Orange Unified School District
GEOMETRY
Year Course

GRADE LEVEL: 9-12

PREREQUISITES: Successful completion of Algebra 1 or Algebra 1B with a *C* or better.

INTRODUCTION TO THE SUBJECT:
The geometry skills and concepts developed in this discipline are useful to all students. In addition to learning these skills and concepts, students will develop their ability to construct formal, logical arguments and proofs in geometric settings and problems.

BY THE END OF THE COURSE THE STUDENT WILL BE ABLE TO:
Apply their knowledge of the geometry content standards to demonstrate proficiency on the California State Standards Assessment. Students will also be able to continue their mathematics education at the high school level with confidence and consistency.

ADOPTED TEXT: *Geometry* ©2005 Glencoe/McGraw-Hill.

FIRST SEMESTER

ASSESSMENT BLUEPRINT:

Semester		Standard	No. Items in Test
1	1.0	Undefined terms, Axioms, Theorems, Reasoning	2
	2.0	Proofs	3
	3.0	Validity of Logical Argument / Counterexamples	2
	4.0	Theorems involving Congruence and Similarity	3
	5.0	Congruent/Similar Triangles; Corresponding Parts	3
	6.0	Triangle Inequality Theorem	2
	7.0	Parallel Lines cut by Transversal; Quadrilaterals; Circles	3
	11.0	Dimension changes affect Perimeter, Area, Volume	1
	12.0	Measures of Sides/Angles to Classify Triangles	3
	13.0	Complementary/Supplementary/Vertical/Exterior Angles (Triangles Only)	2
	14.0	Proof of Pythagorean Theorem	3
	15.0	Pythagorean Theorem	
	18.0	Trigonometric Functions (sin, cos, tan)	2
	19.0	Trigonometric Functions to Find Unknown Side	2
	20.0	Special Right Triangles	2
	22.0	Rotations, Translations, Reflections	2

ESSENTIAL LEARNINGS AND PACING: __DAYS__

I. Chapter 1 – Standards 1, 15, 16
    Essential Learnings: Students will
    - Identify/model points, lines, and planes (undefined terms).
    - Perform basic constructions with straight edge and compass.
    - Use Pythagorean Theorem to determine distance between two points.

A.	Lesson 1-1	Points, Lines, and Planes	1
B.	Lesson 1-2	Linear Measure and Precision (Skip Precision)	1
C.	Lesson 1-3	Distance and Midpoints	1
D.	Lesson 1-4	Angle Measure	1
E.	Lesson 1-5	Angle Relationships	2
F.	Lesson 1-6	Polygons	2
G.	Review and Test		2 10

II. Chapter 2 – Standards 2, 3, 4
    Essential Learnings: Students will
    - Make conjectures based on inductive reasoning and find counterexamples.
    - Write inverse, converse, contra-positive of conditional statements (if…then).
    - Write proofs involving supplementary, complementary, congruent, and right angles.

A.	Lessons 2-1, 2-2	Inductive Reasoning and Conjecture / Logic	1
B.	Lesson 2-3	Conditional Statements	1
C.	Lesson 2-4	Deductive Reasoning	1
D.	Lesson 2-6	Do before 2-5—Algebraic Proof	1
E.	Lesson 2-5	Postulates and Paragraph Proofs	1
F.	Lesson 2-7	Proving Segment Relationships	3 (Honors 2)
G.	Lesson 2-8	Proving Angle Relationships	2 (Honors 1-2)
H.	Review and Test		2 12

III. Chapter 3 – Standards 1, 2, 7
    Essential Learnings: Students will
    - Identify angles formed by a transversal and a pair of lines.
    - Use properties of parallel lines to determine congruent angles.
    - Recognize angle conditions that occur with parallel lines.
    - Prove that two lines are parallel based on given angle relationships.

A.	Lesson 3-1	Parallel Lines and transversals	1
B.	Lesson 3-2	Angles and Parallel Lines	2
C.	Lesson 3-5	Use before 3-3—Proving Lines Parallel	2
D.	Lessons 3-3, 3-4	Slopes of Lines / Equations of Lines	1
E.	Lesson 3-6	SAVE—Perpendiculars and Distance	Save for after CST
F.	Review and Test		2 8

IV. Chapter 4 – Standards 4, 5, 12
    Essential Learnings: Students will
    - Identify and classify triangles by angles and sides.
    - Apply the Angle Sum Theorem and Exterior Angle Theorem.
    - Prove that triangles are congruent and are able to use the concept of CPCTC.

