Geometry Curriculum Map

Geometry Common Assessments

Course: Geometry	**Unit Title/Timeframe:** **Solving Linear and Quadratic Equation Review / 2 weeks**
Enduring Understandings	• Linear and Quadratic equations can be solved or simplified in different ways depending on what the equation looks like.
Essential Questions	• What are the key components to finding and graphing a linear equation? • How do you know how many solutions a polynomial equation has? • How do you determine which strategy to use to factor?
Learning Targets **Common Core/Massachusetts Standards/AP Standards**	• Understand the graph of the equation in two variables is the set of all the solutions plotted in the coordinate plane often forming a curve (which could be a line) **A-REI.10** • Factor quadratic expressions using greatest common factor, difference of two squares and trinomial "box" **A-SSE 2, 3** • Solve quadratic equations using factoring.**A-REI 1, 4, A-APR 3**
Instructional Strategies* **TI** = Technology Integration **ID** = Interdisciplinary connections	Graphic Organizer: Factoring Flowchart, Rule of Four Organizer Visual Representation:Trinomial Box Method
Assessment	IXL skills - (see Geometry Common Assessments) Review Quiz **Geometry Common Assessments**
Major Resources	Factoring Flowchart*, Text: Algebra 1:McDougal Littell (photocopied packets available) *see Common Experience Folder

Course: Geometry	**Unit Title / Timeframe:** **1- Basics of Geometry (Ch 1) / 3 weeks**
Enduring Understandings	• Geometry and spatial sense offer ways to interpret and reflect on our physical environment.
Essential Questions	• How do geometric models describe spatial relationships? • How are geometric figures classified? • How is visualization essential in the study of geometry?
Common Core/Massachusetts Standards/AP Standards	• Know precise definitions of angle, perpendicular line, parallel line, and line segment, based on the undefined notions of point, line, and distance along a line **G-CO (1)** • Use segment and angle postulates • Bisect segments and angles and include the use of tools to do so **G-CO (12)** • Identify a linear pair, vertical angles, complementary and supplementary angles **G-CO (9)** • Find the perimeter and area of common plane figures **6.G**
Learning Targets	• Name points, lines, and planes. • Measure segments and angles. • Use formulas in the coordinate plane. • Construct segments and angles.

Instructional Strategies* **TI** = Technology Integration **ID** = Interdisciplinary connections	Directed Notes Practice Cooperative Learning Desmos: Introduction to Distance Formula **TI** https://teacher.desmos.com/activitybuilder/custom/5600a868e795241d06683511

Assessment	Quiz

	Common Assessment: Points Lines and Planes Project **Geometry Common Assessments**
Major Resources	Text & Resource Kit: Geometry:Big Ideas Geometry Chapter 1(sections 1.1-1.6) *See Common Experience Google Classroom: Geometry OER

Course: Geometry	**Unit Title/Timeframe:** **3- Perpendicular & Parallel Lines (Ch 3) / 2 weeks**
Enduring Understandings	• Analyzing geometric relationships develops reasoning and justification skills. • Understanding how the relationships of parallel and perpendicular lines relate to our physical environment.
Essential Questions	• How do you prove two lines are parallel (geometrically and algebraically)? • What information is needed to write an equation of a line?
Common Core/Massachusetts Standards/AP Standards	• Explain theorems about lines and angles. Theorems include vertical angles are congruent, when a transversal crosses parallel lines (alternate interior, corresponding, and alternate exterior angle pairs are congruent). **G-CO (9)** • Explain the slope criteria for parallel and perpendicular lines in the coordinate plane and use them to solve geometric problems. **G-GPE (5)**
Learning Targets	• Identify lines and angles. • Describe angle relationships formed by parallel lines and a transversal. • Prove theorems involving parallel and perpendicular lines. • Write equations of parallel and perpendicular lines.

Instructional Strategies* **TI** = Technology Integration **ID** = Interdisciplinary connections	Directed Notes Practice Cooperative Learning Geometer's SketchPad activity on *Parallel Lines and Angles* **TI** **Desmos:**Lines, Transversals, and Angles **TI** https://teacher.desmos.com/activitybuilder/custom/56fd6cb1bfa5cb4206f88f5f
Assessment	Quiz Cumulative Test Chapters 1-3 **Geometry Common Assessments**
Major Resources	Text & Resource Kit: Geometry:Big Ideas Geometry Chapter 3 (sections 3.1-3.5) *See Common Experience Google Classroom: Geometry OER

