <li>♦ Writing and correcting quadrilateral proofs based on teacher feedback.</li> </ul>	<p>In this unit, students will:</p> <ul style="list-style-type: none"> <li>♦ Take risks and view mistakes as opportunities to grow academically and emotionally</li> <li>♦ Draw upon your past learning, prior experiences, and the richness of your cultural background to make meaning of new concepts and apply learning on an ongoing basis.</li> <li>♦ Collaborate with peers to demonstrate their knowledge and growth over time and align to the varied learning styles and interests of those in the class community.</li> </ul>	<p>G-CO.10 Prove theorems about triangles. <i>Theorems include: measures of interior angles of a triangle sum to 180°; base angles of isosceles triangles are congruent; the segment joining midpoints of two sides of a triangle is parallel to the third side and half the length; the medians of a triangle meet at a point.</i></p> <p>G-CO.11 Prove theorems about parallelograms. <i>Theorems include: opposite sides are congruent, opposite angles are congruent, the diagonals of a parallelogram bisect each other, and conversely, rectangles are parallelograms with congruent diagonals.</i></p>

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<p><b>Unit 7: Dilations and Similarity</b></p> <p>◆ Do images always look the same when they are moved?</p>	<p>2.5 weeks, 12 topics</p>	<p><u>RCHS FOCUS PRACTICES:</u></p> <ul style="list-style-type: none"> <li>◆ Make sense of problems and persevere in solving them</li> <li>◆ Construct viable arguments and critique the reasoning of others</li> <li>◆ Model with mathematics</li> <li>◆ Look for and make use of structure</li> </ul> <p><u>UNIT SKILLS:</u></p> <ul style="list-style-type: none"> <li>◆ Understanding dilation and the necessary components involved with it (center of dilation and scale factor)</li> <li>◆ Partitioning and directed line segment into given ratio</li> <li>◆ Using proportions to identify similar polygons</li> <li>◆ Proving triangles similar using AA</li> <li>◆ Recognizing and using proportional relationships of corresponding segments of similar triangles</li> </ul>	<p><u>Core Texts:</u> eMathInstruction.com (videos and worksheets)</p> <p><u>Digital Resources:</u></p> <ul style="list-style-type: none"> <li>◆ DeltaMath.com (hands-on practice with geometric concepts)</li> <li>◆ IXL practice skills</li> </ul> <p><u>Materials:</u></p> <ul style="list-style-type: none"> <li>◆ KIM chart</li> <li>◆ Compass, protractor, ruler for deeper understanding of concepts through constructions</li> </ul>	<p><u>Formative:</u></p> <ul style="list-style-type: none"> <li>◆ DeltaMath.com task assessments</li> <li>◆ IXL target skill building</li> <li>◆ Reference sheet strategy – putting together a single sheet of information that will be helpful during summative assessment.</li> <li>◆ PAO strategy, where students work independently, in pairs, and in groups to partition line segments.</li> </ul> <p><u>Summative:</u></p> <ul style="list-style-type: none"> <li>◆ Multiple choice and open response questions aligned to NYS Regents</li> <li>◆ Students will analyze and correct multiple choice questions. They will provide reasoning for their wrong choice, as well as reasoning for the correct choice. Students will determine which definitions help with answering a particular question.</li> <li>◆ Writing and correcting similarity proofs based on teacher feedback.</li> </ul>	<p>In this unit, students will:</p> <ul style="list-style-type: none"> <li>◆ Take risks and view mistakes as opportunities to grow academically and emotionally</li> <li>◆ Draw upon your past learning, prior experiences, and the richness of your cultural background to make meaning of new concepts and apply learning on an ongoing basis.</li> <li>◆ Collaborate with peers to demonstrate their knowledge and growth over time and align to the varied learning styles and interests of those in the class community.</li> <li>◆ Experience multiple perspectives on a topic and be afforded the opportunity to draw your own conclusions on that topic.