Plan for Geometry Unit 1: Constructions and Rigid Transformations

Relevant Unit(s) to review: Grade 8 Unit 1: Rigid Transformations and Congruence

Essential prior concepts to engage with this unit	This unit requires limited prior knowledge and is accessible due to the playful and exploratory approach. Students will review in context many known vocabulary words such as *angle bisector*, *reflection*, *square*, and *translation*. Familiarity with using a compass and straightedge is needed in this unit. If students are not comfortable using these tools, take some time to coach students in their use.
Brief narrative of approach	This unit covers three large topics: constructions, rigid transformations, and evidence and proof. In middle school, students studied transformations of figures in the coordinate plane. In this unit, they transition to more formal definitions that don't rely on the coordinate plane, and the focus shifts from transforming whole figures towards a more point-by-point analysis. This guide does not recommend specific lessons be cut or modified since in grade 8 the year was not interrupted. However, current learning should dictate which optional lessons are included and possibly eliminated if additional time is spent developing routines and reacclimating to school. Also note there is a blank reference chart that students will begin to populate in this unit and will continue to use throughout the course.

Lessons to Add	Lessons to Remove or Modify
For this unit, there are no lessons that need to be added, because most students will have completed the prerequisite lessons in Grade 8 Unit 1. However, some of these lessons might make a nice reference to activate prior knowledge.	This unit does not require any lessons to be removed. However there are some tips should time be an issue: • G.1.8 - optional lesson because it requires technology. • G.1.18 - optional lesson because it is anchored in practice. • G.1.22 - optional lesson because it goes above the depth of the standards.

	• G.1.5 and 6 cover perpendicular line constructions. You can combine these lessons and by eliminating either the angle bisector or parallel line construction if you are behind.
Lessons added: 0	Lessons removed: 0

Modified Plan for Geometry Unit 1

Day	IM lesson	Notes
	assessment	G1 Check Your Readiness
1	G.1.1	Constructions with a compass and straightedge.
2	G.1.2	Describe (in writing) construction steps precisely.
3	G.1.3	Construct perpendicular bisectors.
4	G.1.4	Construct equilateral triangles.
5	G.1.5	Construct perpendicular lines and angle bisectors.
6	G.1.6	Construct parallel lines.
7	G.1.7	Construct squares.
8	G.1.8	Constructions with technology. If you have access to technology and plan to use technology this is a very important lesson as it helps develop skills that students will use throughout the course.
9	G.1.9	Use the construction of perpendicular bisectors to solve problems.
10	Mid Unit Assessment	G1 Mid Unit Assessment
11	G.1.10	Rigid motions produce congruent figures by preserving distance and angles.

12	G.1.11	Rigorously define reflections.
13	G.1.12	Translate figures using directed segments.
14	G.1.13	Rotations are rigid motions and also produce congruent figures.
15	G.1.14	Comprehend that rotations require several descriptors including angle, center, and direction.
16	G.1.15	Comprehend and be able to describe (orally and in writing) the reflections that take a figure onto itself.
17	G.1.16	Comprehend and be able to describe (orally and in writing) the rotations that take a figure onto itself.
18	G.1.17	Comprehend that the notation A' represents the image of point A and the correlation and process of point-by-point transformations.
19	G.1.18	Point-by-point transformations.
20	G.1.19	Vertical angles are congruent.
21	G.1.20	When parallel lines are cut by a transversal, alternate interior angles are congruent and corresponding angles are congruent.
22	G.1.21	Triangle Sum Theorem.
23	G.1.22	Tessellations and geometric designs.
24	Assessment	End of Unit Assessment

Priority and Category List for Lessons

High priority (+), Medium priority (0), Low priority (-)

