LEARNING TRAJECTORY DISPLAY OF THE COMMON CORE STATE STANDARDS FOR MATHEMATICS GEOMETRY

SIMILARITY AND CONGRUENCE, ANGLES, COORDINATE PLANE AND TRANSFORMATIONS (GRADES 6 – 8)
SIMILARITY AND SECTORS, TRANSFORMATIONS AND ANALYTIC GEOMETRY (HIGH SCHOOL)

GRADE 6	GRADE 7	GRADE 8	HIGH SCHOOL	
SIMILARITY AND CONGRUENCE			**SIMILARITY AND SECTORS**	
N/A	**7.G.1** Solve problems involving scale drawings of geometric figures, including computing actual lengths and areas from a scale drawing and reproducing a scale drawing at a different scale.	**8.G.4** Understand that a two-dimensional figure is similar to another if the second can be obtained from the first by a sequence of rotations, reflections, translations, and dilations; given two similar two-dimensional figures, describe a sequence that exhibits the similarity between them.	**LEVEL 1**	**G-SRT.1.ab** Verify experimentally the properties of dilations given by a center and a scale factor: a. 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. b. The dilation of a line segment is longer or shorter in the ratio given by the scale factor.
			LEVEL 2	**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.
			LEVEL 3	**G-SRT.3** Use the properties of similarity transformations to establish the AA criterion for two triangles to be similar.
			LEVEL 4	**G-SRT.4** Prove theorems about triangles. 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.
N/A	**7.G.2** Draw (freehand, with ruler and protractor, and with technology) geometric shapes with given conditions. Focus on constructing triangles from three measures of angles or sides, noticing when the conditions determine a unique triangle, more than one triangle, or no triangle.	**8.G.2** Understand that a two-dimensional figure is congruent to another if the second can be obtained from the first by a sequence of rotations, reflections and translations; given two congruent figures, describe a sequence that exhibits the congruence between them.	**LEVEL 5**	**G-SRT.5** Use congruence and similarity criteria for triangles to solve problems and to prove relationships in geometric figures.
			LEVEL 6	**G-C.5** Drive using similarity the fact that the length of the arc intercept4ed 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.
			LEVEL 7	**N/A**
			LEVEL 8	**G-SRT.9** (+) Derive the formula A= ½ **ab** sin © for the area of a triangle by drawing an auxiliary line from a vertex perpendicular to the opposite side.

LEARNING TRAJECTORY DISPLAY OF THE COMMON CORE STATE STANDARDS FOR MATHEMATICS GEOMETRY

SIMILARITY AND CONGRUENCE, ANGLES, COORDINATE PLANE AND TRANSFORMATIONS (GRADES 6 – 8)
SIMILARITY AND SECTORS, TRANSFORMATIONS AND ANALYTIC GEOMETRY (HIGH SCHOOL)

<table>
<tr><th colspan="3">GRADE 6 / GRADE 7 / GRADE 8</th><th colspan="2">HIGH SCHOOL</th></tr>
<tr><td colspan="3">ANGLES, COORDINATE PLANE AND TRANSFORMATIONS</td><td colspan="2">TRANSFORMATIONS AND ANALYTIC GEOMETRY</td></tr>
<tr><td rowspan="8">6.G.3 Draw polygons in the coordinate plane give coordinates for the vertices: use coordinates to find the length of a side joining points with the same first coordinate or the same second coordinate. Apply these techniques in the context of solving real-world and mathematical problems</td><td rowspan="8">7.G.5 Use facts about supplementary, complementary, vertical, and adjacent angles in a multi-step problem to write and solve simple equations for an unknown angle in a figure.</td><td rowspan="8">8.G.5 Use informal arguments to establish facts about the angle sum and exterior angle of triangles, about the angles created when parallel lines are cut by a transversal, and the angle-angle criterion for similarity of triangles. For example, arrange three copies of the same triangle so that the sum of the three angles appears to form a line, and give an argument in terms of transversals why this is so.
8.G.1.abc Verify experimentally the properties of rotations, reflections, and translations: a. lines are taken to lines and line segments to line segments of the same length, b. angles are taken to angles of the same measure, c.parallel lines are taken to parallel lines.
8.G.3 Describe the effect of dilations, translations, rotations, and reflections on two-dimensional figures using coordinates.</td><td>LEVEL 1</td><td>N/A</td></tr>
<tr><td>LEVEL 2</td><td>G-CO.2 Represent transformations in the plane using, e.g., transparencies and geometric 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.</td></tr>
<tr><td>LEVEL 3</td><td>G-CO.3 Given a rectangle, parallelogram, trapezoid, or regular polygon, describe the rotations and reflections that carry it onto itself.</td></tr>
<tr><td>LEVEL 4</td><td>G-CO.5 Given a geometric figure and rotation, reflection, or translation, draw the transformed figure using, e.g., graph paper, tracing paper, or geometric software. Specify a sequence of transformations that will carry a given figure onto another.</td></tr>
<tr><td>LEVEL 5</td><td>G-GPE.6 Find the point on a directed line segment between two given points that partitions the segment in a given ratio.</td></tr>
<tr><td>LEVEL 6</td><td>G-GPE.7 Use coordinates to compute perimeters of polygons and areas of triangles and rectangles, e.g., using the distance formula.* (REFERS TO MODELING)</td></tr>
<tr><td>LEVEL 7</td><td>N/A</td></tr>
<tr><td>LEVEL 8</td><td>N/A</td></tr>
</table>