</li> </ul>	<p>G-SRT.1 Verify experimentally the properties of dilations given by a center and a scale factor:</p> <p>G-SRT.1A A dilation takes a line not passing through the center of the dilation to a parallel line, and leaves a line passing through the center unchanged.</p> <p>G-SRT.1B The dilation of a line segment is longer or shorter in the ratio given by the scale factor.</p> <p>G-SRT.2 Given two figures, use the definition of similarity in terms of similarity transformations to decide if they are similar; explain using similarity transformations the meaning of similarity for triangles as the equality of all corresponding pairs of angles and the proportionality of all corresponding pairs of sides.</p> <p>G-SRT.3 Use the properties of similarity transformations to establish the AA criterion for two triangles to be similar.</p> <p>G-SRT.4 Prove theorems about triangles. <i>Theorems include: a line parallel to one side of a triangle divides the other two proportionally, and conversely; the Pythagorean Theorem proved using triangle similarity.</i></p> <p>G-SRT.5 Use congruence and similarity criteria for triangles to solve problems and to prove relationships in geometric figures.</p> <p>G-GPE.6 Find the point on a directed line segment between two given points that partitions the segment in a given ratio.</p>



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<p><b>Unit 8: Right Triangle Trigonometry</b></p> <p>◆ How do we connect measures of sides and angles in right triangles?</p>	<p>2 weeks, 6 topics (+2 optional topics)</p>	<p><u>RCHS FOCUS PRACTICES:</u></p> <ul style="list-style-type: none"> <li>◆ Make sense of problems and persevere in solving them</li> <li>◆ Construct viable arguments and critique the reasoning of others</li> <li>◆ Model with mathematics</li> <li>◆ Look for and make use of structure</li> </ul> <p><u>UNIT SKILLS:</u></p> <ul style="list-style-type: none"> <li>◆ Using properties of special right triangles</li> <li>◆ Solving problems involving relationships between parts of a right triangle and the a altitude to its hypotenuse</li> <li>◆ Using trigonometric ratios to find missing parts in a right triangle</li> <li>◆ Solving problems using trigonometry</li> </ul>	<p><u>Core Texts:</u> eMathInstruction.com (videos and worksheets)</p> <p><u>Digital Resources:</u></p> <ul style="list-style-type: none"> <li>◆ DeltaMath.com (hands-on practice with geometric concepts)</li> <li>◆ IXL practice skills</li> </ul> <p><u>Materials:</u></p> <ul style="list-style-type: none"> <li>◆ KIM chart</li> </ul>	<p><u>Formative:</u></p> <ul style="list-style-type: none"> <li>◆ DeltaMath.com task assessments</li> <li>◆ IXL target skill building</li> <li>◆ Reference sheet strategy – putting together a single sheet of information that will be helpful during summative assessment.</li> <li>◆ PAO strategy, where students work independently, in pairs, and in groups to answer questions using trigonometry.</li> </ul> <p><u>Summative:</u></p> <ul style="list-style-type: none"> <li>◆ Multiple choice and open response questions aligned to NYS Regents</li> <li>◆ Students will analyze and correct multiple choice questions. They will provide reasoning for their wrong choice, as well as reasoning for the correct choice. Students will determine which definitions help with answering a particular question.</li> </ul>	<p>In this unit, students will:</p> <ul style="list-style-type: none"> <li>◆ Take risks and view mistakes as opportunities to grow academically and emotionally</li> <li>◆ Draw upon your past learning, prior experiences, and the richness of your cultural background to make meaning of new concepts and apply learning on an ongoing basis.</li> <li>◆ Collaborate with peers to demonstrate their knowledge and growth over time and align to the varied learning styles and interests of those in the class community.</li> </ul>	<p>G-SRT.6 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.</p> <p>G-SRT.7 Explain and use the relationship between the sine and cosine of complementary angles.</p> <p>G-SRT.8 Use trigonometric ratios and the Pythagorean Theorem to solve right triangles in applied problems.</p>