E: Explore, Play, and Discuss, D: Deep Dive, A: Synthesize and Apply

Lesson	Priority (+, 0, -)	Category (E, D, A)	Notes
G.1.1	+	E	This is the foundational lesson and anchors the first part of the unit. Students need to be able to play with a compass and review the definition and properties of circles to succeed in the unit.
G.1.2	+	E	This lesson is more play and exploring and students will benefit from preserving through new mathematical experiences such as following procedures and using precise mathematical language to describe recipes for constructions.
G.1.3	+	E	This lesson introduces students to perpendicular bisectors through construction. Students will use their understanding of perpendicular bisectors in later lessons about reflections. It is important at this point students know the definition of a perpendicular bisector—a line both perpendicular to a segment and passing through its midpoint. Students will continue to develop their understanding and prove properties of perpendicular bisectors in the next unit.
G.1.4	+	E	This lesson gives students the opportunity to practice their construction techniques when they construct equilateral triangles. Students will also practice vocabulary terms and justifying claims throughout the lesson.
G.1.5	0	D	This lesson and Lesson 6 can be combined if needed. Definitely have students construct perpendicular lines and then choose between constructing an angle bisector or parallel lines. Or perhaps have half the class do one and the other half do the other and then pair students to share constructions.
G.1.6	0	D	This lesson and Lesson 5 can be combined if needed. Definitely have students construct perpendicular lines and then choose between constructing an angle bisector or parallel lines. Or perhaps have half the class do one and the other half do the other and then pair students to share constructions.

G.1.7	-	D	Students are familiar with squares. If you are feeling pressed for time, this is a good lesson to skip because the vocabulary used is familiar.
G.1.8	+/-	D	This lesson is optional because it requires technology. If you have technology this is a value lesson in that it allows students to synthesize their learning and create constructions without the need to use paper and pencil.
G.1.9	-	A	This lesson uses perpendicular bisectors to solve problems. This is an application lesson and builds upon Lessons 3 and 5. Students will have plenty of opportunities to solve problems and apply their knowledge. If you are short on time this is a good lesson to skip.
G.1.10	+	D	This a big lesson in that students are comprehending *why* transformed figures are congruent. They are also describing how to map one figure to another using rigid motions. It is critical that students understand that mapped figures are congruent and have a sense of the moves that can produce congruent figures. This lesson builds heavily on G8 U1 (especially lessons 3–5).
G.1.11	-	D	In this lesson, students build on experiences and on their straightedge and compass constructions to rigorously define reflections as transformations that take every point of a figure to a point directly opposite to it on the other side of the line of reflection and the same distance from the line of reflection. This lesson also includes the first Info Gap of the course, which is probably hard to do via distance learning. This is a long lesson and can take up to two in-person class periods. Might be a good lesson to skip if pressed for time.
G.1.12	0	D	This lesson builds on students' understanding of translations by using directed segments.
G.1.13	+	D	This lesson builds in rotations when describing rigid motions and congruent figures. This lesson includes an activity where students complete a sequence of translation, reflection, and rotation where each rigid motion lines up one pair of points in a pair of congruent triangles. This sequence of point-by-point transformation will be the basis for triangle congruence proof in a subsequent unit.
G.1.14	-	D	This lesson builds on the previous lesson and includes opportunities to use rigorous mathematical language. This lesson also includes an Info Gap.
G.1.15	0	D	This lesson builds on previous learning around symmetries. In this course students

			comprehend and are able to describe (orally and in writing) the reflections that take a figure onto itself.
G.1.16	-	D	This lesson is similar to the previous lesson in that it also builds on previous knowledge around symmetries. In this lesson students rigorously define rotations that take a figure onto itself.
G.1.17	0	D	This lesson is challenging via distance learning because it includes a card sort. The lesson content is interesting and students can be successful in the course even if it is shortened or skipped.
G.1.18	-	D	This is an optional lesson that gives students the opportunity to practice point-by-point transformations. This lesson is helpful if students have been struggling. Furthermore, if distance learning is employed this lesson is more accessible than the previous lesson while having similar goals.
G.1.19	+	E	This is an introductory lesson and allows students the opportunity to label diagrams and write convincing arguments. The lesson ultimately has students prove vertical angles are congruent which is a theorem they will use throughout the course.
G.1.20	+	D	This lesson has two theorems that students will use throughout the course. Students need to know that AIA and corresponding angles are congruent when parallel lines are cut by a transversal. This lesson incorporates a lot of proof writing, including two proofs for the cool down. If students are struggling with proof writing they will continue to develop their skills over the next several lessons.
G.1.21	+	D	This lesson has multiple ways to prove the angles of a triangle add to 180 degrees. It is important that students have some understanding as to why the angles of a triangle sum to 180 degrees but they do not need to be able to recreate every scenario from memory.
G.1.22	-	A	This lesson goes beyond the depth of the standards and provides students with the opportunity to construct their own geometric design using properties of transformations.