# Geometry ½ Course Syllabus

| **Franklin High School** | |
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| | **2019-2020** |

| Course Title:  Geometry 1/2 | Grade Level(s): 9th, 10th, 11th, 12th |
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Prerequisites:
Completion of Algebra ½

Course description:
During this course, students will learn about the following topics:

1. Constructions
2. Transformations
3. Lines and angles
4. Congruence and similarity
5. Trigonometry
6. Coordinate geometry
7. Circles
8. Solids
9. Probability

Emphasis will be placed on specific topics as they are considered more essential for further studies in mathematics.  Transformations, Lines and Angles, Trigonometry, Coordinate Geometry, Circles, and Probability are all topics that will have stronger emphasis during this class.

Standards:
**HSG.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.)

**HSG.CO.A.3** Given a rectangle, parallelogram, trapezoid, or regular polygon, describe the rotations and reflections that carry it onto itself.

**HSG.CO.A.4** Develop definitions of rotations, reflections, and translations in terms of angles, circles, perpendicular lines, parallel lines, and line segments.

**HSG.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.

**HSG.SRT.A.1** Verify experimentally the properties of dilations given by a center and a scale factor.

**HSG.SRT.A.1.A** A dilation takes a line not passing through the center of the dilation to a parallel line, and leaves a line passing through the center unchanged.

**HSG.SRT.A.1.B** The dilation of a line segment is longer or shorter in the ratio given by the scale factor.

**HSG.CO.A.1** Know precise definitions of angle, circle, perpendicular line, parallel line, and line segment, based on the undefined notions of point, line, distance along a line, and distance around a circular arc.

**HSG.CO.C.9** Prove theorems about lines and angles.

**HSG.SRT.A.2** Given two figures, use the definition of similarity in terms of similarity transformations to decide if they are similar; explain using similarity transformations the meaning of similarity for triangles as the equality of all corresponding pairs of angles and the proportionality of all corresponding pairs of sides.

**HSG.SRT.A.3** Use the properties of similarity transformations to establish the AA criterion for two triangles to be similar.

**HSG.SRT.B.4** Prove theorems about triangles.

**HSG.SRT.B.5** Use congruence and similarity criteria for triangles to solve problems and to prove relationships in geometric figures.

**HSG.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.

**HSG.CO.B.8** Explain how the criteria for triangle congruence (ASA, SAS, and SSS) follow from the definition of congruence in terms of rigid motions.

**HSG.SRT.C.6** Understand that by similarity, side ratios in right triangles are properties of the angles in the triangle, leading to definitions of trigonometric ratios for acute angles.

**HSG.SRT.C.8** Use trigonometric ratios and the Pythagorean Theorem to solve right triangles in applied problems.*

**HSG.GPE.B.4** Use coordinates to prove simple geometric theorems algebraically.

**HSG.GPE.B.5** Prove the slope criteria for parallel and perpendicular lines and use them to solve geometric problems (e.g., find the equation of a line parallel or perpendicular to a given line that passes through a given point).

**HSG.GPE.B.6** Find the point on a directed line segment between two given points that partitions the segment in a given ratio

**HSG.GPE.B.7** Use coordinates to compute perimeters of polygons and areas of triangles and rectangles, e.g., using the distance formula.

**HSG.CO.C.11** Prove theorems about parallelograms.

**HSG.C.A.2** Identify and describe relationships among inscribed angles, radii, and chords.

**HSG.C.B.5** Derive using similarity the fact that the length of the arc intercepted by an angle is proportional to the radius, and define the radian measure of the angle as the constant of proportionality; derive the formula for the area of a sector.

**HSG.CO.A.1** Know precise definitions of angle, circle, perpendicular line, parallel line, and line segment, based on the undefined notions of point, line, distance along a line, and distance around a circular arc.

**HSG.MG.A.1** Use geometric shapes, their measures, and their properties to describe objects (e.g., modeling a tree trunk or a human torso as a cylinder).

**HSG.MG.A.2** Apply concepts of density based on area and volume in modeling situations (e.g., persons per square mile, BTUs per cubic foot).

**HSG.GMD.A.1** Give an informal argument for the formulas for the circumference of a circle, area of a circle, volume of a cylinder, pyramid, and cone.

**HSG.GMD.A.3** Use volume formulas for cylinders, pyramids, cones, and spheres to solve problems.*

**HSG.GMD.B.4** Identify the shapes of two-dimensional cross-sections of three-dimensional objects, and identify three-dimensional objects generated by rotations of two-dimensional objects.

**HSS.CP.A.1** Describe events as subsets of a sample space (the set of outcomes) using characteristics (or categories) of the outcomes, or as unions, intersections, or complements of other events ("or," "and," "not").

**HSS.CP.A.2** Understand that two events $A$ and $B$ are independent if the probability of $A$ and $B$ occurring together is the product of their probabilities, and use this characterization to determine if they are independent.

**HSS.CP.A.3** Understand the conditional probability of $A$ given $B$ as $P(A$ and $B)/P(B)$, and interpret independence of $A$ and $B$ as saying that the conditional probability of $A$ given $B$ is the same as the probability of $A$, and the conditional probability of $B$ given $A$ is the same as the probability of $B$.

**HSS.CP.A.4** Construct and interpret two-way frequency tables of data when two categories are associated with each object being classified. Use the two-way table as a sample space to decide if events are independent and to approximate conditional probabilities.

**HSS.CP.A.5** Recognize and explain the concepts of conditional probability and independence in everyday language and everyday situations.

**HSS.CP.B.6** Find the conditional probability of *A* given *B* as the fraction of *B*'s outcomes that also belong to *A*, and interpret the answer in terms of the model.

**HSS.CP.B.7** Apply the Addition Rule, P(A or B) = P(A) + P(B) - P(A and B), and interpret the answer in terms of the model.

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Schedule of topics/units covered:

1. Constructions
2. Transformations
3. Lines and angles
4. Congruence and similarity
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6. Coordinate geometry
7. Circles
8. Solids
9. Probability

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Differentiation/accessibility strategies and supports (TAG, ELL, SpEd, other):

Leveled, standards-based assessments with clear benchmarks for C-, B- and A-level work. Flexible timeline for demonstrating proficiency. Multiple attempts to retake and/or revise assessments.  Honors credit available for interested students.  Clearly posted and chunked agenda, daily learning target(s) and content vocabulary.  Investigative, problem-based curricular model to attend to CCSS Mathematical Practices of 'making sense of problems and persevere in solving them'; 'Reason abstractly'; and 'look for and make use of structure,' for example.  Explicit instruction using guided notes and teacher-provided notes.

Assessment (pre/post)/evaluation/grading policy:

*Grades should be based the student's demonstration of understanding of the standards.*

Standard Grading Scale:
90-100% - A
80-89% - B
70-79% - C
60-69% - D
59- below - F

Daily quiz (formative assessment).  Flexible timeline for demonstrating proficiency. Multiple attempts to retake and/or revise tests (summative assessments).  Students can create and use a note sheet on tests.

Grades will be weighted as follows:
Tests (summative assessments): 99%
Quizzes (formative assessments): 1%

Behavioral expectations:

Students are expected to be respectful to their teacher and peers at all times. Students are also expected to work both independently and collaboratively in study teams. Students and teachers will refer to the Franklin High School Student Climate Guide.

Safety issues and requirements:

Students and teachers will refer to the Franklin High School Student Climate Guide.