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<p><b>Unit 9: Circle Geometry</b></p> <p>◆ What makes a circle?</p>	<p><b>3 weeks, 12 topics</b></p>	<p><u>RCHS FOCUS PRACTICES:</u></p> <ul style="list-style-type: none"> <li>◆ Make sense of problems and persevere in solving them</li> <li>◆ Construct viable arguments and critique the reasoning of others</li> <li>◆ Model with mathematics</li> <li>◆ Look for and make use of structure</li> </ul> <p><u>UNIT SKILLS:</u></p> <ul style="list-style-type: none"> <li>◆ Identifying and using parts of circles, including finding measures of arcs &amp; angles</li> <li>◆ Finding arc length and sector area</li> <li>◆ Recognizing and using relationships between arcs, chords, and diameters</li> <li>◆ Finding measures of angles formed by lines intersecting on, inside, or outside the circle</li> <li>◆ Finding measures of segments intersecting in the interior or exterior of the circle</li> <li>◆ Writing an equation of a circle and graphing a circle</li> </ul>	<p><u>Core Texts:</u> eMathInstruction.com (videos and worksheets)</p> <p><u>Digital Resources:</u></p> <ul style="list-style-type: none"> <li>◆ DeltaMath.com (hands-on practice with geometric concepts)</li> <li>◆ IXL practice skills</li> </ul> <p><u>Materials:</u></p> <ul style="list-style-type: none"> <li>◆ KIM chart</li> <li>◆ Compass, protractor, ruler for deeper understanding of concepts through constructions</li> </ul>	<p><u>Formative:</u></p> <ul style="list-style-type: none"> <li>◆ DeltaMath.com task assessments</li> <li>◆ IXL target skill building</li> <li>◆ Reference sheet strategy – putting together a single sheet of information that will be helpful during summative assessment.</li> <li>◆ PAO strategy, where students work independently, in pairs, and in groups to answer questions about components of circles and equations of circles.</li> </ul> <p><u>Summative:</u></p> <ul style="list-style-type: none"> <li>◆ Multiple choice and open response questions aligned to NYS Regents.</li> <li>◆ Construction of a tangent line to a circle, providing reasoning for every step, such as why do the given constructions work and how do we know we are constructing the correct thing?</li> </ul>	<p>In this unit, students will:</p> <ul style="list-style-type: none"> <li>◆ Take risks and view mistakes as opportunities to grow academically and emotionally</li> <li>◆ Draw upon your past learning, prior experiences, and the richness of your cultural background to make meaning of new concepts and apply learning on an ongoing basis.</li> <li>◆ Collaborate with peers to demonstrate their knowledge and growth over time and align to the varied learning styles and interests of those in the class community.</li> <li>◆ Experience multiple perspectives on a topic and be afforded the opportunity to draw your own conclusions on that topic.</li> </ul>	<p>G-C.2 Identify and describe relationships among inscribed angles, radii, and chords. Include the relationship between central, inscribed, and circumscribed angles; inscribed angles on a diameter are right angles; the radius of a circle is perpendicular to the tangent where the radius intersects the circle.</p> <p>G-GPE.1 Derive the equation of a circle of given center and radius using the Pythagorean Theorem; complete the square to find the center and radius of a circle given by an equation.</p> <p>G-GPE.5 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).</p> <p>G-CO.12 Make formal geometric constructions with a variety of tools and methods (compass and straightedge, string, reflective devices, paper folding, dynamic geometric software, etc.). Copying a segment; copying an angle; bisecting a segment; bisecting an angle; constructing perpendicular lines, including the perpendicular bisector of a line segment; and constructing a line parallel to a given line through a point not on the line.</p>

