Topic C:

Similarity and Dilations

G-SRT.A.2, G-SRT.A.3, G-SRT.B.5, G-MG.A.1

Focus Standards:	G-SRT.A.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.
	G-SRT.A.3	Use the properties of similarity transformations to establish the AA criterion for two triangles to be similar.
	G-SRT.B.5	Use congruence and similarity criteria for triangles to solve problems and prove relationships in geometric figures.
	G-MG.A.1	Using geometric shapes, their measures, and their properties to describe objects (e.g., modeling a tree trunk or a human torso as a cylinder).★
Instructional Days:	9	
Lesson 12:	What Are Similarity Transformations, and Why Do We Need Them? (P)[1]	
Lesson 13:	Properties of Similarity Transformations (P)	
Lesson 14:	Similarity (P)	
Lesson 15:	The Angle-Angle (AA) Criterion for Two Triangles to be Similar (S)	
Lesson 16:	Between-Figure and Within-Figure Ratios (P)	
Lesson 17:	The Side-Angle-Side (SAS) and Side-Side-Side (SSS) Criteria for Two Triangles to be Similar (E)	
Lesson 18:	Similarity and the Angle Bisector Theorem (P)	
Lesson 19:	Families of Parallel Lines and the Circumference of the Earth (S)	
Lesson 20:	How Far Away Is the Moon? (S)	

With an understanding of dilations, students are now ready to study similarity in Topic C. This is an appropriate moment to pause and reflect on the change in how the study of similarity is studied in this curriculum versus traditional geometry curricula. It is not uncommon to open to a similarity unit in a

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

traditional textbook and read about polygons, chiefly triangles, which are of the same shape but different size. Some may emphasize the proportional relationship between corresponding sides early in the unit. The point is that similarity is an instance in grade school mathematics where the information has traditionally been packaged into a distilled version of the bigger picture. The unpackaged view requires a more methodical journey to arrive at the concept of similarity, including the use of transformations. It is in Topic C, after a foundation of scale drawings and dilations, that we can discuss similarity.

Students are introduced to the concept of a similarity transformation in Lesson 12, which they learn is needed to identify figures as being similar. Just as with rigid motions and congruence, the lesson intentionally presents curvilinear examples to emphasize that the use of similarity transformations allows us to compare both rectilinear and curvilinear figures. Next, in Lesson 13, students apply similarity transformations to figures by construction. This is the only lesson where students actually perform similarity transformations. The goals are to simply be able to apply a similarity as well as observe how the properties of the individual transformations that compose each similarity hold throughout construction. In Lesson 14, students observe the reflexive, symmetric, and transitive properties of similarity. The scope of figures used in Lessons 15 through 18 narrows to triangles. In these lessons, students discover and prove the AA, SSS, and SAS similarity criteria. Students use these criteria and length relationships between similar figures and within figures to solve for unknown lengths in triangles (**G-SRT.A.3, G-SRT.B.5**). Note that when students solve problems in Lesson 16 they are using geometric shapes, their measures and properties to describe situations, e.g., similar triangles, is work related to the modeling standard **G-MG.A.1.** Lessons 19 and 20 are modeling lessons (**G-MG.A.1**) that lead students through the reasoning the ancient Greeks used to determine the circumference of the earth (Lesson 19) and the distance from the earth to the moon (Lesson 20).