Course: Geometry	**Unit Title/Timeframe:** **4- Transformations (Ch 4) / 2 week**
Enduring Understandings	• There are three ways to transform an image and keep all lengths, angle measures, etc. the -same (isometry) • What is the difference between rotational and regular symmetry?
Essential Questions	• What every day figures can be seen as transformations of other figures of themselves?
Common Core/Massachusetts Standards/AP Standards	• Represent transformations in the plane. Compare transformations that preserve distance and angle to those that do not. **G-CO (2)** • Given a variety of polygons describe the rotations and reflections that carry it onto itself. **G-CO (3)** • Develop definitions of rotations, reflections, and translations in terms of angles, perpendicular/parallel lines, and line segments **G-CO (4)** • Given a geometric figure and a transformation, draw the transformed figure using graph paper

	or geometry software. **G-CO (5)** • Verify experimentally the properties of dilations given by a center and a scale factor **G-SRT (1)**
Learning Targets	• Identify transformations. • Perform translations, reflections, rotations, and dilations. • Describe congruence and similarity transformations. • Solve problems involving transformations.
Instructional Strategies* **TI** = Technology Integration **ID** = Interdisciplinary connections	Cooperative Learning Geometer's SketchPad activity on *Translations, Reflections, Reflection in a Coordinate Plane, Rotations, Dilations, and Applications of Transformations* **TI**
Assessment	Project based unit covering rotations, reflections, and translations Perform transformations of other students figures **Geometry Common Assessments**
Major Resources	Text & Resource Kit: Geometry:Big Ideas Geometry Chapter 4 (sections 4.1- 4.6) *See Common Experience Google Classroom: Geometry OER

Course: Geometry	**Unit Title/Timeframe:** **5- Triangle Congruence (Ch 5) / 2 weeks**
Enduring Understandings	• When two triangles are congruent, each of their corresponding angles and sides are congruent. • Certain combinations of three congruent corresponding pieces are enough to prove triangles congruent.
Essential Questions	• What is the minimal amount of information (sides and angles) needed to prove triangle

	congruence? • How do you use congruent triangles to solve real life problems?
Common Core/Massachusetts Standards/AP Standards	• Identify congruent triangles and corresponding parts. **G-CO (7)** • Show that two triangles are congruent if and only if corresponding sides and angles are congruent. **G-CO (7)** • Explain the criteria for triangle congruence (SSS, SAS, ASA, AAS, and HL). **G-CO (8)** • Explain theorems about triangles. **G-CO (10)**
Learning Targets	• Classify triangles by sides and angles. • Solve problems involving congruent polygons. • Explain why triangles are congruent using different theorems. • Write a coordinate proof.
Instructional Strategies* **TI** = Technology Integration **ID** = Interdisciplinary connections	Directed Notes Practice Cooperative Learning Discovery Based Learning: Discovery activity for triangle congruence Geometer's SketchPad activity on *Investigating Triangles and Congruence, Proving SSS activity* **TI** Discovery activity for triangle congruence*
Assessment	Quiz on Triangle Congruence ***(Common Assessment)*** Chapter 5 Test **Geometry Common Assessments**
Major Resources	Text & Resource Kit: Geometry:Big Ideas Geometry Chapter 5 (sections 5.1-5.8) *See Common Experience Google Classroom: Geometry OER

Course: Geometry	**Unit Title/Timeframe:** **6- Relationships with Triangles (Ch 6) / 3 weeks**
Enduring Understandings	• Mathematical calculations can help predict the optimal location for a geographic application.
Essential Questions	• What conjectures can you make about the perpendicular and angle bisectors of a triangle? • What conjectures can you make about the medians and altitudes of a triangle? • How can the centroid and circumcenter of a triangular region be useful in a geographic application? • Why can the circumcenter lie inside, outside, or on the triangle? • How are the midsegments of a triangle related to the sides of a triangle?
Common Core/Massachusetts Standards/AP Standards	• Explain the slope criteria for parallel and perpendicular lines and use them to solve geometric problems. **G-GPE (5)** • Explain medians of a triangle meet at a certain point. **G-CO (10)**
Learning Targets	• Identify and use perpendicular and angle bisectors of a triangle. • Use medians and altitudes of triangles to solve problems. • Find distances using the Triangle Midsegment Theorem. • Compare measures within triangles and between two triangles.
Instructional Strategies* **TI** = Technology Integration **ID** = Interdisciplinary connections	Directed Notes Practice Cooperative Learning Project-Based Learning: Headquarters Project **TI** Geometer's SketchPad activity on *Altitudes, Angle Bisectors, Centroid Investigation, and Circumcenter Investigation* **TI**
Assessment	Quiz: Finding perpendicular bisectors and medians of a triangle Headquarters Project ***(Common Assessment)*** **Geometry Common Assessments**

Major Resources	Headquarters Project & Rubric* Headquarters Project Exemplars Text & Resource Kit: Geometry:Big Ideas Geometry Chapter 6 (sections 6.1-6.4) *See Common Experience Google Classroom: Geometry OER

