Geometry 2019-20 Syllabus

Geometry
Franklin High School
Dr. Marla Baber
Fall 2018-19

Our math program uses multiple resources to best help students gain understanding of the Common Core State Standards in high school Geometry. They include Serra's *Discovering Geometry*, *Illustrative Mathematics*, *Mathematics Assessment Project*, and the district adopted text *College Preparatory Math: Geometry.* Students will experience mathematics through explorations and problems that are related to real life. The focus is on Geometry while making connections to Algebra and Statistics and Probability through Problem Solving. We will incorporate Organizational and Communication Skills through the Common Core State Standards Mathematical Practices.

Students are required to maintain and bring to class regularly the following:

- His or her Mathematics Journal, which will include:
  Vocabulary, notes, classwork and home practice
- Active listening skills as shown by note taking and participating in class
- A willingness to learn and explore
- A willingness to work as a responsible group member
- A positive attitude
- A growth mindset of "**YET**"

Students will be asked to keep a Math Journal which act as the student's textbook for the class. It will contain:

- Warm up activities
- Daily classroom activities & notes
- Reflections on learning & growth

Grades will be based on demonstrating understanding of the standards in the form of learning targets on:

- Assessments (Tests, Quizzes, and Work Samples)
- Projects

Students have opportunities to experience geometry through differentiation of curriculum both for enrichment and reconstruction of concepts. Students are given access to concepts through different means. This is done automatically for students who are on an IEP's, TAG and in ELL. If you believe you (or your child) would benefit from differentiation, please let me know. Honors credit is available through contract and you must see Ms. Baber and *Baber's Math World* if you are interested.

Attendance is important to the learning process. Students are responsible for **all** missed content knowledge due to absences, either excused or not. This may mean having to spend time on math class during tutorial, lunches, or before/after school by arrangement. You can call and excuse your student when absent at 503-916-5140 ext. 81269.

Communicating mathematical ideas is a big part of learning mathematics. Taking notes and writing about your thinking is an important part of math class and prepares students for future in college and career. Class notes are a snapshot of what is covered in class and is to be used alongside activity sheets and on-line resources. Journals serve as the textbook for this class and will be used for studying for assessments and to reflect on learning.

Cell phones are always to be away during learning as per Franklin High expectations. There will be times we will use phones in the learning environment such as using Desmos Graphing, looking at *Baber's Math World,* taking pictures of notes and doing research. In special situations students will be able to use the music applications. Students will be **clearly** informed when they may use their phones in class. I will follow the FHS Cell Phone policy if they have them out in class for non-academic uses, including listening to music during instruction and group work time.

Grading

Grading will be based on mastery of content, or proficiency. Students will earn a grade on the journal (with includes all assignments), projects and tests based on student's understanding of the concept(s) covered and learning targets. Grades will be assessed both formatively and summatively.

Formative Assessments do not affect the final grade and are meant to inform their understanding. They include short quizzes, journal writes, check-ins. Summative Assessments which will determine the grade and are based on learning targets. They are in the form of chapter/unit tests, work samples, end of term exams, and projects. Assessments will be graded by Proficiency of each learning goal or standard.

Advanced understanding of learning targets or standards: Highly Proficient	HP	4 - 3.5	A
Proficient understanding of learning targets or standards: Proficient	PR	3.49 - 3	B
Some understanding of learning targets or standards, but **NOT YET**: Close to Proficient	CP	2.99 – 2	C
Does **NOT YET** understand learning targets or standards: Developing Proficiency	DP	1.99 - 1	D/F

NOTE: All learning targets or standards that are **NOT YET** will need to be revisited to earn Proficiency or better.

Geometry Overview

These are the standards are from the PPS Guaranteed and Viable Curriculum that has been designed to allow all students a strong mathematics background that allows them to build future learning upon. For more information see https://www.pps.net/domain/4886

Students will use the **Mathematical Practices** of:

1. Making sense of problems and persevere in solving them.
2. Reasoning abstractly and quantitatively.
3. Constructing viable arguments and critique the reasoning of others.
4. Modeling with mathematics.
5. Using appropriate tools strategically.
6. Attending to precision.
7. Looking for and make use of structure.
8. Looking for and express regularity in repeated reasoning.