A.	Lesson 4-1	Classifying Triangles	1 (Honors ½)
B.	Lesson 4-2	Angles of Triangles	1 (Honors ½)
C.	Lesson 4-3	Congruent Triangles	2
D.	Lesson 4-4	Proving Congruence—SSS, SAS	2
E.	Lesson 4-5	Proving Congruence—ASA, AAS	2
F.	Lesson 4-6	Isosceles Triangles	1
G.	Lesson 4-7	SAVE and use with 8-7—Triangles and Coordinate Proof	
H.	Review and Test		2 11(Honors 10)

V. Chapter 5 – Standards 2, 6, 12
Essential Learnings: Students will
- Know and use the Triangle Inequality Theorem
- Write geometric proofs and proofs by contradiction
- Find and use measures of sides, interior / exterior angles of triangles / polygons to classify and solve problems.
  - A. Lesson 5-1   Bisectors, Medians, Altitudes (Skip points of concurrency) 1
  - B. Lesson 5-2   Inequalities and Triangles 1
  - C. Lesson 5-4   Use 5-3 after 5-5—The Triangle Inequality Theorem 1
  - D. Lesson 5-5   Inequalities Involving Two Triangles 1
  - E. Lesson 5-3   Indirect Proof 1
  - F. Review and Test <u>2</u> 7

VI. Chapter 6 – Standards 5, 8 (perimeter only), 11 (perimeter only), 12
Essential Learnings: Students will
- Prove that triangles are congruent or similar using concepts of corresponding parts of congruent triangles
- Know, derive, and solve problems involving perimeter.
- Determine how changes in dimensions affect the perimeter.
- Find and use measures of sides and of interior and exterior angles of triangles and polygons to classify figures and solve problems.
  - A. Lesson 6-1   Proportions 1
  - B. Lesson 6-2   Similar Polygons 1
  - C. Lesson 6-3   Similar Triangles 2 (Honors 1)
  - D. Lesson 6-4   Parallel Lines and Proportional Parts 1
  - E. Lesson 6-5   Parts of Similar Triangles 1
  - F. Lesson 6-6   SAVE—Fractals and Self-Similarity Save for after CST
  - G. Review and Test <u>2</u> 8 (Honors 7)

VII. Chapter 7 – Standards 15, 18, 19, 20
Essential Learnings: Students will
- Know and use the Pythagorean Theorem and its converse
- Know and use trigonometric functions
- Know and use special triangles
  - A. Lesson 7-1   SAVE—Geometric Mean Save for after CST
  - B. Lesson 7-2   The Pythagorean Theorem and Its Converse 1
  - C. Lesson 7-3   Special Right Triangles 2
  - D. Lesson 7-4   Trigonometry 3
  - E. Lesson 7-5   Angles of Elevation and Depression 1
  - F. Lesson 7-6   SAVE—The Law of Sines Save for after CST
  - G. Lesson 7-7   SAVE—The Law of Cosines Save for after CST
  - H. Review and Test <u>2</u> 9

*NOTE: CHAPTER 8 IS TAUGHT IN THE SECOND SEMESTER.

VIII. Chapter 9 – Standard 22
Essential Learnings: Students will
- Understand and be able to reflect, translate, dilate, and rotate an image
  - A. Lesson 9-1   Reflections 1
  - B. Lesson 9-2   Translations 1
  - C. Lesson 9-3   Rotations 1
  - D. Lesson 9-4   SAVE—Tessellations If time permits or Save for after CST
  - E. Lesson 9-5   Dilations 1
  - F. Lesson 9-6   SAVE—Vectors Save for after CST
  - G. Lesson 9-7   SAVE—Transformations with Matrices Save for after CST
  - H. Review and Test <u>2</u> 6

SECOND SEMESTER   **DAYS**

ASSESSMENT BLUEPRINT:

