Geometry Common Core Curriculum

Congruence, Proof, and Constructions

Topic A: Basic Constructions (**G-CO.A.1**, **G-CO.D.12**, **G-CO.D.13**)

Lessons 1–2: Construct an Equilateral Triangle

Lesson 3: Copy and Bisect an Angle

Lesson 4: Construct a Perpendicular Bisector

Lesson 5: Points of Concurrencies

Topic B: Unknown Angles (**G-CO.C.9**)

Lesson 6: Solve for Unknown Angles—Angles and Lines at a Point

Lesson 7: Solve for Unknown Angles—Transversals

Lesson 8: Solve for Unknown Angles—Angles in a Triangle

Lesson 9: Unknown Angle Proofs—Writing Proofs

Lesson 10: Unknown Angle Proofs—Proofs with Constructions

Lesson 11: Unknown Angle Proofs—Proofs of Known Facts

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**)

Lesson 12: Transformations—The Next Level

Lesson 13: Rotations

Lesson 14: Reflections

Lesson 15: Rotations, Reflections, and Symmetry

Lesson 16: Translations

Lesson 17: Characterize Points on a Perpendicular Bisector

Lesson 18: Looking More Carefully at Parallel Lines

Lesson 19: Construct and Apply a Sequence of Rigid Motions

Lesson 20: Applications of Congruence in Terms of Rigid Motions

Lesson 21: Correspondence and Transformations

Topic D: Congruence (**G-CO.B.7**, **G-CO.B.8**)

Lesson 22: Congruence Criteria for Triangles—SAS

Lesson 23: Base Angles of Isosceles Triangles

Lesson 24: Congruence Criteria for Triangles—ASA and SSS

Lesson 25: Congruence Criteria for Triangles—AAS and HL

Lessons 26–27: Triangle Congruency Proofs

Topic E: Proving Properties of Geometric Figures (**G-CO.C.9**, **G-CO.C.10**, **G-CO.C.11**)

Lesson 28: Properties of Parallelograms

Lessons 29–30: Special Lines in Triangles

Topic F: Advanced Constructions (**G-CO.D.13**)

Lesson 31: Construct a Square and a Nine-Point Circle

Lesson 32: Construct a Nine-Point Circle

Topic G: Axiomatic Systems (**G-CO.A.1**, **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.B.8**, **G-CO.C.9**, **G-CO.C.10**, **G-CO.C.11**, **G-CO.C.12**, **G-CO.C.13**)

Similarity, Proof, and Trigonometry

Topic A: Scale Drawings (**G-SRT.A.1**, **G-SRT.B.4, G-MG.A.3**)

Lesson 1: Scale Drawings

Lesson 2: Making Scale Drawings Using the Ratio Method

Lesson 3: Making Scale Drawings Using the Parallel Method

Lesson 4: Comparing the Ratio Method with the Parallel Method

Lesson 5: Scale Factors

Topic B: Dilations (**G-SRT.A.1**, **G-SRT.B.4**)

Lesson 6: Dilations as Transformations of the Plane

Lesson 7: How Do Dilations Map Segments?

Lesson 8: How Do Dilations Map Lines, Rays, and Circles?

Lesson 9:  How Do Dilations Map Angles?

Lesson 10:  Dividing the King’s Foot into 12 Equal Pieces

Lesson 11:  Dilations from Different Centers

Topic C: Similarity and Dilations (**G-SRT.A.2**, **G-SRT.A.3**, **G-SRT.B.5**, **G-MG.A.1**)

Lesson 12: What Are Similarity Transformations, and Why Do We Need Them?

Lesson 13: Properties of Similarity Transformations

Lesson 14: Similarity

Lesson 15: The Angle-Angle (AA) Criterion for Two Triangles to be Similar

Lesson 16: Between-Figure and Within-Figure Ratios

Lesson 17: The Side-Angle-Side (SAS) and Side-Side-Side (SSS) Criteria for Two Triangles to be Similar

Lesson 18: Similarity and the Angle Bisector Theorem

Lesson 19: Families of Parallel Lines and the Circumference of the Earth

Topic D: Applying Similarity to Right Triangles (**G-SRT.B.4**)

Lesson 21: Special Relationships Within Right Triangles—Dividing into Two Similar Sub-Triangles

Lesson 22: Multiplying and Dividing Expressions with Radicals

Lesson 23: Adding and Subtracting Expressions with Radicals

Lesson 24: Prove the Pythagorean Theorem Using Similarity

Topic E: Trigonometry (**G-SRT.C.6**, **G-SRT.C.7**, **G-SRT.C.8**)

Lesson 25: Incredibly Useful Ratios

Lesson 26: The Definition of Sine, Cosine, and Tangent

Lesson 27: Sine and Cosine of Complementary Angles and Special Angles

Lesson 28: Solving Problems Using Sine and Cosine

Lesson 29: Applying Tangents

Lesson 30: Trigonometry and the Pythagorean Theorem

Lesson 31: Using Trigonometry to Determine Area

Lesson 32: Using Trigonometry to Find Side Lengths of an Acute Triangle

Lesson 33: Applying the Laws of Sines and Cosines

Lesson 34: Unknown Angles

Extending to Three Dimensions

Topic A: Area (**G-GMD.A.1**)

Lesson 1: What Is Area?