Students will learn & be evaluated on the **Mathematical Standards** of:

1. Constructions

Make formal geometric constructions with a variety of tools and methods (compass and straightedge, string, reflective devices, paper folding, dynamic geometric software, etc.). Copying a segment; copying an angle; bisecting a segment; bisecting an angle; constructing perpendicular lines, including the perpendicular bisector of a line segment; and constructing a line parallel to a given line through a point not on the line.

2. Transformations

Given a rectangle, parallelogram, trapezoid, or regular polygon, describe the rotations and reflections that carry it onto itself.
Develop definitions of rotations, reflections, and translations in terms of angles, circles, perpendicular lines, parallel lines, and line segments.
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.
Verify experimentally the properties of dilations given by a center and a scale factor.
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.
The dilation of a line segment is longer or shorter in the ratio given by the scale factor.

3. Lines & Angles

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.
Prove theorems about lines and angles. Theorems include vertical angles are congruent; when a transversal crosses parallel lines, alternate interior angles are congruent and corresponding angles are congruent; points on a perpendicular bisector of a line segment are exactly those equidistant from the segment's endpoints.

4. Congruence & Similarity

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.
Use the properties of similarity transformations to establish the AA criterion for two triangles to be similar.
Prove theorems about triangles. Theorems include: a line parallel to one side of a triangle divides the other two proportionally, and conversely; the Pythagorean Theorem proved using triangle similarity.

Use congruence and similarity criteria for triangles to solve problems and to prove relationships in geometric figures.
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.
Explain how the criteria for triangle congruence (ASA, SAS, and SSS) follow from the definition of congruence in terms of rigid .

5. Trigonometry

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.
Use trigonometric ratios and the Pythagorean Theorem to solve right triangles in applied problems.

6. Coordinate Geometry

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; prove or disprove that the point (1, √3) lies on the circle centered at the origin and containing the point (0, 2).
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).
Find the point on a directed line segment between two given points that partitions the segment in a given ratio
Use coordinates to compute perimeters of polygons and areas of triangles and rectangles, e.g., using the distance formula.
Prove theorems about parallelograms. Theorems include opposite sides are congruent, opposite angles are congruent, the diagonals of a parallelogram bisect each other, and conversely, rectangles are parallelograms with congruent diagonals.

7. Circles

Identify and describe relationships among inscribed angles, radii, and chords. Include the relationship between central, inscribed, and circumscribed angles; inscribed angles on a diameter are right angles; the radius of a circle is perpendicular to the tangent where the radius intersects the circle.
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.
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.

8. Solids

Use geometric shapes, their measures, and their properties to describe objects (e.g., modeling a tree trunk or a human torso as a cylinder).
Apply concepts of density based on area and volume in modeling situations (e.g., persons per square mile, BTUs per cubic foot).
Give an informal argument for the formulas for the circumference of a circle, area of a circle, volume of a cylinder, pyramid, and cone. Use dissection arguments, Cavalieri's principle, and informal limit arguments.
Use volume formulas for cylinders, pyramids, cones, and spheres to solve problems.
Identify the shapes of two-dimensional cross-sections of three-dimensional objects, and identify three-dimensional objects generated by rotations of two-dimensional objects.

9. Probability

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").
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.
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.
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. For example, collect data from a random sample of students in your school on their favorite subject among math, science, and English. Estimate the probability that a randomly selected student from your school will favor science given that the student is in tenth grade. Do the same for other subjects and compare the results.
Recognize and explain the concepts of conditional probability and independence in everyday language and everyday situations. For example, compare the chance of having lung cancer if you are a smoker with the chance of being a smoker if you have lung cancer.
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.
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.

Please feel free to call on me anytime to help make the mathematics experience better. Our school number is **503-916-5140 ex. 81459** or email at mbaber@pps.net. For more see my website "*Baber's Math World*" at https://sites.google.com/site/babersmathworld/ or scanning the code on front of this sheet.