Topic A:

Dilation

8.G.A.3

Focus Standard:	8.G.A.3	Describe the effect of dilations, translations, rotations, and reflections on two-dimensional figures using coordinates.
Instructional Days:	7	
Lesson 1:	What Lies Behind "Same Shape"? (E)[1]	
Lesson 2:	Properties of Dilations (P)	
Lesson 3:	Examples of Dilations (P)	
Lesson 4:	Fundamental Theorem of Similarity (FTS) (S)	
Lesson 5:	First Consequences of FTS (P)	
Lesson 6:	Dilations on the Coordinate Plane (P)	
Lesson 7:	Informal Proofs of Properties of Dilations (optional) (S)	

Topic A begins by demonstrating the need for a precise definition of dilation instead of "same shape, different size" because dilation will be applied to geometric shapes that are not polygons. Students begin their work with dilations off the coordinate plane by experimenting with dilations using a compass and straightedge in order to develop conceptual understanding. It is vital that students have access to these tools in order to develop an intuitive sense of dilation and to prepare for further work in Geometry.

In Lesson 1, dilation is defined, and the role of scale factor is demonstrated through the shrinking and magnification of figures. In Lesson 2, properties of dilations are discussed. As with rigid motions, students learn that dilations map lines to lines, segments to segments, and rays to rays. Students learn that dilations are a degree-preserving transformation. In Lesson 3, students use a compass to perform dilations of figures with the same center and figures with different centers. In Lesson 3, students begin to look at figures that are dilated followed by congruence.

In Lessons 4 and 5, students learn and use the Fundamental Theorem of Similarity (FTS): If in ΔABC, D is a point on line AB and E is a point on line AC, and $\frac{|AB|}{|AD|} = \frac{|AC|}{|AE|} = r$, then $\frac{|BC|}{|DE|} = r$ and $L_{DE} \parallel L_{BC}$. Students verify this theorem, experimentally, using the lines of notebook paper. In Lesson 6, the work with dilations is tied to the coordinate plane; students use what they learned in Lessons 4 and 5 to conclude that when the

[1] Lesson Structure Key: **P**-Problem Set Lesson, **M**-Modeling Cycle Lesson, **E**-Exploration Lesson, **S**-Socratic Lesson

center of dilation is the origin, the coordinates of a dilated point is found by multiplying each coordinate of the ordered pair by the scale factor. Students first practice finding the location of dilated points in isolation; then, students locate the dilated points that comprise two-dimensional figures. Lesson 7 provides students with informal proofs of the properties of dilations that they observed in Lesson 2.