Semester		Standard	No. Items in Test
2	7.0	Parallel Lines cut by Transversal; Quadrilaterals; Circles	6
	8.0	Perimeter, Circumference, Area, Volume, Lateral and Surface Area of Common Figures	4
	9.0	Volume/surface areas of prisms, pyramids, cylinders, cones, and spheres	4
	10.0	Areas of polygons, including rectangles, scalene triangles, equilateral triangles, rhombi, parallelograms, and trapezoids.	4
	11.0	Dimension changes affect Perimeter, Area, Volume	2
	12.0	Classify figures using sides and measures of angles	4
	16.0	Constructions	2
	17.0	Midpoint of a line segment, distance formula, equations of lines and circles.	3
	21.0	Chords, secants, tangents, inscribed angles, inscribed / circumscribed polygons of circles.	5

I. Chapter 8 – Standards 7, 12, 17 (excluding circles)
   Essential Learnings: Students will
   - Prove and use theorems involving parallel lines cut by transversals and properties of quadrilaterals.
   - Find and use measures of sides and exterior and interior angles of triangles and polygons to classify figures and solve problems.
   - Prove theorems by using coordinate geometry including distance, midpoint, and various forms of equations of lines
     - A. Lesson 8-1   Angles of Polygons   2
     - B. Lesson 8-2   Parallelograms   1
     - C. Lesson 8-3   Tests for Parallelograms   1
     - D. Lesson 8-4   Rectangles   1
     - E. Lesson 8-5   Rhombi and Squares (Use the supplements for squares)   1
     - F. Lesson 8-6   Trapezoids   1
     - G. Lessons 8-7, 4-7   Coordinate Proof with Quadrilaterals (Triangles from 4-7)   2
     - H. Review and Test   <u>2</u>   11

II. Chapter 11 – Standards 8, 10 **(*BEFORE CHAPTER 10)**
   Essential Learnings: Students will
   - Find perimeters and areas of parallelograms, triangles, trapezoids, rhombi, regular polygons and irregular figures.
   - Find circumference and area of circles.
     - A. Lesson 11-1   Areas of Parallelograms   1
     - B. Lesson 11-2   Areas of Triangles, Trapezoids, and Rhombi   2
     - C. Lessons 11-3, 10-1 Areas of Regular Polygons & Circles (Vocabulary from 10-1) 3
     - D. Lesson 11-4   Areas of Irregular Figures   1
     - E. Lesson 11-5   SAVE—Geometric Probability   Save for after CST
     - F. Review and Test   <u>2</u>   9

III. Chapter 10 – Standards 7, 8, 17, 21 **(*AFTER CHAPTER 11)**
    Essential Learnings: Students will
- Identify and define parts of a circle.
- Use relationships between arcs, chords, and diameters.
- Use the relationships and formulas of tangent and secant lines intersecting a circle.
- Write the equation of a circle.
  - A. Lesson 10-2   Angles and Arcs—(May need to review vocabulary 10-1)   1
  - B. Lesson 10-3   Arcs and Chords   2
  - C. Lesson 10-4   Inscribed Angles   1
  - D. Review   1
  - E. Lesson 10-5   Tangents   1
  - F. Lesson 10-6   Secants, Tangents, and Angle Measures   2
  - G. Lesson 10-7   Special Segments in a Circle   2
  - H. Lesson 10-8   Equations of Circles   1
  - I. Review and Test   <u>3</u>   14

IV. Chapters 12 and 13 – Standards 9, 11
    Essential Learnings: Students will
- Find surface area, lateral area, and volume of prisms, cylinders, pyramids, cones, and spheres.
- Use nets to identify three dimensional figures.
  - A. Lesson 12-1   Three-Dimensional Figures   1
  - B. Lesson 12-2   Nets and Surface Area   1
  - C. Lessons 12-3, 13-1 Surface Area and Volume of Prisms   1
  - D. Lessons 12-4, 13-1 Surface Area and Volume of Cylinders   1
  - E. Lessons 12-5, 13-2 Surface Area and Volume of Pyramids   1
  - F. Lessons 12-6, 13-2 Surface Area and Volume of Cones   1
  - G. Lessons 12-7, 13-3 Surface Area and Volume of Spheres   1
  - H. Lesson 13-4   Congruent and Similar Solids   1
  - I. Lesson 13-5   SAVE—Coordinates in Space   Save for after CST
  - J. Review and Test   <u>2</u>   10