Lesson 2: Properties of Area

Lesson 3: The Scaling Principle for Area

Lesson 4: Proving the Area of a Disk

Topic B: Volume (**G-GMD.A.1**, **G-GMD.A.3**, **G-GMD.B.4**, **G-MG.A.1**, **G-MG.A.2**, **G-MG.A.3**)

Lesson 5: Three-Dimensional Space

Lesson 6: General Prisms and Cylinders and Their Cross-Sections

Lesson 7: General Pyramids and Cones and Their Cross-Sections

Lesson 8: Definition and Properties of Volume

Lesson 9: Scaling Principle for Volumes

Lesson 10: The Volume of Prisms and Cylinders and Cavalieri’s Principle

Lesson 11: The Volume Formula of a Pyramid and Cone

Lesson 12: The Volume Formula of a Sphere

Lesson 13: How Do 3D Printers Work?

Connecting Algebra and Geometry Through Coordinates

Topic A: Rectangular and Triangular Regions Defined by Inequalities (**G-GPE.B.7**)

Lesson 1: Searching a Region in the Plane

Lesson 2: Finding Systems of Inequalities That Describe Triangular and Rectangular Regions

Lesson 3: Lines That Pass Through Regions

Lesson 4: Designing a Search Robot to Find a Beacon

Topic B: Perpendicular and Parallel Lines in the Cartesian Plane (**G-GPE.B.4**, **G-GPE.B.5**)

Lesson 5: Criterion for Perpendicularity

Lesson 6: Segments That Meet at Right Angles

Lesson 7: Equations for Lines Using Normal Segments

Lesson 8: Parallel and Perpendicular Lines

Topic C:Perimeters and Areas of Polygonal Regions in the Cartesian Plane (**G-GPE.B.7**)

Lesson 9: Perimeter and Area of Triangles in the Cartesian Plane

Lesson 10: Perimeter and Area of Polygonal Regions in the Cartesian Plane

Lesson 11: Perimeters and Areas of Polygonal Regions Defined by Systems of Inequalities

Topic D: Partitioning and Extending Segments and Parameterization of Lines (**G-GPE.B.4**, **G-GPE.B.6**)

Lesson 12: Dividing Segments Proportionately

Lesson 13: Analytic Proofs of Theorems Previously Proved by Synthetic Means

Lesson 14: Motion Along a Line—Search Robots Again (Optional)

Lesson 15: The Distance from a Point to a Line

Circles With and Without Coordinates

Topic A: Central and Inscribed Angles (**G-C.A.2**, **G-C.A.3**)

Lesson 1: Thales’ Theorem

Lesson 2: Circles, Chords, Diameters, and Their Relationships

Lesson 3: Rectangles Inscribed in Circles

Lesson 4: Experiments with Inscribed Angles

Lesson 5: Inscribed Angle Theorem and Its Applications

Lesson 6: Unknown Angle Problems with Inscribed Angles in Circles

Topic B: Arcs and Sectors (**G-C.A.1**, **G-C.A.2**, **G-C.B.5**)

Lesson 7: The Angle Measure of an Arc

Lesson 8: Arcs and Chords

Lesson 9: Arc Length and Areas of Sectors

Lesson 10: Unknown Length and Area Problems

Topic C: Secants and Tangents (**G-C.A.2**, **G-C.A.3**)

Lesson 11: Properties of Tangents

Lesson 12: Tangent Segments

Lesson 13: The Inscribed Angle Alternate—A Tangent Angle

Lesson 14: Secant Lines; Secant Lines That Meet Inside a Circle

Lesson 15: Secant Angle Theorem, Exterior Case

Lesson 16: Similar Triangles in Circle-Secant (or Circle-Secant-Tangent) Diagrams

Topic D: Equations for Circles and Their Tangents (**G-GPE.A.1**, **G-GPE.B.4**)

Lesson 17: Writing the Equation for a Circle

Lesson 18: Recognizing Equations of Circles

Lesson 19: Equations for Tangent Lines to Circles

Topic E: Cyclic Quadrilaterals and Ptolemy’s Theorem (**G-C.A.3**)

Lesson 20: Cyclic Quadrilaterals

Lesson 21: Ptolemy’s Theorem