Orange Unified School District

PRACTICAL ESSENTIALS OF GEOMETRY

Year Course

GRADE LEVEL: 10-12

PREREQUISITES: Successful completion of Practical Algebra 1 or Practical Algebra 1B.

INTRODUCTION TO THE SUBJECT:
Practical Geometry is the study of basic geometric concepts using discovery of real-world applications to facilitate learning. This course will use knowledge acquired in Algebra 1A and Algebra 1B or Algebra 1 as the tools required for solving geometry problems. Rather than formal proofs, emphasis will be placed on problem solving and logical reasoning.

ADOPTED TEXT: *Pacemaker® Geometry,* First Edition, Globe Fearon, © 2003.

FIRST SEMESTER

ASSESSMENT BLUEPRINT FOR QUARTER 1:

Quarter	Standard	No. Items in Test
1	Alg.3.0 Solve equations	4
	G.1.0 Terms and Inductive/Deductive Reasoning	6
	G.4.0 Congruence and Similarity	1
	G.5.0 Corresponding Parts of Congruent Triangles	3
	G.7.0 Parallel Lines; Complementary/Supplementary	5
	G.16.0 Bisectors; Angle Measures	5
	G.17.0 Midpoint	1

ESSENTIAL LEARNINGS AND PACING: **DAYS**

I. Chapter 1 – Standards Alg.3.0; G.5.0, 16.0, 17.0 14
Essential Learnings: Students will
- Identify/model points, lines, and planes (undefined terms).
- Apply the Common Segment Theorem and the Midpoint Theorem in problem solving.
- Construct a congruent line segment and a perpendicular bisector with straightedge and compass.

Lesson 1.1	Points, Lines, and Planes	1
Lesson 1.2	Algebra Review: Adding Integers	1
Lesson 1.3	Algebra Review: Subtracting Integers	1
Lesson 1.4	Distance Between Two Points	1
Lesson 1.5	Congruent Line Segments	1
Construction	A Congruent Line Segment	1
Lesson 1.6	Midpoint of a Line Segment	1
Construction	A Bisector to a Line Segment	1
Math in Your Life	Lines of Symmetry	
Lesson 1.8	Problem-Solving Strategy: Draw a Diagram	1
Lesson 1.9	Problem Solving Application: Adding Line Segments	1
Review/Reteach/Assess	Chapter 1	4

II. Chapter 2 – Standards G.5.0, 7.0, 16.0 14

Essential Learnings: Students will

- Use a protractor to measure angles.
- Classify angles and distinguish between complementary and supplementary angles.
- Construct congruent angles and an angle bisector using straightedge and compass.
- Apply the Angle Bisector Theorem in problem solving.

Lesson 2.1	Using a Protractor	1
Lesson 2.2	Classifying Angles	1
Lesson 2.3	Algebra Review: Solving Equations With Parentheses	1
Lesson 2.4	Adding and Subtracting Angle Measures	1
Lesson 2.5	Complementary and Supplementary Angles	1
Lesson 2.6	Congruent Angles	1
Construction	A Congruent Angle	1
Lesson 2.7	Vertical Angles	1
Lesson 2.8	Angle Bisectors	1
Construction	An Angle Bisector	1
Lesson 2.11	Problem Solving Application: Angles and Sports	1
Review/Reteach/Assess	Chapter 2	3

III. Chapter 3 – Standards G.1.0, 4.0 7

Essential Learnings: Students will

- Distinguish between inductive and deductive reasoning.
- Write conditional (if…then) and inverse statements.

Lesson 3.1	Inductive Reasoning	1
Lesson 3.2	Deductive Reasoning	1
Lesson 3.3	Conditional Statements	1
Lesson 3.4	Algebra Review: Properties of Equality	1
Lesson 3.5	Properties of Congruence	1
Review/Reteach/Assess	Chapter 3	2

Semester	Standard	No. Items in Test
1	Alg.2.0 Exponents	3
	G.5.0 Corresponding Parts of Congruent Triangles	2
	G.6.0 Triangle Inequality; Sum of Angles	2
	G.7.0 Parallel Lines; Properties of Quadrilaterals/Circles	6
	G.12.0 Interior/Exterior Angles	4
	G.15.0 Pythagorean Theorem	3
	G.16.0 Bisectors	2
	G.17.0 Midpoints	1
	G.20.0 Special Right Triangles	2

IV. Chapter 4 – Standards G.7.0, 16.0 15

Essential Learnings: Students will

- Construct perpendicular line and perpendicular bisector using straightedge and compass.
- 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.