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<p><b>Unit 10:</b> <b>Measurement and Modeling</b></p> <p>◆ How do we find the volume of the ice cream in an ice cream cone?</p>	<p><b>2 weeks, 11 topics</b></p> <p><b>May 26 – June 10, 2022</b></p>	<p><u>RCHS FOCUS PRACTICES:</u></p> <ul style="list-style-type: none"> <li>◆ Make sense of problems and persevere in solving them</li> <li>◆ Construct viable arguments and critique the reasoning of others</li> <li>◆ Model with mathematics</li> <li>◆ Look for and make use of structure</li> </ul> <p><u>UNIT SKILLS:</u></p> <ul style="list-style-type: none"> <li>◆ Finding perimeter, circumference, and area of 2-dimensional figures</li> <li>◆ Investigating cross-sections of 3-dimensional figures</li> <li>◆ Using surface area to solve problems for prisms, cylinders, pyramids, cones, and sphere</li> <li>◆ Using volumes to solve problems for prisms, cylinders, pyramids, cones, and sphere</li> </ul>	<p><u>Core Texts:</u> eMathInstruction.com (videos and worksheets)</p> <p><u>Digital Resources:</u></p> <ul style="list-style-type: none"> <li>◆ DeltaMath.com (hands-on practice with geometric concepts)</li> <li>◆ IXL practice skills</li> </ul> <p><u>Materials:</u></p> <ul style="list-style-type: none"> <li>◆ KIM chart</li> <li>◆ Compass, protractor, ruler for deeper understanding of concepts through constructions</li> </ul>	<p><u>Formative:</u></p> <ul style="list-style-type: none"> <li>◆ DeltaMath.com task assessments</li> <li>◆ IXL target skill building</li> <li>◆ Reference sheet strategy – putting together a single sheet of information that will be helpful during summative assessment.</li> <li>◆ Fish Bowl strategy, where a group of students first work with the teacher to learn a task and then work with their peers explaining and showing it.</li> </ul> <p><u>Summative:</u></p> <ul style="list-style-type: none"> <li>◆ Multiple choice and open response questions aligned to NYS Regents.</li> <li>◆ Creating a 2-dimensional plan of a 3-dimensional space using concepts learned in this unit.</li> </ul>	<p>In this unit, students will:</p> <ul style="list-style-type: none"> <li>◆ Take risks and view mistakes as opportunities to grow academically and emotionally</li> <li>◆ Draw upon your past learning, prior experiences, and the richness of your cultural background to make meaning of new concepts and apply learning on an ongoing basis.</li> <li>◆ Collaborate with peers to demonstrate their knowledge and growth over time and align to the varied learning styles and interests of those in the class community.</li> <li>◆ Experience multiple perspectives on a topic and be afforded the opportunity to draw your own conclusions on that topic.</li> <li>◆ Connect in-school learning with the world outside the classroom.</li> </ul>	<p>G-GPE.7 Use coordinates to compute perimeters of polygons and areas of triangles and rectangles, e.g., using the distance formula.</p> <p>G-MG.1 Use geometric shapes, their measures, and their properties to describe objects (e.g., modeling a tree trunk or a human torso as a cylinder).</p> <p>G-MG.2 Apply concepts of density based on area and volume in modeling situations (e.g., persons per square mile, BTUs per cubic foot).</p> <p>G-MG.3 Apply geometric methods to solve design problems (e.g., designing an object or structure to satisfy physical constraints or minimize cost; working with typographic grid systems based on ratios).</p> <p>G-GMD.1 Give an informal argument for the formulas for the circumference of a circle, area of a circle, volume of a cylinder, pyramid, and cone. Use dissection arguments, Cavalieri’s principle, and informal limit arguments.</p> <p>G-GMD.3 Use volume formulas for cylinders, pyramids, cones, and spheres to solve problems.</p> <p>G-GMD.4 Identify the shapes of two-dimensional cross-sections of three-dimensional objects, and identify three-dimensional objects generated by rotations of two-dimensional objects.</p> <p>G-C.1 Prove that all circles are similar</p> <p>G-C.5 Derive using similarity the fact that the length of the arc intercepted by an angle is proportional to the radius, and define the radian measure of the angle as the constant of proportionality; derive the formula for the area of a sector.</p>