This Geometry class is designed as a one-year class. The fall semester covers chapters from lines to quadrilaterals. Students in this class first time encounter proof in mathematics and the class is designed to be sensitive to the difficulty this brings. Due to limited class hours, self motivation will determine how much a student will gain from the class. Emphasis will be on inspiration, understanding, rather than drilling. However, homework are essential to this course, like it is to any advanced mathematics course. Parental supervision is recommended.

The course is quite challenging given the relatively small number of hours dedicated and large content scope. Only the best, the brightest and the hardest working students are invited.

Textbook:
Geometry: Seeing, Doing, Understanding [Student Edition] [Hardcover]
Harold R. Jacobs

Hardcover: 780 pages
Publisher: W. H. Freeman; 3rd edition (March 14, 2003)
ISBN-10: 0716743612
ISBN-13: 978-0716743613

Note: Parents are expected to order the textbooks from online book sellers such as Amazon.com and others. Used textbooks can be cheaper.

Fall 2010

**Chapter 1 An Introduction to Geometry 09/12**

1. Lines in designing a city
2. Angles in measuring earth
3. Polygons and polyhedra: pyramid architecture
4. Construction: telling time with shadows
5. We can't go on like this

**Chapter 2 Nature of Deductive Reasoning 09/19**

1. Conditional statements
2. Definitions
3. Direct proof
4. A deductive system 09/26
5. Some famous theorems of geometry

**Chapter 3 Lines and Angles 10/03**

1. Number operations and inequality
2. The ruler and distance
3. Bisection
4. Complementary and supplementary angles 10/10
5. Linear pairs and vertical angles

6. perpendicular and parallel lines

**Chapter 4 Congruence 10/17**

1. Coordinates and distance
2. Polygon and congruence
3. ASA and SAS congruence
4. Congruence proofs 10/24
5. Isosceles and equilateral Triangles
6. SSS congruence
7. Constructions

**Chapter 5 Inequalities 10/31**

1. Properties of inequality
2. The exterior angles: theorem
3. Triangle side and angle inequalities
4. The triangle inequality theorem

**Chapter 6 Parallel Lines 11/07**

1. Line symmetry
2. Proving lines parallel
3. The parallel postulate
4. Parallel lines and angles 11/14
5. The angles of a triangle
6. AAS and HL congruence

**Chapter 7 Quadrilaterals 11/21**

1. Quadrilaterals
2. Parallelogram and point symmetry
3. More on parallelograms
4. Rectangles, rhombuses, and squares 12/05
5. Trapezoids
6. The midsegment theorem

Final Exam 12/19

Spring, 2011

**Chapter 7: Quadrilaterals**

7.1 Quadrilaterals 01/09
7.2 Parallelogram and Point Symmetry
7.3 More on Parallelograms
7.4 Rectangles, Rhombuses, and Squares 01/16
7.5 Trapezoids
7.6 The Midsegment Theorem

**Chapter 8: Transformations**

8.1 Transformations and Symmetry 01/23
8.2 Reflections
8.3 Isometries and Congruence
8.4 Transformations and Symmetries

**Chapter 9: Area**
9.1 Area 02/06
9.2 Squares and Rectangles
9.3 Triangles
9.4 Parallelograms and Trapezoids
9.5 The Pythagorean Theorem

**Chapter 10: Similarity**
10.1 Ratio and Proportion 02/13
10.2 Similar Figures
10.3 The Side-Splitter Theorem
10.4 The AA Similarity Theorem 02/20
10.5 Proportions and Dilations
10.6 Perimeters and Areas of Similar Polygons

**Chapter 11: The Right Triangle**
11.1 Proportions in a Right Triangle 02/27
11.2 The Pythagorean Theorem Revisited
11.3 Isosceles and 30°-60° Right Triangles
11.4 The Tangent Ratio 03/06
11.5 The Sine and Cosine Ratios
11.6 Slope
11.7 The Laws of Sines and Cosines

**Chapter 12: Circles**
12.1 Circles, Radii and Chords 03/13
12.2 Tangents
12.3 Central Angles and Arcs
12.4 Inscribed Angles 03/27
12.5 Secant Angles
12.6 Tangent Segments and Intersecting Chords

**Chapter 13: The Concurrence Theorems**
13.1 Triangles and Circles 04/10
13.2 Cyclic Quadrilaterals
13.3 Incircles
13.4 The Centroid of a Triangle 04/17
13.5 Ceva's Theorem
13.6 Napoleon's Discovery and Other Surprises

**Chapter 14: Regular Polygons and the Circle**
14.1 Regular Polygons 04/24
14.2 The Perimeter of a Regular Polygon
14.3 The Area of a Regular Polygon
14.4 From Polygons to Pi 05/01
14.5 The Area of a Circle
14.6 Sectors and Arcs

**Chapter 15: Geometric Solids**
15.1 Lines and Planes in Space: Solid Geometry as a Deductive System 05/08
15.2 Rectangular Solids
15.3 Prisms
15.4 The Volume of a Prism
15.5 Pyramids 05/15
15.6 Cylinders and Cones
15.7 Spheres
15.8 Similar Solids
15.9 The Regular Polyhedra

**Chapter 16: Non-Euclidean Geometries** Optional self study
16.1 Geometry on a Sphere
16.2 The Saccheri Quadrilateral
16.3 The Geometries of Lobachevsky and Riemann
16.4 The Triangle Angle Sum Theorem Revisited

**Final Review 05/22**

**Final Exam 06/5**