



Topic C:

Transformations/Rigid Motions

G-CO.A.2, G-CO.A.3, G-CO.A.4, G-CO.A.5, G-CO.B.6, G-CO.B.7, G-CO.D.12

Focus Standard:	G-CO.A.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).
	G-CO.A.3	Given a rectangle, parallelogram, trapezoid, or regular polygon, describe the rotations and reflections that carry it onto itself.
	G-CO.A.4	Develop definitions of rotations, reflections, and translations in terms of angles, circles, perpendicular lines, parallel lines, and line segments.
	G-CO.A.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.
	G-CO.B.6	Use geometric descriptions of rigid motions to transform figures and to predict the effect of a given rigid motion on a given figure; given two figures, use the definition of congruence in terms of rigid motions to decide if they are congruent.
	G-CO.B.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.
	G-CO.D.12	Make formal geometric constructions with a variety of tools and methods (compass and straightedge, string, reflective devices, paper folding, dynamic geometric software, etc.). <i>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.</i>

Instructional Days: 10

Lesson 12: Transformations—The Next Level (M)¹

Lesson 13: Rotations (E)

Lesson 14: Reflections (E)

Lesson 15: Rotations, Reflections, and Symmetry (E)

Lesson 16: Translations (E)

Lesson 17: Characterize Points on a Perpendicular Bisector (S)

Lesson 18: Looking More Carefully at Parallel Lines (S)

Lesson 19: Construct and Apply a Sequence of Rigid Motions (S)

Lesson 20: Applications of Congruence in Terms of Rigid Motions (S)

Lesson 21: Correspondence and Transformations (P)

In Topic C, students are reintroduced to rigid transformations, specifically rotations, reflections, and translations. Students first saw the topic in Grade 8 (**8.G.A.1–3**) and developed an intuitive understanding of the transformations, observing their properties by experimentation. In Topic C, students develop a more exact understanding of these transformations. Beginning with Lesson 12, they will discover what they do *not* know about the three motions. The lesson is designed to elicit the gap in students' knowledge, particularly the fact that they need to learn the language of the parameters of each transformation. During this lesson, they will also learn to articulate what differentiates rigid motions from non-rigid motions. Students examine each transformation more closely in Lessons 13 through 16, developing precise definitions of each and investigating how rotations and reflections can be used to verify symmetries within certain polygons. In Lessons 17 and 18, students will use their construction skills in conjunction with their understanding of rotations and reflections to verify properties of parallel lines and perpendicular lines. With a firm grasp of rigid motions, students then define congruence in Lesson 19 in terms of rigid motions. They will be able to specify a sequence of rigid motions that will map one figure onto another. Topic C closes with Lessons 20 and 21, in which students examine correspondence and its place within the discussion of congruency.

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