

Saint Patrick High School

Curriculum Guide

Department:	Mathematics	Grade and Level:	10 and 11
Class:	Phoenix Geometry	Term (Semester or Year):	Year course

Required Text:	Geometry Concepts and Skills (McDougal Littell)
Additional Resources (i.e. texts, materials, apps, etc.):	iPad iPad apps <ul style="list-style-type: none">• Goodreader• Showbie

Course Description

This class is focused on the application of geometric shapes and their properties. We will cover a wide variety of topics including but not limited to lines and line-segments, triangles, quadrilaterals, regular polygons, circles, area, and similar shapes. This course will also build on our formal logic skills through the use of triangle proofs in first semester.

Academic Standards Addressed (CCSS):

These are a list of the common core state standards which match the learning targets emphasized in this curriculum. Much of the content knowledge has been pushed down to middle school in the hopes that this gives teachers more time to address the process standards to formalize and extend mathematical reasoning.

Unit Themes (Table of Contents)

Unit 1:	Basic Elements of Geometry	4 weeks
Unit 2:	Parallel and Perpendicular Lines	3 weeks
Unit 3:	Triangles Relationships	4 weeks
Unit 4:	Congruent Triangles	4 weeks
Unit 5:	Quadrilaterals	3 weeks
Unit 6:	Similarity	3 weeks
Unit 7:	Polygons & Area	3 weeks
Unit 8:	Surface Area & Volume	3 weeks
Unit 9:	Circles	3 weeks
Unit 10:	Cartesian Plane	3 weeks

Agreed Upon Assessments

Forms of assessments may include but are not limited to....

- Unit Test
- Learning Target Quizzes
- Construction Assessments

Unit: 1	Basic Elements of Geometry	Duration:	4 weeks
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Essential Questions:

- What are the basic elements of geometry?
- What conventions do we use to represent these elements?
- What operations are we allowed to use with all geometric elements?

Learning Targets:

Students will be able to...:

- Identify and communicate a pattern through the use of inductive reasoning.
- Differentiate between lines, rays, and line-segments.
- Create geometric elements with proper notation.
- Apply the addition and subtraction postulates on line-segments and angles.
- Use the definitions of complementary and supplementary pairs to solve for unknown angle measures.
- Define and apply the concept of a midpoint and an angle bisector.
- Define and apply the concept of vertical angles.
- Use all aforementioned learning targets to make conclusions about geometric diagrams.

Academic Standards Address (CCSS):

- 4.G.1
- 7.G.2
- 7.G.5
- G.CO.1
- G.CO.12

Common Assessments:

- Vocabulary, Notation, and geometric element quiz
- Addition/subtraction postulate quiz
- Midpoint/angle bisector quiz
- Unit Test

Unit: 2	Parallel Lines and Perpendicular Lines	Duration:	4 weeks
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Essential Questions:

- What does it mean for two lines to be parallel?
- What properties arise from a transversal crossing two parallel lines?
- What conditions are necessary for two lines to be parallel?

Learning Targets:

Students will be able to...:

- differentiate and identify angle pairs with a transversal.
 - corresponding angles
 - same-side interior angles
 - alternate interior angles
 - alternate exterior angles
- create and solve an equation based on a specific angle pair.
- reason with converse theorems to draw conclusions about parallelism.
- apply proportions to solve for line-segments created by parallel lines and transversals
- incorporate perpendicular lines and contrast them with parallel lines.

Academic Standards Addressed (CCSS):

- 4.G.1
- 7.G.5
- G.CO.4
- G.CO.9

Common Assessments:

- Angle Pair Quiz
- Converse theorem project
- Multiple Transversal Quiz
- Unit Test

Unit: 3	Triangle Relationships	Duration:	4 weeks
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Essential Questions:

- What properties are inherent for all triangles?
- What classifications can we use to describe triangles?
- What can be said about a specific types of triangle?

Learning Targets:

Students will be able to...:

- Classify triangles by both sides and angles.
- Apply the triangle inequality to hypothetical diagrams.
- Pythagorean Theorem
- Apply the interior angle sum to solve for missing angles.
- Apply the exterior angle triangle theorem to solve for missing angles.
- Incorporate properties of isosceles triangles and solve for unknown sides/angles.
- Incorporate properties of equilateral triangles and solve for unknown sides/angles.

Academic Standards Address (CCSS):

- 7.G.2
- 8.G.6
- 8.G.7
- G.CO.12

Common Assessments:

- Triangle Classification concept chart
- Interior/Exterior Triangle Angle Quiz
- Isosceles and Equilateral Triangle Quiz
- Unit Test

Unit: 4	Triangle Congruence	Duration:	4 weeks
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Essential Questions:

- What does it mean to have two congruent shapes?
- What methods can we use to show two triangles are congruent?
- How is symmetry related to congruence?

Learning Targets:

Students will be able to...:

- Identify conditional reasoning (if-then statements) and create their own.
- Apply the transitive property to reach new conclusions.
- Use negations, inverse statements, converse statements, and contrapositive statements to reach new conclusions.
- Use the definition of congruent figures to determine if two triangles are congruent.
- Construct congruent triangles to precise specifications with a ruler and protractor.
- Write Flow-Proofs that demonstrate all triangle congruence theorems (SSS, SAS, ASA)
- Use the congruent figure corollary to draw conclusions about other geometric elements (CPCTC).
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Academic Standards Address (CCSS):

- 8.G.1
- G.CO.6
- G.CO.7
- G.CO.8
- G.CO.10
- G.CO.12

Common Assessments:

- CLUE based logical proposition project
- Blue-print congruent triangle project
- Flow-proof Quiz
- Unit Test

Unit: 5	Quadrilaterals	Duration:	3 weeks
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Essential Questions:

- What unique property do all quadrilaterals share?
- How can we classify quadrilaterals?
- What properties does each classification inherently possess?