Course: Geometry	**Unit Title/Timeframe:** **7- Quadrilaterals & other Polygons (Ch 7) / 3 weeks**
Enduring Understandings	● Polygons are apparent in all 3-dimensional objects. ● The classification of quadrilaterals is important in identifying additional unknown properties.
Essential Questions	● How are polygons classified? ● What are the key properties of each special quadrilateral? ● Do any special quadrilaterals have the same properties?
Common Core/Massachusetts Standards/AP Standards	● Explain theorems about parallelograms. **G-CO (11)** ● Use coordinates to prove simple geometric theorems algebraically. For example; prove or disprove that a figure defined by four given points in the coordinate plane is a rectangle. **G-GPE (4)** ● Explain the slope criteria for parallel and perpendicular lines and use them to solve geometric problems. **G-GPE (5)** ● Use coordinates to compute perimeter and area of polygons, e.g. using the distance formula. **G-GPE (7)**
Learning Targets	● Find angles of polygons. ● Describe properties of parallelograms. ● Use properties of parallelograms. ● Use properties to identify special quadrilaterals.

Instructional Strategies* **TI** = Technology Integration **ID** = Interdisciplinary connections	Directed Notes on properties and area of quadrilaterals Practice Cooperative Learning
Assessment	Quiz- Quadrilateral flow chart Chapter 7 Cumulative Test properties and area of all Quadrilaterals Proving special types of Quadrilateral algebraically with partners **Geometry Common Assessments**
Major Resources	Text & Resource Kit: Geometry:Big Ideas Geometry Chapter 7 (sections 7.1-7.5) *See Common Experience Google Classroom: Geometry OER

Course: Geometry	**Unit Title/Timeframe:** **8- Similarity (Ch 8) / 3 weeks**
Enduring Understandings	● Proportional relationships express how quantities change in relationship to each other.
Essential Questions	● How does identifying similar figures help describe the relationship between them? ● When and why do I use proportional comparisons?
Common Core/Massachusetts Standards/AP Standards	● Decide if two figures are similar. Explain based on congruence of corresponding angles and proportionality of corresponding sides. **G-SRT (2)** ● Use the properties of similarity to establish the AA criterion for two triangles to be similar. **G-SRT (3)** ● Explain theorems about triangle proportionality. **G-SRT (4)** ● Use congruence and similarity criteria for triangles to solve problems. **G-SRT (5)**

Learning Targets	• Identify corresponding parts of similar polygons. • Find and use the scale factor in similar polygons. • Prove triangles are similar. • Use proportionality theorems to solve problems.
Instructional Strategies* **TI** = Technology Integration **ID** = Interdisciplinary connections	Directed Notes on ratios, proportions, and identifying similar polygons Practice Cooperative Learning Geometer's SketchPad activity on *Exploring Dilations* **TI**
Assessment	Quiz - Ratio & proportion and identifying similar polygons **Geometry Common Assessments**
Major Resources	Text & Resource Kit: Geometry:Big Ideas Geometry Chapter 8 (sections 8.1-8.4) *See Common Experience Google Classroom: Geometry OER

Course: Geometry	**Unit Title/Timeframe:** **9- Right Triangle Trigonometry (Ch 9) / 3 weeks**
Enduring Understandings	• Trigonometric functions are defined as the ratios of two sides of a triangle. • We can find missing side lengths of a triangle by using trigonometric functions of specific angles. • There are some special triangles with commonly used angles that we should know.

Essential Questions	• Why is the sin(30) always ½ no matter how big the triangle is? • What are our options for finding a missing side of a triangle given certain information?
Common Core/Massachusetts Standards/AP Standards	• Understand and apply the Pythagorean Theorem **8.G** • Understand that by similarity side ratios in right triangles are properties of the angles in the triangle, leading to the definitions of trigonometric ratios for acute angles. **G-SRT (6)** • Explain and use the relationship between sine, cosine, and tangent of complementary angles. **G-SRT (7)** • Use trigonometric ratios and the Pythagorean Theorem to solve triangles and apply problems. **G-SRT (8)**
Learning Targets	• Classify triangles. • Use the Pythagorean Theorem. • Solve problems using trigonometric ratios. • Explain how to use the Law of Sines and Law of Cosines.
Instructional Strategies* **TI** = Technology Integration **ID** = Interdisciplinary connections	Directed Notes on the Pythagorean Theorem, it's converse, and right triangle trigonometry Practice Cooperative Learning TO SCALE measurements of triangle sides and angles to help show trig values Geometer's SketchPad activity on *Investigating Sides and Angles of Triangles* **TI**
Assessment	Trig Lab on Finding the Angles of Elevation for the stairs, staircases, and ramps of LHS Quiz - Pythagorean Theorem and Converse, and special right triangles Create and solve triangle Chapter 9 Cumulative Test **Geometry Common Assessments**
Major Resources	Text & Resource Kit: Geometry:Big Ideas Geometry Chapter 9 (sections 9.1-9.7) *See Common Experience Google Classroom: Geometry OER See Algebra 2: McDougal Littell Chapter 13 resource guide for right triangle word problems