Lesson 4.1	Perpendicular Lines	1
Construction	A Perpendicular Line Through a Point on a Line	1
Lesson 4.2	Perpendicular Bisector	1
Construction	A Perpendicular Line Through a Point Not on a Line	1
Lesson 4.3	Parallel Lines	1
Lesson 4.4	Parallel Lines With Transversals	1
Lesson 4.5	Alternate Interior Angles	1
Lesson 4.6	Same-Side Interior Angles	1
Lesson 4.7	Corresponding Angles	1
Construction	A Line Parallel to a Given Line	1
Math Connection	Contour Maps	
Lesson 4.9	Problem-Solving Skill: Draw a One-Point Perspective	1
Lesson 4.10	Problem-Solving Application: Taxicab Routes	1
Review/Reteach/Assess	Chapter 4	3

V. Chapter 5 – Standards G.5.0, 6.0, 12.0, 17.0 20

Essential Learnings: Students will

- Identify and classify triangles by angles and sides.
- Apply the Angle Sum Theorem, the Exterior Angle Theorem, the Triangle Inequality Theorem, the Isosceles Triangle Theorem, the Opposite Side-Angle Theorem, and the Triangle Midsegment Theorem.
- Know that triangles are congruent and are able to use the concept of CPCTC; apply the postulates of SSS, SAS, ASA, and AAS.

Lesson 5.1	Classifying Triangles by Angles	1
Lesson 5.2	Angle Sum Theorem	1
Lesson 5.3	Exterior Angles of a Triangle	1
Lesson 5.4	Classifying Triangles by Sides	1
Lesson 5.5	Triangle Inequality Theorem	1
Lesson 5.6	Isosceles Triangles	1
Lesson 5.7	Side-Angle Relationship	1
Lesson 5.8	Congruent Triangles	1
Lesson 5.9	Congruent Triangles: SSS and SAS	2
Lesson 5.10	Congruent Triangles: ASA and AAS	2
Lesson 5.11	Medians, Altitudes, and Angle Bisectors	2
Lesson 5.12	Triangle Midsegment Theorem	1
On-the-Job Math	Tessellations	
5.14	Problem-Solving Skill: Find the Centroid	1
5.15	Problem-Solving Application: Engineering	1
Review/Reteach/Assess	Chapter 5	3

VI. Chapter 6 – Standards Alg. 2.0; G.15.0, 20.0 15

Essential Learnings: Students will

- Apply the Pythagorean Theorem.
- Know and use special right triangles in problem solving.

Lesson 6.1	Algebra Review: Squares	1
Lesson 6.2	Algebra Review: Square Roots	1
Lesson 6.3	Algebra Review: Simplifying Radicals	2
Lesson 6.4	Parts of a Right Triangle	1
Lesson 6.5	Pythagorean Theorem	2
Construction	A Right Triangle	1
Lesson 6.6	Special Right Triangle: 45˚- 45˚ - 90˚	1
Lesson 6.7	Special Right Triangle: 30˚- 60˚ - 90˚	1

Lesson 6.8	Calculator: Pythagorean Triples	1
On-the-Job Math	Carpenters	
Lesson 6.9	Problem-Solving Strategy: Draw a Diagram	1
Lesson 6.10	Problem-Solving Application: Indirect Measurement	1
Review/Reteach/Assess	Chapter 6	2

Quarter	Standard	No. Items in Test
3	6.NS.1.3 Proportions	4
	G.5.0 Corresponding Parts of Congruent/Similar Polygons	6
	G.7.0 Properties of Quadrilaterals/Circles	1
	G.8.0 Circumference/Area of Circle	3
	G.12.0 Interior/Exterior Angles	5
	G.17.0 Midpoints	1
	G.21.0 Chords, Secants, Tangents, Inscribed Angles,	5

VII. Chapter 7 – Standards G.5.0, 7.0, 12.0, 17.0 11

Essential Learnings: Students will

- Apply the Trapezoid Midsegment Theorem, the Exterior- and Interior-Angle Sum Theorems for Polygons.
- Find and use measures of sides and exterior and interior angles of triangles and polygons to classify figures and solve problems.