Learning Targets:

Students will be able to...:

- Characterize quadrilaterals by their unique properties.
- Apply the interior angle sum of quadrilaterals to find unknown angles.
- Determine the necessary conditions for a quadrilateral to become a parallelogram.
- Utilize properties of parallelograms to create and solve algebraic equations.
- Characterize and identify special parallelograms. (Rhombus, Rectangle, and Square)
- Determine the necessary conditions for a quadrilateral to become a trapezoid.
- Utilize properties of trapezoids to create and solve algebraic equations.
- Use prior triangle knowledge to investigate properties of kites. **(optional)**
- Use flow-proofs to explicate properties of quadrilaterals. **(optional)**

Academic Standards Address (CCSS):

- 5.G.3
- 5.G.4
- 6.G.1
- G.CO.12

Common Assessments:

- Quadrilateral Identification Quiz
- Parallelogram Family Quiz
- Trapezoid Family Quiz
- Unit Test

Unit: 6	Similarity	Duration:	3 weeks
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Essential Questions:

- What does it mean for two shapes to be similar?
- How does similarity differ from congruence?
- How can we find and use a constant of proportionality?

Learning Targets:

Students will be able to...:

- explain similarity as a relationship between two figures in constant proportion of a scale factor.
- match corresponding geometric elements between congruent figures.
- apply laws of proportions to solve for unknown quantities.
- conclude if two triangles are similar by...
 - AA similarity
 - SAS similarity
 - SSS Similarity
- connect similar proportions of triangle and generalize application to parallel lines.
- apply angle bisectors to discover new triangle proportions.

Academic Standards Addressed (CCSS):

- 7.G.2
- G.SRT.2
- G.SRT.3
- G.SRT.4

Common Assessments:

- Similar figure fractal art project.
- Similar Triangle Quiz
- Unit Test

Unit: 7	Polygons & Area	Duration:	3 weeks
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Essential Questions:

- What general characteristics do polygons share in common?
- How can we classify polygons by characteristics?
- What information is needed to find the area of a specific polygon?

Learning Targets:

Students will be able to...:

- Identify if a figure is or is not a polygon by referencing the definition.
- Categorize polygons by
 - sides
 - convex versus concave
- apply general theorems of polygons to investigate specific characteristics.
 - interior/exterior angle sums
 - number of diagonals
- calculate areas of specific polygons given formulas.
- explain why area formulas share similar features.
- determine unknown parts of polygons given the area and other conditions.
- find the area of a composite shape using multiple simple polygons.

Academic Standards Addressed (CCSS):

- 6.G.1
- 7.G.6

Common Assessments:

- Polygon case study project
- basic area formula quiz
- advanced area quiz
- Unit Test

Unit: 8	Surface Area & Volume	Duration:	3 weeks
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Essential Questions:

- What information is needed to find the surface area of a specific solid?
- What information is needed to find the volume of a specific solid?
- What commonalities can we draw from the area and polygon unit?

Learning Targets:

Students will be able to...:

- define different solids by their characteristics.
- differentiate and classify solids by their characteristics.
- find the surface area of a solid given its formula.
- find the volume of a solid given its formula.
- explain why the formulas share similar features.
- calculate composite surface areas and volumes from simple solids.

Academic Standards Addressed (CCSS):

- 5.MD.3
- 5.MD.4
- 7.G.6
- 8.G.9
- G.GMD.3
- G.GMD.4

Common Assessments:

- Solid case study project
- Surface area quiz
- Volume quiz
- Unit Test

Unit: 9	Circles	Duration:	3 weeks
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Essential Questions:

- What does pi represent?
- How are the radius, the diameter, chords, arcs, area, and the circumference all related?

Learning Targets:

Students will be able to...:

- distinguish a radius, diameter, chord, tangent, and secant.
- use relationships between radii, chords, and tangents to determine unknown lengths.
- apply quantitative reasoning to obtain measurements of arcs.
- describe how the position of the vertex of an angle changes the relationship between angle and arc
- calculate angles given arcs and arcs given angles
- calculate arc lengths of segments of circles.
- apply the aforementioned concepts to concentric and adjacent circles.**(optional)**

Academic Standards Addressed (CCSS):

- 7.G.4
- G.C.1
- G.C.2
- G.C.4
- G.C.5
- G.GMD.1

Common Assessments:

- Line-segments in circles quiz
- Angles and Arcs quiz
- Unit Test

Unit: 10	Cartesian Plane	Duration:	3 weeks
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Essential Questions:

- What advantages do we gain by placing geometric figures in the cartesian plane?
- What equivalent theorems can we understand in the context of the cartesian plane?
- What new theorems can we understand through the cartesian plane?

Learning Targets:

Students will be able to...:

- represent parallel and perpendicular lines in the cartesian plane.
- calculate distance in the cartesian plane and find perimeters.
- describe transformations in the cartesian plane
 - reflections
 - rotations
 - translations
- compose transformations on a figure and show the path towards the final image.
- use shoelace formula to calculate area of closed polygon.
- use the encasement method to find area of figures.
- find the center of mass of a convex polygon(**optional**)

Academic Standards Addressed (CCSS):

- 5.G.1
- 6.G.3
- 8.G.2
- 8.G.3
- 8.G.8
- G.CO.4
- G.GPE.5
- G.GPE.7

Common Assessments:

- algebraic geometry quiz
- transformation project
- Unit Test