	*See Common Experience Folder

Course: Geometry	**Unit Title/Timeframe:** **10-Circles (Ch 10) / 3 weeks**
Enduring Understandings	• Arcs are parts of a circle that are measured by the angle that creates them
Essential Questions	• How do you find the measure of an arc of a circle? • How do you identify the types of lines and segments created with points on a circle?
Common Core/Massachusetts Standards/AP Standards	• Explain that all circles are similar. **G-C (1)** • Identify and describe relationships among inscribed angles, radii, and chords. **G-C (2)** • Explain the properties of angles for a quadrilateral inscribed in a circle. **G-C (3)** • Explain using similarity the fact that the length of the arc intercepted by an angle is proportional to the radius. Explain the formula for the area of a sector. **G-C (5)**
Learning Targets	• Identify lines and segments that intersect circles. • Solve problems using angle relationships in circles. • Solve problems using segment relationships in circles. • Write and graph equations of circles.
Instructional Strategies* **TI** = Technology Integration **ID** = Interdisciplinary connections	Directed Notes on properties of arcs, chords, tangents, and secants Practice Cooperative Learning Geometer's SketchPad activity on *Investigating Segment Lengths* **TI** Geometer's SketchPad activity on *Investigating Points Equidistant from a Point and a Line* **TI**
Assessment	Open Notes Quiz **Geometry Common Assessments**
Major Resources	Text & Resource Kit: Geometry:Big Ideas Geometry Chapter 10 (sections 10.1-10.7)

	*See Common Experience Google Classroom: Geometry OER

Course: Geometry	**Unit Title/Timeframe:** **11- Circumference, Area, & Volume (Ch 11) / 2 weeks**
Enduring Understandings	• Performing unit analysis with all unknowns in a formula can help you make sure the formula is correct. • A solid's area, volume, shape etc. changes differently depending on which dimension is changed.
Essential Questions	• How is applying geometric formulas helpful in solving real life problems?
Common Core/Massachusetts Standards/AP Standards	• Give an informal argument for the formulas of the circumference of a circle, the area of a circle, volume of a cylinder, pyramid, and cone. **G-GMD 1** • Use volume formulas for cylinders, pyramids, cones, and spheres to solve problems. **G-GMD 3** • Apply geometric methods to solve design problems. Example, design an object to satisfy physical constraints or minimize cost. **G-MG 3**
Learning Targets	• Use formulas to find the circumferences and areas of circles. • Find areas of polygons. • Find the surface areas and volumes of solids. • Find missing dimensions of solids.
Instructional Strategies* **TI** = Technology Integration **ID** = Interdisciplinary connections	Directed Notes Practice Cooperative Learning Geometer's SketchPad activity on *Minimizing Surface Area* **TI**

Assessment	Project based unit covering surface area and volume Greenhouse Area, Perimeter, and Volume activity ***(Common Assessment)*** **Geometry Common Assessments**
Major Resources	Text & Resource Kit: Geometry:Big Ideas Geometry Chapter 11 (sections 11.1-11.8) *See Common Experience Google Classroom: Geometry OER

Additional Unit if Time Allows

Course: Geometry	**Unit Title/Timeframe:** **2- Reasoning & Logic (Ch 2) / 2 weeks**
Enduring Understandings	• Patterns provide insights into potential relationships.
Essential Questions	• How can deductive reasoning be used to establish or refute conjectures? • How can patterns be used to make predictions?
Common Core/Massachusetts Standards/AP Standards	• Rewriting statements as conditional statements and determining the converse, inverse, and contrapositive statements and their accuracy **G-CO** • Biconditional statements **G-CO** • Reasoning with properties of algebra in order to solve or rewrite equations **G-CO (9)** • Proving statements about segments and angles **G-CO (9), (10)**
Learning Targets	• Use inductive and deductive reasoning. • Justify steps using algebraic reasoning. • Explain postulates using diagrams. • Prove geometric relationships.
Instructional Strategies* **TI** = Technology Integration	Directed Notes Practice

ID = Interdisciplinary connections	Cooperative Learning Project-Based Learning: Slogan Project
Assessment	Slogan Project 1 Quiz **Geometry Common Assessments**
Major Resources	Slogan Project and Rubric* Slogan Project Exemplars Text & Resource Kit: Geometry:Big Ideas Geometry Chapter 2 (sections 2.1-2.6) *See Common Experience Google Classroom: Geometry OER