V. Following CST (Need to be done, especially for Honors)
- A. Lesson 7-6   The Law of Sines
- B. Lesson 7-7   The Law of Cosines
- C. Lesson 9-6   Vectors
- D. Lesson 9-7   Transformation with Matrices
- E. Lesson 3-6   Perpendiculars and Distance

VI. Optional Sections
- A. Lesson 6-6   Fractals and Self-Similarity
- B. Lesson 11-5   Geometric Probability
- C. Lesson 13-5   Coordinates in Space
- D. Lesson 7-1   Geometric Mean
- E. Lesson 5-1   Points of Concurrency
- F. Algebra 1 Review

DATE OF LAST CONTENT REVISION: <u>August 2005</u>

DATE OF BOARD APPROVAL: <u>October 13, 2005</u>

DATE OF CURRENT CONTENT REVISION: <u>February 2010</u>

CALIFORNIA STANDARDS TEST
GEOMETRY
(Blueprint adopted by the State Board of Education 10/02)

CALIFORNIA CONTENT STANDARDS: GEOMETRY	# of Items
The geometric skills and concepts in this discipline are useful to all students. Aside from learning these skills and concepts, students will develop their ability to construct formal, logical arguments and proofs in geometric settings and problems.	
Geometry	**65**
1.0* Students demonstrate understanding by identifying and giving examples of undefined terms, axioms, theorems, and inductive and deductive reasoning.	2
2.0* Students write geometric proofs, including proofs by contradiction.	3
3.0* Students construct and judge the validity of a logical argument and give counterexamples to disprove a statement.	4
4.0* Students prove basic theorems involving congruence and similarity.	5
5.0 Students prove that triangles are congruent or similar, and they are able to use the concept of corresponding parts of congruent triangles.	2
6.0 Students know and are able to use the triangle inequality theorem.	1
7.0* Students prove and use theorems involving the properties of parallel lines cut by a transversal, the properties of quadrilaterals, and the properties of circles.	5 2/3**
8.0* Students know, derive, and solve problems involving perimeter, circumference, area, volume, lateral area, and surface area of common geometric figures.	4
9.0 Students compute the volumes and surface areas of prisms, pyramids, cylinders, cones, and spheres; and students commit to memory the formulas for prisms, pyramids, and cylinders.	2
10.0* Students compute areas of polygons, including rectangles, scalene triangles, equilateral triangles, rhombi, parallelograms, and trapezoids.	4
11.0 Students determine how changes in dimensions affect the perimeter, area, and volume of common geometric figures and solids.	1
12.0* Students find and use measures of sides and of interior and exterior angles of triangles and polygons to classify figures and solve problems.	5
13.0 Students prove relationships between angles in polygons by using properties of complementary, supplementary, vertical, and exterior angles.	2
14.0* Students prove the Pythagorean theorem.	1/3**
15.0 Students use the Pythagorean theorem to determine distance and find missing lengths of sides of right triangles.	2
16.0* Students perform basic constructions with a straightedge and compass, such as angle bisectors, perpendicular bisectors, and the line parallel to a given line through a point off the line.	4
17.0* Students prove theorems by using coordinate geometry including the midpoint of a line segment, the distance formula, and various forms of equations of lines and circles.	3
18.0* Students know the definitions of the basic trigonometric functions defined by the angles of a right triangle. They also know and are able to use elementary relationships between them. For example, $\tan(x) = \sin(x)/\cos(x)$, $(\sin(x))2 + (\cos(x))2 = 1$.	3

19.0*	Students use trigonometric functions to solve for an unknown length of a side of a right triangle, given an angle and a length of a side.	**3**
20.0	Students know and are able to use angle and side relationships in problems with special right triangles, such as 30°, 60°, and 90° triangles and 45°, 45°, and 90° triangles.	**1**
21.0*	Students prove and solve problems regarding relationships among chords, secants, tangents, inscribed angles, and inscribed and circumscribed polygons of circles.	**5**
22.0*	Students know the effect of rigid motions on figures in the coordinate plane and space, including rotations, translations, and reflections.	**3**
GEOMETRY TOTAL		**65**

*   Key standards comprise a minimum of 70% of the test
**   Fractional values indicate rotated standards (e.g., 1/2 = rotated every two years;
      1/3 = rotated every three years)

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