Lesson 7.1	Polygons	1
Lesson 7.2	Parallelograms	1
Lesson 7.3	Special Parallelograms: Rectangle, Square, and Rhombus	1
Lesson 7.4	Diagonals of Parallelograms	1
Lesson 7.5	Trapezoids	1
Lesson 7.6	Isosceles Trapezoids	1
Lesson 7.7	Calculator: Exterior Angles or Regular Polygons	1
Math Connection	Kites	
Lesson 7.8	Problem-Solving Skill: Interior-Angle Sum of a Polygon	1
Lesson 7.9	Problem-Solving Application: Indirect Measurement	1
Review/Reteach/Assess	Chapter 7	2

VIII. Chapter 9 – Standards G.5.0, 6.0, 12.0, 17.0 15

Essential Learnings: Students will

- Solve proportions
- Use concepts of similarity and congruence to solve problems

Lesson 9.1	Algebra Review: Ratios	1
Lesson 9.2	Algebra Review: Proportions	1
Lesson 9.3	Similar Triangles	1
Lesson 9.4	Angle-Angle Similarity	1
Lesson 9.5	Altitude of a Right Triangle	1
Lesson 9.6	Legs of a Right Triangle	1
Lesson 9.7	Side-Splitter Theorem	1
Lesson 9.8	Similar Polygons	1
Lesson 9.9	Perimeter of Similar Polygons	1
Lesson 9.10	Area of Similar Polygons	1
Math Connection	The Golden Rectangle (*Donald in Mathemagic Land*)	
Lesson 9.12	Problem-Solving Strategy: Write an Equation	1
Lesson 9.13	Problem-Solving Application: Scale Drawings	1
Review/Reteach/Assess	Chapter 9	3

IX. Chapter 10 – Standards G.8.0, 21.0 15 days

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.

Lesson 10.1	Circumference of a Circle	1
Lesson 10.2	Area of a Circle	1
Lesson 10.3	Arcs and Central Angles	1
Lesson 10.4	Arc Length and Sectors	1
Lesson 10.5	Inscribed Angles	1
Lesson 10.6	Tangents	1
Lesson 10.7	Tangents, Secants, and Angles	1
Lesson 10.8	Tangents and Segments	1
Lesson 10.9	Chords	1
Lesson 10.10	Chords and Angles	1
Lesson 10.11	Chords and Segments	1
Lesson 10.12	Calculator: Circumference and Area of a Circle	1
Math In Your Life	Concentric Circles in Nature	
Lesson 10.13	Problem-Solving Skill: Inscribed & Circumscribed Circles (CAHSEE)	1
Review/Assess	Chapter 10	2

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.	8
	11.0 Dimension changes affect Perimeter, Area, Volume	2
	12.0 Interior and Exterior Angles	5
	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.	6

X. Chapters 12 – Standard G.22.0 11 days

Essential Learnings: Students will

- Solve problems involving transformations on the coordinate plane.
- Identify slope of parallel and perpendicular lines.

Lesson 12.1	Algebra Review: Points on the Coordinate Plane	1
Lesson 12.2	Algebra Review: Finding Distance	1
Lesson 12.3	Midpoint of a Line Segment	1
Lesson 12.4	Slope of a Line	1
Lesson 12.5	Parallel and Perpendicular Lines	1
Lesson 12.6	Translations in the Coordinate Plane	1

Lesson 12.7	Reflections in the Coordinate Plane	1
Lesson 12.8	Rotations in the Coordinate Plane	1
Lesson 12.9	Dilations in the Coordinate Plane	1
Math In Your Life	Navigation	
Review/Assess	Chapter 12	2

XI. Chapter 8 – Standards G.8.0, 10.0 10

Essential Learnings: Students will

- Find perimeters and areas of parallelograms, triangles, trapezoids, rhombi, regular polygons and irregular figures.

Lesson 8.1	Perimeter of Polygons	1
Lesson 8.2	Area of Rectangles and Squares	1
Lesson 8.3	Area of Parallelograms	1
Lesson 8.4	Area of Triangles	1
Lesson 8.5	Area of Trapezoids	1
Math Connection	Area of States	
Lesson 8.7	Problem-Solving Strategy: Simplify the Problem	1
Lesson 8.8	Problem-Solving Application: Tiling a Surface	1
Review/Reteach/Assess	Chapter 8	3

XII. Chapter 11 – Standards G.9.0 12 days

Essential Learnings: Students will

- Find surface area and volume of space figures.

Lesson 11.1	Space Figures	1
Lesson 11.2	Nets of Space Figures	1
Lesson 11.3	Surface Area of a Prism	1
Lesson 11.4	Surface Area of a Cylinder	1
Lesson 11.6	Volume of a Prism	1
Lesson 11.7	Volume of a Cylinder	1
Lesson 11.8	Volume of a Cone	1
Lesson 11.10	Volume of Similar Figures	1
Lesson 11.11	Calculator: Volume of a Pyramid	1
Math Connection	Archimedes and Volume	
Lesson 11.12	Problem-Solving Strategy: Write an Equation	1
Review/Assess	Chapter 11	2

DATE OF LAST CONTENT REVISION:

DATE OF BOARD APPROVAL:

DATE OF CURRENT CONTENT REVISION: May 2012

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**